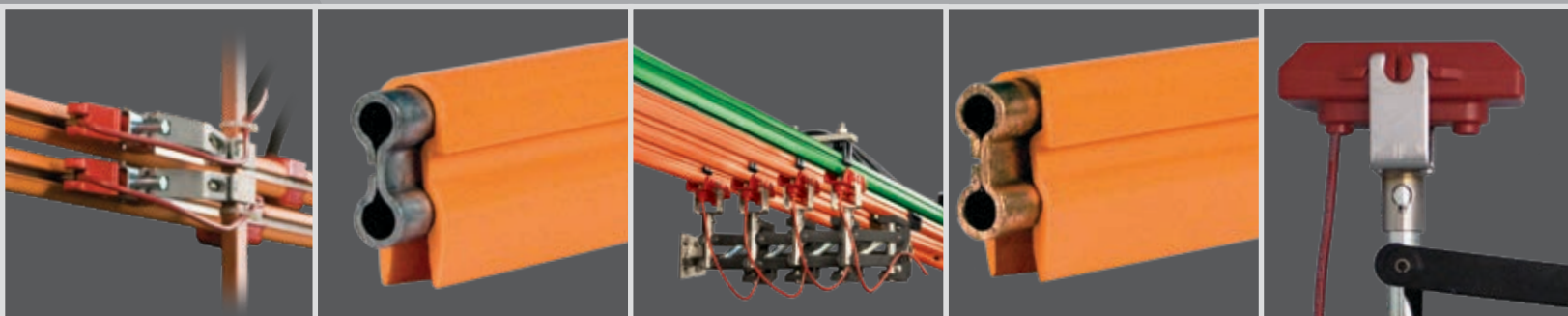


Conductor Bar

8 Bar | Side Contact



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Conductor Bar Summary Chart

Conductor Bar Lines Manufactured in the USA

8-Bar and Side Contact are shown in catalog CAT1004. Hevi-Bar MD is shown in CAT1011.

	Safe-Lec 2	Hevi-Bar II	Hevi-Bar MD	8-Bar	Side Contact
Common Applications	Small to medium overhead cranes, moderate curves	Medium to large overhead cranes, higher speeds	Very large cranes, mill handling systems, and transit	Small to medium overhead cranes, tighter curves	Constrained spaces, slip ring applications, curves
Bar Ampacity Selections	100	500	2200	40	40
	125	700	3800	90	90
	160	1000	4000	110	110
	200	1500	6000	250	250
	250			350	350
	315			500	
	400				
Max. Voltage	600	600 ¹	600 ¹	600	600
Max. Speed ² ft/min (m/min.)	1200 (365.7)	2000 (609.6)	2000 (609.6)	900 (274.3)	600 (182.8)
Bar Spacing in. (mm)	1.7 (43.2)	3.0 (76.2)	7.0 (177.8)	3.0 (76.2)	1.375 (34.9)
Cover Temps Low 160°F (71°C) Med. 250°F (121°C) High 400°F (204°C)	Low Med.	Low Med. High (700A & 1000A only)	n/a	Low Med. High	Low Med.
Outdoor Rated?	Yes	Yes	Yes	Yes	No
Dura-Coat Available?	No	Yes	No	No	No
Orientation (Collector Entry)	Bottom/Side	Bottom/Side	Bottom/Side/Top	Bottom/Side	Side Only
Min Bend Rad Low-Temp Cover in. (mm)	60.0 (1524)	Consult Factory	n/a	18.0 (457) ³ 45.0 (1143) ⁴	9.0 (228)
Med-Temp. Cover in. (mm)	60.0 (1524)	Consult Factory	n/a	57.0 (1447)	57.0 (1447)
Heater Wire Available?	Yes	500A only	n/a	No	No

¹ Can be configured for 5000 volts and more - contact Factory. ² For faster speeds - contact Factory. ³ The "easy way" (bar profile vertical) ⁴ The "hard way" (horizontal)

Don't see what you need? Give us a call. We offer hundreds of special designs and options!

“Quick Quote Web” Online System Quoting Program

Do you specify or purchase Conductor Bar, Cable Festoon Systems, or Push Button Pendants on a regular basis? If so, we recommend that you use our innovative **Quick Quote Web** online configuration tool. To access the program, all you need is a **Partners Site** login - see below.



Quick Quote Web:

- Configures systems based on your needs and generates a bill of material
- Allows you to create and save customized quotes for your customers
- Lets you turn your quote into an order, directly to Conductix-Wampfler at the click of a button.

Advanced features for our most popular Conductor Bar Systems

- Calculates crane amp draw with one or more vehicles
- Automatically calculates and graphs voltage drop with single or multiple power feed locations
- Handles advanced bar and collector mounting configurations
- Provides conductor bar system schematic

Advanced features for C-track and Square Bar Festoon Systems

- Handles most common festoon mounting configurations
- Lets you set-up cable package arrangements and trolley selection
- Handles factory pre-wiring and pre-assembly options for festoon systems

Quick Quote Web allows you to add the appropriate Push Button Pendant

- Determines the type of pendant required based on your cable festoon system parameters
- Allows you to choose pre-configured pendants and related accessories, including pendant cable

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Sales@ErgonomicPartners.com
www.ErgonomicPartners.com
Tel: (314) 884-8884



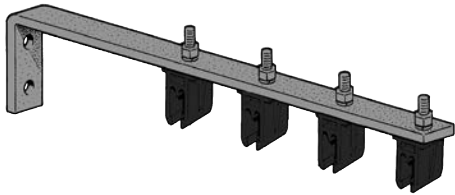
8 Bar: El Tesoro Copper Mine, Chile

Comparison of 8 Bar and Safe-Lec 2

The original Insul 8® 8 Bar is the best "figure 8" bar on the market. But if you are putting in a new installation, there are several reasons you should consider Safe-Lec 2 (CAT1003), the new standard in crane electrification.

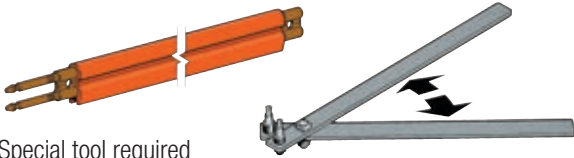
8 Bar

- 10 ft (3.05 M) bar lengths; more splices required
- Hangers hold only one bar each



- Wires must be spliced to collector pigtails

- Pinned joints, no matter how good, are not as secure as bolts



- Special tool required

- 8 Bar can go 300 ft before an expansion section is required (or 200 ft for copper bar)

- Brackets have round holes, so alignment must be more accurate
- Harder to make system alignment adjustments



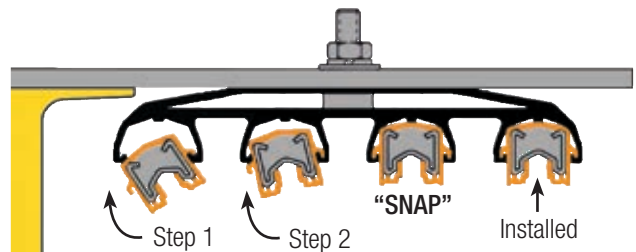
- Shoe is guided by the plastic cover
- Accurate system alignment is much more critical



Safe-Lec 2

Quicker and Less Costly Installation

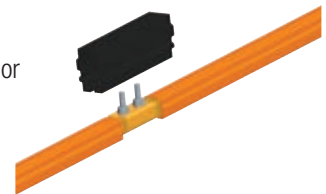
- 14.76 ft (4.50 M) bar lengths; fewer joints
- Multiple pole hangers; a "snap" to install



- Wires connect into lug integrated in the collector arm

More Secure Bolted Splice Joint

- Bolted joints
- No special tools required
- No need for "joint keepers" or "joint repair kits", etc

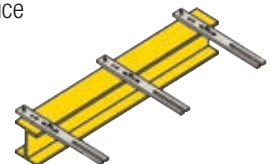


Fewer Expansion Sections are Required

- Safe-Lec 2 can go further - 492 ft (150m) - before an expansion section is required

Easier System Alignment

- Slotted brackets are available to reduce hole alignment problems
- System alignments are easy!



Superior Collector Shoe Tracking

- Shoe is guided by the V-contact in the metal bar
- Collector arm articulates to accommodate mild system misalignments



Conductor Bar Specification Data Sheet

Fax to: 800-780-8329 or 402-339-9627

E-mail to: info.us@conductix.com

Request Date	_____	Sales Person	_____
Company	_____	Name	_____
	_____	Title	_____
	_____	Phone	_____
	_____	Fax	_____
Company Type	_____	E-mail	_____

APPLICATION

1. Application Type: ☐ Runway ☐ Bridge ☐ Monorail ☐ Other
2. ☐ New Approved Installation? ☐ Extended Existing? ☐ Replacement?
3. System Length: _____ ☐ Feet ☐ Meters
4. Total # of Conductors: _____ Will one conductor be designated as a ground? ☐ Yes ☐ No

ENVIRONMENTAL DATA

Describe the environment where the conductor system will be located:

1. ☐ Indoors ☐ Outdoors ☐ Both Indoors and Outdoors ☐ Outdoor & Ice
2. Ambient temperature range: Min. _____ Max. _____ Degrees ☐ Fahrenheit ☐ Celcius
3. Radiant Heat Temperature Range: Min. _____ Max. _____ ☐ Fahrenheit ☐ Celcius
4. Will a heater wire need to be included? ☐ Yes ☐ No (If yes, consult factory)
5. Is there a source of corrosion present? ☐ Yes ☐ No **Refer to Appendix I Pg. 57**
If yes, describe the corrosive: _____
6. Other environmental considerations (dust, etc.)? _____

MECHANICAL DATA

1. Vehicle Speed _____ ☐ feet/min ☐ M/min Duty Cycle: _____
2. Number of vehicles or trolleys: _____ Crane Class (if applicable) _____
Refer to Appendix I Pg. 60.
3. Will Conductix-Wampfler be supplying mounting brackets? ☐ Yes ☐ No
4. Does the system include any curves? ☐ Yes ☐ No
If Yes; Radius _____ ☐ Feet ☐ Meters Angle _____ °degree
5. Mounting Position (w/regards to the monorail: ☐ Inside ☐ Outside ☐ Both
6. Other mechanical notes: _____

ELECTRICAL SPECIFICATIONS

1. Number of power feeds: _____
2. Location of power feeds (check all that apply): ☐ Center ☐ Multiple ☐ End **Refer to Appendix I Pg. 58**
☐ Advanced: Distance power feeds will be from end of system: _____ (or attach diagram)
3. Number of power phases: _____ Operating voltage: _____ (volts) ☐ AC ☐ DC
4. Total current draw: (sum of all vehicles) _____ (Amps) Demand factor _____ (typically .9)
5. Operating Frequency _____ (Hz - USA is 60 Hz) (Refer to chart on Pg. 7 for multiple cranes)

Contact Ergonomic Partners today to discuss your Conductor Bar application.

Conductor Bar Specification Data Sheet

Sizing systems for multiple hoists, motors, and/or multiple cranes

For a single crane: Size the conductor bar to handle 100% of the current draw of the largest motor or group of motors, plus 50% of the combined current draw of the other motors on the vehicle.

For multiple cranes or vehicles: Determine the current draw for each crane/vehicle, using the method above. Sum all the current draws for each crane/vehicle, then multiply the sum by the appropriate demand factor:

# of Cranes/vehicles	Demand Factor
2	.95
3	.91
4	.87
5	.84
6	.81
7	.78



8 Bar: An excellent choice for tightly curved systems



Insul 8® 8 Bar and Side Contact Overview

Conductix-Wampfler has designed and built state-of-the-art conductor bar systems for over 60 years. Our experienced engineering and sales people are recognized experts in the application of conductor bar in the most demanding applications.

Conductix-Wampfler USA was founded in 1944 as Insul-8 Corporation (San Carlos, CA). Insul-8 developed the first "Figure 8" conductor bar system, which became the standard method for electrifying overhead cranes. In 1991 the company moved its manufacturing facility to Harlan, Iowa.

With the merger of Conductix and Wampfler in 2007, **Conductix-Wampfler** is now the world leader in the design and manufacture of high-performance conductor bar systems for industry.

Our innovations include the "finger-safe", V-contact Safe-Lec 2 system, Hevi-Bar II with optional Dura-Coat corrosion protection, and Hevi-Bar MD for high-current mill applications.

Conductix-Wampfler 8 Bar and Side Contact systems are manufactured in the USA to provide unsurpassed service and quick delivery. Our plants are ISO9001-2008 certified and adhere to stringent quality standards.

We offer a full complement of other mobile electrification products to include Cable Festoon Systems, Cable Reels (spring and motor driven), Push-Button Pendants, Radio Remote Controls, and Crane Bumpers - see page 51 for details.



8 Bar

The first insulated conductor system for crane/monorail electrification. If you need 8 Bar, insist on the original! Many accessories available. Able to accommodate small bend radii for curved systems and slip rings. 40A, 90A, 110A, 250A, 350A, and 500A capacity bars.

UL / CSA Listed



Side Contact

Similar in construction to 8 Bar, Side Contact is the appropriate system for constrained spaces and difficult installations. Side contact can accommodate very small bend radii for curved systems and slip rings. 40A, 90A, 110A, 250A, and 350A capacity bars.

UL / CSA Listed



Safe-Lec 2 and Hevi-Bar II

For details on Safe-Lec 2 and Hevi Bar II conductor bar lines, please refer to catalog CAT1003 and CAT1006.

800 Series Conductor Rails

For details on 800 Series conductor bar products manufactured by Conductix-Wampfler, please refer to catalogs:

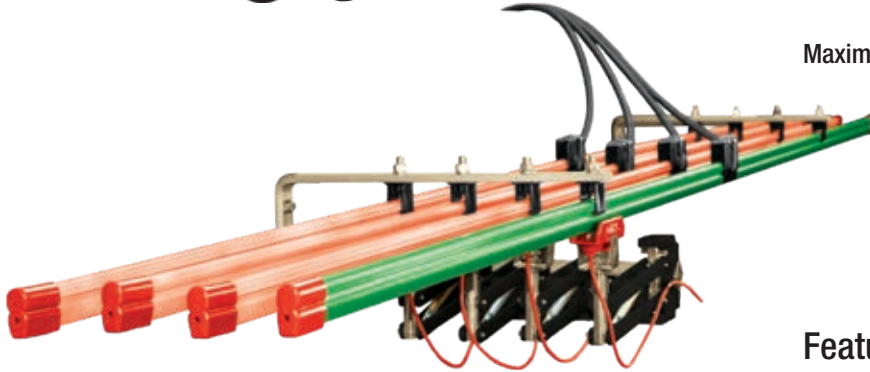
- KAT0811 811 Series
- KAT0812 812 Series
- KAT0813 813 Series
- KAT0815 815 Series
- KAT0831 831 Series, Multiline
- KAT0832 832 Series, EcoClick Line
- KAT0842 842 Series, Enclosed "Box Track"



Insul 8® 8 Bar Design Features

Conductix-Wampfler "Insul 8® 8 Bar" was invented by Insul 8 Corporation over 60 years ago. This is the *original* "figure 8" conductor bar system! This innovative product was the first safe, insulated electrification solution for cranes, monorails, hoists, conveyors, and many other applications. Thousands of miles of 8 Bar are in use all around the world. There are many "copy cat" systems around. Don't settle for imitations; insist on the original 8 Bar system!

UL and CSA Listed



Insul 8® 8 Bar is Ideal for:

- Small/Medium sized cranes
- Hoists
- Conveyors
- Tightly curved systems
- Monorails
- Other mobile power applications

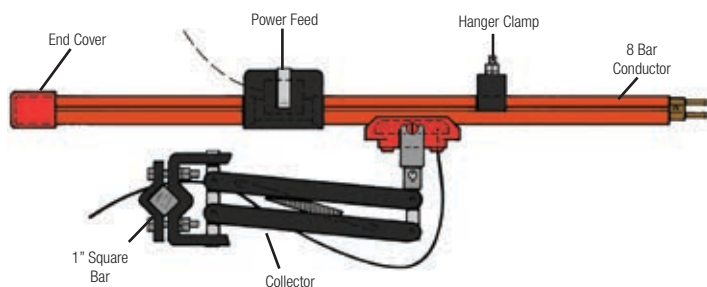
Current range: 40A, 90A, 110A, 250A, 350A, 500A
@ 600 volts max.

Maximum Speed: 900 ft/min (274 M/min)

Features

- Designed and built in the USA under stringent ISO 9001:2008 standard
- In stock availability for quick shipment
- A large number of special options and adaptations developed over 60 years of usage to handle numerous industrial situations.
- The ability to be curved into a tighter radius than most other systems.
- Knurled joint pins for secure joints. Won't pull apart under normal conditions when properly installed.
- Backed by the best after-sale services in the industry.

Basic 8 Bar Components



Power Feed	Conducts the power source to the conductor bar
Collector	Transfers power from the bar to the moving machine. Connects to a 1" mounting staff
Hanger Clamp	Suspends the conductor bar from hanger bracket
End Cover	Caps off the end of the conductor bar
Hanger Bracket	Attaches to crane beam or other structure to support multiple hangers
Anchor Clamp	Connects the bar to the structure and directs movement of the conductors during thermal expansion and contraction

Installs Quickly and Easily

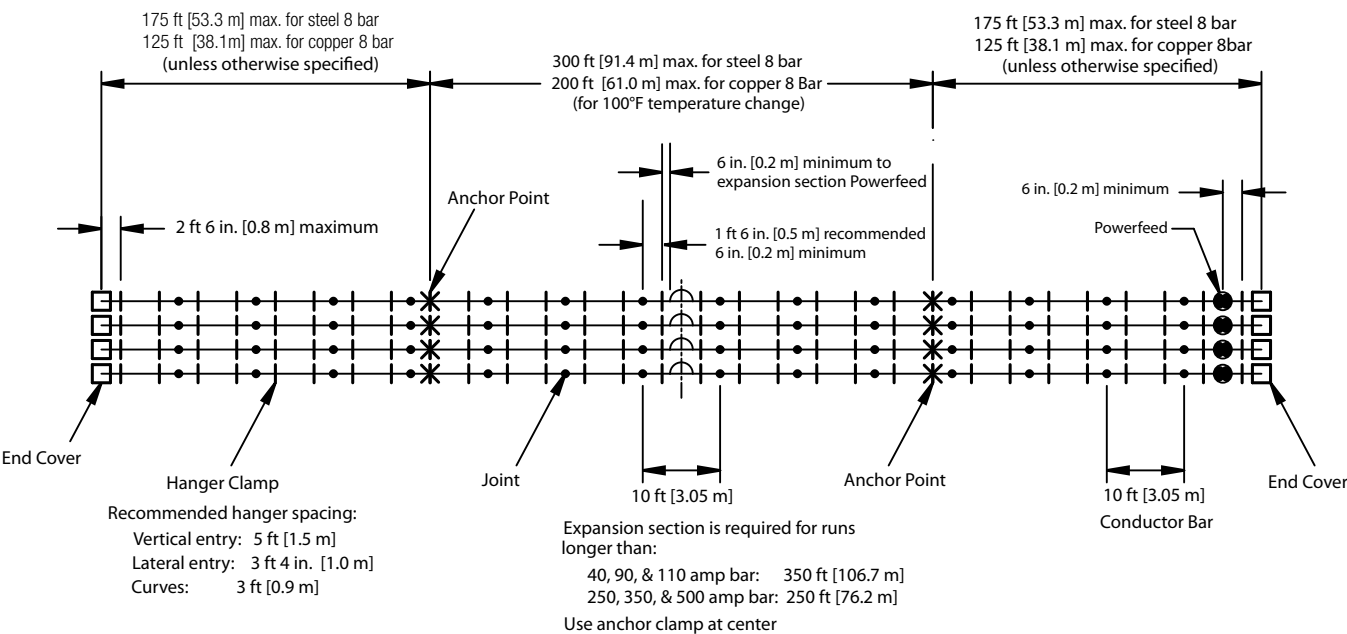
- Minimum number of basic parts
- Quick "pin-style" splice joints
- Bar snaps into mating hanger

Many Options

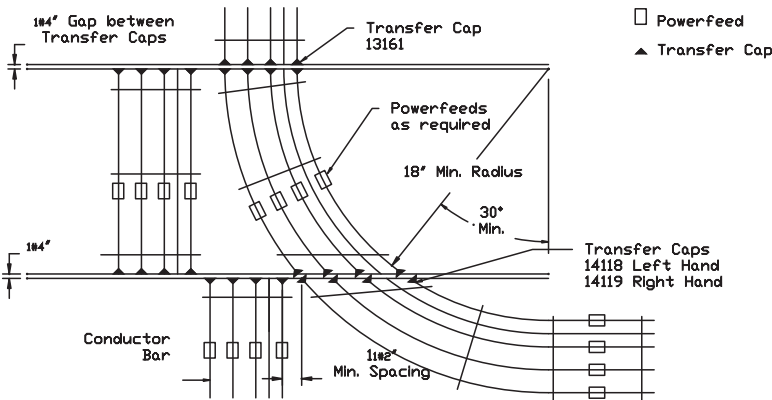
- Stainless steel hardware
- Green bonding (ground) conductor covers
- Black "UV stable" outdoor covers
- Curved systems with low heat cover; can be curved to 18" minimum radius with the bar profile vertical (i.e. the "easy" way) or 45" the "hard way" (low heat cover).

Use our advanced "Quick Quote Web" configuration tool to specify 8 Bar - See page 4.

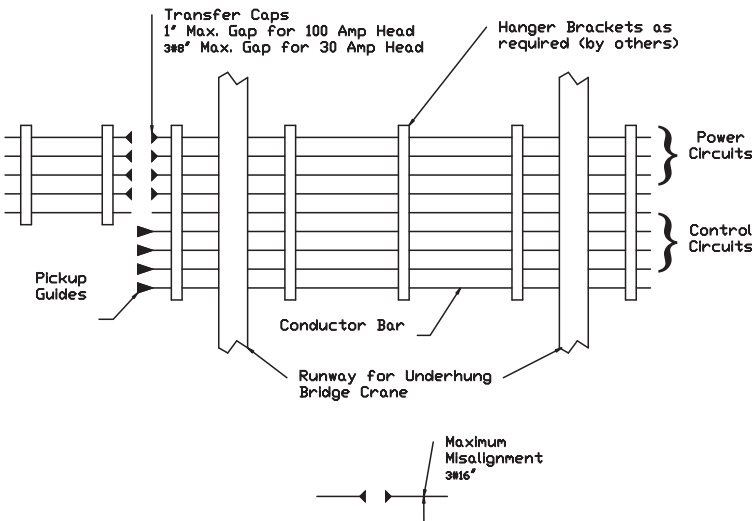
Typical 4-Pole 8 Bar Layout



2-WAY STUB SWITCH



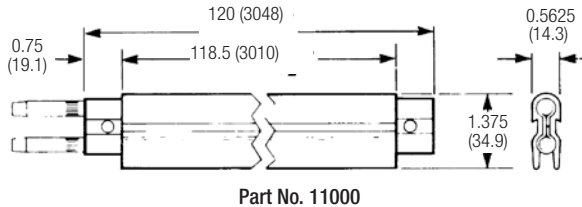
BRIDGE CRANE INTERLOCK



8 Bar Specifications

Conductor Bar Information

Please use the Specification Data Sheets on pages 6-7 and the information in Appendices I through III at the back of this catalog to determine your conductor bar needs. Contact Conductix-Wampfler Sales if you have any questions about the suitability of this product to your application.



Roll formed of 1/16" (1.59 mm) material except laminates which are 1/32" (0.79 mm) copper, steel, or stainless steel, and the 90 A galvanized bar. The cross-section area is 188 mcm (95 mm²); except solid copper bar which is 313 mcm (158 mm²). The equivalent rectangle for all conductors is 1" x 1/4" (25.4 x 6.3 mm). Supports are required every 3 feet (0.91 M) for curves, 3 feet 4 inches (1.01 M) for lateral mount, and 5 feet (1.52 M) standard.

Assembled with Connector Pins and Cover										
Part No.							Micro-ohms per foot *			
Material	Lgth ft (m)	w/PVC Cover	w/Med Heat Cover	w/High Heat Cover	Expansion Coefficient in./in./° F	Nominal Wt lb/ft (kg/M)	Max. Amps (cont. duty)	Resist. R (DC)	Reac- tance X (60 Hz, 3-Phase)	Imped- ance Z (60 Hz)
Stainless Steel	10 (3.05)	14299	24304	24307	.000007	0.72 (0.0995)	40	2310	67	2311
Galvanized Steel	10 (3.05)	22135	22141	22147	.000007	0.46 (0.0636)	90	771	73	774
Galvanized Steel	10 (3.05)	11000	11019	11038	.000007	0.65 (0.0899)	110	500	67	505
Stainless Clad Copper Laminate	10 (3.05)	11004	11023	11042	.000009	0.65 (0.0899)	250	110	73	132
Copper Steel Laminate	10 (3.05)	11008	11027	11046	.000009	0.65 (0.0899)	250	110	77	127
Rolled Copper	10 (3.05)	11012	11031	11050	.000009	0.76 (0.1051)	350	55	66	86
Solid Copper	20 (6.10)	11016	11035	11054	.000009	1.16 (0.5262)	500	32	60	68

* Example: 0.000060 ohms/ft. X values are calculated at 3 inch center-line spacing, adjusted for three conductors with multiplier 1.26 a nominal permeability μ of 10-12 is used for the steel conductor calculations. For reference, $X = \frac{52.9 \log 10^3 \times 1.26 + 34.5}{1250}$ $Z = \sqrt{R^2 + X^2}$

8 Bar Conductors

8 Bar conductor bars come with cover and connector pins installed. Bars are available in 40A, 90A, 110A, 250A, 350A, 500A capacities (@ 600 volts maximum). Expansion Sections, listed below, are required to compensation for thermal expansion; one every 350 feet (106.7 m) for 40A, 90A, and 100A systems or one every 250 feet (76.2 m) for 250A, 350A, and 500A systems.

Power Feeds are used to bring outside power to the conductor bar.

Factory installed covers are available in:

- **Rigid PVC:** -10° F to 160° F (- 23.3°C to 71.1°C)
- **Medium Heat:** - 25° F To 250° F (- 31.7°C to 121.1°C)
- **High Heat:** - 60° F To 400° F (-51.1°C to 204.2°C)

Stainless Steel, 40A



Item	Rigid PVC Cover *		Med Heat Cover		High Heat Cover	
	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)
Conductor Bar, 10 ft (3.05 m)	14299	7.0 (3.18)	24304	6.6 (2.29)	24307	7.5 (3.40)
Conductor Bar, 5 ft (1.52 m)	14823	3.5 (1.59)	24305	3.3 (1.50)	24308	3.8 (1.72)
Expansion Section, 10 ft (3.05 m)	24279	7.5 (3.40)	24306	7.0 (3.18)	24309	8.2 (3.72)
Power Feed	11091	0.4 (0.18)	11091	0.4 (0.18)	11122	0.4 (0.18)
End Cover	11088	0.1 (0.05)	11088	0.1 (0.05)	11633	0.1 (0.05)

Galvanized Steel, 90A



Item	Rigid PVC Cover *		Med Heat Cover		High Heat Cover	
	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)
Conductor Bar, 10 ft (3.05 m)	22135	4.4 (2.00)	22141	4.1 (1.86)	22147	4.9 (2.22)
Conductor Bar, 5 ft (1.52 m)	22136	2.2 (1.00)	22142	2.1 (0.95)	22148	2.5 (1.14)
Expansion Section, 10 ft (3.05 m)	22140	6.7 (3.31)	22146	6.3 (2.86)	22152	7.4 (3.36)
Power Feed	11091	0.4 (0.18)	11091	0.4 (0.18)	11122	0.4 (0.18)
End Cover	22070	0.1 (0.05)	22070	0.1 (0.05)	11633	0.1 (0.05)

Galvanized Steel, 110A



Item	Rigid PVC Cover *		Med Heat Cover		High Heat Cover	
	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)
Conductor Bar, 10 ft (3.05 m)	11000	4.4 (2.00)	11019	4.1 (1.86)	11038	4.9 (2.22)
Conductor Bar, 5 ft (1.52 m)	11001	2.2 (1.00)	11020	2.1 (0.95)	11039	2.5 (1.13)
Expansion Section, 10 ft (3.05 m)	11057	6.7 (3.31)	11064	6.3 (2.86)	11070	7.4 (3.36)
Power Feed	11091	0.4 (0.18)	11091	0.4 (0.18)	11122	0.4 (0.18)
End Cover	11088	0.1 (0.05)	11088	0.1 (0.05)	11633	0.1 (0.05)

* For Conductor Bar or Expansion Section with green PVC cover, add "G" to part no.

* For Conductor Bar or Expansion Section with black UV resistant PVC, add "B" to the part no.

8 Bar Conductors

Stainless Clad Copper, 250A

Requires a Joint Keeper (page 15) with each conductor bar - order separately



Item	Rigid PVC Cover *		Med Heat Cover		High Heat Cover	
	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)
Conductor Bar, 10 ft (3.05 m)	11004	6.6 (2.99)	11023	6.2 (2.81)	11042	7.1 (3.22)
Conductor Bar, 5 ft (1.52 m)	11005	3.3 (1.47)	11024	3.1 (1.41)	11043	3.6 (1.63)
Expansion Section, 10 ft (3.05 m)	11059	8.5 (3.86)	11065	8.0 (3.63)	11071	9.2 (4.17)
Power Feed	11092	0.7 (0.32)	11093	0.7 (0.32)	11093	0.7 (0.32)
End Cover	11088	0.1 (0.05)	11088	0.1 (0.05)	11633	0.4 (0.18)

Copper Steel Laminate, 250A

Requires a Joint Keeper (page 15) with each conductor bar - order separately



Item	Rigid PVC Cover *		Medium Heat cover		High Heat Cover	
	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)
Conductor Bar, 10 ft (3.05 m)	11008	6.2 (2.81)	11027	5.8 (2.63)	11046	6.7 (3.04)
Conductor Bar, 5 ft (1.52 m)	11009	3.1 (1.41)	11028	2.9 (1.32)	11047	3.4 (1.54)
Expansion Section, 10 ft (3.05 m)	11060	10.0 (4.54)	11066	9.4 (4.26)	11072	10.8 (4.90)
Power Feed	11092	0.7 (0.32)	11093	0.7 (0.32)	11093	0.7 (0.32)
End Cover	11088	0.1 (0.05)	11088	0.1 (0.05)	11633	0.4 (0.18)

Rolled Copper, 350A

Requires a Joint Keeper (page 15) with each conductor bar - order separately



Item	Rigid PVC Cover *		Medium Heat Cover		High Heat Cover	
	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)
Conductor Bar, 10 ft (3.05 m)	11012	7.0 (3.18)	11031	6.6 (2.99)	11050	7.5 (3.40)
Conductor Bar, 5 ft (1.52 m)	11013	3.5 (1.59)	11032	3.3 (1.50)	11051	3.8 (1.72)
Expansion Section, 10 ft (3.05 m)	11062	11.0 (4.99)	11068	11.0 (4.99)	11074	11.8 (5.35)
Power Feed	11094	0.7 (0.32)	11094	0.7 (0.32)	11094	0.7 (0.32)
End Cover	11088	0.1 (0.05)	11088	0.1 (0.05)	11633	0.4 (0.18)

Solid Copper, 500A

500 amp solid copper bar requires copper connector clamp rather than connector pins, purchased separately see page 15.



Item	Rigid PVC Cover *		Medium Heat Cover		High Heat Cover	
	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)
Conductor Bar, 20 ft (6.10 m)	11016	23.6 (10.71)	11035	22.1 (10.02)	11054	24.6 (11.16)
Conductor Bar, 10 ft (3.05 m)	11017	11.8 (5.35)	11036	11.0 (4.99)	11055	12.3 (5.58)
Expansion Section, 10 ft (3.05 m)	11063	18.5 (3.39)	11069	17.3 (7.85)	11075	20.0 (9.07)
Power Feed	11094	2.6 (1.18)	11094	2.6 (1.18)	11094	2.6 (1.18)
End Cover	12171	0.2 (0.09)	11633	0.2 (0.09)	11633	0.4 (0.18)

* For Conductor Bar or Expansion Section with green PVC cover, add "G" to part no.

* For Conductor Bar or Expansion Section with black UV resistant PVC, add "B" to the part no.

8 Bar Replacement Covers, Connectors, & Joint Covers

Replacement 8 Bar Covers



Meets all requirements for plastic electrical insulation and may be used indoors or outdoors. Covers are included with the conductors listed on pages 12-13.

Replacement length is 9 ft to 10.5 ft. (2.74 M to 3.20 M)

Material	Color	Temp-Rating	Part No.	Wt lb (kg)
Rigid PVC	Orange	-10° F to 160° F	11114	1.2 (0.54)
Rigid PVC	Green	-10° F to 160° F	11114G	1.2 (0.54)
UV Resistant PVC	Black	-10° F to 160° F	11114B	1.2 (0.54)
UV Resistant PVC	Green	-10° F to 160° F	11114C	1.4 (0.62)
Medium Heat Lexan	Red	-25° F to 250° F	11115	0.8 (0.36)
Medium Heat Lexan	Green	-25° F to 250° F	11115B	1.1 (0.50)
High Heat Polyester	Dark Orange	-60° F to 400° F	11116	1.7 (0.77)
High Heat Polyester	Green	-60° F to 400° F	11116B	1.2 (0.56)

Replacement Connector Pins



21914



11120

Used to connect two bar sections together. For quick and easy installation. Supplied with conductors listed on pages 12-13. Two required per connection.

Pin Used With:	Material	Pin Lgth (in.)	Part No.
Stainless steel 40A 8 Bar	Stainless steel	2.50	24196
Galvanized steel 90A 8 Bar	Zinc plated steel	3.25	21914
Galvanized steel 110A 8 Bar	Zinc plated Steel	2.50	11120
Rolled copper and laminated 8 Bar	Copper	2.50	11121
Transition Pin: To join 90 to 110A 8 Bar	Zinc plated steel	2.94	22885

Joint Covers



13601



13600



11123

Insulated protective covers for conductor bar joining parts. Required when ordering Conductor Bars from pages 12-13.

Used with:	Part No.	Wt lb (kg)
40A to 350A Rigid PVC Cover (Black)	13601	0.1 (0.05)
40A to 350A Medium Heat Cover	13600	0.1 (0.05)
40A to 350A High Heat Cover	11123	0.4 (0.18)

8 Bar Joint Parts & Tools

Copper Connector Clamp and Case



11117 (Shown with only half of the cover)

To connect 500A solid copper conductor together. For all cover types.

Description	Part No.	Wt lb (kg)
Complete Assembly for Solid Copper 8 Bar	11117	1.5 (0.68)

Joint Keeper



Required to secure and stabilize joints for all rolled copper or laminated copper Conductor Bar from page 13.

Used With:	Part No.	Wt lb (kg)
Rolled or laminated copper 8 Bar, 250A and 350A	11125	0.01 (0.004)

Joint Repair Kit



24632 (Shown with only half cover)

To repair joints of damaged conductor bar.

Used For:	Part No.	Wt lb (kg)
40A to 350A formed 8 Bar	24632	0.7 (0.32)
High Heat Systems	51666	0.7 (0.32)

Connector Pin Tool



Inserts into pre-punched holes of the conductor bar to pull conductor sections together securely. Supplied with the appropriate system at a nominal charge.

Used with:	Part No.	Wt lb (kg)
40A to 350A 8 Bar Conductors	11134	2.3 (1.04)

8 Bar End Covers & Power Feeds

End Cover

For covering the exposed ends of 8 Bar Conductors.



11088

Used With 8 Bar Conductors:	Max. Temp. °F (°C)	Part No.	Wt lb (kg)
40A, 110A thru 350A	300 (149)	11088	0.03 (0.02)
90A	250 (121)	22070	0.03 (0.02)
110A thru 350A	400 (204)	11633	0.03 (0.02)
500A Solid Copper	160 (71)	12171	0.40 (0.02)
500A Solid Copper w/ Stainless Steel Hardware	160 (71)	27102	0.40 (0.02)

Power Feeds

Provides attachment of incoming power to the conductor rails. Fully insulated, simple clamp design for easy installation anywhere on the system.



11091

Current Cap.	Clamp Matl	Case Matl	Max. Temp °F (°C)	Part No.	Wt lb (kg)
90 or 110	Steel	Rigid PVC	160 (71)	11091	0.4 (0.18)
90 or 110	Steel	Polyester	400 (204)	11122	0.4(0.18)
250	Copper	Rigid PVC	160 (71)	11092	0.7 (0.32)
250	Copper	Polyester	400 (204)	11093	0.7 (0.32)
500	Copper	Polyester	400 (204)	11094	2.60 (1.19)
250	Copper Clamp w/Stainless Steel Hardware	Rigid PVC	160 (71)	27104	0.7 (0.32)
500	Copper Clamp w/Stainless Steel Hardware	Polyester	400 (204.2)	27106	2.60 (1.19)

Power Feed Parts/Accessories

Description	Part No.	Wt lb (kg)
Case & clip only. PVC 90/110, 250A	11131	0.2 (0.09)
Case & clip only. High heat. 90/110, 250A	11132	0.3 (0.14)
Case only. High heat 500A	11133	1.0 (0.45)
Power Feed Clamp only. For Galvanized Steel, 90/110A	11128	0.1 (0.04)
Power Feed Clamp only. For Copper, 250A	11129	0.4 (0.18)

8 Bar Expansions & Isolation Sections

Expansion Section

Required every 300 feet (94.1 m) for steel conductors or every 200 feet (61.0 m) for copper conductors to compensate for thermal expansion. Power feeds and flexible jumpers are factory installed to meet electrical and mechanical requirements of your system.

Note: Part numbers are located in the Conductor Bar tables - See pages 12-13.



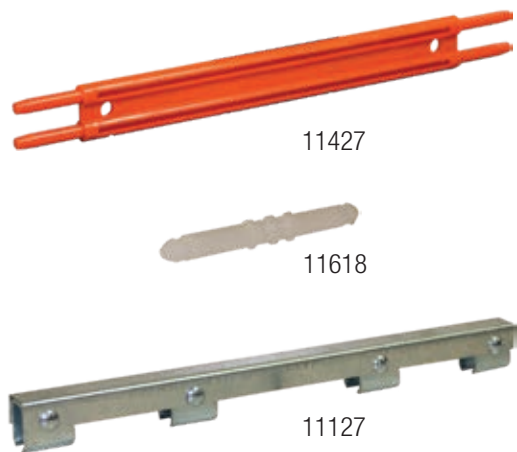
Isolation Section



Conductor isolation sections are used to electrically isolate control circuits, maintenance bays, etc. The kit includes 11127 Guide Assembly, PVC Cover, and Isolation Section for 40A to 350A (not including 90A). Contact our factory for proper selection.

Part No.	Wt lb (kg)
21841	2.3 (1.04)

Isolation Section Parts



Components used for in-field modification.

Description	Part No.	Wt lb (kg)
Molded plastic insulating piece; only for 21841	11427	0.3 (0.14)
Molded plastic 1" (25.4 mm) isolating pin. For 40-350A except for 90A; Two required per location.	11615	0.03 (0.01)
Molded plastic, 1" (25.4 mm) isolating pin. For 90A only. Two required per location.	11618	0.03 (0.01)
Galvanized Steel Guide Assembly. Provides rigid support at isolation areas.	11127	1.5 (0.68)

8 Bar Transfer Caps, Pickup Guides, Collector Brackets

Transfer Caps



Used in switches and interlocks to accomplish smooth collector transfer.

Item Description	Part No.	Wt lb (kg)
End Transfer Cap for 90A bar.	22070	0.03 (0.01)
Left Transfer Cap for 90A bar.	22395	0.03 (0.01)
Right Transfer Cap for 90A bar.	22396	0.03 (0.01)
End Transfer Cap for 40-350A bar	13161	0.03 (0.01)
Left-hand Cap for 40-350A bar	14118	0.03 (0.01)
Right-hand Cap for 40-350A bar	14119	0.03 (0.01)

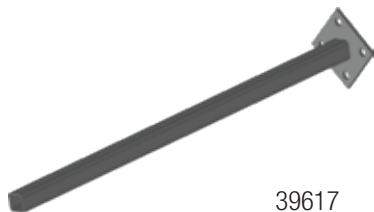
Pick-Up Guides



The Pick-up Guide allows the collector to leave the conductor and re-track upon return. Requires use of "Self-Centering" J-Head Collectors, see pages 23-24. Contact factory for selection.

Used:	Part No.	Wt lb (kg)
Indoors, for 3" bar spacing	13142	1.75 (0.79)
Indoors, for 4" bar spacing	11089	1.75 (0.79)
Outdoors, for 3" bar spacing	13143	2.00 (0.91)
Outdoors, for 4" bar spacing	11090	2.00 (0.91)

Collector Brackets



For mounting collectors to the moving vehicle. Applicable for all 8 Bar and Saf-T-Bar Series C Collectors. See pages 23 and 24 for Collector Assembly descriptions.

TYPE	Type	Post Size in. (mm)	Part No.	Wt lb (kg)
Single post	Plated steel	1.00 (25)	39617	1.77 (0.80)
Single post	Stainless steel	1.00 (25)	52336	1.77 (0.80)

8 Bar Hanger and Anchor Clamps

Polycarbonate Snap-in Hanger Clamps



Hanger Clamps are designed to grip 8 Bar Conductors for stable support. Clamps are required every 5 foot (1.52 M) standard. These Polycarbonate Snap-in Hanger Clamps are recommended for standard mount only; not recommended for curves or lateral mount.

Type	Hardware	Part No.	Wt lb (kg)
Without Insulator	Zinc Plated	22800	0.3 (0.14)
Without Insulator	Stainless Steel	23370	0.3 (0.14)
With Insulator	Zinc Plated	24405	0.5 (0.23)
With Insulator	Stainless Steel	28122	0.5 (0.23)

Steel Snap-in Hanger Clamp



The spring-steel Hanger Clamps are designed to grip 8 Bar Conductors for stable support.

Clamps are required every 5 foot (1.52 M) standard. Steel Snap-in Hanger Clamps are recommended for standard mounting; not recommended for curves or lateral mount.

Type	Part No.	Wt lb (kg)
Without Insulator	21600	0.2 (0.09)
With Insulator	22000	0.4 (0.18)

Cross-Bolt Hanger Clamp



Cross-Bolt Hanger Clamps are designed to lock to 8 Bar Conductors for stable support.

Hangers are required every 5' for vertical entry, 3' for curved systems and every 3' 4" for lateral entry. Cross-Bolt Hanger Clamps are recommended for standard mounting, lateral mounting, and curved systems.

Type	Material	Part No.	Wt lb (kg)
Without Insulator	Plated Steel	11076	0.3 (0.14)
Without Insulator	Stainless Steel	11078	0.3 (0.14)
With Insulator	Plated Steel	11082	0.5 (0.23)
With Insulator	Stainless Steel	11084	0.5 (0.23)

Anchor Clamp



For standard mount, not recommended for curves or lateral mount.

Type	Material	Part No.	Wt lb (kg)
Without Insulator	Plated Steel	21833	0.3 (0.14)
Without Insulator	Stainless Steel	28123	0.3 (0.14)
With Insulator	Plated Steel	21982	0.5 (0.23)
With Insulator	Stainless Steel	28124	0.5 (0.23)

8 Bar Standard Brackets - Without Hangers

Web Bracket



22014

For top running, web-mounted, bottom entry systems. Zinc plated steel. See page 19 for hangers.

Distance to First Hole:	Part No.	Wt lb (kg)
6.0 (152)	22014	2.4 (1.09)
9.0 (229); with three more holes - At 12.0 (305), 15 (381), and 18 (457)	29876	4.5 (2.04)

Flange Mount Brackets



27762

For bottom entry monorail and under-hung systems, flange-mounted. Zinc plated steel. See page 19 for hangers.

Type	Part No.	Wt lb (kg)
For 2 hangers each side	27762	2.5 (1.13)
For 4 hangers on one side	27767	2.5 (1.13)

8 Bar Standard Brackets - With Hangers

Brackets w/Pre-Assembled Hanger Clamps

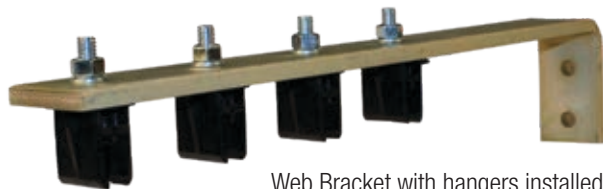
The following brackets come with hanger clamps on 3" centers, brackets are zinc plated steel. **Hanger Clamp styles are described on page 19.**

With Polycarbonate Snap-In Hanger Clamps

Description	Without Insulators		With Insulators	
	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)
Web type 6.0" (152)	28829	2.0 (0.91)	51004	2.4 (1.09)
Web type 9.0" (229)	34189	3.1 (1.40)	50314	3.5 (1.59)
Flange type, 2 hangers each side	51864	2.6 (1.18)	51865	3.1 (1.41)
Flange type, 4 hangers on one side	51870	2.6 (1.18)	51871	3.1 (1.41)

Steel Snap-In Hanger Clamps

Description	Without Insulators		With Insulators	
	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)
Web type 6.0" (152)	30281	1.6 (0.73)	51005	2.0 (0.91)
Web type 9.0" (229)	50313	2.7 (1.23)	50315	3.1 (1.41)
Flange type, 2 hangers each side	51866	2.1 (0.95)	51867	2.5 (1.11)
Flange type, 4 hangers on one side	51872	2.1 (0.95)	51873	2.5 (1.11)



Web Bracket with hangers installed
(# 34189 shown)



Flange Bracket with hangers installed
(# 51864 shown)

Cross-Bolt Hanger Clamps

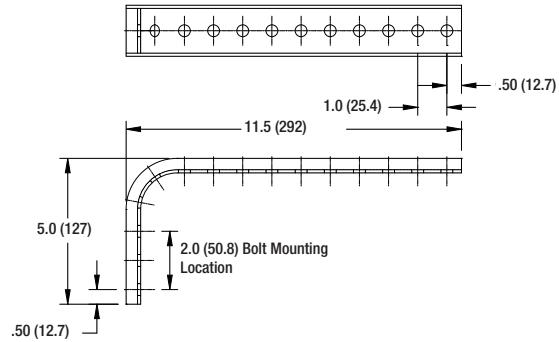
Description	Without Insulators		With Insulators	
	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)
Web type 6.0" (152)	31762	2.0 (0.91)	29534	2.3 (1.04)
Web type 9.0" (229)	50312	3.1 (1.41)	50316	3.5 (1.59)
Flange type, 2 hangers each side	51868	2.5 (1.11)	51869	2.9 (1.32)
Flange type, 4 hangers on one side	51874	2.5 (1.11)	51875	2.9 (1.32)

8 Bar Universal Brackets

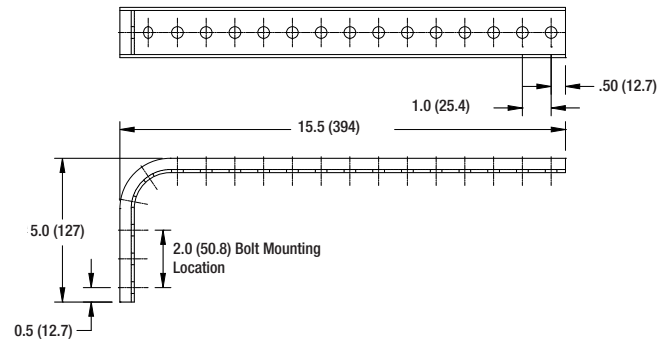
You can order pre-assembled brackets with your choice of hangers on page 21. Or, if these hanger locations don't work for the application, the "Universal Brackets" shown below should address most special applications. Holes are drilled on 1.0 inch (25.4 mm) centers.

Type	Length	Part No.	Wt lb (kg)
Web Bracket, Short	11.5 (29)	31409	1.0 (0.45)
Web Bracket, Long	15.5 (39)	31407	1.3 (0.59)
Flange Bracket	18.0 (46)	31408	1.2 (0.54)
Flange Bracket with Beam Clips	18.0 (46)	31418	1.6 (0.73)
Flange Bracket with Beam Clips	24.0 (61)	31911	2.0 (0.91)

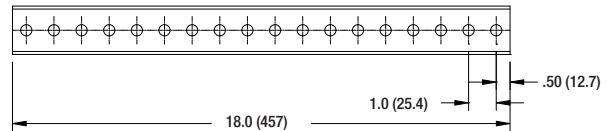
Web Bracket - Short (31409)



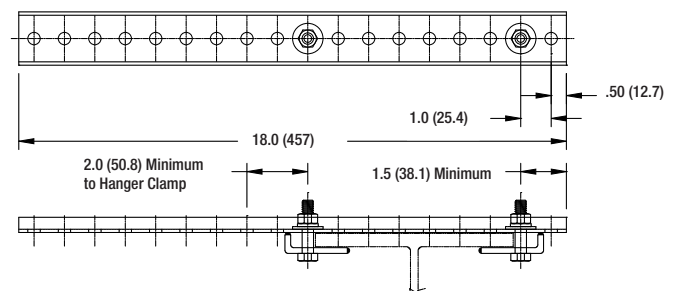
Web Bracket - Long (31407)



Flange Bracket (31408)



Flange Bracket with Clips (31418)



8 Bar Universal Brackets with Pre-assembled Hangers

Ordering Instructions:

- 1) Choose the part number of the desired bracket from the styles shown below.
- 2) Referring to the drawings below, choose the hole number locations at which hangers are to be assembled observing the minimum bar spacing table below:

Recommended Minimum Conductor Bar Spacing

	Indoor, inch (mm)	Outdoor, inch (mm)
8 Bar (bottom entry)	2.0 (50.8)	3.0 (76.2)
Side Contact (Lateral Mount)	3.0 (76.2)	Not for outside use

For less than 2.0" (50.8 mm) spacing, contact factory

- 3) From page 19, select desired hanger type by part number.

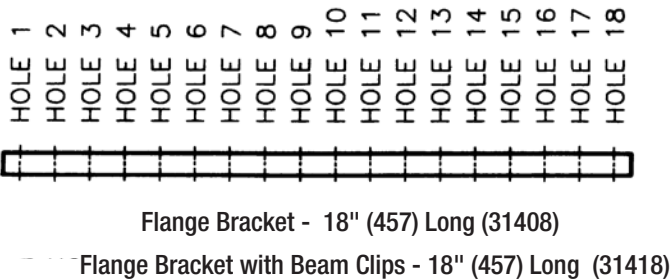
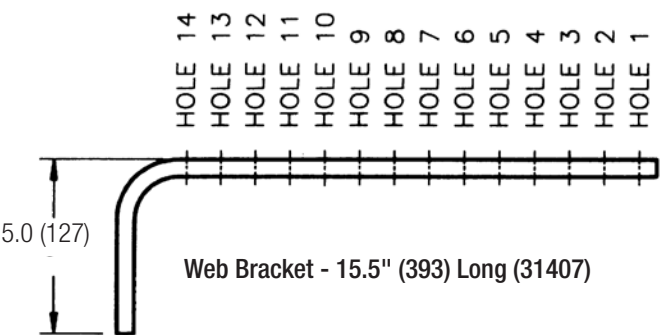
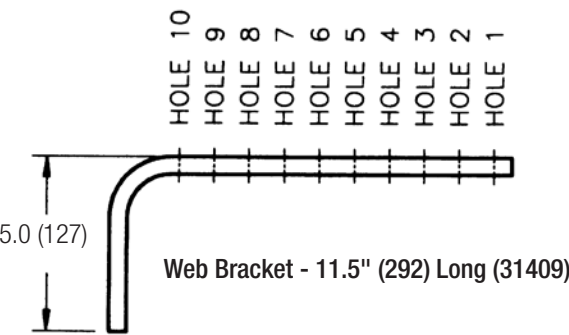
Example: 10 Universal Brackets with four polycarbonate snap-in hangers on each:

Qty	Part No. (hole numbers where hangers are to be mounted)	Description
10	31407 (1, 3, 5, 7)	Web Bracket, Long (from below)
40	22800	Polycarbonate Snap Hanger (from page 19)

Note: When the order is received, a unique part number will be created for the requested bracket and hanger combination.

Bracket Hole Position Numbers

Holes start 0.5" from the end of the bracket and are 1" on-center.



8 Bar Collector Assemblies

Sliding contact Collector Assemblies are offered in either single shoe or tandem shoe configurations. Current capacities range from 30A to 200A depending on the model. The shoes are supported by insulated holders on articulating, spring-loaded collector arms. Most collector arms are made from **Grivory GV-5**, a high-strength fiberglass-filled polymer material that is stronger and less porous than aluminum. Wear on the collector assembly is confined to easily replaceable contact shoes.

30A and 60A J-Head, C-Base Type

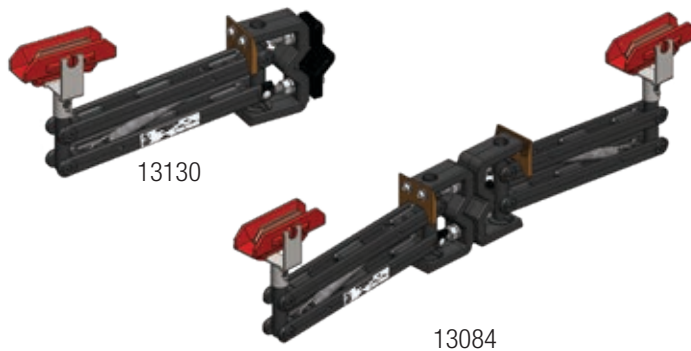


For systems up to 600 volts with straight runs and curves to 18" minimum radius. Assemblies have 19" pigtails (not shown in the illustration). Choose standard bottom entry or lateral-mount versions.

Replacement shoe for these collectors is Part No. [13136](#) - see page 25.

Type	Mounting	Cap.	Part No.	Wt lb (kg)
Single	Bottom Entry	30A	13128	2.5 (1.13)
Tandem	Bottom Entry	60A	13082	4.7 (2.13)
Single	Lateral-Mount	30A	13129	2.5 (1.13)
Tandem	Lateral-Mount	60A	13083	4.7 (2.13)

30A and 60A Self-Centering J-Head, C-Base Type

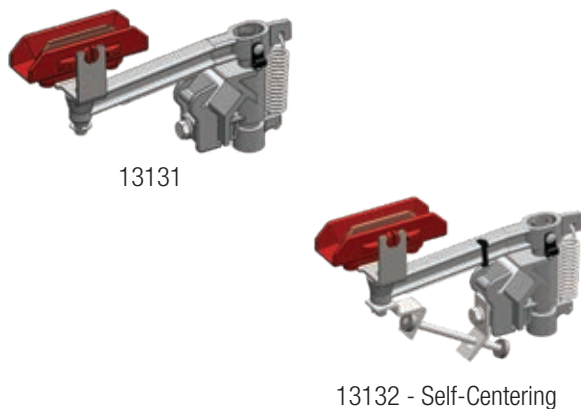


The "Self-Centering" versions below are used with Pick-up Guides, see page 18. These are for bottom entry mounting and have 19" pigtails (not shown in the illustration).

Replacement shoe for these collectors is Part No. [13136](#), see page 25.

Type	Cap.	Part No.	Wt lb (kg)
Self-Centering Single	30A	13130	2.6 (1.18)
Self-Centering Tandem	60A	13084	4.9 (2.22)

30A J-Head, H-Base Type



For systems up to 600 volts with straight runs and curves to 18" minimum radius. Assemblies have 15" pigtails (not shown in the illustration). Choose standard bottom entry or lateral-mount versions.

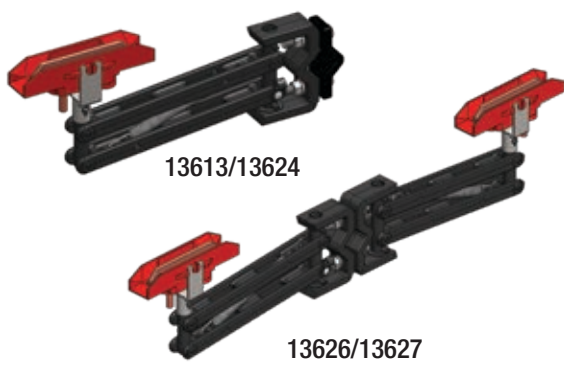
The "Self-Centering" version is used with Pick-up Guides, see page 18.

Replacement shoe for these collector is Part No. [13136](#), see page 25.

Type	Cap.	Part No.	Wt lb (kg)
Single	30A	13131	1.4 (0.64)
Self-Centering Single	30A	13132	1.7 (0.77)
Lateral-Mount Single	30A	13133	1.4 (0.64)

8 Bar Collector Assemblies

100A and 200A J-Head, C-Base Type

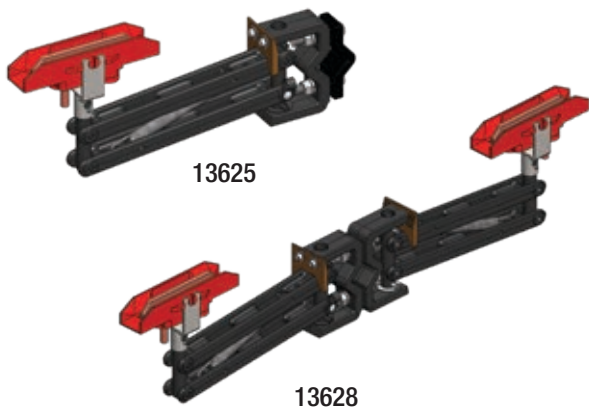


For straight system runs of 600V or less. Assemblies have 21" pigtails (not shown in the illustration). Choose standard "bottom entry" or lateral-mount versions.

Replacement shoe for this collector is Part No. [11157](#) - see page 25.

Type	Mounting	Cap.	Part No.	Wt lb (kg)
Single	Bottom Entry	100A	13613	3.1 (1.41)
Tandem	Bottom Entry	200A	13626	5.8 (6.23)
Single	Lateral-Mount	100A	13624	3.1 (1.41)
Tandem	Lateral-Mount	200A	13627	5.8 (6.23)

100A and 200A J-Head, C-Base Type Self-Centering

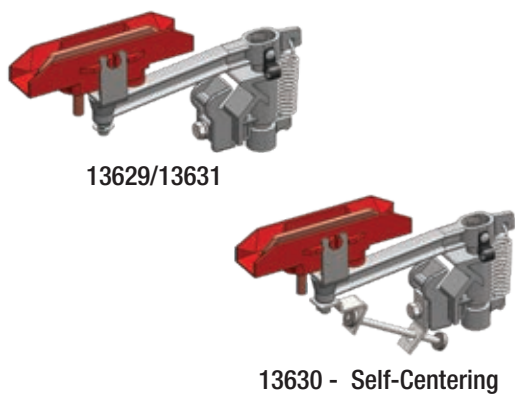


The "Self-Centering" versions are used with Pick-up Guides - See page 18. For straight system runs of 600V or less. These are for bottom entry mounting and have 21" pigtails (not shown in the illustration).

Replacement shoe for this collector is Part No. [11157](#) - see page 25.

Type	Capacity	Part No.	Wt lb (kg)
Self-Centering Single	100A	13625	3.2 (1.45)
Self-Centering Tandem	200A	13628	6.0 (0.72)

100A J-Head, H-Base Type



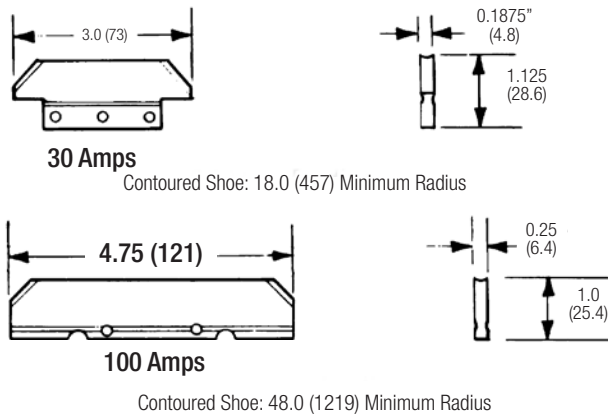
For straight system runs of 600V or less, and curves to a minimum of 48" radius. Assemblies have 21" pigtails (not shown in the illustration). Choose standard bottom entry or lateral-mount versions. The "Self-Centering" version is used with Pick-up Guides - See page 18 - and are for bottom-entry mounting.

Replacement shoe for this collector is Part No. [11157](#) - see page 25.

Type	Part No.	Wt lb (kg)
Single	13629	1.4 (0.65)
Self-Centering Single	13630	1.7 (0.77)
Lateral-Mount Single	13631	1.4 (0.65)

8 Bar Shoes, Curves, & Slip Rings

Replacement Collector Shoes



Standard shoe material is copper graphite. The optional cast iron shoe is to be used temporarily to clean the bar. "Insuloy" has self-cleaning properties, but will cause more wear on the bar versus copper graphite.

Cap.	Material	Application	Part No.	Wt. lb (kg)
30A	Copper Graphite	Standard	13136	0.12 (0.05)
30A	Cast Iron	Cleaning shoe	13138	0.12 (0.05)
30A	Insuloy	Self-cleaning	19678	0.12 (0.18)
60A	Copper Graphite	Standard	11154	0.13 (0.06)
100A	Copper Graphite	Standard	11157	0.23 (0.10)
100A	Cast Iron	Cleaning shoe	11159	0.25 (0.11)
100A	Insuloy	Self-cleaning	19347	0.23 (0.10)

Curved 8 Bar

Factory curved conductors. Refer to page 26 to specify your curve requirements. Contact factory for assistance. Maximum length: 10 feet (3.05 meters).

Minimum bend radius: PVC - 18.0" (457 mm); Lexan Medium Heat or Polyester High Heat- 57" (1447 mm)

Conductor Bar	Current Cap.	Part No.		
		PVC Cover	Lexan Cover	Polyester Cover
Galvanized Steel	110A	11003	11022	11041
Stainless Clad Copper Laminate	250A	11007	11026	11045
Copper Steel Laminate	250A	11011	11030	11049
Rolled Copper	350A	11015	11034	11053
Solid Copper	500A	11018	11037	11056

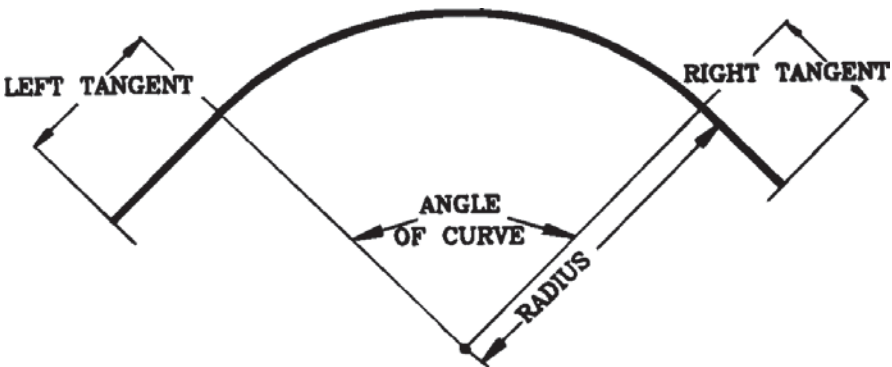



Slip Rings

Factory manufactured curved segments for slip ring use. Contact factory for assistance.

Conductor Bar	Current Cap.	Ring Radius Range in. (mm)	Pieces	Part No.	
				PVC	Lexan
Galvanized Steel	110A	18-35 (457- 889)	2-180°	23626	n/a
Stainless Clad Copper Laminate	250A	18-35 (457- 889)	2-180°	23627	n/a
Copper Steel Laminate	250A	18-35 (457- 889)	2-180°	23628	n/a
Rolled Copper	350A	18-35 (457- 889)	2-180°	23629	n/a
Galvanized Steel	110A	35-54 (892-1371)	3-120°	23630	n/a
Stainless Clad Copper Laminate	250A	35-54 (892-1371)	3-120°	23631	n/a
Copper Steel Laminate	250A	35-54 (892-1371)	3-120°	23632	n/a
Rolled Copper	350A	35-54 (892-1371)	3-120°	23633	n/a
Solid Copper	500A	35-54 (892-1371)	3-120°	24292	n/a
Galvanized Steel	110A	54-72 (1374-1828)	4-90°	23634	23638
Stainless Clad Copper Laminate	250A	54-72 (1374-1828)	4-90°	23635	23639
Copper Steel Laminate	250A	54-72 (1374-1828)	4-90°	23636	23640
Rolled Copper	350A	54-72 (1374-1828)	4-90°	23637	23641
Solid Copper (500A)	500A	54-72 (1374-1828)	4-90°	24293	24294

8 Bar Curves & Slip Rings Specification Data

This worksheet is designed to help you choose the correct curved section for your application. Contact factory for assistance.

Customer:		
Project No.:	Item No.:	Date:
1. Bar type, Rating (Amps/Volts):		
2. Environment / Ambient Temp:		
3. Fill in		
Angle of curve:		
Left tangent 6" (152 mm) standard:		
Right tangent 6" (152 mm) standard:		
Radius to contact surface: (See page 25 for minimum radii.)		
4. Select style of bar:		
		
<input type="radio"/> Outside Contact	<input type="radio"/> Inside Contact	<input type="radio"/> Bottom Contact
5. For systems with parallel curves, sketch layout below and indicate the radius, angle and tangent for each.		
<div></div>		

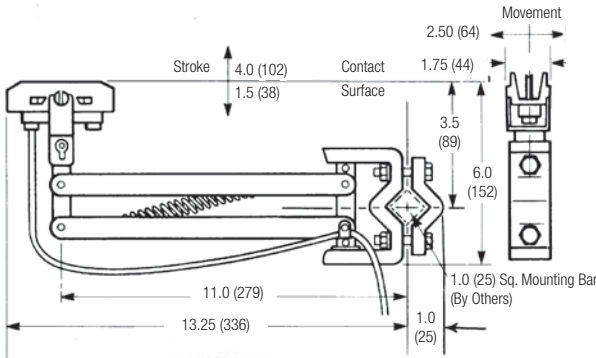
8 Bar Collector Dimensions

C Base Collectors

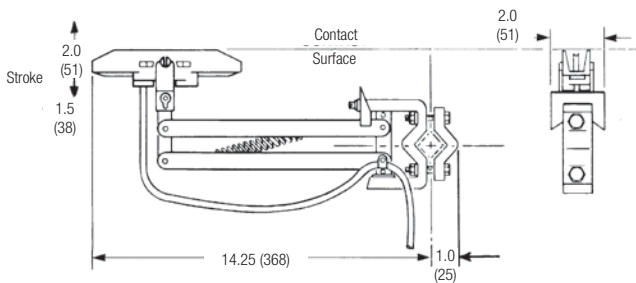
Dimensions common to all C-Base Collectors are not repeated.

Type	30 Amp	60 Amp Tandem	100 Amp	200 Amp Tandem
Standard Mount	13128	13082	13613	13626
Self-Centering	13130	13084	13625	13628

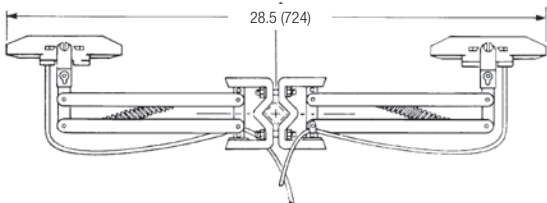
Standard Mount, Single - Part No. 13128 Shown



Self-Centering - Part No. 13625 Shown



Standard Mount, Tandem - Part No. 13626

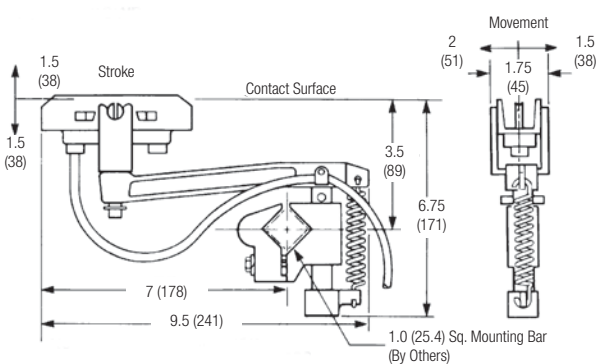


H Base Collector

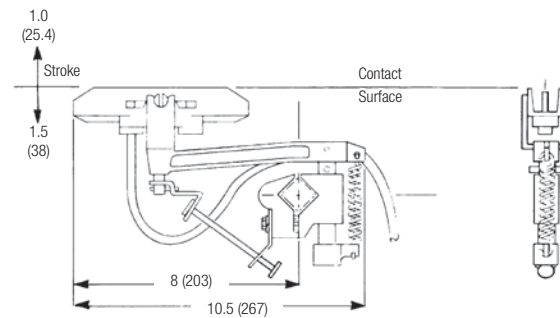
Dimensions common to all H-Base Collectors are not repeated.

Type	30 Amp	100 Amp
Standard Mount	13131	13629
Self-Centering	13132	13630

Standard Mount, Single - Part No. 13131 Shown

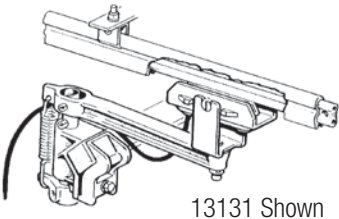


Standard Mount, Single - Part No. 13630 Shown



Collector Mounting

Standard Mount
(Vertical Entry)



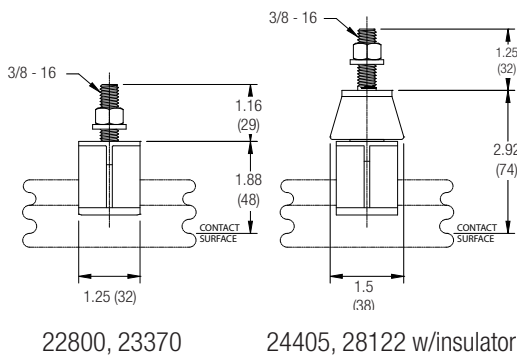
Shoe Pressure

30 amp: 3-5 lb
100 amp 6-9 lb

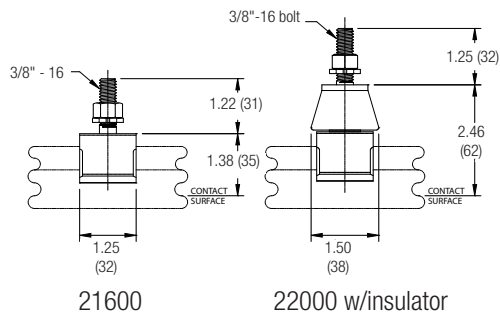
8 Bar Hanger and Anchor Dimensions

Note: Plastic or steel snap-in hangers are not recommended for lateral mounting or curves.

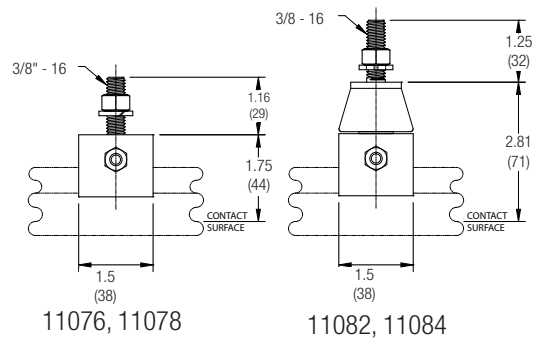
Plastic Snap-in Hanger Clamps, 250° F



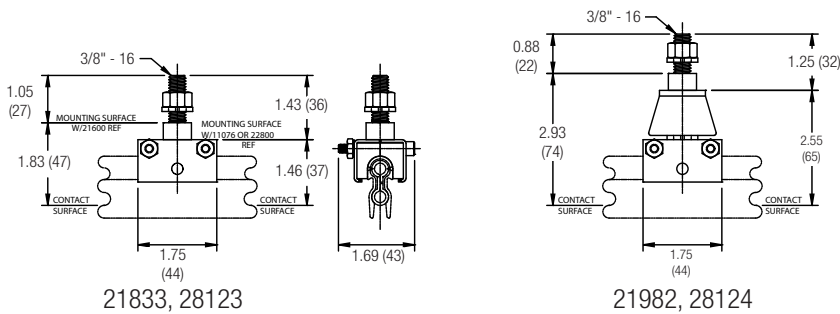
Spring Steel Snap-in Hanger Clamps, 400° F



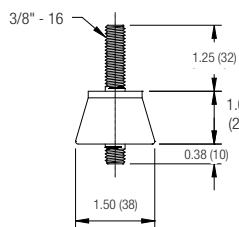
Cross-Bolt Hanger Clamps



Anchor Clamp, 400° F



Insulator, 400° F



Transfer Cap, 300° F

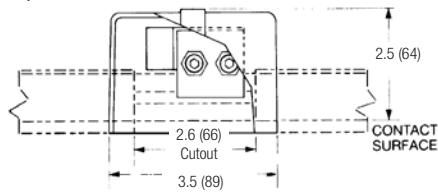


	Center	Left	Right
40, 110, 250, 350 amp	13161	14118	14119
90 amp only	22070	22395	22396

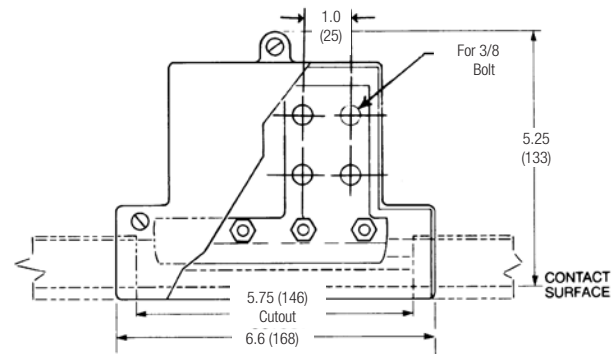
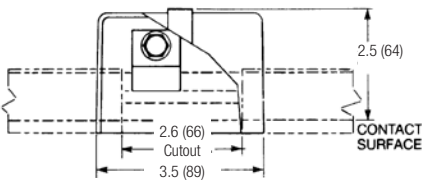
8 Bar Component Dimensions

Power Feeds

11092, 11093, 27104



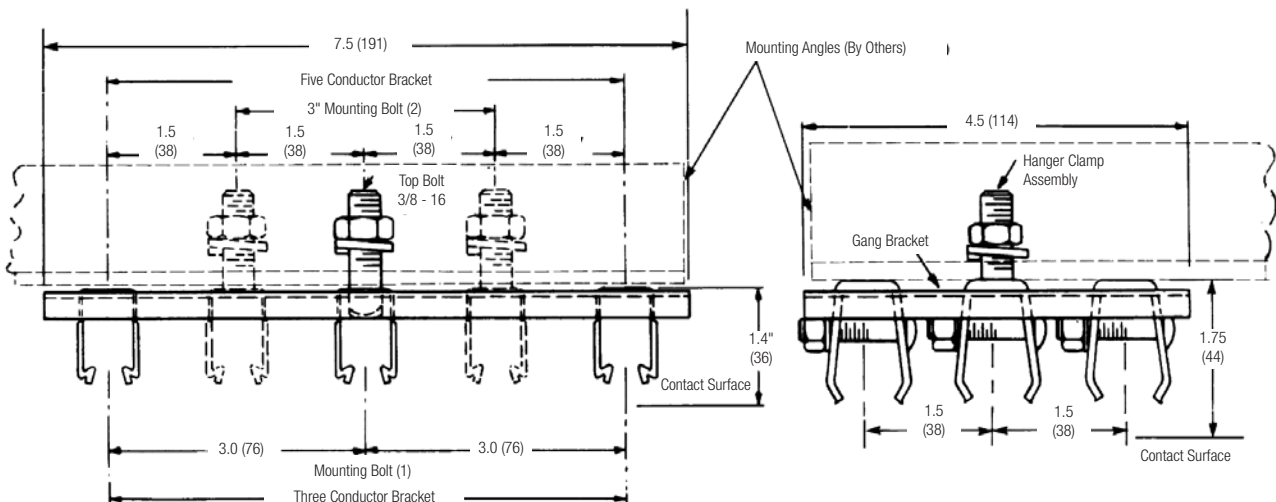
11091, 11122



11094, 27106

Part No.	Current Cap. (Amps)	Temp. Rating °F (°C)	Description
11091	90 / 110	160 (71.1)	Steel clamp type. Complete assembly of clamp and PVC case for steel systems only. Single bolt hole 1/4" for 3/0
11122	90 / 110	400 (204.4)	Steel clamp type. Complete assembly of clamp and high-heat case for steel systems only.
11092 / 27104	250	160 (71.1)	Copper clamp type. Complete assembly of clamp and PVC case for systems with feed wires from #8 AWG to 1/0.
11093	250	400 (204.4)	Copper clamp type. Complete assembly of clamp and high heat case for systems with feed wires from #8 AWG to 1/0.
11094 / 27106	500	400 (204.4)	Copper clamp type with stub. Complete assembly of clamp with NEMA standard 4-hole stub and case. Feed wires to 500 MCM.

Gang Hanger Clamp Bracket

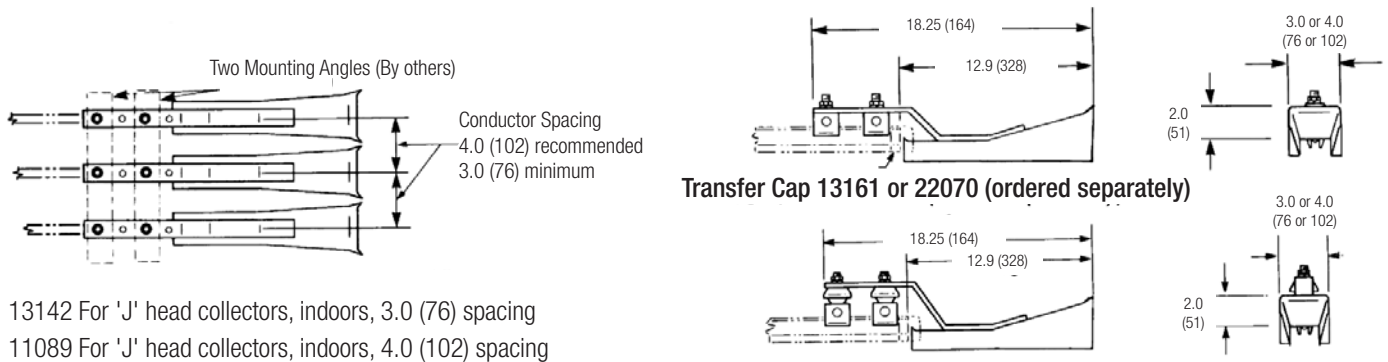


Snap-in Hanger 22646

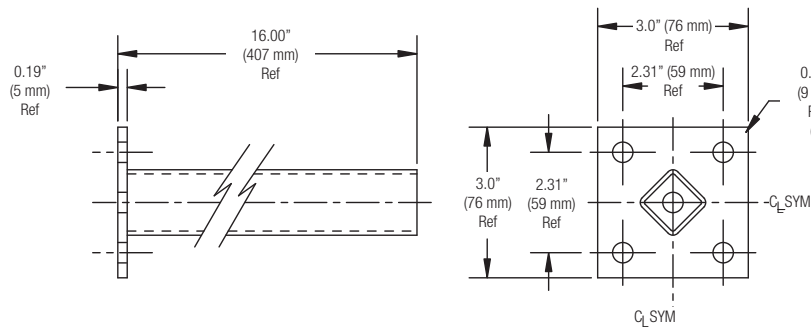
Cross-Bolt Hanger 22649

8 Bar Component Dimensions

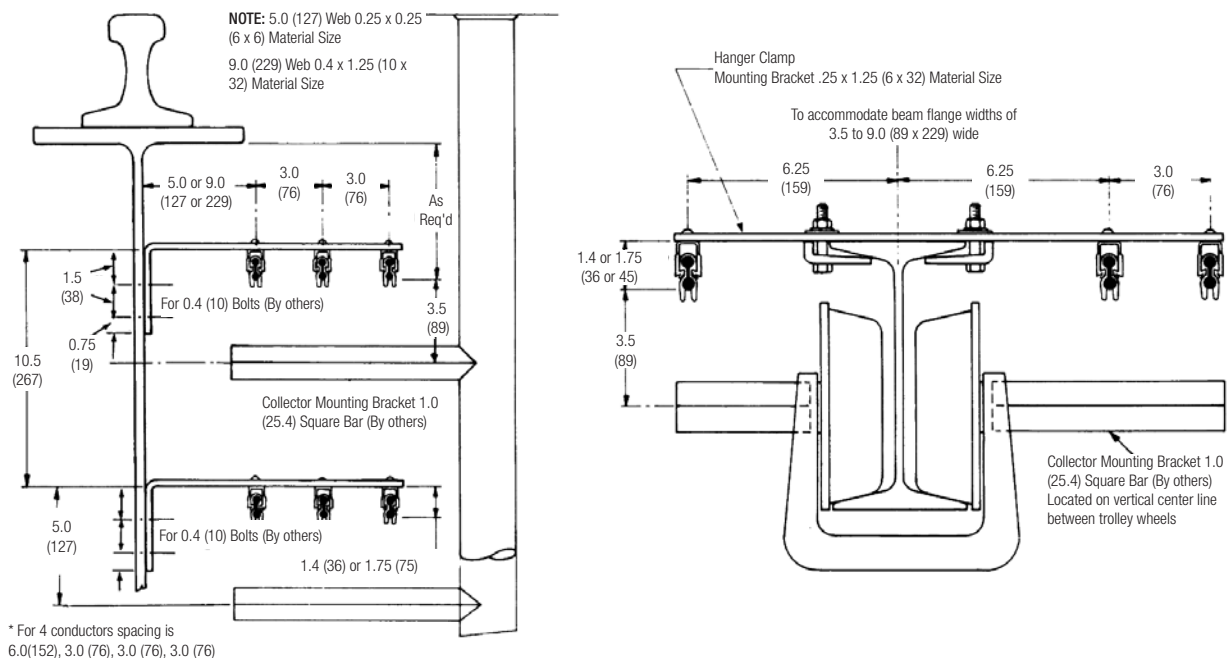
Pick-up Guides



Collector Bracket, 1.00" (25 mm) square (39617 & 52336)



Crane Bridges and Runways



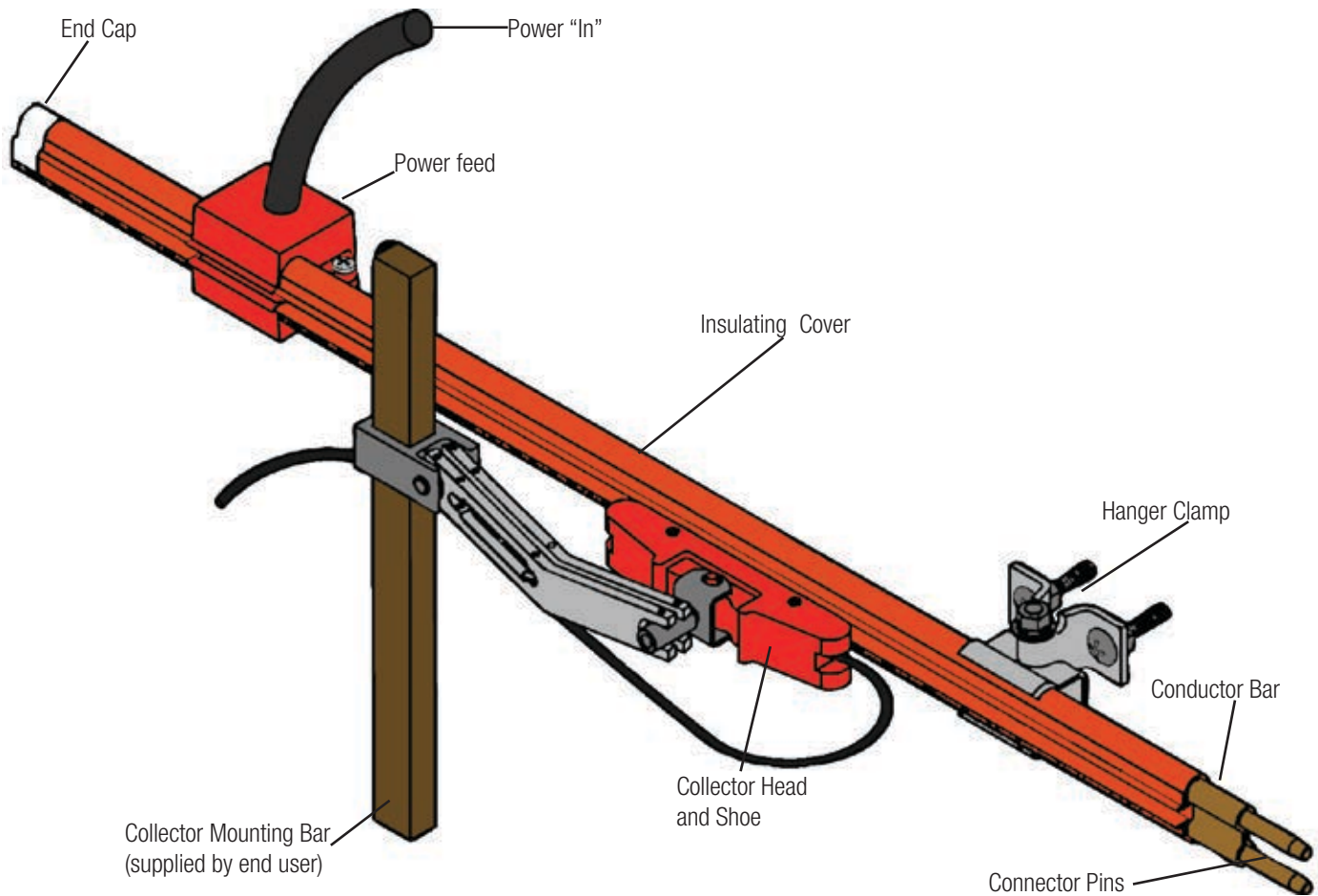
Insul 8® Side Contact Design Features

Conductix-Wampfler Side Contact Conductor Bar is a variation of the 8 Bar system designed for lateral (side) entry of the collector. UL / CSA listed.



Side Contact is Ideal When:

- There is insufficient room for standard "bottom entry" mounting
- Conductors must be more closely spaced than standard 8 Bar allows



Component Descriptions

Conductor Bar: The supply of incoming power

Power feed: Attachment of incoming power

Collector: Collects the incoming power and transfers it to the moving machine

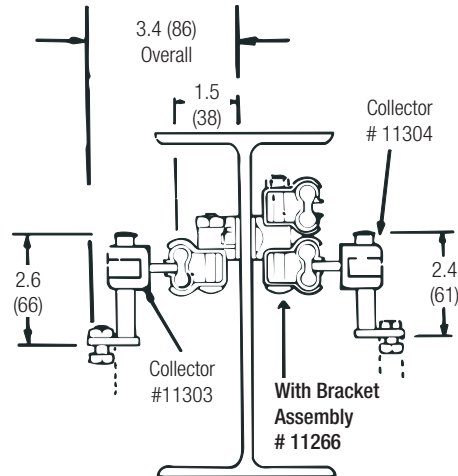
Hangers: Supports the conductor bar, may also be used as an anchor to direct movement due to expansion and contraction

End Cover: Safety protection at the end of conductor system

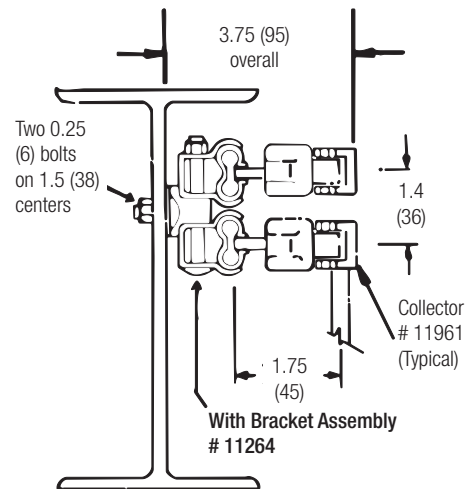
Typical Side Contact Mounting Arrangements

Shown below are some typical mounting arrangements for Side Contact. Trolleys on which collectors are mounted must be stabilized, particularly in systems involving discontinuous circuits. One acceptable way is to use guide rollers on the edge of the track flange.

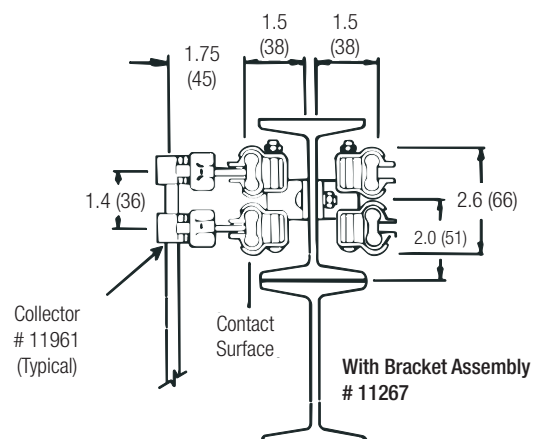
One Conductor Left and Two Right



Two Conductors on the Right



Two Conductor on the Right, Two on the Left



Side Contact Conductor Bar, Expansions, Power Feeds

Side Contact Conductor Bar comes with cover and connector pins installed. Joint Keepers are required when ordering copper or laminated bar. Bars are available in 40A, 90A, 110A, 250A, and 350A capacities @ 600 volts maximum. Expansion Sections listed below are required every 350 feet (106.7m) for 40A, 90A, and 110A systems or 250 feet (76.2m) for 250A and 350A systems to compensate for thermal expansion. Power Feeds bring outside power to the conductor bar.

Factory installed covers are available in:

- **Rigid PVC:** -10° F to 160° F (- 23.3° C to 71.1° C)
- **Medium Heat:** - 25° F To 250° F (- 31.7° C to 121.1° C)

Stainless Steel, 40A



Item	Rigid PVC Cover		Medium Heat Cover	
	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)
Conductor Bar, 10 ft (3.05 M)	24273	7.0 (3.18)	24298	6.6 (2.99)
Conductor Bar, 5 ft (1.52 M)	24274	3.5 (1.59)	24299	3.3 (1.50)
Expansion Section, 10 ft (3.05 M)	24277	10.0 (4.57)	24302	10.3 (4.67)
Power feed	11289	0.34 (0.15)	11289	0.34 (0.15)
End Cover	11295	0.03 (0.01)	11295	0.03 (0.01)

Galvanized Steel, 90A



Item	Rigid PVC Cover		Medium Heat Cover	
	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)
Conductor Bar, 10 ft (3.05m)	24275	4.5 (2.04)	24300	4.5 (2.04)
Conductor Bar, 5 ft (1.52m)	24276	3.5 (1.59)	24301	3.3 (1.59)
Expansion Section, 10 ft (3.05)	24278	6.7 (3.04)	24303	6.7 (3.04)
Power feed	11289	0.34 (0.15)	11289	0.34 (0.15)
End Cover	24424	0.03 (0.01)	24424	0.03 (0.01)

Galvanized Steel, 110A



Item	Rigid PVC Cover		Medium Heat Cover	
	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)
Conductor Bar, 10 ft (3.05m)	11223	7.0 (3.18)	11239	6.6 (2.99)
Conductor Bar, 5 ft (1.52m)	11224	3.5 (1.59)	11240	3.3 (1.50)
Expansion Section, 10 ft (3.05)	11255	10.0 (4.57)	11259	10.3 (4.67)
Power feed	11289	0.34 (0.15)	11289	0.34 (0.15)
End Cover	11295	0.03 (0.0)	11295	0.03 (0.01)

Side Contact Conductor Bar, Expansions, Power Feeds

Stainless Clad Copper 250A



Item	Rigid PVC Cover		Medium Heat Cover	
	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)
Conductor Bar, 10 ft (3.05m)	11227	7.0 (3.18)	11243	6.6 (2.99)
Conductor Bar, 5 ft (1.52m)	11228	3.5 (1.59)	11244	3.3 (1.50)
Expansion Section, 10 ft (3.05)	11256	11.0 (5.00)	11260	10.3 (4.67)
Power feed	11289	0.34 (0.15)	11289	0.34 (0.15)
End Cover	11295	0.03 (0.01)	11295	0.03 (0.01)

Copper Steel Laminate 250A



Item	Rigid PVC Cover		Medium Heat Cover	
	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)
Conductor Bar, 10 ft (3.05m)	11231	7.0 (3.18)	11247	6.6 (2.99)
Conductor Bar, 5 ft (1.52m)	11232	3.5 (1.59)	11248	3.3 (1.50)
Expansion Section, 10 ft (3.05)	11257	11.0 (4.99)	11261	10.3 (4.67)
Power feed	11289	0.34 (0.15)	11289	0.34 (0.15)
End Cover	11295	0.03 (0.01)	11295	0.03 (0.01)

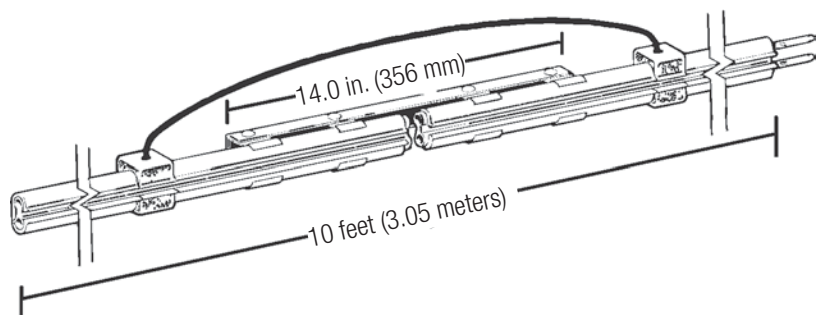
Electrolytic Copper 350A



Item	Rigid PVC Cover		Medium Heat Cover	
	Part No.	Wt lb (kg)	Part No.	Wt lb (kg)
Conductor Bar, 10 ft (3.05m)	11235	7.0 (3.175)	11251	6.6 (2.994)
Conductor Bar, 5 ft (1.52m)	11236	3.5 (1.588)	11252	3.3 (1.497)
Expansion Section, 10 ft (3.05)	11258	11.0 (4.990)	11262	10.3 (4.672)
Power feed	11289	0.4 (0.122)	11289	0.4 (0.122)
End Cover	11295	0.03 (0.014)	11295	0.03 (0.014)

Expansion Section

Expansion Sections compensate for the thermal expansion that occurs from a combination of ambient heat and electrical heat. Power feeds and flexible jumpers are factory installed to meet electrical and mechanical requirements of each system. Part numbers are located in the conductor tables - See pages 33-34.



Side Contact Connectors and Covers

Connector Pins



Used to join the conductor bar together.

Description	Part No.	Wt lb (kg)
Galvanized steel for 110A	11120	0.8 (0.36)
Copper for 250 and 350A	11121	0.8 (0.36)
Galvanized steel for 90A	21914	0.8 (0.36)
Stainless steel for 40A	24196	0.8 (0.36)

Insulating Cover



Replacement Part in the event original supplied cover becomes damaged or cracked.
Available in PVC or Lexan cover. The cover is designed for indoor use.

Description	Part No.	Length ft (m)	Wt lb (kg)
Rigid PVC to 160° F	34579	10.0 (3.05)	1.5 (6.80)
Medium Heat to 250° F	11294	10.0 (3.05)	1.5 (6.80)

End Cover



Used to close the end of the conductors to cover exposed conductor and avoid accidental contact. Also used as a transfer cap for switch applications.

Description	Part No.	Wt lb (kg)
For 40, 110, 250 and 350A	11295	0.03 (0.01)
For 90A	24424	0.03 (0.01)

Side Contact Power Feed & Pick-up Guide

Power feed



11289 (shown with only half cover)

Fully insulated clamp is easily installed anywhere on the system for feeding power to the conductor bar.

Description	Part No.	Wt lb (kg)
Complete Assembly, Clamp & Case	11289	0.34 (0.15)
Power feed case with hardware	11290	0.20 (0.09)
Clamp Assembly	11291	0.10 (0.05)

Pick-up Guides



Used at the end of conductors to guide collectors that completely leave the conductors (Discontinuous Systems) then re-engage.

Requires use of self-centering collectors, see page 39-40.

NOT TO BE USED FOR SWITCH APPLICATIONS

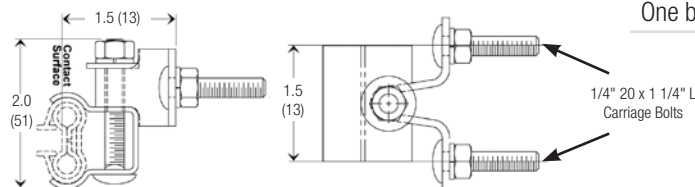
Description	Part No.	Wt lb (kg)
For all systems (except 90A)	11292	1.25 (0.57)

Side Contact Hanger Brackets and Clamps

Provides a simple method for installing Side Contact Conductors on conveyors, monorails, bridges, crane runways and switches. These supports secure and separate the insulated conductors uniformly with a minimal amount of installation time. Hanger clamps are all stainless steel with 1/4" zinc plated hardware.

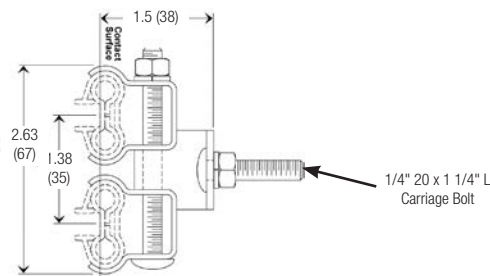
Contact Factory if you need a configurations not shown.

Single Bar, One Side of Beam



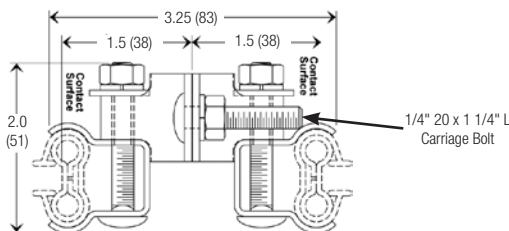
For	Part No.
One bar, one side of beam	11263

Two Bars, One Side of Beam



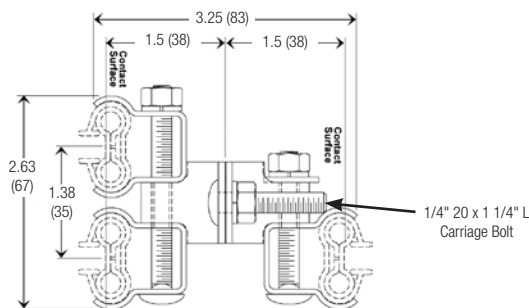
For	Part No.
Two bars, one side of beam	11264

One Bar, Each Side of Beam



For	Part No.
One bar, each side of beam	11265

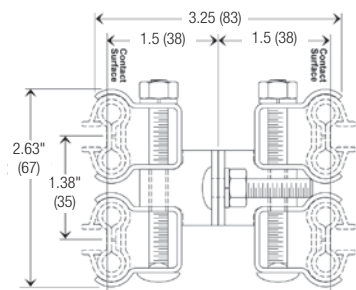
Two Bars One Side of Beam, One on the Other



For	Part No.
Two bars one side of beam, one on the other	11266

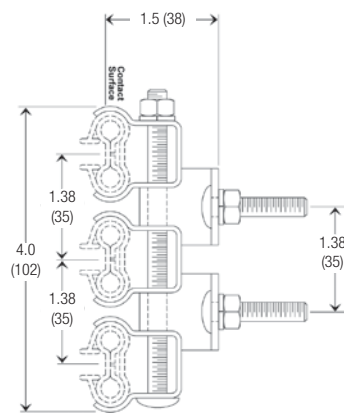
Side Contact Hanger Brackets and Clamps

Two Bars, On Each Side of Beam



For	Part No.
Two bars, each side of beam	11267

Three Bars, On One Side of Beam



For	Part No.
Three bars on one side of beam	31844

Single Conductor Hangers



17690



27927

Standard hanger spacing should every 4 feet for straight runs or every 3 feet for curves.

Description	Part No.
Stainless Steel hanger with 1/4" zinc plated hardware	27927
Stainless Steel hanger with 1/4" stainless steel hardware	27926
Stainless Steel hanger with insulator and 1/4" stainless steel hardware	17690

Side Contact Collectors

Side Contact Collectors are available in numerous configurations to match the application. Note that collectors should not be used as power switching devices. The resultant arcing may cause rapid deterioration of both contact shoes and conductor bars. Ampere capacity of conductor bars, power feeds, jumpers etc., should be greater than or equal to that of the system. Contact factory for systems using tandem mounted collectors and special requirements. For mechanically discontinuous systems, only collectors designated as "self-centering" should be used.

Contact shoe pressure: Between 4 and 6 pounds (1.81 kg to 2.72 kg) for all collector styles.

M-Head, L-Base Type, 40A

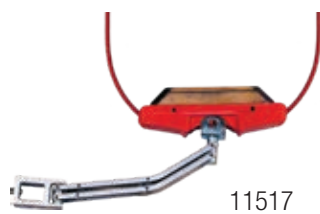


For conveyor, monorail systems, and crane bridges. Operates through curves at a minimum radii of 9.0 (228).

Standard pigtail length: 15" (381 mm)

Description	Part No.
Standard Collector, for continuous systems	11961
Self Centering Collector, for discontinuous systems that are equipped with pickup guide 11292	12295

M-Head, L-Base Type, 80A

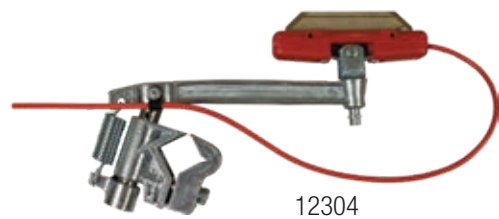


For conveyor, monorail systems, and crane bridges. Operates through curves at a minimum radii of 9.0 (228). Includes an additional pigtail for extra current capacity.

Standard pigtail length: 15" (381 mm)

Description	Part No.
Standard Collector, for continuous systems	11517
Self Centering Collector, for discontinuous systems that are equipped with pickup guide 11292	11518

M-Head, H-Base Type, 40A



This rugged collector provides a long stroke for continuous systems where clearance is not restricted.

Standard pigtail length: 15" (381 mm)

Description	Part No.
Standard Collector, for continuous systems	12304
Same as 12304, except a counter weight is added for lateral mount	12306

Side Contact Collectors

M-Head, L-Base Type, Tandem 160A



For systems that require 160A capacity. Operates through curves to minimum radii of 24.0 (610). Has tandem collectors and additional pigtails for the added current capacity.

Standard pigtail length: 15" (381 mm)

Description	Part No.
Standard Collector, for continuous systems	11519
Self-centering tandem. For discontinued systems equipped with pickup guide 11292 that require 160A capacity.	15046

M-Head, L-Base Type, Tandem 80A



Continuous systems that require 80A capacity. Operates through curves to minimum radii of 24.0 (610). Has tandem collectors.

Standard pigtail length: 15" (381 mm)

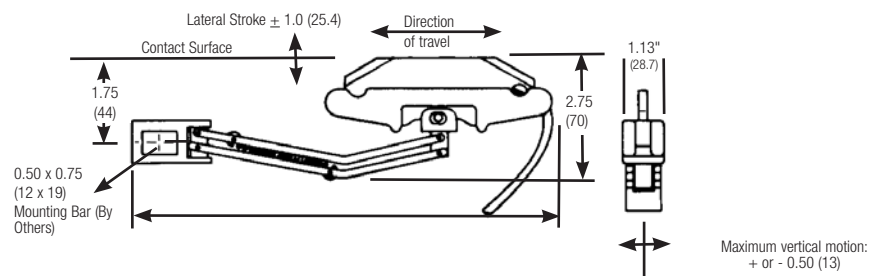
Description	Part No.
Standard Collector	11955
Self-centering tandem. For discontinued systems equipped with pickup guide 11292 that require 80A capacity.	11954

Side Contact Collector Parts

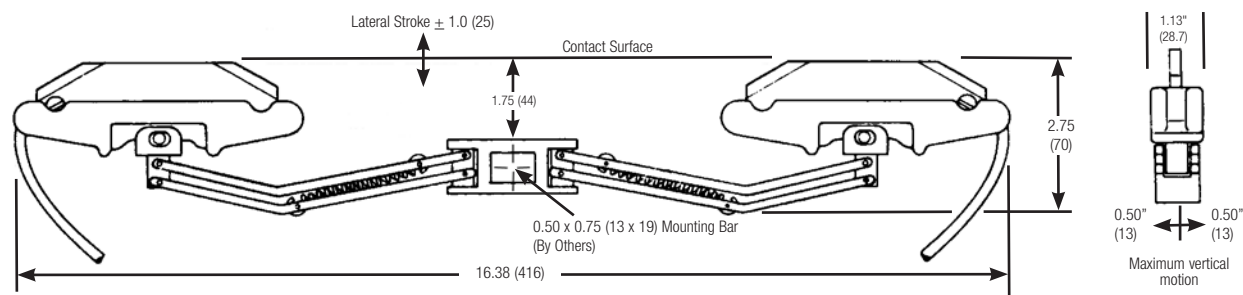
Description	Part No.
Case only, for M-Head, H-Base Collectors	11307
Case only, for M-Head, L-Base collectors	11300
Contact shoe (copper graphite) for all M-Head collectors	14104
Head assembly for M-Head, H-Base collectors	12296
Head assembly for M-Head, L-Base collectors	11930

Side Contact Collector Parts and Dimensions

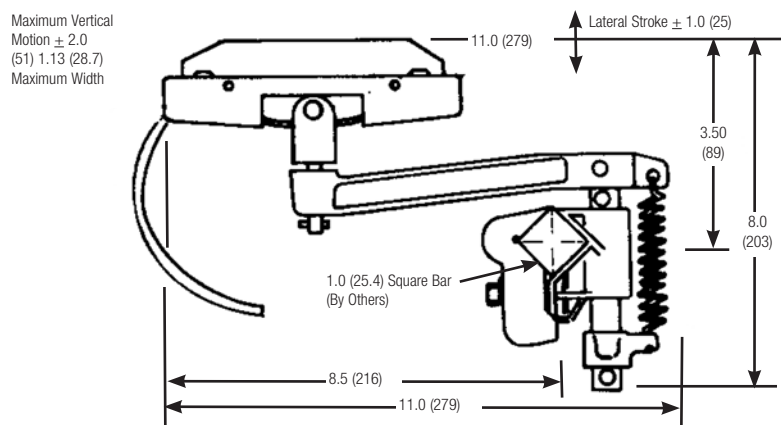
M-Head, L-Base Collectors (11961 shown)



M-Head, L-Base Collectors, Tandem (11955 shown)



M-Head, H-Base Collectors (12304 shown)



Side Contact Slip Rings & Curves

Curves

Side Contact can be set up to handle curves, horizontally or vertically, with standard 6.0 (152) tangents on each end. The systems are specially designed for curves, switches, interlocks, gaps, and continuous control circuits. They are readily adaptable to most operating conditions. Both conductor bar and insulated cover are sufficiently flexible to permit bending to any desired radius up to the noted minimums. Hanger spacing is every 3 feet (0.91 meters) on curves. Maximum bar length is 10 feet (3.05 meters). Information required for curves are:

- Radius for each conductor bar
- Angle
- Inside or outside contact
- Tangents if other than 6" standard.

Conductor Type	Cover	Current Cap. (Amps)	Min. Radius	Part No.
Galvanized Steel	PVC (standard heat)	110	9.0 (229)	11226
Stainless Clad Copper Laminate	PVC (standard heat)	250	9.0 (229)	11230
Copper Steel Laminate	PVC (standard heat)	250	9.0 (229)	11234
Rolled Copper	PVC (standard heat)	350	9.0 (229)	11238
Galvanized Steel	Lexan (medium heat)	110	57.0 (1448)	11242
Stainless Clad Copper Laminate	Lexan (medium heat)	250	57.0 (1448)	11246
Copper Steel Laminate	Lexan (medium heat)	250	57.0 (1448)	11250
Rolled Copper	Lexan (medium heat)	350	57.0 (1448)	11254

Slip Rings, PVC Standard Heat Covers

Conductor Type	Current Cap. (Amps)	Radius Range - in. (mm)	Pieces	Part No.
Galvanized Steel	110	9.0 to 34.0 (229 to 864)	2-180° pieces	23642
Stainless Clad Copper Laminate	250	9.0 to 34.0 (229 to 864)	2-180° pieces	23643
Copper Steel Laminate	250	9.0 to 34.0 (229 to 864)	2-180° pieces	23644
Rolled Copper	350	9.0 to 34.0 (229 to 864)	2-180° pieces	23645
Galvanized Steel	110	34.5 to 51.0 (876 to 1295)	3-120° pieces	23646
Stainless Clad Copper Laminate	250	34.5 to 51.0 (876 to 1295)	3-120° pieces	23647
Copper Steel Laminate	250	34.5 to 51.0 (876 to 1295)	3-120° pieces	23648
Rolled Copper	350	34.5 to 51.0 (876 to 1295)	3-120° pieces	23649
Galvanized Steel	110	51.1 to 69.0 (1298 to 1753)	4-90° pieces	23650
Stainless Clad Copper Laminate	250	51.1 to 69.0 (1298 to 1753)	4-90° pieces	23651
Copper Steel Laminate	250	51.1 to 69.0 (1298 to 1753)	4-90° pieces	23652
Rolled Copper	350	51.1 to 69.0 (1298 to 1753)	4-90° pieces	23653

Appendix I - Selection of Systems

Carefully review your equipment and application to choose the correct system and reduce the risk of system failures, equipment downtime, and maintenance time and expense. There are eight interrelated factors that should be considered when selecting the correct system.

Environmental Conditions

- **Freezing Conditions** - Might require a **heater wire** to keep the conductor contact surface free from ice.
- **Water and/or Dust** - Might adversely affect components and might require the use of insulated hangers to better isolate the “live” conductors from ground.
- **Chemicals** – Can adversely affect system components. Acidic or basic fumes may require stainless steel hardware and components. With the Hevi-Bar II system, you may want to consider the optional “**Dura-Coat**” treatment to reduce component corrosion. This is available for 8-bar; contact the Factory for details.
- **Cutting Oils** – May negatively affect polycarbonate components
- **Radiation** - May require the use of non-PVC components and non-galvanized plated components.

Mounting and Installation

- **Bottom Entry** – Puts the running surface on the bottom side of the conductor, which keeps dust, water, or debris away.
- **Lateral (or side) Entry** – Can be used if space is limited. Lateral mounting is not recommended for dusty, outdoor, or wet conditions. You may be able to stagger the collectors to decrease the space required for the system.
- **Installation** – Collector Arms are designed to accommodate a certain amount of movement or misalignments between the crane/ vehicle and the conductor. However, if misalignments are excessive the collector could disengage from the bar.
Poor collector installation is the single greatest cause of new system problems. Installation Instructions should be strictly followed to optimize system performance and prevent problems. Manuals are available at www.conductix.us.

Number of Power and Bonding Conductors Required

- **Power Legs** - Each “power leg” requires one run of bar
- **Bonding (Ground) Bar** - Per article 610.61 (National Electrical Code): “The trolley frame and bridge frame shall not be considered as electrically grounded through the bridge and trolley wheels and its respective tracks. A separate bonding conductor shall be provided”. A bonding bar is required for all overhead cranes built after 2004.

Moving Versus Stationary Applications

- **Moving Machine** - Draws maximum power as it moves. Current-induced heat is dissipated over a wider area of the conductor.
- **Stationary Machine** - Draws maximum power while stationary for extended periods (e.g.: welding stations, testing equipment, or cranes that repeatedly lift in the same location). Current-induced heat is not easily dissipated when collectors are stationary. In these cases, verify that the collectors and conductors are adequate for the application.

Current and Voltage Requirements

The purchase of a new conductor system affords the opportunity to size the system for additional cranes or larger cranes that may be added in the future. *A small investment now could avoid major investments in the future.*

- **Conductor Bar Rating** – Per NEC Article 610-14, the bar must accommodate 100% of the current of all the largest motors involved in a single movement, plus 50% of the next largest motors. The auxiliary hoist motor must be included if it works in conjunction with the main hoist. The system also must accommodate 100% the current draw of auxiliary equipment such as magnets, lighting, air conditioners, etc. that operate when the largest motors are energized.
- **Multiple Cranes on a Single Runway** – Sum the amperage requirements of each crane, then apply the appropriate “diversity factor” (NEC Table 610-14e). All cranes do not pull the maximum load all the time or pull the load at the same time.
- **Two Cranes Working in Tandem** - Do not apply the diversity factor, since both run at the same time. See Specification Data Sheet, Pgs. 6-7 for further “total load” calculation details.

Appendix I - Selection of Systems

- **Voltage Rating** - 600 volt rated insulators are standard. Higher voltages require insulators designed for that voltage. Conductor separation may also be affected for medium voltage (e.g. 4160 volts) and higher. The conductor system may need to meet the fault force requirements as determined by a qualified engineer.

Voltage Drop and Power Feed Locations Voltage drop along a conductor increases as system length increases and as ambient temperature increases.

- **Maximum Voltage Drop** - The CMAA (Crane Manufacturers Association of America) recommends a maximum voltage drop of 3% on runways and 2% on bridges. The voltage drop in volts will vary according to voltage available. For example, a 3% voltage drop on a 480 volt system is 14.40 volts; a 3% voltage drop at 115 volts is 3.45 volts.
- **Center Power Feed** - Is the optimal location for most systems. Longer runs may require multiple power feed locations to compensate for voltage drop and to minimize the total cost of the system.
- **Multiple Power Feeds** - Can reduce total system cost if the savings of a lower capacity bar offsets the cost to install the multiple powerfeed locations.
- **Calculating Voltage Drop** - Use Conductix-Wampfler Quick Quote (see Pg. 5) to automate this calculation, as shown in the examples below. Voltage drop can also be manually calculated – see Appendix II, Pg. 87.

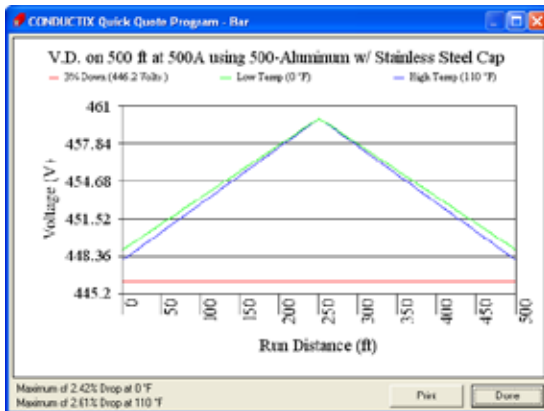


Figure 1 – Center Feed Example: Voltage drop along a 500 foot (152.4 meters) long runway with one crane drawing 500 amps at 460 volts on a 500 amp rated bar. The green line shows the voltage drop along the run at 0°F. The blue line shows the voltage drop at 110°F. The red line indicates the 3% maximum voltage drop. The voltage drop increases linearly as you move away from the center feed point.

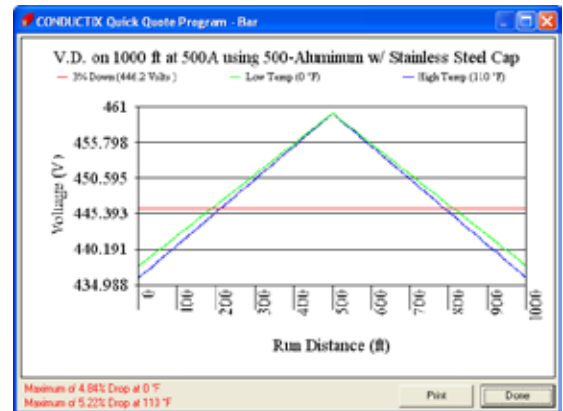


Figure 2: Same parameters as Fig. 1, except with a 1000 foot (304.8 meters) system. Note that the voltage drop is now greater than the recommended 3%.

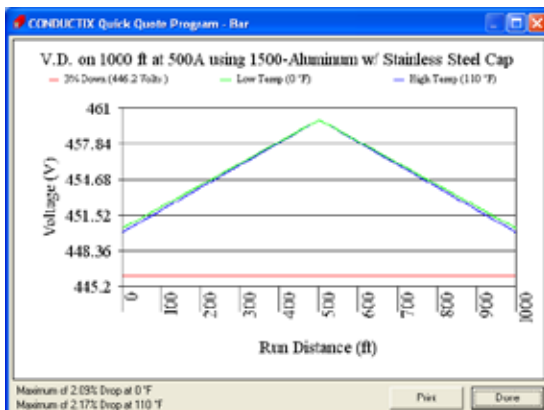


Figure 3: Center Power Example: With higher capacity 1500 amp bar to lower the voltage drop below 3%.

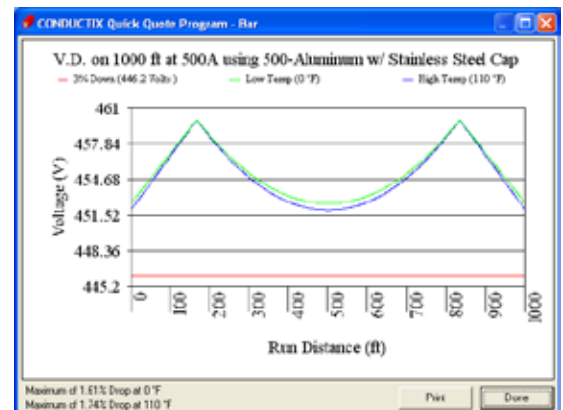


Figure 4: Two power feeds optimally located. The voltage drop remains under 3% , without the need to increase conductor capacity. A load positioned between the two feed points is supplied by both power feeds.

Appendix I - Selection of Systems

Thermal Expansion/Contraction and Other Effects of Heat

The effects of thermal expansion and contraction become more pronounced as the length of the run increases. The combination of ambient heat plus current-induced heat affects the size of conductor bar needed, the power feed arrangement, and the type of insulating cover required.

- **“Snaking”** – Occurs when the conductors heat up, and due to cumulative hanger friction, start to bow to the side. This can be observed by sighting down the runway. Each bar will bow alternately left and right between hangers, which puts strain on the collectors and hangers. Eventually, the collectors can disengage and damage the system.
- **“Snaking” - Older Systems** - May begin after a year or two in operation. This is because accumulated dirt increases friction between bar and hangers. This possibility should be considered when determining the number of expansions. Precautions taken at the time of installation could avoid costly repairs later.
- **Shorter Systems** - Can be anchored in the center. As the temperature of the conductor rises, the expansion simply pushes the bar outward. The longest system that can be successfully “center-anchored” depends on the friction of the hangers and the rigidity of the conductor.
- **Longer Systems** - Require the installation of one or more **“Expansion Sections”** - i.e. lengths of conductors designed to slide in and out to absorb bar expansion/contraction between anchor points. The slider is bridged by a jumper cable to maintain electrical continuity and acts as the running surface for the collector. Expansion sections effectively break the run into smaller lengths defined by the anchor points. The length of run an expansion section can accommodate is based on expansion/contraction parameters, including temperature range, conductor material, and the length of the slider. The **high end** of the temperature range is the sum of current-induced heat of the bar (at maximum load) plus the highest ambient temperature. The **low end** is the lowest ambient temperature, which may occur during a January system shutdown. Conductor sections need to be anchored properly between each expansion and between the last expansion and the end of the run.
- **Ambient Heat** – All heat sources must be considered and evaluated for their effect on the conductor and cover. Typical heat sources are furnaces, billets, slag, etc. Ambient heat is easy to measure and the effects are consistent with measured values.
- **Radiant Heat** - Can be difficult to measure and its effects hard to anticipate. It will directly affect cover, and the cover might withstand it. However, the effect on metal components might be even more pronounced. For example, metal hangers may heat to such a degree that they will melt the cover. Heat shields provide a good way of minimizing the effects of radiant heat. If heat shields are not practical, higher temperature rated covers might be required.
- **Total Operating Temperature** – The sum of the ambient temperature, radiant heat, and current-induced temperature rise. This is the total heat the conductor and its cover material must withstand. For example, if your machine is working in an ambient temperature of 120°F (49°C), and the current-induced temperature rise of the conductor adds another 50°F, the total 170°F (76.7°C) exceeds the PVC cover rating of 70°C (156°F). The cover will deform or melt, and interfere with collector tracking and/or interrupt power. In this scenario, the cover must be made from a heat-resistant material. Conductix-Wampfler offers “Medium Heat” or “High Heat” covers for most systems – see page 4.

Conductor Bar Current Rating and Duty Cycle

- **Conductor Electrical Capacity** – A wide variety of capacities are offered, since conductors often power multiple vehicles. Ratings are based on the electrical load the conductor can handle before the operating temperature of the bar exceeds the temperature rating of its cover. The rating assumes a certain ambient temperature (e.g.: 49°C or 120°F) and a specific duty cycle.
- **Duty Cycle** - One manufacturer may rate their conductors for continuous duty; others for intermittent duty based on a given duty cycle. It is important to know which was used to establish the ratings.

Appendix I - Selection of Systems

- **Continuous Duty** - A conductor is put under a continuous load at some “normal” ambient, usually 30° C. Once the bar temperature has stabilized at the target load rating, the bar temperature cannot exceed the temperature rating of the cover. Most PVC covers can handle approximately 70° C, which is a 40° C rise over 30° C ambient.
- **Intermittent Duty** - Assumes that the current is “on” for a period of time and “off” for a period of time; i.e. one “duty cycle”. The conductor is allowed to cool between “on” phases. A 50% duty cycle is most common – i.e. one minute on and one minute off. Since a crane cannot lift continuously, nor is current flowing at maximum for long periods of time, most operate at a 40% duty cycle or less. So a 50% duty cycle is sufficient. However, cranes that see heavy duty, especially Class D and E cranes (see end of this Appendix), may push the conductor beyond a 50% intermittent duty rating.
- **Collector Electrical Capacity** – A limited selection of collector capacities is available, since collectors only power the crane/vehicle they service. Additional collectors can be used if the crane/vehicle load exceeds the collector rating. Note that the load will not be shared equally among multiple collectors. The collector closest to the power feed will carry a larger load than those farther down the line. So when using multiple sets of collectors, make sure the collector capacities are adequate for this scenario

CMAA Crane Classifications

Provided for general information only. Refer to CMAA Section 78-6 for full definitions.

Class A (Standby or Infrequent Service) Performs precise lifts at slow speed, with long idle period between lifts. Performs lifts at full or near rated capacity. Power houses, public utilities, turbine rooms.

Class B (Light Service) Light service requirements at slow speed. Performs 2 to 5 lifts/hour, light to occasional full loads, at 10 ft. average height. Repair shops, light assembly, service buildings, light warehousing.

Class C (Moderate Service) Moderate service requirement with loads averaging 50% of capacity. 5 to 10 lifts per hour at 15 foot average lift height. Not more than 50% of lifts at rated capacity. Machine shops, paper mill machine rooms, etc.

Class D (Heavy Service) Bucket/magnet duty, where heavy duty production is required. Loads of 50% capacity handled constantly. 10 to 20 lifts per hour averaging 15 ft. lift-height. Not over 65% of the lifts at rated capacity. Heavy machine shops, foundries, fabricating plants, steel warehouses, container yards, lumber mills, etc.

Class E (Severe Service) Loads approaching capacity throughout the life of the crane. 20 or more lifts per hour at or near rated capacity. Magnet/bucket cranes for scrap yards, cement mills, lumber mills, fertilizer plants, container handling.

Class F (Continuous Severe Service) Handles loads approaching capacity continuously under severe service conditions throughout the life of the crane. Includes custom designed specialty cranes performing work critical to the total production facility. Needs to have the highest reliability and ease of maintenance.

For system recommendations based on Crane Class, contact Conductix-Wampfler Sales.

Appendix II - Voltage Drop Calculations

Proper selection of conductor and covers for Conductix-Wampfler conductor systems is simple, requiring only the ampacity, voltage and ambient conditions.

The method for determining the rating for cranes and hoists is completely outlined in NEC 640-14(e). Further reference to the Code is 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.

$$\begin{array}{rcl} \text{Hoist} & = & 65\text{A} \times 1 = 65.0 \\ \text{Bridge} & = & 27\text{A} \times .5 = 13.5 \\ \hline \text{Total} & & 78.5\text{A} \end{array}$$

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 with data taken from motor nameplates - all are 460V, 3-phase, 60 Hz.

$$\begin{array}{rcl} \text{Crane \#1} & & \\ \text{Hoist} & = & 65\text{A} \times 1 = 65.0 \\ \text{Bridge} & = & 27\text{A} \times .5 = 13.5 \\ \hline \text{Total} & & 78.5\text{A} \end{array}$$

$$\begin{array}{rcl} \text{Crane \#2} & & \\ \text{Hoist} & = & 52\text{A} \times 1 = 52.0 \\ \text{Bridge} & = & 14\text{A} \times .5 = 7.0 \\ \hline \text{Total} & & 59.0\text{A} \end{array}$$

$$\text{Total of \#1 + \#2} \quad 137.5 \times .195 = 130.0\text{A}$$

- II. When the motor ampere ratings are unknown, a good approximation may be made using the nominal horse power ratings of the motors, converting them to full load amperes per NEC table 430-150; then proceed as above. If the motors are not three-phase, applicable tables 430-137 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

Voltage drop is the difference between the voltage at the feed point and the voltage at the extreme end. It is usually expressed as a percentage of the supply voltage and can be calculated as shown below.

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

Voltage Drop per 100 Feet of Run Per 100A of Current

Conductor	3-Phase 60 Hz	D.C.
Stainless Steel 40A	16.0	18.5
Galvanized Steel 90A	12.1	13.9
Galvanized Steel 110A	9.6	11.1
Stainless Clad Copper 250A	5.7	6.6
Copper Steel Laminate 250A	5.5	6.4
Rolled Copper 350A	5.2	6.0
Solid Copper 500A	5.9	6.8

3% at Max Amps and Length from Power feed			
Bar	Amps	480V	240V
SS	40	102'	51'
Galv	90	99'	49'
Galv	110	130'	65'
SS / CU	250	287'	144'
CU / Galv	250	287'	144'
Rolled Cu	350	296'	148'
Solid Cu	500	381'	191'

$$\begin{array}{l} 3\% \text{ of } 480\text{V} = 14.4 \\ 2\% \text{ of } 240\text{V} = 7.2 \\ 2\% \text{ of } 180\text{V} = 9.6 \\ 2\% \text{ of } 240\text{V} = 4.8 \end{array}$$

Appendix III Electrical Formulas & Conversions

Electrical Formulas

Ohms Law

$\text{Ohms} = \frac{\text{volts}}{\text{amperes}}$	$\text{Amperes} = \frac{\text{volts}}{\text{ohms}}$	$\text{Volts} = \text{amperes} \times \text{ohms}$
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Power

$\text{Watts} = \text{amperes} \times \text{volts}$	$\text{3-phase Kilowatts} = \frac{\text{volts} \times \text{amperes} \times \text{power factor} \times 1.732}{1000}$
$\text{Amperes} = \frac{\text{watts}}{\text{volts}}$ (not 3-Phase)	$\text{3-phase Amperes} = \frac{746 \times \text{HP (Horsepower)}}{1.732 \times \text{volts} \times \text{efficiency} \times \text{power factor}}$
$\text{HP} = \frac{\text{volts} \times \text{amps} \times \text{efficiency}}{746}$	$\text{3-phase Volt-Amperes} = \text{volts} \times \text{amperes} \times 1.732$
$\text{Power Factor} = \frac{\text{watts}}{\text{amperes} \times \text{volts}}$	$\text{Single-phase Kilowatts} = \frac{\text{volts} \times \text{amperes} \times \text{power factor}}{1000}$
	$\text{Single-phase Amperes} = \frac{746 \times \text{HP (Horsepower)}}{\text{volts} \times \text{efficiency} \times \text{power factor}}$

Speed

$\text{Synchronous RPM} = \frac{\text{Hertz} \times 120}{\text{poles}}$	$\text{Percent Slip} = \frac{\text{Synchronous RPM} - \text{Full Load RPM}}{\text{Synchronous RPM}} \times 100$
---	---

Metric Conversions

To Obtain	Multiply
Millimeters	Inches x 25.4
Inches	Millimeters x 0.0394
Meters	Feet x .3048
Feet	Meters x 3.281
Square Centimeters	Square Inches x 6.45
Square Inches	Square Centimeters x 0.155
Kilograms	Pounds x 0.4536
Pounds	Kilograms x 2.205
Kilograms per Meter	lb/ft (divided by) .6719
Pounds per Foot	kg/m X .6719
Degrees Celsius	(Degrees F-32) x 5/9
Degrees Fahrenheit	(Degrees C x 9/5) + 32

Appendix IV Terms, Conditions, and Warranty

The technical data and images which appear in this catalog are for informational purposes only. NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE CREATED BY THE DESCRIPTIONS AND DEPICTIONS OF THE PRODUCTS SHOWN IN THIS CATALOG. Conductix-Wampfler (“seller”) makes no warranty and assumes no liability as to the function of equipment or the operation of systems built according to customer design or of the ability of any of its products to interface, operate or function with any portions of customer systems not provided by Conductix-Wampfler.

Seller agrees to repair or exchange the goods sold hereunder necessitated by reason of defective workmanship, and material discovered and reported to Seller within one year after shipment of such goods to Buyer. Except where the nature of the defect is such that it is appropriate in Seller’s judgement to effect repairs on site, the seller’s obligation hereunder to remedy defects shall be limited to repairing or replacing (at Seller’s option), FOB point of original shipment by Seller, any part returned to Seller at the risk and cost of Buyer. Defective parts replaced by Seller shall become the property of Seller.

Seller shall only be obligated to make such repair or replacement of the goods which have been used by Buyer in service recommended by Seller and altered only as authorized by Seller. Seller is not responsible for defects which arise from improper installation, neglect, or improper use or from normal wear and tear.

Additionally, Seller’s obligation shall be limited by the manufacturer’s warranty (and shall not be further warranted by Seller) for all parts procured from others according to published data, specifications, or performance information not designed by or for Seller.

Seller further agrees to replace, or at Seller’s option to provide a refund of the sales price of any goods that did not conform to applicable specifications or which differ from that agreed to be supplied which non-conformity is discovered and forthwith reported to Seller within thirty (30) days after shipment to Buyer. Seller’s obligation to replace or refund the purchase price for non-conforming goods shall arise once Buyer returns such good FOB point of original shipment by Seller at the risk and cost of Buyer. Goods replaced by Seller shall be come property of Seller.

There is no guarantee or warranty as to anything made or sold by Seller, or any service performed, except as to title and freedom from encumbrances, and except as herein expressly stated and particularly without limiting the foregoing. There is no guarantee or warranty, express or implied, of merchantability or of fitness for any particular purpose or against claim of infringement or the like.

Seller makes no warranty (and assumes no liability) as to function of equipment or operation of systems built to Buyer’s design or of the ability of any goods to interface, operate or function with any portions of Buyer’s system not provided by Seller.

Seller’s liability on any claim; whether in contract (including negligence) or otherwise, for any loss or damage arising out of, connected with, or resulting from the manufacture, sale, delivery, resale, repair, replacement or use of any products or, services shall in no case exceed the price paid for the product or services or any part thereof which give rise to the claim. In no event shall Seller be liable for consequential, special, incidental or other damages, nor shall Seller be liable in respect to personal injury or damage to property on the subject matter hereof unless attributable to gross misconduct of Seller, which shall mean an act of omission by Seller demonstrating reckless disregard of the foreseeable consequences thereof.

Seller is not responsible for incorrect choice of models or where products are used in excess of their rated and recommended capacities and design functions or under abnormal conditions. Seller assumes no liability for loss of time, damage or injuries to property or persons resulting from the use of Seller’s products. Buyer shall hold Seller harmless from all liability, claims, suits and expenses in connection with loss or damage resulting from operation of products or utilization of services, respectively, of Seller and shall defend any suit or action which might arise there from Buyer’s name, provided that Seller shall have the right to elect to defend any such suit or action for the account of Buyer. The foregoing shall be the exclusive remedies of the buyer and all persons and entitles claiming through the Buyer.

Other Conductor Rail Products

Conductor rails made by Conductix-Wampfler in Weil am Rhein, Germany, and stocked in the USA, are an ideal choice for the transmission of digital data and power up to 2000 amps and beyond. Special metal rails are used for the accurate transmission of data. Conductix-Wampfler's innovative electronic Powertrans is an extremely efficient system that permits reliable data transmission even under difficult operation conditions.

Conductix-Wampfler conductor rails are available in any number of poles in any desired length and are designed for ease of installation. The rails feature robust construction suitable for harsh industrial environments. Heavy-duty collector assemblies guarantee reliable transmission without interruption for trouble-free operation.

Current collectors articulate along three axes to compensate for variations in assembly tolerances and inevitable travel variations during operation. This permits uninterrupted transmission of energy and digital data and keeps wear to a minimum. Conductor rails are available for travel speeds up to 33 feet per second.

The experienced engineering and sales people at Conductix-Wampfler are experts in applying conductor rails to all kinds of industrial applications

For more information on these rail designs, please contact Conductix-Wampfler.

All Conductix-Wampfler plants in the United States, Germany, France, and Italy are ISO 9001:2000 certified. Our stringent quality systems assure that you will get the right product every time. See page 51 for a sampling of our other quality products.

In 2007, with the merger of Conductix and Wampfler, the company is now the world leader in the design and manufacture of high performance energy and data transmission products for industrial applications.



811 Series

Available from 10 to 100 amps for ASRS, monorails, cranes, and special machines. Straight or curved tracks.



812 Series

Available from 25 to 400 amps.

Ideal for mid-sized cranes, people movers, amusement rides, and special machines. Stainless steel running surface for straight or curved track.



813 Series

Available from 500 to 1250 amps. Works well for heavy cranes, people movers, and special machines. Patented stainless steel running surface for straight or curved tracks.



815 Series

Available from 32 to 100 amps. A compact multi-conductor system for electrified overhead monorails and slip rings. Either .47 inch (12mm) or .55 inch (14mm) spacing. Straight or curved tracks.



831 Series Multiline

Handles from 10 to 125 amps, in 3, 4, or 5 pole configuration. Great for cranes, automated storage and retrieval systems, and special machines. Straight tracks.



842 Series BoxLine

Accommodates from 35 to 140 amps in a continuous conductor strip and enclosed "box track" system. 5 or 7 poles. For smaller cranes, work stations, and other applications requiring an enclosed system.

Other Products from Conductix-Wampfler

The products described in this catalog represent a few of the products from the broad spectrum of Conductix-Wampfler components and systems for the transfer of energy, data, gases, and fluids. The solutions we deliver for your applications are based on your specific requirements. In many cases, a combination of several different Conductix-Wampfler products are needed to fill the application. You can count on all of Conductix-Wampfler's business units for hands-on engineering support - coupled with the perfect solution to meet your energy management and control needs.



Motor driven cable reels

Motor driven reels by Conductix-Wampfler are the perfect solution for managing long lengths of heavy cable and hoses in very demanding industrial applications. Monospiral, level wind, and random wind spools.



Slip ring assemblies

Whenever powered machinery needs to rotate 360°, field proven slip ring assemblies by Conductix-Wampfler can flawlessly transfer energy and data. Here, everything revolves around flexibility and reliability.



Conductor bar

Whether they are enclosed conductor rails, expandable single-pole bar systems, or high amperage bar for demanding steel mill use up to 6000 amps. Conductix-Wampfler's conductor bar is the proven solution to reliably move people and material.



Spring driven cable reels

We have 60 years experience and trusted brands such as Insul-8, Wampfler, and IER. We offer small cord reels all the way to large multi-motor units, a wide range of accessories, and hazardous location reels.



Cable Festoon systems

It's hard to imagine Conductix-Wampfler cable trolleys not being used in virtually every industrial application. They are reliable and robust and available in an enormous variety of sizes and models.



Push Button Pendants

Our ergonomic pendants are ideally suited for industrial control applications. They are available in a wide range of configurations for overhead cranes and other machinery.



Radio remote controls

Safe, secure, and reliable radios use the latest in microprocessor technology. Available in several models for overhead crane control and other types of machinery.



Inductive Power Transfer IPT®

The contact-less system for transferring energy and data. For all tasks that depend on high speeds and absolute resistance to wear.



Energy guiding chains

The "Jack of all Trades" when it comes to managing energy and data cables and air and fluid hoses. A wide range of energy guiding chains are available for many industrial applications.



Air hoists and balancers

ENDO Air hoists accurately place delicate loads and continuously vary the speed for precise positioning. They run cool in continuous operations.



Bumpers

Conductix-Wampfler offers a complete range of bumpers for the auto industry, cranes, and heavy machinery. These include rubber, rubber/metal, and cellular types.



Spring balancers and retractors

ENDO spring balancers by Conductix-Wampfler are rugged, reliable high-precision positioning devices that reduce operator fatigue and assist with accurate tool placement.

Conductor Bar

Safe-Lec 2 | Hevi-Bar II



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Safe-Lec 2 and Hevi-Bar II Overview

Conductix-Wampfler has designed and built state-of-the-art conductor bar systems for over 60 years. Our experienced engineering and sales people are recognized experts in the application of conductor bar in the most demanding applications.

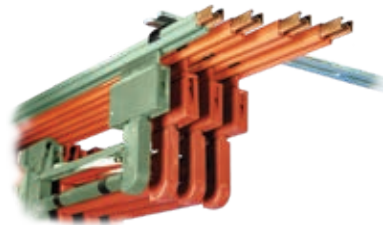
Conductix-Wampfler USA was founded in 1944 as Insul-8 Corporation (San Carlos, CA). Insul-8 developed the first "Figure 8" conductor bar system, which became the standard method for electrifying overhead cranes. In 1991 the company moved its manufacturing facility to Harlan, Iowa.

With the merger of Conductix and Wampfler in 2007, **Conductix-Wampfler** is now the world leader in the design and manufacture of high-performance conductor bar systems for industry.

Our innovations include the "finger-safe", V-contact Safe-Lec 2 system, Hevi-Bar II with optional Dura-Coat corrosion protection, and Hevi-Bar MD for high-current mill applications.

Conductix-Wampfler 8 Bar and Side Contact systems are manufactured in the USA to provide unsurpassed service and quick delivery. Our plants are ISO9001-2008 certified and adhere to stringent quality standards.

We offer a full complement of other mobile electrification products to include Cable Festoon Systems, Cable Reels (spring and motor driven), Push-Button Pendants, Radio Remote Controls, and Crane Bumpers - see page 67 for details.



Safe-Lec 2

The **new industry standard** for crane, monorail, and material handling electrification. Easy to install and maintain. Collector shoes track accurately on V-contact bar. Requires fewer joints and expansion sections than other systems. "Finger-safe" (IP2 rated). Can be mounted for bottom or lateral entry. Heater wire system available for cold climates; black UV resistant cover for outdoor applications.

cUL Listed 



Hevi-Bar II

The ideal conductor bar system for large process cranes and material handling equipment used in mills and other heavy industrial applications. Aluminum body efficiently dissipates heat; stainless steel V-contact surface for accurate shoe tracking and long wear. Can be mounted for bottom or lateral entry. Heater wire system available for cold climates; black UV resistant cover for outdoor applications.

UL / CSA Listed  

8-Bar and Side Contact

For details on the original "Insul-8" conductor bar products, please refer to catalog CAT1004.

Series 811, 812, 813, 815, 831, 842

For details on our German-made conductor rail lines, please refer to catalog KATO***-0001-US (***) = series no.)



Omaha Plant



Harlan Plant

Conductor Bar Summary Chart

Conductor Bar Lines Manufactured in the USA

8-Bar and Side Contact are shown in catalog CAT1004. Hevi-Bar MD is shown in CAT1011.

	Safe-Lec 2	Hevi-Bar II	Hevi-Bar MD	8-Bar	Side Contact
Common Applications	Small to medium overhead cranes, moderate curves	Medium to large overhead cranes, higher speeds	Very large cranes, mill handling systems, and transit	Small to medium overhead cranes, tighter curves	Constrained spaces, slip ring applications, curves
Bar Ampacity Selections	100 125 160 200 250 315 400	500 700 1000 1500	2200 3800 4500 6000	40 90 110 250 350 500	40 90 110 250 350
Max. Voltage	600	600 ¹	600 ¹	600	600
Max. Speed ² ft/min (m/min.)	1200 (365.7)	2000 (609.6)	2000 (609.6)	900 (274.3)	600 (182.8)
Bar Spacing in. (mm)	1.69 (43)	3.0 (76.2)	7.0 (177.8)	3.0 (76.2)	1.375 (34.9)
Cover Temps Low 160°F (71°C) Med 250°F (121°C) High 400°F (204°C)	Low Med	Low Med. High (700A & 1000A only)	n/a	Low Med. High	Low Med.
Outdoor Rated?	Yes	Yes	Yes	Yes	No
Dura-Coat Available?	No	Yes	No	No	No
Orientation (Collector Entry)	Bottom/Side	Bottom/Side	Bottom/Side/Top	Bottom/Side	Side Only
Min Bend Rad Low-Temp Cover in. (mm)	60.0 (1524)	Consult Factory	n/a	18.0 (457) ³ 45.0 (1143) ⁴	9.0 (228)
Med-Temp. Cover in. (mm)	60.0 (1524)	See Page 48	n/a	57.0 (1447)	57.0 (1447)
Heater Wire Available?	Yes	500A only	n/a	No	No

¹ Can be configured for 5000 volts and more - contact Factory. ² For faster speeds - contact Factory. ³ The "easy way" (bar profile vertical) ⁴ The "hard way" (horizontal)

Don't see what you need? Give us a call. We offer hundreds of special designs and options!

“Quick Quote Web” Online System Quoting Program

Do you specify or purchase Conductor Bar Systems, Festoon Systems, or Push Button Pendants on a regular basis? If so, we recommend that you use our innovative **Quick Quote Web** online configuration tool. To access the program, all you need is a **Partners Site** login - see below.

Need help? Call 800-621-4688, press 1

CONDUCTIX WAMPFLER

Main Menu Quote Summary Give Us Feedback

Bar Configuration Back Specifications Bar Configuration Bill of Materials Next

Bar Selection

Bar Type Safe-Lec 2

Cover PVC (-22°F to 167°F)

Amperage 125 - Galvanized Steel

☒ Voltage Drop Analysis

Maximum of 2.79% drop at 0 °F

Maximum of 2.84% drop at 110 °F

Show Chart

Bar Mounting and Collectors

Collector Orientation Standard (Vertical)

Max. Hanger Spacing 59 in

Bracket Selection XA-36197 - Web Bracket Long

Hanger Selection XA-310821 - 4 Conductor Standard...

Anchors XA-310832 - Standard Anchor Cla...

Collector Type XA-310990 - 100 Amp DI Collector

Deflector (Ground Only) None

Mounting Staff Kit Crane Collector Mount

Tandem Collectors ☒

Include Sealing Lips ☐

Voltage Drop on 550 at 90A using 125 Galvanized Steel

Quote 8177109

Line Temp (°F) High Temp (110 °F) 4% Brown Cable Value

Maximum of 2.79% drop at 0 °F

Maximum of 2.84% drop at 110 °F

Close Print

Quick Quote Web:

- Configures systems based on your needs and generates a bill of material
- Allows you to create and save customized quotes for your customers
- Enables you to transmit your quote to Conductix-Wampfler as an order, at the click of a button.

Quick Quote Web specifies our most popular Conductor Bar Systems:

- Calculates crane amp draw with one or more vehicles
- Automatically calculates and graphs voltage drop with single or multiple power feed locations
- Handles advanced bar and collector mounting configurations
- Provides conductor bar system schematic

Also handles advanced features for C-track and Square Bar Festoon Systems:

- Handles most common festoon mounting configurations
- Lets you set-up cable package arrangements and trolley selection
- Handles factory prewiring and preassembly options for festoon systems

Quick Quote Web allows you to add the appropriate Push Button Pendant:

- Determines the type of pendant required based on your cable festoon system parameters
- Allows you to choose pre-configured pendants and related accessories, including pendant cable



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www.ErgonomicPartners.com
Tel: (314) 884-8884

Conductor Bar Specification Data Sheet

Request Date	_____	Sales Person	_____
Company	_____	Name	_____
	_____	Title	_____
	_____	Phone	_____
	_____	Fax	_____
Company Type	_____	E-mail	_____

APPLICATION

1. Application Type: ☐ Runway ☐ Bridge ☐ Monorail ☐ Other
2. ☐ New Approved Installation? ☐ Extended Existing? ☐ Replacement?
3. System Length: _____ ☐ Feet ☐ Meters
4. Total # of Conductors: _____ Will one conductor be designated as a ground? ☐ Yes ☐ No

ENVIRONMENTAL DATA

Describe the environment where the conductor system will be located:

1. ☐ Indoors ☐ Outdoors ☐ Both Indoors and Outdoors ☐ Outdoor & Ice
2. Ambient temperature range: Min. _____ Max. _____ Degrees ☐ Fahrenheit ☐ Celcius
3. Radiant Heat Temperature Range: Min. _____ Max. _____ ☐ Fahrenheit ☐ Celcius
4. Will a heater wire need to be included? ☐ Yes ☐ No (If yes, consult factory)
5. Is there a source of corrosion present? ☐ Yes ☐ No **Refer to Appendix I Pg. 57**
If yes, describe the corrosive: _____
6. Other environmental considerations (dust, etc.)? _____

MECHANICAL DATA

1. Vehicle Speed _____ ☐ feet/min ☐ M/min Duty Cycle: _____
2. Number of vehicles or trolleys: _____ Crane Class (if applicable) _____
Refer to Appendix I Pg. 60.
3. Will Conductix-Wampfler be supplying mounting brackets? ☐ Yes ☐ No
4. Does the system include any curves? ☐ Yes ☐ No
If Yes; Radius _____ ☐ Feet ☐ Meters Angle _____ °degree
5. Mounting Position (w/regards to the monorail: ☐ Inside ☐ Outside ☐ Both
6. Other mechanical notes: _____

ELECTRICAL SPECIFICATIONS

1. Number of power feeds: _____
2. Location of power feeds (check all that apply): ☐ Center ☐ Multiple ☐ End **Refer to Appendix I Pg. 58**
☐ Advanced: Distance power feeds will be from end of system: _____ (or attach diagram)
3. Number of power phases: _____ Operating voltage: _____ (volts) ☐ AC ☐ DC
4. Total current draw: (sum of all vehicles) _____ (Amps) Demand factor _____ (typically .9)
5. Operating Frequency _____ (Hz - USA is 60 Hz) (Refer to chart on Pg. 7 for multiple cranes)

Conductor Bar Specification Data Sheet

Sizing systems for multiple hoists, motors, and/or multiple cranes

For a single crane: Size the conductor bar to handle 100% of the current draw of the largest motor or group of motors, plus 50% of the combined current draw of the other motors on the vehicle.

For multiple cranes or vehicles: Determine the current draw for each crane/vehicle, using the method above. Sum all the current draws for each crane/vehicle, then multiply the sum by the appropriate demand factor:

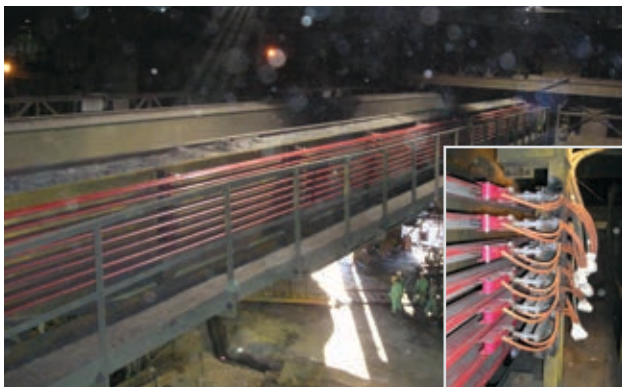
# of Cranes/vehicles	Demand Factor
2	.95
3	.91
4	.87
5	.84
6	.81
7	.78



Hevi-Bar II - Process Crane



Hevi-Bar II - Mill Application



Hevi-Bar II - Foundry Crane



Hevi-Bar II - Curved System

Safe-Lec 2 Overview & Design Features

Safe-Lec 2™ - The “next generation” in electrification for overhead cranes and other moving equipment. This modern system delivers safe, reliable power in a rugged, easy-to-install package. **UL Listed.**



Safe-Lec 2 is ideal for:

- Small to medium cranes
- Monorails
- Conveyor systems
- Material Handling Equipment
- Moderately curved systems
- Amusement rides

Ampacity range:

100A, 125A, 160A, 200A, 250A, 315A, & 400A capacities up to 600 volts maximum.

Maximum Speed:

1200 ft/min

Options:

Heater wire systems (Pg. 26), stainless steel hardware, green bonding (ground) conductor covers, black “UV resistant” outdoor covers, curved systems to a minimum of 60” radius (curved at our factory).

Safe-Lec 2 Features:

- Positive shoe tracking and superior conductivity. Long-wearing shoe is guided by the V-contact in the rail.
- Robust collector arm articulates to help maintain contact.
- IP2 “finger safe” operation; no live parts exposed.
- Secure, bolted splice joints pre-installed on conductors for superior electrical connection. Won’t pull apart over time. Includes one-piece snap-on cover.
- Integrated collector cables; won’t snag on moving equipment.
- Peaked insulating covers to shed dust and water. The same cover profile fits all bar styles; fewer parts to stock.

Safe-Lec 2 Installs Quickly:

- Less expense and shorter crane downtime.
- Requires fewer splice joints; 14’ 9” (4.5m) rail lengths versus 10’ for most other systems.
- Includes pre-installed splice joints on one end of bar.
- Uses multi-pole hanger; multiple bars snap into the same hanger and hanger mounts with a single bolt.
- Requires fewer expansion joints; up to 492’ (150m) without an expansion section.
- Is easy to install and align with slotted hanger brackets.
- Is easy to wire; power wires connect to lug at base of collector. Requires no in-line splices or connectors.

Automate your quotations with our advanced “Quick Quote” software - See Pg. 5.

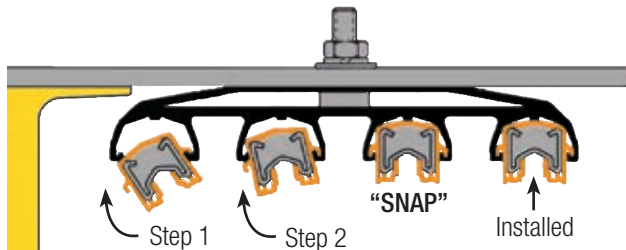
Safe-Lec 2 Overview & Design Features

Here are several specific reasons why Safe-Lec 2 is superior to a traditional (and now outmoded) 8-Bar system. And we should know . . . we invented 8-Bar over 50 years ago!

Safe-Lec 2

Quicker and less costly Installation

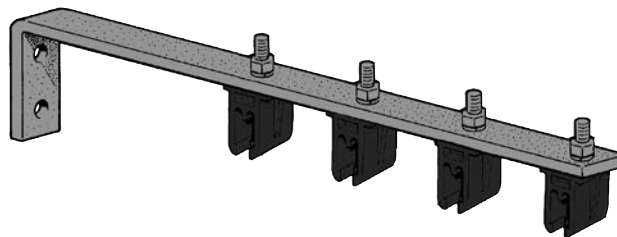
- 14.76 ft (4.50m) bar lengths; fewer joints
- Multiple pole hangers; a “snap” to install



- Wires connect into lug integrated in the collector arm

8-Bar

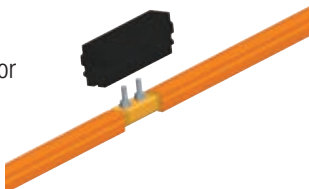
- 10 ft (3.05m) bar lengths; more splices required
- Hangers hold only one bar each



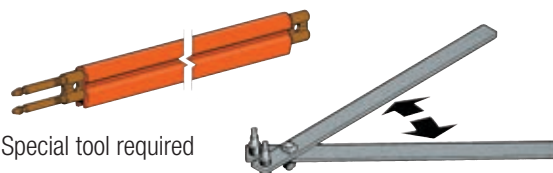
- Wires must be spliced to collector pigtails

More secure splice joint

- Bolted joints
- No special tools required
- No need for “joint keepers” or “joint repair kits”, etc



- Pinned joint can pull apart; requires special parts



- Special tool required

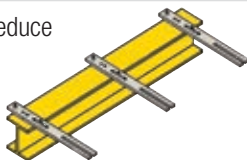
Fewer expansion sections required

- Safe-Lec 2 can go 492 ft (150m) before an expansion is required

- 8-Bar can only go 300 ft before an expansion section is required (or 200 ft for copper bar)

Easier system alignment

- Slotted brackets are available to reduce hole alignment problems
- System alignments are easy!



- Brackets have round holes, so alignment must be perfect
- Harder to make system alignment adjustments



Superior Collector Shoe Tracking

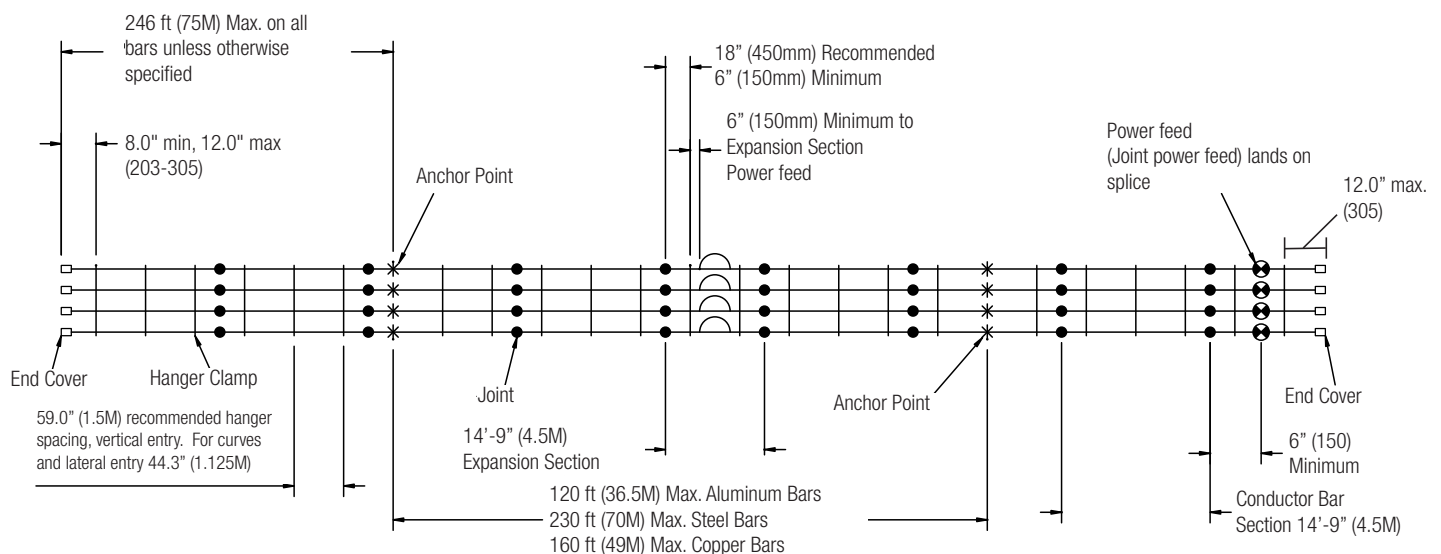
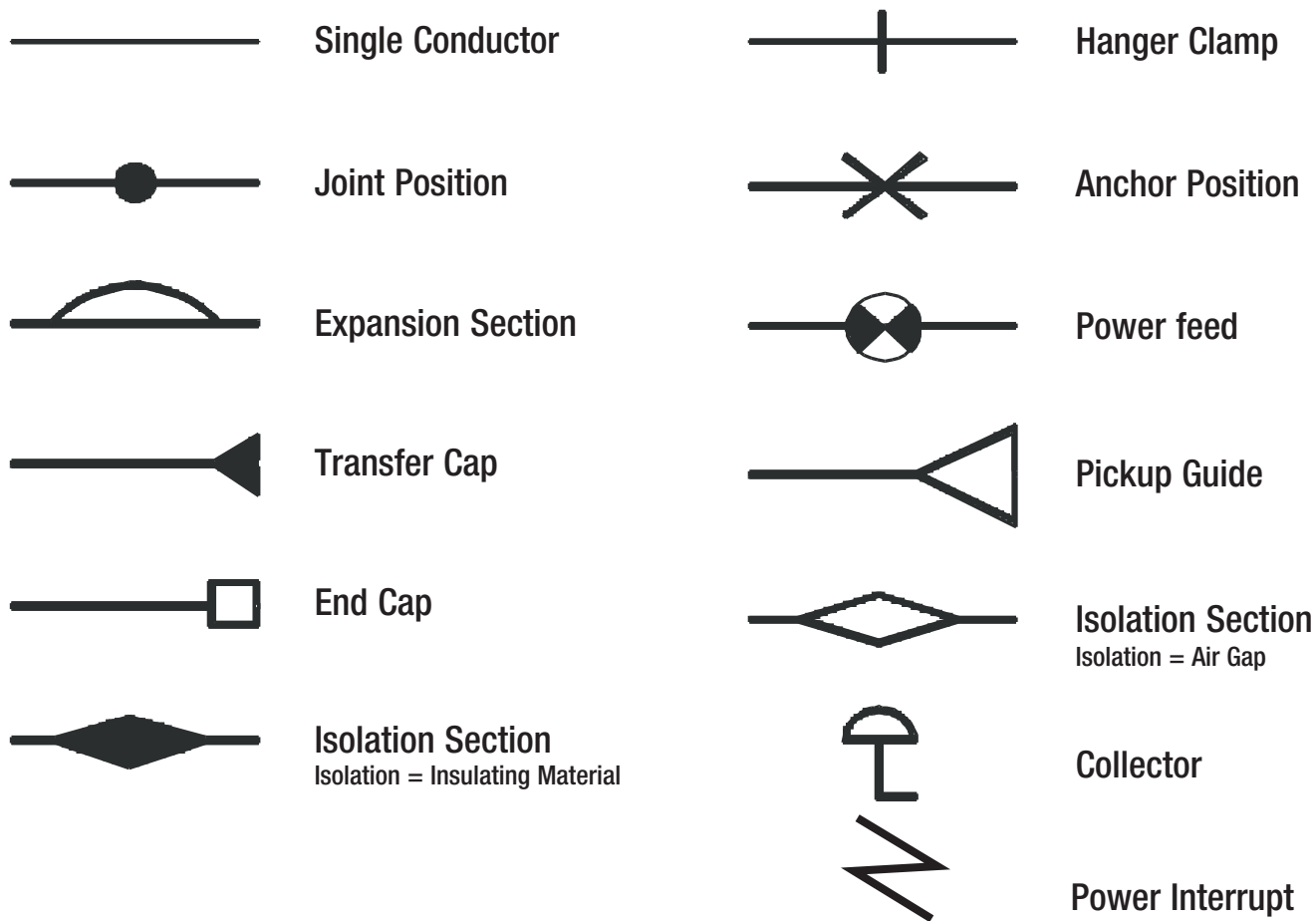
- Shoe is guided by the V-contact in the metal bar
- Collector arm articulates to accommodate mild system misalignments



- Shoe is guided by the plastic cover
- Accurate system alignment is much more critical



Typical 4-Bar Safe-Lec 2 System



Notes: Maximum length without expansions; 492' (150M), use anchor clamp at center

Maximum Runway Without Expansions = 492'

ATTENTION: CURVED BAR TO BE FACTORY BENT ONLY!

Dimensions are in Inches (mm)

NOTE: Maximum Recommended Hanger Spacing:
1.125 Meters (44")
On all Lateral Mount Systems
Curved Systems (curved section only)

Electrical Ratings for Safe-Lec 2

Voltage Drop Calculations

Volt drop calculation 3U :

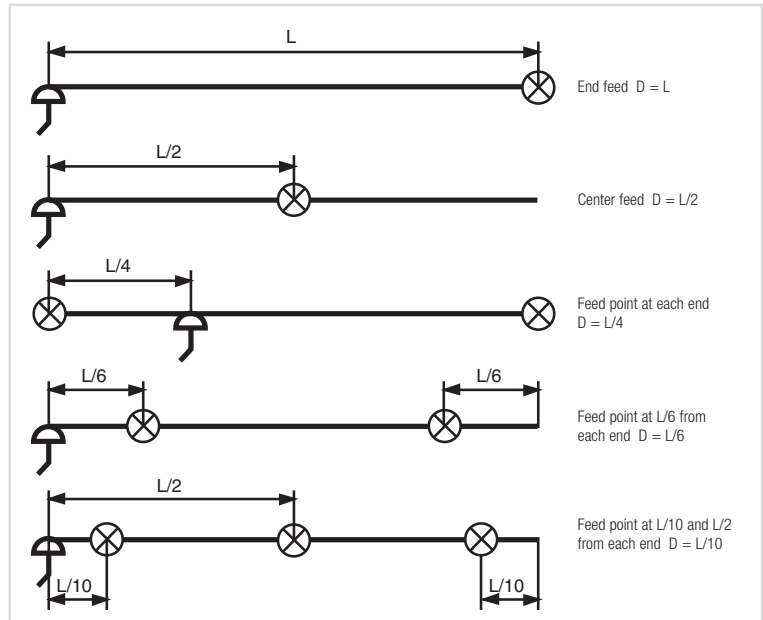
$$\begin{aligned} \text{3-Phase AC} & \quad \Delta U = \sqrt{3} \times I \times D \times Z \\ \text{Single Phase AC} & \quad \Delta U = 2 \times I \times D \times Z \\ \text{Continuous current DC} & \quad \Delta U = 2 \times I \times D \times R \end{aligned}$$

$$\Delta U\% = (^3U \times 100) / U$$

Where:

- ΔU : voltage drop in Volts
- U_n : Nominal voltage
- I : Maximum current in amps
- D : Distance between the feed and pick-up points in meters.
- R : Resistance of conductor in ohms per meter (see Pg. 13)
- Z : Impedance of conductor in ohms per meter (see Pg. 13)

See Appendix I and Appendix II for more information about voltage drop.



Current Rating

The maximum allowable continuous current rating of the conductor bar depends on the Duty Factor "K" of the cranes and the maximum ambient temperature T_a . Allowable current (I) is calculated using the following formula:

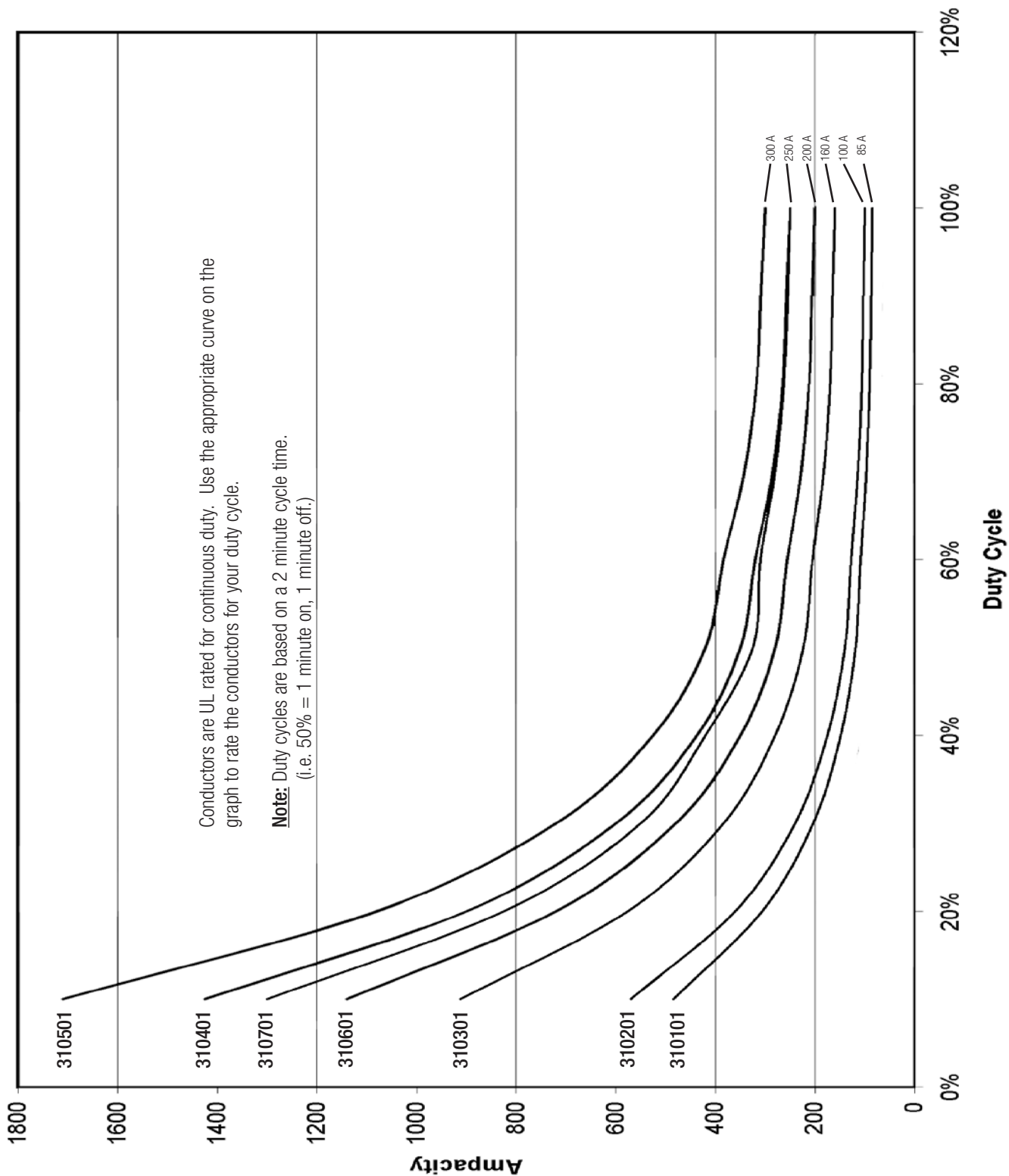
$$I_{\text{allowable}} = \text{Nominal Current} \times K$$

		Factor "K"				
		Duty				
		100%	80%	60%	40%	20%
Standard Cover	T_a					
	77°F (25°C)	1.000	1.118	1.291	1.581	2.236
	95°F (35°C)	0.905	1.011	1.168	1.430	2.023
	113°F (45°C)	0.798	0.892	1.030	1.261	1.784
Medium Heat Cover	130°F (55°C)	0.674	0.754	0.870	1.066	1.508
	150°F (65°C)	0.775	0.866	1.000	1.225	1.732
	167°F (75°C)	0.707	0.791	0.913	1.118	1.581
	185°F (85°C)	0.632	0.707	0.816	1.000	1.414

For UL rated capacities, see graph on Pg. 12

Safe-Lec 2 Electrical Ratings

Conductor De-rating



Safe-Lec 2 Specifications

The appropriate conductor bar can be chosen only when all the relevant factors are known. Please refer to the Data Sheet on Pg. 6, and to Appendices I through IV at the back of this catalog. Also, please consult Conductix-Wampfler sales if you have any questions about the suitability of this product to your application.

Safe-Lec 2 Conductor Bar

	Galvanized Steel		Copper			Aluminum / Stainless Steel		
Nominal Current	100A	125A	160A	250A	400A	200A	315A	400A
Cross Sectional Area	63mm ²	93mm ²	50mm ²	63mm ²	93mm ²	104mm ²	120mm ²	156mm ²
Maximum System Voltage AC or DC (Per UL listing) *	600V	600V	600V	600V	600V	600V	600V	600V
Resistance R (for DC) at 20° C (Ω/m)	0.002867	0.001933	0.000342	0.000274	0.000184	0.000301	0.000261	0.000199
Impedance Z (for AC) at 20° C (Ω/m)	0.002891	0.001968	0.000364	0.000300	0.000221	0.000325	0.000288	0.000234
Maximum Allowable Ambient Temperature for 100% Duty Cycle	25°C	25°C	25°C	25°C	25°C	25°C	25°C	25°C
Bar Length	4.5m	4.5m	4.5m	4.5m	4.5m	4.5m	4.5m	4.5m
Support Pitch	Standard							
Lateral	1500mm	1500mm	1500mm	1500mm	1500mm	1500mm	1500mm	1500mm
	1125mm	1125mm	1125mm	1125mm	1125mm	1125mm	1125mm	1125mm
Minimum Pitch Centers Standard	43mm	43mm	43mm	43mm	43mm	43mm	43mm	43mm
Expansion Sections (Not required for runs less than)	150m	150m	150m	150m	150m	150m	150m	150m
Minimum Bending Radius (Horizontal only, bent at factory)	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m	1.5m

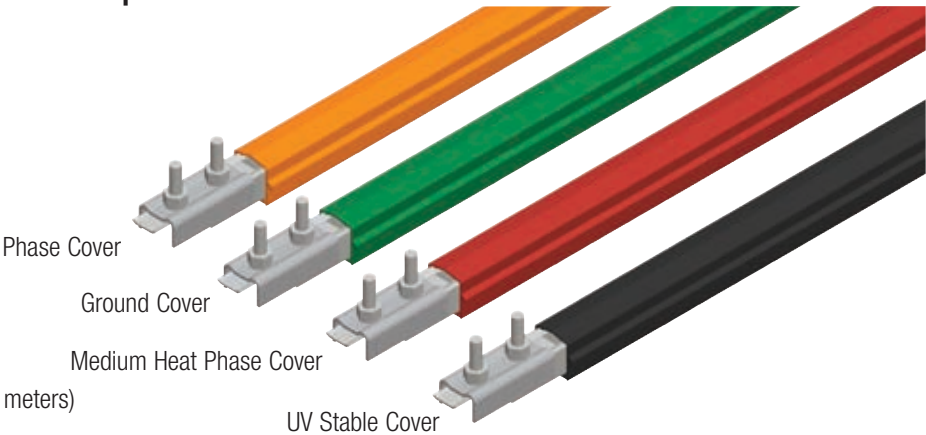
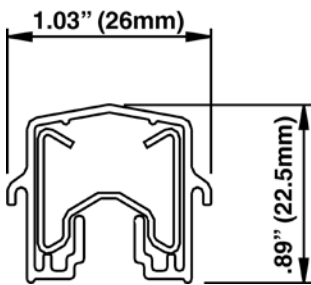
* Contact Conductix-Wampfler for other voltages

Safe-Lec 2 Conductor Bar Covers

	Standard (Orange or Green)	UV Stable (Black)	Medium Heat (Red)
Material	PVC	PVC	Polycarbonate
Dielectric Strength	271 kv/cm	271 kv/cm	165 kv/cm
Surface Resistivity	10 ¹¹ Ω	10 ¹¹ Ω	>10 ¹⁴ Ω
Volume Resistivity	>10 ¹⁵ Ω/cm	>10 ¹⁵ Ω/cm	> 2 x 10 ¹⁷ Ω/cm
Vicat Softening Temperature Never expose PVC cover to temperatures in excess of 176° F (80° C)	160°F (71.1°C)	160°F (71.1°C)	304°F (121.1°C)
Flame Test	Self extinguishing	Self extinguishing	Self extinguishing
Oxygen Index	54%	54%	24%
Specific Density	1.38 g/cm ³	1.38 g/cm ³	1.2 g/cm ³

Safe-Lec 2 Galvanized Steel Bar

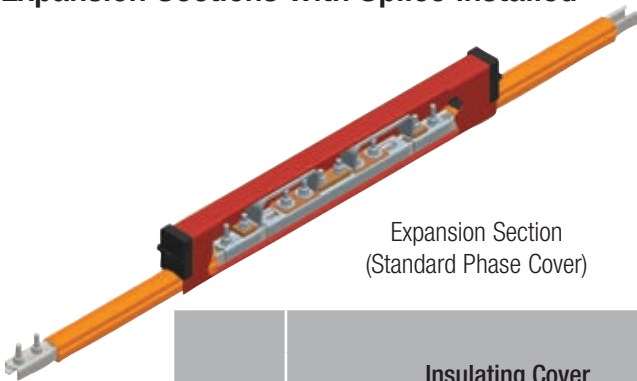
Galvanized Steel Conductor Bars - with Splice Installed



All Bar and Expansion Lengths: 14.76 ft (4.5 meters)

Bar Type	Insulating Cover			Nominal Current Rating			
				100 Amps*		125 Amps*	
	Color	Type	Max Temp °F (°C)	Part No.	Wgt	Part No.	Wgt
Phase*	Orange	PVC	160 (71.1)	310101-J	6.44 (2.92)	310201-J	8.83 (4.01)
Ground*	Green	PVC	160 (71.1)	310102-J	6.44 (2.92)	310202-J	8.83 (4.01)
Phase	Red	Polycarbonate	250 (121.1)	310103-J	6.24 (2.83)	310203-J	8.65 (3.76)
Outdoor	Black	PVC, UV Stable	160 (71.1)	310101B-J	5.98 (2.71)	310201B-J	8.27 (3.76)

Expansion Sections with Splice Installed



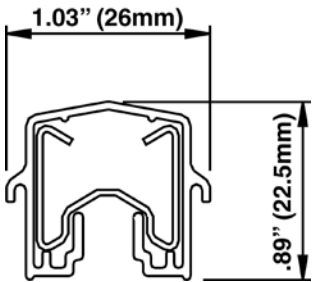
Expansion Sections are used at all structural expansion joints and for systems longer than 492 ft (150m) to allow for thermal expansion / contraction of the bar. The maximum gap of the Expansion Section is 2.0" (50 mm). The Expansion Section is installed in place of one length of conductor bar.

Bar Type	Insulating Cover			Nominal Current Rating			
				100 Amps*		125 Amps*	
	Color	Type	Max Temp °F (°C)	Part No.	Wgt	Part No.	Wgt
Phase*	Orange	PVC	160 (71.1)	310107-J	7.91 (3.59)	310207-J	10.49 (4.76)
Ground*	Green	PVC	160 (71.1)	310108-J	7.84 (3.56)	310208-J	
Phase	Red	Polycarbonate	250 (121.1)	310109-J	7.71 (3.50)	310209-J	10.0 (4.53)
Outdoor	Black	PVC, UV Stable	160 (71.1)	39130-J	7.91 (3.59)	39131-J	10.0 (4.53)

* UL Listed File E16232; at 85 amps and 100 amps respectively

Safe-Lec 2 Copper Bar

Copper Conductor Bars with Splice Installed



Standard Phase
Cover

Standard Ground
Cover

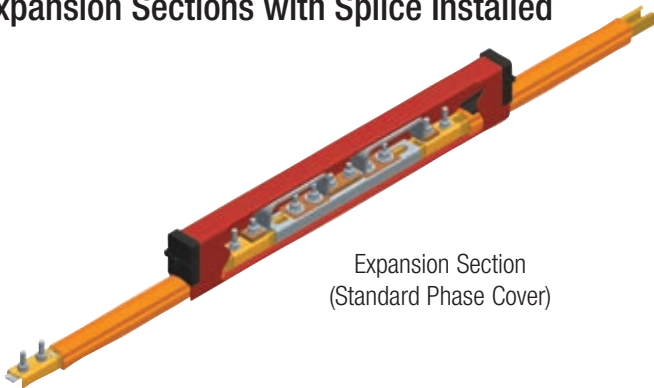
Medium Heat
Cover

UV Stable Cover

All Bar and Expansion Lengths: 14.76 ft (4.5 meters)

Bar Type	Insulating Cover			Nominal Current Rating					
				160 Amps*		250 Amps*		400 amps	
	Color	Type	Max Temp °F (°C)	Part No.	Wgt	Part No.	Wgt	Part No.	Wgt
Phase*	Orange	PVC	160 (71.1)	310301-J	6.36 (2.88)	310401-J	8.83 (4.01)	310501-J	10.0 ()
Ground*	Green	PVC	160 (71.1)	310302-J	6.36 (2.88)	310402-J	8.83 (4.01)	310502-J	
Phase	Red	Polycarbonate	250 (121.1)	310303-J	6.24 (2.83)	310403-J	8.65 (3.76)	310503-J	
Outdoor	Black	PVC, UV Stable	160 (71.1)	310301B-J	5.98 (2.71)	310401B-J	8.27 (3.76)	310501B-J	

Expansion Sections with Splice Installed



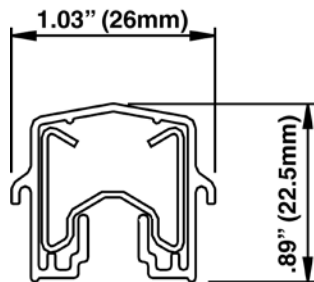
Expansion Section
(Standard Phase Cover)

Expansion Sections are used at all structural expansion joints and for systems longer than 492 ft. (150m) to allow for thermal expansion / contraction of the bar. The maximum gap of the Expansion Section is 2.0" (50 mm). The Expansion Section is 14' 9" (4.5 m) long and is installed in place of one length of conductor bar.

Bar Type	Insulating Cover			Nominal Current Rating					
				160 Amps*		250 Amps*		400 amps	
	Color	Type	Max Temp °F (°C)	Part No.	Wgt	Part No.	Wgt	Part No.	Wgt
Phase*	Orange	PVC	160 (71.1)	310307-J	6.36 (2.88)	310407-J	8.83 (4.01)	310507-J	10.0 ()
Ground*	Green	PVC	160 (71.1)	310308-J	6.36 (2.88)	310408-J	8.83 (4.01)	310508-J	
Phase	Red	Polycarbonate	250 (121.1)	310309-J	6.24 (2.83)	310409-J	8.65 (3.76)	310509-J	
Outdoor	Black	PVC, UV Stable	160 (71.1)	39132-J	5.98 (2.71)	39133-J	8.27 (3.76)	39134-J	

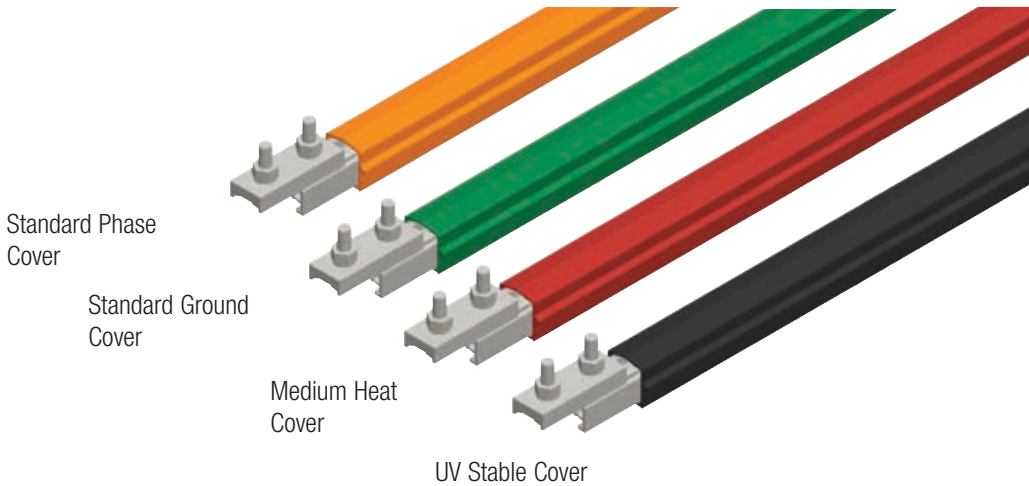
Safe-Lec 2 Aluminum / Stainless Bar

Aluminum / Stainless Steel Conductor Bars with Splice Installed



Bar Length: 14.76' (4.5m)

COVER TYPE	CURRENT RATING		
	200A	315A	400A
Standard Phase Cover (Orange)	310601-J	310701-J	399101-J
Standard Ground Cover (Green)	310602-J	310702-J	399102-J
Medium Heat Cover (Red)	310603-J	310703-J	399103-J
UV Stable (Black)	310601B-J	310701B-J	399101B-J
Wt lb (kg)	6.5 (2.9)	6.5 (2.9)	7.5 (3.4)



Expansion Sections with Splice Installed

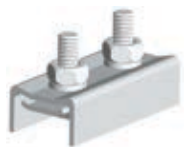


Expansion Sections are used at all structural expansion joints and for systems longer than 492 ft. (150m) to allow for thermal expansion / contraction of the bar. The maximum gap of the Expansion Section is 2.0" (50 mm). The Expansion Section is 14' 9" (4.5 m) long and is installed in place of one length of conductor bar.

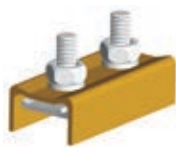
COVER TYPE	CURRENT RATING		
	200A	315A	400A
Standard Phase Cover (Orange)	310607-J	310707-J	399107-J
Standard Ground Cover (Green)	310608-J	310708-J	399108-J
Medium Heat Cover (Red)	310609-J	310709-J	399109-J
UV Stable (Black)	39135-J	39136-J	399107B-J
Wt lb (kg)	8.2 (3.3)	7 (3.72)	7 (3.72)

Safe-Lec 2 Joints & Power Feeds

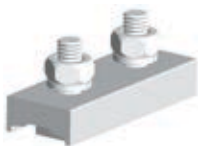
Splice Joints



Steel Joint 310872



Copper Joint 310873



Aluminum Joint 310874

One splice joint is included with bar part numbers ending with “-J” (see Pgs. 14-16)

TYPE	Part No.	Wt lb (kg)
Steel	310872	0.11 (0.049)
Copper	310873	0.12 (0.054)
Aluminum	310874	0.07 (0.032)

Joint Covers



Standard Phase Joint Cover
310850B

Must be ordered separately - one per splice joint.

TYPE	Part No.	Wt lb (kg)
Standard Cover (UV Black)	310850B	.05 (0.027)
Medium Heat Cover (Red)	310855	.06 (0.027)

Joint Compound

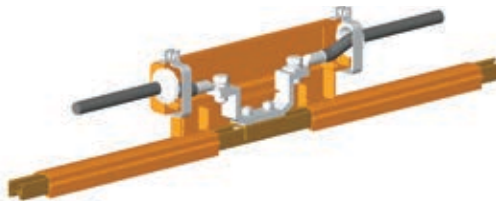


Joint compound is applied to the contact surfaces at every joint on aluminum systems. One tube is included with every aluminum/stainless bar system at a nominal cost and is sufficient for over 300 connections (equal to a 1000 foot long system with four phases).

Part No.	Wt lb (kg)
15629	.50 (0.225)

Joint Power Feeds

The Joint Power Feed is usually installed on top of a splice joint. Cable lugs are customer supplied.



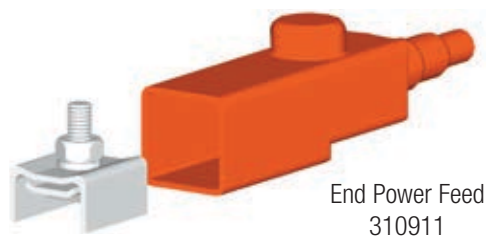
250A Joint Power Feed
310910B

CURRENT RATING

TYPE	Up to 250A	Up to 400A
Standard Cover (Black)	310910B	310912B
Medium Heat Cover (Red)	310913	310915
No. of Cable Connections	2	2
Max. Cable Size	#3/0 (95mm ²)	300kcmil (150mm ²)
Wt lb (kg)	0.53 (0.24)	0.66 (0.30)

Safe-Lec 2 Hanger Clamps

End Power Feed



The End Power Feed is installed in place of an end cover. Maximum cable connection size: 6 AWG (16mm²). These are suitable for 100A Galvanized Steel Bar only.

Part No.	Wt lb (kg)
310911	0.1 (0.045)

Hanger Clamps Standard

Maximum support bracket spacing is 59.1" (1.5m) Hardware is plated steel unless noted otherwise.



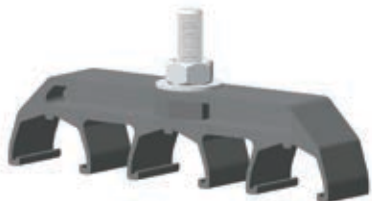
TYPE	Mounting Orientation		Acetyl (Black) 160° Max.	Polycarbonate (Red) 250° Max.	Stainless Steel	Wt lb (kg)
	Standard	Lateral				
Single Pole	X	X	310824	310829	310919	0.18 (0.08)
Two Pole	X	X	310882	310899	-	0.10 (0.045)
Three Pole	X	X	310861	310871	-	0.11 (0.05)
Four Pole	X		310821	310857	39768	0.12 (0.054)
Four Pole		X	310835	310859	50120	0.20 (0.09)



Two Pole Hanger
310882



Four Pole Hanger, Standard Mount
310821 (plated hardware)
39768 (stainless steel hardware)



Three Pole Hanger
310861



Four Pole Hanger, Lateral Mount
310835 (plated hardware)
50120 (stainless steel hardware)

Safe-Lec 2 Hanger / Anchor Clamps

Hanger Clamps With Insulator

In particularly dusty, humid, or outdoor environments, hangers with insulators should be used. Two-Part Hangers are ideal for installation where conductor bar must be repeatedly installed and removed.



Single Pole Hanger
310918

TYPE	Material	Max. Temp	Part No.	Wt lb (kg)
Single Pole	Acetyl (Black)	160° F	310918	0.12 (0.054)
Single Pole	Polycarbonate (Red)	250° F	310834	0.13 (0.058)
Single Pole	Stainless Steel	250° F	38779	0.15 (0.068)
Single Pole, Two-Part	Acetyl (Black)	160° F	399544B	0.18 (0.082)
Two Pole, Two-Part	Acetyl (Black)	160° F	399647	0.29 (0.131)



Single Pole Hanger
310834



Stainless Steel Hanger
38779



Two-Part Single Pole
Hanger
399544B



Two-Part Two Pole
Hanger
399647

Anchor Clamps

Anchor points are usually situated in the middle of a conductor system. Additional anchor points are required for systems with expansion sections.



Anchor Clamp
310832 (plated hdwe)
310833 (stainless steel hdwe)

TYPE	Max. Temp	Part No. Plated Steel Hdwe	Part No. Stainless Steel Hdwe	Wt lb (kg)
Standard	250° F	310832	310833	1.22 (0.55)
With Insulator	250° F	310969	38780	0.52 (0.24)
Without Top Bolt (Two req'd per anchor point)	250° F	310831	38220	0.45 (0.20)



Anchor Clamp, with Insulator
310969 (plated hdwe)
38780 (stainless steel hdwe)



Anchor Clamp, without Top Bolt
310831 (plated hdwe)
38220 (stainless steel hdwe)

Safe-Lec 2 End Caps & Pick Up Guides

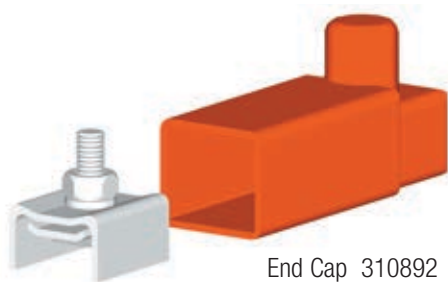
End Caps

End Caps are insulated covers installed at the ends of the conductor system. Transfer Caps transfer the collectors across switch gaps up to 0.40" (10mm) wide.

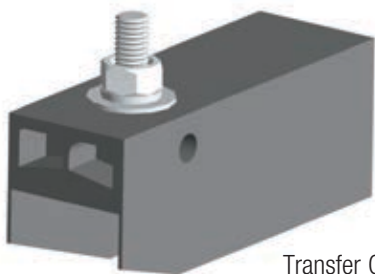
Transfer Cap Tolerances

Vertical tolerance $\pm 0.20"$ (5mm)

Horizontal tolerance $\pm 0.08"$ (2mm)



End Cap 310892



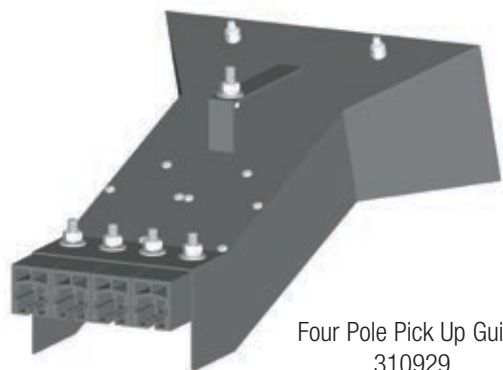
Transfer Cap 310951

TYPE	Material	Part No.	Wt lb (kg)
End Cap Steel / Copper Bar	PVC	310892	0.07 (0.03)
End Cap Aluminum Bar	PVC	310893	0.05 (0.02)
Transfer Cap	Polycarbonate	310951	0.24 (0.11)

Pick Up Guides

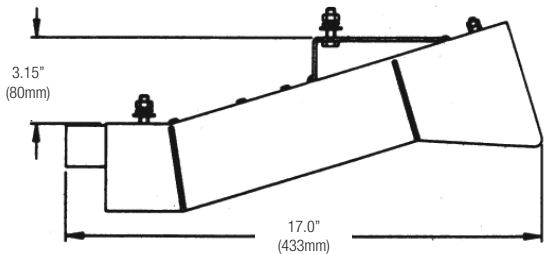
Pick-up Guides are used on discontinuous systems to guide collectors on and off the conductors. Special collectors are required for systems where pick up guides are fitted - see Pg. 22. Guide housing is black painted steel. Guide surfaces are PVC. Molded guides are Polycarbonate.

Not recommended for lateral mounting



Four Pole Pick Up Guide
310929

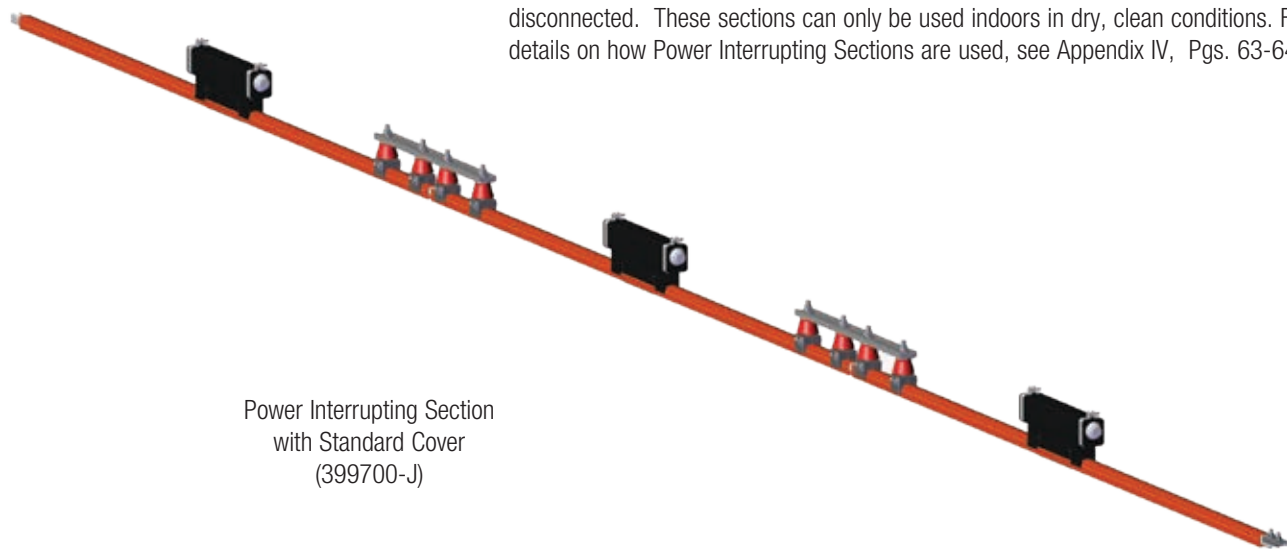
TYPE	Part No.	Wt lb (kg)
Single Pole	310920	2.8 (1.27)
Three Pole	399502	4.6 (2.10)
Four Pole	310929	5.6 (2.54)



Safe-Lec 2 Power Interrupting Sections

Power Interrupting Sections with Splice Installed

Power Interrupting Sections provide a dead or safe zone between adjacent, separately powered zones of the system. Each section is 14' - 9" (4.5m) long and is installed in place of one length of conductor bar. It is recommended that Power Interrupting Sections are not mounted in ground conductors so that the ground is never disconnected. These sections can only be used indoors in dry, clean conditions. For details on how Power Interrupting Sections are used, see Appendix IV, Pgs. 63-64.



Power Interrupting Section
with Standard Cover
(399700-J)

Galvanized Steel Bar

COVER TYPE	CURRENT RATING	
	100A	125A
Standard Phase (Orange)	399700-J	399700-J
Medium Heat (Red)	399702-J	399702-J
UV Stable (Black)	399701-J	399701-J
Wt lb (kg)	13 (5.1)	13 (5.1)

Copper Bar

COVER TYPE	CURRENT RATING		
	160A	250A	400A
Standard Phase (Orange)	399703-J	399703-J	399706-J
Medium Heat (Red)	399705-J	399705-J	399708-J
UV Stable (Black)	399704-J	399704-J	399707-J
Wt lb (kg)	12 (5.44)	12 (5.44)	15 (6.80)

Aluminum / Stainless Steel Bar

COVER TYPE	CURRENT RATING		
	200A	315A	400A
Standard Phase (Orange)	399709-J	399712-J	399715-J
Medium Heat (Red)	399711-J	399714-J	399717-J
UV Stable (Black)	399710-J	399713-J	399716-J
Wt lb (kg)	9 (4.1)	10 (4.53)	11 (5)

Safe-Lec 2 Collectors & Shoes

Safe-Lec 2 “V-Contact” Collectors articulate to accurately track in the conductor bar groove for superior conductivity. Includes long-wearing copper graphite shoe (in holder) and shunt wires as noted below. The green “ground” (earth) collectors are available without “deflector”, or with either right-hand or left-hand deflector. Deflectors prevent the ground collector from coming in contact with adjacent phase collectors. For recommendations about choosing collectors see Appendix I, Pg. 57.

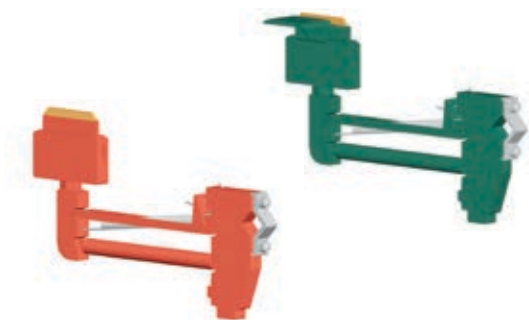
50A Collectors



Collector shoe shunt wire is integrated into the arm. Incoming cable is connected to the terminal lug at the base of the collector (maximum 8 AWG).

TYPE	Part No.	Wt lb (kg)
Phase (Red)	399360	0.84 (0.38)
Ground, w/o Deflector	399380	0.85 (0.39)
Ground, with RH Deflector	399373	0.87 (0.39)
Ground, with LH Deflector	399372	0.87 (0.39)

100A Collectors



Collector shoe shunt wire is integrated into the arm. Incoming cable is connected to the terminal lug at the base of the collector (maximum 2 AWG).

TYPE	Part No.	Wt lb (kg)
Phase (Red)	310990	1.74 (0.78)
Ground, w/o Deflector	399355	1.74 (0.78)
Ground, with RH Deflector	399340	1.80 (0.82)
Ground, with LH Deflector	399352	1.80 (0.82)

Collectors used with Pick-up Guides Only, See Pg. 20.

Phase (Red)	310988	2.42 (1.09)
Ground	399358	2.42 (1.09)

200A Collectors



Two 2 AWG cables, 42” long, are connected to the collector shoe. Incoming cables splice directly to the shunt wires.

Type-Color	Part No.	Wt lb (kg)
Phase (Black)	34956	4.16 (1.89)
Stainless Steel	531632	4.16 (1.89)
Lateral Mount	532146	4.16 (1.89)

Collector Shoe & Holder



50A / 100A Collector
Shoe and Holder
310993

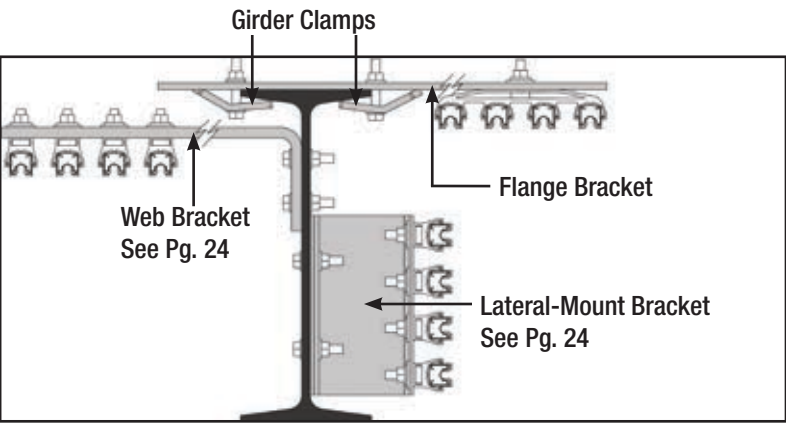


200A Collector Shoe
and Holder
35289

Current Rating	50A & 100A Phase (Red)	50A & 100A Ground (Green)	50A & 100A with Deflector (Green)	200A
Part No.	310993	399357	399356	35289
Wt lb (kg)	0.185 (0.08)	0.07 (0.03)	0.25 (0.11)	0.45 (0.20)

Cleaning Shoe (Cast Iron)	50A & 100A	200A
Part No.	39157	N/A
Wt lb (kg)	1.0 (0.08)	N/A

Safe-Lec 2 Conductor Flange Brackets



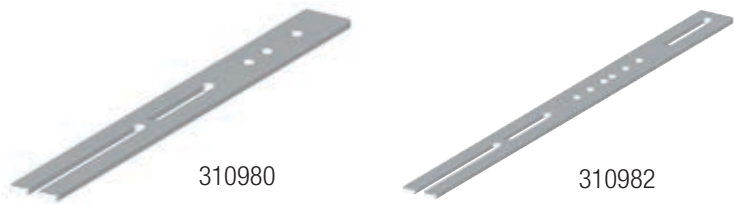
Example Bracket Installations

The various mounting brackets shown on this page and Pg. 24 are used to mount Safe-Lec 2 in many different configurations to suit the application. The diagram shown at the left illustrates how the various brackets are mounted to the I-beam. **All brackets are zinc plated unless noted otherwise.**

Recommended Max. Bracket Spacing

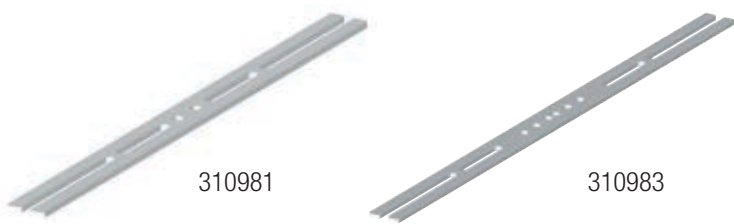
Application	Collectors Coming Into	Spacing
Vertical Entry	Bottom of rail	59.0" (1.500 M)
Lateral Entry	Side of rail	44.3" (1.125 M)
Curves	Bottom of rail	44.3" (1.125 M)

Single-sided Flange Brackets



For Beam Flange:	Part No.	Wt lb (kg)
3.15" to 6.10" (80 to 155 mm)	310980	1.415 (0.64)
6.10" to 12.01" (155 to 305 mm)	310982	1.945 (0.88)
6.10" to 12.01" (155 to 305 mm)	530987 Stainless Steel	1.945 (0.88)

Double-sided Flange Brackets



For Beam Flange:	Part No.	Wt lb (kg)
3.15" to 7.28" (80 to 185 mm)	310981	1.805 (0.82)
7.28" to 12.01" (185 to 305 mm)	310983	2.37 (1.08)

Girder Clamp



Two required with each flange bracket.

Part No.	Wt lb (kg)
51142	0.255 (0.12)
537183 Stainless Steel	0.255 (0.12)

Safe-Lec 2 Conductor Web and Collector Brackets

Web Brackets

For mounting conductors horizontally, perpendicular to the web of the I-Beam - see illustration on page 23. For bracket dimensions and hole locations, see page 32.



310984



36198 or 39948



36197

Length in.(mm)	Material	Part No.	Wt lb (kg)
10.25 (260)	Plated steel	310984	1.34 (0.61)
10.50 (267)	Plated steel	36198	1.21(0.55)
10.50 (267)	Stainless steel	39948	1.18 (0.54)
15.75 (400)	Plated steel	36197	2.39 (1.08)

Lateral Mount Bracket

For mounting conductors laterally to the web of the I-Beam. See drawing at the top of Pg. 23,



Part No.	Material	Wt lb (kg)
399517	Plated steel	1.64 (0.74)

Collector Brackets

For mounting collectors to the moving vehicle, which positions the collectors to slide along the bar.



39618C



39050



39617 or 52336



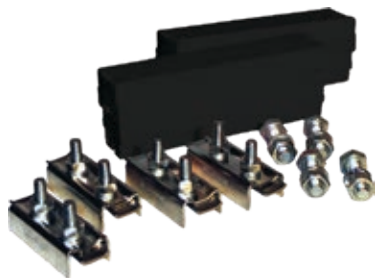
37863 or 534687

# of Posts	For Collector:	Material	Post Size in. (mm)	Length (in.)	Part No.	Wt lb (kg)
Single	50A	Plated steel	0.50 (12.7)	16.0	39618	1.58 (0.72)
Single	50A	Plated Steel	0.50 (12.7)	8.0	39618C	1.01(0.46)
Double	50A	Plated steel	0.50 (12.7)	16.0	39050	3.90 (1.77)
Single	100A or 200A	Plated steel	1.00 (25.4)	16.0	39617	1.72 (0.78)
Single	100A or 200A	Stainless steel	1.00 (25.4)	16.0	52336	1.72 (0.78)
Double	100A or 200A	Plated steel	1.00 (25.4)	16.0	37863	4.35 (1.97)
Double	100A or 200A	Stainless steel	1.00 (25.4)	16.0	534687	4.35 (1.97)

Safe-Lec 2 Splice Hardware Kits

When you're 40 feet in the air, small parts will unavoidably fall to the floor. Conductix-Wampfler now provides the spare parts that you need to make your installation easier. These parts are included with every Safe-Lec 2 system and are available using the information below.

For 100, and 125 Amp Systems



Includes:

- 4 Steel Splice Assemblies
- 2 Splice Covers
- 4 Bolts, Nuts, and Washers for the Bar Hangers

Description	Part No.
Hardware Kit, 100, or 125 Amp	37906

For 160, 250, and 400 Amp Systems



Includes:

- 4 Copper Splice Assemblies
- 2 Splice Covers
- 4 Bolts, Nuts, and Washers for the Bar Hangers

Description	Part No.
Hardware Kit, 160, 250, or 400 Amp	37907

For 200, 315 and 400 Amp Systems



Includes:

- 4 Aluminum Splice Assemblies
- 2 Splice Covers
- 4 Bolts, Nuts and Washers for the bar hangers

Description	Part No.
Hardware Kit, 200, 315, or 400 Amp	37908

Safe-Lec 2 Heater Wire

Heater Wire System

A heater wire system is recommended for outdoor applications where frost and ice buildup may occur. The thermostatic control box will automatically energize the heater wire system at temperatures of 35°F (1.66°C) and below. Heater wires are pre-installed in each section of bar. Please consult Conductix-Wampfler for assistance in selecting the correct heater wire system.

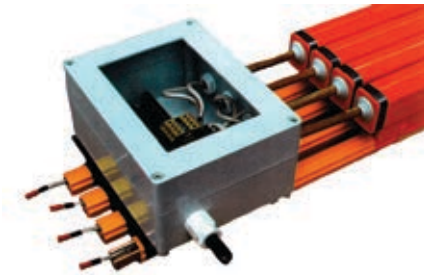


Heater Wire (Male/Female)

Heater Wire Connection

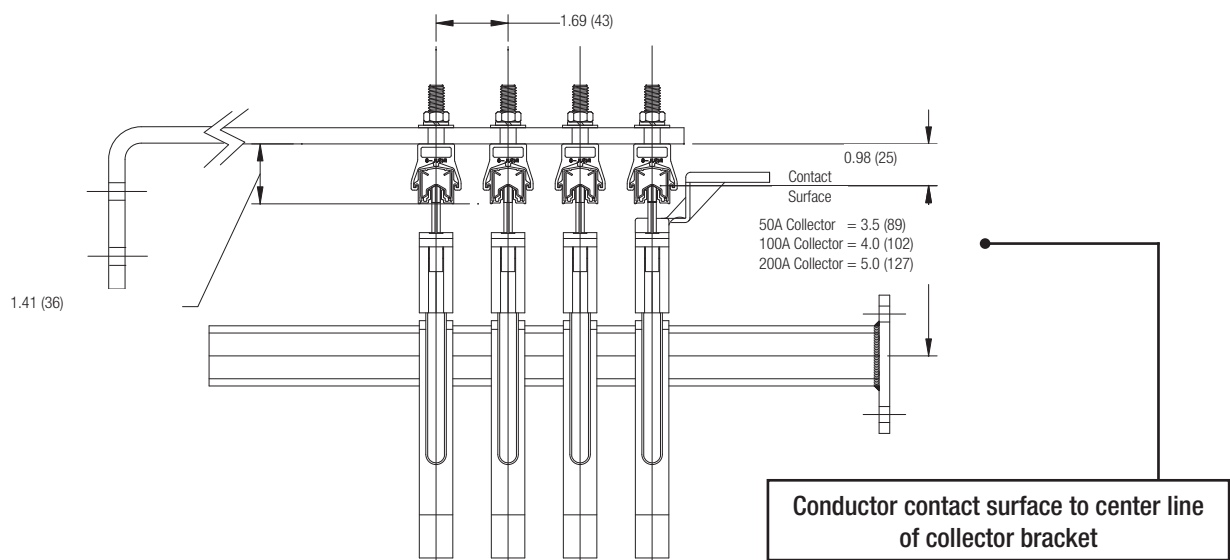


Main Connection Box

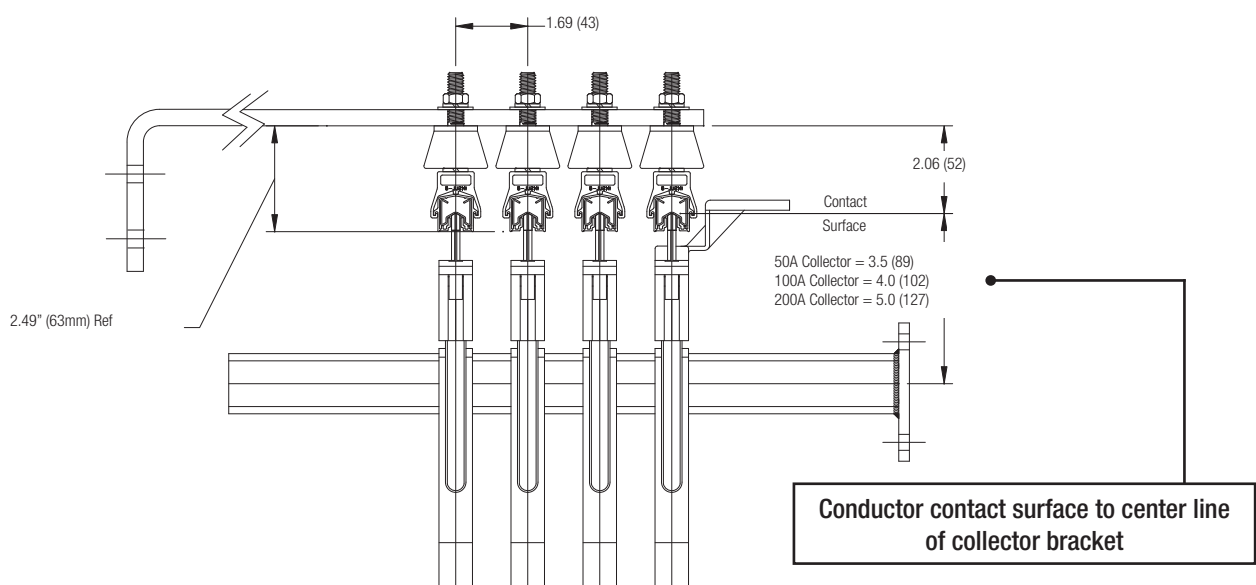


Safe-Lec 2 Installed Dimensions

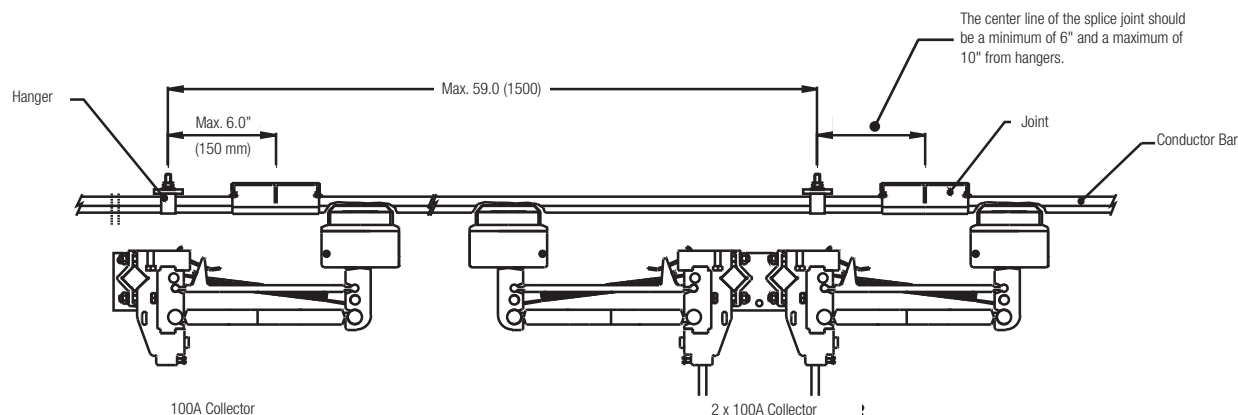
End View - Standard Hanger Clamps



End View - Hanger Clamps with Insulator



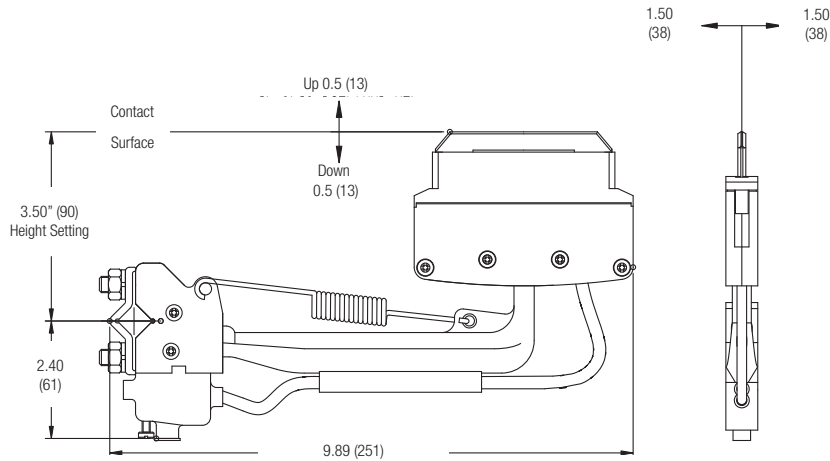
Side View



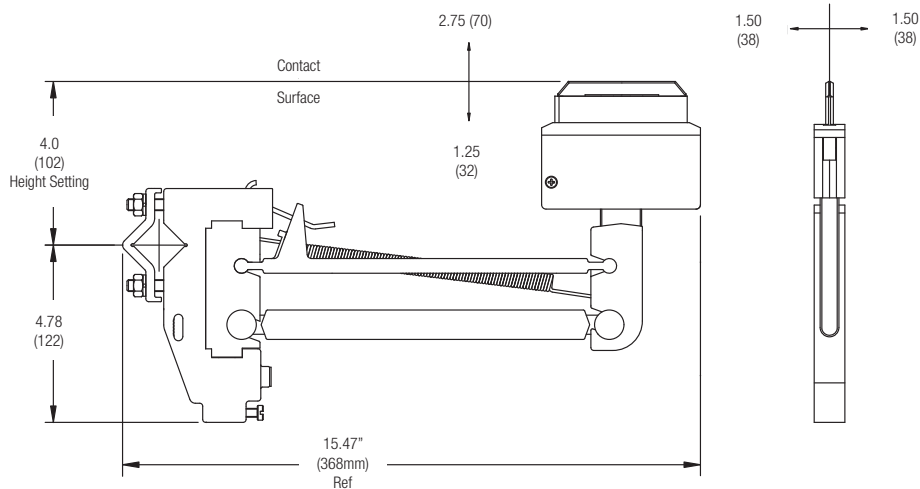
Safe-Lec 2 Collector Dimensions

All dimensions are inches (mm), reference dimensions only

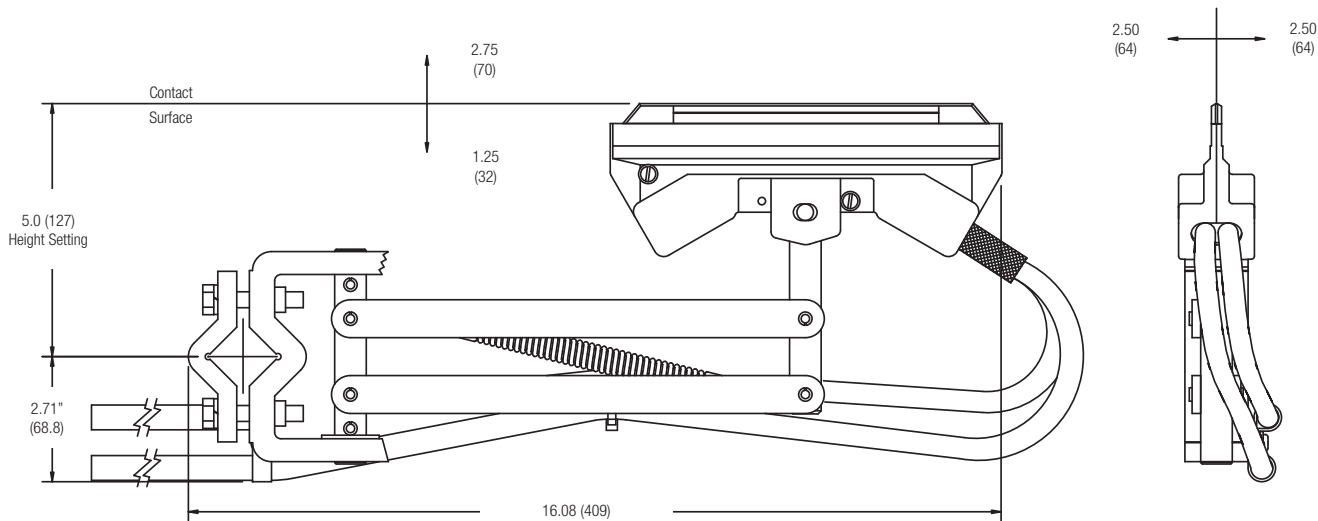
50A Collector (399360)



100A Collector (310990 / 399355)

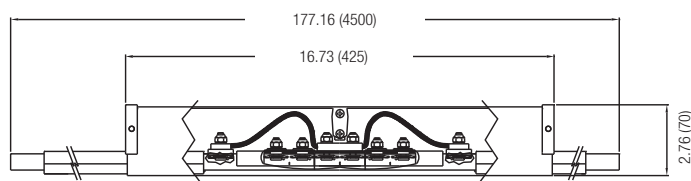


200A Collector (34956)

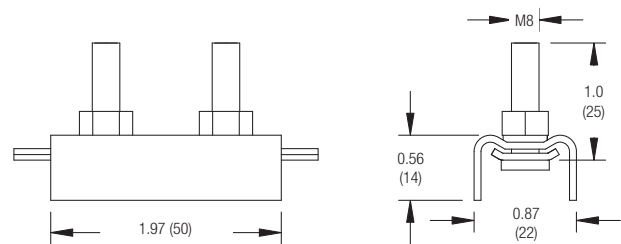


Safe-Lec 2 Component Dimensions

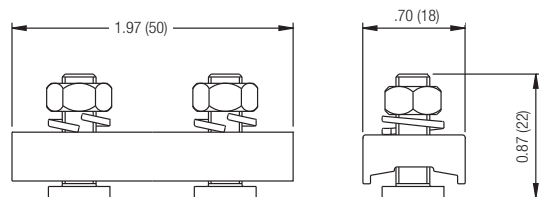
All reference dimensions are in inches (mm)



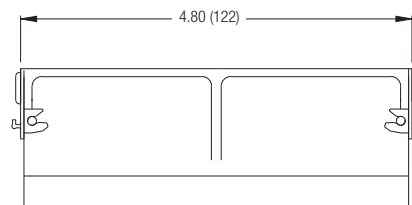
Expansion Section
(Typical)



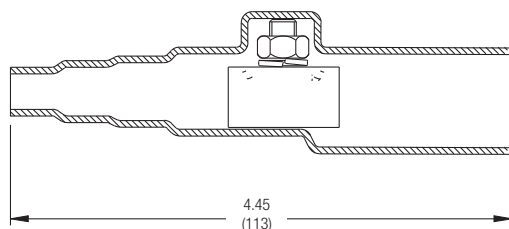
Steel Joint / Copper
(310872) / (310873)



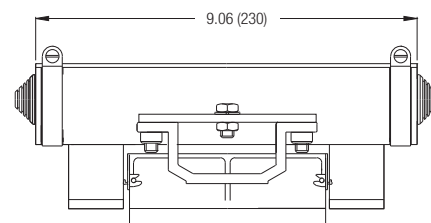
Aluminum Joint
(310874)



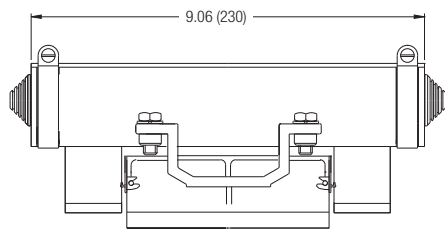
Standard Phase Cover
(310850B)



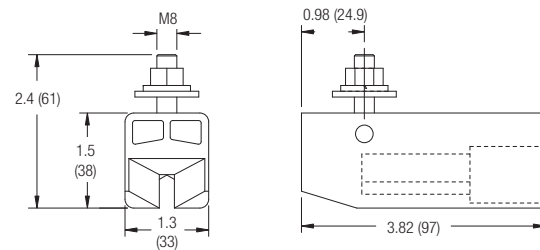
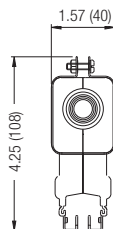
End Power Feed
(310911)



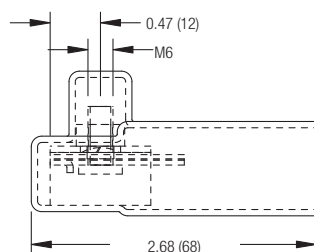
400A Joint Power feed
(310912B)



250A Joint Power feed
(310910B)

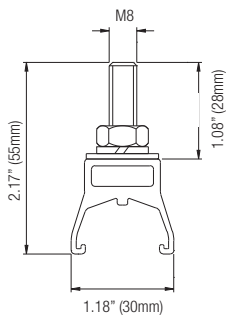


Transfer End Cap
(310951)

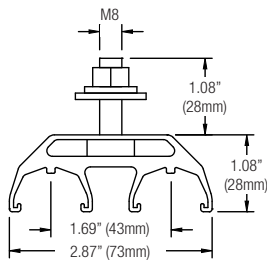


End Cap
for Aluminum Bar
(310892)

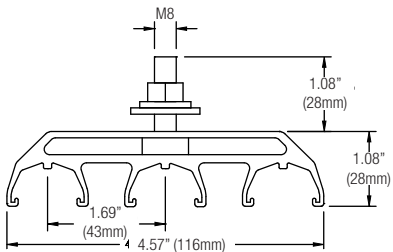
Safe-Lec 2 Component Dimensions



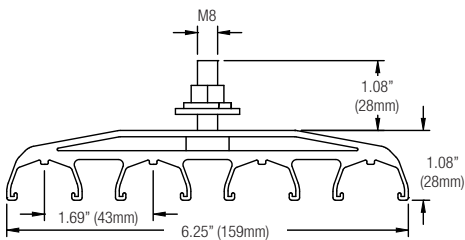
Single Pole
Hanger Clamp
Standard Mount
(310824)



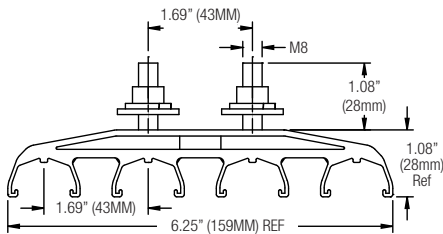
Two Pole
Hanger Clamp
Standard Mount
(310882)



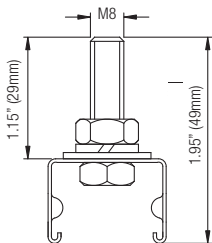
Three Pole
Hanger Clamp
Standard Mount
(310861)



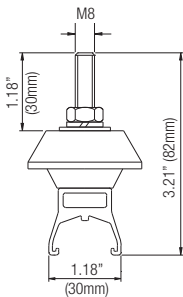
Four Pole
Hanger Clamp
Standard Mount
(310821)



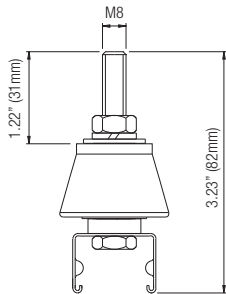
Four Pole
Hanger Clamp
Lateral Mount
(310835)



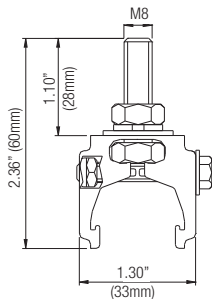
Stainless Steel
Hanger Clamp
(399416B)



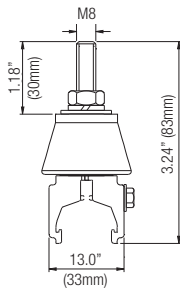
Single Pole
Hanger Clamp
with Insulator
(310918)



Stainless Steel
Hanger Clamp
with Insulator
(38779)



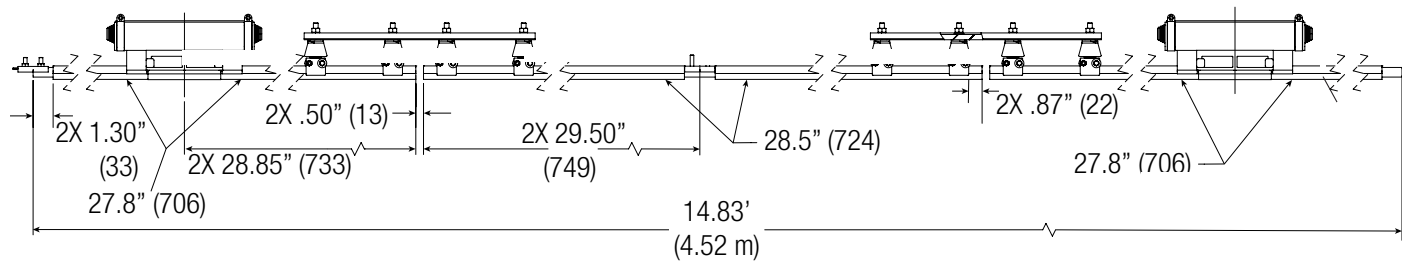
Anchor Clamp
(310832)



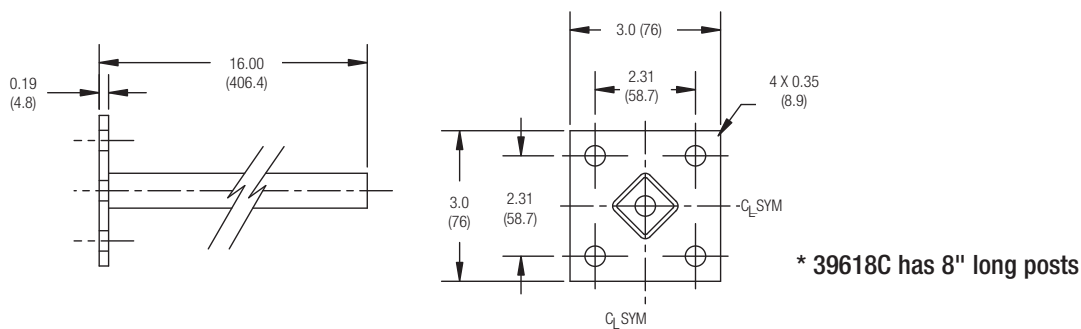
Anchor Clamp
With Insulator
(310969)

Safe-Lec 2 Component Dimensions

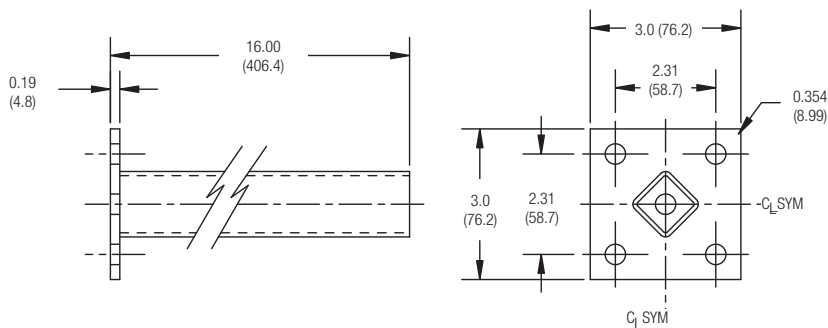
Power Interrupting Section (Typical)



Single Collector Bracket 39618 (1/2" Square Posts) *

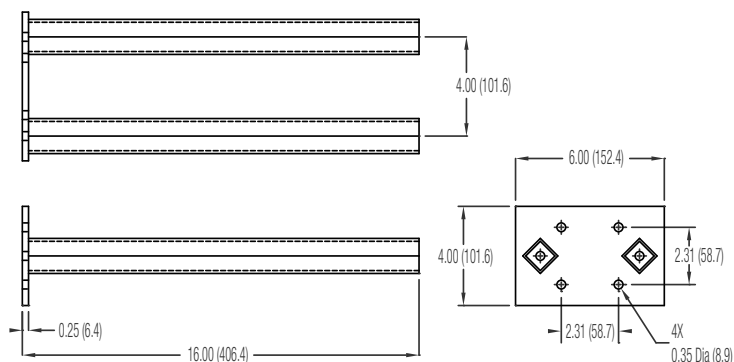


Single Collector Bracket 39617 and 52336 (1" Square Posts)

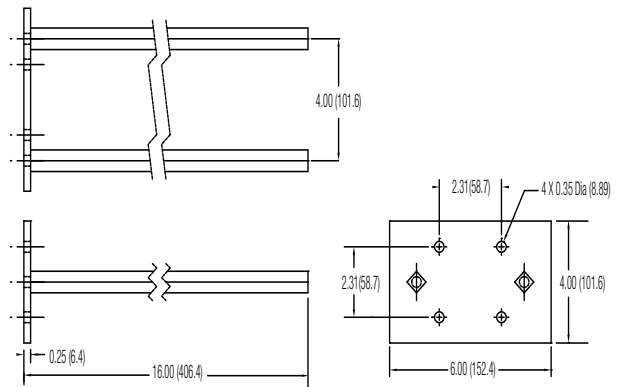


Dual Collector Brackets

37863 and (1" Square Posts)

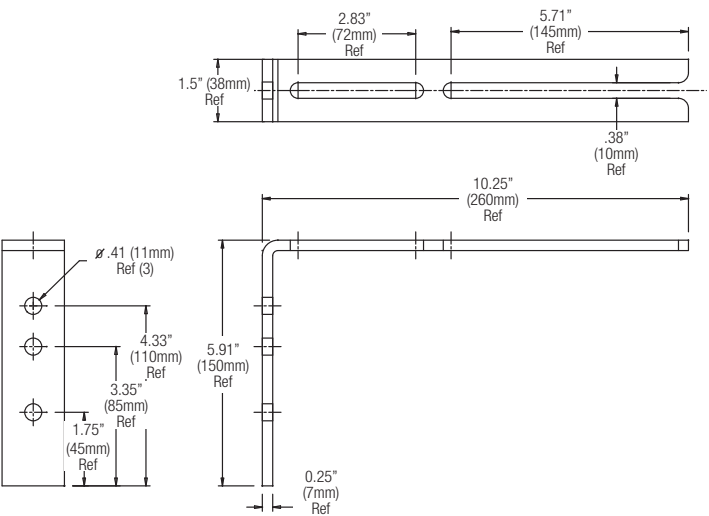


39050 (1/2" Square Posts)

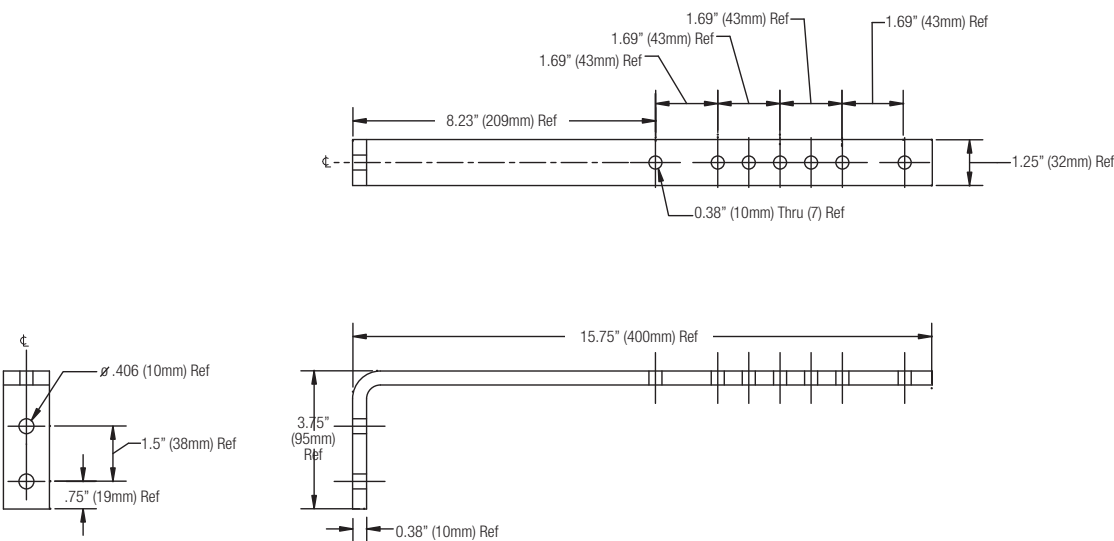


Safe-Lec 2 Bracket Dimensions

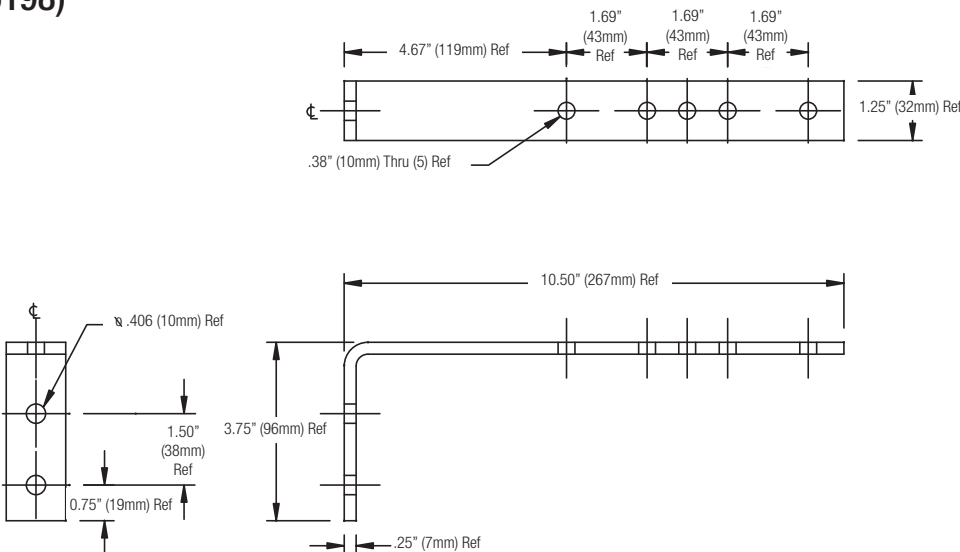
Web Bracket (310984)



Web Bracket (36197)

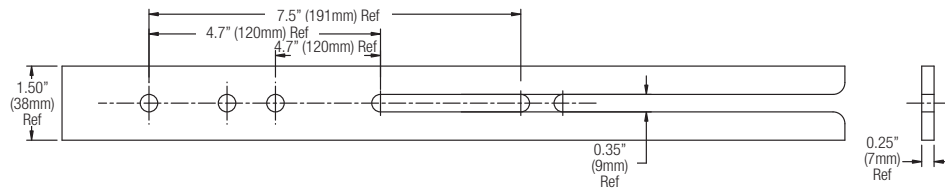


Web Bracket (36198)

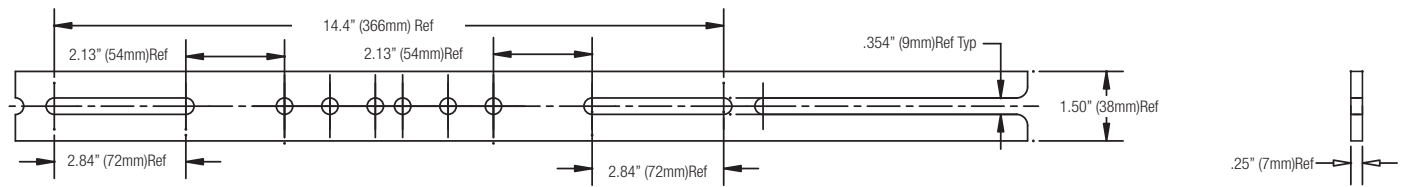


Safe-Lec 2 Bracket Dimensions

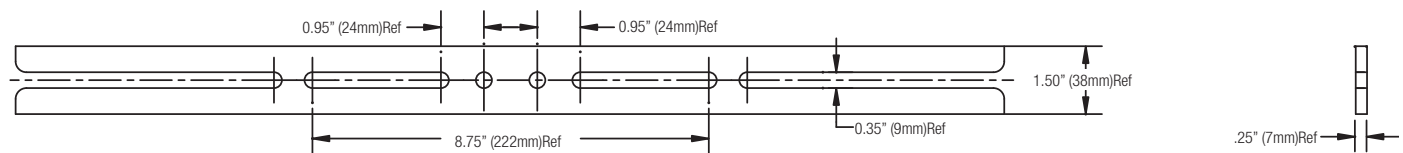
Single Sided Flange Bracket - Fits beam widths up to 7" (310980)



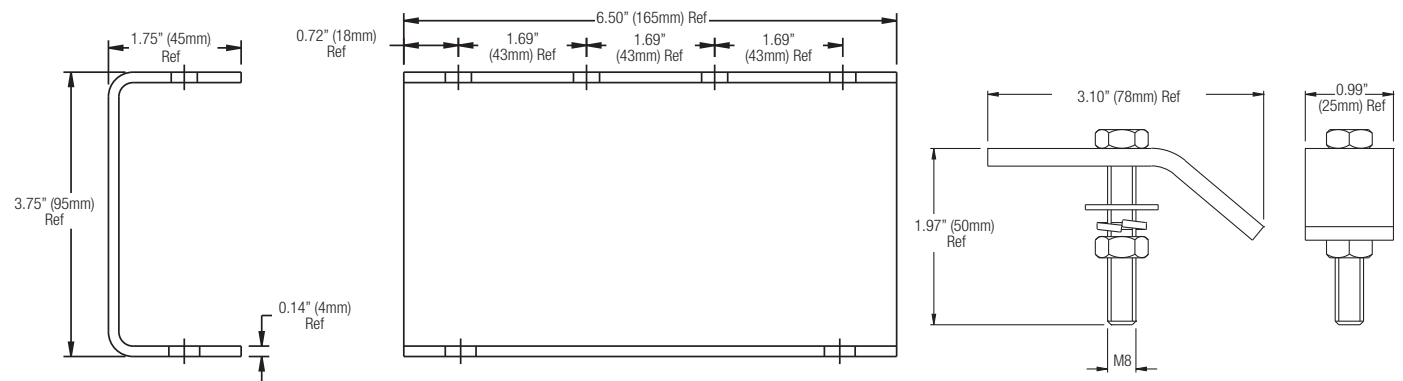
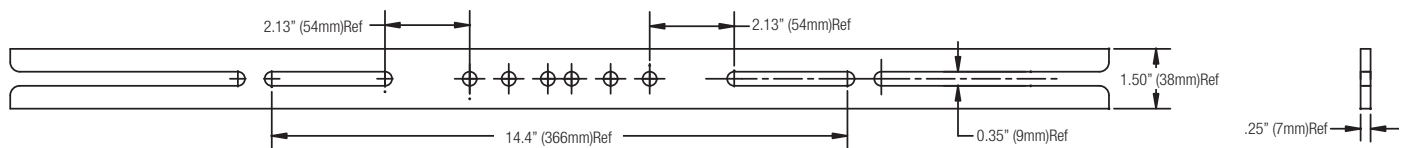
Single Sided Flange Bracket - Fits beam widths up to 14" (310982)



Double Sided Flange Bracket - Fits beam widths up to 8" (310981)



Double Sided Flange Bracket - Fits beam widths up to 14" (310983)



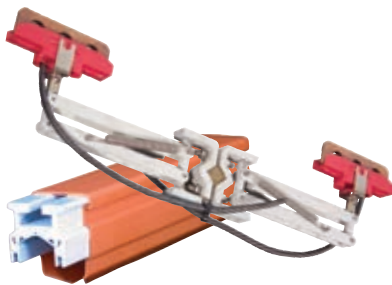
Lateral Web Bracket (399517)

Girder Clamp (51142)

Hevi-Bar II Overview

The rugged Hevi-Bar II Conductor Bar System delivers reliable, high-capacity electrical performance. It is ideal for tough environments and demanding, heavy-use applications found in mills, heavy industry, storage yards, and transit systems. It is truly a “put it up once and forget it” system that will last for the life of your equipment.

UL Listed



Hevi-Bar II is ideal for:

- Medium to large cranes
- Bulk Handling Systems
- Mills and heavy industry
- Transit Systems
- Material Handling Equipment
- Other mobile power applications

Ampacity Selections: 500A, 700A, 1000A, and 1500A, at 600 volts.

Maximum Speed: 2000 feet per minute
(Contact the factory if higher speeds are needed)

Hevi-Bar II Features

- Uses surface area rather than mass to dissipate heat generated by high current conditions
- Can be mounted horizontally or vertically (“side entry”)
- V-grooved for positive and accurate collector shoe tracking
- Has hardened, long-wearing and corrosion resistant stainless steel contact surface.
- Offers a choice of insulating covers:
 - Standard orange for indoor use
 - Green for the ground (bonding) conductor
 - Black UV-resistant for outdoor use
 - Medium or high heat versions to withstand higher ambient temperatures

Hevi Bar II is easy to install and maintain. For further information, please download the Hevi Bar II manual from our web site.

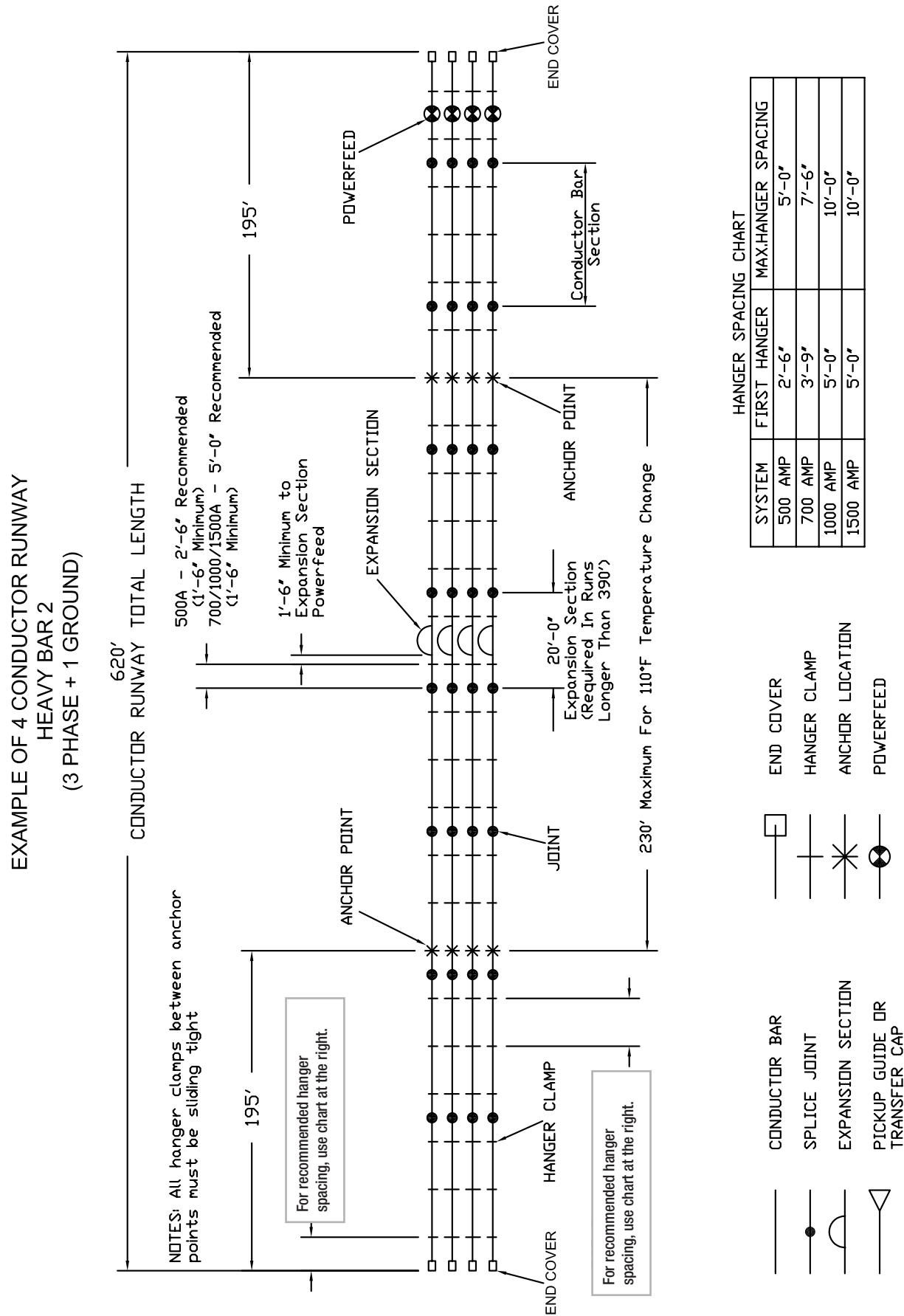
DURA-COAT Option - for Hevi-Bar II

Hevi-Bar II is available with our optional **DURA-COAT** finish, specially formulated for corrosive environments. Hevi-Bar II Dura-Coat uses a combined ceramic compound with epoxy binder to provide superior corrosion resistance. Our systems have been tested in 10% hydrochloric acid and 10% sulfuric acid vapor conditions for corrosion resistance. Concentrations that exceed these levels may cause accelerated wear. The entire bar is coated, with the exception of the stainless steel running surface. The insulating cover is applied over the coating.

DURA-COAT is ideal for galvanizing and electro-plating lines, chemical plants, smelters, foundries and cast houses, coke and ore handling cranes, and oxidizing/electro-winning facilities.

Contact Conductix-Wampfler for further information about **DURA-COAT**.

Hevi-Bar II Typical 4-Bar System

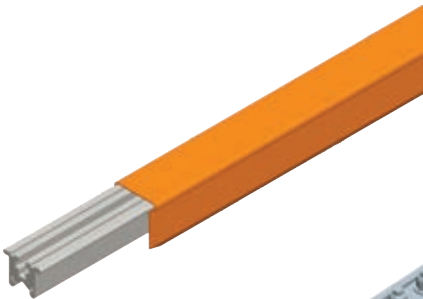


Hevi-Bar II - 500A Conductors

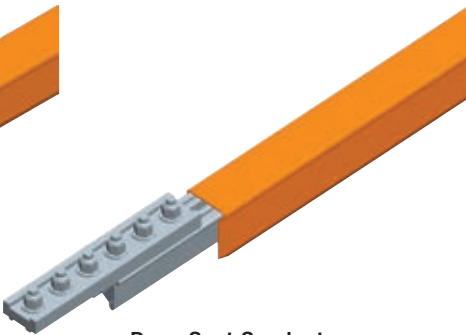
Standard Conductor Bar and Components

Type / Max Temp.	Use (Color)	Conductor Bar	Conductor Bar Cut Lgth (Specify 5 to 29 ft)	Expansion Section	Splice	Power Feed	Power Interrupting Section ♦	End Cover
PVC 160° F	Phase / Indoors (Orange)	27582	27583	37677	37676	37674	50746	27588
	Ground / Indoors (Green)	50258	50260	37677E	37676	37674	N/A	27588
	Phase & Ground / Outdoors UV Stable (Black)	38925	38926	38946	37676	37674	50746B	27588
Poly - carbonate 250°F	Phase & Ground / Indoors & Outdoors (Red)	32496	39225	32498	32499	32500	50747	27588
Wt lb (kg)		26.0 (11.79)	.87 lb/ft. (1.29 kg/m)	30.0 (13.61)	1.2 (0.681)	0.9 (0.408)	50 (22.67)	0.1 (0.045)
Length ft (m)		30.0 (9.114)	*	30.0 (9.114)	/	/	30.0 (9.114)	/

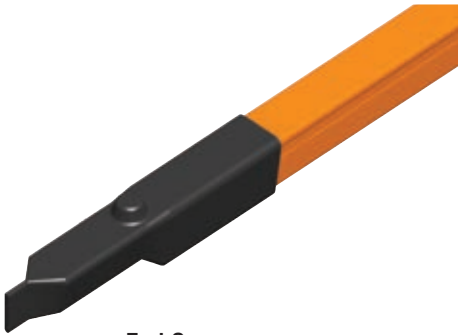
♦ See Appendix IV Pgs. 63-64.



Conductor Bar



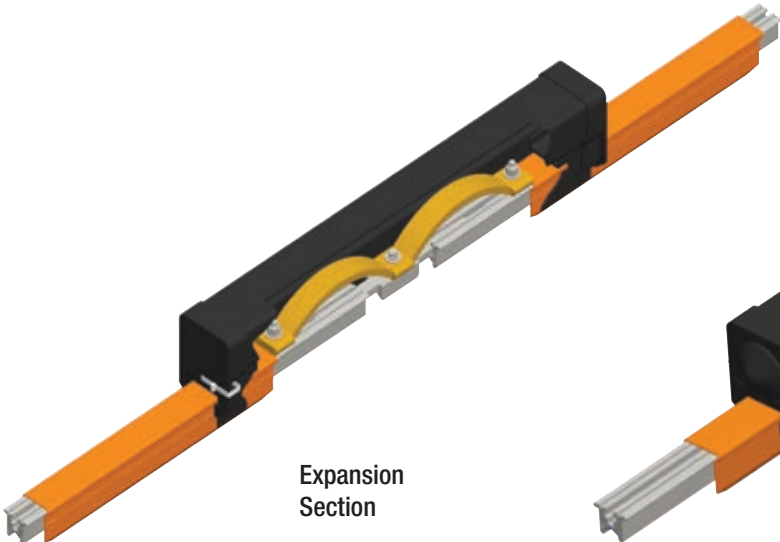
Dura-Coat Conductor Bar with Splice



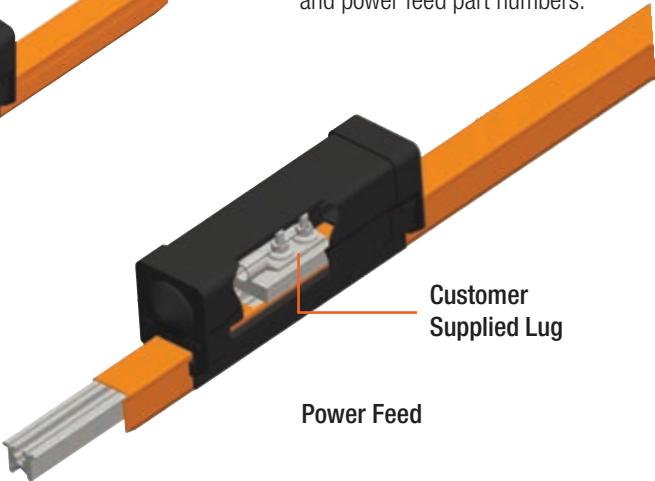
End Cover

Expansion Sections and Power Feed

Expansion Sections are required at all structural expansion joints and for all systems greater than 390 ft (118.87 m). See table above for expansion and power feed part numbers.



Expansion Section



Power Feed

Hevi-Bar II - 500A DURA-COAT & Hangers

DURA-COAT Conductor Bar & Components

The ideal option for highly corrosive environments. Splices are pre-installed on Dura-Coat conductors.

Type / Max Temp.	Use (Color)	Conductor Bar	Conductor Bar Cut Lgth (Specify 5 to 29 ft)	Expansion Section	Splice Cover	Power Feed	Power Interrupting Section ♦	End Cover
PVC 160° F	Phase / Indoors (Orange)	39745-J	39747-J	39741-J	51304	37674	50749-J	27588
	Ground / Indoors (Green)	39745G-J	51861-J	39741G-J	51304	37674	N/A	27588
	Phase & Ground / Outdoors UV Stable (Black)	39745B-J	51367-J	39741B-J	51304	37674	50749B-J	27588
Poly-carbonate 250°F	Phase & Ground / Indoors & Outdoors (Red)	50731-J	51383-J	50741-J	51305	32500	50750-J	27588
Wt lb (kg)		27.0 (12.24)	0.90 lb/ft (1.34 kg/m)	28 (12.7)	0.73 (0.33)	4.0 (1.81)	50 (22.67)	1.0 (0.45)
Length ft (m)		30.0 (9.144)	-	30.0 (9.14)	/	/	30.0 (9.14)	/

♦ See Appendix IV Pgs. 63-64.

Hangers

Hangers can be installed on brackets up to 3/8" thick (9.5mm).



Polycarbonate Snap-In



Polycarbonate Snap-in w/Insulator

Hangers - Used with 500A Bar Only	Plated Hardware	Stainless Steel Hardware	Wt lb (kg)
Polycarbonate Snap-In	26591	28368	0.29 (0.14)
Polycarbonate Snap-in w/Insulator	27483	27780	0.89 (0.40)
Stainless Steel Cross Bolt	27481	27788	0.60 (0.27)
Stainless Steel Cross Bolt w/Insulator	27482	29574	1.14 (0.50)

Anchor Pin

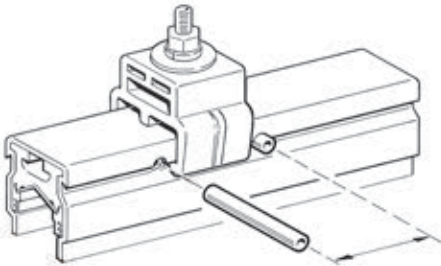
Anchor Pin	Part No.	Wt lb (kg)
Anchor Pin (2 Req'd Per Hanger to turn a hanger into an anchor)	23946	.1 (0.05)



Stainless Steel Cross Bolt



Stainless Steel Cross Bolt w/Insulator



Anchor Pin 23946 (Two Shown)

Hevi-Bar II - 700A Conductors

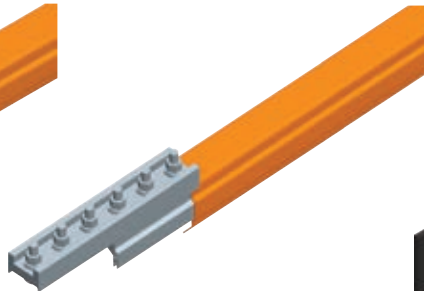
Standard Conductor Bar and Components

Type / Max Temp.	Use (Color)	Conductor Bar	Conductor Bar Cut Lgth (Specify 5 to 29 ft)	Expansion Section	Splice	Power Feed	Power Interrupting Section ♦	End Cover
PVC 160°F	Phase / Indoors (Orange)	24528	24529	24566	38115	38117	50748	50859
	Ground / Indoors (Green)	24528B	51369	24566B	38115	38117	N/A	50859
	Phase & Ground / Outdoors UV Stable (Black)	38934	38936	38949	38115	38117	50748B	50859
Poly Carbonate 250°F	Phase & Ground / Indoors & Outdoors (Red)	50733	51371	50738	38115C	50067	50752	50859
Fiberglass Reinforced Polyester 400°F	Phase & Ground / Indoors (Orange)	24554	24555	24567D	24558	24594	50754	24585
Wt lb (kg)		34.0 (15.42)	1.13 lb/ft (1.69 kg/m)	24.0 (10.86)	1.9 (0.86)	1.4 (0.64)	66.0 (29.93)	1.8 (0.82)
Length ft (m)		30.0 (9.114)	*	15.0 (4.572)	/	/	30.0 (9.114)	/

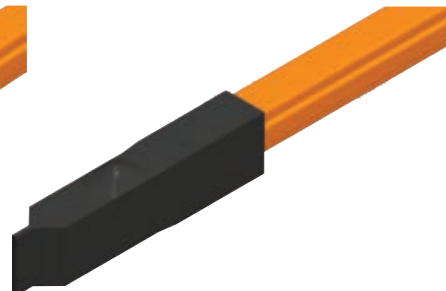
♦ See Appendix IV Pgs. 63-64.



Conductor Bar



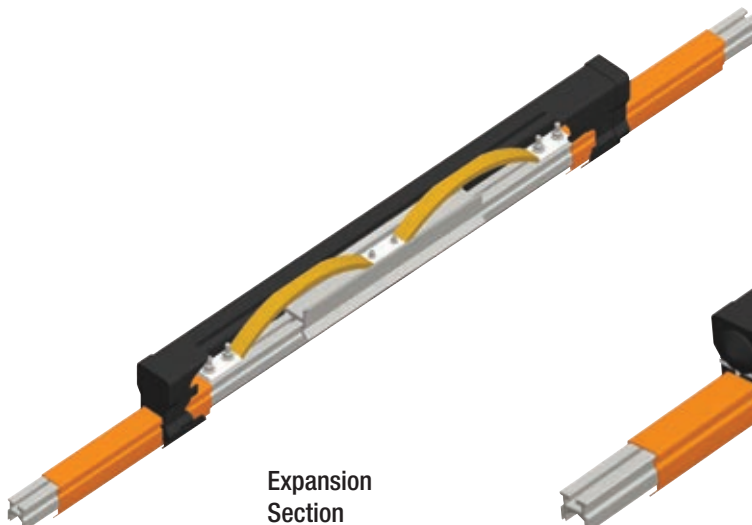
Dura-Coat Conductor Bar with Splice



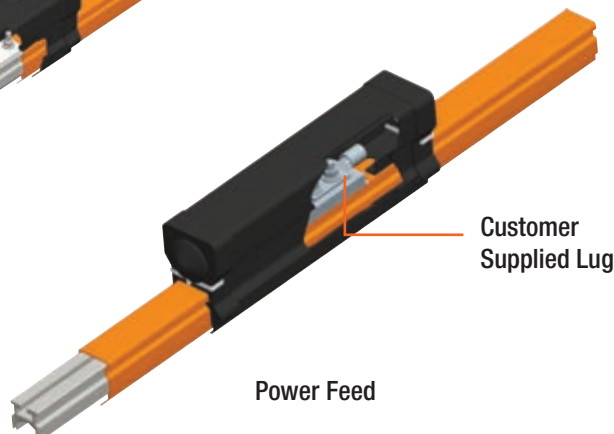
End Cover

Expansion Sections and Power Feed

Expansion Sections are required at all structural expansion joints and for all systems greater than 390 ft (118.87 m). See table above for expansion and power feed part numbers.



Expansion Section



Power Feed

Hevi-Bar II - 700A DURA-COAT & Hangers

DURA-COAT Conductor Bar & Components

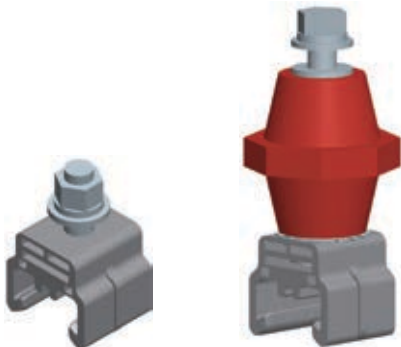
The ideal option for highly corrosive environments Splices are pre-installed on Dura-Coat conductors.

Type / Max Temp.	Use (Color)	Conductor Bar	Conductor Bar Cut Lgth (Specify 5 to 29 ft)	Expansion Section	Splice Cover	Power Feed	Power Interrupting Section ♦	End Cover
PVC 160° F	Phase / Indoors (Orange)	39847-J	51372-J	50739-J	51320	38117	50751-J	50859
	Ground / Indoors (Green)	39847G-J	51862-J	50739B-J	51320	38117	N/A	50859
	Phase & Ground / Outdoors UV Stable (Black)	39847B-J	51376-J	50740-J	51320	38117	50751B-J	50859
Poly - carbonate 250°F	Phase & Ground / Indoors & Outdoors (Red)	50062-J	51374-J	50063-J	51321	50067	50753-J	50859
Wt lb (kg)		35.0 (15.87)	1.17 lb/ft (1.74 kg/m)	25.0 (11.33)	0.7 (0.31)	5.0 (2.268)	66.0 (29.93)	2.0 (0.907)
Length ft (m)		30.0 (9.114)	-	15.0 (4.57)	1.5 (0.457)	1.5 (0.457)	30.0 (9.114)	1.5 (0.457)

♦ See Appendix IV Pgs. 63-64.

Hangers

Hangers can be installed on brackets up to 3/8" thick (9.5mm).



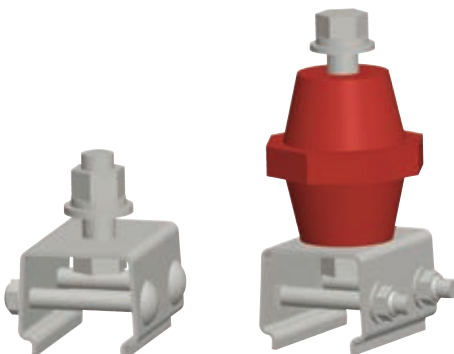
Polycarbonate Snap-In

Polycarbonate Snap-in w/Insulator

Hangers - Used with 700 to 1500A Bar	Plated Hardware	Stainless Steel Hardware	High Temp.	Wt lb (kg)
Polycarbonate Snap-In	23223	28220	N/A	0.27 (0.13)
Polycarbonate Snap-in w/insulator	24902	24902B	N/A	0.83 (0.40)
Stainless Steel Cross Bolt	27481	27788	51972	0.58 (0.28)
Stainless Steel Cross Bolt w/insulator	27482	32807	34361B	1.11 (0.53)

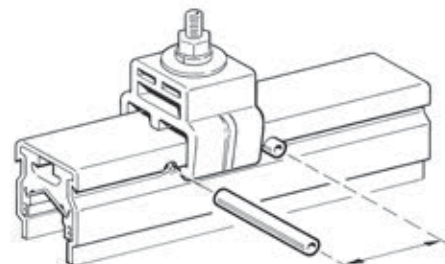
Anchor Pin

Anchor Pin	Part No.	Wt lb (kg)
Anchor Pin (2 Req'd Per Hanger to turn a hanger into an anchor)	23946	.1 (0.05)



Stainless Steel Cross Bolt

Stainless Steel Cross Bolt w/Insulator



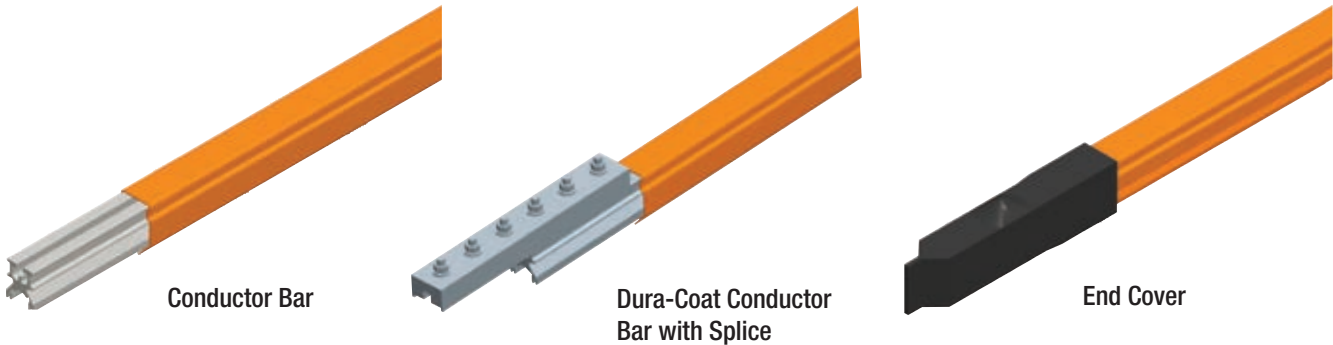
Anchor Pin 23946 (Two Shown)

Hevi-Bar II - 1000A Conductors

Standard Conductor Bar and Components

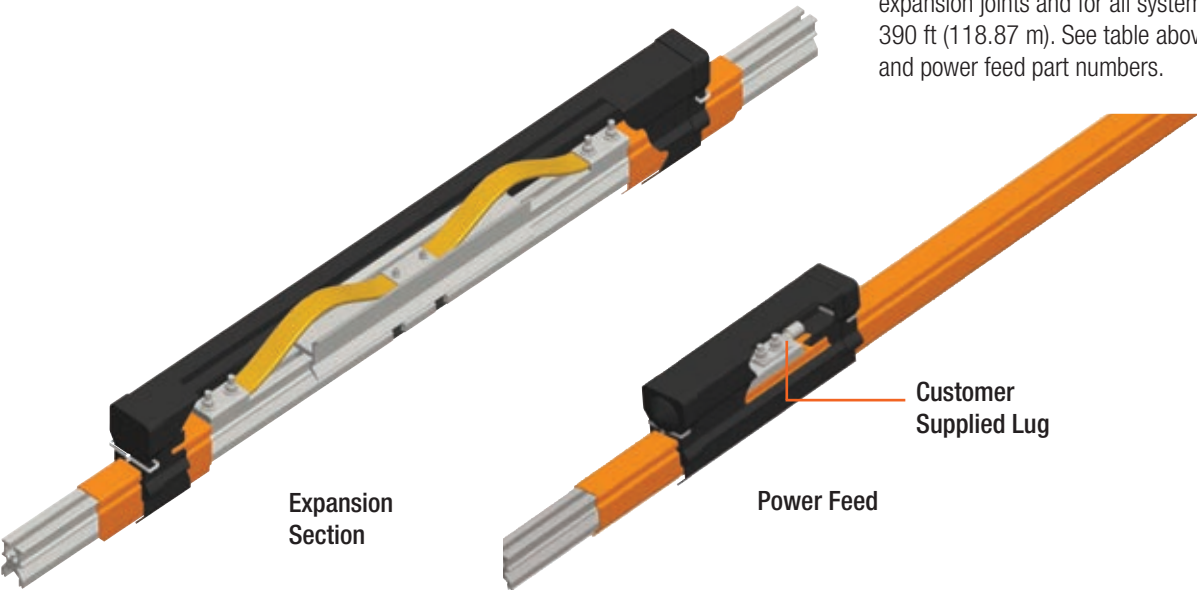
Type / Max Temp.	Use (Color)	Conductor Bar	Conductor Bar Cut Lgth (Specify 5 to 29 ft)	Expansion Section	Splice	Power Feed	Power Interrupting Section ♦	End Cover
PVC 160° F	Phase / Indoors (Orange)	23500	23503	23512	37746	38184	50755	33796B
	Phase & Ground / Outdoors UV Stable (Black)	23500D	38938	23512C	37746	38184	50755B	33796B
Poly - carbonate 250°F	Phase & Ground / Indoors & Outdoors (Red)	31991	51408	50941	31964	38184D	50756	33796B
Fiberglass Reinforced Polyester 400°F	Phase & Ground / Indoors (Orange)	23508	23511	23514	23520	23530	50757	23523
Wt (lb)		48 (21.77)	1.6 lb/ft (2.39 kg/m)	60 (27.21)	3.0 (1.36)	1.5 (0.68)	79 (35.83)	1.3 (0.59)
Length (ft.)		30	-	20.0	/	/	30.0	/

♦ See Appendix IV Pg. 63-64.



Expansion Sections and Power Feed

Expansion Sections are required at all structural expansion joints and for all systems greater than 390 ft (118.87 m). See table above for expansion and power feed part numbers.



Hevi-Bar II - 1000A DURA-COAT & Hangers

DURA-COAT Conductor Bar & Components

The ideal option for highly corrosive environments Splices are pre-installed on Dura-Coat conductors.

Type / Max Temp.	Use (Color)	Conductor Bar	Conductor Bar Cut Lgth (Specify 5 to 29 ft)	Expansion Section	Splice Cover	Power Feed	Power Interrupting Section ♦	End Cover
PVC 160° F	Phase / Indoors (Orange)	50736-J	51377-J	50743-J	51322	38184	50758-J	33796B
	Phase & Ground / Outdoors UV Stable (Black)	50736B-J	51381-J	50743B-J	51322	38184	50758B-J	33796B
Poly-carbonate 250°F	Phase & Ground / Indoors & Outdoors (Red)	50735-J	51379-J	50817-J	534845	38184D	50759-J	33796B
Wt lb (kg)		49 (22.22)	1.63 lb/ft (2.44 kg/m)	40 (18.14)	1.2 (0.54)	6.5 (2.95)	77 (34.92)	1.5 (0.68)
Length ft (kg)		30 (9.114)	*	20 (6.096)	/	/	30 (9.114)	/

♦ See Appendix IV Pgs. 63-64.

Hangers

Hangers can be installed on brackets up to 1/2" thick (12.7mm).



Polycarbonate Snap-In



Polycarbonate Snap-in w/Insulator

Hangers - Used with 700 to 1500A Bar	Plated Hardware	Stainless Steel Hardware	High Temp.	Wt lb (kg)
Polycarbonate Snap-In	23223	28220	N/A	0.28 (0.13)
Polycarbonate Snap-in w/insulator	24902	24902B	N/A	0.87 (0.40)
Stainless Steel Cross Bolt	27481	27788	51972	0.61 (0.28)
Stainless Steel Cross Bolt w/insulator	27482	32807	34361B	1.16 (0.53)

Anchor Pin

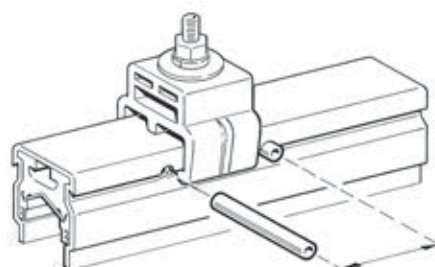
Anchor Pin	Part No.	Wt lb (kg)
Anchor Pin (2 Req'd Per Hanger to turn a hanger into an anchor)	23946	.1 (0.05)



Stainless Steel Cross Bolt



Stainless Steel Cross Bolt w/Insulator

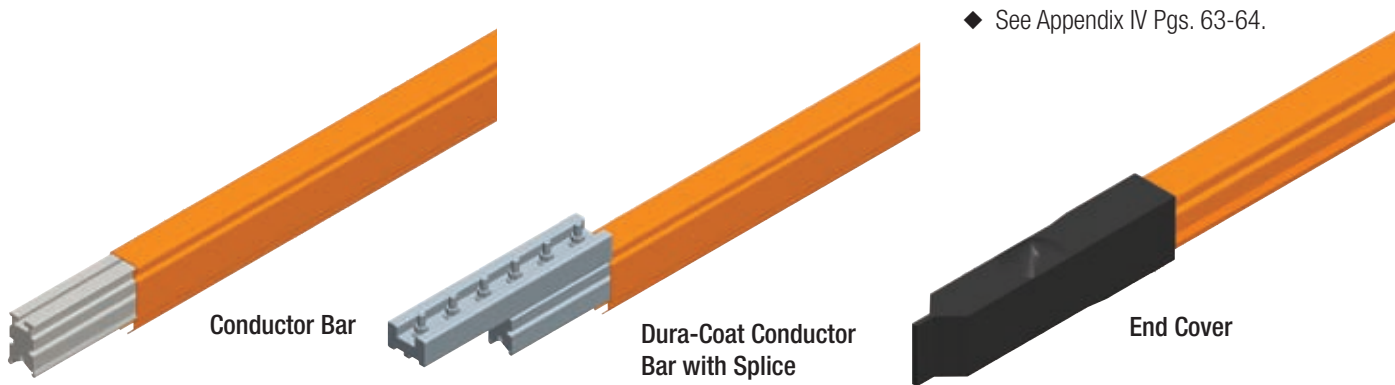


Anchor Pin 23946 (Two Shown)

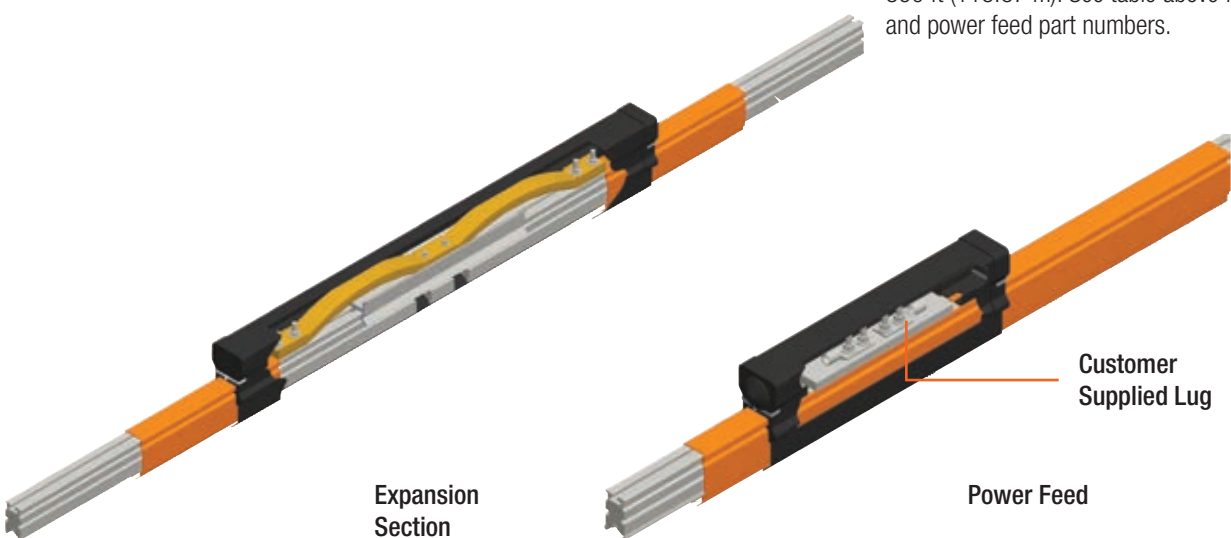
Hevi-Bar II - 1500A Conductors

Standard Conductor Bar and Components

Type / Max Temp.	Use (Color)	Conductor Bar	Conductor Bar Cut Lgth (Specify 5 to 29 ft)	Expansion Section	Splice	Power Feed	Power Interrupting Section ♦	End Cover
PVC 160° F	Phase / Indoors (Orange)	24000	24003	32820	38968	50227	50760	33796B
	Phase & Ground / Outdoors UV Stable (Black)	24000C	38944	38952	38968	50227	50760B	33796B
Poly - carbonate 250°F	Phase & Ground / Indoors & Outdoors (Red)	39296	39296	39287	34802	50227C	50761	33796B
Wt lb (kg)		96 (43.54)	3.2 lb/ft (4.78 kg/m)	71 (32.2)	3.8 (1.72)	2.1 (0.95)	123.0 (55.8)	1.5 (0.680)
Length ft (m)		30 (9.114)	-	20 (6.10)	/	/	30 (9.114)	/



Expansion Sections and Power Feed



Hevi-Bar II - 1500A DURA-COAT & Hangers

DURA-COAT Conductor Bar & Components

The ideal option for highly corrosive environments Splices are pre-installed on Dura-Coat conductors.

Type / Max Temp.	Use (Color)	Conductor Bar	Conductor Bar Cut Lgth (Specify 5 to 29 ft)	Expansion Section	Splice Cover	Power Feed	Power Interrupting Section ♦	End Cover
PVC 160° F	Phase / Indoors (Orange)	50734-J	51382-J	50742-J	51297	50227	50762-J	33796B
	Phase & Ground / Outdoors UV Stable (Black)	50734B-J	50230-J	50742B-J	51297	50227	50762B-J	33796B
Poly - carbonate 250°F	Phase & Ground / Indoors & Outdoors (Red)	39430-J	39430-J	50060-J	51297B	50227C	50763-J	33796B
Wt lb (m)		97 (44)	3.23 lb/ft (4.83 kg/m)	72 (36.65)	1.41 (0.64)	130 (58.97)	126 (57.15)	1.5 (0.68)
Length ft (m)		30.0 (9.144)	-	20.0 (6.10)	/	/	30.0 (9.144)	/

♦ See Appendix IV Pgs. 63-64.

Hangers

Hangers can be installed on brackets up to 1/2" thick (12.7mm).



Polycarbonate Snap-In



Polycarbonate Snap-in w/Insulator

Hangers - Used with 700 to 1500A Bar	Plated Hardware	Stainless Steel Hardware	High Temp.	Wt lb (kg)
Polycarbonate Snap-In	23223	28220	N/A	0.28 (0.127)
Polycarbonate Snap-in w/insulator	24902	24902B	N/A	0.87 (0.395)
Stainless Steel Cross Bolt	27481	27788	51972	0.61 (0.277)
Stainless Steel Cross Bolt w/insulator	27482	32807	34361B	1.16 (0.526)

Anchor Pin

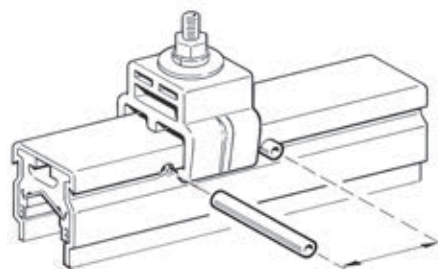
Anchor Pin	Part No.	Wt lb (kg)
Anchor Pin (2 Req'd Per Hanger to turn a hanger into an anchor)	23946	.1 (0.05)



Stainless Steel Cross Bolt



Stainless Steel Cross Bolt w/Insulator

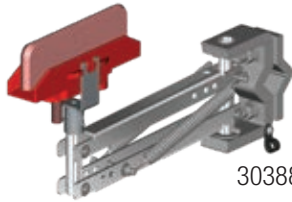


Anchor Pin 23946 (Two Shown)

Hevi-Bar II Collectors & Replacement Shoes

All collectors include long-wearing copper graphite shoes in holders and “pigtail” wiring as noted below. For recommendations about choosing collectors, see Appendix I Pgs. 57-60.

Single Collector - 125 Amp

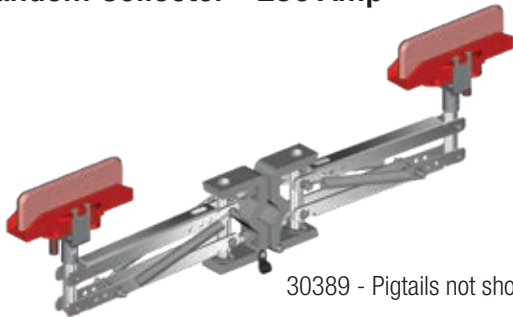


30388 - Pigtails not shown

21” long pigtails, 4 AWG, are supplied on the collector. Customer supplied wiring connects to the collector pigtail with in-line connectors. **Used on 500A conductor bar only.**

TYPE	Cap. (amps)	Part No.	Wt lb (kg)
Standard Collector with Shoe	125	30388	3.50 (1.58)
Stainless Steel Collector with Shoe	125	50205	3.58 (1.76)
Lateral Mount Collector with Shoe	125	532272	3.36 (1.52)
Replacement Shoe	125	30516	1.00 (0.45)
Cast Iron Cleaning Shoe	n/a	39166	1.38 (0.63)

Tandem Collector - 250 Amp

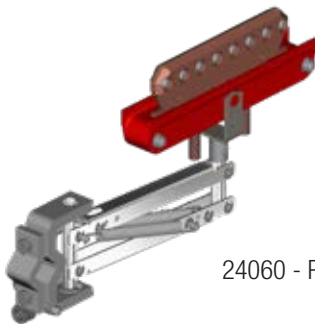


30389 - Pigtails not shown

21” long pigtails, 4 AWG, are supplied on the collector. Customer supplied wiring connects to the collector pigtail with in-line connectors. **Used on 500A conductor bar only.**

TYPE	Cap. (amps)	Part No.	Wt lb (kg)
Standard Collector with Shoes	250	30389	6.54 (2.96)
Stainless Steel Collector with Shoes	250	39752	6.76 (3.06)
Lateral Mount Collector with Shoes	250	532273	6.39 (2.90)
Replacement Shoe 2 required per collector	250	30516	1.0 (0.45)
Cast Iron Cleaning Shoe 2 required per collector	n/a	39166	1.38 (0.63)

Single Collector - 200 | 300 Amp

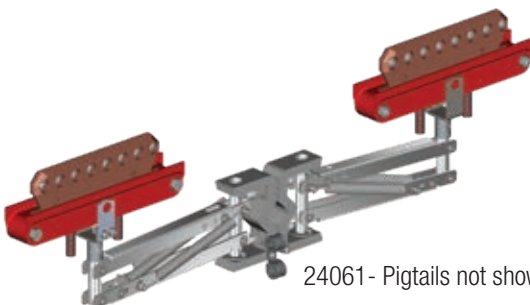


24060 - Pigtails not shown

42” long pigtails, 2 AWG, are supplied on the collector. Customer supplied wiring connects to the collector pigtail with in-line connectors. **Used on 700A - 1500A conductor bar only.** Note that the 300A version is the same as the 200A, except with an extra tension spring on the arm.

TYPE	Cap. (amps)	Part No.	Wt lb (kg)
Standard Collector with Shoe	200	24060	6.79 (3.08)
Stainless Steel Collector with Shoe	200	51522	6.87 (3.11)
Standard Collector with Shoe	300	24060Q	6.89 (3.12)
Lateral Mount Collector with Shoe	200	31933	4.80 (2.18)
Replacement Shoe	200	11417X	0.76 (0.34)
Cast Iron Cleaning Shoe	n/a	28267	1.0 (0.45)

Tandem Collector - 400 Amp



24061 - Pigtails not shown

42” long pigtails, 2 AWG, are supplied on the collector. Customer supplied wiring connects to the collector pigtail with in-line connectors. **Used on 700A - 1500A conductor bar only.** Note that the 600A version is the same as the 400A, except with one extra tension spring on each arm.

TYPE	Cap. (amps)	Part No.	Wt lb (kg)
Standard Collector with Shoes	400	24061	13.31 (6.04)
Stainless Steel Collector with Shoes	400	39848	13.25 (6.01)
600A Standard Collector with Shoes	600	24061B	13.31 (6.04)
Lateral Mount Collector with Shoes	400	32111D	21.36 (9.69)
Replacement Shoe (2 required/collector)	400	11417X	0.38 (0.17)
Cast Iron Cleaning Shoe (2 required /collector)	n/a	28267	1.0 (0.45)

Hevi-Bar II 500A - 700A Support Brackets

The Hevi-Bar II Support Brackets listed below are for 500A - 700A conductors. They are available in three types as listed below and can be ordered in five different configurations:

- Bracket only (no hangers included)
- Bracket with four pre-installed hangers - standard Polycarbonate
- Bracket with four pre-installed hangers - standard Polycarbonate w/insulators
- Bracket with four pre-installed hangers - stainless steel cross-bolt
- Bracket with four pre-installed hangers - stainless steel cross-bolt w/insulators

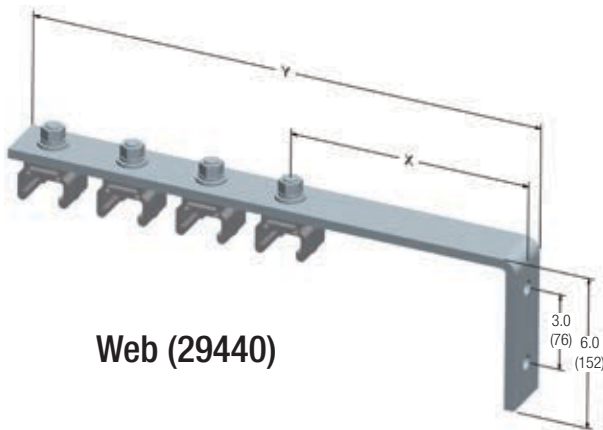
All holes to accept hangers are 3" on-center and .56" diameter.

Web Bracket

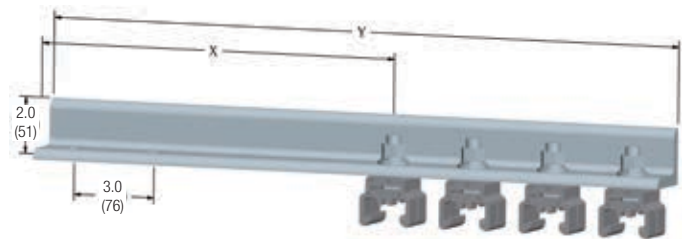
Mounts to vertical web of beam. Bracket is 2" wide by 3/8" thick.

* Brackets 33655 & 35337 are 1/2" thick

						Part Nos. - With Four Hangers Pre-Installed			
For Bar	Bracket Finish	Dim X inches (mm)	Dim Y Inches (mm)	Part No. <u>Bracket Only</u>	Wt lb (kg)	Standard Polycarbonate	Standard Polycarbonate w/Insulators	Stainless Steel Cross-Bolt	Stainless Steel Cross-Bolt w/Insulator
500A	Plated Steel	6.0 (152)	16.25 (413)	29441	4.4 (2.996)	29440	29440B	29440C	29440D
	Plated Steel	9.0 (229)	19.25 (489)	30503	5.1 (2.313)	51785	51785B	51785C	51785D
	Plated Steel	11.0 (279)	21.25 (540)	33655	7.3 (3.311)	38268	38268B	38268C	38268D
	Stainless Steel	9.0 (229)	19.25 (489)	35337	6.7 (3.309)	51786	51786B	51786C	51786D
	Hot Dip Galv.	9.0 (229)	19.25 (489)	30697	5.1 (2.313)	34814	34814B	34814C	34814D
700A	Plated Steel	6.0 (152)	16.25 (413)	29441	4.4 (2.996)	537794	537794B	537794C	537794D
	Plated Steel	9.0 (229)	19.25 (489)	30503	5.1 (2.313)	537796	537796B	537796C	537796D
	Plated Steel	11.0 (279)	21.25 (540)	33655	7.3 (3.311)	537795	537795B	537795C	537795D
	Stainless Steel	9.0 (229)	19.25 (489)	35337	6.7 (3.309)	n/a	n/a	n/a	n/a
	Hot Dip Galv	9.0 (229)	19.25 (489)	30697	5.1 (2.313)	537797	537797B	537797C	537797D



Web (29440)



Flange (30493)

Flange Bracket

Mounts to top flange of beam. Bracket is a 2"x 2" angle, by 3/8" thick. The first hole is 1 1/4" from the end.

						Part Nos. - With Four Hangers Pre-Installed			
For Bar	Bracket Finish	Dim X Inches (mm)	Dim Y Inches (mm)	Part No. <u>Bracket Only</u>	Wt lb (kg)	Standard Polycarbonate	Standard Polycarbonate w/Insulators	Stainless Steel Cross-Bolt	Stainless Steel Cross-Bolt w/Insulator
500A	Plated Steel	13.25 (337)	23.50 (597)	30529	8.8 (3.992)	30493	30493B	30493C	30493D
700A	Plated Steel	13.25 (337)	23.50 (597)	30529	8.8 (3.992)	51878	51878B	51878C	51878D

Hevi-Bar II 1000A - 1500A Support Brackets

The Hevi-Bar II Support Brackets listed below are for 1000A or 1500A conductors. They are available in three types as listed below, and can be ordered in five different configurations:

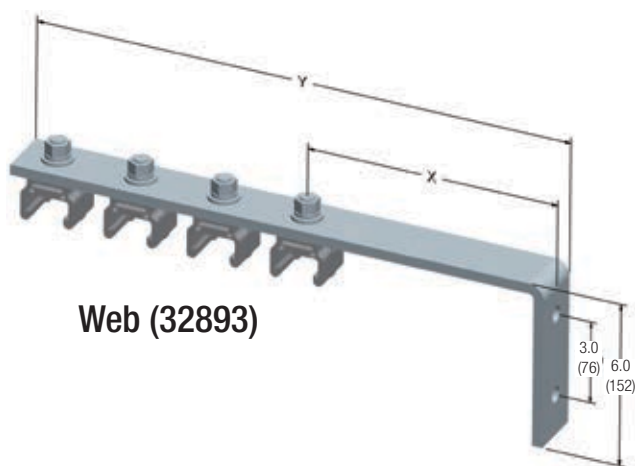
- Bracket only (no hangers included)
- Bracket with four pre-installed hangers - standard Polycarbonate
- Bracket with four pre-installed hangers - standard Polycarbonate w/insulators
- Bracket with four pre-installed hangers - stainless steel cross-bolt
- Bracket with four pre-installed hangers - stainless steel cross-bolt w/insulators

All holes to accept hangers are 3" on-center and .56" diameter.

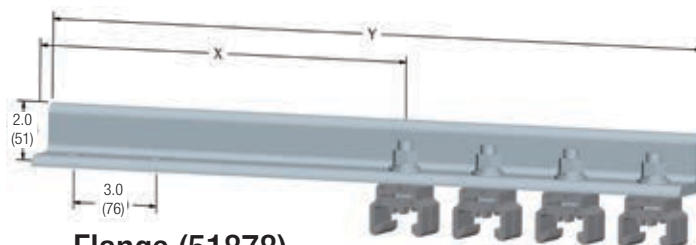
Web Bracket

Mounts to vertical web of beam. Bracket is 2" wide by 1/2" thick.

Bracket Finish	Dim X Inches (mm)	Dim Y Inches (mm)	Part No. Bracket Only	Wt (lb)	Part No. - With Four Hangers Pre-Installed			
					Standard Polycarbonate	Standard Polycarbonate w/Insulators	Stainless Steel Cross-Bolt	Stainless Steel Cross-Bolt w/Insulator
Plated Steel	6.0 (152)	16.25 (413)	537552	5.6	32893	32893B	32893C	32893D
Plated Steel	9.0 (229)	19.25 (489)	537554	6.2	39923	39923B	39923C	39923D
Hot Dip Galv.	9.0 (229)	19.25 (489)	537555	6.2	32932	32932B	32932C	32932D



Web (32893)



Flange (51878)

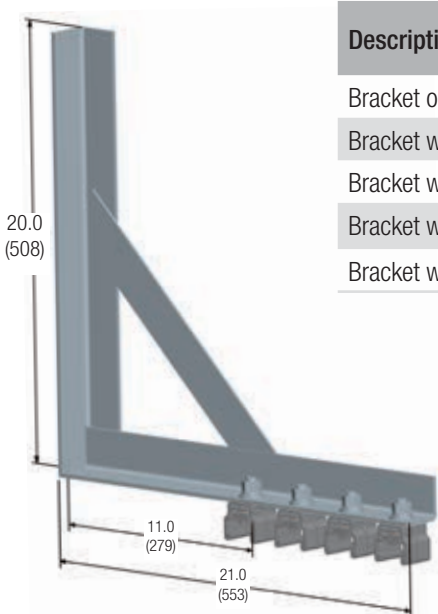
Flange Bracket

Mounts to top flange of beam. Bracket is a 2"x 2" angle, by 3/8" thick. The first hole is 1 1/4" from the end.

Bracket Finish	Dim X Inches (mm)	Dim Y Inches (mm)	Part No. Bracket Only	Wt (lb)	Part Nos. - With Four Hangers Pre-Installed			
					Standard Polycarbonate	Standard Polycarbonate w/Insulators	Stainless Steel Cross-Bolt	Stainless Steel Cross-Bolt w/Insulator
Plated Steel	13.25 (337)	23.50 (597)	30529	8.9	51878	51878B	51878C	51878D

Hevi-Bar II 700A - 1000A - 1500A Support Brackets

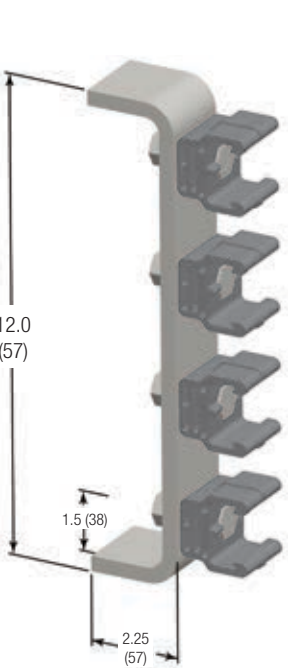
Braced Web Bracket Plated steel weldment with brace, used for heavier conductor bar (e.g. 1500A). Not for 500A bar.



Braced Web (25691)

Description	Hanger Type	Part No.	Wt lb (kg)
Bracket only	n/a	25720	9.5 (4.30)
Bracket with 4 Hangers Installed	Polycarbonate (# 23223)	25691	4.4 (2.00)
Bracket with 4 Hangers Installed	Polycarbonate w/insulators (# 24902)	25691B	6.8 (3.08)
Bracket with 4 Hangers Installed	Stainless Steel Cross Bolt (# 27481)	25691C	5.7 (2.59)
Bracket with 4 Hangers Installed	Stainless Steel Cross Bolt w/Insulators (# 27482)	25691D	7.9 (3.58)

Lateral Bracket Mounts to vertical web of beam to configure conductor bar one above the other. Bracket is 2" wide by 3/8" thick. Not for 500A bar.



Lateral (51876)

Description	Hanger Type	Part No.	Wt lb (kg)
Bracket only	n/a	50498	3.1 (1.41)
Bracket with 4 Hangers Installed	Polycarbonate (# 23223)	51876	4.3 (1.95)
Bracket with 4 Hangers Installed	Polycarbonate w/insulators (# 24902)	51876B	6.7 (3.04)
Bracket with 4 Hangers Installed	Stainless Steel Cross Bolt (# 27481)	51876C	5.6 (2.54)
Bracket with 4 Hangers Installed	Stainless Steel Cross Bolt w/Insulators (# 27482)	51876D	7.8 (3.54)

Hevi-Bar II Specifications

Conductor Bar Cover

	Cover Type:				
	Standard (Ground)	UV Resistant	Medium Heat	Hi Heat*	Bare Bar
Material	PVC	PVC	Lexan Polycarbonate	Fiberglass Reinforced	N/A
Color	Orange (Green)	Black	Red	Orange	no color
Normal Ambient	-40°F to 104°F -40°C to 40°C	-40°F to 104°F -40°C to 40°C	-40°F to 200°F -40°C to 93.3°C	-40°F to 345°F -40°C to 173.8°C	-40°F to 690°F -40°C to 365.5°C
Max. Temperature	160°F (71.1°C)	160°F (71.1°C)	250°F (121.1°C)	400°F (204.4°C)	750°F (398.8°C)
Material	PVC	PVC	Lexan Polycarbonate	Fiberglass	N/A
Dielectric Strength	450 volts/mil	450 volts/mil	600 volts/mil	200 volts/mil	N/A
Volume Resistivity	>10 ¹² (Ω/mil)	>10 ¹² (Ω/mil)	>10 ¹³ (Ω/mil)	>10 ¹¹ (Ω/mil)	N/A
Flame Test	Self Extinguishing	Self Extinguishing	Self Extinguishing	Self Extinguishing	N/A
Specific Density	1.5 g/cm ³	1.5 g/cm ³	1.15 g/cm ³	1.24 g/cm ³	N/A

* 700A and 1000A only

Conductor Bar

	Nominal Current of Bar			
	500A	700A	1000A	1500A
Cross Sectional Area, in. (mm)	0.52 (333.5)	0.70 (451.6)	1.06 (680.6)	2.30 (1483.9)
AC & DC Voltage	600	600/4160	600/4160	600/4160
DC Resistance at 20°C (Ω/ft.)	3.27 x 10 ⁻⁵	2.11 x 10 ⁻⁵	1.41 x 10 ⁻⁵	0.64 x 10 ⁻⁵
Phase Corrected Impedance Z at 20°C (Ω/ft.)	5.40 x 10 ⁻⁵	4.21 x 10 ⁻⁵	3.39 x 10 ⁻⁵	2.28 x 10 ⁻⁵
Conductor Length, ft. (m)	30.0 (9.1)	30.0 (9.1)	30.0 (9.1)	30.0 (9.1)
Support Spacing, ft (m)	5 (1.52)	7.5 (2.28)	10 (3.05)	10 (3.05)
Spacing between Conductors, in (mm)	3.0 (76.2)	3.0 (76.2)	3.0 (76.2)	3.0 (76.2)
Expansion Sections not required for runs less than; ft. (m)	390 (11.9)	390 (11.9)	390 (11.9)	390 (11.9)
Minimum Bending Radius, ft (m)	8.0 (2.4)	10.0 (3.05)	12.0 (3.7)	15.0 (4.6)

Corrosion Protection

Hardware Type:	Duty
Zinc Plated	Moderate
Stainless Steel	Severe
DURA-COAT	Extreme Duty

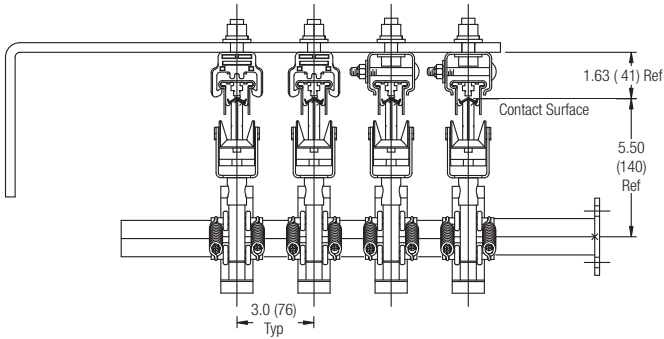
Available Accessories (Contact Conductix-Wampfler)

- Thermostatically controlled heater wire system, for ice and snow environments (500A only)
- Transfer Caps for switches
- Pick-up Guides for discontinuous systems
- Vertical and horizontal curves

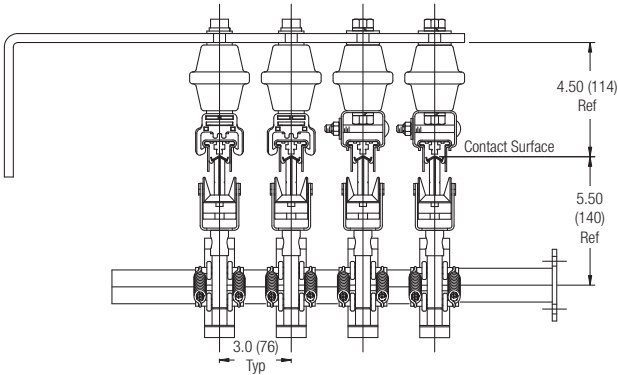
The appropriate conductor bar can be chosen only when all the relevant factors are known. Please refer to the Specification Data Sheet on Pg. 6, and to Appendices I through IV at the back of this catalog. Also, please consult Conductix-Wampfler Sales if you have any questions about the suitability of this product to your application.

Hevi-Bar II Installed Dimensions

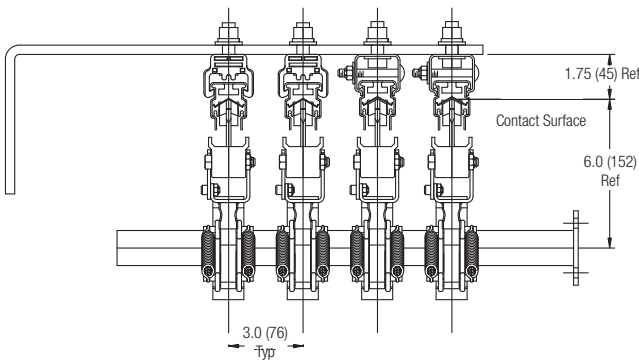
500A - Standard Hanger



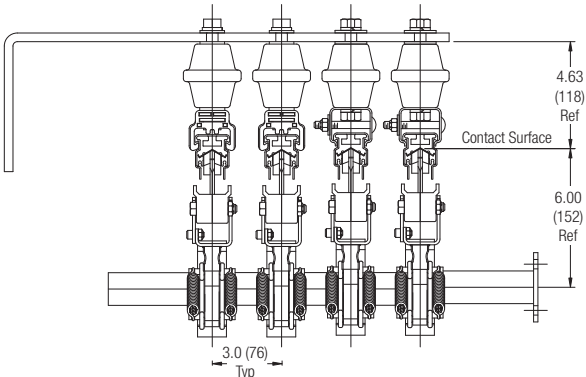
500A - with Insulators



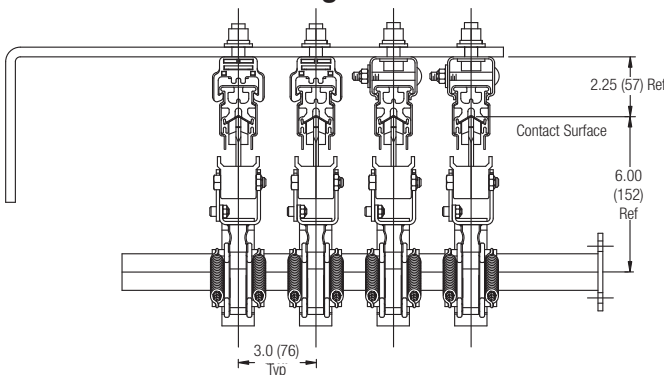
700A - Standard Hangers



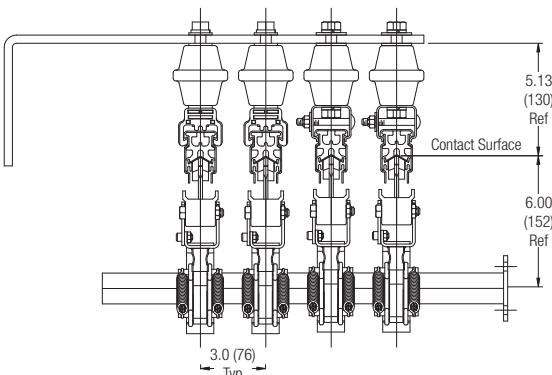
700A - with Insulators



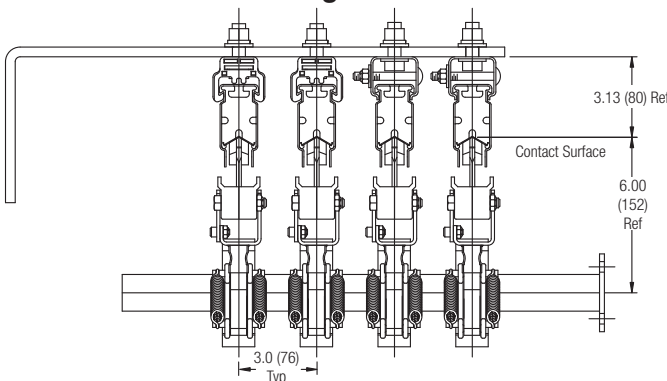
1000A - Standard Hangers



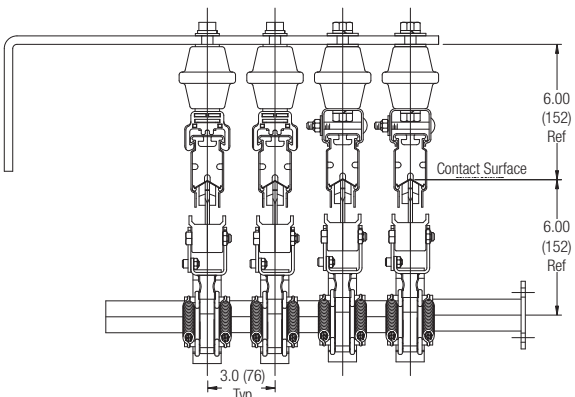
1000A - with Insulators



1500A - Standard Hangers

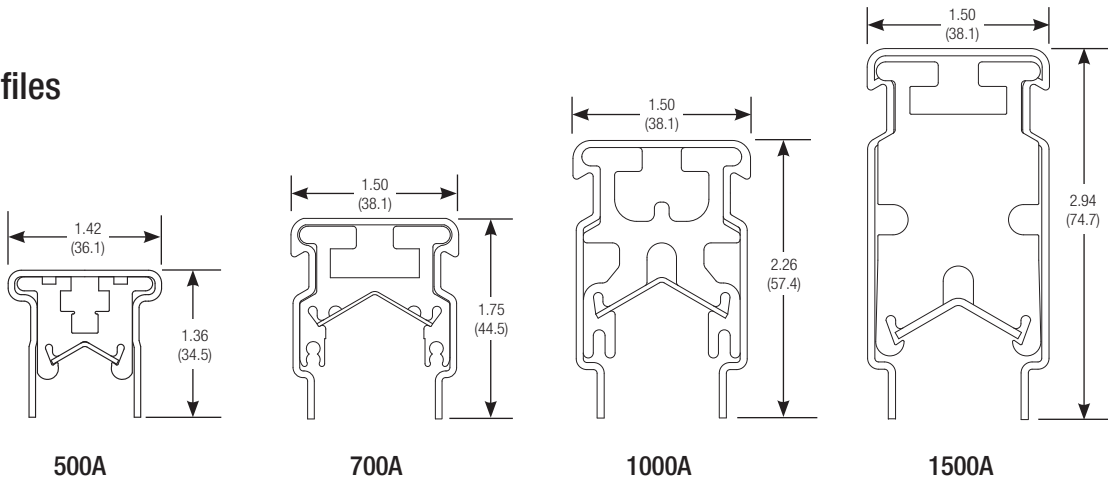


1500A - with Insulators

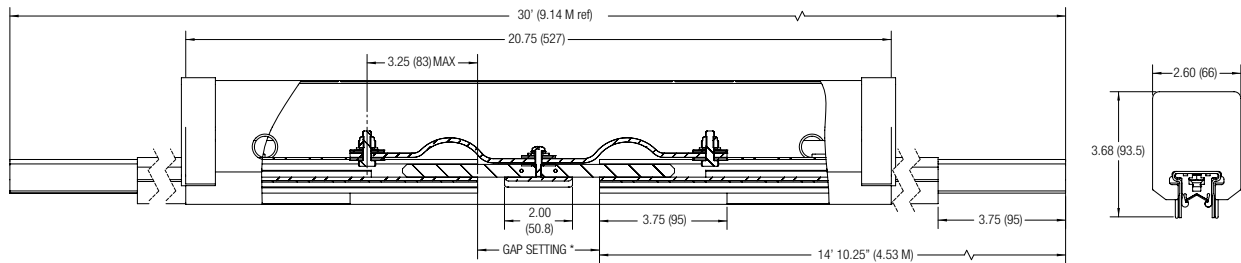


Hevi-Bar II Bar & Expansion Dimensions

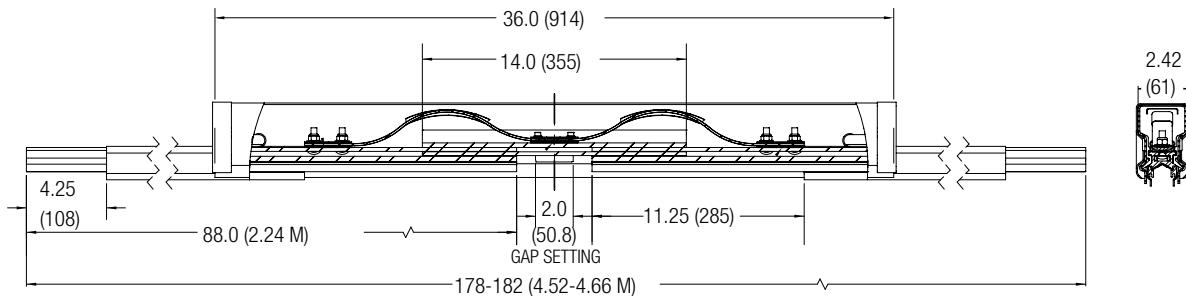
Bar Profiles



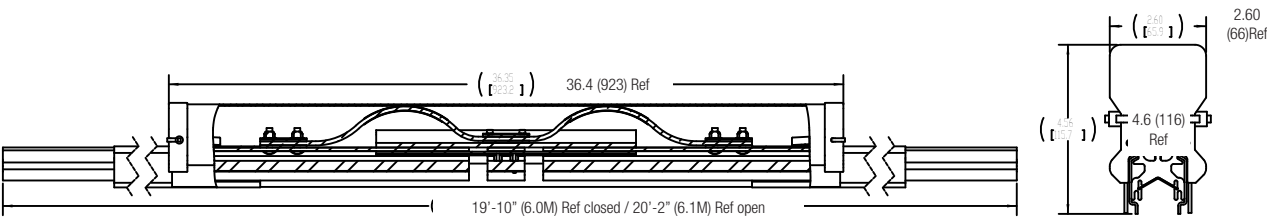
500A Expansion Section (37677 and 39741-J)



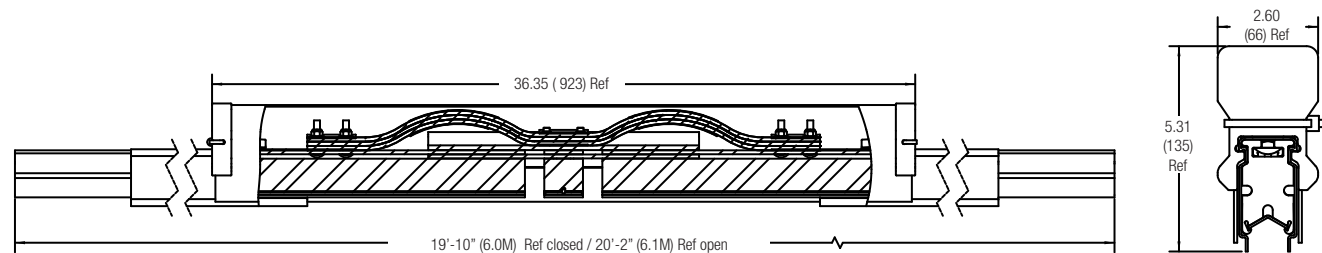
700A Expansion Section (24566 and 50739)



1000A Expansion Section (23512)

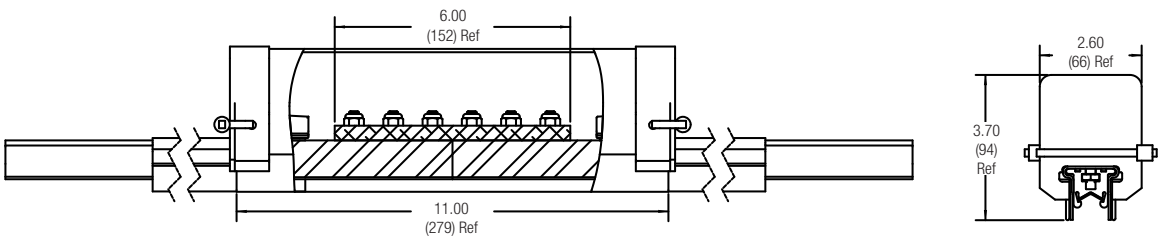


1500A Expansion Section (32820)

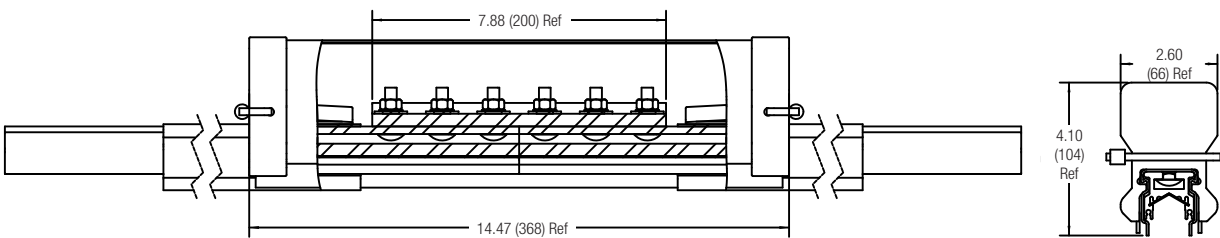


Hevi-Bar II Splice Dimensions

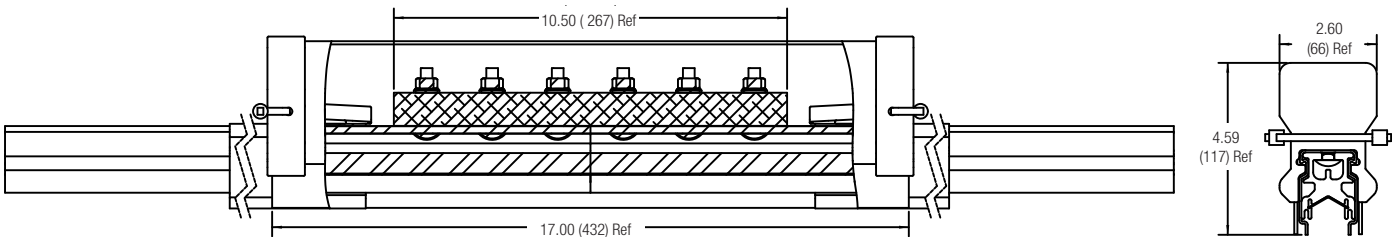
500A Splice (37676), 1/4" Bolts, Torque to 6 - 8 ft-lb



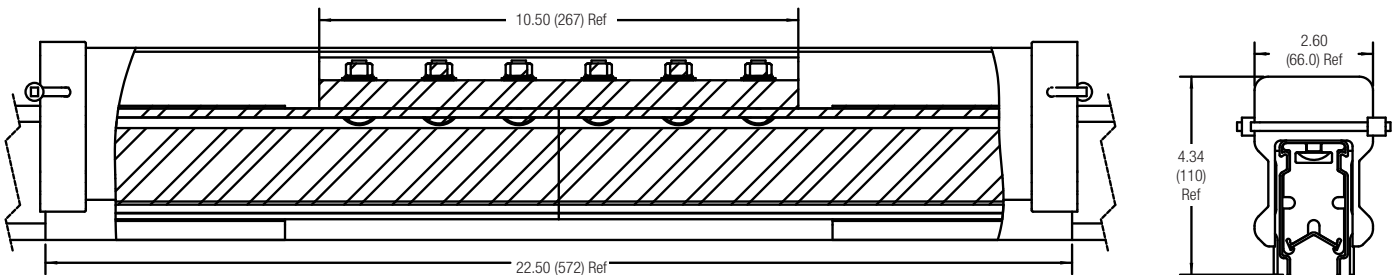
700A Splice (38115), 5/16" Bolts, Torque to 10 - 11 ft-lb



1000A Splice (37746), 5/16" Bolts, Torque to 10 - 11 ft-lb

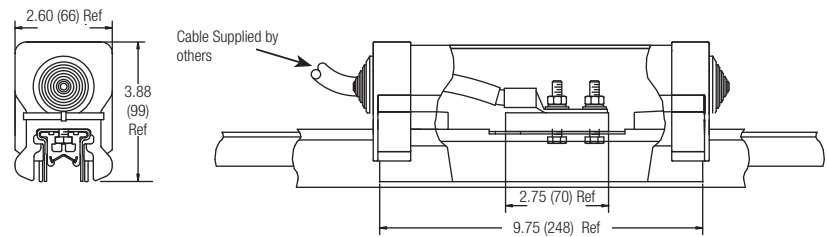


1500A Splice (38968), 5/16", Torque to 10 - 11 ft-lb

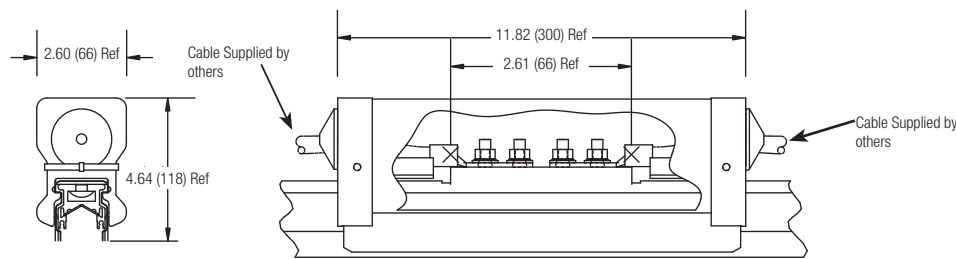


Hevi-Bar II Power Feed Dimensions

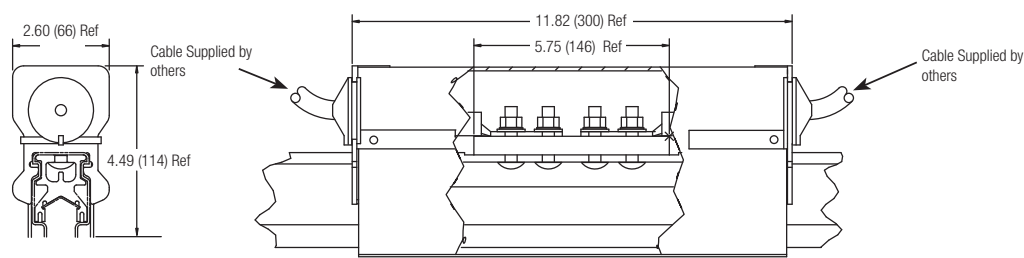
500A Power Feed (37674), 1/4" Bolts on 1" Centers, 6 - 8 ft-lb



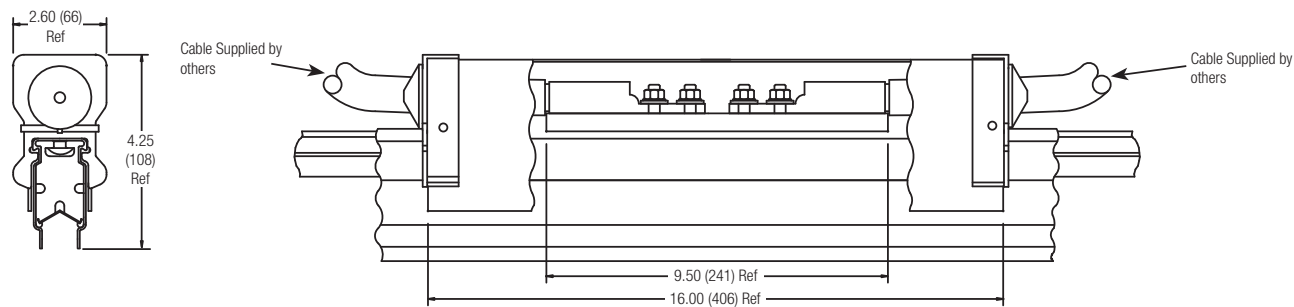
700A Power Feed (38117), 5/16" Bolts on 1" Centers, 10 - 11 ft-lb



1000A Power Feed (38184), 5/16" Bolts on 1" Centers, 10 - 11 ft-lb

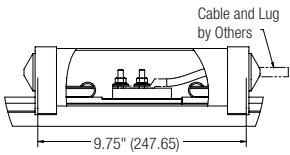
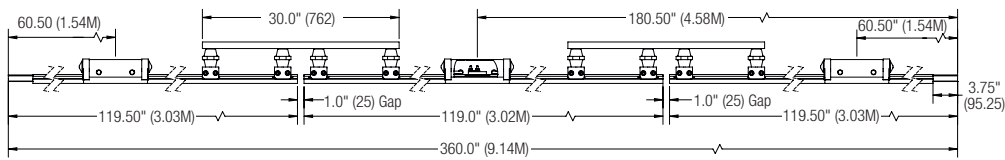


1500A Power Feed (50227), 5/16" Bolts on 1" Centers, 10 - 11 ft-lb

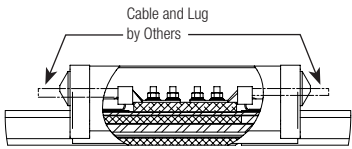
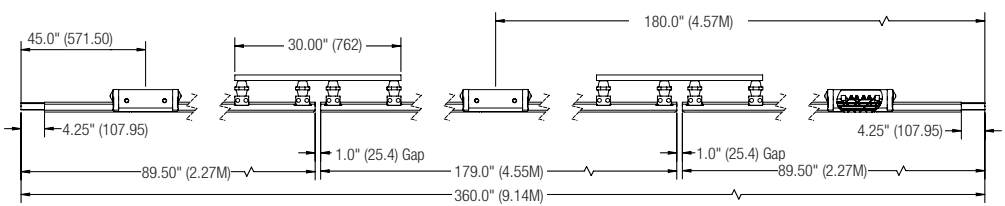


Hevi-Bar II Power Interrupting Section Dimensions

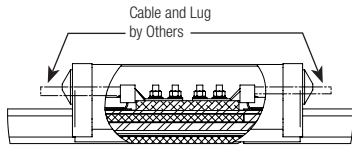
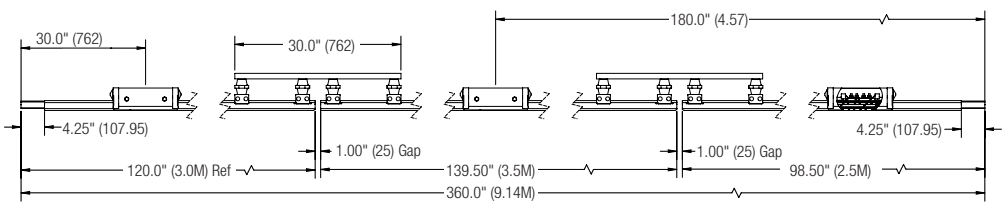
500A Power Interrupting Section (50746)



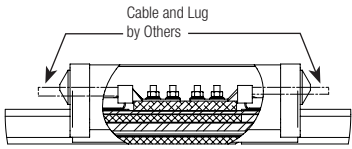
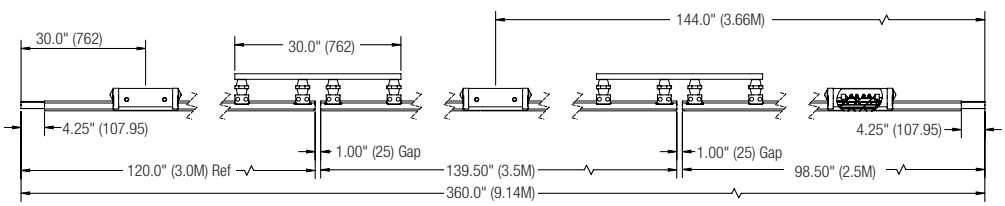
700A Power Interrupt (50748)



1000A Power Interrupt (50755)

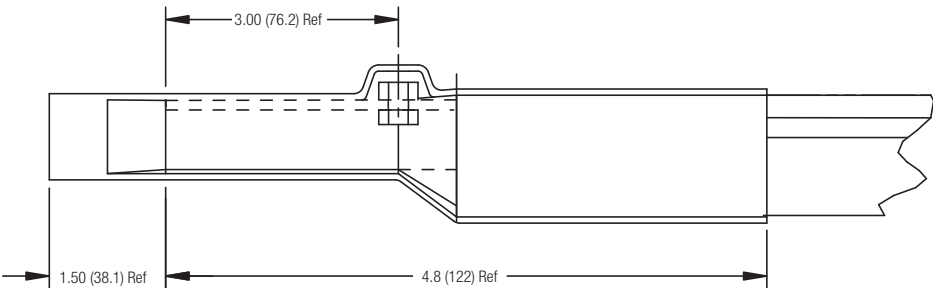


1500A Power Interrupt (50760)

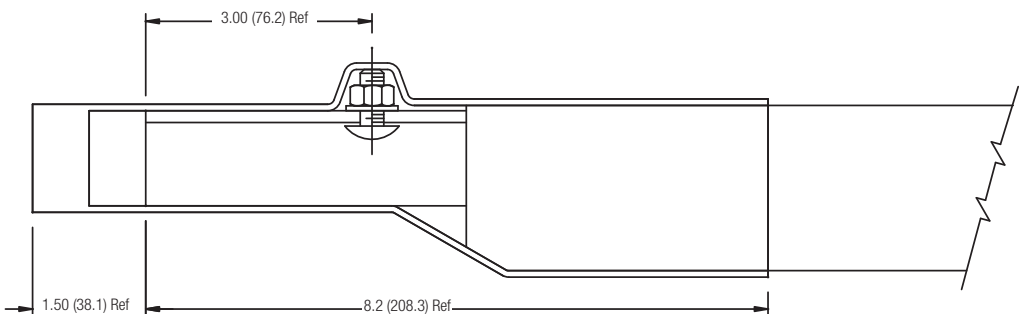


Hevi-Bar II End Cover Dimensions

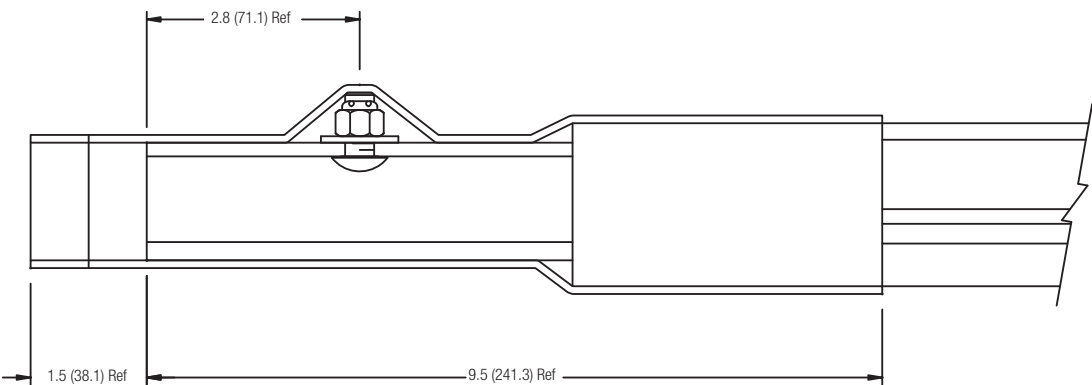
500A End Cover (27588)



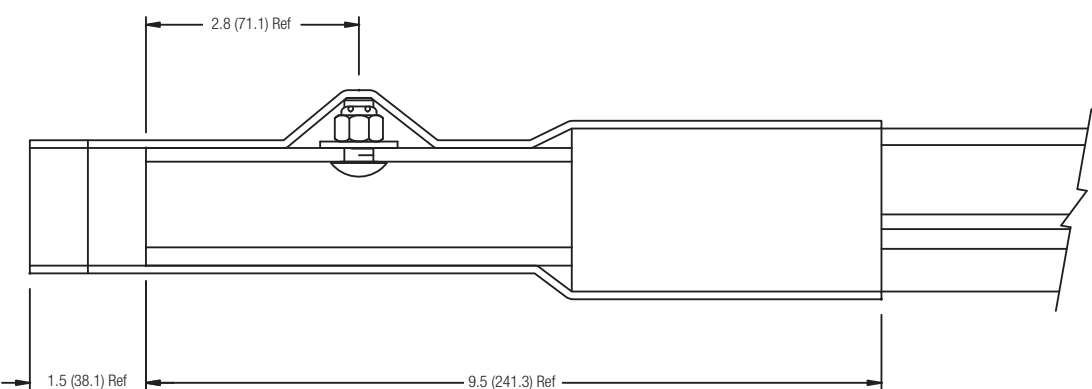
700A End Cover (50859)



1000A End Cover (33796B)

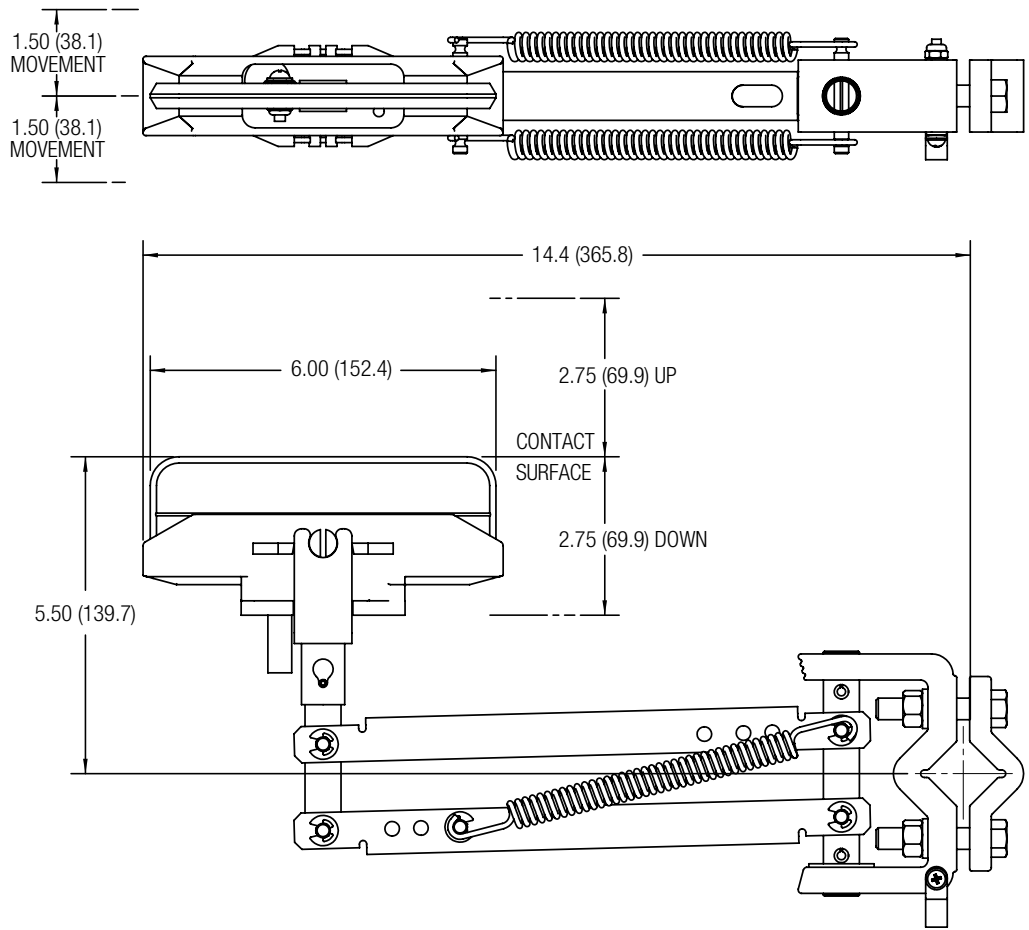


1500A End Cover (33796B)

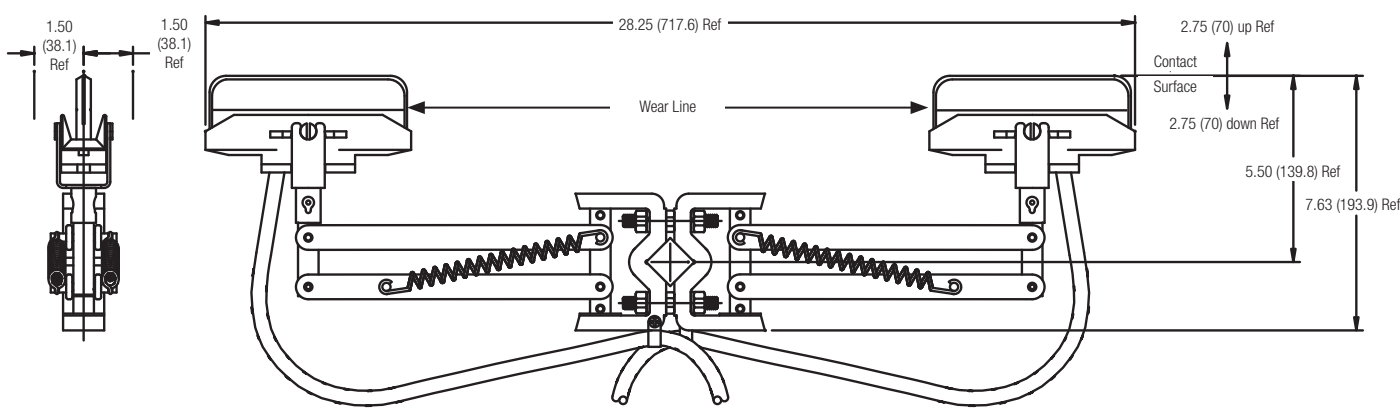


Hevi-Bar II Collector Dimensions

125A Single Collector * (30388/50205)



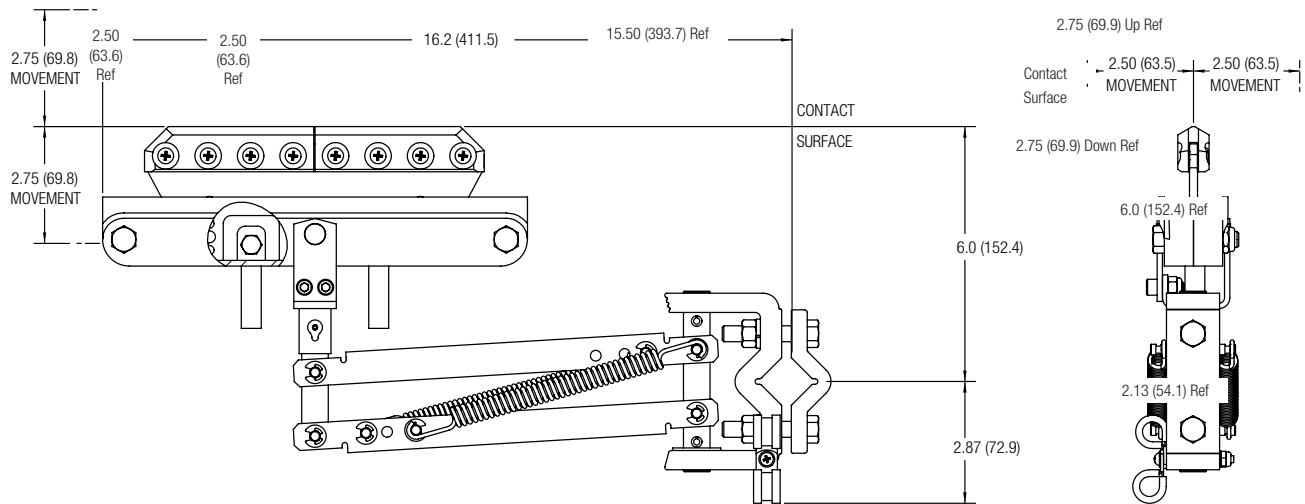
250A Tandem Collector * (30389/39752)



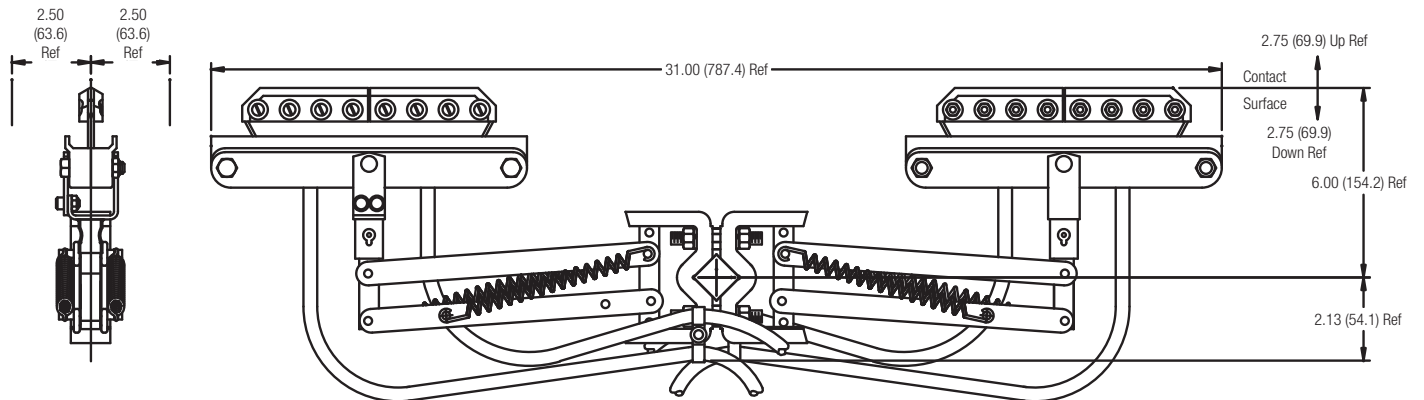
* Only for use with 500A Conductor Bar

Hevi-Bar II Collector Dimensions

200A & 300A Single Collector (24060 / 51522 / 24060Q)



400A & 600A Tandem Collector (24061 / 39848 / 24061B)



✱ Only for use with 700A, 1000A & 1500A Conductor Bar

Appendix I - Selection of Systems

Carefully review your equipment and application to choose the correct system and reduce the risk of system failures, equipment downtime, and maintenance time and expense. There are eight interrelated factors that should be considered when selecting the correct system.

Environmental Conditions Have all aspects of the operating environment been accounted for?

- **Freezing Conditions** - Might require a **heater wire** to keep the conductor contact surface free from ice.
- **Water and/or Dust** - Might adversely affect components and might require the use of insulated hangers to better isolate the “live” conductors from ground.
- **Chemicals** – Can adversely affect system components. Acidic or basic fumes may require stainless steel hardware and components. With the Hevi-Bar II system, you may want to consider the optional “**Dura-Coat**” treatment to reduce component corrosion (Pgs. 37, 39, 41, 44).
- **Cutting Oils** – May negatively affect polycarbonate components
- **Radiation** - May require the use of non-PVC components and non-galvanized plated components.

Mounting and Installation How will your system be mounted?

- **Bottom Entry** – Puts the running surface on the bottom side of the conductor, which keeps dust, water, or debris away.
- **Lateral (or side) Entry** – Can be used if space is limited. Lateral mounting is not recommended for dusty, outdoor, or wet conditions. You may be able to stagger the collectors to decrease the space required for the system.
- **Installation** – Collector Arms are designed to accommodate a certain amount of movement or misalignments between the crane/ vehicle and the conductor. However, if misalignments are excessive the collector could disengage from the bar.
Poor collector installation is the single greatest cause of new system problems. Installation Instructions should be strictly followed to optimize system performance and prevent problems. Manuals are available at www.conductix.us.

Number of Power and Bonding Conductors Required Have you ordered enough conductor runs?

- **Power Legs** - Each “power leg” requires one run of bar
- **Bonding (Ground) Bar** - Per article 610.61 (National Electrical Code): “The trolley frame and bridge frame shall not be considered as electrically grounded through the bridge and trolley wheels and its respective tracks. A separate bonding conductor shall be provided”. A bonding bar is required for all overhead cranes built after 2004.

Moving Versus Stationary Applications Is the equipment moving or stationary when operating?

- **Moving Machine** - Draws maximum power as it moves. Current-induced heat is dissipated over a wider area of the conductor.
- **Stationary Machine** - Draws maximum power while stationary for extended periods (e.g.: weld stations, testing equipment, or cranes that repeatedly lift in the same location). Current-induced heat is not easily dissipated when collectors are stationary. In these cases, verify that the collectors and conductors are adequate for the application.

Current and Voltage Requirements The purchase of a new conductor system affords the opportunity to size the system for additional cranes or larger cranes that may be added in the future. *A small investment now could avoid major investments in the future.*

- **Conductor Bar Rating** – Per NEC Article 610-14, the bar must accommodate 100% of the current of all the largest motors involved in a single movement, plus 50% of the next largest motors. The auxiliary hoist motor must be included if it works in conjunction with the main hoist. The system also must accommodate 100% the current draw of auxiliary equipment such as magnets, lighting, air conditioners, etc. that operate when the largest motors are energized.
- **Multiple Cranes on a Single Runway** – Sum the amperage requirements of each crane, then apply the appropriate “*diversity factor*” (NEC Table 610-14e). All cranes do not pull the maximum load all the time or pull the load at the same time.
- **Two Cranes Working in Tandem** - Do not apply the diversity factor, since both run at the same time. See Specification Data Sheet, Pg. 6-7 for further “total load” calculation details.

Appendix I - Selection of Systems

- **Voltage Rating** - 600 volt rated insulators are standard. Higher voltages require insulators designed for that voltage. Conductor separation may also be affected for medium voltage (e.g. 4160 volts) and higher. The conductor system may need to meet the fault force requirements as determined by a qualified engineer.

Voltage Drop and Power Feed Locations Voltage drop along a conductor increases as system length increases and as ambient temperature increases.

- **Maximum Voltage Drop** - The CMAA (Crane Manufacturers Association of America) recommends a maximum voltage drop of 3% on runways and 2% on bridges. The voltage drop in volts will vary according to voltage available. For example, a 3% voltage drop on a 480 volt system is 14.40 volts; a 3% voltage drop at 115 volts is 3.45 volts.
- **Center Power Feed** - Is the optimal location for most systems. Longer runs may require multiple power feed locations to compensate for voltage drop and to minimize the total cost of the system.
- **Multiple Power Feeds** - Can reduce total system cost if the savings of a lower capacity bar offset the cost to install the multiple power feed locations.
- **Calculating Voltage Drop** - Use Conductix-Wampfler Quick Quote (see Pg. 5) to automate this calculation, as shown in the examples below. Voltage drop can also be manually calculated – see Appendix II, Pg. 61.

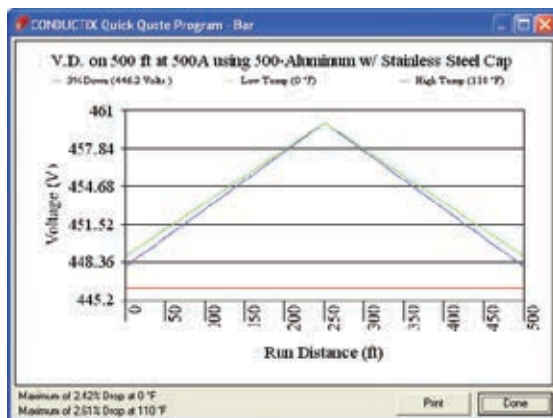


Figure 1 – Center Feed Example: Voltage drop along a 500 foot long runway with one crane drawing 500 amps at 460 volts on a 500 amp rated bar. The green line shows the voltage drop along the run at 0°F. The blue line shows the voltage drop at 110°F. The red line indicates the 3% maximum voltage drop. The voltage drop increases linearly as you move away from the center feed point.

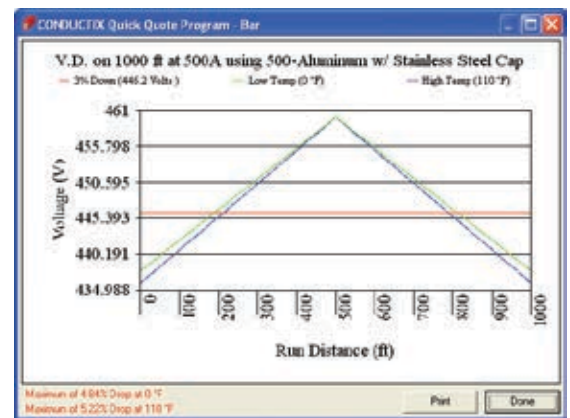


Figure 2: - Same parameters as Fig. 1, except with a 1000 foot system. Note that the voltage drop is now greater than the recommended 3%.

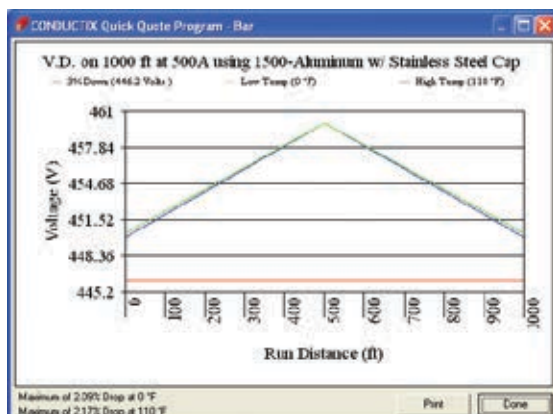


Figure 3: Center Power Example: With higher capacity 1500 amp bar to lower the voltage drop below 3%.

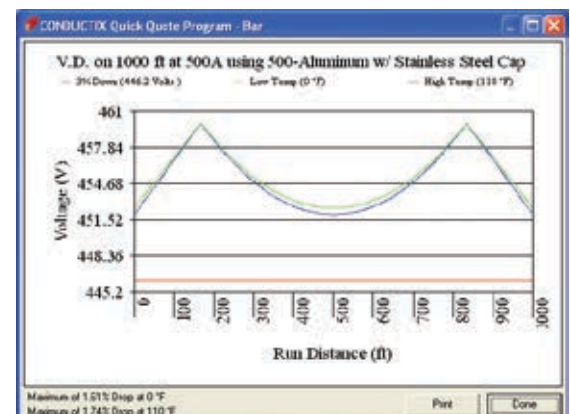


Figure 4: Two power feeds optimally located. The voltage drop remains under 3%, without the need to increase conductor capacity. A load positioned between the two feed points is supplied by both power feeds.

Appendix I - Selection of Systems

Thermal Expansion/Contraction and Other Effects of Heat The effects of thermal expansion and contraction become more pronounced as the length of the run increases. The combination of ambient heat plus current-induced heat affects the size of conductor bar needed, the power feed arrangement, and the type of insulating cover required.

- **“Snaking”** – Occurs when the conductors heat up, and due to cumulative hanger friction, start to bow to the side. This can be observed by sighting down the runway. Each bar will bow alternately left and right between hangers, which puts strain on the collectors and hangers. Eventually, the collectors can disengage and damage the system.
- **“Snaking” - Older Systems** - May begin after a year or two in operation. This is because accumulated dirt increases friction between bar and hangers. This possibility should be considered when determining the number of expansions. Precautions taken at the time of installation could avoid costly repairs later.
- **Shorter Systems** - Can be anchored in the center. As the temperature of the conductor rises, the expansion simply pushes the bar outward. The longest system that can be successfully “center-anchored” depends on the friction of the hangers and the rigidity of the conductor.
- **Longer Systems** - Require the installation of one or more **“Expansion Sections”** - i.e: lengths of conductors designed to slide in and out to absorb bar expansion/contraction between anchor points. The slider is bridged by a jumper cable to maintain electrical continuity and acts as the running surface for the collector. Expansion sections effectively break the run into smaller lengths defined by the anchor points. The length of run an expansion section can accommodate is based on expansion/contraction parameters, including temperature range, conductor material, and the length of the slider. The **high end** of the temperature range is the sum of current-induced heat of the bar (at maximum load) plus the highest ambient temperature. The **low end** is the lowest ambient temperature, which may occur during a January system shutdown. Conductor sections need to be anchored properly between each expansion and between the last expansion and the end of the run.
- **Ambient Heat** – All heat sources must be considered and evaluated for their effect on the conductor and cover. Typical heat sources are furnaces, billets, slag, etc. Ambient heat is easy to measure and the effects are consistent with measured values.
- **Radiant Heat** - Can be difficult to measure and its effects hard to anticipate. It will directly affect cover, and the cover might withstand it. However, the effect on metal components might be even more pronounced. For example, metal hangers may heat to such a degree that they will melt the cover. Heat shields provide a good way of minimizing the effects of radiant heat. If heat shields are not practical, higher temperature rated covers might be required.
- **Total Operating Temperature** – The sum of the ambient temperature, radiant heat, and current-induced temperature rise. This is the total heat the conductor and its cover material must withstand. For example, if your machine is working in an ambient temperature of 120°F (49°C), and the current-induced temperature rise of the conductor adds another 50°F, the total 170°F (76.7°C) exceeds the PVC cover rating of 70°C (156°F). The cover will deform or melt, and interfere with collector tracking and/or interrupt power. In this scenario, the cover must be made from a heat-resistant material. Conductix-Wampfler offers “Medium Heat” or “High Heat” covers for most systems – see Pg. 4.

Conductor Bar Current Rating and Duty Cycle

- **Conductor Electrical Capacity** – A wide variety of capacities are offered, since conductors often power multiple vehicles. Ratings are based on the electrical load the conductor can handle before the operating temperature of the bar exceeds the temperature rating of its cover. The rating assumes a certain ambient temperature (e.g.: 49°C or 120°F) and a specific duty cycle.
- **Duty Cycle** - One manufacturer may rate their conductors for continuous duty; others for intermittent duty based on a given duty cycle. It is important to know which was used to establish the ratings.
- **Continuous Duty** - A conductor is put under a continuous load at some “normal” ambient, usually 30°C. Once the bar temperature has stabilized at the target load rating, the bar temperature cannot exceed the temperature rating of the cover. Most PVC covers can handle approximately 70°C, which is a 40°C rise over 30°C ambient.

Appendix I - Selection of Systems

- **Intermittent Duty** - Assumes that the current is “on” for a period of time and “off” for a period of time; i.e.: one “duty cycle”. The conductor is allowed to cool between “on” phases. A 50% duty cycle is most common – i.e.: one minute on and one minute off. Since a crane cannot lift continuously, nor is current flowing at maximum for long periods of time, most operate at a 40% duty cycle or less. So a 50% duty cycle is sufficient. However, cranes that see heavy duty, especially Class D and E cranes (see end of this Appendix), may push the conductor beyond a 50% intermittent duty rating.
- **Collector Electrical Capacity** – A limited selection of collector capacities is available, since collectors only power the crane/vehicle they service. Additional collectors can be used if the crane/vehicle load exceeds the collector rating. Note that the load will not be shared equally among multiple collectors. The collector closest to the power feed will carry a larger load than those farther down the line. So when using multiple sets of collectors, make sure the collector capacities are adequate for this scenario

CMAA Crane Classifications

Provided for general information only. Refer to CMAA Section 78-6 for full definitions.

Class A (Standby or Infrequent Service) Performs precise lifts at slow speed, with long idle period between lifts. Performs lifts at full or near rated capacity. Power houses, public utilities, turbine rooms.

Class B (Light Service) Light service requirements at slow speed. Performs 2 to 5 lifts/hour, light to occasional full loads, at 10 ft. average height. Repair shops, light assembly, service buildings, light warehousing.

Class C (Moderate Service) Moderate service requirement with loads averaging 50% of capacity. 5 to 10 lifts per hour at 15 ft. average lift height. Not more than 50% of lifts at rated capacity. Machine shops, paper mill machine rooms, etc.

Class D (Heavy Service) Bucket/magnet duty, where heavy duty production is required. Loads of 50% capacity handled constantly. 10 to 20 lifts per hour averaging 15 ft. lift height. Not over 65% of the lifts at rated capacity. Heavy machine shops, foundries, fabricating plants, steel warehouses, container yards, lumber mills, etc.

Class E (Severe Service) Loads approaching capacity throughout the life of the crane. 20 or more lifts per hour at or near rated capacity. Magnet/bucket cranes for scrap yards, cement mills, lumber mills, fertilizer plants, container handling.

Class F (Continuous Severe Service) Handles loads approaching capacity continuously under severe service conditions throughout the life of the crane. Includes custom designed specialty cranes performing work critical to the total production facility. Needs to have the highest reliability and ease of maintenance.

For system recommendations based on Crane Class, contact Ergonomic Partners Sales.

Distributed by Ergonomic Partners
Sales@ErgonomicPartners.com
www.ErgonomicPartners.com
Tel: (314) 884-8884

Appendix II - Voltage Drop Calculations

Proper selection of conductor and covers for Conductix-Wampfler conductor systems is simple, requiring only the ampacity, voltage and ambient conditions.

The method for determining the rating for cranes and hoists is completely outlined in NEC 640-14(e). Further reference to the Code is 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.

$$\begin{aligned}\text{Hoist} &= 65\text{A} \times 1 = 65.0 \\ \text{Bridge} &= 27\text{A} \times .5 = 13.5 \\ \text{Total} &= \underline{78.5\text{A}}\end{aligned}$$

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 with data taken from motor nameplates - all are 460V, 3-phase, 60 Hz.

$$\begin{aligned}\text{Crane \#1} \\ \text{Hoist} &= 65\text{A} \times 1 = 65.0 \\ \text{Bridge} &= 27\text{A} \times .5 = 13.5 \\ \text{Total} &= \underline{78.5\text{A}}\end{aligned}$$

$$\begin{aligned}\text{Crane \#2} \\ \text{Hoist} &= 52\text{A} \times 1 = 52.0 \\ \text{Bridge} &= 14\text{A} \times .5 = 7.0 \\ \text{Total} &= \underline{59.0\text{A}}\end{aligned}$$

$$\text{Total of \#1 + \#2} = 137.5 \times .195 = 130.0\text{A}$$

- II. When the motor ampere ratings are unknown, a good approximation may be made using the nominal horse power ratings of the motors, converting them to full load amperes per NEC table 430-150; then proceeding as above. If the motors are not three-phase, applicable tables 430-137 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

Voltage drop is the difference between the voltage at the feed point and the voltage at the extreme end. It is usually expressed as a percentage of the supply voltage and can be calculated as shown below.

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

Voltage Drop per 100 Ft. of Run Per 100A of Current

Conductor	3-Phase 60 Hz	D.C.	Example
Stainless Steel 40A	35.2	44.6	Rolled Copper 3-phase 350' long, 250A load. $VD = 1.39 \times 3.5 \times 2.5 = 12.1 \text{ volts}$ Assume load pF is 90
Galvanized Steel 90A	16.2	15.0	
Galvanized Steel 110A	10.1	7.1	
Stainless Clad Copper 250A	2.01	2.0	
Copper Steel Laminate 250A	2.01	2.0	
Rolled Copper 350A	1.39	1.2	
Solid Copper 500A	1.08	0.8	

3% at Max Amps and Length from Power feed			
Bar	Amps	480V	240V
SS	40	102'	51'
Galv	90	99'	49'
Galv	110	130'	65'
SS / CU	250	287'	144'
CU / Galv	250	287'	144'
Rolled Cu	350	296'	148'
Solid Cu	500	381'	191'

$$\begin{aligned}3\% \text{ of } 480\text{V} &= 14.4 \\ 2\% \text{ of } 240\text{V} &= 7.2 \\ 2\% \text{ of } 180\text{V} &= 9.6 \\ 2\% \text{ of } 240\text{V} &= 4.8\end{aligned}$$

Appendix III Electrical Formulas & Conversions

Electrical Formulas

Ohms Law

$\text{Ohms} = \frac{\text{volts}}{\text{amperes}}$	$\text{Amperes} = \frac{\text{volts}}{\text{ohms}}$	$\text{Volts} = \text{amperes} \times \text{ohms}$
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Power

$\text{Watts} = \text{amperes} \times \text{volts}$	$\text{3-phase Kilowatts} = \frac{\text{volts} \times \text{amperes} \times \text{power factor} \times 1.732}{1000}$
$\text{Amperes} = \frac{\text{watts}}{\text{volts}}$ (not 3-Phase)	$\text{3-phase Amperes} = \frac{746 \times \text{HP (Horsepower)}}{1.732 \times \text{volts} \times \text{efficiency} \times \text{power factor}}$
$\text{HP} = \frac{\text{volts} \times \text{amps} \times \text{efficiency}}{746}$	$\text{3-phase Volt-Amperes} = \text{volts} \times \text{amperes} \times 1.732$
$\text{Power Factor} = \frac{\text{watts}}{\text{amperes} \times \text{volts}}$	$\text{Single-phase Kilowatts} = \frac{\text{volts} \times \text{amperes} \times \text{power factor}}{1000}$
	$\text{Single-phase Amperes} = \frac{746 \times \text{HP (Horsepower)}}{\text{volts} \times \text{efficiency} \times \text{power factor}}$

Speed

$\text{Synchronous RPM} = \frac{\text{Hertz} \times 120}{\text{poles}}$	$\text{Percent Slip} = \frac{\text{Synchronous RPM} - \text{Full Load RPM}}{\text{Synchronous RPM}} \times 100$
---	---

Metric Conversion Formulas

To Obtain:	Calculate:
Millimeters	Inches x 25.4
Inches	Millimeters x 0.0394
Meters	Feet x .3048
Feet	Meters x 3.281
Square Centimeters	Square Inches x 6.45
Square Inches	Square Centimeters x 0.155
Kilograms	Pounds x 0.4536
Pounds	Kilograms x 2.205
Kilograms per Meter	lb/ft (divided by) .6719
Pounds per Foot	kg/m x .6719
Degrees Celsius	(Degrees F-32) x 5/9
Degrees Fahrenheit	(Degrees C x 9/5) + 32

Appendix IV - Power Interrupting Sections

You can shut off power in a designated area along a bar system, either to safely maintain vehicles or for some other purpose while leaving the rest of the system powered. The shut-off zone can be configured at the end of your system or in the middle using a "Power Interrupting Section" along with the proper switch arrangement. The diagrams on pages 63-64 illustrate how this is set up. Note that Tandem Collectors can bridge across the "isolation joint" of an isolation section, so enough Power Feeds and Isolation Sections must be used to ensure a safe power-off situation. Conductix-Wampfler offers a safe switching arrangement called **PowerGuard™** shown in catalog CAT1017.

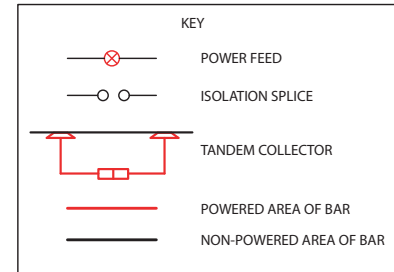
"End" Power Interrupting Sections

Safe-Lec 2 System: For each power phase order:

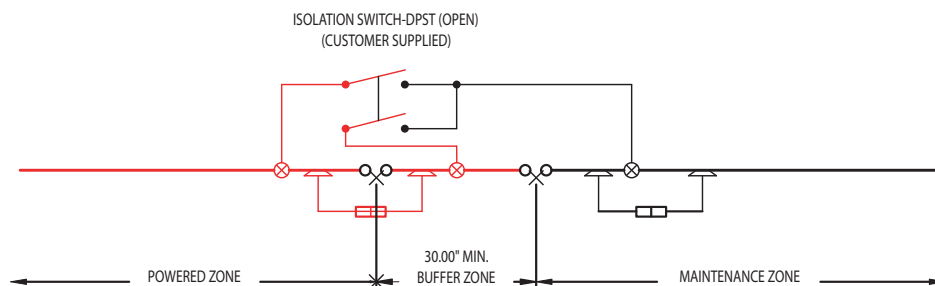
- Qty. 1 - "Power Interrupting Section" of the desired current rating (Pg. 21).
With this "kit" you get the required isolations and power feeds. Safe-Lec 2 interrupts are meant for indoor use only in dry, clean environments.
- Qty. 1 - "Customer supplied" DPST switch per phase and necessary power wiring (ordered from others) - OR Conductix-Wampfler's **PowerGuard**.

Hevi-Bar II System: For each power phase order:

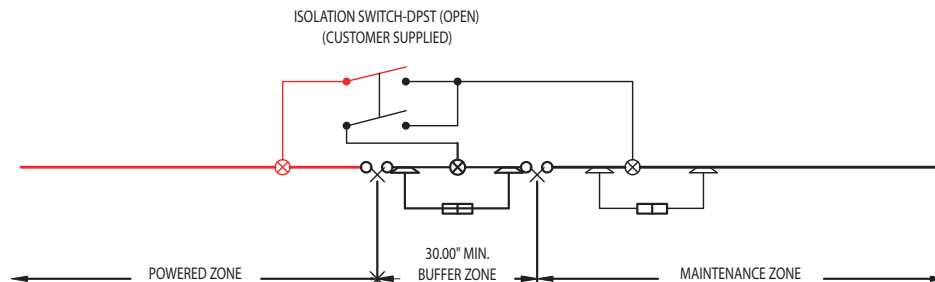
- Qty. 1 - "Power Interrupting Section" of the desired current rating (Pgs. 36-43). With this "kit" you get the required isolations and power feeds. The HB-II power interrupts can be used indoors or out and can withstand dirty/dusty environments common in mills.
- Qty. 1 - "Customer supplied" DPST switch per phase and necessary power wiring (ordered from others)



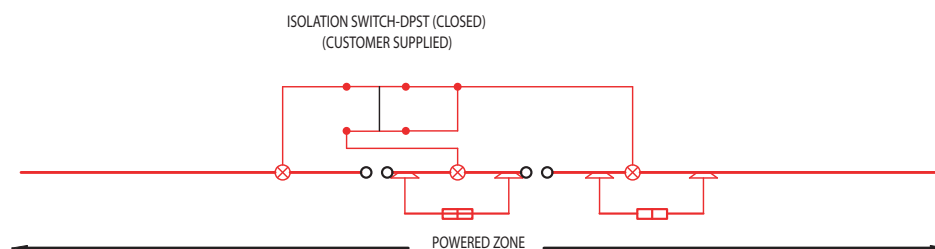
I: System with power off to the maintenance section (DPST switch open), but with tandem collector bridging the first (left-most) isolation joint.



II: System with power off to the maintenance section (DPST switch open), but with tandem collector fully to the right of the first (left-most) isolation joint.



III: System with power on to the maintenance section (DPST switch closed).



Appendix IV - Power Interrupting Sections

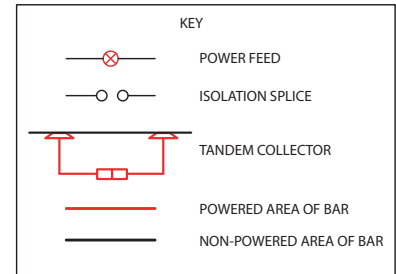
“Middle” Power Interrupting Sections

Safe-Lec 2: For each power phase order:

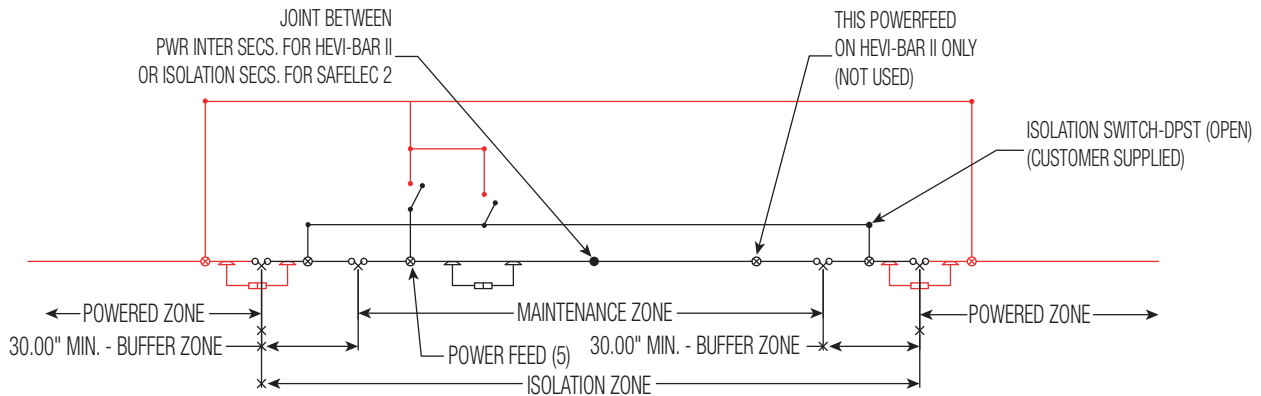
- Qty. 2 - “Power Interrupting Section” of the desired current rating (Pgs. 21). With this “kit” you get the required isolations and power feeds.
- Qty. 1 - “Customer supplied” DPST switch per phase and necessary power wiring (ordered from others) - OR Conductix-Wampfler's **PowerGuard**.

Hevi-Bar II: For each power phase order:

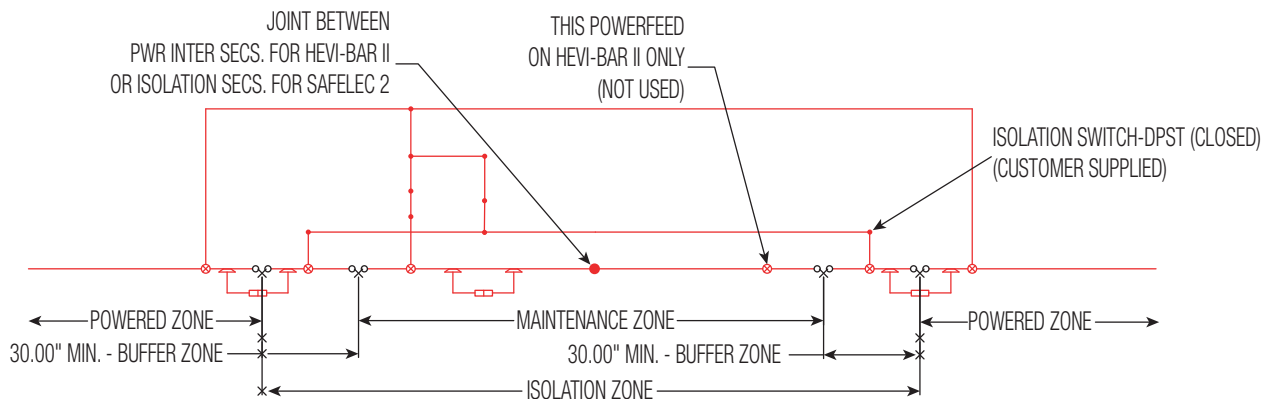
- Qty. 2 - “Power Interrupting Section” of the desired current rating (Pgs. 36-43). With this “kit” you get the required isolations and power feeds.
- Qty. 1 - “Customer supplied” DPST switch per phase and necessary power wiring (ordered from others) - OR Conductix-Wampfler's **PowerGuard**.



I: System with power off to the maintenance section (DPST switches open), power will not feed into the maintenance zone.



II: System with power on (DPST switches closed), normal crane operation resumes with power to all zones.



Appendix V Terms, Conditions, and Warranty

The technical data and images which appear in this catalog are for informational purposes only. NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE CREATED BY THE DESCRIPTIONS AND DEPICTIONS OF THE PRODUCTS SHOWN IN THIS CATALOG. Conductix-Wampfler (“seller”) makes no warranty and assumes no liability as to the function of equipment or the operation of systems built according to customer design or of the ability of any of its products to interface, operate or function with any portions of customer systems not provided by Conductix-Wampfler.

Seller agrees to repair or exchange the goods sold hereunder necessitated by reason of defective workmanship, and material discovered and reported to Seller within one year after shipment of such goods to Buyer. Except where the nature of the defect is such that it is appropriate in Seller’s judgment to effect repairs on site, the seller’s obligation hereunder to remedy defects shall be limited to repairing or replacing (at Seller’s option), FOB point of original shipment by Seller, any part returned to Seller at the risk and cost of Buyer. Defective parts replaced by Seller shall become the property of Seller.

Seller shall only be obligated to make such repair or replacement of the goods which have been used by Buyer in service recommended by Seller and altered only as authorized by Seller. Seller is not responsible for defects which arise from improper installation, neglect, or improper use or from normal wear and tear.

Additionally, Seller’s obligation shall be limited by the manufacturer’s warranty (and shall not be further warranted by Seller) for all parts procured from others according to published data, specifications, or performance information not designed by or for Seller.

Seller further agrees to replace, or at Seller’s option to provide a refund of the sales price of any goods that did not conform to applicable specifications or which differ from that agreed to be supplied which non-conformity is discovered and forthwith reported to Seller within thirty (30) days after shipment to Buyer. Seller’s obligation to replace or refund the purchase price for non-conforming goods shall arise once Buyer returns such good FOB point of original shipment by Seller at the risk and cost of Buyer. Goods replaced by Seller shall be come property of Seller.

There is no guarantee or warranty as to anything made or sold by Seller, or any service performed, except as to title and freedom from encumbrances, and except as herein expressly stated and particularly without limiting the foregoing. There is no guarantee or warranty, express or implied, of merchantability or of fitness for any particular purpose or against claim of infringement or the like.

Seller makes no warranty (and assumes no liability) as to function of equipment or operation of systems built to Buyer’s design or of the ability of any goods to interface, operate or function with any portions of Buyer’s system not provided by Seller.

Seller’s liability on any claim; whether in contract (including negligence) or otherwise, for any loss or damage arising out of, connected with, or resulting from the manufacture, sale, delivery, resale, repair, replacement or use of any products or, services shall in no case exceed the price paid for the product or services or any part thereof which give rise to the claim. In no event shall Seller be liable for consequential, special, incidental or other damages, nor shall Seller be liable in respect to personal injury or damage to property on the subject matter hereof unless attributable to gross misconduct of Seller, which shall mean an act of omission by Seller demonstrating reckless disregard of the foreseeable consequences thereof.

Seller is not responsible for incorrect choice of models or where products are used in excess of their rated and recommended capacities and design functions or under abnormal conditions. Seller assumes no liability for loss of time, damage or injuries to property or persons resulting from the use of Seller’s products. Buyer shall hold Seller harmless from all liability, claims, suits and expenses in connection with loss or damage resulting from operation of products or utilization of services, respectively, of Seller and shall defend any suit or action which might arise there from Buyer’s name, provided that Seller shall have the right to elect to defend any such suit or action for the account of Buyer. The foregoing shall be the exclusive remedies of the buyer and all persons and entitles claiming through the Buyer.



Other Conductor Rail Products

Conductor rails made in the Weil am Rhein, Germany Conductix-Wampfler plant are an ideal choice for the transmission of digital data and power up to 2000 amps and beyond. Special metal rails are used for the accurate transmission of data. Conductix-Wampfler's innovative electronic Powertrans is an extremely efficient system that permits reliable data transmission even under difficult operation conditions.

Conductix-Wampfler rails are available in any number of poles in any desired length and are designed for ease of installation. The rails feature robust construction suitable for harsh industrial environments. Heavy-duty collector assemblies guarantee reliable transmission without interruption for trouble-free operation.

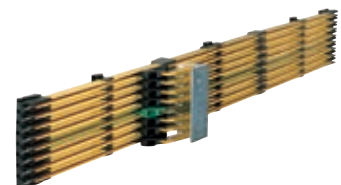
Current collectors move along three axes to compensate for variations in assembly tolerances and inevitable travel variations during operation. This permits uninterrupted transmission of energy and digital data and keeps wear to a minimum. Conductor rails are available for travel speeds up to 33 feet per second.

The experienced engineering and sales people at Conductix-Wampfler are experts in the application of conductor rails to all kinds of industrial applications

For more information on these rail set, please contact Conductix-Wampfler.

All Conductix-Wampfler plants in the United States, Germany, France, and Italy are ISO 9001:2000 certified. Our stringent quality systems assure that you will get the right product every time. See Pg. 67 for a sampling of our other quality products.

In 2007, with the merger of Conductix and Wampfler, the company is now the world leader in the design and manufacture of high performance energy and data transmission products for industrial applications.



811 Series

Available from 10 to 100 amps for automated storage and retrieval systems, monorails, cranes, and special machines. Straight or curved tracks.

812 Series

Available from 25 to 400 amps. Ideal for mid-sized cranes, people movers, amusement rides, and special machines. Stainless steel running surface for straight or curved track.

813 Series

Available from 500 to 1250 amps. Works well for heavy cranes, people movers, and special machines. Patented stainless steel running surface for straight or curved tracks.

815 Series

Available from 32 to 100 amps. A compact multi-conductor system for electrified overhead monorails and slip rings. Either .47 inch (12mm) or .55 inch (14mm) spacing. Straight or curved tracks.

831 Series

Handles from 10 to 125 amps, in 3, 4, or 5 pole configuration. Great for cranes, automated storage and retrieval systems, and special machines. Straight tracks.

842 Series

Accommodates from 35 to 140 amps in a continuous conductor strip and enclosed "box track" system. 5 or 7 poles. For cranes, ASRS systems, and work stations.

Other Products from Conductix-Wampfler

The products described in this catalog represent a few of the products from the broad spectrum of Conductix-Wampfler components and systems for the transfer of energy, data, gases, and fluids. The solutions we deliver for your applications are based on your specific requirements. In many cases, a combination of several different Conductix-Wampfler products are needed to fill the application. You can count on all of Conductix-Wampfler's business units for hands-on engineering support - coupled with the perfect solution to meet your energy management and control needs.



Motor driven cable reels

Motor driven reels by Conductix-Wampfler are the perfect solution for managing long lengths of heavy cable and hoses in very demanding industrial applications. Monospiral, level wind, and random wind spools.



Slip ring assemblies

Whenever powered machinery needs to rotate 360°, field proven slip ring assemblies by Conductix-Wampfler can flawlessly transfer energy and data. Here, everything revolves around flexibility and reliability.



Conductor bar

Whether they are enclosed conductor rails, expandable single-pole bar systems, or high amperage bar for demanding steel mill use up to 6000 amps. Conductix-Wampfler's conductor bar is the proven solution to reliably move people and material.



Spring driven cable reels

We have 60 years experience and trusted brands such as Insul-8, Wampfler, and IER. We offer small cord reels all the way to large multi-motor units, a wide range of accessories, and hazardous location reels.



Cable Festoon systems

It's hard to imagine Conductix-Wampfler cable trolleys not being used in virtually every industrial application. They are reliable and robust and available in an enormous variety of sizes and models.



Push Button Pendants

Our ergonomic pendants are ideally suited for industrial control applications. They are available in a wide range of configurations for overhead cranes and other machinery.



Radio remote controls

Safe, secure, and reliable radios use the latest in microprocessor technology. Available in several models for overhead crane control and other types of machinery.



Inductive Power Transfer IPT®

The contact-less system for transferring energy and data. For all tasks that depend on high speeds and absolute resistance to wear.



Energy guiding chains

The "Jack of all Trades" when it comes to managing energy and data cables and air and fluid hoses. A wide range of energy guiding chains are available for many industrial applications.



Air hoists and balancers

ENDO Air hoists accurately place delicate loads and continuously vary the speed for precise positioning. They run cool in continuous operations.



Bumpers

Conductix-Wampfler offers a complete range of bumpers for the auto industry, cranes, and heavy machinery. These include rubber, rubber/metal, and cellular types.



Spring balancers and retractors

ENDO spring balancers by Conductix-Wampfler are rugged, reliable high-precision positioning devices that reduce operator fatigue and assist with accurate tool placement.

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