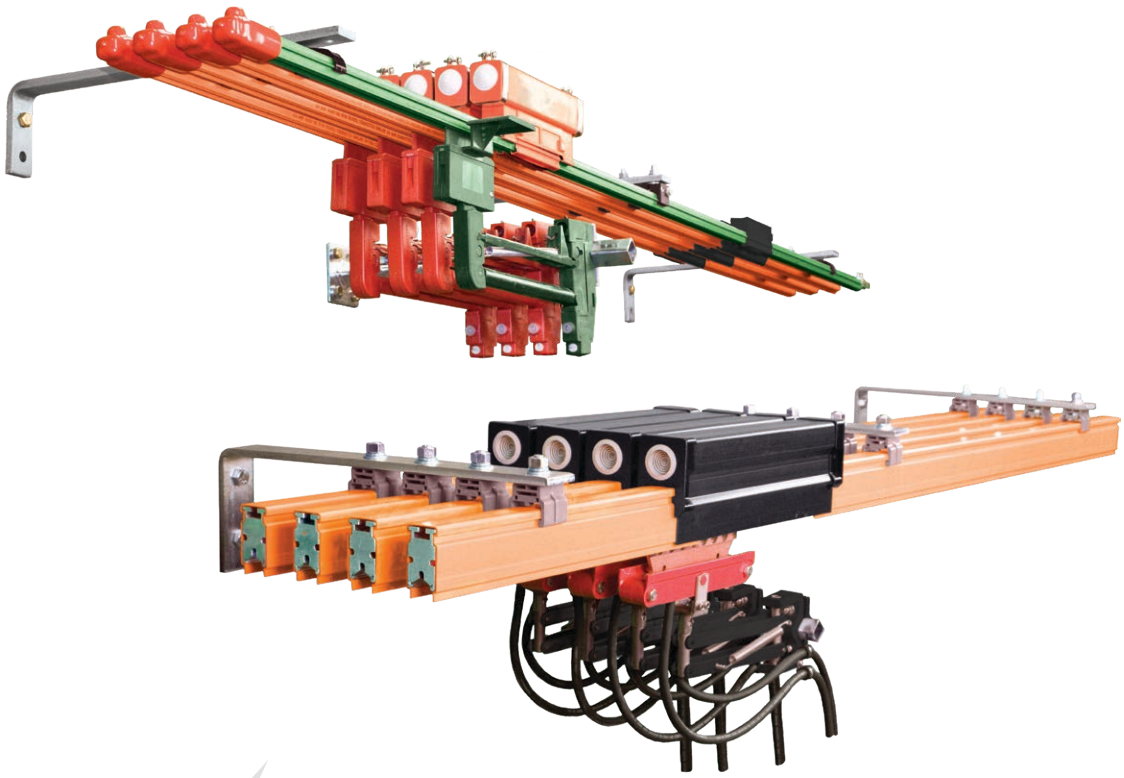
Conductor Bar
Safe-Lec 2 | Hevi-Bar II



CONDUCTIX wampfler

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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.

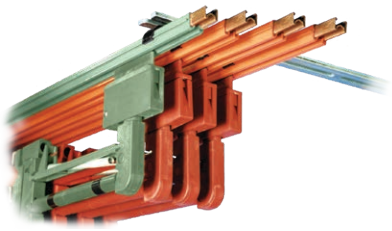
Conductix-Wampfler USA was founded in 1944 as Insul-8 Corporation (San Carlos, CA). Insul-8 developed the first "Figure 8" conductor bar system, which became the standard method for electrifying overhead cranes. In 1991 the company moved its manufacturing facility to Harlan, Iowa.

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.

Most components are UL Listed: Contact Factory

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 KAT0***-0001-US (*** = series no.)


Omaha Plant


Harlan Plant

Material Handling Industry of America® Member Company

CMAA OEM Crane Component Manufacturer

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)

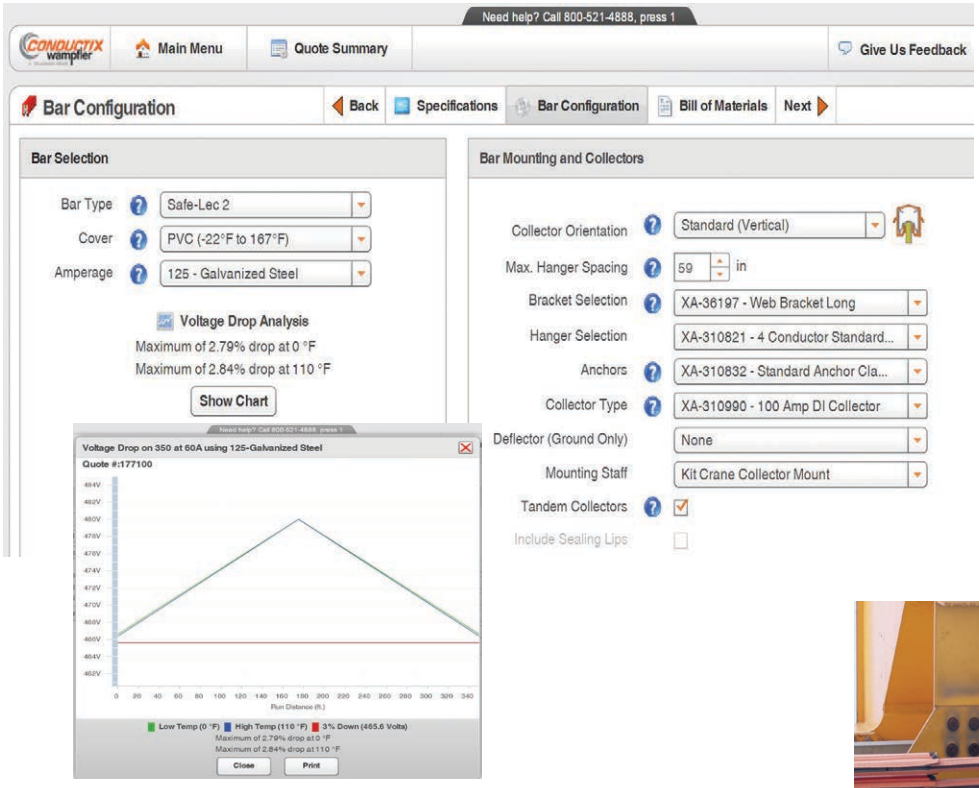
Conductix-Wampfler Germany - Conductor Rail Lines

Conductix-Wampfler Germany's high-performance conductor rails are stocked and available in the USA. Please contact our office at (+1) 800-521-4888 for more information. See Pg. 66 of this catalog for a brief overview of available series

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.



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

Our **Quick Quote Web** program is available on our ***Partners Site*** at

www.conductix.us

To access the program, you will need a Partners Site Login. Contact our Customer Service Team for details:

(+1) 800 521 4888 or (+1) 402 339 9300), Press 1.

Or by e-mail at **customerservice@conductix.com**

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 Appenxix 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 Conductix-Wampfler 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.

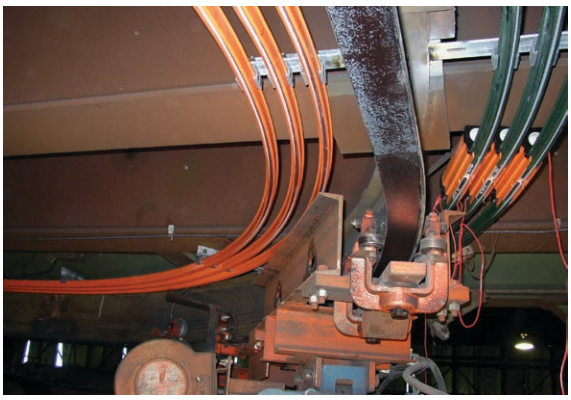
For multiple cranes or vehicles: Determine the current draw for each crane/vehicle, using the method above. Sum all the current draws for each crane/vehicle, then multiply the sum by the appropriate demand factor:

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

Hevi-Bar II - Process Crane

Hevi-Bar II - Mill Application

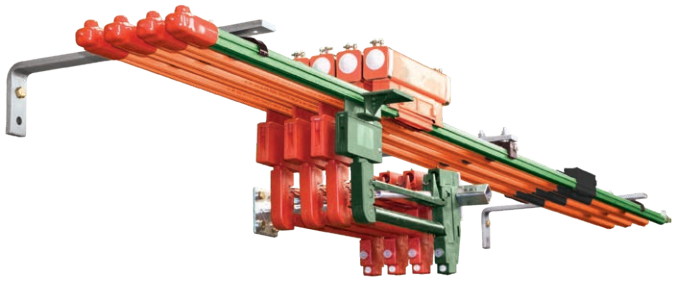
Hevi-Bar II - Foundry Crane



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. Most components are **UL Listed** - contact Factory for details.



Safe-Lec 2 is ideal for:

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

Ampacity range:

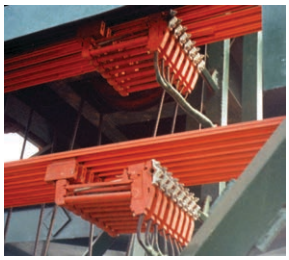
100A, 125A, 160A, 200A, 250A, 315A, & 400A capacities up to 600 volts maximum.

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

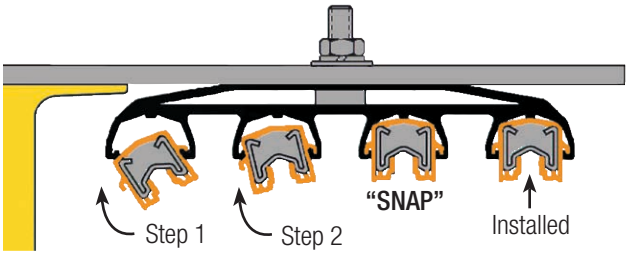
Here are several specific reasons why Safe-Lec 2 is superior to a traditional (and now outmoded) 8-Bar system. And we should know . . . we invented 8-Bar over 50 years ago!

Safe-Lec 2

8-Bar

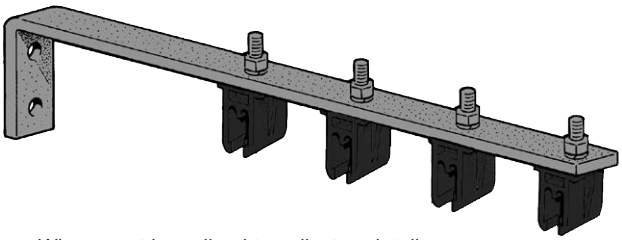
Quicker and less costly Installation

- 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

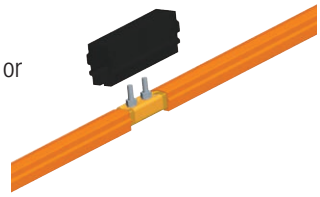
- 10 ft (3.05m) bar lengths; more splices required
- Hangers hold only one bar each



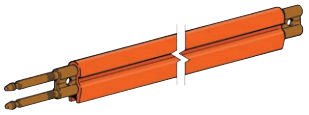
- Wires must be spliced to collector pigtails

More secure splice joint

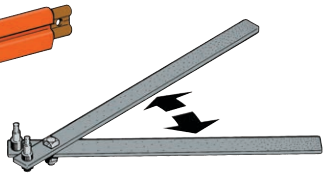
- Bolted joints
- No special tools required
- No need for "joint keepers" or "joint repair kits", etc



- Pinned joint can pull apart; requires special parts



- Special tool required



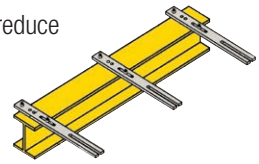
Fewer expansion sections required

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

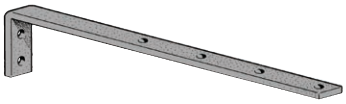
- 8-Bar can only go 300 ft before an expansion section is required (or 200 ft for copper bar)

Easier system alignment

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

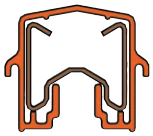


- Brackets have round holes, so alignment must be perfect
- Harder to make system alignment adjustments



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

Single Conductor

Joint Position

Expansion Section

Transfer Cap

End Cap

Isolation Section
Isolation = Insulating Material

Hanger Clamp

Anchor Position

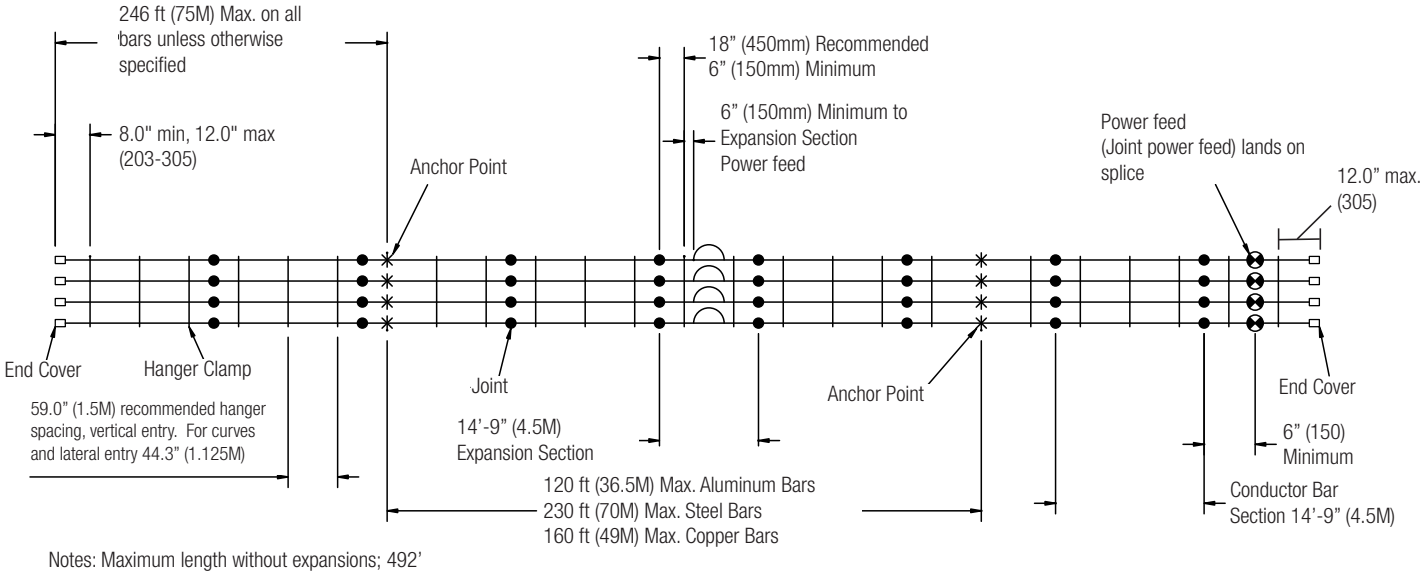
Power feed

Pickup Guide

Isolation Section
Isolation = Air Gap

Collector

Power Interrupt



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:

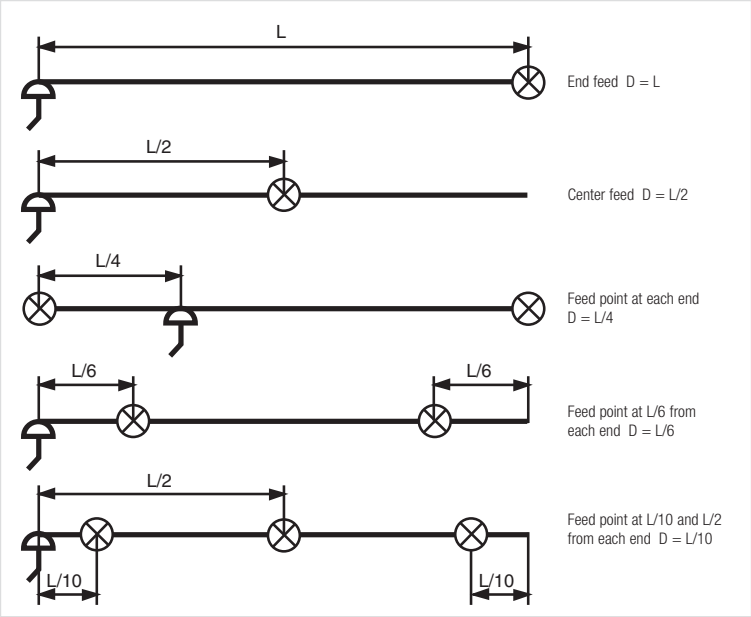
3-Phase AC	$\Delta U = \sqrt{3} \times I \times D \times Z$
Single Phase AC	$\Delta U = 2 \times I \times D \times Z$
Continuous current DC	$\Delta U = 2 \times I \times D \times R$

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

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 Ta. Allowable current (I) is calculated using the following formula:

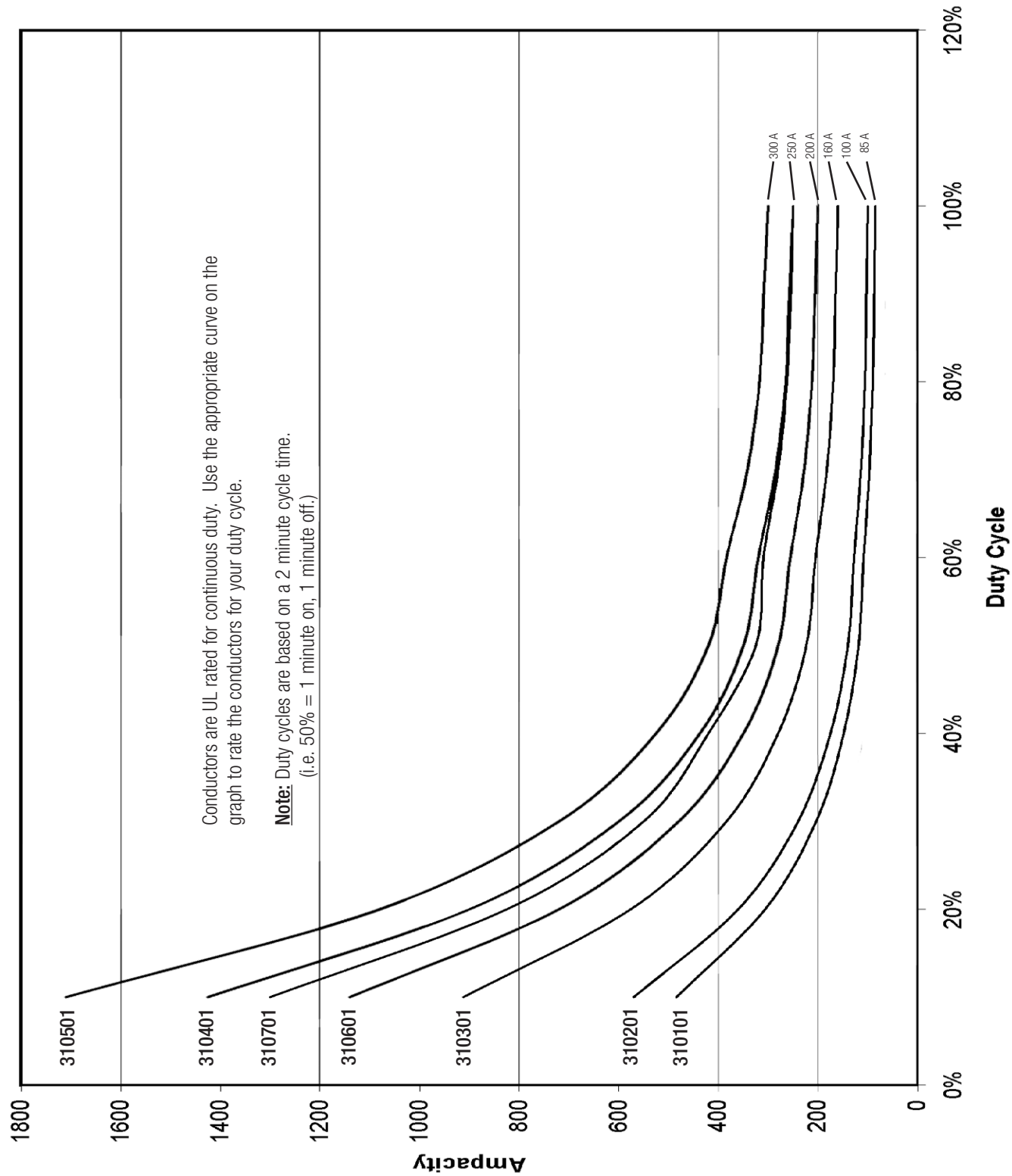
$$I_{allowable} = \text{Nominal Current} \times K$$

Factor "K"						
	Ta \ Duty	100%	80%	60%	40%	20%
Standard Cover	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
	130°F (55°C)	0.674	0.754	0.870	1.066	1.508
Medium Heat Cover	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 20^0 C (Ω/m)	0.002867	0.001933	0.000342	0.000274	0.000184	0.000301	0.000261	0.000199
Impedance Z (for AC) at 20^0 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^{0}C	25^{0}C	25^{0}C	25^{0}C	25^{0}C	25^{0}C	25^{0}C	25^{0}C
Bar Length	4.5m	4.5m	4.5m	4.5m	4.5m	4.5m	4.5m	4.5m
Support Pitch Standard Lateral	1500mm 1125mm	1500mm 1125mm	1500mm 1125mm	1500mm 1125mm	1500mm 1125mm	1500mm 1125mm	1500mm 1125mm	1500mm 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

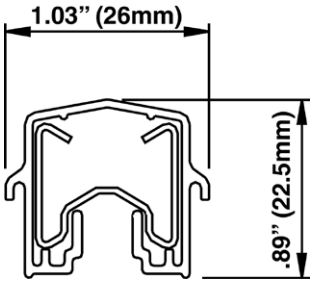
✱ Contact Conductix-Wampfler for other voltages

Safe-Lec 2 Conductor Bar Covers

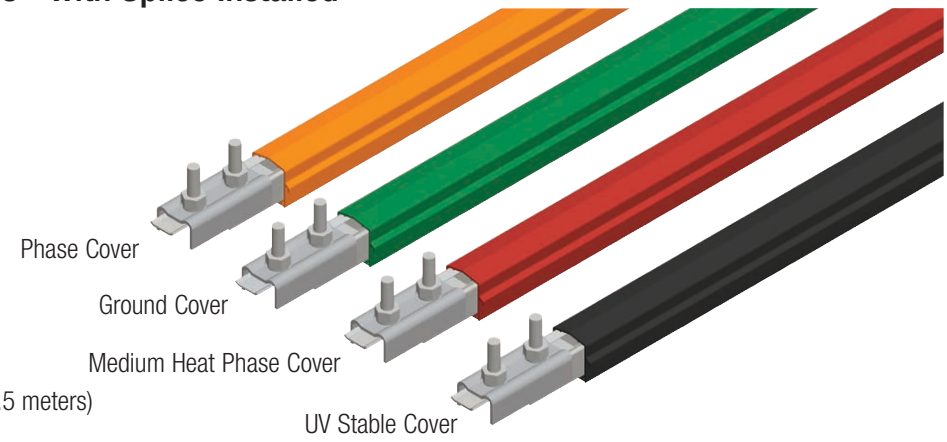
	Standard (Orange or Green)	UV Stable (Black)	Medium Heat (Red)
Material	PVC	PVC	Polycarbonate
Dielectric Strength	271 kv/cm	271 kv/cm	165 kv/cm
Surface Resistivity	$10^{11}\Omega$	$10^{11}\Omega$	$>10^{14}\Omega$
Volume Resistivity	$>10^{15}\Omega$/cm	$>10^{15}\Omega$/cm	$> 2 \times 10^{17}\ \Omega$/cm
Vicat Softening Temperature **Never expose PVC cover to temperatures in excess of 176^0 F (80^0 C)**	160^{0}F (71.1^{0}C)	160^{0}F (71.1^{0}C)	304^{0}F (121.1^{0}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

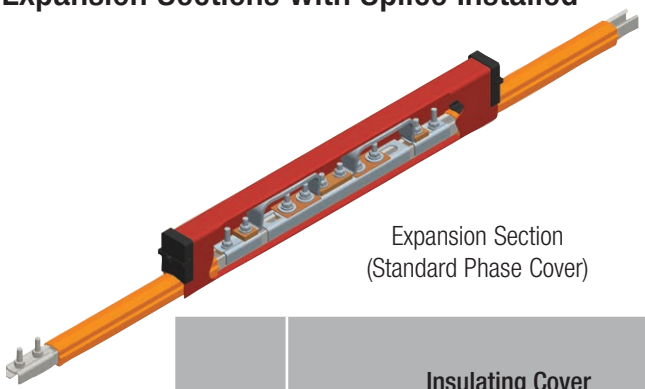


All Bar and Expansion Lengths: 14.76 ft (4.5 meters)



Bar Type	Insulating Cover			Nominal Current Rating	
				100 Amps	125 Amps
	Color	Type	Max Temp °F (°C)	Part No.	Part No.
Phase	Orange	PVC	160 (71.1)	**310101-J**	**310201-J**
Ground	Green	PVC	160 (71.1)	**310102-J**	**310202-J**
Phase	Red	Polycarbonate	250 (121.1)	**310103-J**	**310203-J**
Outdoor	Black	PVC, UV Stable	160 (71.1)	**310101B-J**	**310201B-J**

Expansion Sections with Splice Installed



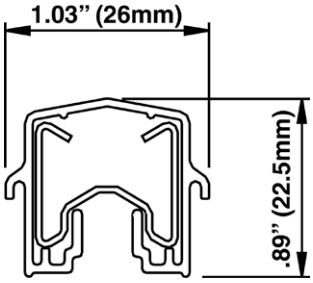
Expansion Section
(Standard Phase Cover)

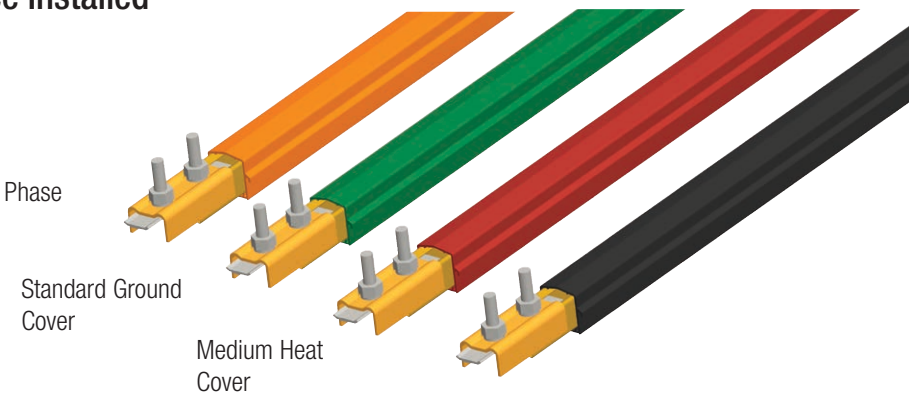
Expansion Sections are used at all structural expansion joints and for systems longer than 492 ft (150m) to allow for thermal expansion / contraction of the bar. The maximum gap of the Expansion Section is 2.0" (50 mm). The Expansion Section is installed in place of one length of conductor bar.

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

Safe-Lec 2 Copper Bar

Copper Conductor Bars with Splice Installed

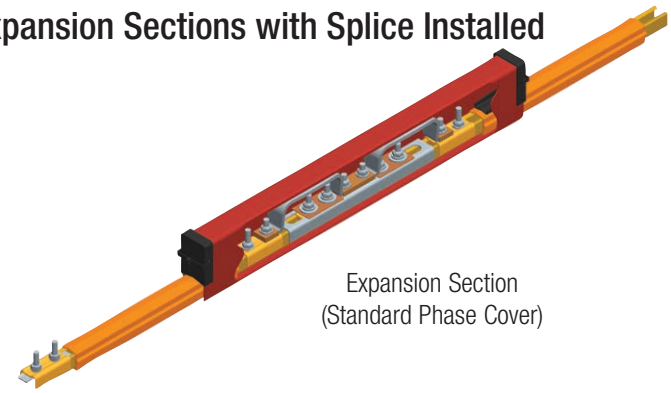




All Bar and Expansion Lengths: 14.76 ft (4.5 meters)

Bar Type	Insulating Cover			Nominal Current Rating		
				160 Amps	250 Amps	400 amps
	Color	Type	Max Temp °F (°C)	Part No.	Part No.	Part No.
Phase	Orange	PVC	160 (71.1)	**310301-J**	**310401-J**	**310501-J**
Ground	Green	PVC	160 (71.1)	**310302-J**	**310402-J**	**310502-J**
Phase	Red	Polycarbonate	250 (121.1)	**310303-J**	**310403-J**	**310503-J**
Outdoor	Black	PVC, UV Stable	160 (71.1)	**310301B-J**	**310401B-J**	**310501B-J**

Expansion Sections with Splice Installed



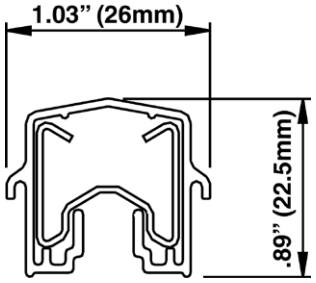
Expansion Section
(Standard Phase Cover)

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.	Part No.	Part No.
Phase	Orange	PVC	160 (71.1)	**310307-J**	**310407-J**	**310507-J**
Ground	Green	PVC	160 (71.1)	**310308-J**	**310408-J**	**310508-J**
Phase	Red	Polycarbonate	250 (121.1)	**310309-J**	**310409-J**	**310509-J**
Outdoor	Black	PVC, UV Stable	160 (71.1)	**39132-J**	**39133-J**	**39134-J**

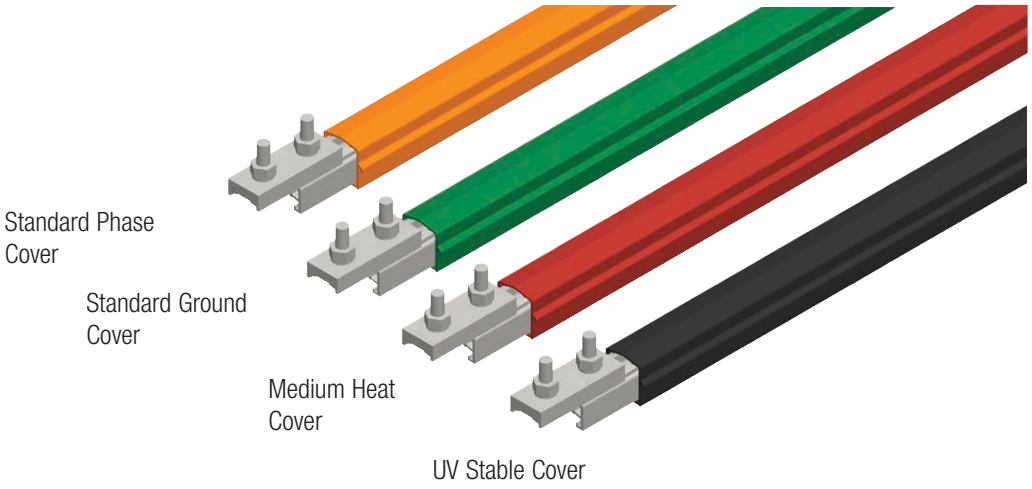
Safe-Lec 2 Aluminum / Stainless Bar

Aluminum / Stainless Steel Conductor Bars with Splice Installed

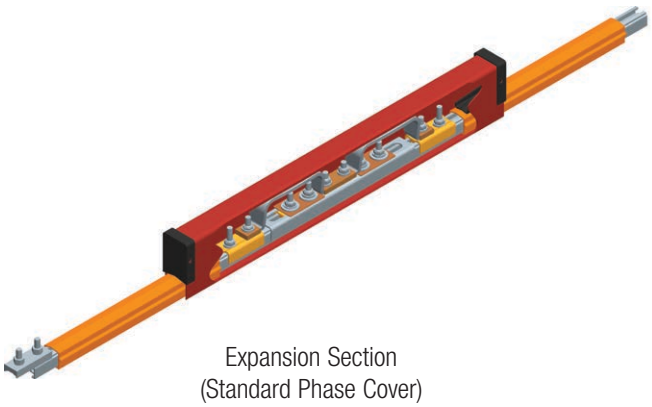


Bar Length: 14.76' (4.5m)

	CURRENT RATING		
COVER TYPE	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



Expansion Sections with Splice Installed



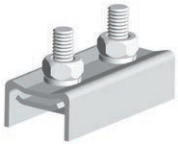
Expansion Section
(Standard Phase Cover)

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.

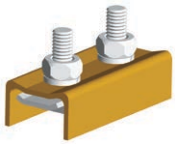
	CURRENT RATING		
COVER TYPE	200A	315A	400A
Standard Phase Cover (Orange)	310607-J	310707-J	399107-J
Standard Ground Cover (Green)	310608-J	310708-J	399108-J
Medium Heat Cover (Red)	310609-J	310709-J	399109-J
UV Stable (Black)	39135-J	39136-J	399107B-J

Safe-Lec 2 Joints & Power Feeds

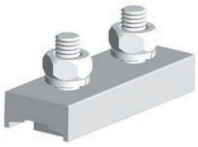
Splice Joints



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.
Steel	**310872**
Copper	**310873**
Aluminum	**310874**

Joint Covers

Standard Phase Joint Cover
310850B

Must be ordered separately - one per splice joint.

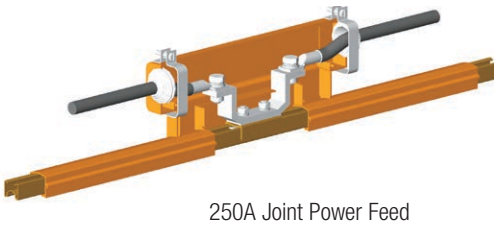
TYPE	Part No.
Standard Cover (UV Black)	**310850B**
Medium Heat Cover (Red)	**310855**

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.
15629

Joint Power Feeds



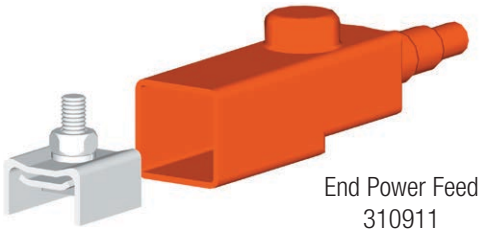
250A Joint Power Feed
310910B

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

	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)

Safe-Lec 2 Hanger Clamps

End Power Feed



End Power Feed
310911

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.

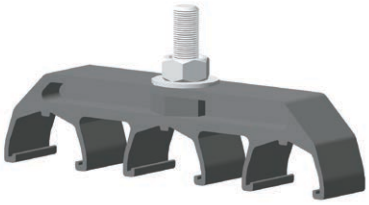
Part No.
310911

Hanger Clamps Standard

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

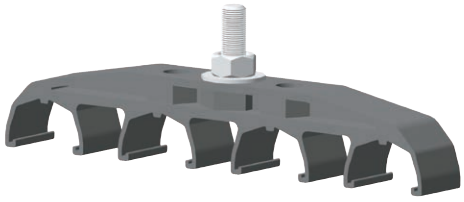
Single Pole Hanger 310824
310919 (stainless steel hardware)

Two Pole Hanger
310882

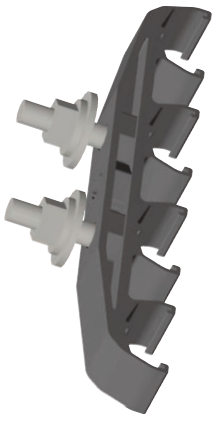


Three Pole Hanger
310861

TYPE	Mounting Orientation Standard	Lateral	Acetyl (Black) 160⁰ Max.	Polycarbonate (Red) 250⁰ Max.	Stainless Steel
Single Pole	X	X	**310824**	**310829**	**310919**
Two Pole	X	X	**310882**	**310899**	-
Three Pole	X	X	**310861**	**310871**	-
Four Pole	X		**310821**	**310857**	**39768**
Four Pole		X	**310835**	**310859**	**50120**



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



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.

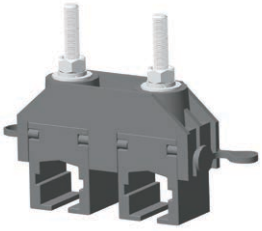
TYPE	Material	Max. Temp	Part No.
Single Pole	Acetyl (Black)	160^0 F	**310918**
Single Pole	Polycarbonate (Red)	250^0 F	**310834**
Single Pole	Stainless Steel	250^0 F	**38779**
Single Pole, Two-Part	Acetyl (Black)	160^0 F	**399544B**
Two Pole, Two-Part	Acetyl (Black)	160^0 F	**399647**

Single Pole Hanger
310918

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.

TYPE	Max. Temp	Part No. Plated Steel Hdwe	Part No. Stainless Steel Hdwe
Standard	250^0 F	**310832**	**310833**
With Insulator	250^0 F	**310969**	**38780**
Without Top Bolt (Two req'd per anchor point)	250^0 F	**310831**	**38220**

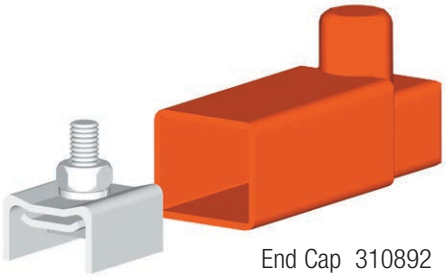
Anchor Clamp
310832 (plated hdwe)
310833 (stainless steel hdwe)

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

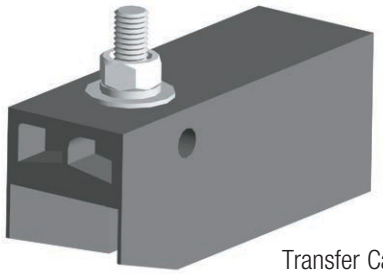
Anchor Clamp, without Top Bolt
310831 (plated hdwe)
38220 (stainless steel hdwe)

Safe-Lec 2 End Caps & Pick Up Guides

End Caps



End Cap 310892



Transfer Cap 310951

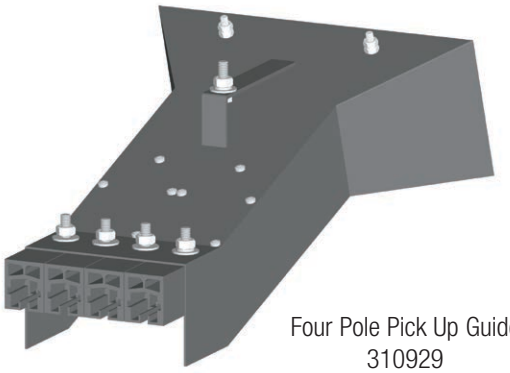
End Caps are insulated covers installed at the ends of the conductor system. Transfer Caps transfer the collectors across switch gaps up to 0.40" (10mm) wide.

Transfer Cap Tolerances
Vertical tolerance ± 0.20" (5mm)

Horizontal tolerance ± 0.08" (2mm)

TYPE	Material	Part No.
End Cap Steel / Copper Bar	PVC	**310892**
End Cap Aluminum Bar	PVC	**310893**
Transfer Cap	Polycarbonate	**310951**

Pick Up Guides

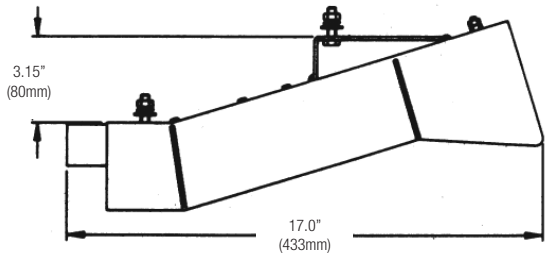


Four Pole Pick Up Guide 310929

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

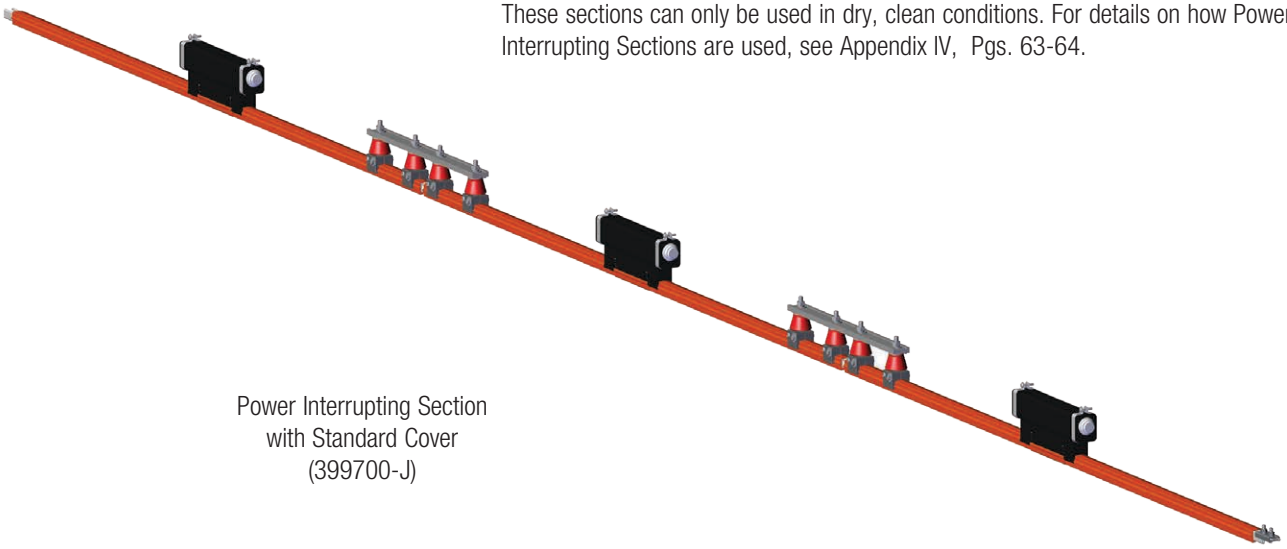
TYPE	Part No.
Single Pole	**310920**
Two Pole	**XA-50476**
Three Pole	**399502**
Four Pole	**310929**



Safe-Lec 2 Power Interrupting Sections

Power Interrupting Sections with Splice Installed

Power Interrupting Sections provide buffer 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 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

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

Copper Bar

	CURRENT RATING		
COVER TYPE	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

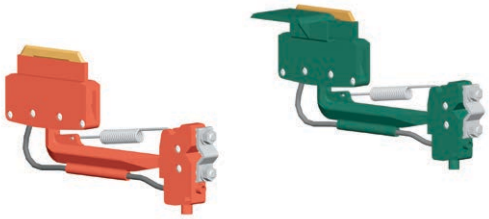
Aluminum / Stainless Steel Bar

	CURRENT RATING		
COVER TYPE	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

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.

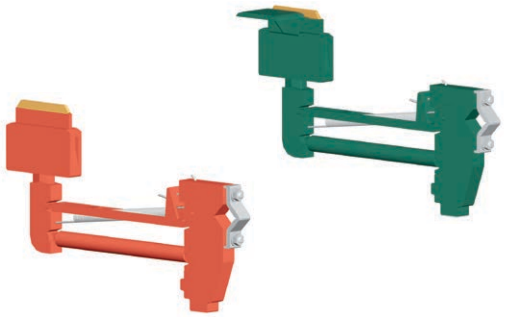
50A Collectors



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.
Phase (Red)	**399360**
Ground, w/o Deflector	**399380**
Ground, with RH Deflector	**399373**
Ground, with LH Deflector	**399372**

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.
Phase (Red)	**310990**
Ground, w/o Deflector	**399355**
Ground, with RH Deflector	**399340**
Ground, with LH Deflector	**399352**

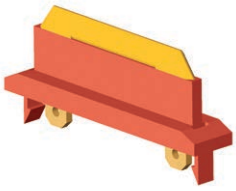
Collectors used with Pick-up Guides Only, See Pg. 20.	
Phase (Red)	**310988**
Ground	**399358**

200A Collectors

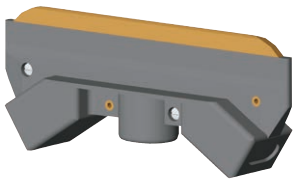
Two 2 AWG cables, 42” long, are connected to the collector shoe. Incoming cables splice directly to the shunt wires.

Type-Color	Part No.
Phase (Black)	**34956**
Stainless Steel	**531632**
Lateral Mount	**532146**

Collector Shoe & Holder



50A / 100A Collector Shoe and Holder 310993

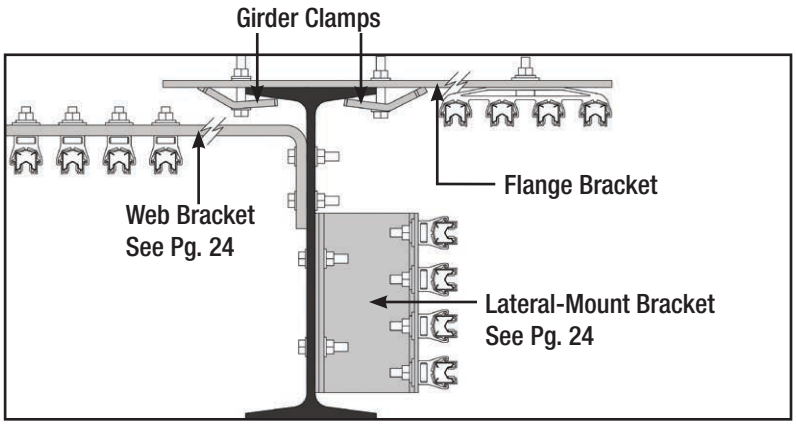


200A Collector Shoe and Holder 35289

Current Rating	50A & 100A Phase (Red)	50A & 100A Ground (Green)	50A & 100A with Deflector (Green)	200A
Part No.	**310993**	**399357**	**399356**	**35289**

Cleaning Shoe (Cast Iron)	50A & 100A	200A
Part No.	**39157**	**N/A**

Safe-Lec 2 Conductor Flange Brackets



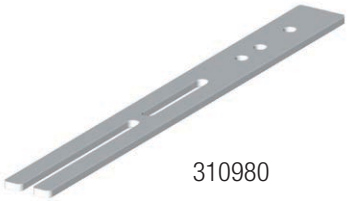
Example Bracket Installations

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.**

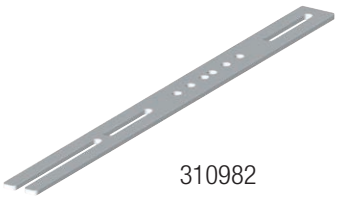
Recommended Max. Bracket Spacing

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



310980

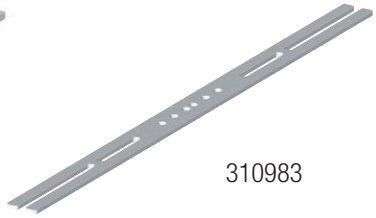


310982

Material	For Beam Flange:	Part No.
Galvanized Steel	3.15" to 6.10" (80 to 155 mm)	**310980**
Galvanized Steel	6.10" to 12.01" (155 to 305 mm)	**310982**
Stainless Steel	6.10" to 12.01" (155 to 305 mm)	**530987**

Double-sided Flange Brackets

310981



310983

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.

Material	Part No.
Plated Steel	51142
Stainless Steel	537183

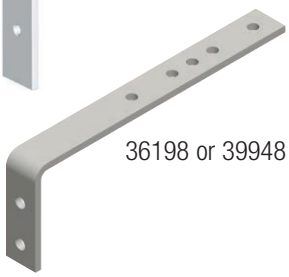
Safe-Lec 2 Conductor Web and Collector Brackets

Web Brackets

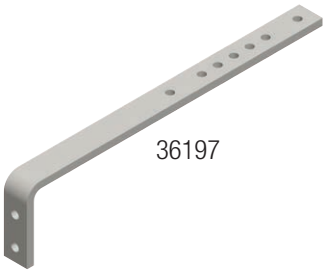
For mounting conductors horizontally, perpendicular to the web of the I-Beam - see illustration on page 23. For bracket dimensions and hole locations, see page 32.

Length in. (mm)	Material	Part No.
10.25 (260)	Plated steel	**310984**
10.50 (267)	Plated steel	**36198**
10.50 (267)	Stainless steel	**39948**
15.75 (400)	Plated steel	**36197**

310984



36198 or 39948



36197

Lateral Mount Bracket

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

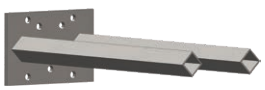
Material	Part No.
Plated steel	**399517**

Collector Brackets

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

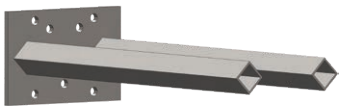
# of Posts	For Collector:	Material	Post Size in. (mm)	Length (in.)	Part No.
Single	50A	Plated steel	0.50 (12.7)	16.0	**39618**
Single	50A	Plated Steel	0.50 (12.7)	8.0	**39618C**
Double	50A	Plated steel	0.50 (12.7)	16.0	**39050**
Single	100A or 200A	Plated steel	1.00 (25.4)	16.0	**39617**
Single	100A or 200A	Stainless steel	1.00 (25.4)	16.0	**52336**
Double	100A or 200A	Plated steel	1.00 (25.4)	16.0	**37863**
Double	100A or 200A	Stainless steel	1.00 (25.4)	16.0	**534687**

39618C



39050

39617 or 52336

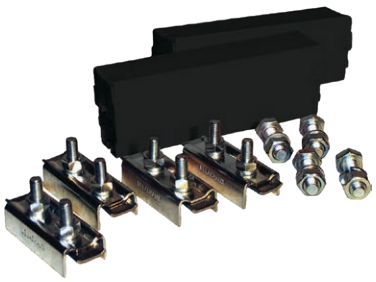


37863 or 534687

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**

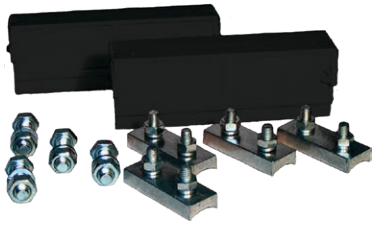
For 160, 250, and 400 Amp Systems

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**

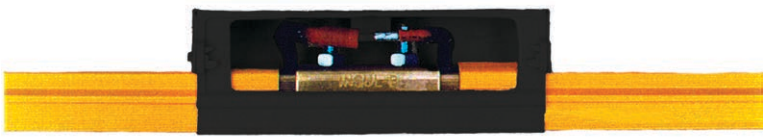
Safe-Lec 2 Heater Wire

Heater Wire System

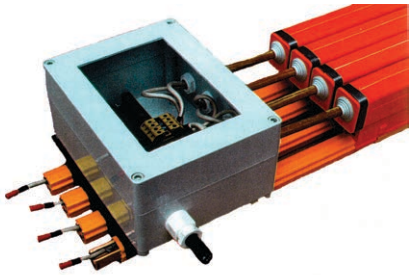
A heater wire system is recommended for outdoor applications where frost and ice buildup may occur. The thermostatic control box will automatically energize the heater wire system at temperatures of 35^{0}F (1.66^{0}C) and below. Heater wires are pre-installed in each section of bar. Please consult Conductix-Wampfler for assistance in selecting the correct heater wire system.

Heater Wire (Male/Female)

Heater Wire Connection

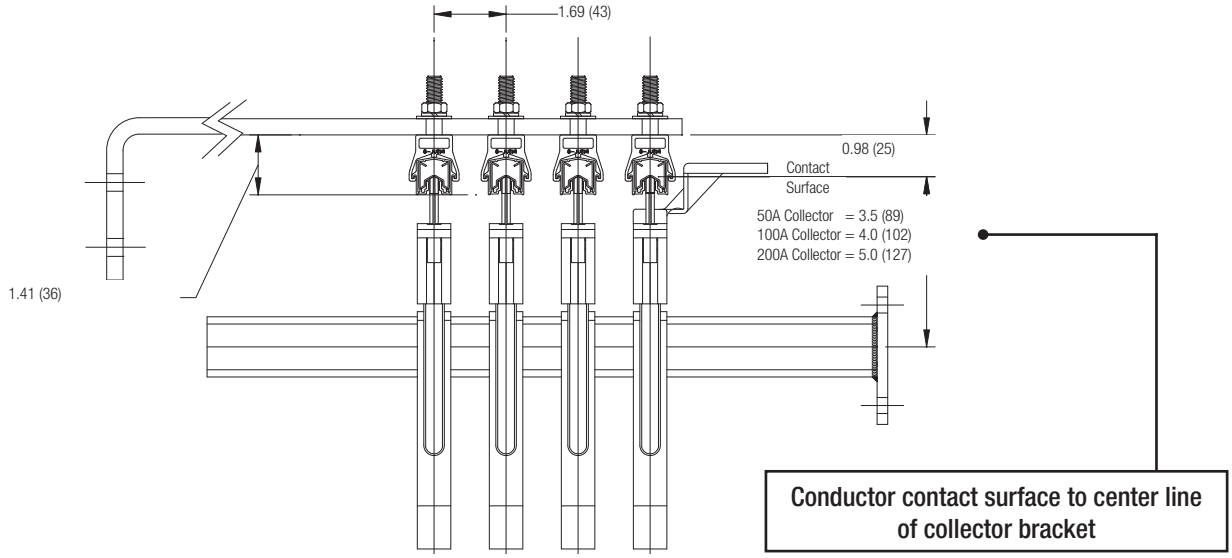


Main Connection Box

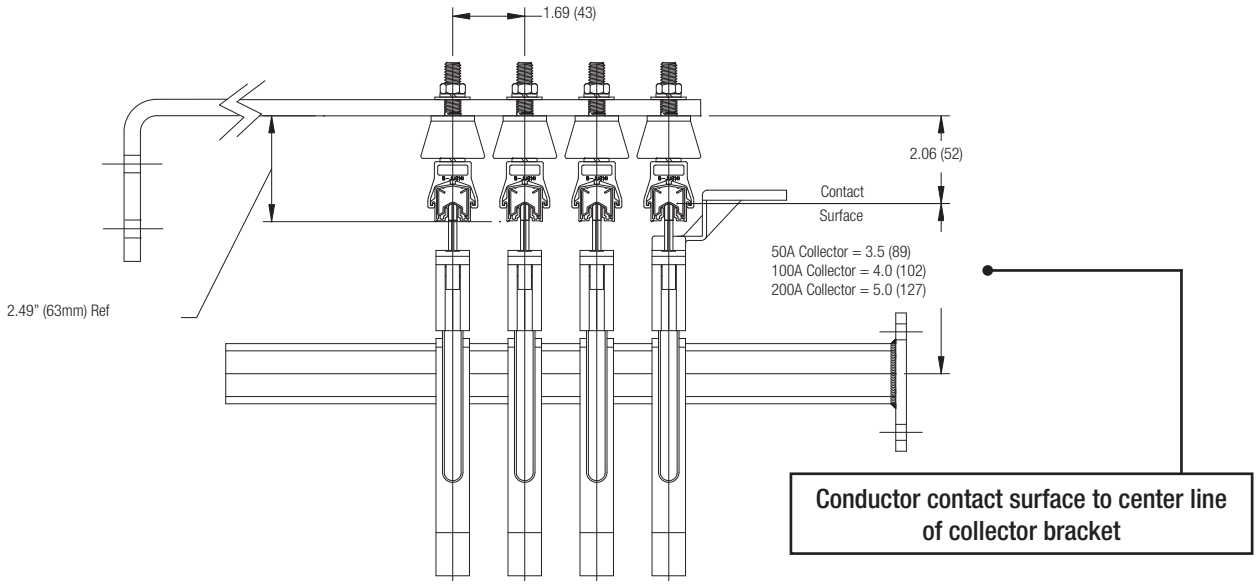


Safe-Lec 2 Installed Dimensions

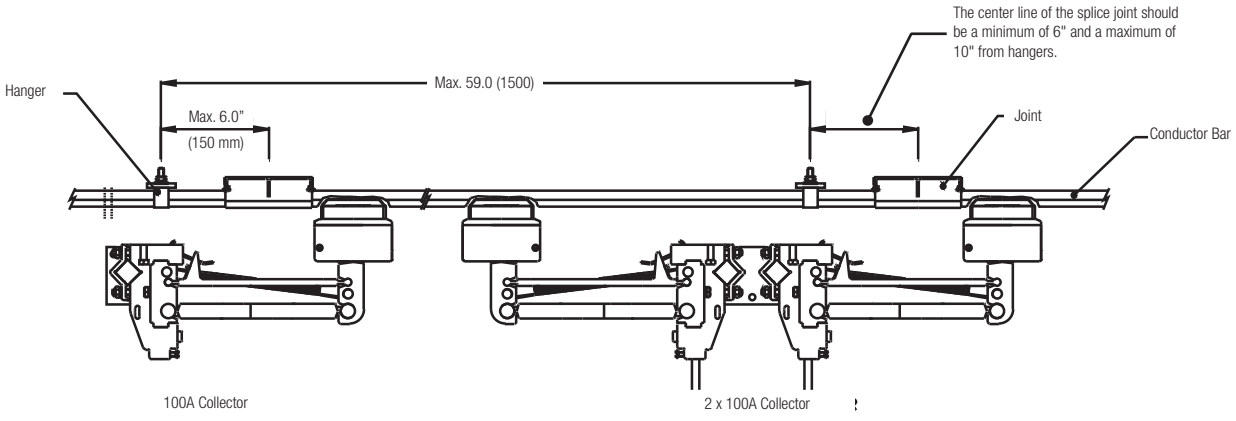
End View - Standard Hanger Clamps



End View - Hanger Clamps with Insulator



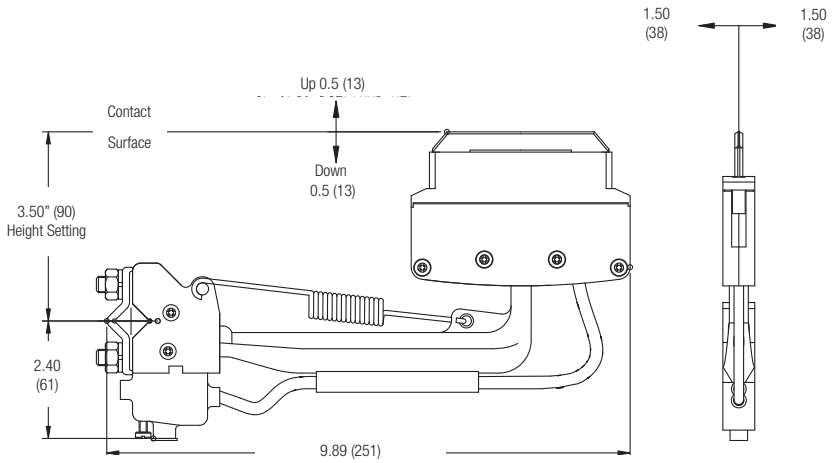
Side View



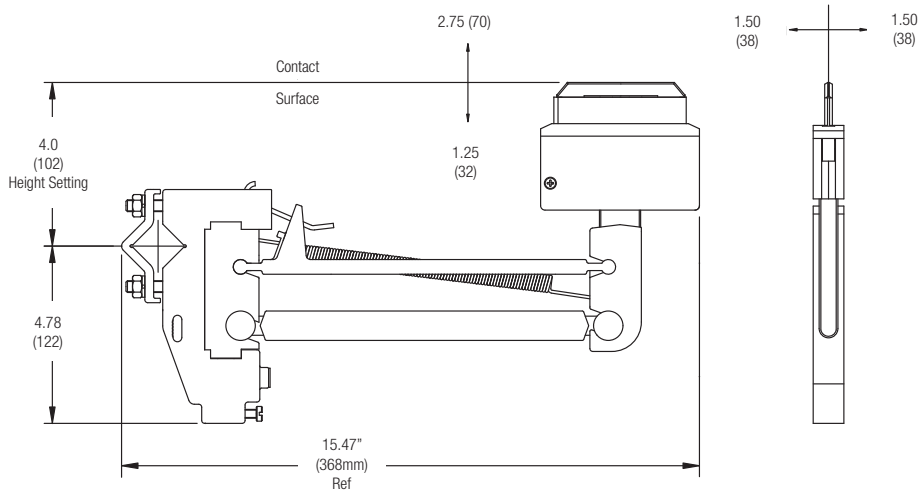
Safe-Lec 2 Collector Dimensions

All dimensions are inches (mm), reference dimensions only

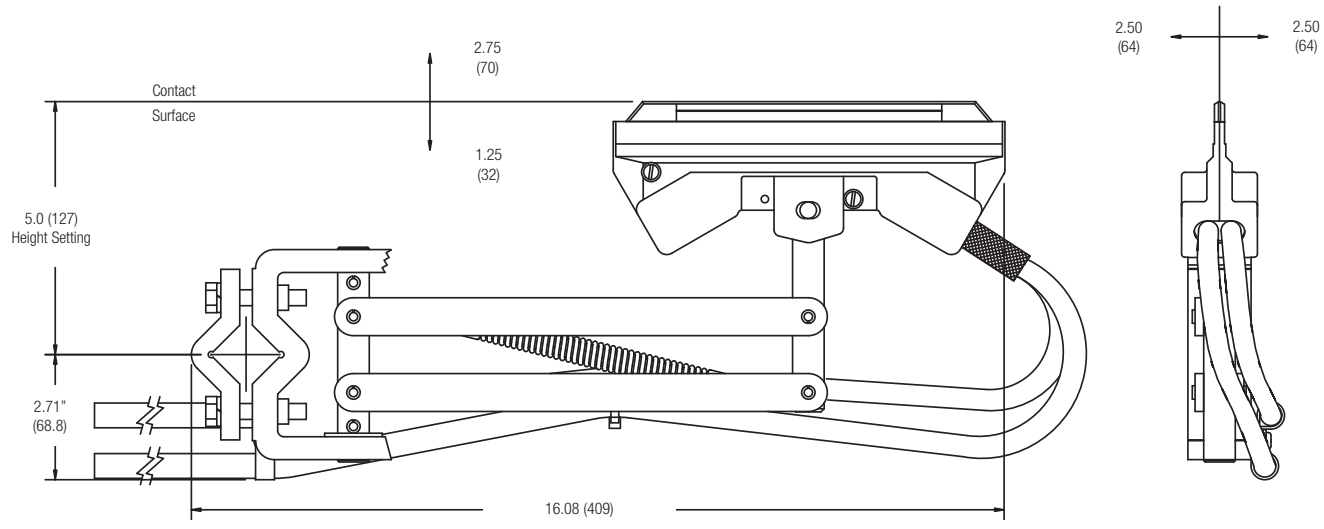
50A Collector (399360)



100A Collector (310990 / 399355)

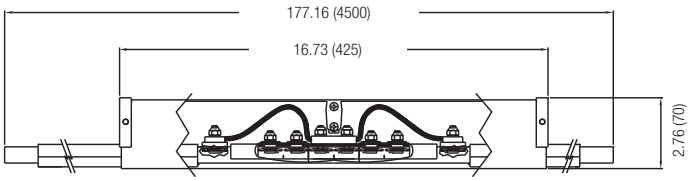


200A Collector (34956)

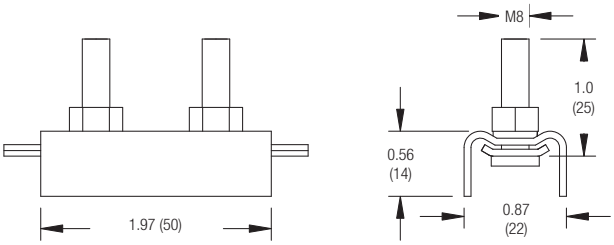


Safe-Lec 2 Component Dimensions

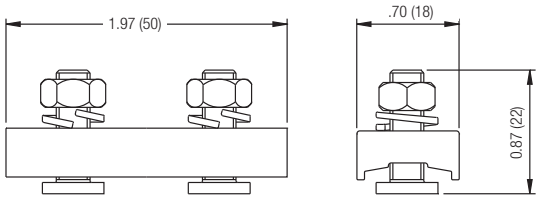
All reference dimensions are in inches (mm)



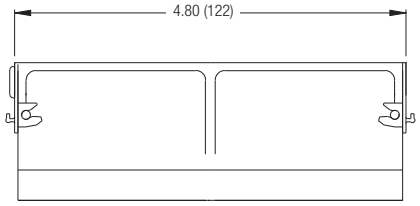
Expansion Section
(Typical)



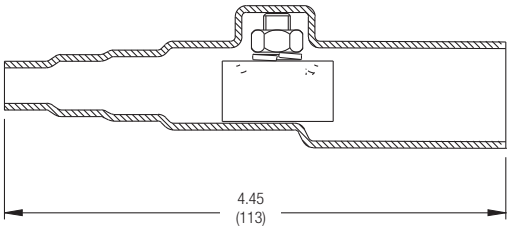
Steel Joint / Copper
(310872) / (310873)



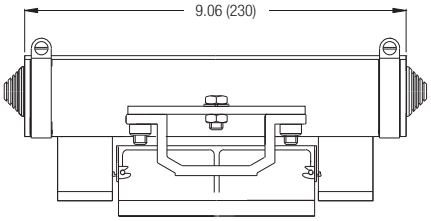
Aluminum Joint
(310874)



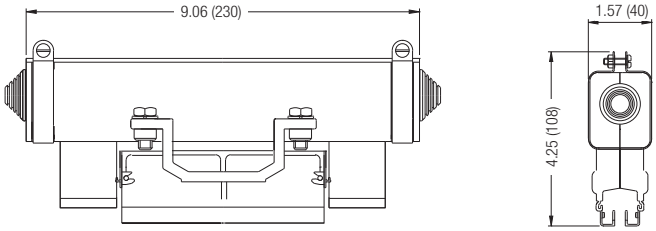
Standard Phase Cover
(310850B)



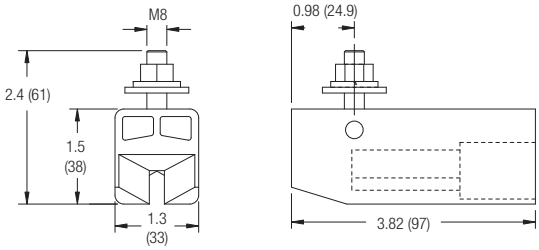
End Power Feed
(310911)



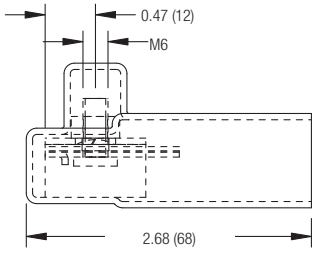
400A Joint Power feed
(310912B)



250A Joint Power feed
(310910B)

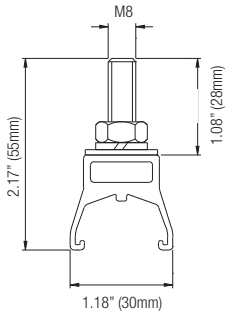


Transfer End Cap
(310951)

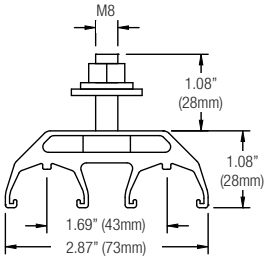


End Cap
for Aluminum Bar
(310892)

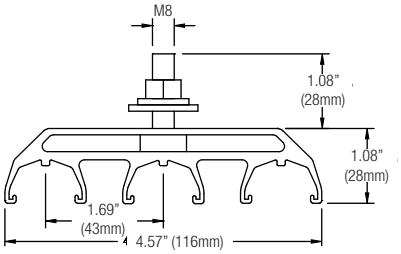
Safe-Lec 2 Component Dimensions



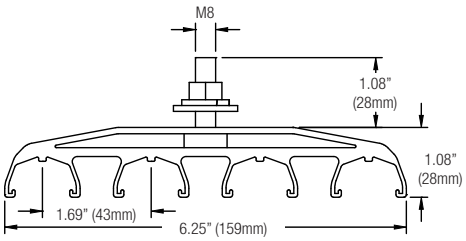
Single Pole
Hanger Clamp
Standard Mount
(310824)



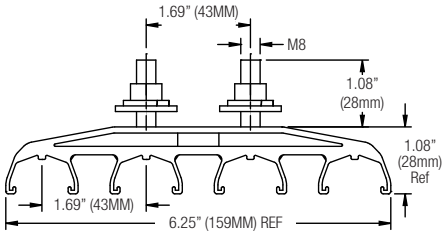
Two Pole
Hanger Clamp
Standard Mount
(310882)



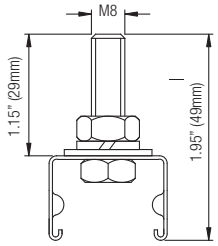
Three Pole
Hanger Clamp
Standard Mount
(310861)



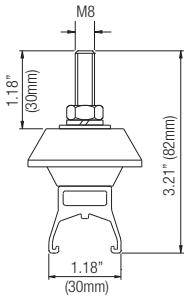
Four Pole
Hanger Clamp
Standard Mount
(310821)



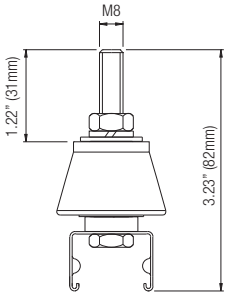
Four Pole
Hanger Clamp
Lateral Mount
(310835)



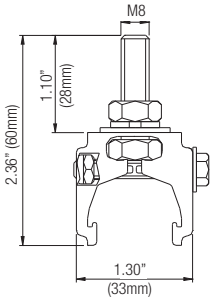
Stainless Steel
Hanger Clamp
(399416B)



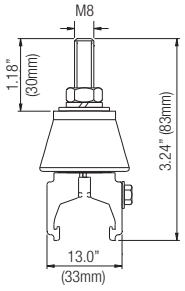
Single Pole
Hanger Clamp
with Insulator
(310918)



Stainless Steel
Hanger Clamp
with Insulator
(38779)



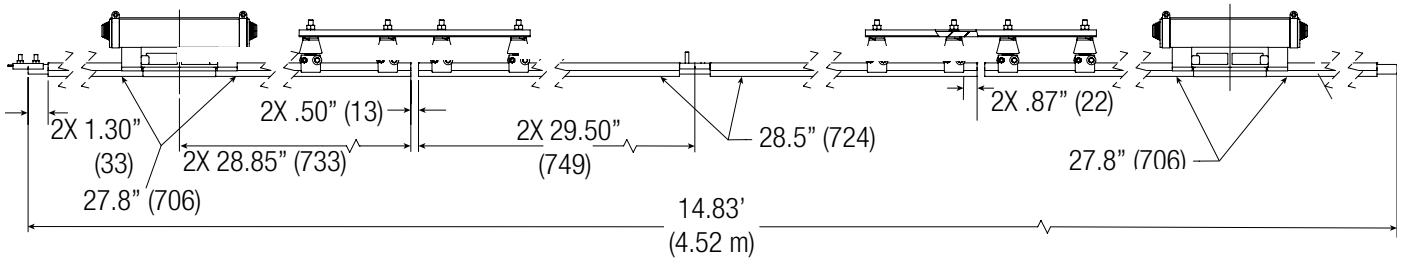
Anchor Clamp
(310832)



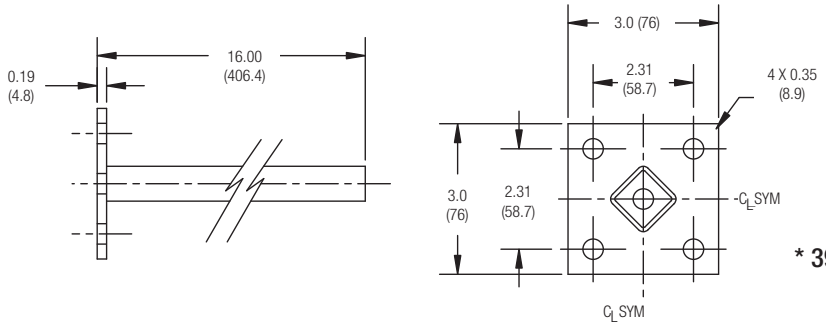
Anchor Clamp
With Insulator
(310969)

Safe-Lec 2 Component Dimensions

Power Interrupting Section (Typical)

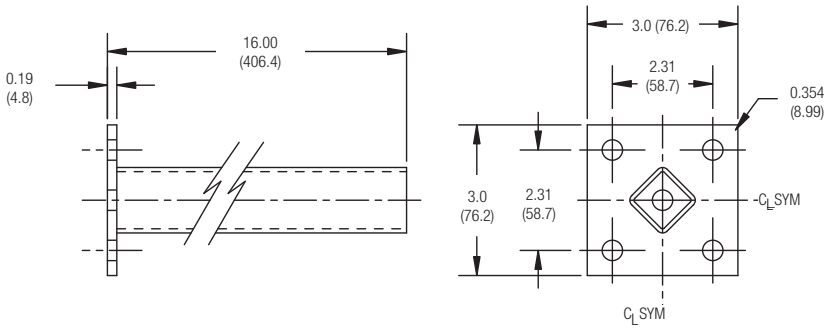


Single Collector Bracket 39618 (1/2" Square Posts) *



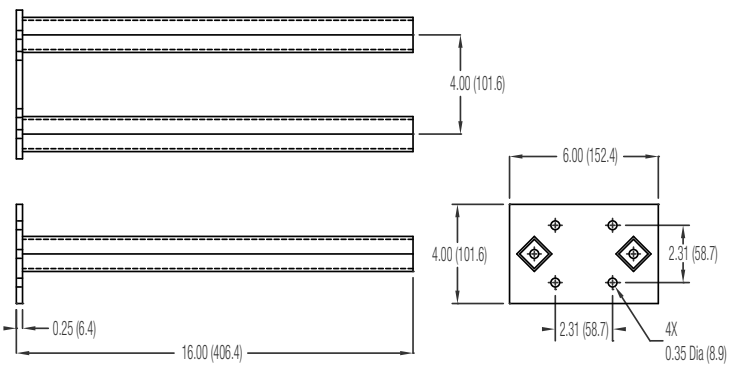
*** 39618C has 8" long posts**

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

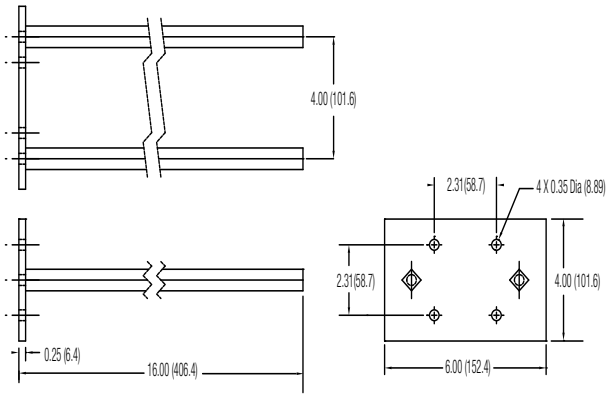


Dual Collector Brackets

37863 and (1" Square Posts)

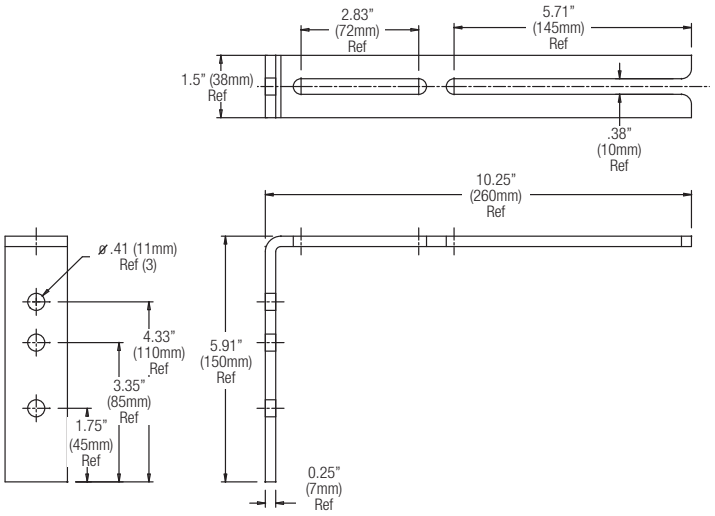


39050 (1/2" Square Posts)

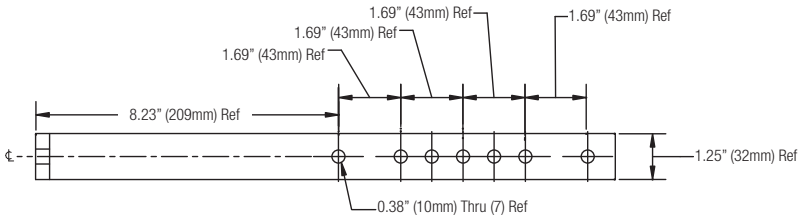


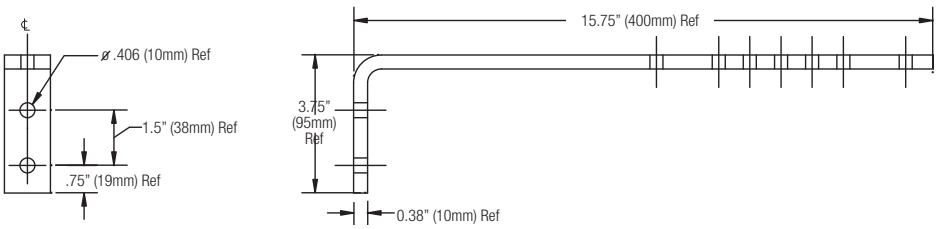
Safe-Lec 2 Bracket Dimensions

Web Bracket (310984)

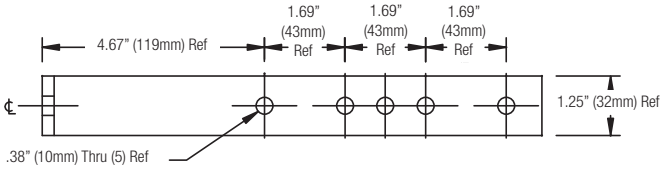


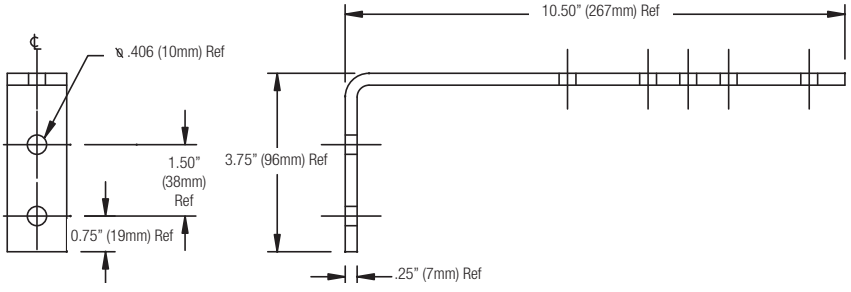
Web Bracket (36197)





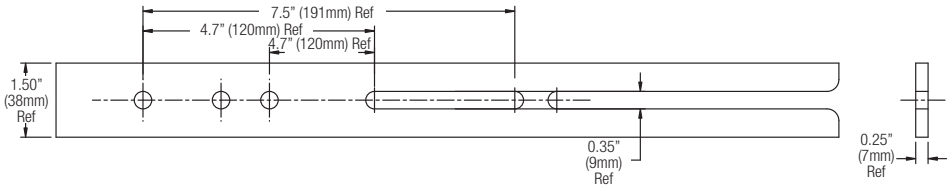
Web Bracket (36198)



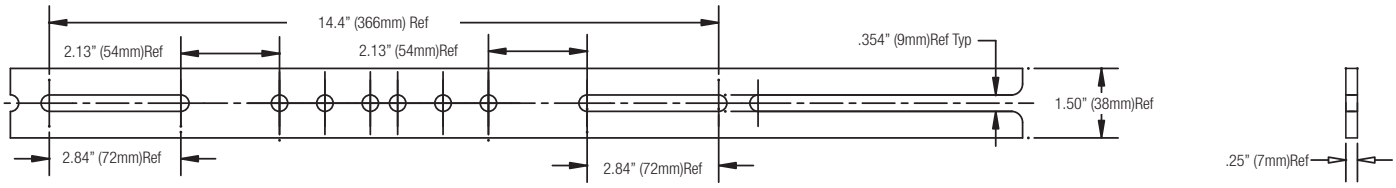


Safe-Lec 2 Bracket Dimensions

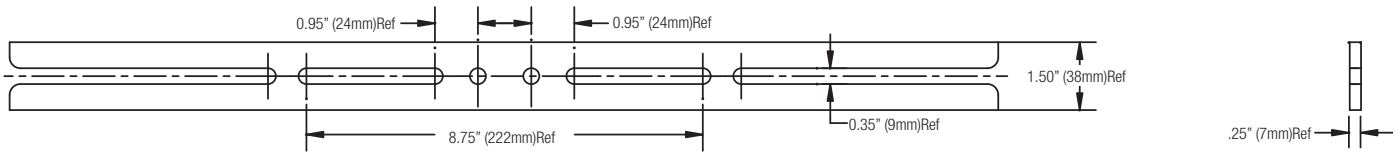
Single Sided Flange Bracket - Fits beam widths up to 7” (310980)



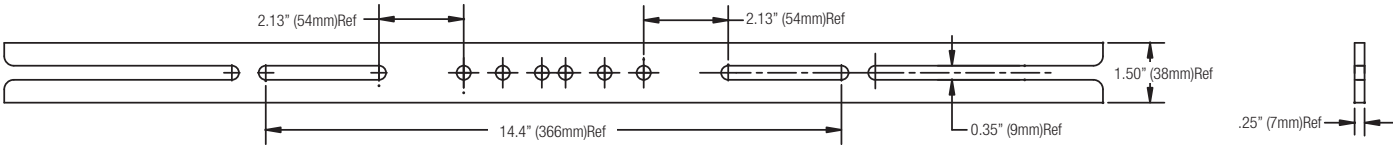
Single Sided Flange Bracket - Fits beam widths up to 14” (310982)

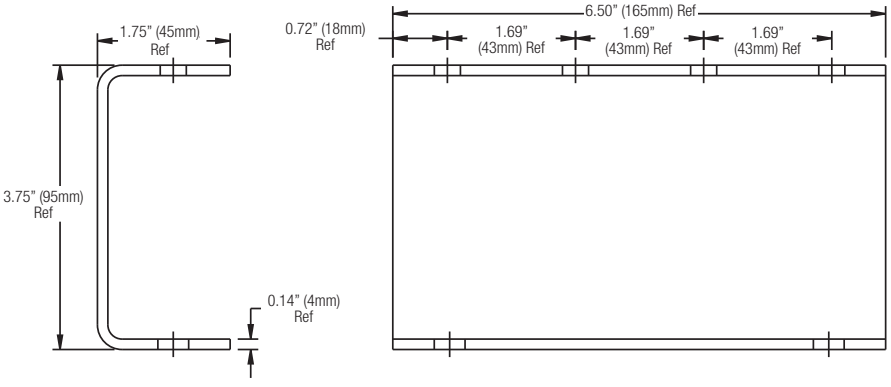


Double Sided Flange Bracket - Fits beam widths up to 8” (310981)

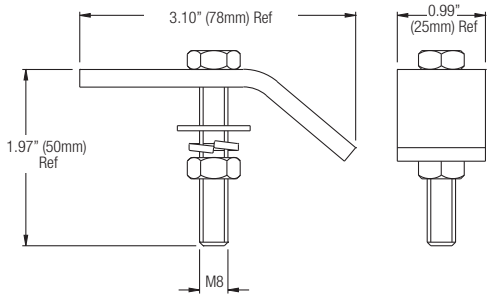


Double Sided Flange Bracket - Fits beam widths up to 14” (310983)





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

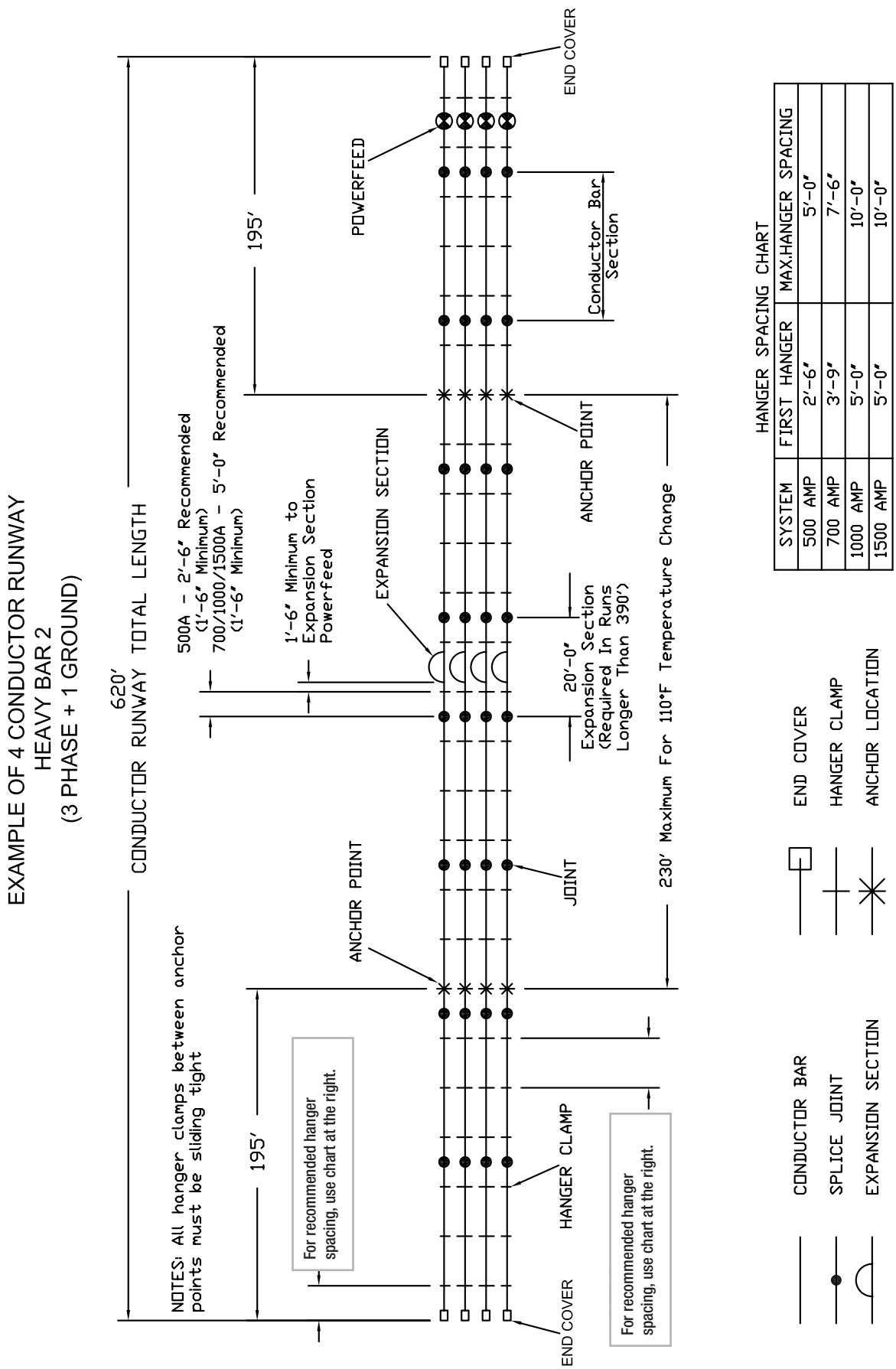
Hevi-Bar II is available with our optional **DURA-COAT** finish, specially formulated for corrosive environments. Hevi-Bar II Dura-Coat uses a combined ceramic compound with epoxy binder to provide superior corrosion resistance. Our systems have been tested in 10% hydrochloric acid and 10% sulfuric acid 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.**

For a list of job references, contact Conductix-Wampfler

Hevi-Bar II Typical 4-Bar System



HANGER SPACING CHART

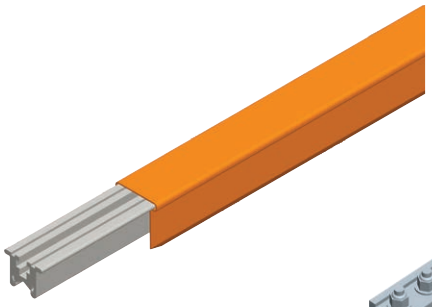
SYSTEM	FIRST HANGER	MAX.HANGER SPACING
500 AMP	2'-6"	5'-0"
700 AMP	3'-9"	7'-6"
1000 AMP	5'-0"	10'-0"
1500 AMP	5'-0"	10'-0"

Hevi-Bar II - 500A Conductors

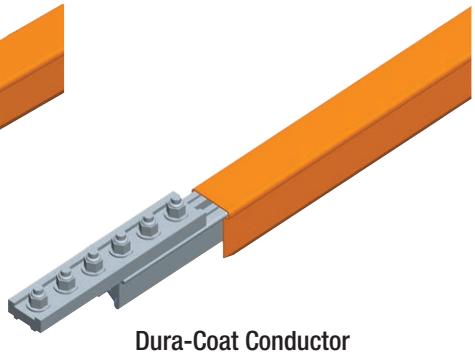
Standard Conductor Bar and Components

Type / Max Temp.	Use (Color)	Conductor Bar	Conductor Bar Cut Length	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)	/

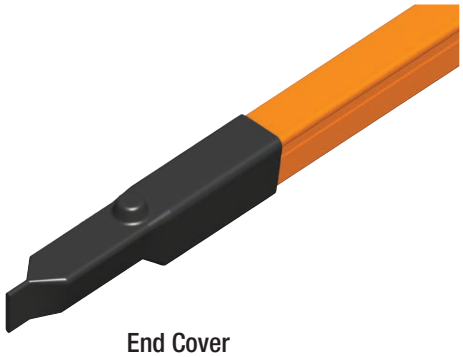
◆ See Appendix IV Pgs. 63-64.



Conductor Bar



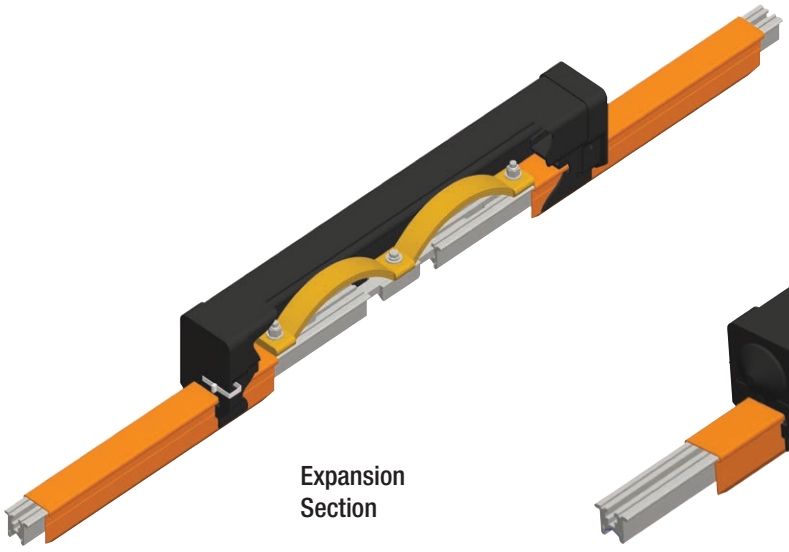
Dura-Coat Conductor Bar with Splice



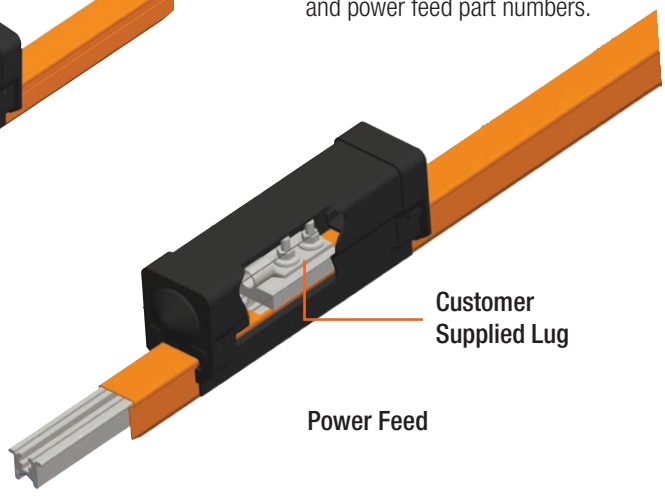
End Cover

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

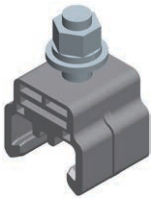
The ideal option for highly corrosive environments. Splices are pre-installed on Dura-Coat conductors.

Type / Max Temp.	Use (Color)	Conductor Bar	Conductor Bar Cut Length	Expansion Section	Splice Cover	Power Feed	Power Interrupting Section ◆	End Cover
PVC 160^0 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^{0}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.

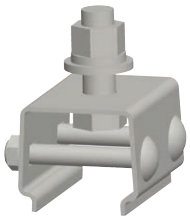
Hangers

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



Polycarbonate Snap-In

Polycarbonate Snap-in w/Insulator



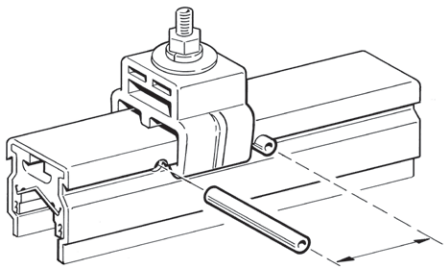
Stainless Steel Cross Bolt

Stainless Steel Cross Bolt 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)



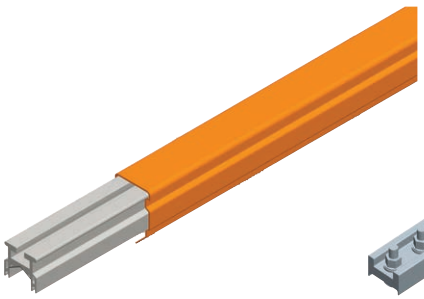
Anchor Pin 23946 (Two Shown)

Hevi-Bar II - 700A Conductors

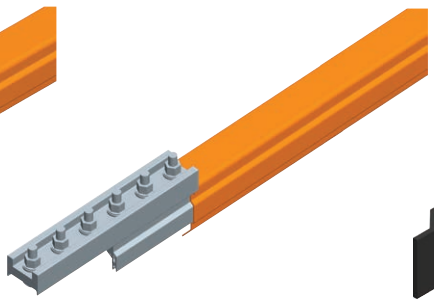
Standard Conductor Bar and Components

Type / Max Temp.	Use (Color)	Conductor Bar	Conductor Bar Cut Length	Expansion Section	Splice	Power Feed	Power Interrupting Section ◆	End Cover
PVC 160^0 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^{0}F	Phase & Ground / Indoors & Outdoors (Red)	**50733**	**51371**	**50738**	**38115C**	**50067**	**50752**	**50859**
Fiberglass Reinforced Polyester 400^{0}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)	/

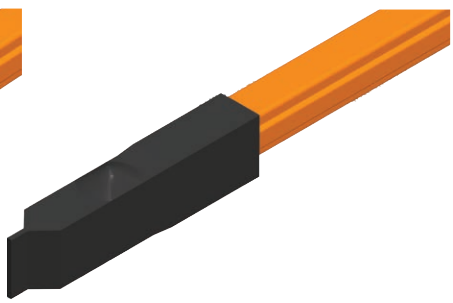
◆ See Appendix IV Pgs. 63-64.



Conductor Bar



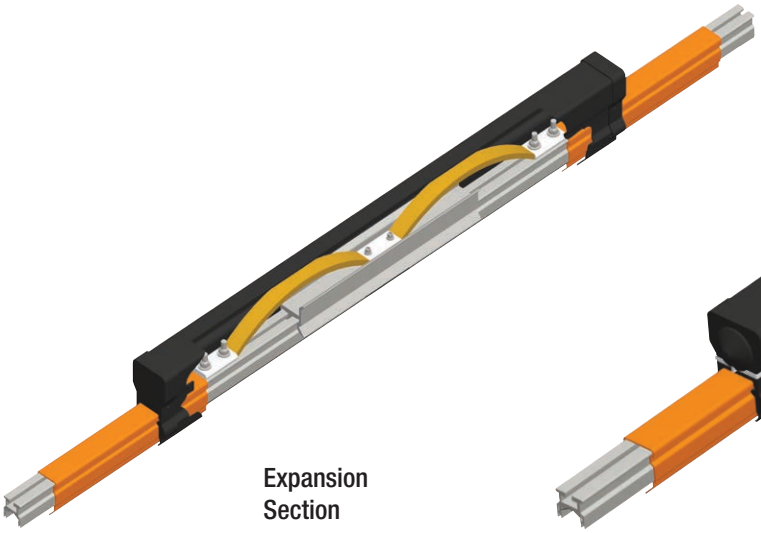
Dura-Coat Conductor Bar with Splice



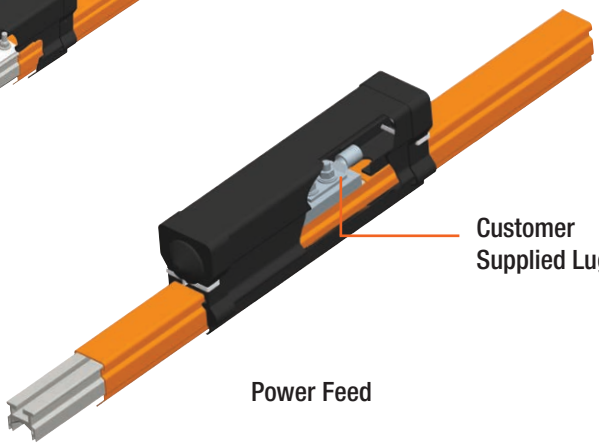
End Cover

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.

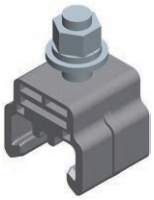
Type / Max Temp.	Use (Color)	Conductor Bar	Conductor Bar Cut Length	Expansion Section	Splice Cover	Power Feed	Power Interrupting Section ◆	End Cover
PVC 160° F	Phase / Indoors (Orange)	**39847-J**	**51372-J**	**50739-J**	**51320**	**38117**	**50751-J**	**50859**
	Ground / Indoors (Green)	**39847G-J**	**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

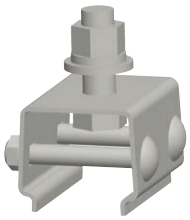
Hangers can be installed on brackets up to 3/8" thick (9.5mm).

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)



Polycarbonate Snap-In

Polycarbonate Snap-in w/Insulator

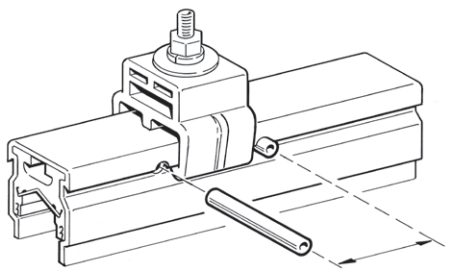


Stainless Steel Cross Bolt

Stainless Steel Cross Bolt w/Insulator

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)



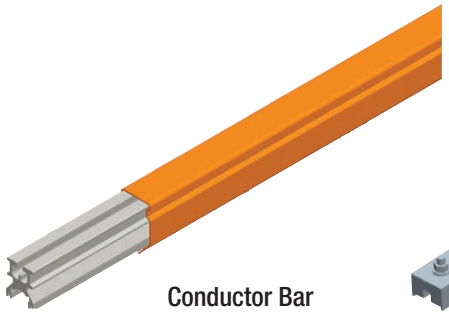
Anchor Pin 23946 (Two Shown)

Hevi-Bar II - 1000A Conductors

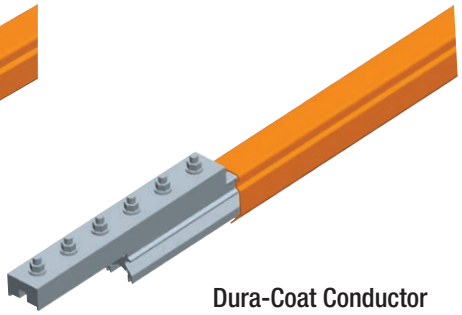
Standard Conductor Bar and Components

Type / Max Temp.	Use (Color)	Conductor Bar	Conductor Bar Cut Length	Expansion Section	Splice	Power Feed	Power Interrupting Section ◆	End Cover
PVC 160⁰ 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 250⁰F	Phase & Ground / Indoors & Outdoors (Red)	**31991**	**51408**	**50941**	**31964**	**38184D**	**50756**	**33796B**
Fiberglass Reinforced Polyester 400⁰F	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	/

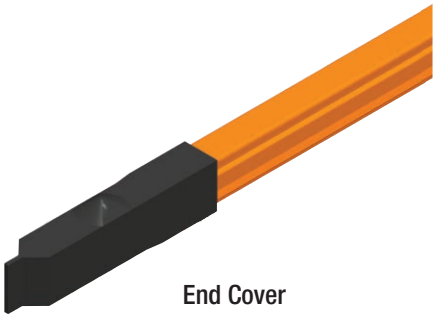
◆ See Appendix IV Pg. 63-64.



Conductor Bar



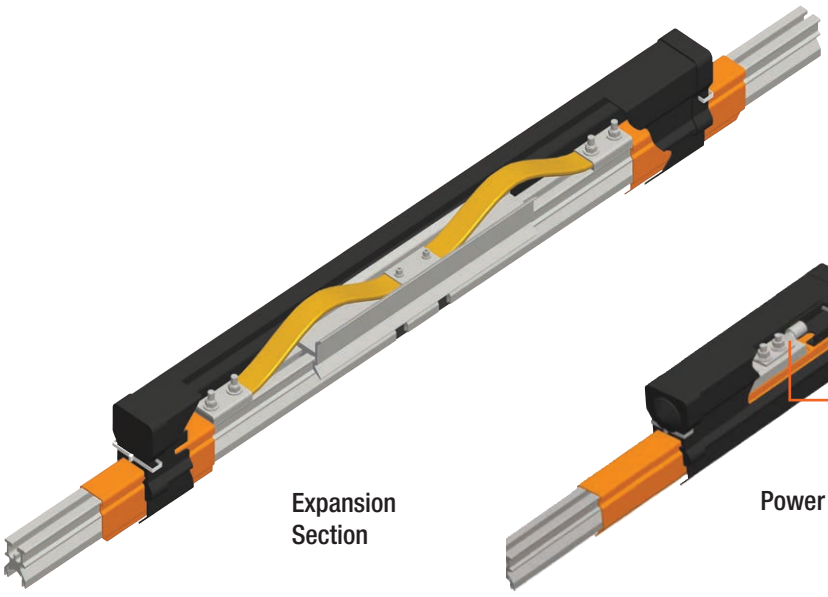
Dura-Coat Conductor Bar with Splice



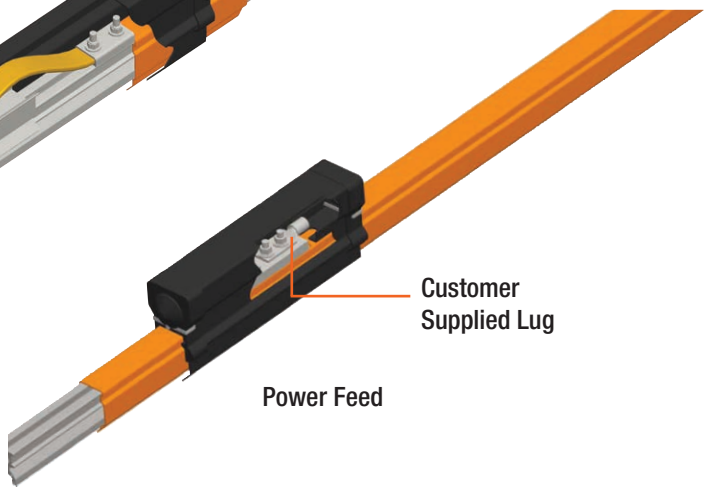
End Cover

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



Customer Supplied Lug

Power Feed

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.

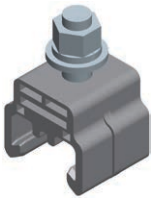
Type / Max Temp.	Use (Color)	Conductor Bar	Conductor Bar Cut Length	Expansion Section	Splice Cover	Power Feed	Power Interrupting Section ◆	End Cover
PVC 160° F	Phase / Indoors (Orange)	**50736-J**	**51377-J**	**50743-J**	**51322**	**38184**	**50758-J**	**33796B**
	Phase & Ground / Outdoors UV Stable (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

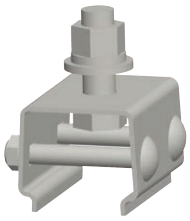
Hangers can be installed on brackets up to 1/2" thick (12.7mm).

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**	**588232**	1.16 (0.53)



Polycarbonate Snap-In

Polycarbonate Snap-in w/Insulator

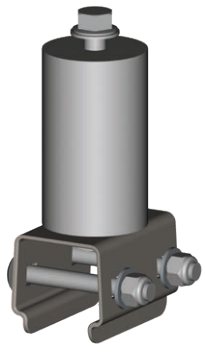


Stainless Steel Cross Bolt

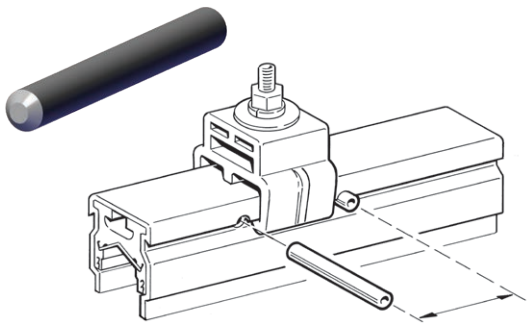
Stainless Steel Cross Bolt w/Insulator

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 w/Insulator High Temp



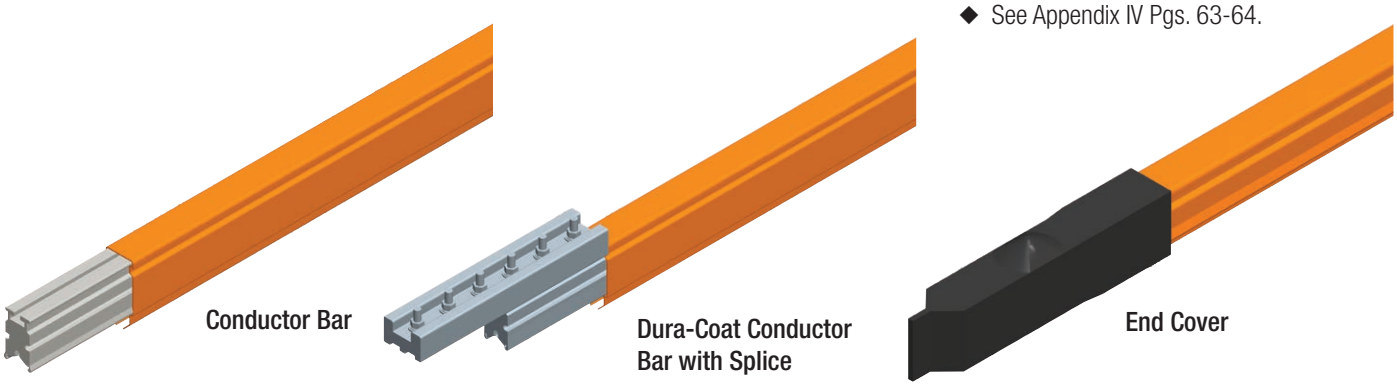
Anchor Pin 23946 (Two Shown)

Hevi-Bar II - 1500A Conductors

Standard Conductor Bar and Components

Type / Max Temp.	Use (Color)	Conductor Bar	Conductor Bar Cut Length	Expansion Section	Splice	Power Feed	Power Interrupting Section ◆	End Cover
PVC 160^0 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^{0}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)	/

◆ See Appendix IV Pgs. 63-64.



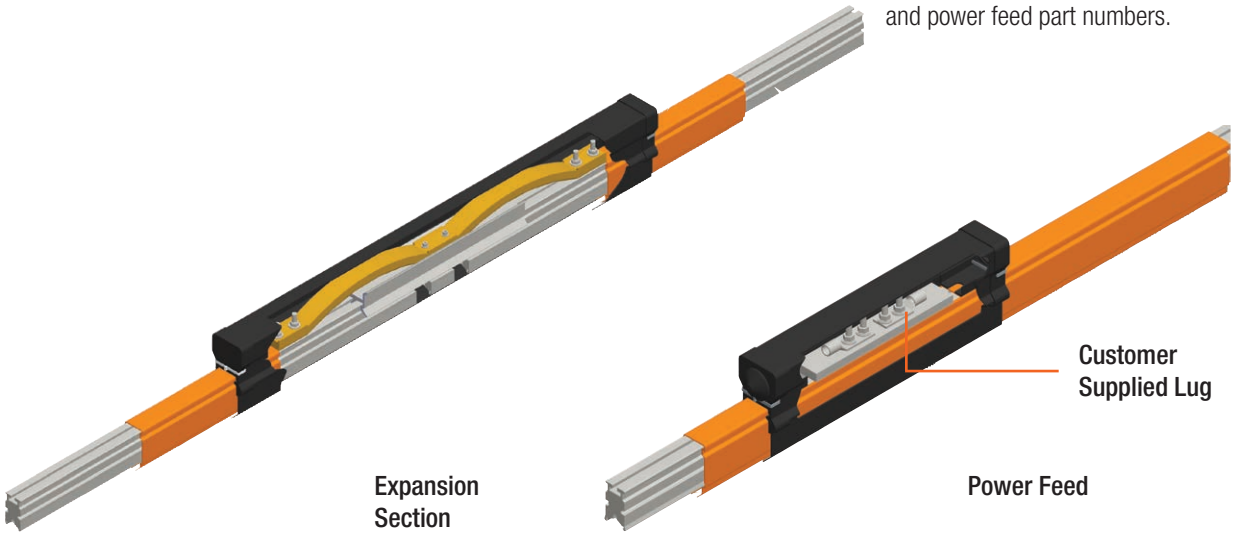
Conductor Bar

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

Customer Supplied Lug

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.

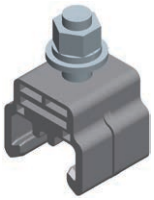
Type / Max Temp.	Use (Color)	Conductor Bar	Conductor Bar Cut Length	Expansion Section	Splice Cover	Power Feed	Power Interrupting Section ◆	End Cover
PVC 160^0 F	Phase / Indoors (Orange)	**50734-J**	**51382-J**	**50742-J**	**51297**	**50227**	**50762-J**	**33796B**
	Phase & Ground / Outdoors UV Stable (Black)	**50734B-J**	**50230-J**	**50742B-J**	**51297**	**50227**	**50762B-J**	**33796B**
Poly - carbonate 250^{0}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

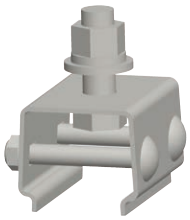
Hangers can be installed on brackets up to 1/2" thick (12.7mm).

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)



Polycarbonate Snap-In

Polycarbonate Snap-in w/Insulator

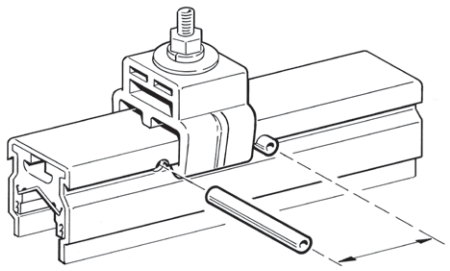


Stainless Steel Cross Bolt

Stainless Steel Cross Bolt w/Insulator

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)

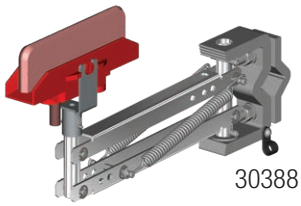


Anchor Pin 23946 (Two Shown)

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

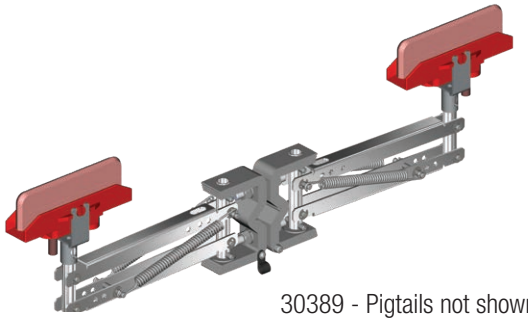


30388 - Pigtails not shown

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)
Corrosive Environment Collector with Shoes	125	**588351**	
Replacement Shoe (2 req'd per tandem)	125	**30516**	1.00 (0.45)
Cast Iron Cleaning Shoe (2 req'd per tandem)	n/a	**39166**	1.38 (0.63)

Tandem Collector - 250 Amp

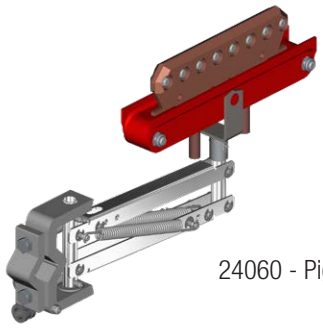


30389 - Pigtails not shown

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)
Corrosive Environment Collector with Shoes	205	**583623**	6.54 (2.96)

Single Collector - 200 | 300 Amp

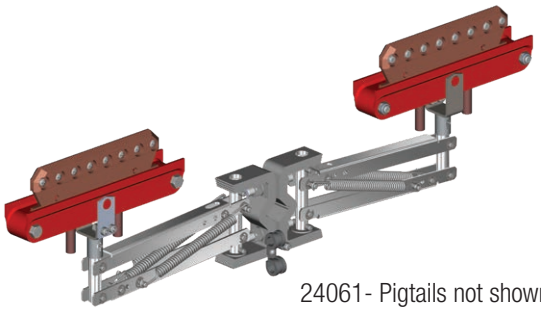


24060 - Pigtails not shown

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 (2 req'd per tandem)	200	**11417X**	0.76 (0.34)
Cast Iron Cleaning Shoe (2 req'd per tandem)	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)

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:

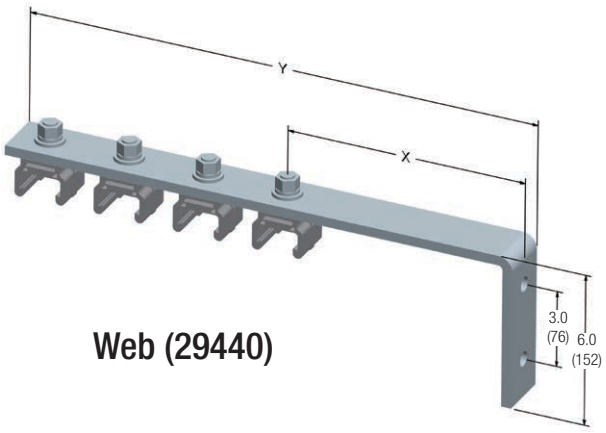
- Bracket only (no hangers included)
- Bracket with four pre-installed hangers - standard Polycarbonate
- Bracket with four pre-installed hangers - standard Polycarbonate w/insulators
- Bracket with four pre-installed hangers - stainless steel cross-bolt
- Bracket with four pre-installed hangers - stainless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

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

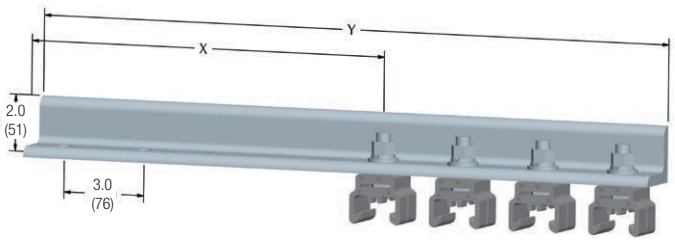
Web Bracket

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. Bracket Only	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. Bracket Only	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:

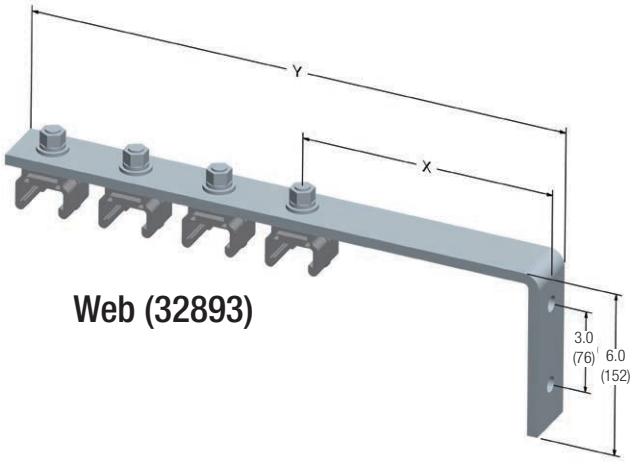
- Bracket only (no hangers included)
- Bracket with four pre-installed hangers - standard Polycarbonate
- Bracket with four pre-installed hangers - standard Polycarbonate w/insulators
- Bracket with four pre-installed hangers - stainless steel cross-bolt
- Bracket with four pre-installed hangers - stainless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

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

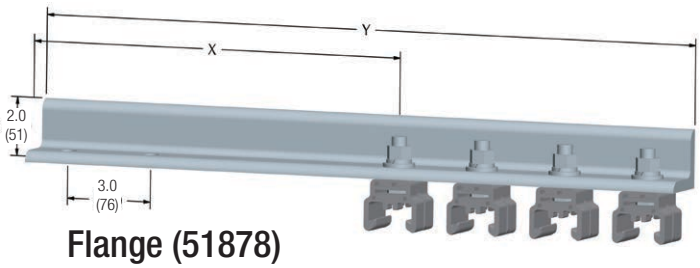
Web Bracket

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

					Part No. - With Four Hangers Pre-Installed			
Bracket Finish	Dim X Inches (mm)	Dim Y Inches (mm)	Part No. Bracket Only	Wt (lb)	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

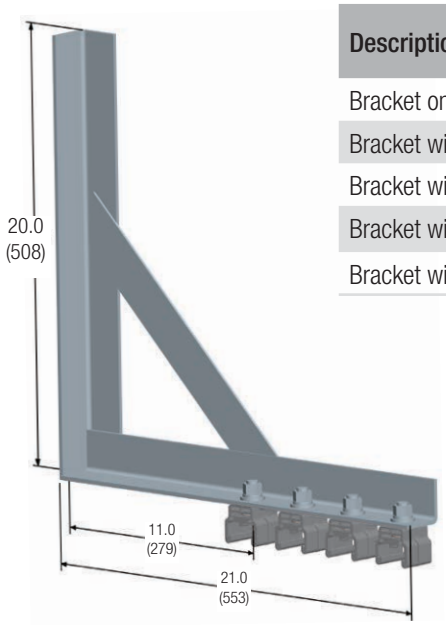
Mounts to top flange of beam. Bracket is a 2"x 2" angle, by 3/8" thick. The first hole is 1 1/4" from the end.

					Part Nos. - With Four Hangers Pre-Installed			
Bracket Finish	Dim X Inches (mm)	Dim Y Inches (mm)	Part No. Bracket Only	Wt (lb)	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).



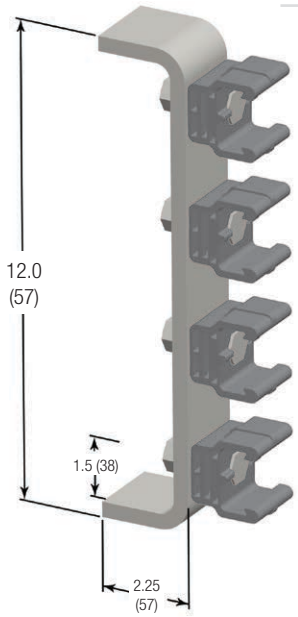
Braced Web (25691)

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.

Description	Hanger Type	Amperage	Part No.	Wt lb (kg)
Bracket only	n/a	All	**50498**	3.1 (1.41)
Bracket w/ Hangers	Polycarbonate (# 23223)	700, 1000, 1500	**51876**	4.3 (1.95)
Bracket w/ Hangers	Polycarbonate w/insulators (# 24902)	700, 1000, 1500	**51876B**	6.7 (3.04)
Bracket w/ Hangers	Stainless Steel Cross Bolt (# 27481)	All	**51876C**	5.6 (2.54)
Bracket w/ Hangers	Stainless Steel Cross Bolt w/Insulators (# 27482)	All	**51876D**	7.8 (3.54)



Lateral (51876)

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/cm³	1.5 g/cm³	1.15 g/cm³	1.24 g/cm³	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.)	3.27×10^{-5}	2.11×10^{-5}	1.41×10^{-5}	0.64×10^{-5}
Phase Corrected Impedance Z at 20°C (Ω/ft.)	5.40×10^{-5}	4.21×10^{-5}	3.39×10^{-5}	2.28×10^{-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

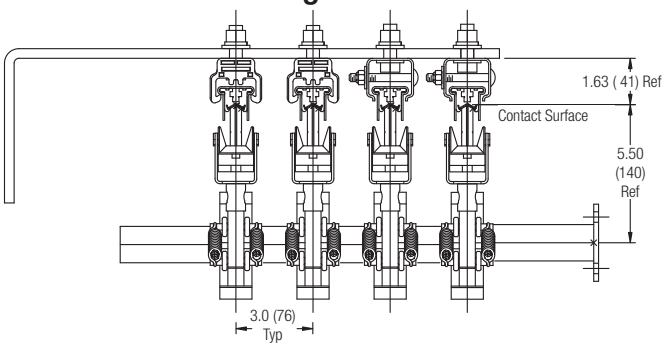
Available Accessories (Contact Conductix-Wampfler)

- 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

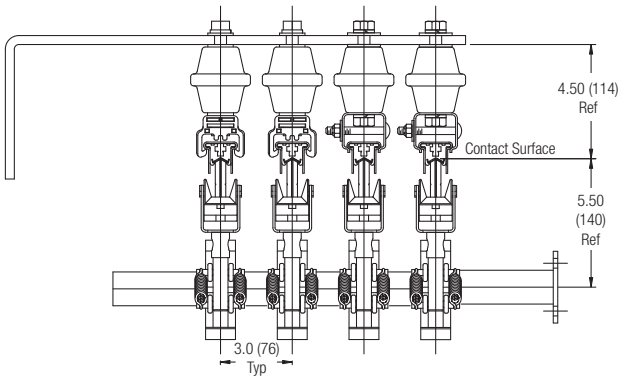
The appropriate conductor bar can be chosen only when all the relevant factors are known. Please refer to the Specification Data Sheet on Pg. 6, and to Appendices I through IV at the back of this catalog. Also, please consult Conductix-Wampfler Sales if you have any questions about the suitability of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

Hevi-Bar II Installed Dimensions

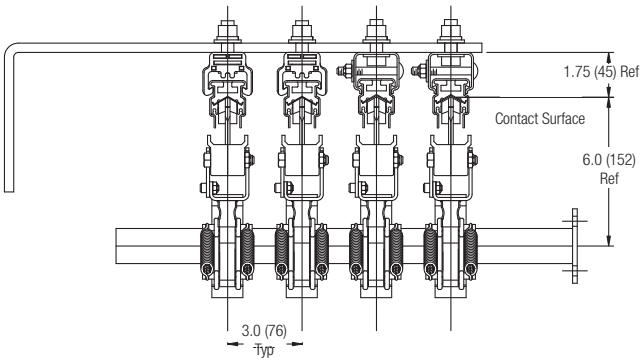
500A - Standard Hanger



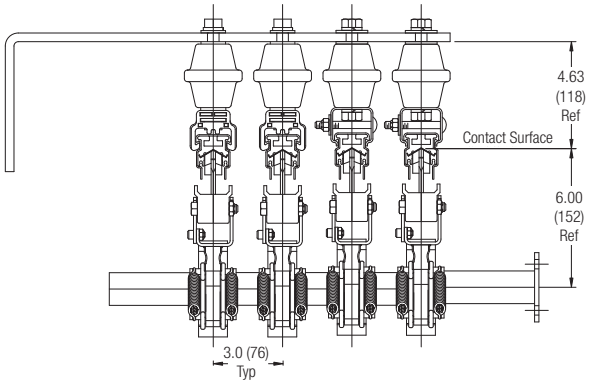
500A - with Insulators



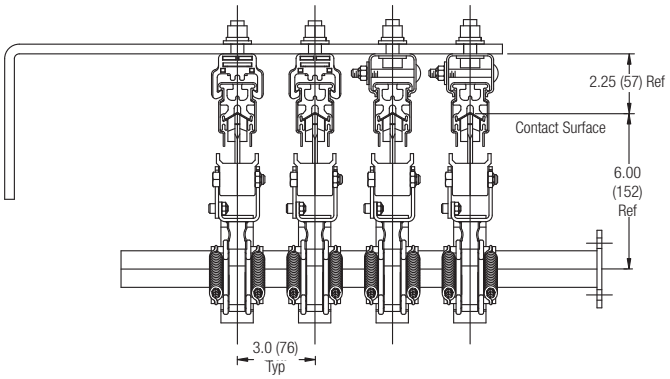
700A - Standard Hangers



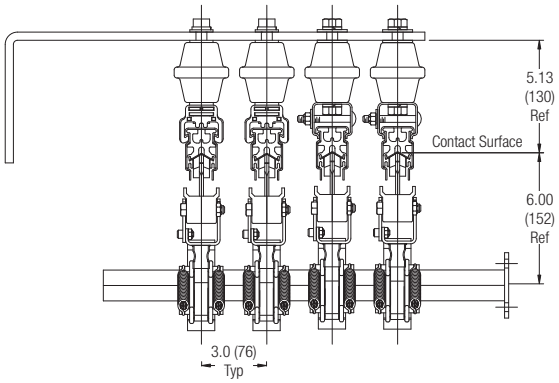
700A - with Insulators



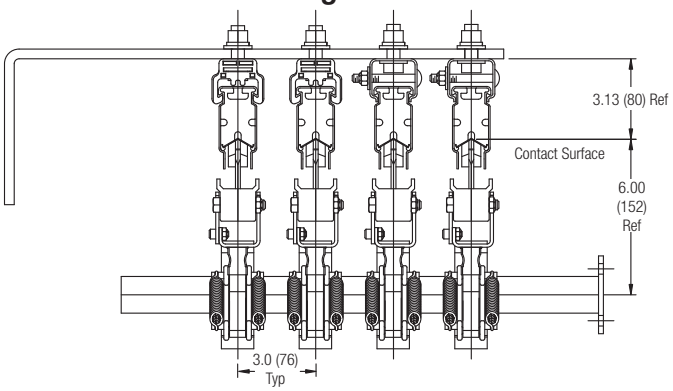
1000A - Standard Hangers



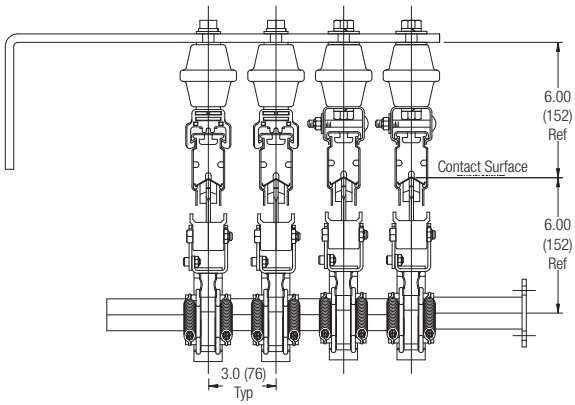
1000A - with Insulators



1500A - Standard Hangers

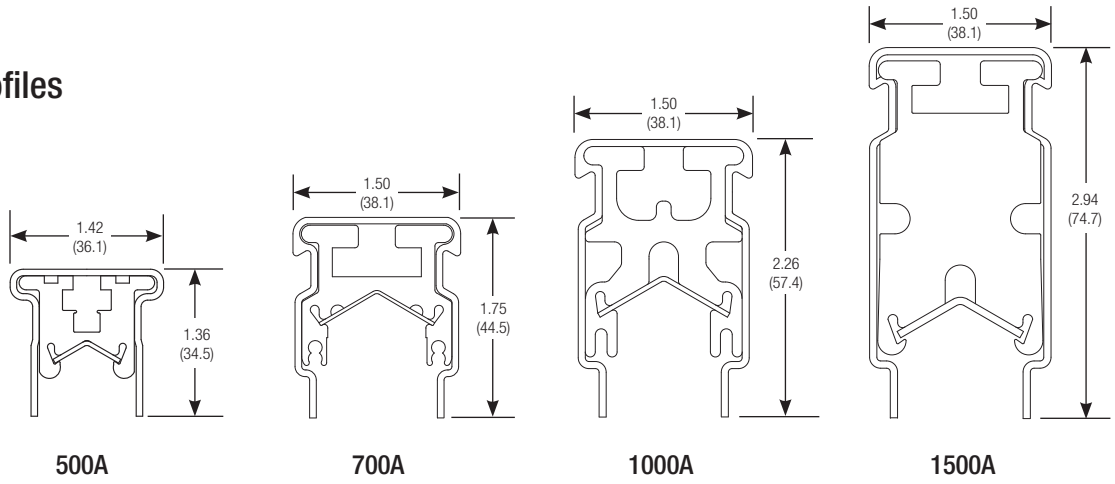


1500A - with Insulators



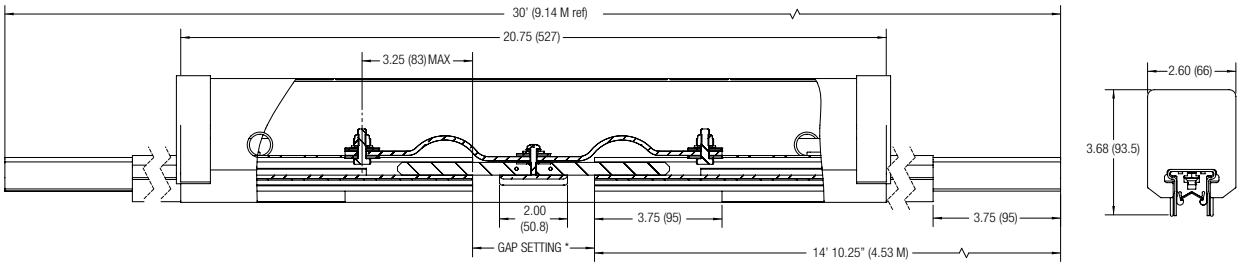
Hevi-Bar II Bar & Expansion Dimensions

Bar Profiles

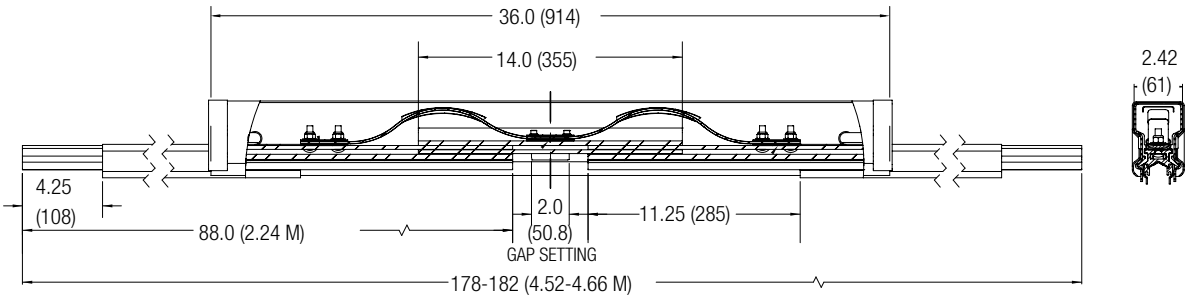


500A 700A 1000A 1500A

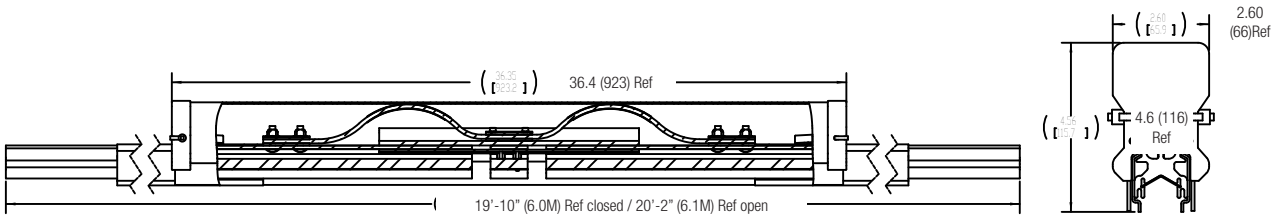
500A Expansion Section (37677 and 39741-J)



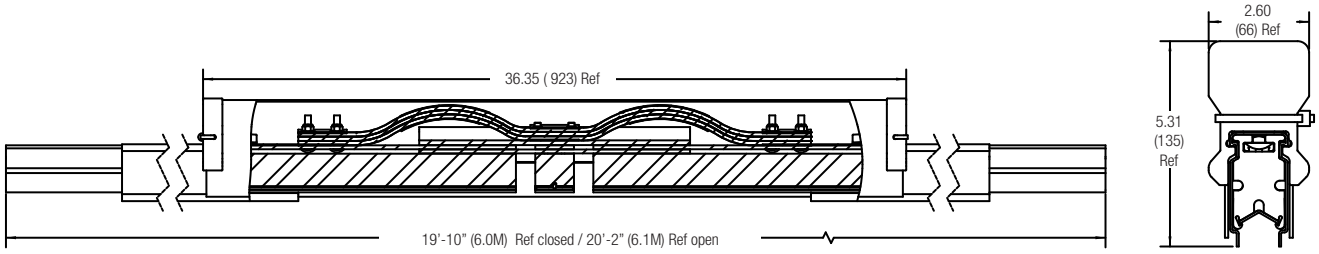
700A Expansion Section (24566 and 50739)



1000A Expansion Section (23512)

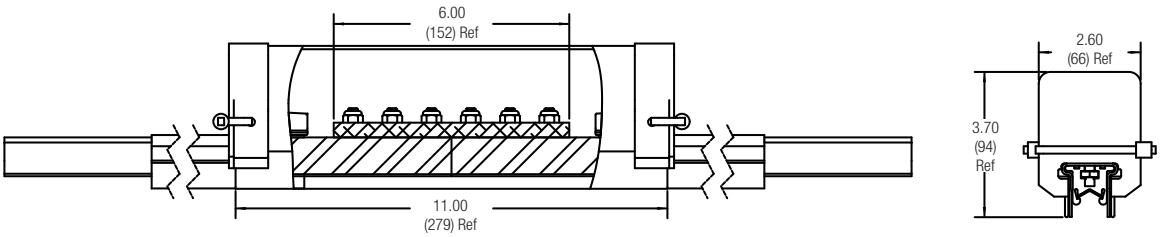


1500A Expansion Section (32820)

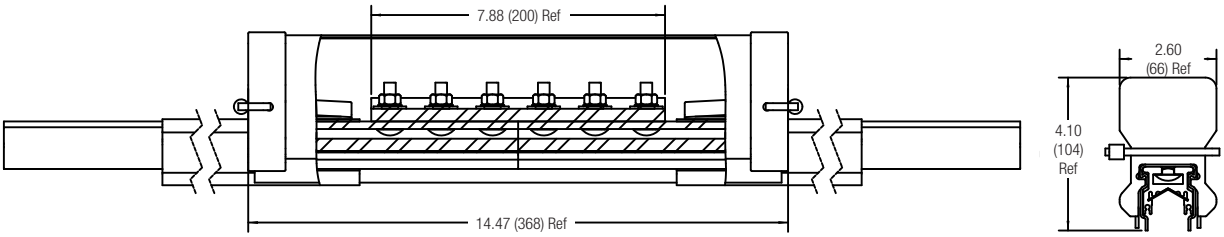


Hevi-Bar II Splice Dimensions

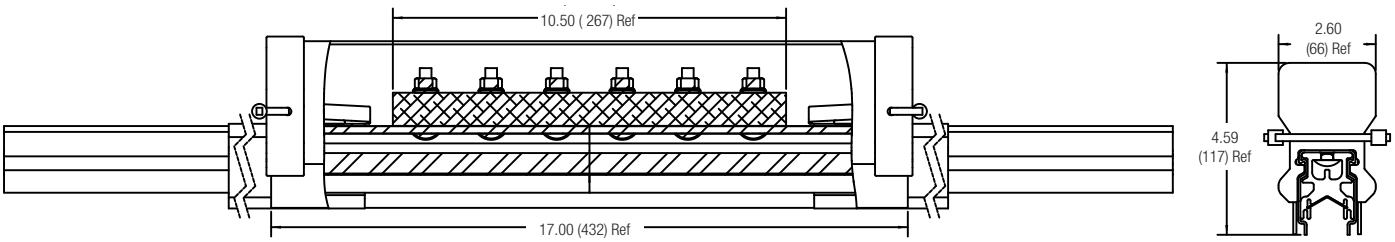
500A Splice (37676), 1/4” Bolts, Torque to 6 - 8 ft-lb



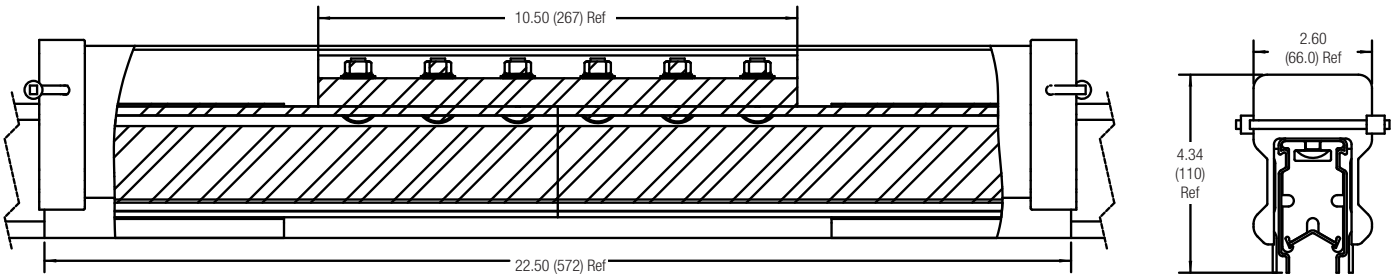
700A Splice (38115), 5/16” Bolts, Torque to 10 - 11 ft-lb



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

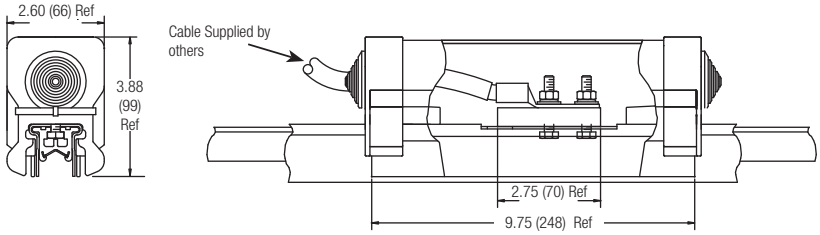


1500A Splice (38968), 5/16”, Torque to 10 - 11 ft-lb

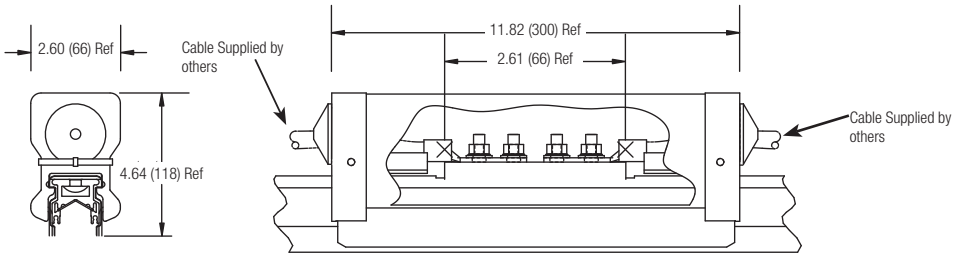


Hevi-Bar II Power Feed Dimensions

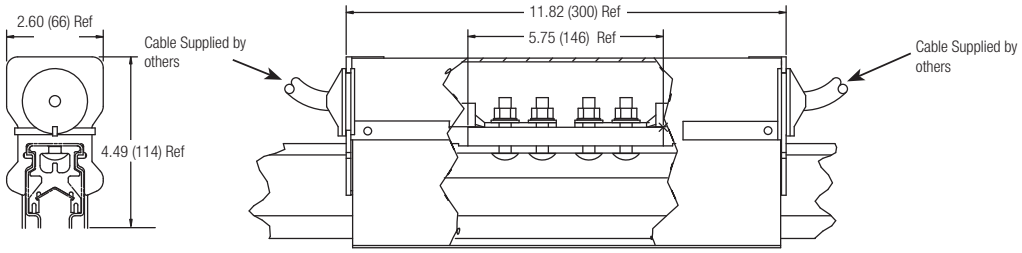
500A Power Feed (37674), 1/4” Bolts on 1” Centers, 6 -8 ft-lb



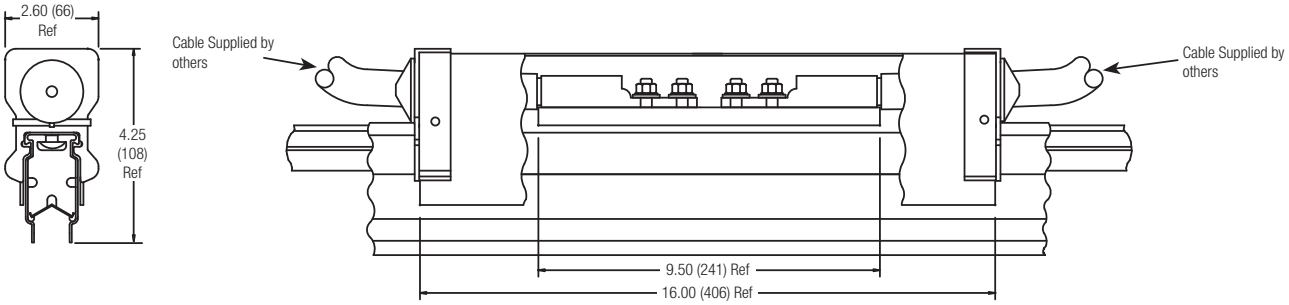
700A Power Feed (38117), 5/16” Bolts on 1” Centers, 10 - 11 ft-lb



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

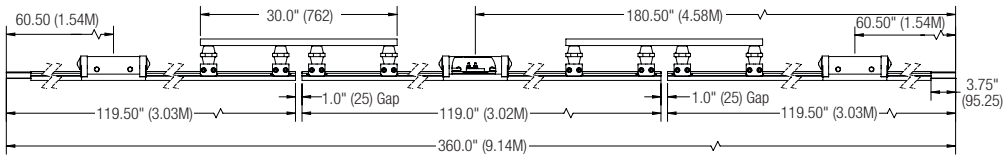


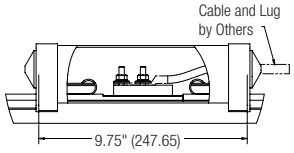
1500A Power Feed (50227), 5/16” Bolts on 1” Centers, 10 - 11 ft-lb



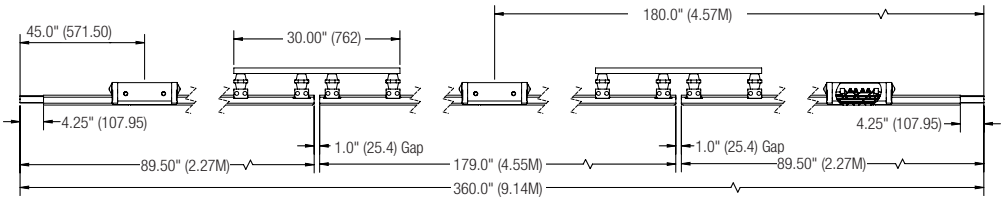
Hevi-Bar II Power Interrupting Section Dimensions

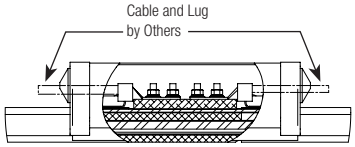
500A Power Interrupting Section (50746)



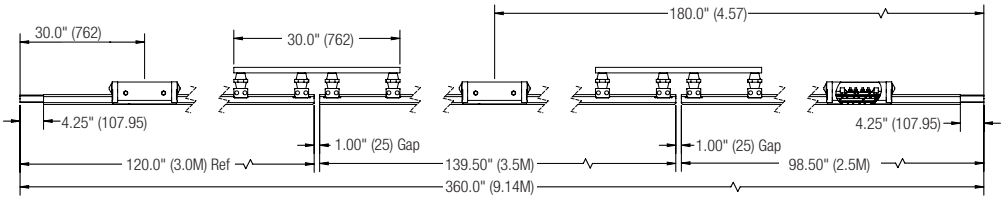


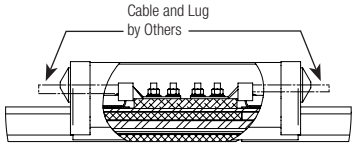
700A Power Interrupt (50748)



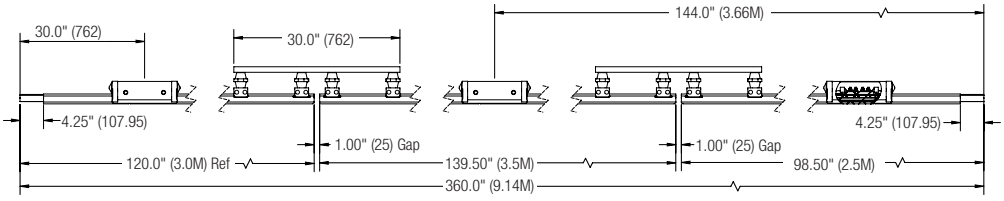


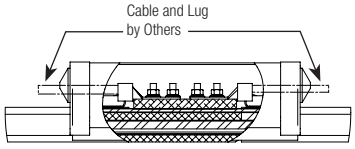
1000A Power Interrupt (50755)





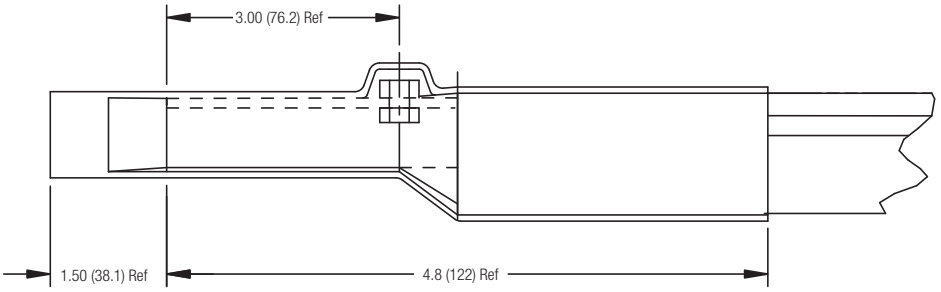
1500A Power Interrupt (50760)



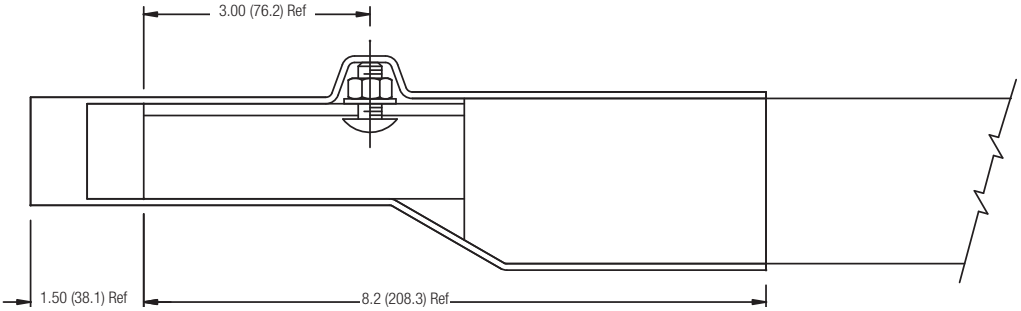


Hevi-Bar II End Cover Dimensions

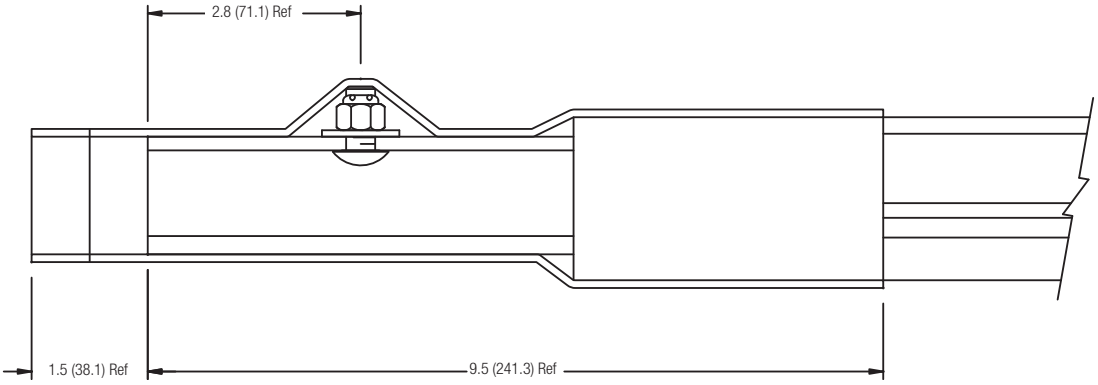
500A End Cover (27588)



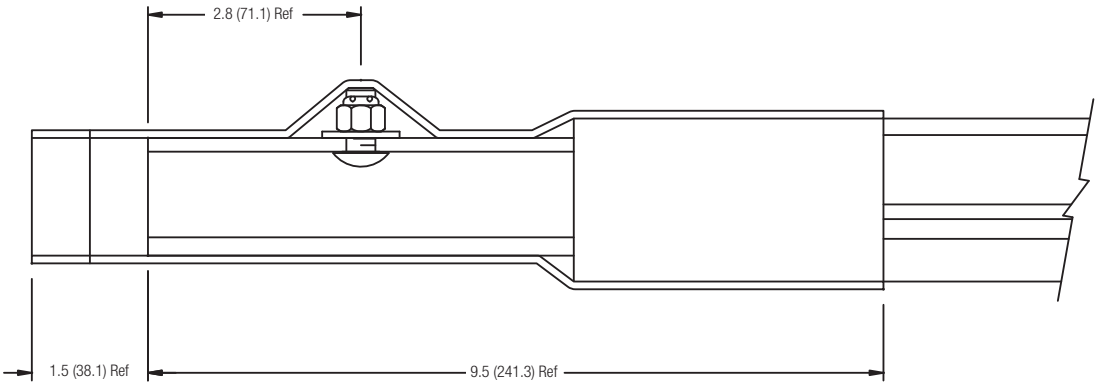
700A End Cover (50859)



1000A End Cover (33796B)

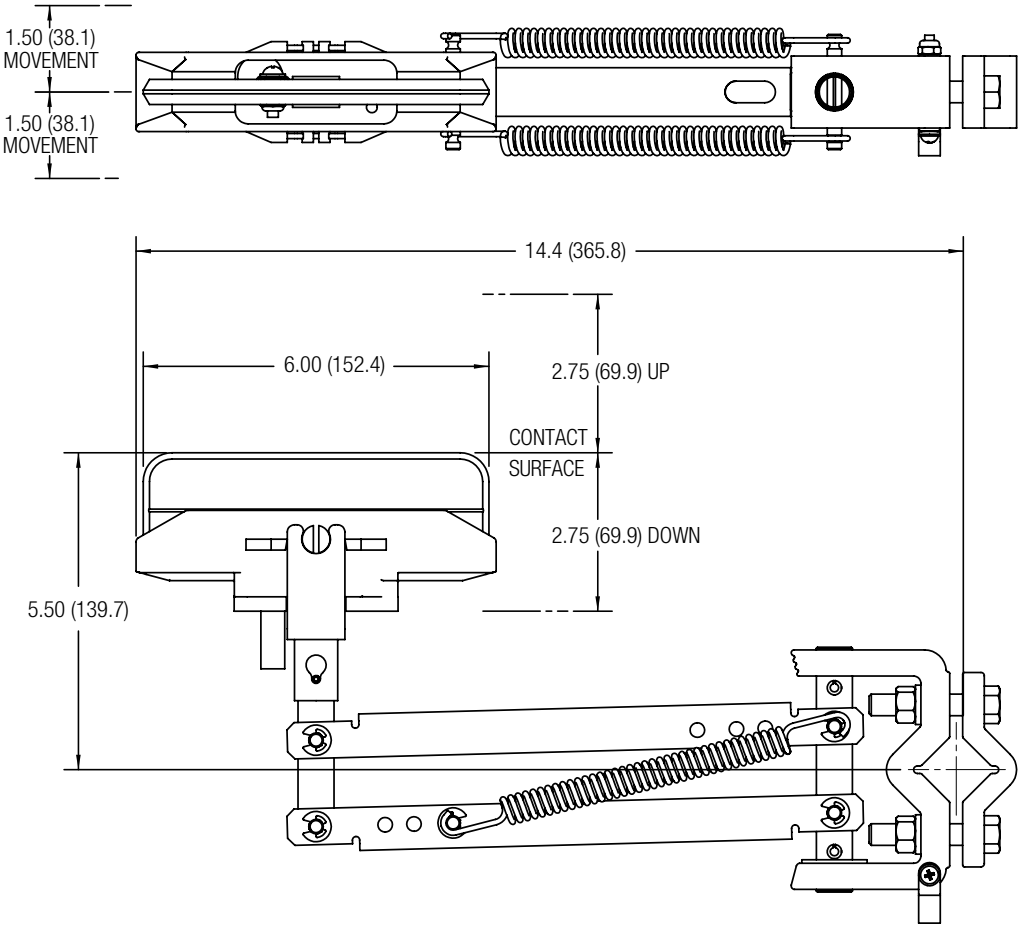


1500A End Cover (33796B)

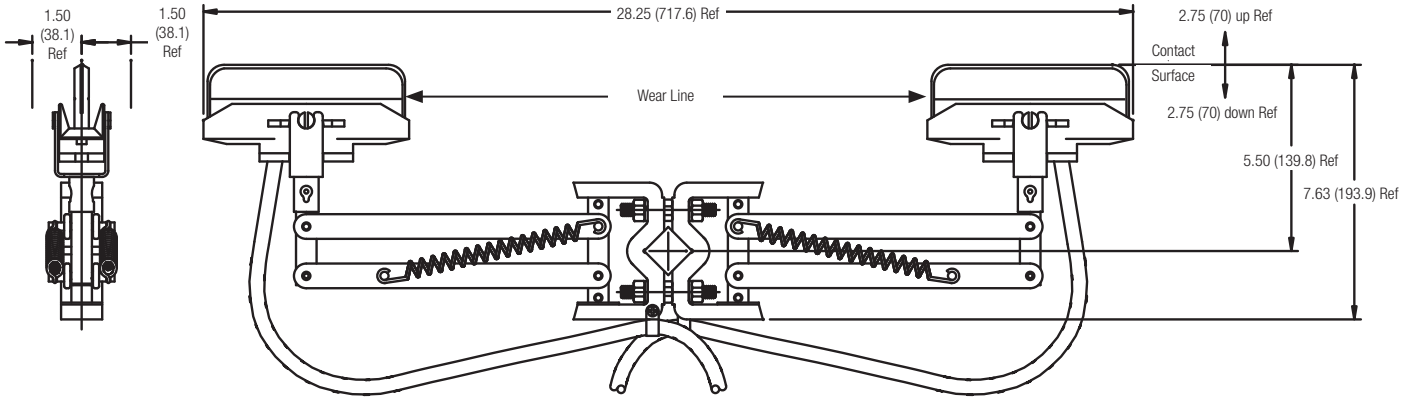


Hevi-Bar II Collector Dimensions

125A Single Collector ✱ (30388/50205)



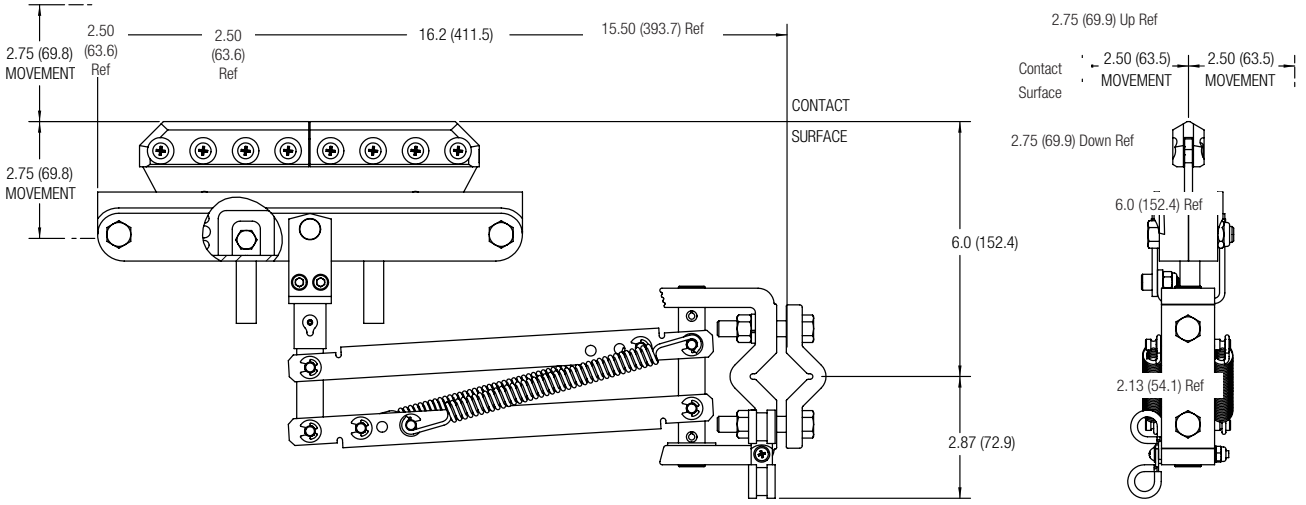
250A Tandem Collector ✱ (30389/39752)



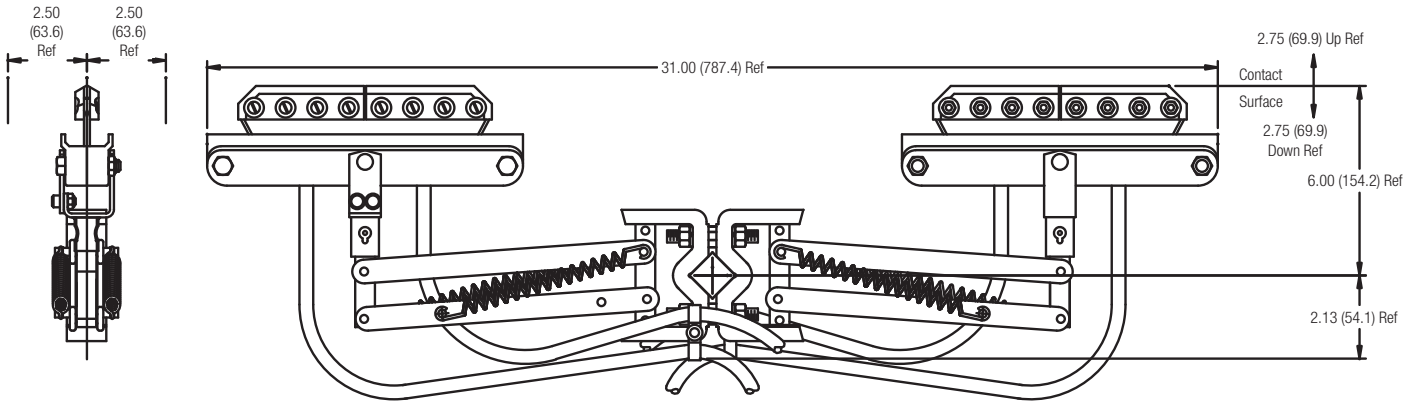
✱ Only for use with 500A Conductor Bar

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 chose 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 volt age 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.

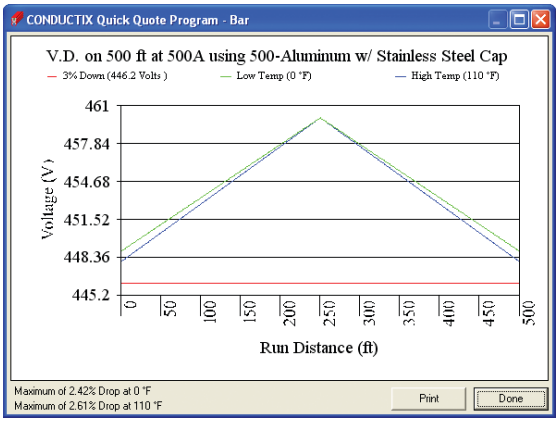


Figure 1 – Center Feed Example: Voltage drop along a 500 foot long runway with one crane drawing 500 amps at 460 volts on a 500 amp rated bar. The green line shows the voltage drop along the run at 0^0 F. The blue line shows the voltage drop at 110^0 F. The red line indicates the 3% maximum voltage drop.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

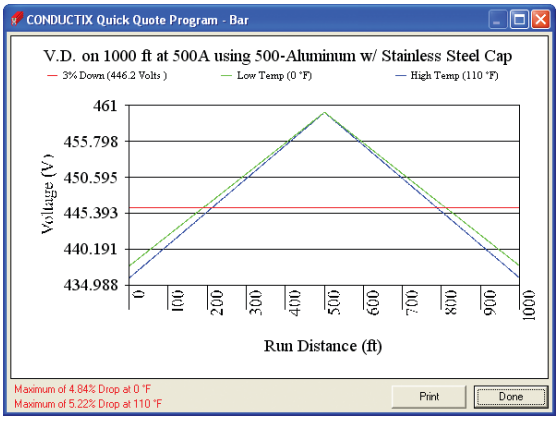


Figure 2: - Same parameters as Fig. 1, except with a 1000 foot system. Note that the voltage drop is now greater than the recommended 3%.

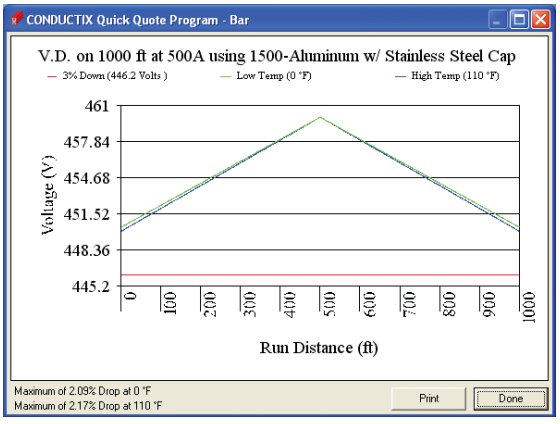


Figure 3: Center Power Example: With higher capacity 1500 amp bar to lower the voltage drop below 3%.

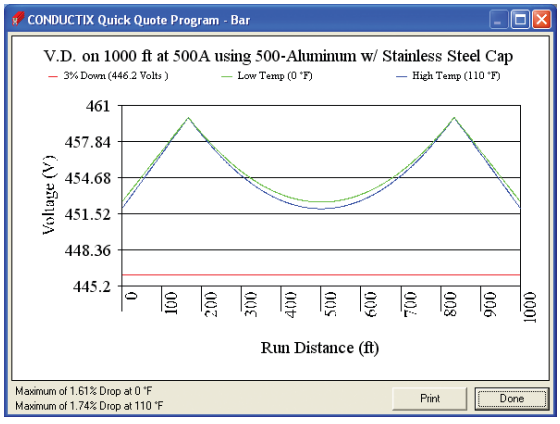


Figure 4: Two power feeds optimally located. The voltage drop remains under 3% , without the need to increase conductor capacity. A load positioned between the two feed points is supplied by both power feeds.

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 120^0 F (49^0 C), and the current-induced temperature rise of the conductor adds another 50^0 F, the total 170^0 F (76.7^0 C) exceeds the PVC cover rating of 70^0 C (156^0 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.: 49^0 C or 120^0 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 30^0 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 70^0 C, which is a 40^0 C rise over 30^0 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 that 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.

Hoist = 65A x 1 = 65.0
Bridge = 27A x .5 = 13.5
Total 78.5A

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.

Crane #1
Hoist = 65A x 1 = 65.0
Bridge = 27A x .5 = 13.5
Total 78.5A

Crane #2
Hoist = 52A x 1 = 52.0
Bridge = 14A x .5 = 7.0
Total 59.0A

Total of #1 + #2 137.5 x .195 = 130.0A

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	
Galvanized Steel 90A	16.2	15.0	
Galvanized Steel 110A	10.1	7.1	Rolled Copper 3-phase 350' long, 250A load.
Stainless Clad Copper 250A	2.01	2.0	VD = 1.39 x 3.5 x 2.5 = 12.1 volts
Copper Steel Laminate 250A	2.01	2.0	Assume load pF is 90
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'

3% of 480V = 14.4
2% of 240V = 7.2
2% of 180V = 9.6
2% of 240V = 4.8

Appendix III Electrical Formulas & Conversions

Electrical Formulas

Ohms Law

Ohms = $\frac{\text{volts}}{\text{amperes}}$ **Amperes** = $\frac{\text{volts}}{\text{ohms}}$ **Volts** = amperes x ohms

Power

Watts = amperes x volts

Amperes = $\frac{\text{watts}}{\text{volts}}$ (not 3-Phase)

HP = $\frac{\text{volts x amps x efficiency}}{746}$

Power Factor = $\frac{\text{watts}}{\text{amperes x volts}}$

3-phase Kilowatts = $\frac{\text{volts x amperes x power factor x 1.732}}{1000}$

3-phase Amperes = $\frac{\text{746 x HP (Horsepower)}}{\text{1.732 x volts x efficiency x power factor}}$

3-phase Volt-Amperes = volts x amperes x 1.732

Single-phase Kilowatts = $\frac{\text{volts x amperes x power factor}}{1000}$

Single-phase Amperes = $\frac{\text{746 x HP (Horsepower)}}{\text{volts x efficiency x power factor}}$

Speed

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

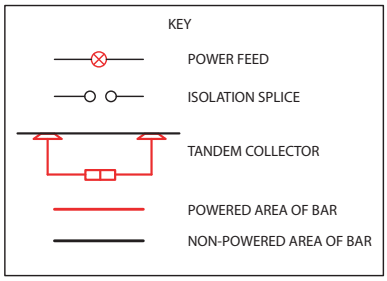
Metric Conversion Formulas

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



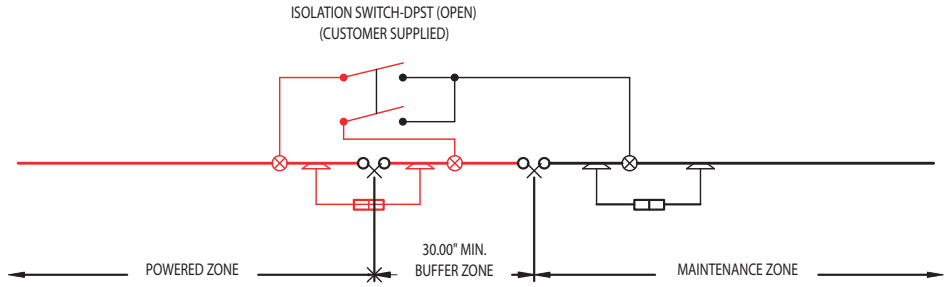
Safe-Lec 2 System: For each power phase order:

- 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 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**.

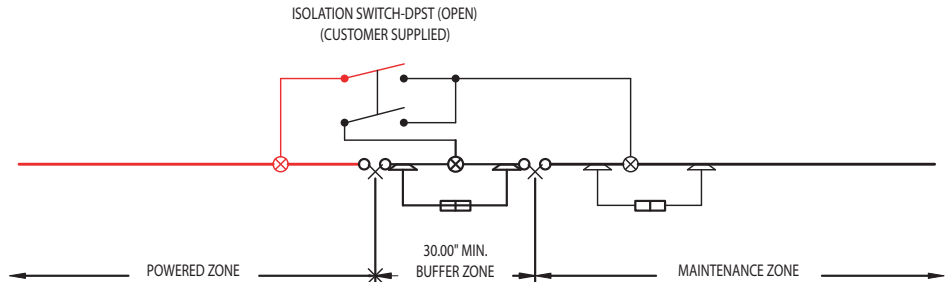
Hevi-Bar II System: For each power phase order:

- 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)

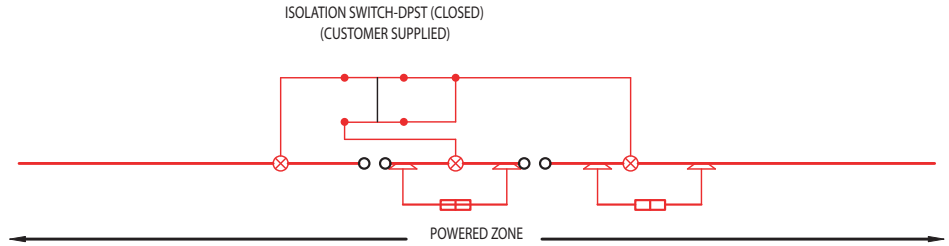
I: System with power off to the maintenance section (DPST switch open), but with tandem collector bridging the first (left-most) isolation joint.



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

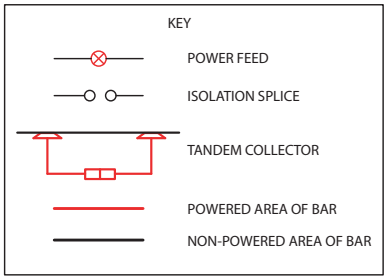
“Middle” Power Interrupting Sections

Safe-Lec 2: For <u>each power phase</u> order:

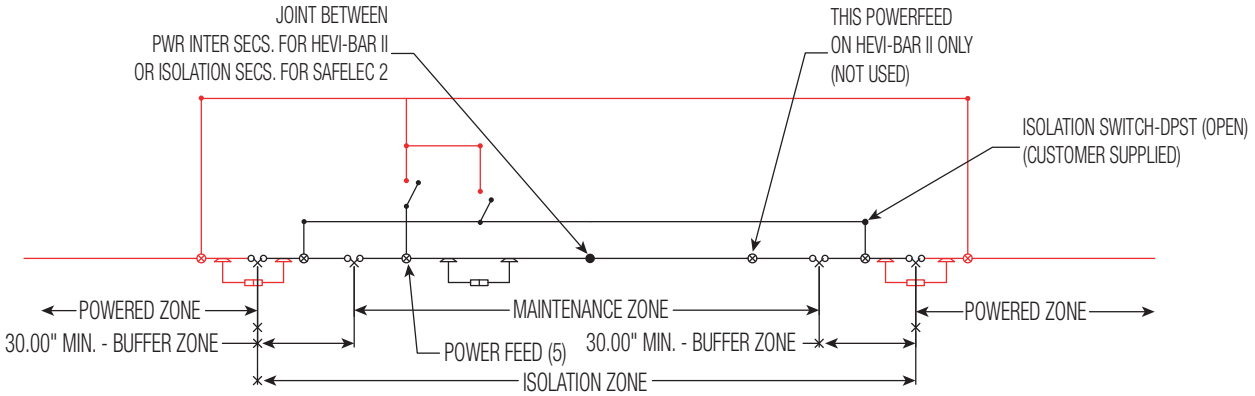
- Qty. 2 - “Power Interrupting Section” of the desired current rating (Pgs. 21). With this “kit” you get the required isolations and power feeds.
- Qty. 1 - “Customer supplied” DPST switch per phase and necessary power wiring (ordered from others) - OR Conductix-Wampfler's **PowerGuard**.

Hevi-Bar II: For <u>each power phase</u> order:

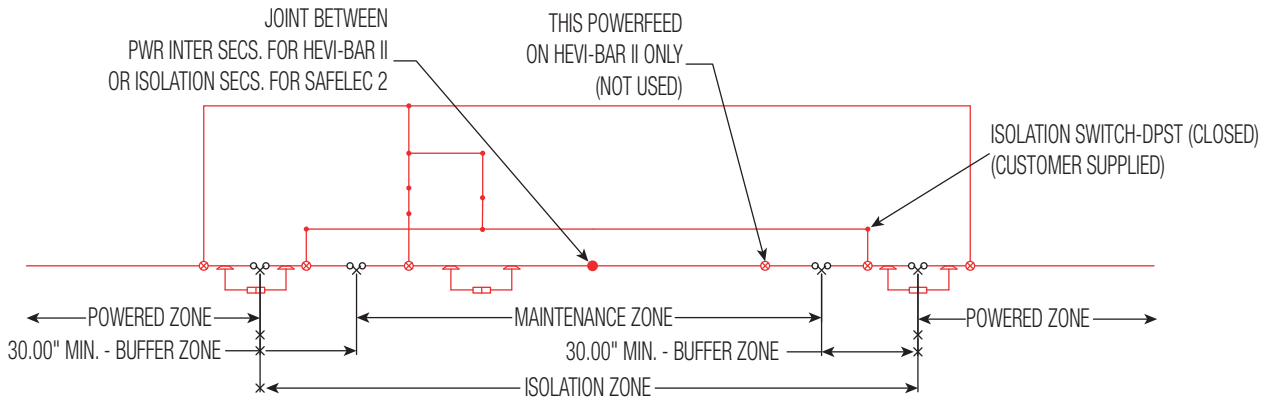
- Qty. 2 - “Power Interrupting Section” of the desired current rating (Pgs. 36-43). With this “kit” you get the required isolations and power feeds.
- Qty. 1 - “Customer supplied” DPST switch per phase and necessary power wiring (ordered from others) - OR Conductix-Wampfler's **PowerGuard**.



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



II: System with <u>power on</u> (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

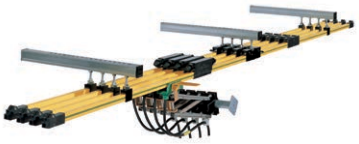
For more information on these rail set, please contact Conductix-Wampfler.

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 specials machines. Straight or curved tracks.

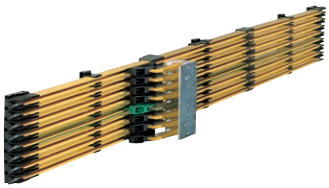


812 Series

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 the 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.

Data Transfer: ProfiDAT® I Nexus

Safe & reliable wireless communication using slotted waveguide technology that's PROFIsafe compatible.

Nexus NB for narrow band signal transfer over power conductors

LJU Automation EMS Controller

Specialized controllers Programmable by parameters, Ideal for Electrified Monorails at automotive plants, with over 1500 in service worldwide. Adaptable for other applications

BridgeGuard™

Prevents crane to crane and crane to end collisions. IP69K rated for indoor and outdoor use, with a 3 ft to 150 ft range. Compliant with IEC 60068-2-6:2007

Air & Spring balancers I Air hoists

Conductix-Wampfler offers the full line of ENDO positioning devices. Rugged, reliable steel construction increasing safety and decreasing fatigue and body stress.

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