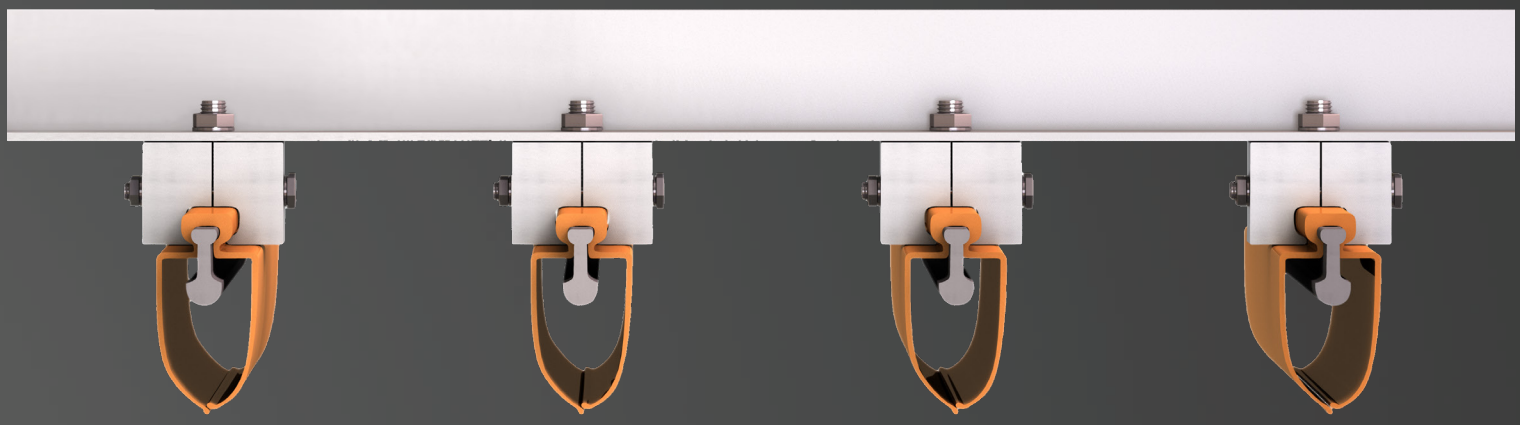


U-S SAFETY TROLLEY

Installation, Operation and Maintenance Manual

Span-Guard

REVISION REGISTER

Version	Details of Update	Date
1	Original document creation	09/01/2017
2	Convert to SpanGuard Corp	10/11/2023

TABLE OF CONTENTS

Section 1
Product Specification

SPAN-GUARD SPECIFICATION

1 GENERAL

1.01 SCOPE

A. The installing contractor shall furnish and install the U-S Safety Trolley Span-Guard system including all necessary fittings, hangers and accessories as specified herein and as shown on the installation drawings.

B. The trolley system must be suitable for indoor/outdoor environments to include but not subject to, under the continuous exposure to severe weather including rain, snow, or ice, harsh manufacturing environments, chemical plants, corrosion environments, etc.

C. The trolley system shall be of such design that expansion joints will not be required for satisfactory operation, except at points in conjunction with building expansion joint locations.

D. The trolley system shall be used to provide moveable electrical power as shown on the approval drawings.

E. The trolley system shall be new and unused products of an established manufacturer and shall be a model that has been successfully operated in similar service for 20 years of time to establish its reliability.

1.02 APPLICABLE STANDARDS

A. Trolley systems components shall be designed, manufactured and tested in accordance with the latest applicable following standards of NEC, ANSI, and NEMA.

B. Installing Contractor shall adhere to NEC, OSHA, State, and Local safety guidelines, laws, rules, and regulations.

C. Installing Contractor/personnel shall conform to all applicable ANSI, CMAA, and HMI specifications and/or standards.

D. All conductors, components and hardware must be manufactured and supported in the USA.

2 PRODUCTS

2.01 APPROVED MANUFACTURERS

Spanguard Corporation
14 N Main Street
Tioga, PA 16946

2.02 END SUPPORTS

A. Mounting shall be accomplished by properly installing (2) end supports; (1) support on each end of the runway, and in accordance with manufacturer's installation instructions.

B. End supports should be well braced since the conductors will be tensioned at approximately 900lbs-force for each conductor.

C. Recommended support spacing: 2 inches x 2 inches x 1/4 inches angle iron typical.

2.03 INTERMEDIATE MOUNTING SUPPORTS

A. Mounting shall be accomplished by attaching insulated hangers to a rigid mounting system along the runway that will hold hanger firmly in place such as Welded Angle Iron, Beam Clamp, etc.

B. Intermediate Mounting Supports shall not be closer than 15 feet as a minimum and a maximum of 25 feet of distance. (Consult the manufacturer for applications that require distances of <15 feet and/or >25 feet)

2.04 CONDUCTORS

A. Each conductor shall be a continuous solid copper conductor up to 2,000 feet in length, and shall be splice and joint free for its entire length, NO EXCEPTIONS.

B. Conductors shall be solid hard-drawn cooper.

C. Conductors current rating shall be 250A or 520A as specified on approval drawings and rated up to 600VAC or DC.

D. Conductors must be completely enclosed with a flexible self-closing insulated covers.

E. Each conductor must have a minimum of (2) insulated dead-end assemblies and (1) power feed assembly.

F. Conductor bar system that requires splices, pins, and/or screws to join sections together shall not be permitted.

2.05 INSULATED COVERS

A. Each conductor bar shall be completely enclosed with flexible insulated conductor cover.

B. Each cover must be joint free for its entire length.

C. Flexible insulated conductor cover must be fully closed in its dormant state.

D. Flexible insulated conductor cover must open and close as the collector assembly travels over the entire length of the conductor bar.

E. Flexible insulated cover shall have a minimum electrical insulation of 12,000 Volts RMS and shall not support combustion.

F. Flexible insulated cover material must Koroseal® PVC in Orange color, 83A Type, # 28-55-11503-04 or #28-55-11815-04 series.

2.06 COLLECTORS

A. Collectors must be spring loaded type to allow for sag and/or curvatures caused by expansion and contraction of the conductor bar system.

B. Collectors must be constructed to allow misalignment range of up to 2 3/4 inches vertical and 3.5 inches horizontal. (Consult the manufacturer for applications that require larger misalignment ranges)

C. Collectors must be rated at 100A or 200A (250A Model Systems), and at 400A (520A Model Systems), up to 600V as specified on approval drawings.

D. Collectors must be constructed of aluminum or stainless steel bodies and equipped with weather cuff, porcelain spreaders, and copper-graphite collectors which can be easily replaced in the field.

E. The collector shoe shall provide a minimum of 5,000 miles of wear life usage.

2.07 HANGERS

A. Hangers shall be constructed of insulated material.

B. Hangers shall be equipped with stainless steel or cadmium plated bolts.

2.08 REPAIR SECTIONS

A. System must be designed to allow splice joints only when necessary. E.g. repair a damaged section, extending an existing runway, or creating an isolated maintenance zone.

2.09 ABRASIVE CLIPS

A. Each conductor must be equipped a minimum of (1) abrasive clip hanger per conductor to prevent uneven wear of collector shoes.

B. The abrasive clips shall be installed under the orange flexible insulation conductor cover, and located on the crane runway where the collector most frequently travels, in accordance with manufacturer's installation instructions.

C. Abrasive clips installation/presence must be indicated with a red color insulation hanger to allow quick field identification and inspection.

3 EXECUTION

3.01 INSTALLATION & INSPECTION

A. Inspect trolley system for conformance with reviewed approval drawings

B. Trolley system shall be installed in conformance with manufacturer's instructions and inspected by a manufacturer's representative. Provide all necessary accessories to make system complete, usable, and capable of meeting the operating requirements specified. Test, adjust and clean equipment for acceptance by Owner.

3.02 WARRANTY

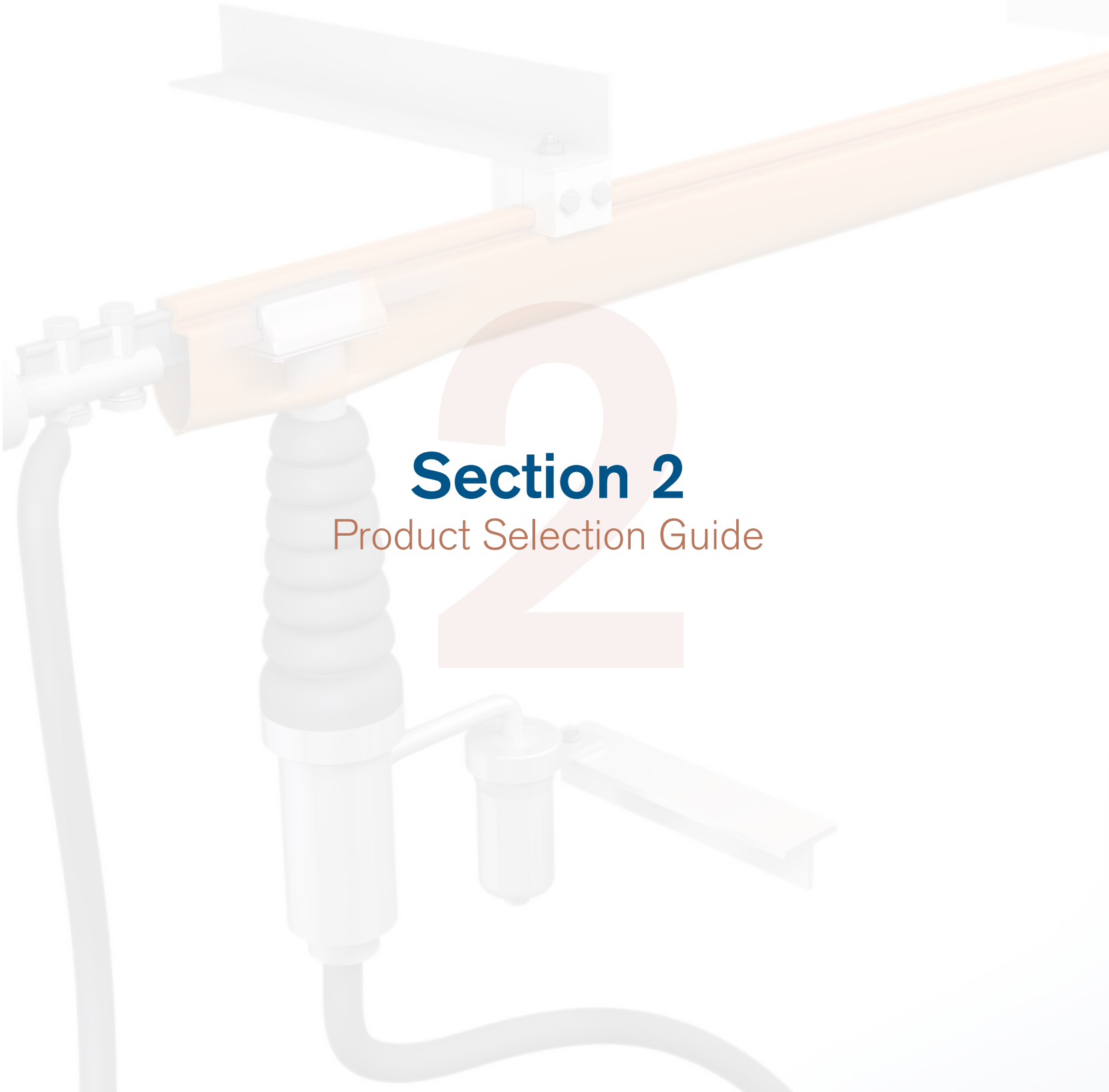
A. Limited Warranty. Equipment manufacturer warrants all products sold by it to be free from defects in material or workmanship for a period of (1) year from the date of delivery, and limited to the obligation set forth in the manufacturer's limited warranty provisions herein.

B. Extended warranties shall be allowed as specified herein.

3.03 START-UP SERVICES

A. A factory authorized service representative shall perform all startup and inspection services.

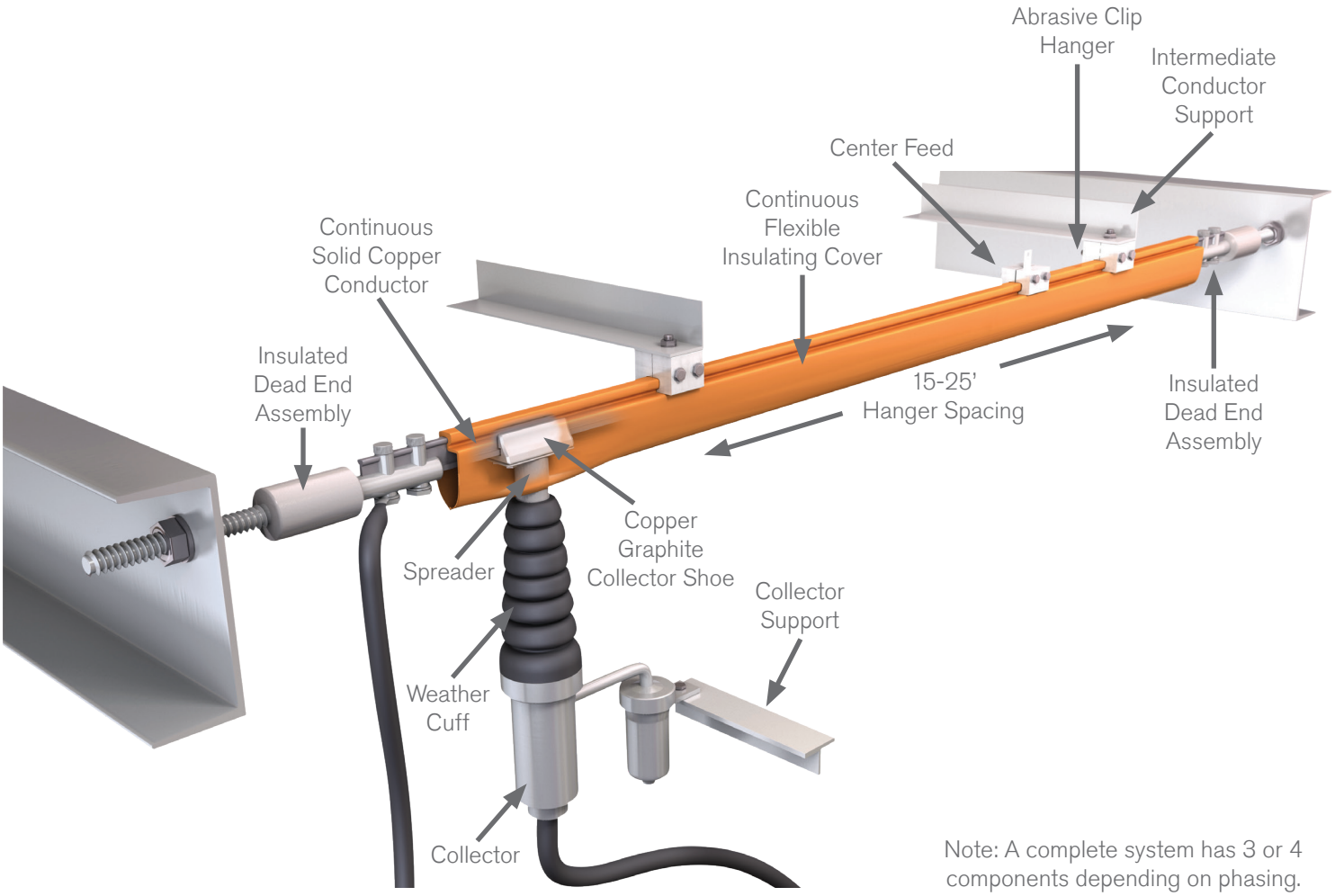
B. Train Owner's maintenance personnel on procedures for servicing and maintaining trolley system equipment per manufacturer's recommendations.



Section 2

Product Selection Guide

SYSTEM LAYOUT DRAWING



Note: A complete system has 3 or 4 components depending on phasing.

Motor Terminal Amperes At Full Load

DIRECT CURRENT AMPERES			
H.P.	115V	230V	2-wire 550V
1 2 3	9.6 17.1 25.0	4.8 8.5 12.5	2.0 3.6 5.2
5 7 1/2 10	40 58 76	20 29 38	8.3 12.0 16.0
15 20 25	112 148 184	56 74 92	23 31 38
30 40 50	220 292 360	110 146 180	46 61 75
60 75 100	430 536 –	215 268 355	90 11 148
125 150 200	– – –	443 534 712	184 220 295

SINGLE-PHASE AC AMPERES		
H.P.	115V	230V
1 1 1/2 2	16 20 24	8 10 12
3 5 7 1/2	34 56 56	17 28 40
10	100	

Note: For full-load currents of 208 volt motors, increase the corresponding 220 volt motor full load current by 6 percent.

‡80 percent P.F. values.
Practical application of these values: 60% for light duty, 90% for average duty, 120% heavy duty.

THREE-PHASE AC‡ INDUCTION-TYPE SQUIRREL-CAGE & WOUND ROTOR AMPERES				
H.P.	110V	220V	440V	550V
1 2 3	7 13 –	3.5 6.5 9	1.8 3.3 4.5	1.4 2.6 4
5 7 1/2 10	– – –	15 22 27	7 1/2 11 14	6 9 11
15 20 25	– – –	40 52 64	20 26 32	16 21 26
30 40 50	– – –	78 104 125	39 52 63	31 41 50
60 75 100	– – –	150 185 246	75 93 123	60 74 98
125 150 200	– – –	310 360 480	155 180 240	124 144 192

Circuit Length For One-Volt Drop For Indicated Currents

Installation

10	20	30	40	50	60	70	90	125	150	200	225	300	350	400	450	500

Permissible Length Of Circuit (Runway Feet)

conductorsize	THREE PHASE 60 CPS A-C															
75	48	20	10	7	6	5	…	…	…	…	…	…	…	…	…	…
250	…	…	…	122	98	82	70	53	36	29	23	22	…	…	…	…
520	…	…	…	…	…	…	…	…	70	58	45	38	29	25	22	20	17
	SINGLE PHASE 60 CPS A-C															
75	40	16	10	7	6	5	…	…	…	…	…	…	…	…	…	…
250	…	…	…	…	82	68	59	46	33	28	21	18	…	…	…	…
520	…	…	…	…	134	112	96	75	54	45	33	30	22	19	17	16	14
	DIRECT CURRENT															
75	67	33	22	17	13	11	…	…	…	…	…	…	…	…	…	…
250	…	…	…	…	116	96	83	65	46	39	29	26	…	…	…	…
520	…	…	…	…	332	276	235	183	132	111	82	75	55	47	40	36	32

1. For other voltage drops, multiply the lengths in the table by the desired drop in volts. For example, No. 250 conductor will carry 90 Amperes 53' for a drop of one volt. If a drop of 6 volts is permissible, the permissible length of 53' x 6 or 318'.
2. For other currents, multiply the length in the table by the ratio of the current in the table to a new current. For example, the table shows a permissible circuit length of 45' for No. 520 conductor carrying 200 Amperes for a drop of one volt. If it should be desired to carry 210 Amperes at a drop of one volt, the permissible length is:

$$45 \times \frac{200}{210} \text{ or } 43'$$

3. Most motor manufacturers state their motors will operate at voltages plus or minus 10% of the name plate marking. A 5% voltage drop is normally a safe design factor.

Example

Give: 250' runway-end fed–220 Volts–60 cycle–3phase–AC
Motors: 20HP bridge motor–10HP trolley motor–40HP hoist motor
The maximum normal demand would be:

40HP Hoist motor	104 Amperes
20HP Bridge motor @ 50%	26 Amperes
Total	130 Amperes

Using the No. 250A Conductor, the distance 130 Amperes will travel for a one volt drop = $125 \times \frac{36}{130} = 35$ feet.

For a runway 250 feet long the voltage drop would be $\frac{250}{35} = 7.1$ volts. The percentage of voltage drop $\frac{7.1}{220} = 3.2\%$

The No. 250A conductor is satisfactory.

Bill of Material For Example:

750'	No. 250A	Pre-Assembled Conductor and Flexible cover–three 250' lengths
3	No. C200/WC-1	Collectors with WC-1 weather cuff
6	No. DE1	Insulated Dead Ends
42	No. H2	Insulated Hangers
6	No. H4A/1098	Abrasive Clip Hanger and Abrasive Dressing Clip
16	No. 2094	Steel Intermediate Conductor Support
1pr	No. 2095	Steel End Support
3	No. 2098	200 Amp Shoes (spares)

Conductor and Flexible Cover

Product Description	Cat. No.	Unit	Wt.
250 Ampere – Solid Copper with Pre-Assembled Cover	250A	Ft.	.7
250 Ampere – Solid Copper – Conductor Only	250B	Ft.	.5
250 Ampere – Solid Copper with Pre-Assembled Low Temperature Cover	250LT	Ft.	.7
– Cover Only for 250A	250C	Ft.	.2
– Low Temperature Cover Only for 250LT	250LTC	Ft.	.2
520 Ampere – Solid Copper with Pre-Assembled Cover	520A	Ft.	1.5
520 Ampere – Solid Copper – Conductor Only	520B	Ft.	1.1
520 Ampere – Solid Copper with Pre-Assembled Low Temperature Cover	520LT	Ft.	1.5
– Cover Only for 520A	520C	Ft.	.4
– Low Temperature Cover Only for 520LT	520LTC	Ft.	.4

Trolley Collector

Product Description	Cat. No.	Unit	Wt.
100 Ampere – Use with 250 Conductor	C100	Ea.	3.0
100 Ampere – Stainless Steel	C100SS	Ea.	3.0
100 Ampere – Heated Collector	C100H	Ea.	3.2
200 Ampere – Use with 250 Conductor	C200	Ea.	3.2
200 Ampere – Stainless Steel	C200SS	Ea.	3.2
300 Ampere - Use with 520 Conductor	C300	Ea.	7.6
300 Ampere - Use with 520 Conductor	C300SS	Ea.	7.6
400 Ampere – Use with 520 Conductor	C400	Ea.	7.8
400 Ampere - Use with 520 Conductor	C400SS	Ea.	7.8
*Voltage: 600V			

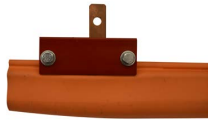
Insulated Hanger

Product Description	Cat. No.	Unit	Wt.
Use with 250 Conductor (2 Bolt)	H2	Ea.	.3
Use with 250 Conductor Stainless Steel Bolts	H2SS	Ea.	.3
Use with 250 Conductor in Acid Atmosphere	H2SSA	Ea.	.3
Use with 250 Conductor (4 Bolt)	H4	Ea.	.5
Use with 250 Conductor at Abrasive Clip Location	H4A-1098	Ea.	.6
Use with 520 Conductor	H6	Ea.	.7
Use with 520 Conductor at Abrasive Clip Location	H6A-2045	Ea.	.8
Use with 250 Conductor Switch & Transfer Points	H6DEA	Ea.	.8
Use with 520 Conductor at Switch & Transfer Points	H6DEA-520	Ea.	.9

Pre assembled Insulated Dead End Assembly

Product Description	Cat. No.	Unit	Wt.
Use with 250 Conductor	DE3	Ea.	1.5
Use with 520 Conductor	DE2	Ea.	4.0

Center Feed



Product Description	Cat. No.	Unit	Wt.
Use with 250 Conductor	CF 81	Ea.	.6
Use with 520 Conductor	CF82	Ea.	2.0

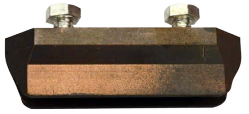
Splice Joint

Product Description	Cat. No.	Unit	Wt.
Use with 250 Conductor	SJ225	Ea.	1.6
Use with 520 Conductor	SJ500	Ea.	1.7
*To add on or replace damaged section only			

Abrasive Hanger

Product Description	Cat. No.	Unit	Wt.
Use with Abrasive Clip 1098 - Use with 250 Conductor	H4A-1098	Ea.	0.3
Use with Abrasive Clip 2045 - Use with 520 Conductor	H6A-2045	Ea.	0.5

Collector Shoes



Product Description	Cat. No.	Unit	Wt.
100 Ampere – Use with 250 Conductor	2093	Ea.	.25
100 Ampere – Heated Shoe	2142	Ea.	.35
200 Ampere – Use with 250 Conductor	2098	Ea.	.35
400 Ampere – Use with 520 Conductor	2084	Ea.	.7

Intermediate Conductor Support

Product Description	Cat. No.	Unit	Wt.
Use with 250 Conductor	2094-4	Ea.	2.4
Use with 520 Conductor	2096-4	Ea.	3.7

End Support

Product Description	Cat. No.	Unit	Wt.
Use with 250 Conductor	2095-4	Pr.	25
Use with 520 Conductor	2097-4	Pr.	40

Installation Cable Pulley (deposit)

Product Description	Cat. No.	Unit	Wt.
Used to install Span-Guard	CP-DEP	Ea.	3.5
*this item can be returned after use for a full refund			

Section 3

Installation Instructions

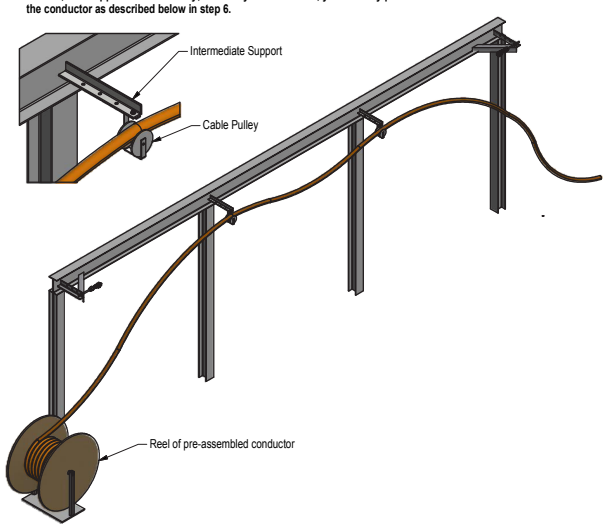
250 & 520 Amp Span Guard

1. Recommended support spacing: (2" x 2" x 1/4" angle iron typical)
   Crane Runways - 15 ft.
   Crane Bridges - 10 ft.
   Roof trusses - should not exceed 25 ft.
   End supports should be well braced since the conductor will be tensioned at approximately 900 in lbs. on each conductor. (Reference step 7 for tensioning guide line)

2. Place the reel of pre-assembled conductor at one end of the runway.

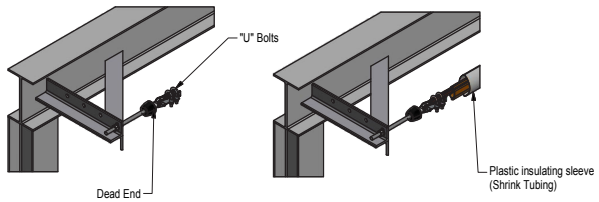
3. Install a cable pulley on each intermediate steel support, and install a drag rope in the pulleys. Cable pulleys are available from the factory on a purchase or deposit basis.

4. Secure the drag rope to the conductor and pull the conductor by hand; or, on longer runs, a pulling device such as a winch can be used. Prior to tensioning, the conductor will lie loosely in the cable pulleys. **Caution: As the conductor comes off the reel, it will appear bent and wavy; do not try to correct this, you will only put kinks in the conductor. Tension the conductor as described below in step 6.**



5. Remove the pulling rope from the end of the conductor and install the dead end insulator and plastic insulating sleeve on conductor. Insert dead end insulator into end support. (Torque nuts, DE-3: 250 in./lbs, DE-2: 425 in./lbs).

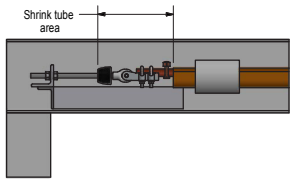
   a. Slip shrink tubing over orange cover. Peel back orange cover on conductor approximately 5" from the end.
   b. Insert conductor through the "U" bolts of the dead end assembly. Conductor should extend about 1/2" beyond the second "U" bolt.
   c. Torque nuts on the "U" bolt to (see above). The round surface of the conductor should be close to the nuts.
   d. The end power feed, when used, is attached using a split bolt connector (by others) as shown. (See step 9)
   e. Slip the shrink tubing over the exposed electrical parts. Apply heat to shrink tubing.



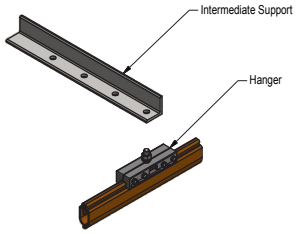
6. Complete the tensioning by fastening cable grip to the other end of conductor and tension conductor by means of a coffin hoist or similar equipment. Cut conductor to length, install dead end insulator and plastic insulating sleeve and put final tension on the conductor by turning nuts on the threaded rod at both ends of the conductor.

   Sag: There should be no nore that 1/4" of sag in a 15 ft. span at 75°F.

   The conductor will become perfectly straight with proper tensioning as mentioned in steps 1 and 4.



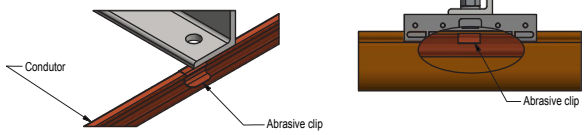
7. Begin at one end of runway and lift conductor out of pulley. Install the hanger onto the conductor and bolt to intermediate support. On long runways it may be necessary to tighten conductors several times during hanger installation to avoid more than 1/4" sag in a 15 ft span at 75°F. (H2, H4: 50 in/lbs, H6: 90 in/lbs)



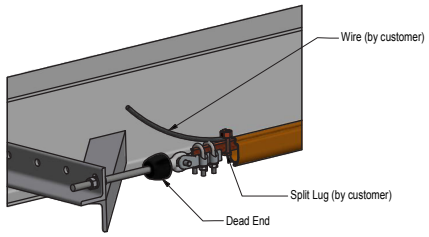
8. Abrasive clips increase shoe life by filing the shoe shoulders as the shoe travels along the copper conductor. The abrasive clips are installed under the orange cover with an abrasive clip hanger at an intermediate steel support. Installation of the abrasive clips should be at points of maximum travel.

   a. Clips must be installed for proper operation of Span-Guard. Install clip in area of runway where collector most frequently travels.
   b. Raise the orange cover off the conductor at the point where the abrasive clip is to be installed underneath the cover. Snap the clip around the top flange of the conductor.
   c. Replace the orange cover onto the conductor but over the abrasive clip. If the clip is sprung during installation, reform with channel lock pliers to original shape.
   d. Install the special insulated hanger making sure the clip is centered in the hanger. Bolts should not be excessively tight.
   e. Fasten the hanger to the runway or crane support.

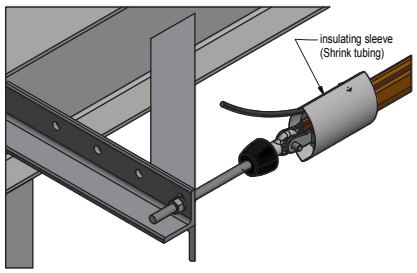
   Repeat the above steps for each conductor.

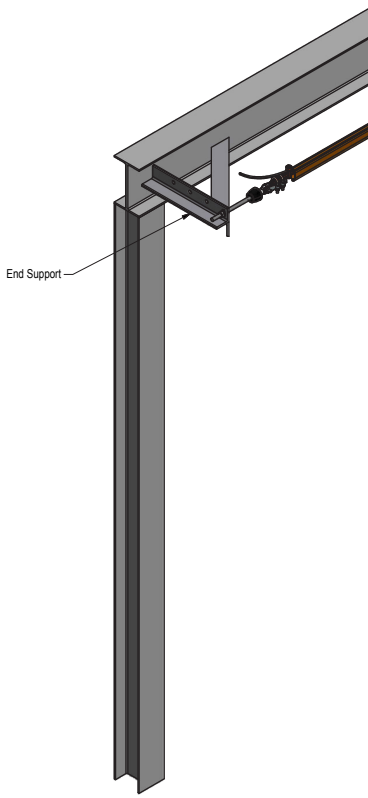


9. When power is fed to conductor at the end of the runway, connect this wire to the end fitting with a wire lug.



Slip plastic insulating sleeve over exposed metal parts to insulate dead end fitting.



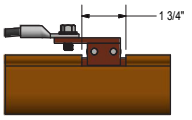


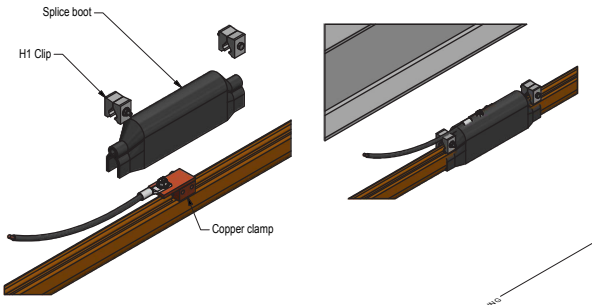
10. When power is center fed, cut only the top lobe of the orange cover and clamp center feed to the top lobe of the copper conductor. Install neoprene boot or insulating case as required. (CF81: 2", CF82: 1 3/4")

a. Cut top lobe only of the orange cover appoximately (see above) long at the location where power is to be fed to the conductor.

CF82

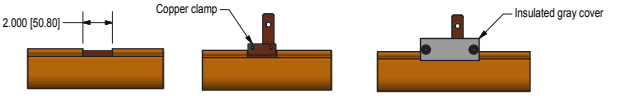
b. Install copper clamp on the top lobe of the conductor that is exposed when the orange cover is cut. Tighten the two clamp bolts. Cut a hole in the end of the black neoprene insulating cover to permit the power conductor to be threaded through the hole. Thread cover onto conductor. Fasten the customer supplied lug onto the power cable and connect lug to tongue of the CF-82 Center Feed. Position black neoprene cover over the connection and secure to the orange cover with supplied H1 clips.



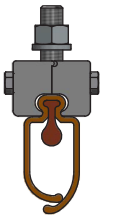


CF81

c. Install copper clamp on the top lobe of the conductor that is exposed when the orange cover is cut. Before fastening wire, slip the red shrink tubing over the wire. Fasten your power cable to the copper tongue with a bolt and lug furnished by the customer. Position shrink tubing so that it covers all live parts, and then shrink with hot air gun. Place insulated gray cover on copper clamp and secure bolts.

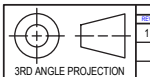


250 Amp



520 Amp

NOT RELEASED FOR PRODUCTION
FOR QUOTING AND PROTOTYPING
PURPOSES ONLY



3RD ANGLE PROJECTION

ALL DIMENSIONS IN INCHES.
[ ] ARE IN MILLIMETERS.

SHAPING & FORMING TOLERANCES

DECIMALS	ANGULAR
x.x ±0.1	x ±3°
x.xx ±0.03	x.x ±1.5°
x.xxx ±0.015	

MACHINING TOLERANCES

DECIMALS	ANGULAR
x.x ±0.1	x ±2°
x.xx ±0.02	x.x ±1.0°
x.xxx ±0.008	

ALL CORNERS, BENDS, AND OTHER FORMATIONS ARE TO BE FREE FROM TEARS, CRACKS, OR PITTING.
ALL ENCOUNDERS MUST ADHERE TO U. BEC. SECTIONS 7.1 AND 7.2 IN REGARDS TO OPENINGS AND ARE TO BE CAUSHIONLESS

Revision History

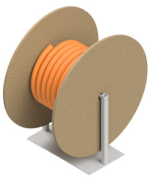
REV	REVISION DESCRIPTION	DATE	REV BY	APP
1	Original		eschultz	

DRAWN BY	eschultz
DRAWN ON	4/21/2017
REVIEWED BY	
REVIEWED ON	
APPROVED BY	temp
APPROVED ON	4/24/2017

U-S SAFETY TROLLEY
A DIVISION OF UNIVERSAL ELECTRIC CORPORATION

DRAWING TITLE	Span Guard Installation Instructions
DRAWING NUMBER	129-0001-0
SHEET SIZE	D
SHEET NO.	1
NO. SHEETS	
SCALE	1/2

PARTS NEEDED



Conductor/
Insulator

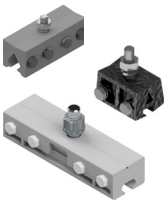
End Support

Intermediate
Support

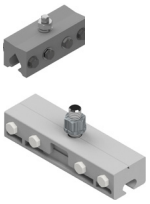
Cable Pulley

Wire Puller

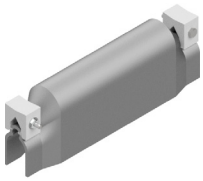
Dead End



Hangers



Abrasive
Holders



Center Feed

Winch (come along)
Not provided

Collector

TOOLS NEEDED

Winch (come along)	3/4” Socket
Rope	9/16” Socket
Gloves	1/2” Socket
Reel Holder	7/16” Socket
Torque Wrench	15/16” Wrench
Grinder or bolt cutter	3/4” Wrench
Utility knife	9/16” Wrench
File set	1/2” Wrench
1/2” Ratchet	7/16” Wrench

GENERAL INSTALLATION INSTRUCTIONS

1. Recommended support spacing: (2” x 2” x 1/4” angle iron typical)

   Crane Runways - 15 ft.

   Crane Bridges - 10 ft.

   Roof trusses - should not exceed 25 ft.

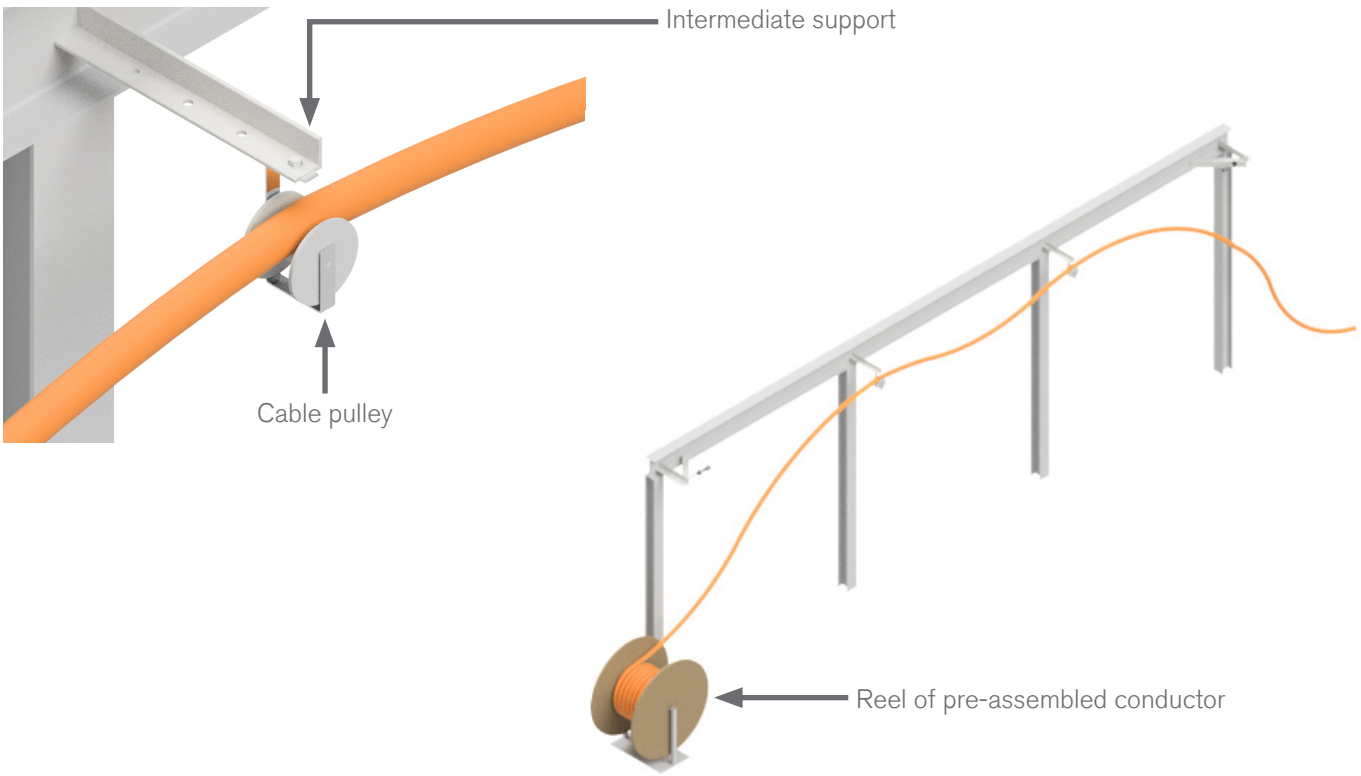
   End supports should be well braced since the conductor will be tensioned at approximately 900 in./lbs. on each conductor. Reference step 7 for tensioning guideline.

2. Place the reel of pre-assembled conductor at one end of the runway.

3. Install a cable pulley on each intermediate steel support, and install a drag rope in the pulleys. Cable pulleys are available from the factory on a purchase or deposit basis.

4. Secure the drag rope to the conductor and pull the conductor by hand; or, on longer runs, a pulling device such as a winch can be used. Prior to tensioning, the conductor will lay loosely in the cable pulleys.

   Caution: As the conductor comes off the reel, it will appear bent and wavy; do not try to correct this, you will only put kinks in the conductor. Tension the conductor as described in step 6.



5. Remove the pulling rope from the end of the conductor and install the dead end insulator and plastic insulating sleeve on conductor. Insert dead end insulator into end support.

   Torque nuts

   DE-3: 250 in./lbs.
   DE-2: 425 in./lbs.

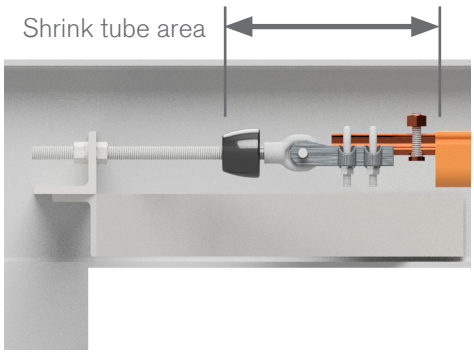
   a. Slip shrink tubing over orange cover. Peel back orange cover on conductor approximately 5" from the end.
   b. Insert conductor through the "U" bolts of the dead end assembly. Conductor should extend about 1/2" beyond the second "U" bolt.
   c. Torque nuts on the "U" bolt to specification above. The round surface of the conductor should be close to the nuts.
   d. The end power feed, when used, is attached using a split bolt connector as shown. (See step 9)
   e. Slip the shrink tubing over the exposed electrical parts. Apply heat to shrink tubing.

6. Complete the tensioning by fastening cable grip to the other end of conductor and tension conductor by means of a coffin hoist or similar equipment.

   Cut conductor to length, install dead end insulator and plastic insulating sleeve and put final tension on the conductor by turning nuts on the threaded rod at both ends of the conductor.

   Sag: There should be no more than 1/4" of sag in a 15 ft. span at 75°F.

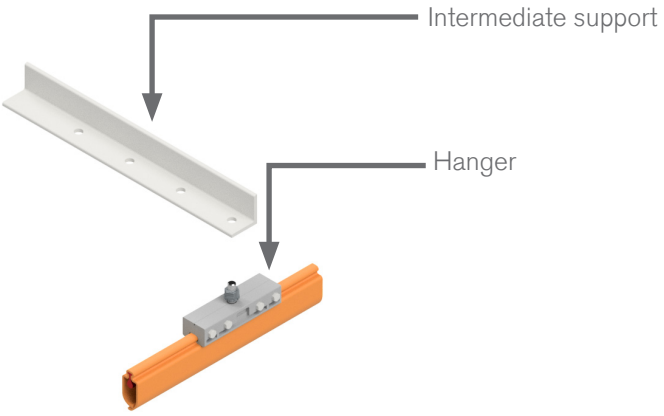
   The conductor will become perfectly straight with proper tensioning as mentioned in steps 1 and 4.



7. Begin at one end of runway and lift conductor out of pulley. Install the hanger onto the conductor and bolt to intermediate support. On long runways, it may be necessary to tighten conductors several times during hanger installation to avoid more than 1/4" sag in a 15 ft. span at 75°F.

   H2, H4: 50 in./lbs.

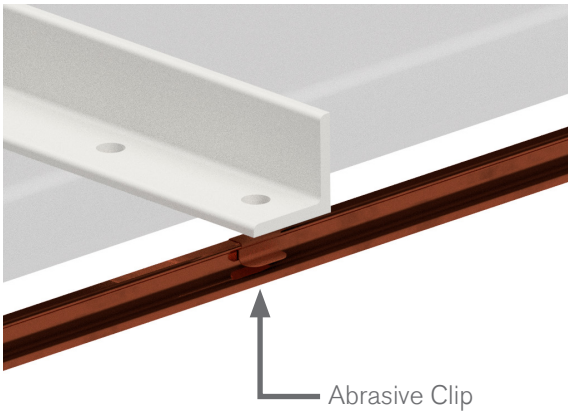
   H6: 90 in./lbs.

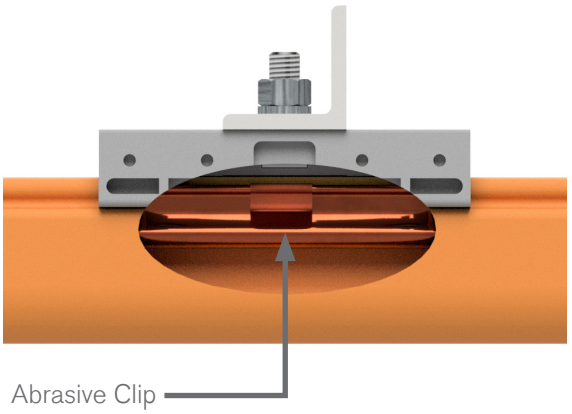


8. Abrasive clips increase shoe life by filing the shoe shoulders as the shoe travels along the copper conductor. The abrasive clips are installed under the orange cover with an abrasive clip hanger at an intermediate steel support. Installation of the abrasive clips should be at points of maximum travel.

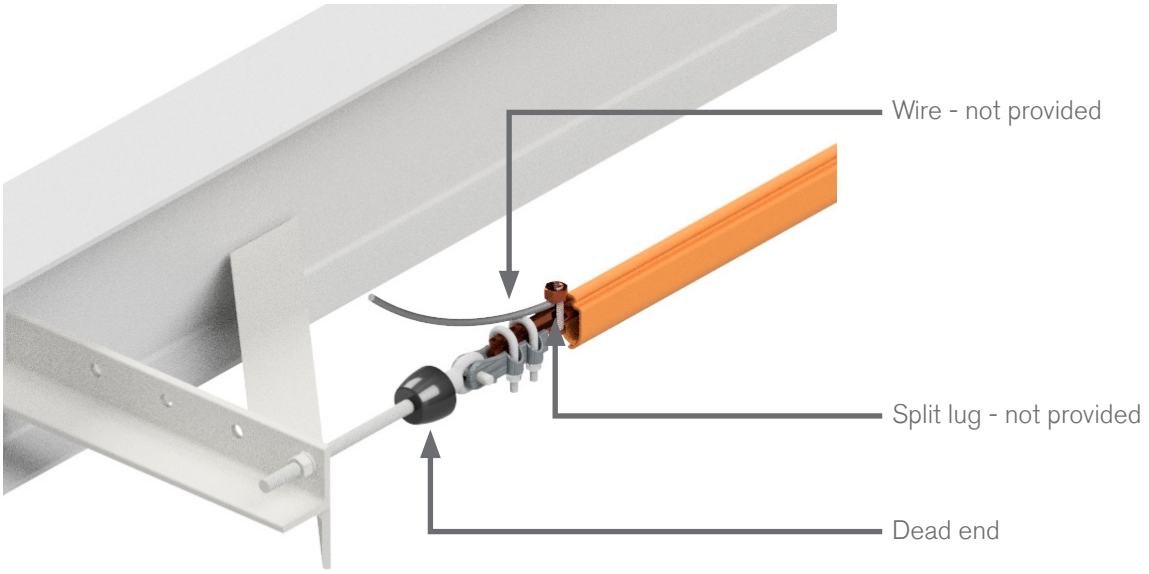
   a. Clips must be installed for proper operation of Span-Guard. Install clip in area of runway where collector most frequently travels.
   b. Raise the orange cover off the conductor at the point where the abrasive clip will be installed underneath the cover. Snap the clip around the top flange of the conductor.
   c. Replace the orange cover onto the conductor but over the abrasive clip. If the clip is sprung during installation, re-form with channel lock pliers to original shape.
   d. Install the special insulated hanger making sure the clip is centered in the hanger. Bolts should not be excessively tight.
   e. Fasten the hanger to the runway or crane support.

   Repeat the above steps for each conductor.

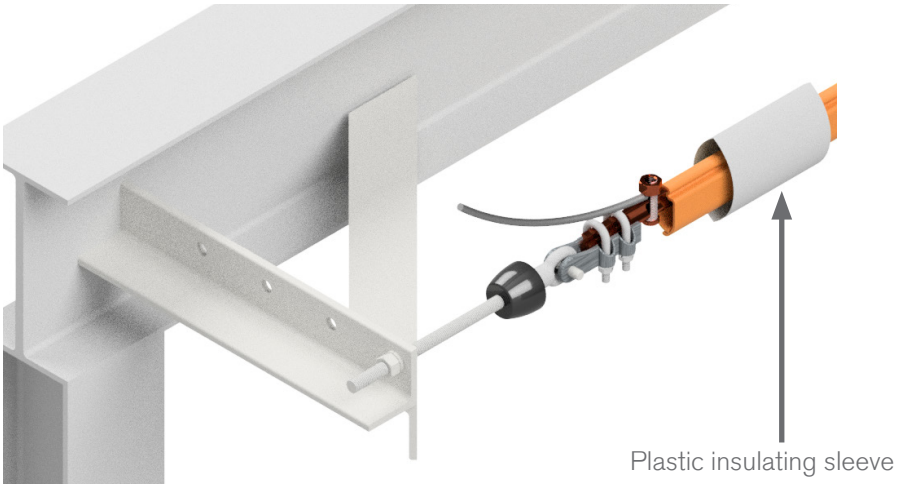




9. When power is fed to conductor at the end of the runway, connect this wire to the end fitting with a wire lug.



Slip plastic insulating sleeve over exposed metal parts to insulate dead end fitting.



10. When power is center fed, cut only the top lobe of the orange cover and clamp center feed to the top lobe of the copper conductor. Install neoprene boot or insulating case as required.

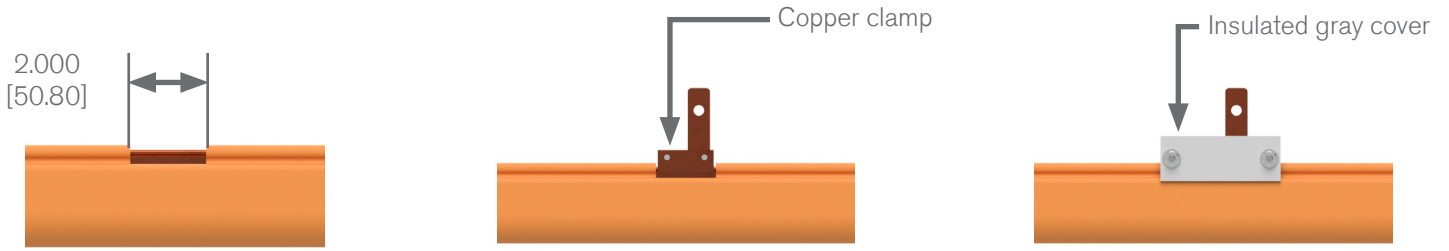
    CF81: 2”

    CF82: 1 3/4”

    a. Based on the measurements above, cut top lobe only of the orange cover at the location where power will be fed to the conductor.

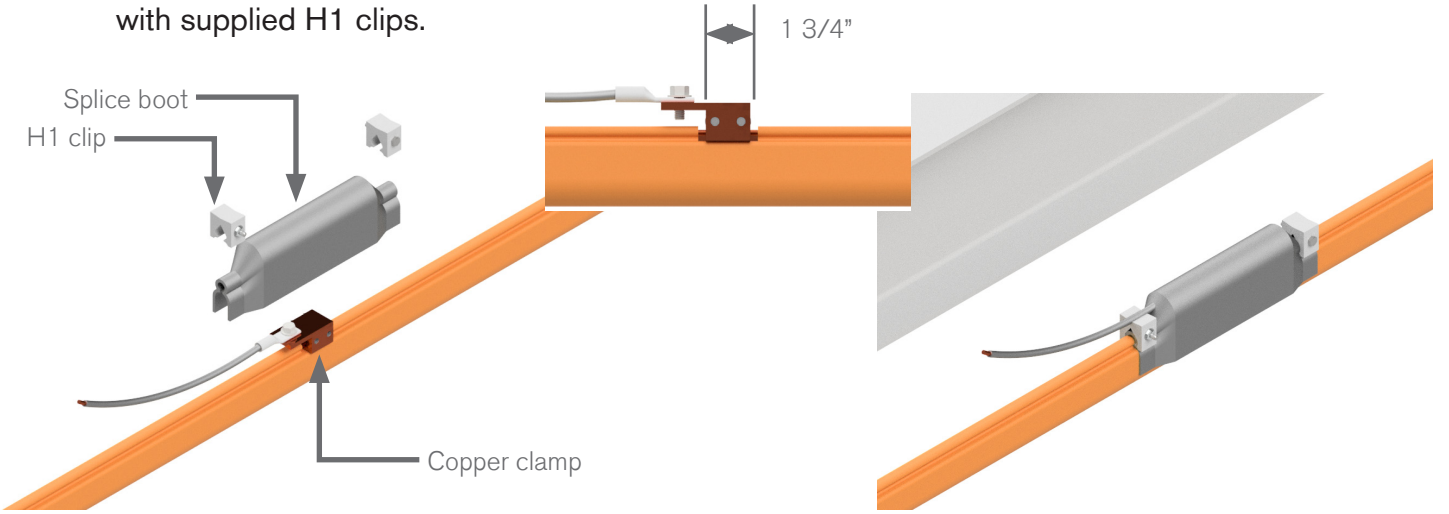
    CF81 (250A system)

    b. Install copper clamp on the top lobe of the conductor that is exposed when the orange cover is cut. Before fastening wire, slip the red shrink tubing over the wire. Fasten the power cable to the copper tongue with a bolt and lug. Position shrink tubing so that it covers all live parts, and then shrink with hot air gun. Place insulated gray cover on copper clamp and secure bolts.



    CF82 (520A system)

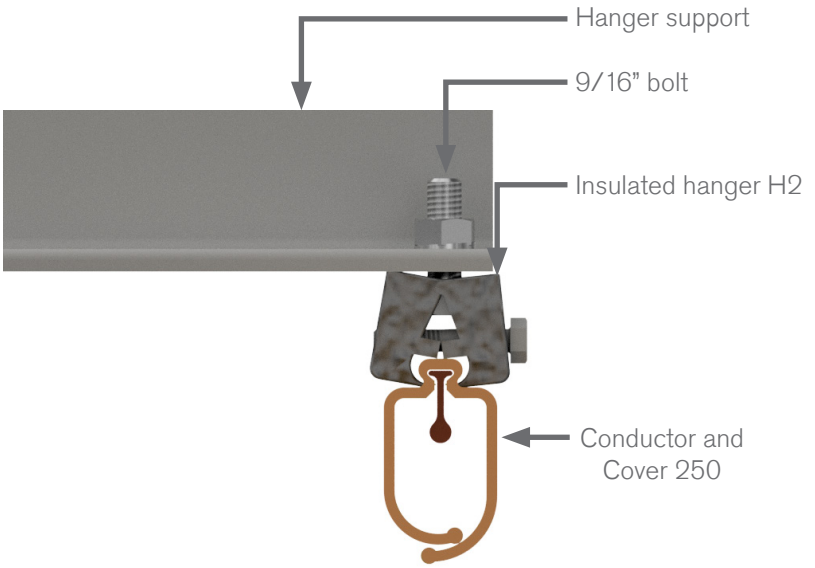
    c. Install copper clamp on the top lobe of the conductor that is exposed when the orange cover is cut. Tighten the two clamp bolts. Cut a hole in the end of the black neoprene insulating cover to permit the power conductor to be threaded through the hole. Thread cover onto conductor. Fasten the customer supplied lug onto the power cable and connect lug to tongue of the CF-82 Center Feed. Position black neoprene cover over the connection and secure to the orange cover with supplied H1 clips.

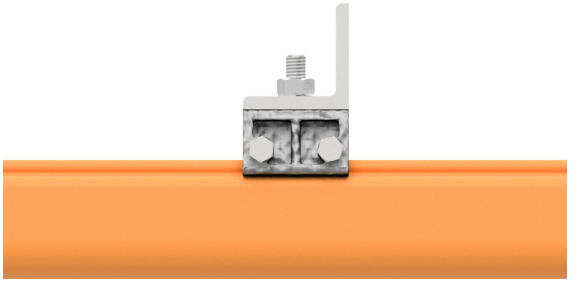


INSULATED HANGERS

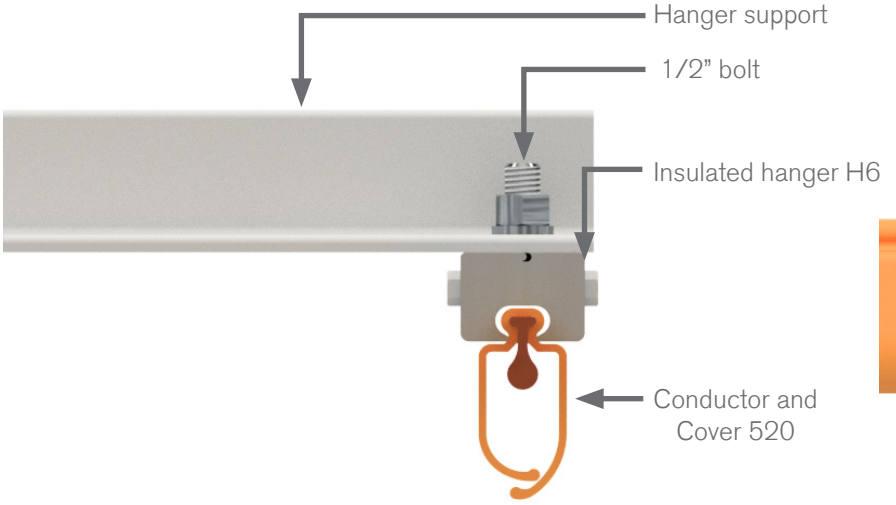
1. Make sure the top lobe of the orange cover is seated around the top lobe of the copper conductor.
2. Position the insulated hanger over the lobe of the orange cover and conductor so that the vertical bolt will fit in the hole of the runway or crane support.
3. Using a 7/16” nut driver or small wrench, tighten the 1/4” cross bolts until they are snug.

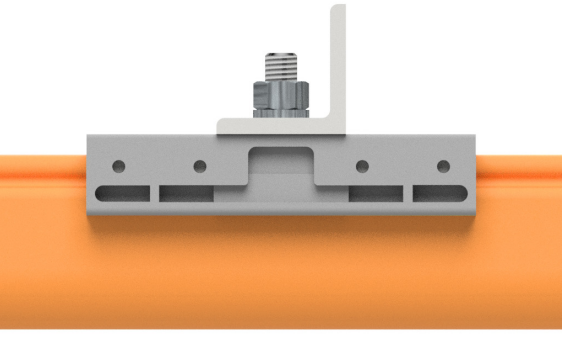
   Do not over-tighten.
4. Secure the hanger (vertical bolt) to runway or crane hanger support.





Side view





Front view

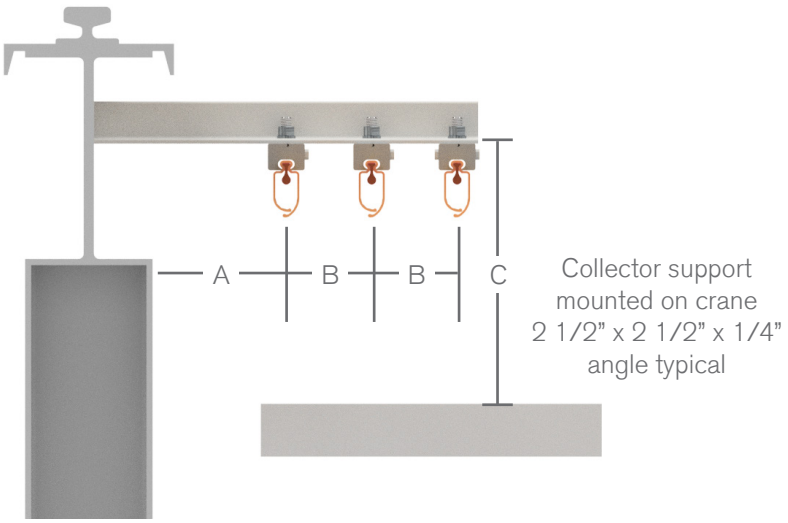
INSTALLATION INSTRUCTIONS FOR COLLECTORS

1. Install collector support in a substantial manner. A flimsy support that will twist and vibrate will cause poor operation of collectors.
2. For C100 and C200 collectors, the distance from the steel hanger conductor support to the collector support should be 9". The bottom of the black plastic plunger tube on the collector should protrude 2 1/8" below the bottom of the metal plunger cylinder. The white line on the black plastic plunger tube is 1 1/2" from the end.
3. For C300 and C400 collectors, the distance from the steel hanger conductor support to the collector support should be 11". The bottom of the black plastic plunger tube on the collector should protrude 1 1/2" below the bottom of the metal plunger cylinder. The white line on the black plastic plunger tube is 1 1/2" from the end.
4. Drill holes for mounting the collector directly underneath the conductor and install collector. The collector should always be installed so that it operates about the midpoint of its travel both up, down, and sideways. The sliding shoe must lay flat against the conductor. If the shoe does not lay flat against the conductor, the collector support must be adjusted to accomplish this.
5. Connect wire from crane to the flexible wire of the collector. Connection of crane wires to the collector must be done in such a manner as to not limit or restrict the motion of the collector or twist the shoe so that it is not parallel with the conductor. A twist or side pressure in the flexible wire on the collector will cause the sliding shoe to be forced off the conductor. In this free position, the shoe on the plunger assembly should remain parallel to the conductor. To correct, reshape flexible wire.
6. Run equipment and observe collectors in operations. If the black plastic plunger tube protrudes less than 1" at any location on the runway, you must lower the conductors at that location. Make final adjustments as necessary.
7. If the collector comes off the conductor, check the following:
    a. The mounting height of the collector is not too high or too low. At each hanger support the black plastic plunger tube should protrude below the metal plunger cylinder approximately 2" for the C100 and C200 collectors and approximately 2 1/2" for the C300 and C400 collectors.
    b. Make sure the collector is centered on the conductor.
    c. Make sure any misalignment is within the recommended limits of the collector.
    d. Check flexible lead to collector to make sure it permits free movement of the collector.

e. Check to make sure that the collector shoe is not cocked on the conductor; that is, both ends of the collector shoe must be touching the conductor.

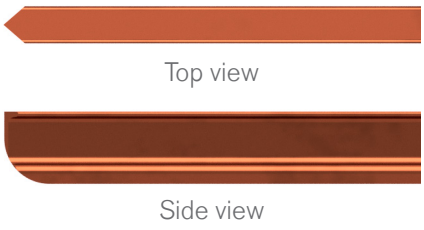
f. Check to make sure that external structural members do not interfere with movement of the collector.

	A	B	C
100-200 AMP Collectors	5	3	9
300-400 AMP Collectors	5	4	11

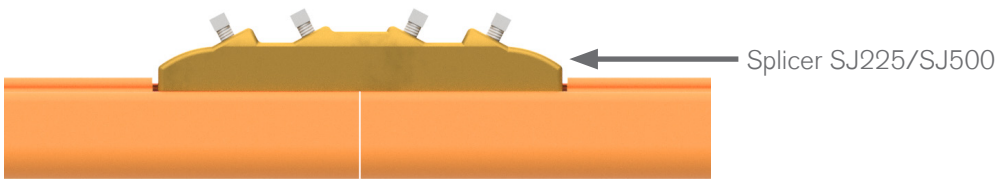


SPLICE JOINTS – SJ225/SJ500

1. Both ends of the conductors should be filed to resemble a wedge as shown below.

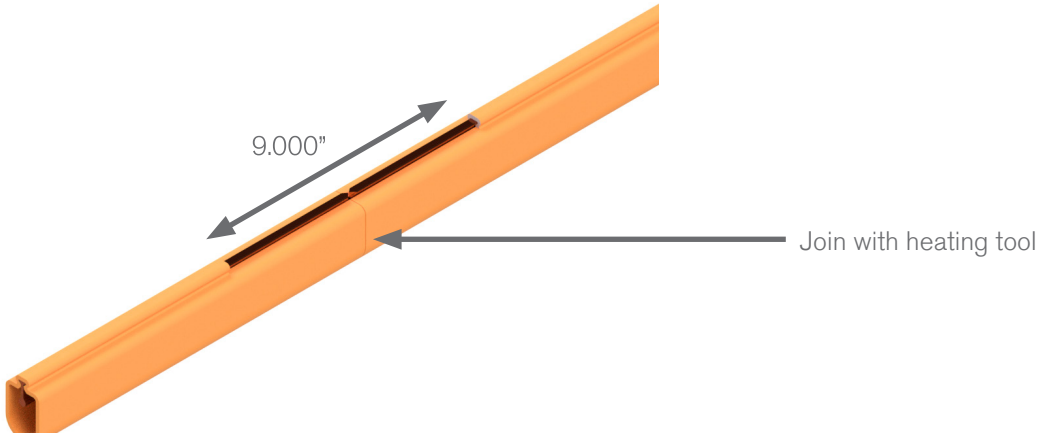


2. Insert top lobe of the conductor to the midpoint of the cast splicer. Tighten up bolts. Insert conductor to be extended into other half of splicer and tighten bolts. Make sure conductors align.

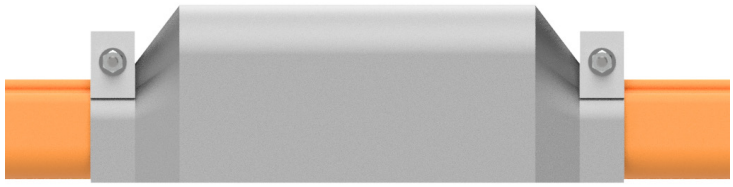


3. Conductors should be tensioned. Make sure that the conductors abut after tension is applied.

4. Join the ends of the orange cover by heating - a tool with instructions to do this is available on loan from the factory. Cut only the top lobe of the cover as indicated below and slip cover over conductor.



5. Complete installation by installing cover (boot) over orange cover.



INLINE CONDUCTOR SUPPORT – H7DEA/H7DEA-520

H7DEA inline conductor supports are used to split a Span-Guard system into two isolated systems, or at building expansion joints.

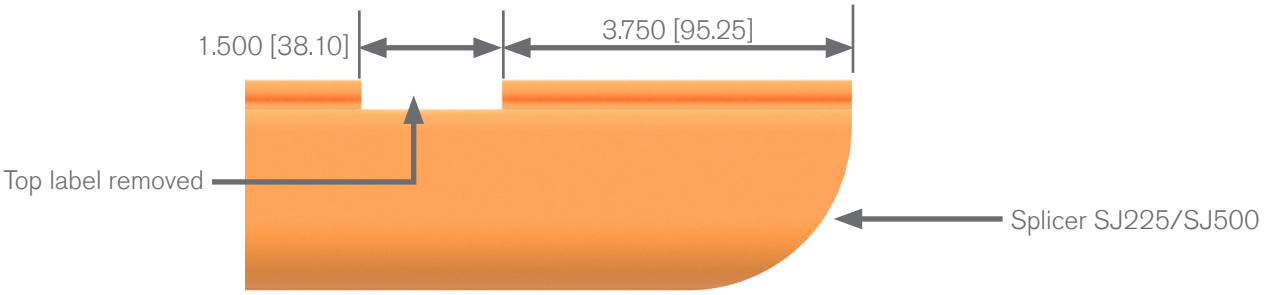
1. Both ends of the conductor should be filed to resemble a wedge as shown below.


Side view


Top view

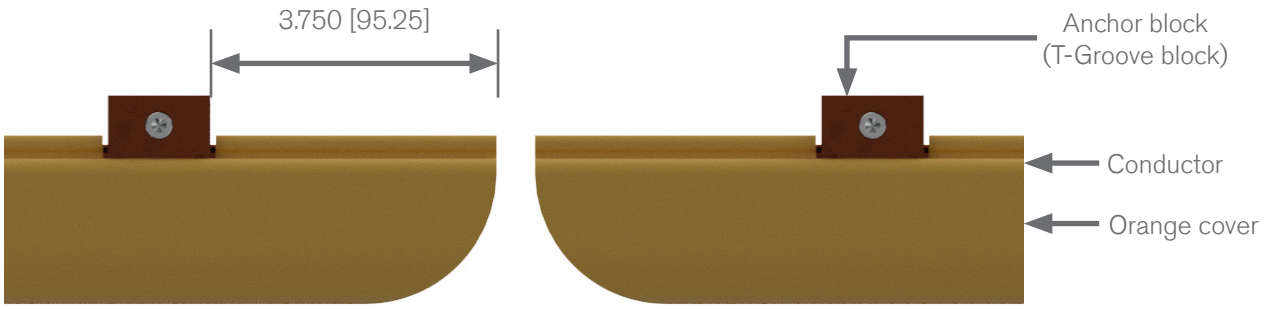
2. Replace the orange cover over the conductor. Cover should be flush with the end of the conductor.

3. Taper the end of the cover as shown in detail below. Cut top lobe of cover 1-1/2" long and 3-3/4" from the end of the cover as shown.



4. Position H7DEA or H7DEA-520 hanger so that the conductor and cover protrude approximately 7/8" from end of hanger.

5. Secure "T Groove" block to conductor by drilling 1/8" dia. hole for 250 or 3/16 dia. for 520 conductor, and insert hardened steel pins. This block is located 3 3/4" from the end of the conductor and will protrude through the top lobe of the cover that was cut in step 3.



6. Install hanger onto conductor and fasten to supporting steel.

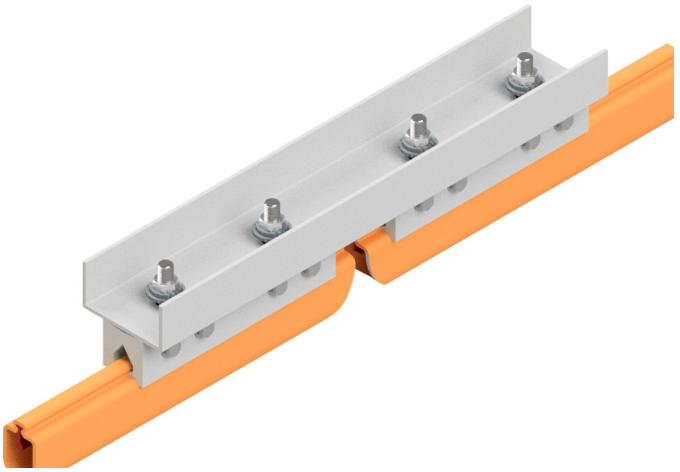
7. When hangers are used to secure a conductor at points where a conductor changes from a straight run to a curve, it is generally preferable to install the H7DEA or H7DEA-520 hanger first and tension from this hanger toward the ends.

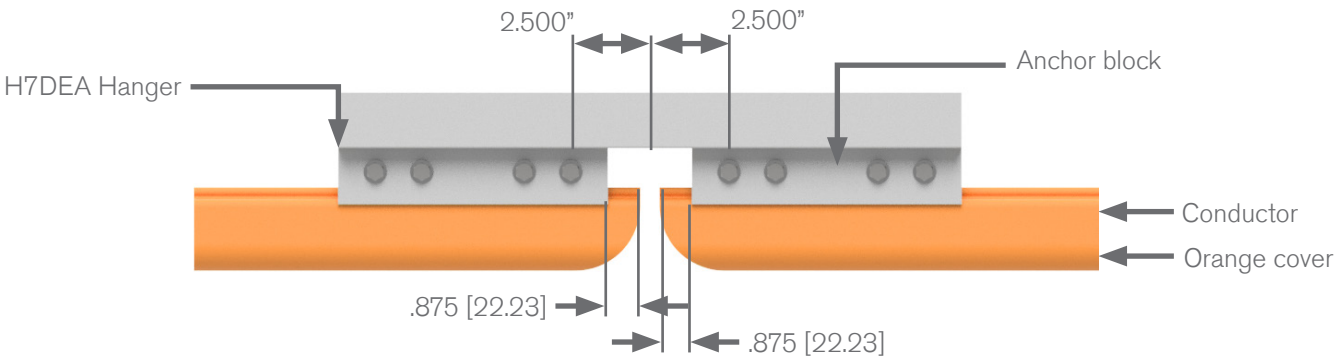
8. Install conductor and tension in the normal manner without installing the H7DEA or H7DEA- 520 hangers onto the conductor as described above.

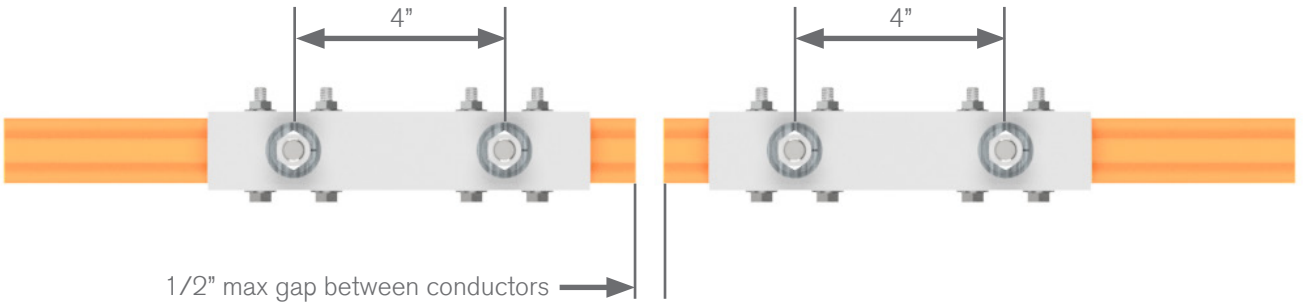
9. Before cutting the conductor the two hangers should be bolted to their steel supports.

10. Cut the conductor and cover between the two H7DEA or H7DEA-520 hangers. The tension in the conductor prior to cutting will spread the conductor about one-half inch when the conductor is cut.

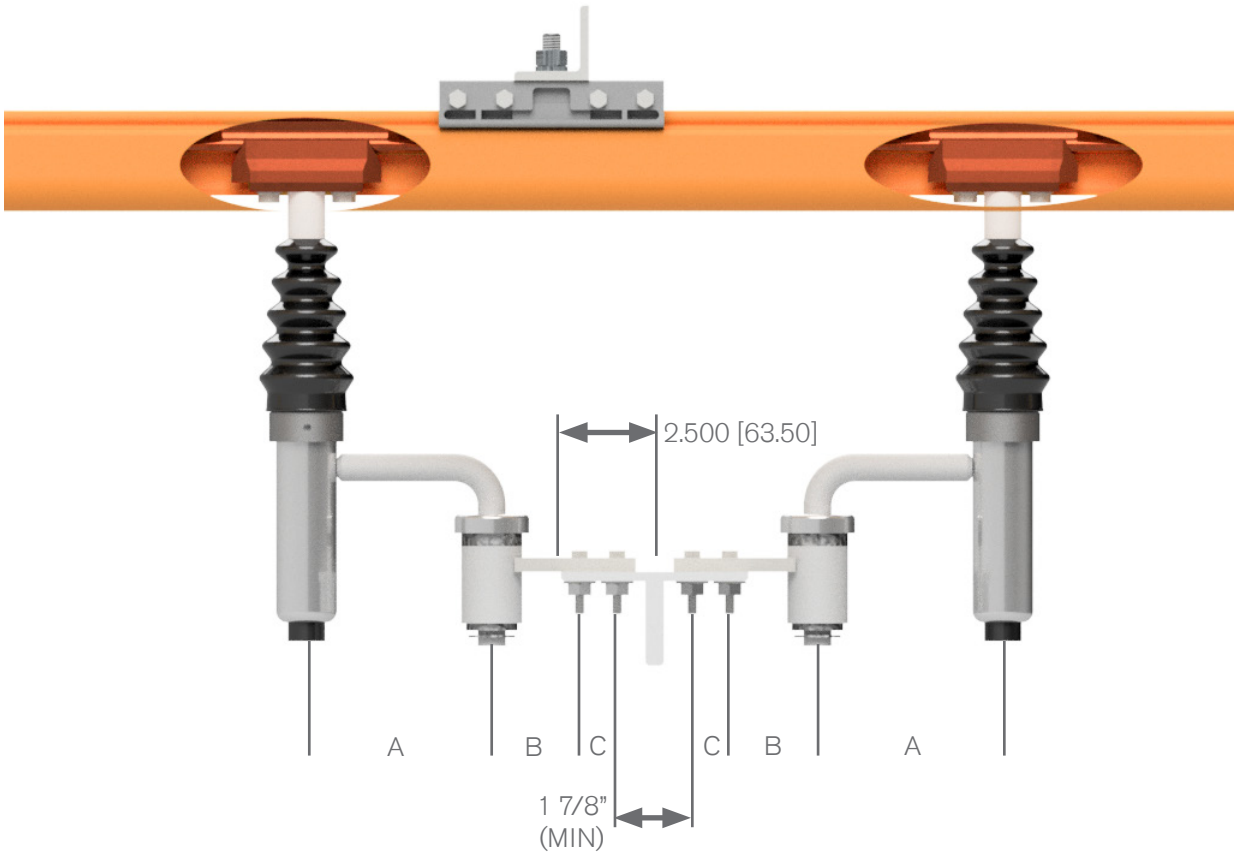
11. Shape and straighten the conductor and cover as described above.




2.500”
2.500”
H7DEA Hanger
Anchor block
Conductor
Orange cover
.875 [22.23]
.875 [22.23]


4”
4”
1/2” max gap between conductors

TANDEM COLLECTOR MOUNTING



Collectors						Movement	
System	Collector	Amperage	Dim "A"	Dim "B"	Dim "C"	Max Vertical	Max Horizontal
250 AMP	C100-WC1 C200-WC1	100 Amp 200 Amp	4.250 4.250	1.500 1.500	1.000 1.000	2.750 2.750	3.000 3.000
520 AMP	C300-WC1 C400-WC1	300 Amp 400 Amp	5.000 5.000	2.375 2.375	1.000 1.000	3.000 3.000	3.500 3.500

SPLICING SPAN-GUARD COVER

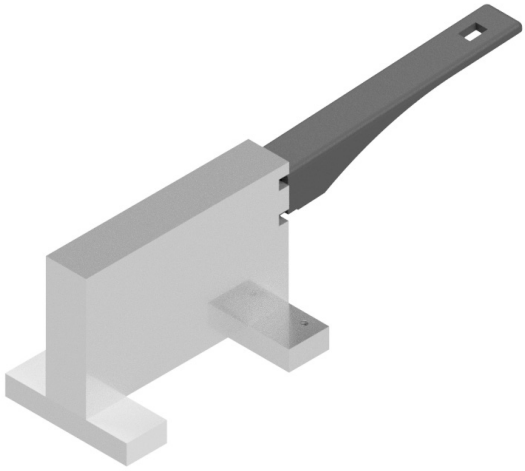
WARNING: WEAR APPROPRIATE PPE WHEN COMPLETING THE SPLICING PROCESS. HEATING TOOL MAY OVERHEAT IF LEFT ON FOR OVER 30 MINUTES.

TOOLS NEEDED: Heating tool, pipe forms, electrical tape, and scissors or knife.

1. Plug in the heating tool and allow it to warm up to proper temperature. If material sticks to iron it's too cold. If it turns black, it's too hot.
2. Using the two 1 1/2" sections of pipe supplied, tape the cover halves around the pipe. Trim excess cover evenly allowing at least 1/4" to with past the pipe ends.

   Note: We advise making a practice splice first.
3. Hold the ends of the cover to be spliced against both sides of the heating tool. When the cover becomes very soft and begins to melt, in approximately 10 seconds, remove it from the heating tool and push ends of cover together, starting with the small lobe at the top of the cover. Hold firmly together for 15 to 20 seconds or until cool.
4. After cover has sufficiently cooled, trim excess material on the inside of the cover with scissors or a knife.

   Note: Your old cover may be a different shape than the new one.



Heating tool

Section 4
Field Services and Warranty

U-S SAFETY TROLLEY SERVICE GROUP

U-S Safety Trolley Service Group offers a comprehensive suite of services from startup and system certification through on-going support contracts and extended warranty programs. To ensure that your Span-Guard is installed properly you can trust our team of factory certified technicians to perform services throughout the long life of your system.

System Startup and Certification

System startup and certification is strongly recommended for all Span-Guard systems and required by many states as part of their NFPA code. Ensure proper system installation by having a U-S Safety Trolley factory certified technician come to your job site and perform a customized system startup checklist. Benefits of U-S Safety Trolley Startup and Certification program include:

- Double the length of the standard factory warranty
- Ensure all center feed and splice connections are properly installed with continuity testing
- Ensure proper installation of conductors and collectors
- Validate that system will perform to your specified requirements
- Full findings and certification report delivered electronically at conclusion of service

Training

Training is recommended for all customers prior to installation. Equipping your installers with increased U-S Safety Trolley knowledge can save time and money throughout theinstallation process. The focus of on-site training includes installation, safety and maintenance, and optional add-on demonstrations of all U-S Safety Trolley products that are applicable to the customer's site. Trainers will also be available to answer questions pertaining to all products that have been shipped to site to ensure your system is ready to install when the proper time has come.

Warranties

U-S Safety Trolley Span-Guard system comes with a standard, (1) year warranty that commences upon the shipment of the system. Customers may purchase additional years of extended warranty coverage. All warranties cover 100% of component replacement costs including freight. Contact your local sales representative for rates.

Ongoing Support Plans

Choose from one of the U-S Safety Trolley Service Group's Ongoing Support Plans to ensure that your Span-Guard system is receiving proper attention throughout its lifespan. A certified technician will come to your facility to inspect your system once or twice per year based on your system usage. Certified technician will complete any required maintenance and component replacement while on-site. Each year, upon successful completion of the ongoing support checklist, you will receive an additional year of extended warranty. Your operation will also benefit from 24/7 emergency phone support and access to certified U-S Safety Trolley technicians while they are on-site to perform service.

STANDARD FACTORY WARRANTY

Contractor/Customer: _____

Customer Order: _____

Seller warrants all products sold by SpanGuard Corporation to be free from defects in material or workmanship for a period of one year from the date of shipping. Seller's liability on this warranty shall be limited to the repair or replacement of any product which is returned to the Seller, within one year of the date of delivery and which is found by the Seller to be defective in material or workmanship. Customer must have written authorization prior to returning any material. The Buyer will be responsible for the cost of removing and reinstalling a defective part(s) or its replacement and all labor and material and all other costs or expenses incurred in connection therewith.

Notwithstanding any provision contained herein to the contrary, (i) Buyer's use of any plug-ins, parts and/or components that are not manufactured by SpanGuard with the Products, and/or (ii) if any services and/or warranties are provided by any person/entity other than SpanGuard without SpanGuard's prior written consent, all warranties for all Products shall immediately terminate and be null and void.

Warranty Period: 1 year from delivery date

STANDARD FACTORY WARRANTY PROCESS

1. Customer calls either SpanGuard Rep or SpanGuard direct.
2. Customer Service Specialist will issue Return Material Authorization (RMA).
3. Customer returns warranted item along with copy of RMA.
4. SpanGuard will either rework item or manufacture new item depending on the customer needs.
5. SpanGuard ships item back to customer.
6. SpanGuard will determine reason for failure.
7. Corrective action will be documented.
8. If reason for failure is requested by customer. SpanGuard will send report to customer.
9. All action items from corrective action report must be completed by assigned designer and returned to Quality Department.
10. Quality Assurance Department will track all warranted events and report them to SpanGuard Managers, Directors, and the Executive Team.

Section 5
Maintenance

U-S SAFETY TROLLEY RECOMMENDED MAINTENANCE

U-S Safety Trolley is designed to be user friendly with no mandatory maintenance required. Our unique joint-less conductors system make our systems virtually maintenance free. The end result is a reliable, continous connection along the system that requires little to no maintenance over the life of the product.

However, we strongly recommend that the system be inspected periodically for physical damage or signs of any abnormalities. The periodic inspection of shoe collectors for instance will identify early detection of excessive wear and tear, key to proactively avoid any undesired power interruption. The replacement of collector shoes and abrasive clips is recommended every 2,000 – 4,000 miles of runtime.

U-S Safety Trolley offers comprehensive on-going service plans that extend the life of the warranty over the duration of the plan. For more information, contact your U-S Safety Trolley line sales representative or email our factory at sales@spanguard.net.

U-S SAFETY TROLLEY

For additional information regarding the Span-Guard system, please visit:
http://www.Spanguard.net

SPAN-GUARD