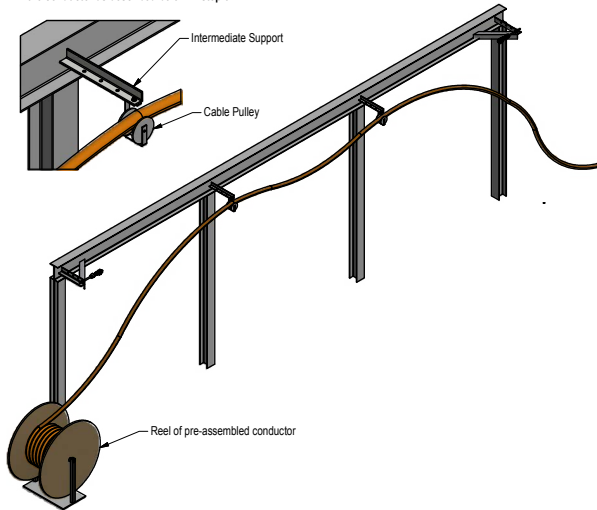




Installation Instructions

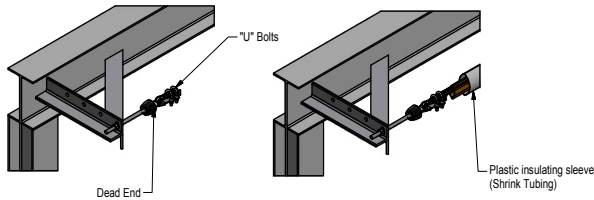
250 & 520 Amp Span Guard

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



- 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).

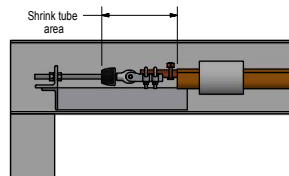
- Slip shrink tubing over orange cover. Peel back orange cover on conductor approximately 5" from the end.
- Insert conductor through the "U" bolts of the dead end assembly. Conductor should extend about 1/2" beyond the second "U" bolt.
- Torque nuts on the "U" bolt to (see above). The round surface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



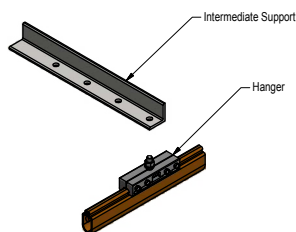
- Complete the tensioning by fastening cable grip to the other end of conductor and tension conductor by means of a coffin hoist or similar equipment. Cut conductor to length, install dead end insulator and plastic insulating sleeve and put final tension on the conductor by turning nuts on the threaded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



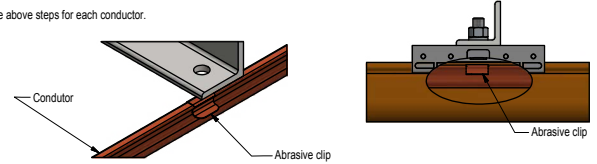
- Begin at one end of runway and lift conductor out of pulley. Install the hanger onto the conductor and bolt to intermediate support. On long runways it may be necessary to tighten conductors several times during hanger installation to avoid more than 1/4" sag in a 15 ft span at 75°F. (H2, H4: 50 in/lbs,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



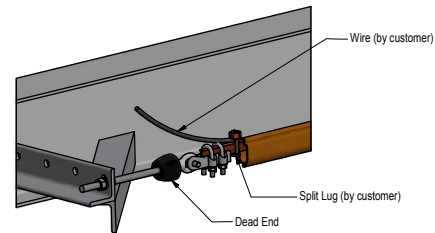
- Abrasive clips increase shoe life by filing the shoe shoulders as the shoe travels along the copper conductor. The abrasive clips are installed under the orange cover with an abrasive clip hanger at an intermediate steel support. Installation of the abrasive clips should be at points of maximum travel.

- Clips must be installed for proper operation of Span-Guard. Install clip in area of runway where collector most frequently travels.
- 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.
- 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.
- Install the special insulated hanger making sure the clip is centered in the hanger. Bolts should not be excessively tight.
- Fasten the hanger to the runway or crane support.

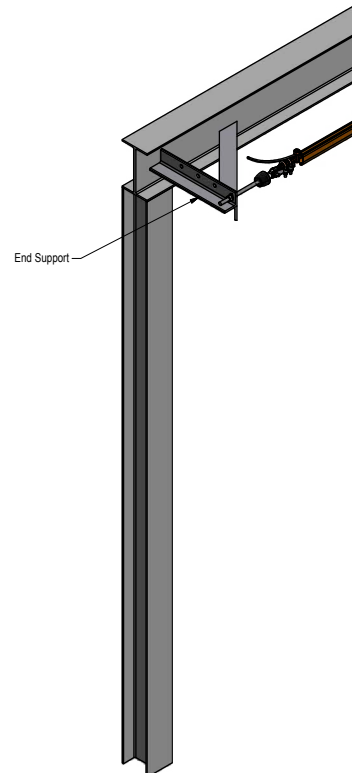
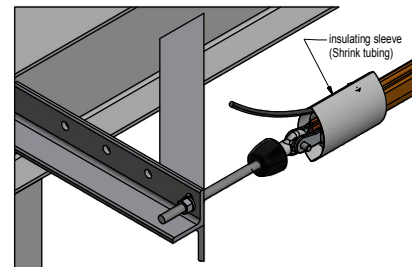
Repeat the above steps for each conductor.



- 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.

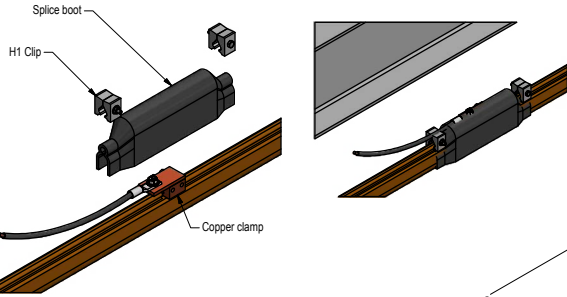
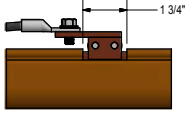


10. When power is center fed, cut only the top lobe of the orange cover and clamp center feed to the top lobe of the copper conductor. Install neoprene boot or insulating case as required. (CF81: 2", CF82: 1 3/4")

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

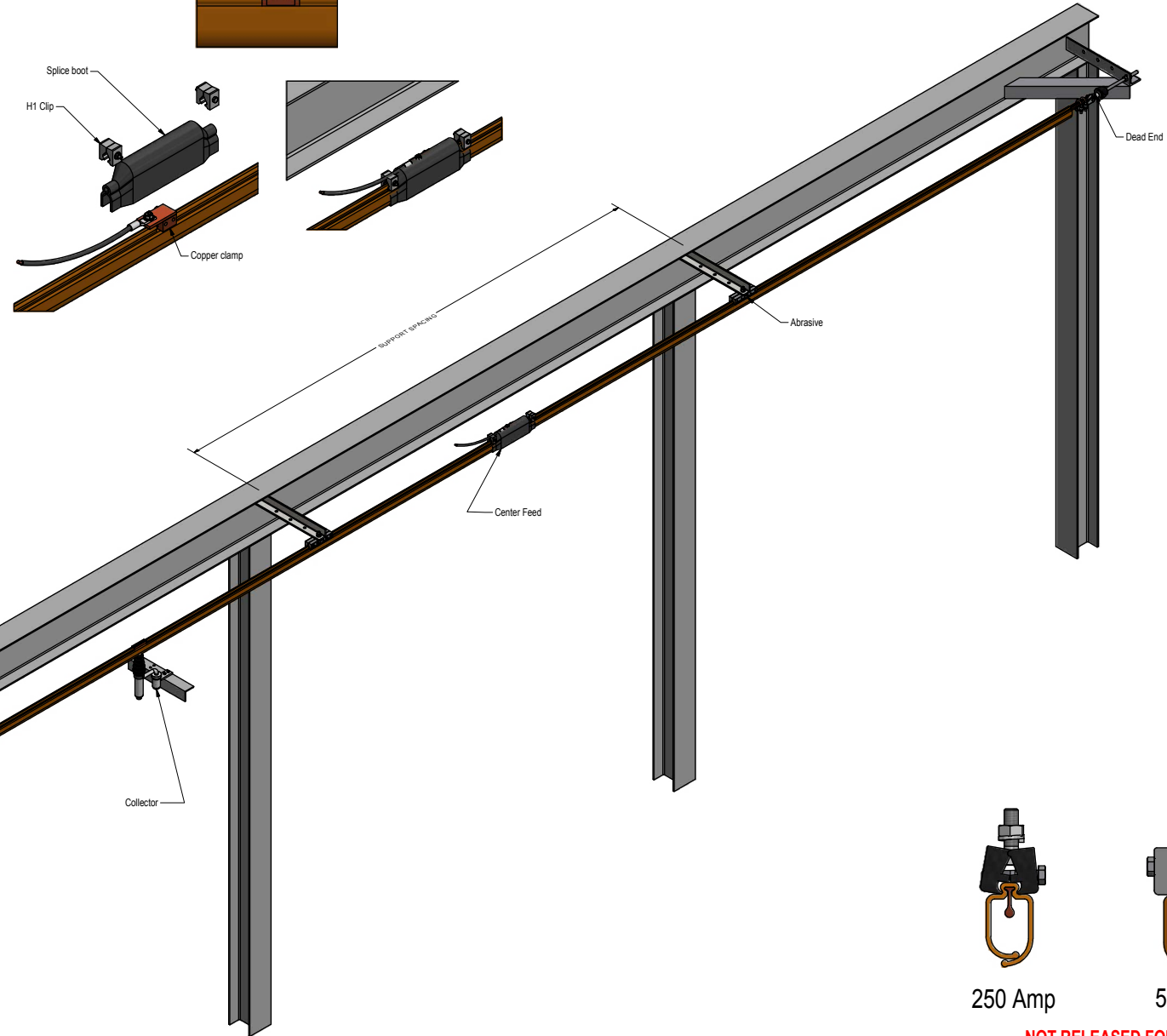
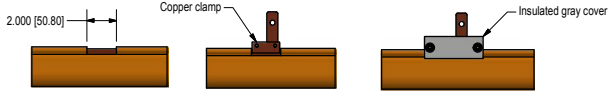
CF82

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.

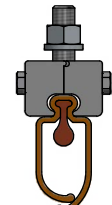


CF81

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**

Revision History			
REV	DESCRIPTION	DATE	REVISOR
1	Original		eschultz

3RD ANGLE PROJECTION

ALL DIMENSIONS IN INCHES
[] ARE IN MILLIMETERS.

SHARPING & FORMING TOLERANCES	ANGULAR
XX ± 0.1	X ± 0.3
XXX ± 0.03	XX ± 1.0
XXXX ± 0.015	

DATE: 4/2/2017

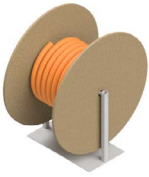
MACHINING TOLERANCES	ANGULAR
XX ± 0.1	X ± 0.3
XXX ± 0.03	XX ± 1.0
XXXX ± 0.008	

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U-S SAFETY TROLLEY
A DIVISION OF UNIVERSAL ELECTRIC CORPORATION

PROJECT: 129-0001-0
DATE: 4/24/2017
REV: D
SHEET: 1
OF SHEETS: 1/2

PARTS NEEDED



Conductor/
Insulator



End Support



Intermediate
Support



Cable Pulley



Wire Puller



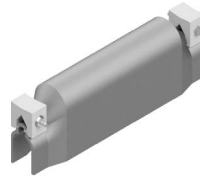
Dead End



Hangers



Abrasive
Holders



Center Feed



Winch (come along)
Not provided



Collector

TOOLS NEEDED

Winch (come along)
Rope
Gloves
Reel Holder
Torque Wrench
Grinder or bolt cutter
Utility knife
File set
1/2" Ratchet

3/4" Socket
9/16" Socket
1/2" Socket
7/16" Socket
15/16" Wrench
3/4" Wrench
9/16" Wrench
1/2" Wrench
7/16" Wrench

GENERAL INSTALLATION INSTRUCTIONS

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

Crane Runways - 15 ft.

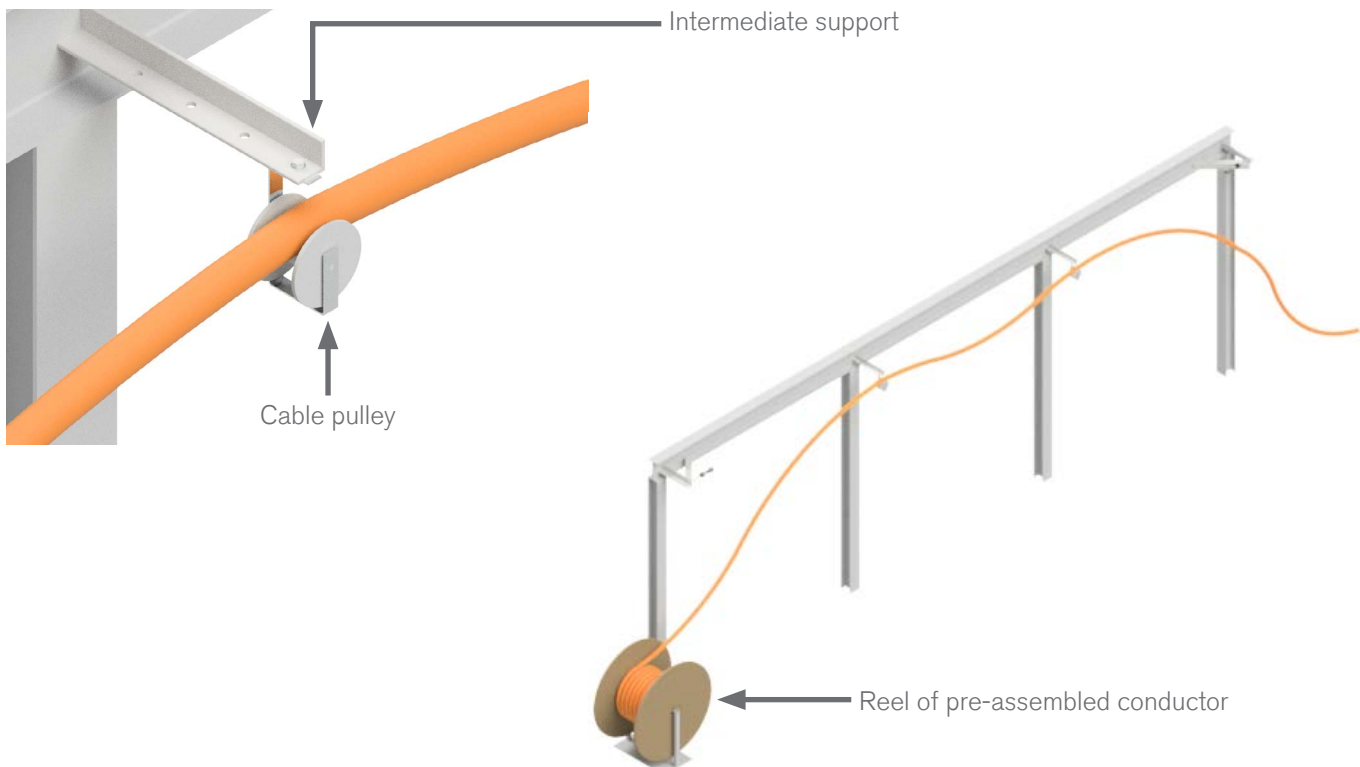
Crane Bridges - 10 ft.

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.

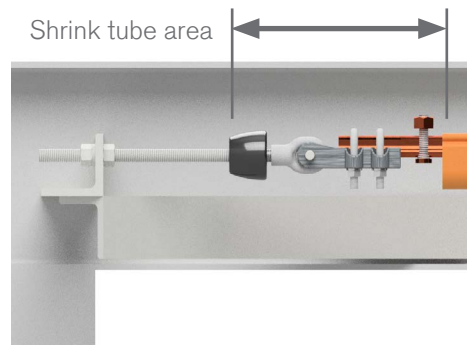


6. Complete the tensioning by fastening cable grip to the other end of conductor and tension conductor by means of a coffin hoist or similar equipment.

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.

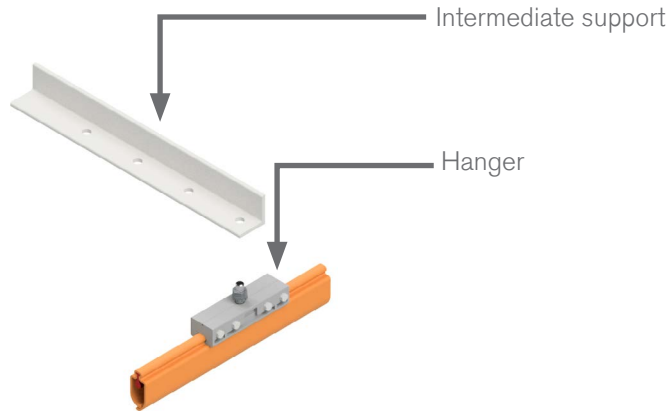
The conductor will become perfectly straight with proper tensioning as mentioned in steps 1 and 4.



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.

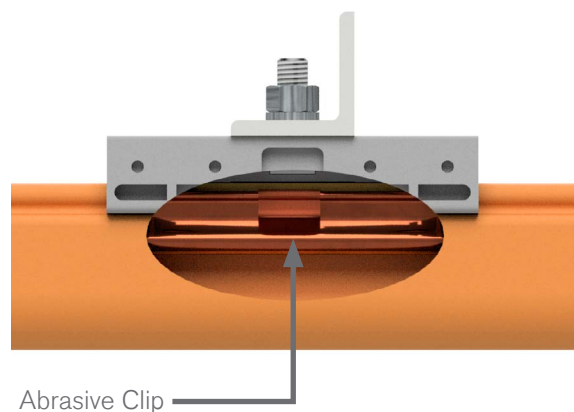
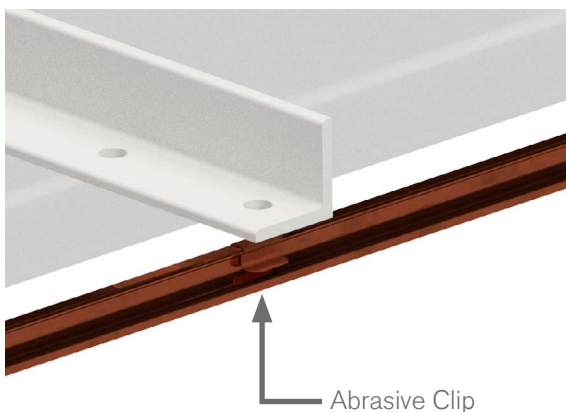
H6: 90 in./lbs.



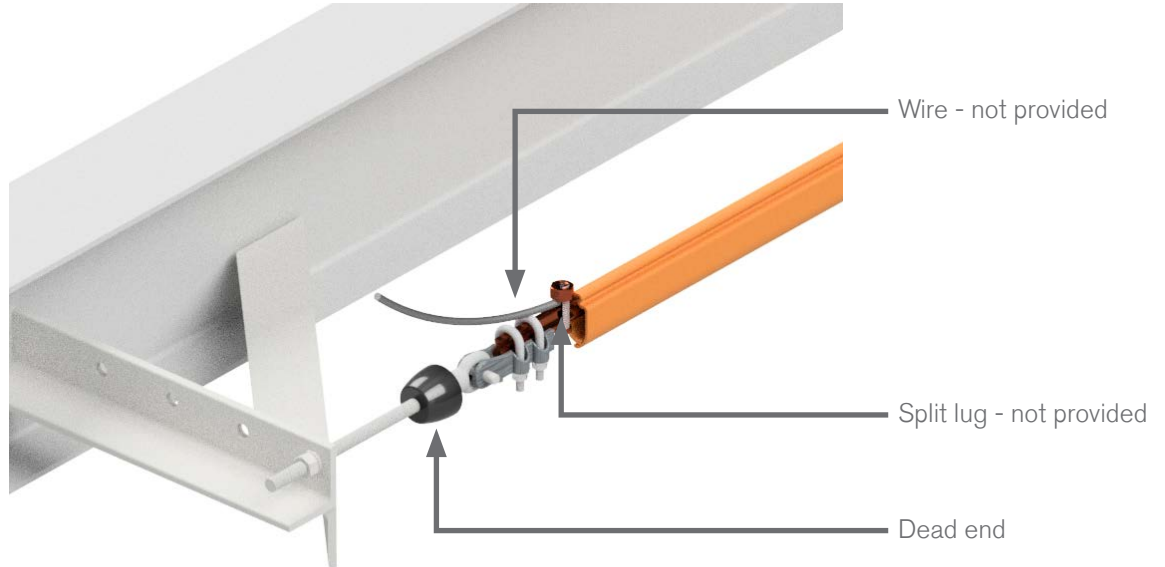
8. Abrasive clips increase shoe life by filing the shoe shoulders as the shoe travels along the copper conductor. The abrasive clips are installed under the orange cover with an abrasive clip hanger at an intermediate steel support. Installation of the abrasive clips should be at points of maximum travel.

- 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.

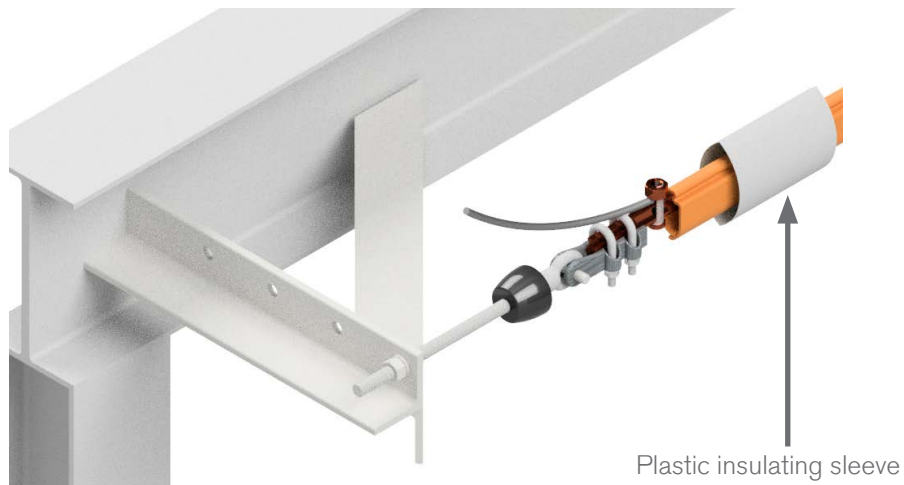
Repeat the above steps for each conductor.



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.

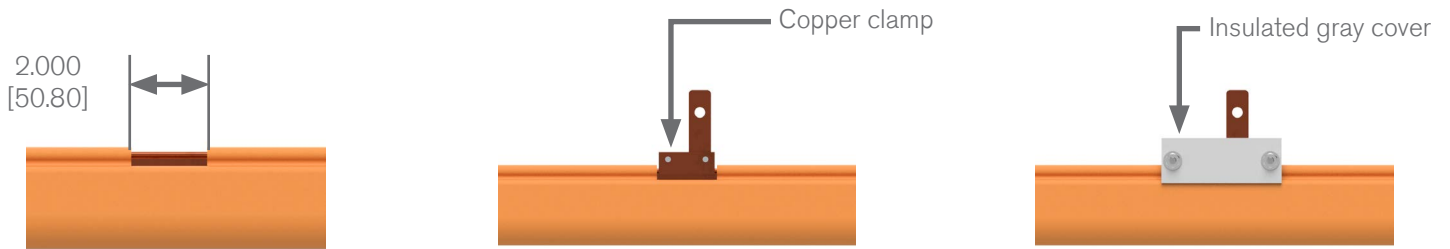
CF81: 2"

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.

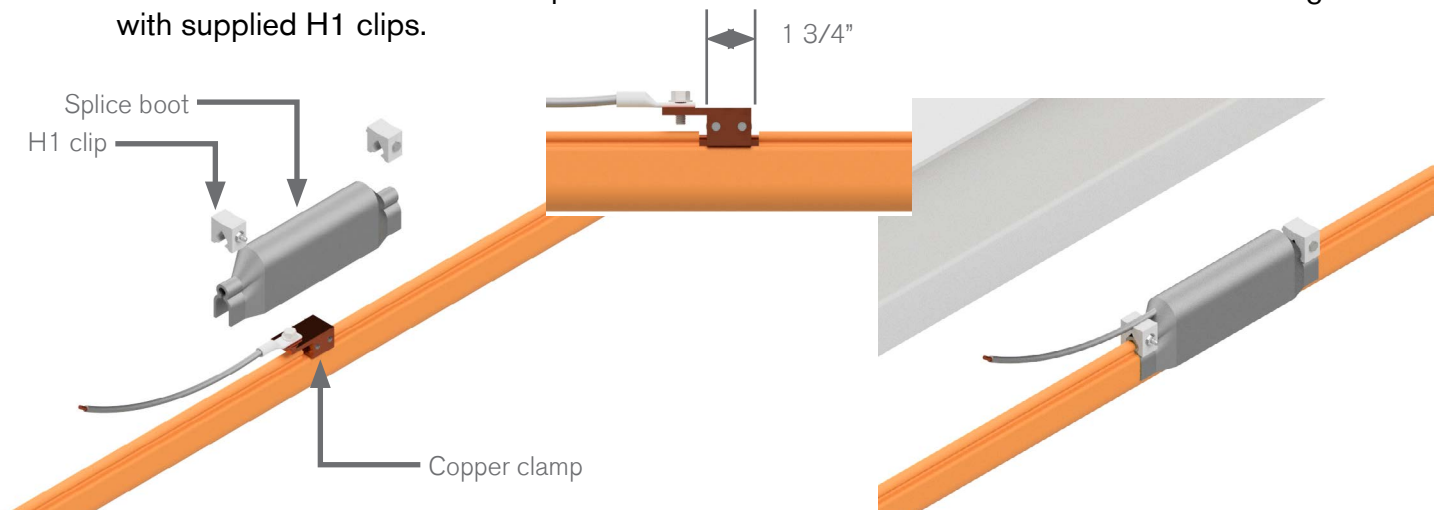
CF81 (250A system)

- 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.

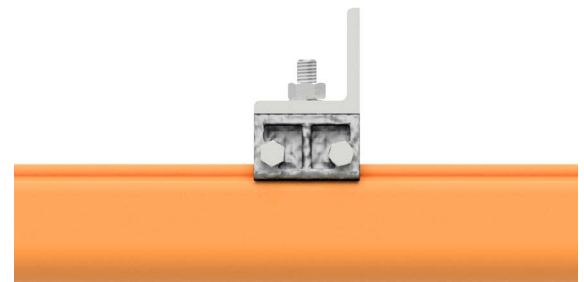
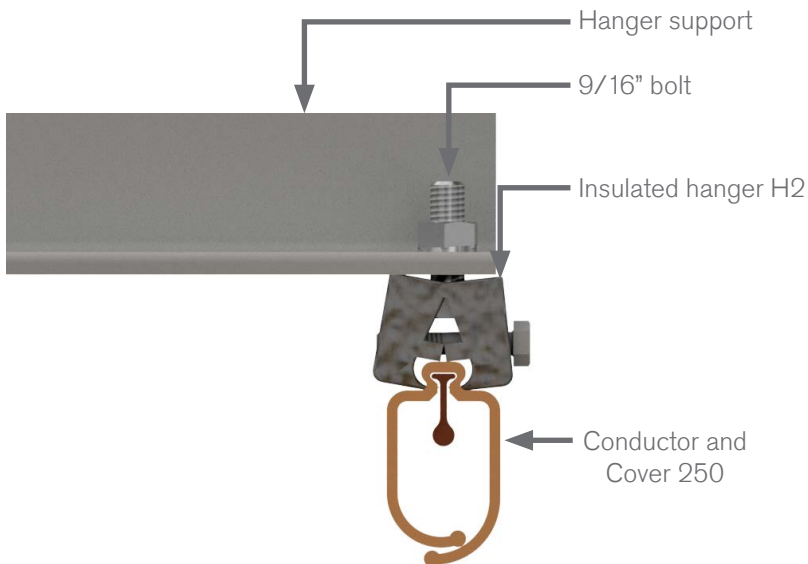


INSULATED HANGERS

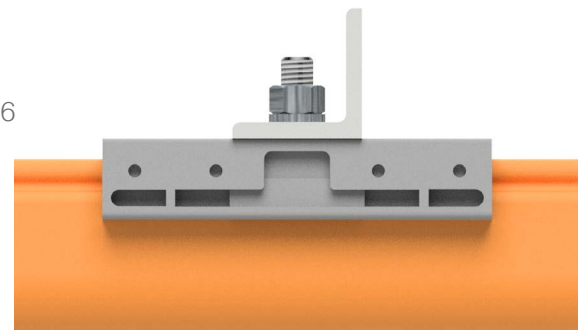
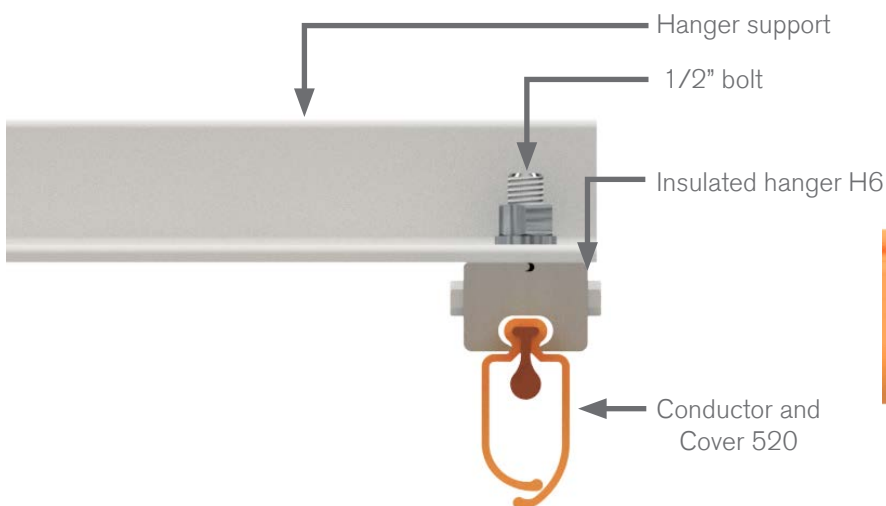
1. Make sure the top lobe of the orange cover is seated around the top lobe of the copper conductor.
2. Position the insulated hanger over the lobe of the orange cover and conductor so that the vertical bolt will fit in the hole of the runway or crane support.
3. Using a 7/16" nut driver or small wrench,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



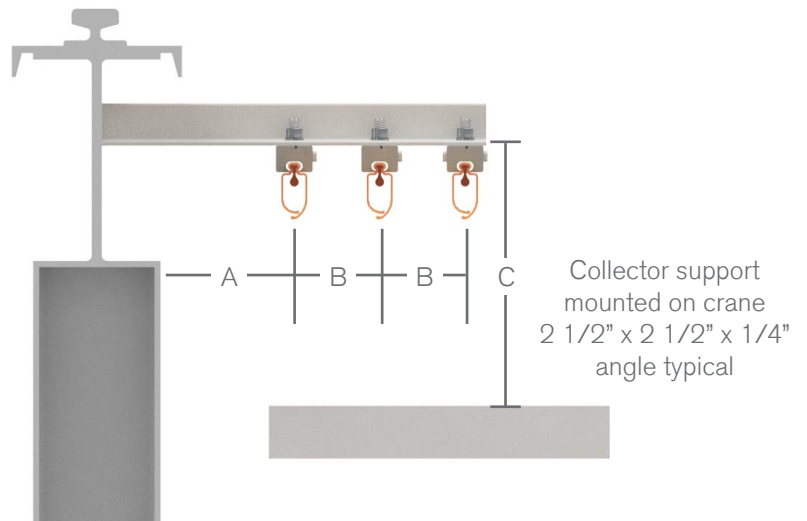
Front view

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.

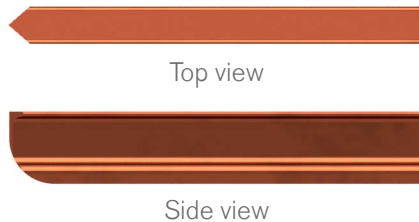
- e. Check to make sure that the collector shoe is not cocked on the conductor; that is, both ends of the collector shoe must be touching the conductor.
- f. Check to make sure that external structural members do not interfere with movement of the collector.

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

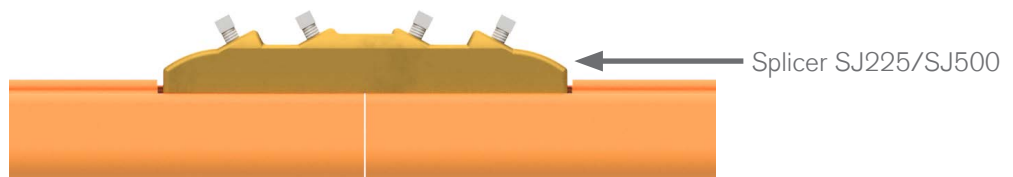


SPLICE JOINTS – SJ225/SJ500

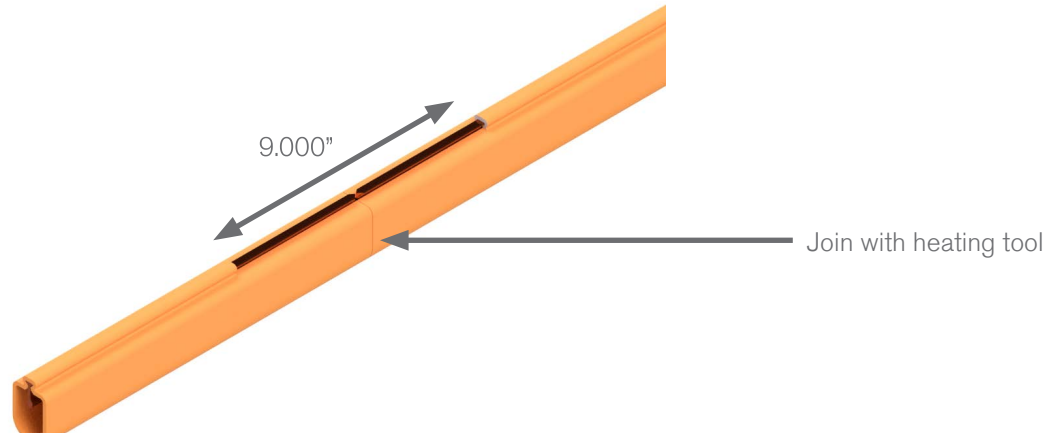
1. Both ends of the conductors should be filed to resemble a wedge as shown below.



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.



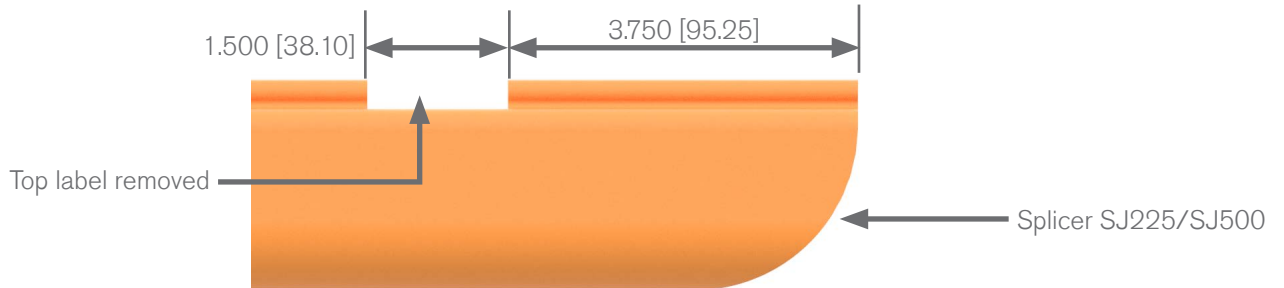
Side view



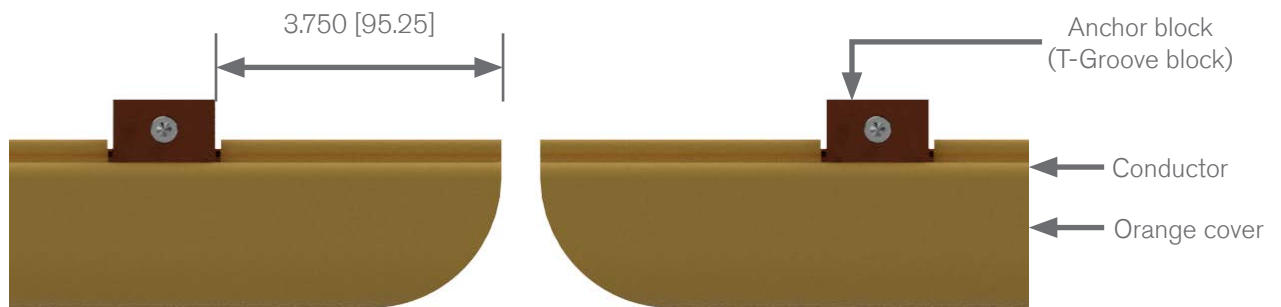
Top view

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

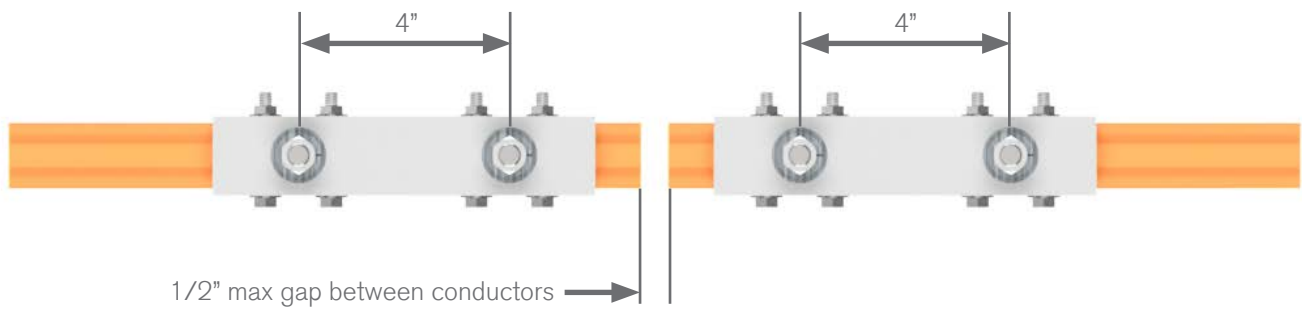
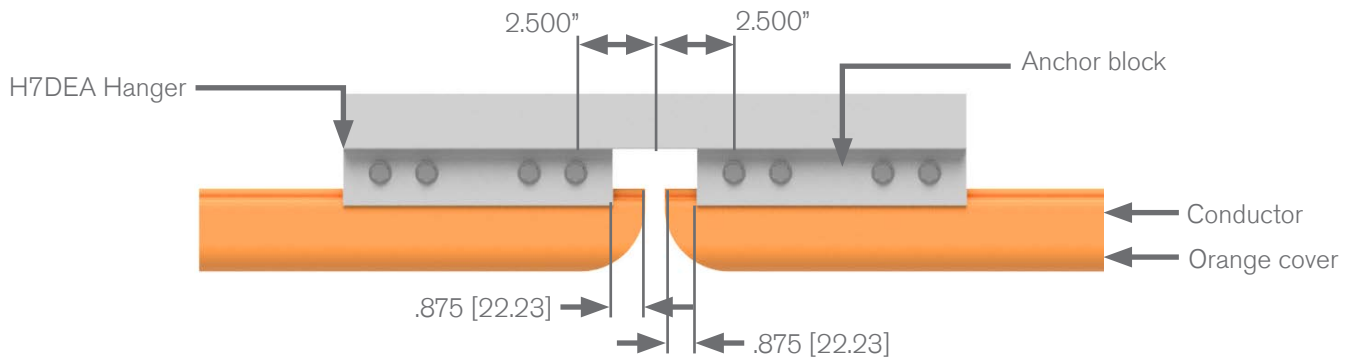
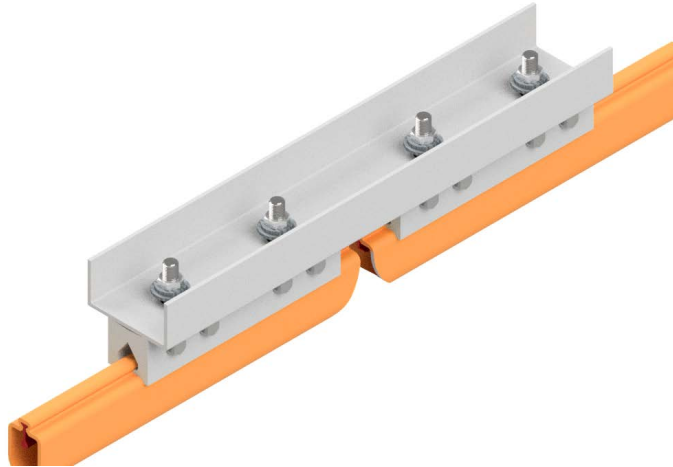
3. Taper the end of the cover as shown in detail below. Cut top lobe of cover 1-1/2" long and 3-3/4" from the end of the cover as shown.



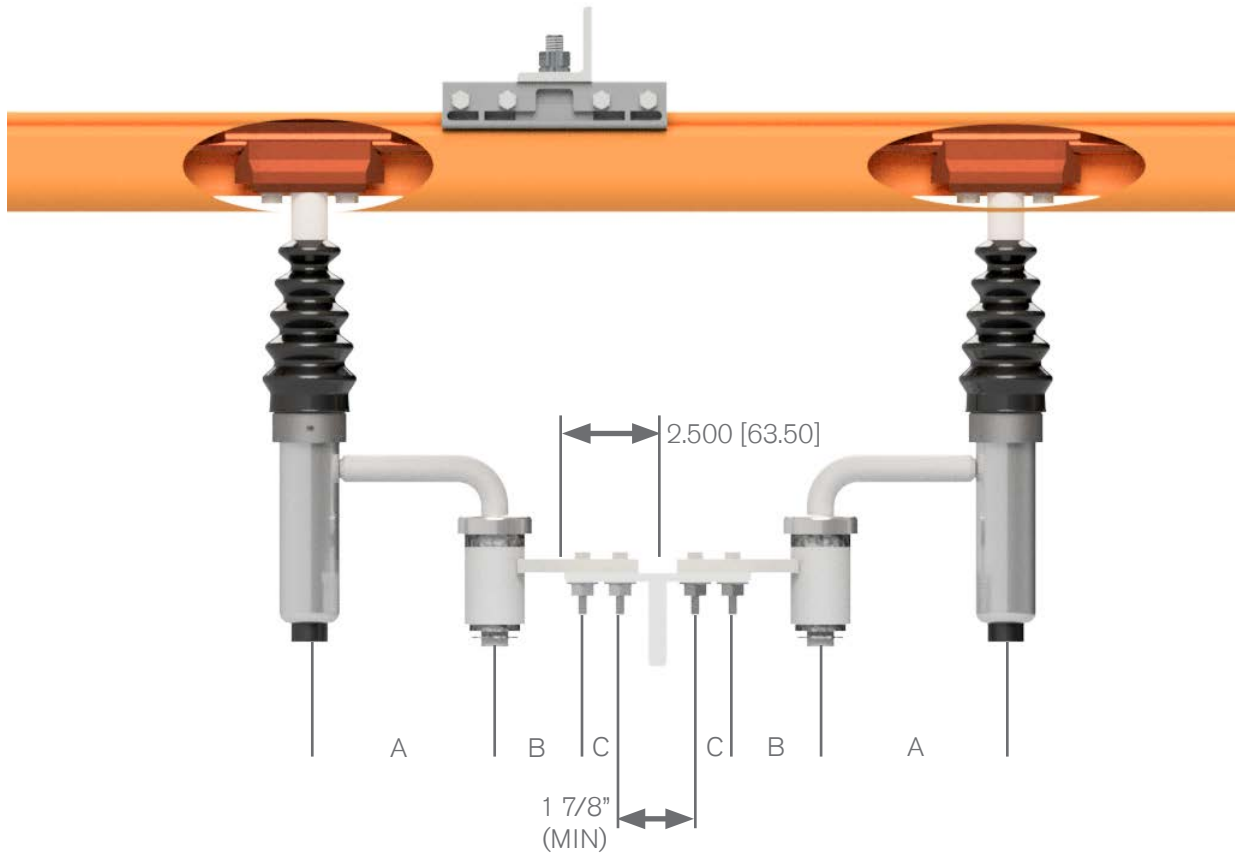
4. Position H7DEA or H7DEA-520 hanger so that the conductor and cover protrude approximately 7/8" from end of hanger.
5. Secure "T Groove" block to conductor by drilling 1/8" dia. hole for 250 or 3/16 dia. for 520 conductor, and insert hardened steel pins. This block is located 3 3/4" from the end of 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.



TANDEM COLLECTOR MOUNTING



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

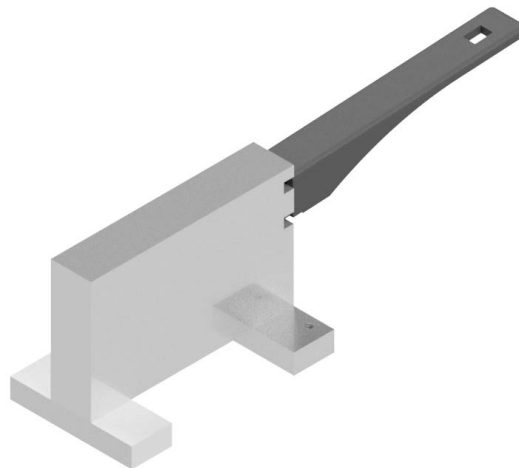
TOOLS NEEDED: Heating tool, pipe forms, electrical tape, and scissors or knife.

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