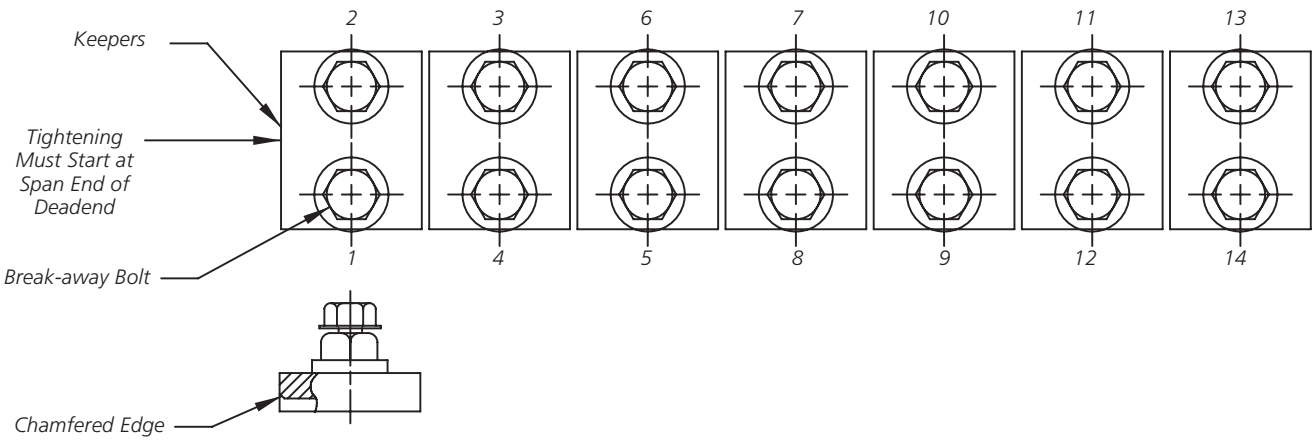
Installation Instructions for OPGW Bolted Dead End

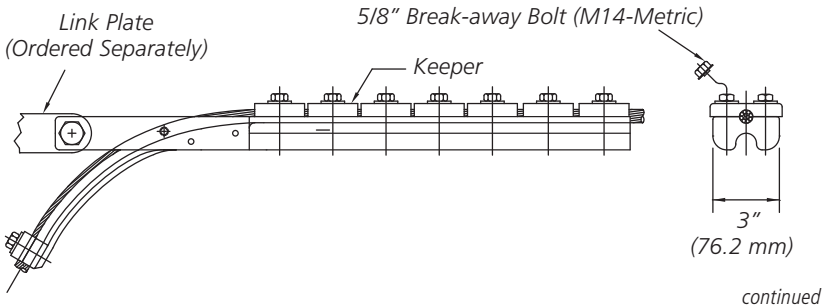
Procedure

1. Disassemble dead end. Remove one bolt from the same side of each keeper. Loosen other bolts to permit conductor to be placed in the conductor groove. If keepers and bolts are removed completely, care must be taken to return the keeper closest to the span end of the dead end to its original position (chamfered edge towards span). Remove clevis hardware.
2. Straighten conductor removing set caused by reel.
3. Place conductor into groove and install dead end keepers with washers break-away bolts.
4. Care should be taken during installation to maintain the keepers squarely on the conductor with equal clearance on both sides of conductor.
5. Starting at the span end of the dead end, follow the tightening sequence shown below, tighten all bolts to approximately 5 ft.-lbs. (7 Nm for metric). Repeat to approximately 25 ft.-lbs. (33 Nm for metric). Then final pass until break-away head breaks off. The sequential pattern is set up to equalize the load in each bolt and to prevent the deadend keepers from cocking to one side during installation.



6. If cable guide is not supplied, proceed to step 8. Cable guide, if used, is provided to insure that minimum bending radius of OPGW is not violated. Care should be exercised to avoid undue stress on cable guide. Note: cable guide is not a structural member and adds nothing to the holding strength of the clamp. Train conductor to make it bottom along the cable guide groove. This is important to assure clearance for the link plate/connecting hardware.
7. After placing OPGW into cable guide groove, install cable guide keeper with lockwashers and green break-away bolts alternately tightening bolts by 2 ft.-lbs. Repeat until break-away head breaks off. Care should be taken during installation to maintain the keeper squarely on the conductor with equal clearance on both sides of conductor.
8. Install connecting hardware with dead end clevis bolt. Check for clearance with OPGW.
9. If re-installation is necessary, bolts should be torqued according to the chart below. Installation with a torque wrench must be performed when break-away bolt is not present.

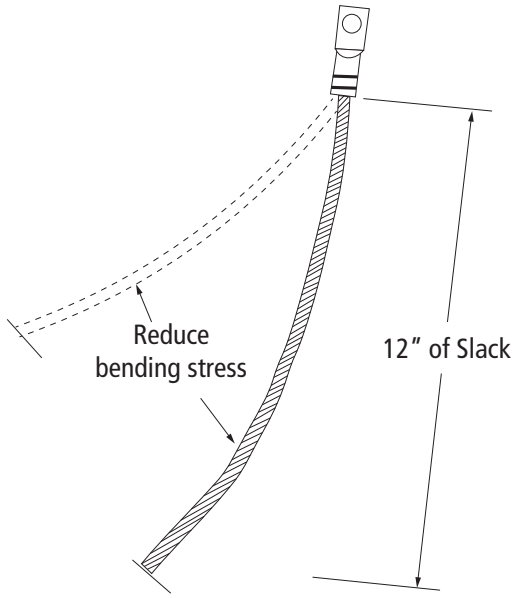
BOLT SIZE (IN.)	BOLT COLOR	BREAK-AWAY TORQUE (FT-LBS.)
1/2	Black	27-32
5/8	Red	35-40
5/8	Blue	40-45



continued

Installation Instructions for OPGW Bolted Dead End

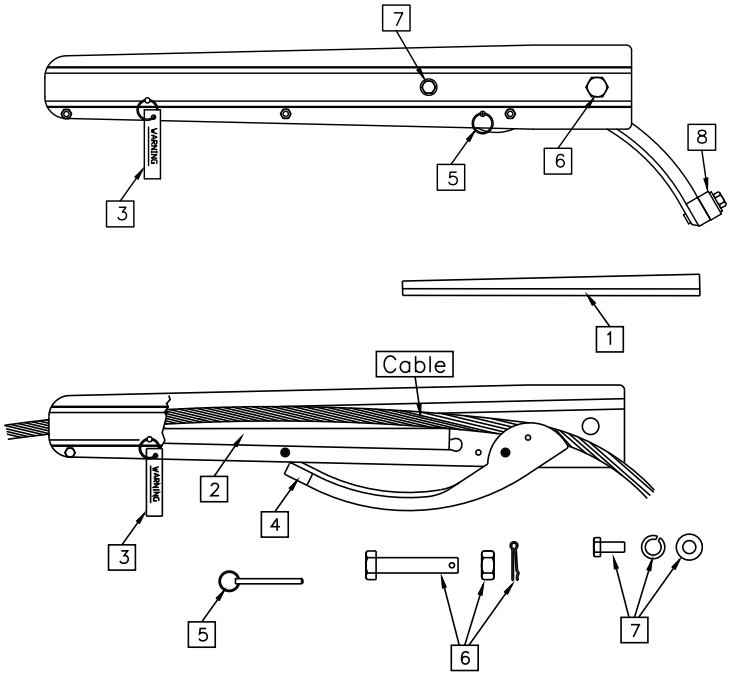
10. Attach grounding lug to grounding pad on side of dead end body (using 1/2″-13) if grounding is required. Ground wire assembly must be long enough such that 12″ of free slack wire extends directly down from the suspension grounding pad before looping back up to the adjacent structure attachment point.



Installation Instructions for OPGW Wedge Dead End

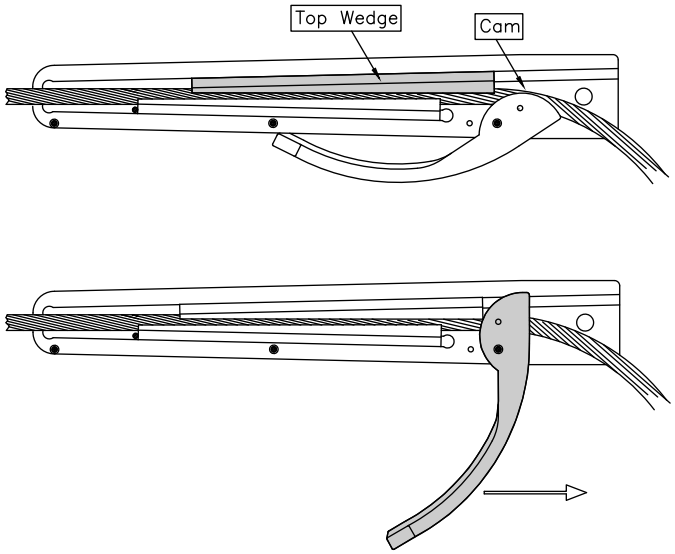
Parts of the Assembly

1. Top Wedge
2. Bottom Wedge
3. Wedge Retaining Pin (with Warning Label)
4. Cam/Cable Guide
5. Cable Guide Retaining Pin
6. Attachment Hardware
7. Grounding Hardware
8. Keeper



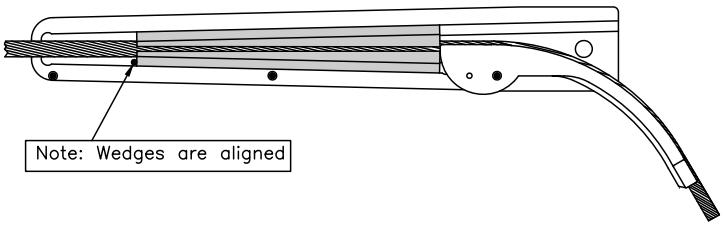
Installation Instructions

1. Hardware items (Items 6 & 7) are removed.
2. Top Wedge (Item 1) is removed.
3. Cable Guide Retaining Pin (Item 5) is removed.
4. Cam/Cable Guide (Item 4) is advanced as shown.
5. Cable is installed through the open top of the assembly and seated in Bottom Wedge.
6. Top wedge is installed and pushed beyond the "Cam" of the Cam/Cable Guide (Item 4).
7. The Cam/Cable Guide is pulled back to advance the top wedge.



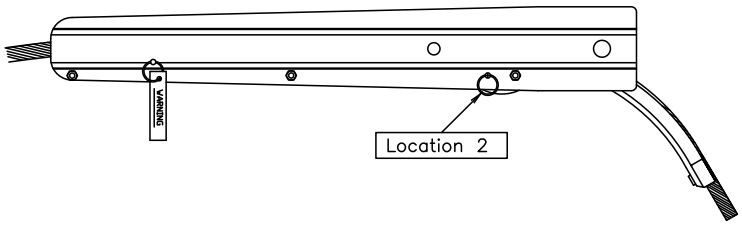
Installation Instructions for OPGW Wedge Dead End (cont.)

8. When Cam/Cable Guide is pulled back to position as shown, the Top Wedge will be inline with the Bottom Wedge.



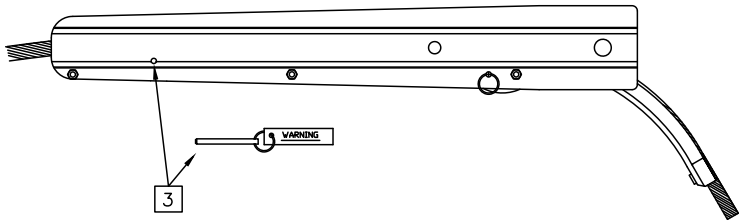
9. Replace Cable Guide Retaining Pin (Item 5) in "Location 2".

NOTE: Retaining Pin is installed through both side plates and holes shown at Location 2.



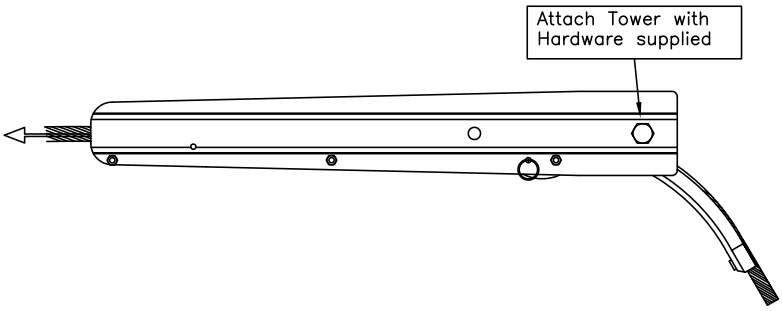
10. Remove Wedge Retaining Pin (Item 3).

NOTE: If Wedge Retaining Pin (Item 3) is not removed the dead end will not hold tension.



11. Attach OPGW Wedge Dead End to the tower with bolt, nut, and cotter pin supplied. Release tension on comealong. The wedges (Items 1 & 2) will advance, gripping the cable securely.

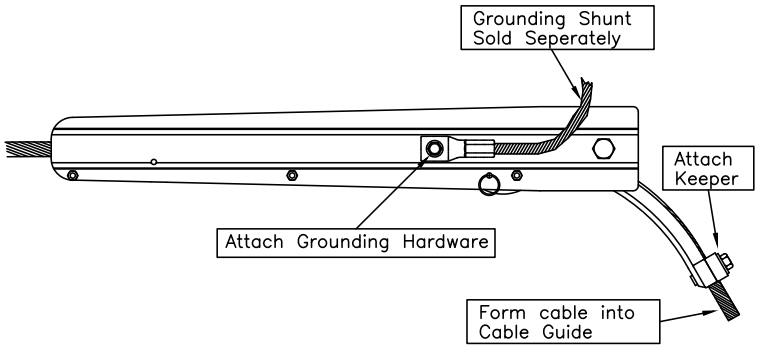
NOTE: A comealong is a temporary device which holds the cable during tensioning. The comealong is attached to a tensioning device, which is then attached to the tower. The comealong is located a distance from the end of the cable, leaving the end of the cable free to attaching the dead end.



12. Form cable into the groove of the Cam/Cable Guide, then attach keeper (Item 8) with lockwashers and green break-away bolts alternately tightening bolts by 2 ft.-lbs. Repeat until break-away head breaks off. Care should be taken during installation to maintain the keeper squarely on the conductor with equal clearance on both sides of conductor.

13. Attach grounding shunt with hardware provided. Torque bolts to 25 lbf.-ft. (34 N.m)

NOTE: Grounding Shunt sold separately. Contact customer service for ordering information.

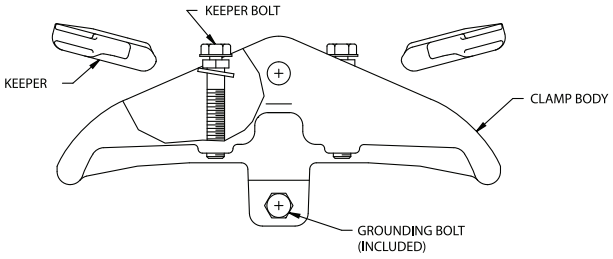


14. Assembly is complete.

Installation Instructions for OPGW Suspension Unit

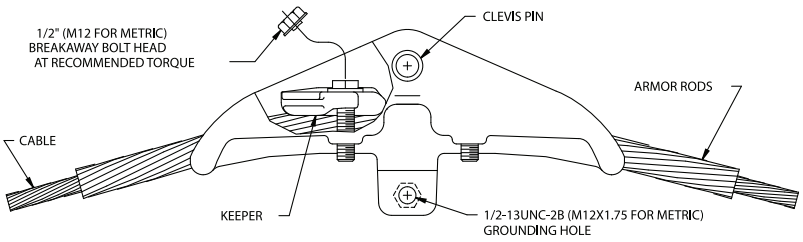
1. Mark center of clamp location on OPGW cable with ink (not tape).
2. Install armor rods on cable alligning center mark of armor rods with center mark on OPGW cable (per **Step 1**).
3. Remove clamp clevis pin. Loosen, but do not remove clamp keeper bolts. Remove clamp keepers. See **Figure 1**.

FIGURE 1:

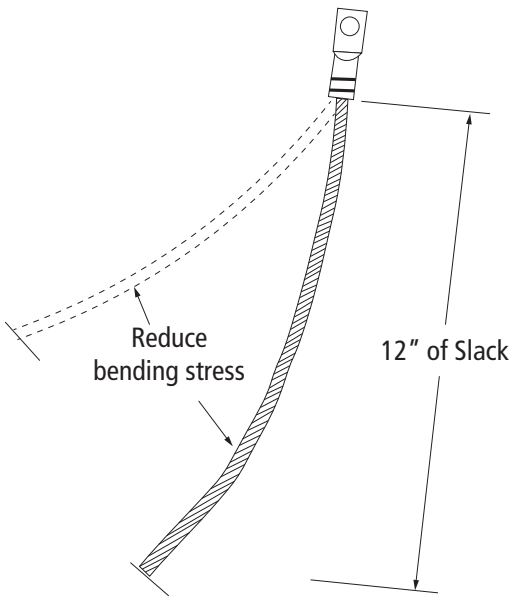


4. Place clamp body on OPGW cable and center clamp on armor rod center mark.
5. Attach clamp to tower attachment with clevis pin and install cotter pin in clevis pin.
6. Place keepers in clamp and slide keepers under keeper bolts (if double sided keeper, diameter range faces cable and armor rods).
7. Tighten keeper bolts finger tight and insure that keepers are not cocked on OPGW cable.
8. Tighten keeper bolts on each keeper in 5 ft-lb (7 nm for metric) increments, alternating tightening to insure keepers are not cocked in clamp. Tighten until break-away bolt head shears off (20-25 ft-lb or 28-35 nm for metric). See **Figure 2**.

FIGURE 2:



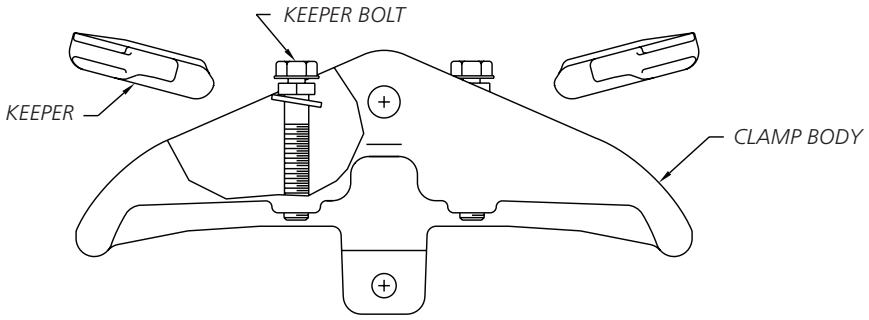
9. Attach grounding lug to grounding pad on bottom of suspension clamp (using 1/2″-13 or m12x1.75 Thread tapped hole) if grounding is required. Ground wire assembly must be long enough such that 12″ of free slack wire extends directly down from the suspension grounding pad before looping back up to the adjacent structure attachment point.



Installation Instructions for OPGW Double Suspension Unit

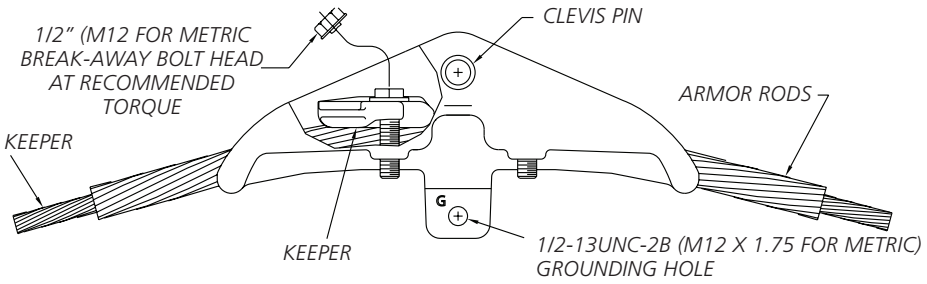
1. Mark center of clamp location on cable with ink (not tape).
2. Install the armor rods on cable aligning center mark of armor rods with center mark on OPGW (per Step 1).
3. Mark centers of clamp locations on armor rods with ink (not tape). This distance is equal to 1/2 the dimension between attachment holes on the yoke plate.
4. Remove clamp clevis pin. Loosen, but do not remove clamp keeper bolts. Remove the clamp keepers (see Figure 1).

FIGURE 1



5. Place clamp body on OPGW and center clamp on one of the center marks (per Step 3).
6. Place keepers in clamp and slide keepers under keeper bolts.
7. Tighten keeper bolts finger tight and insure that keepers are not cocked on OPGW.
8. Tighten keeper bolts on each keeper in 5 ft-lb increments, alternating tightening to insure keepers are not cocked in clamp. Tighten until break-away bolt head shears off (see Figure 2).

FIGURE 2



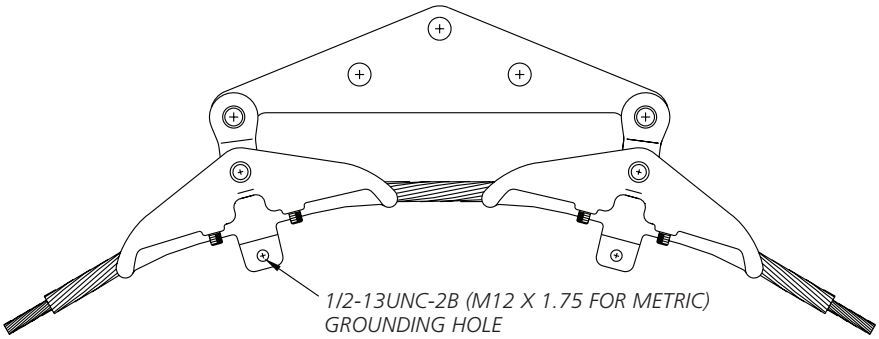
Installation Instructions for OPGW Double Suspension Unit (cont.)

9. Repeat steps 4 through 8 for the other clamp.

10. Attach clevis eye to clamp bodies with clevis pins and install cotter pins in clevis pins.

11. Attach clevis eyes to yoke plate.

FIGURE 3 - COMPLETED ASSEMBLY



12. Attach completeed assembly to tower attachment (see Figure 3).

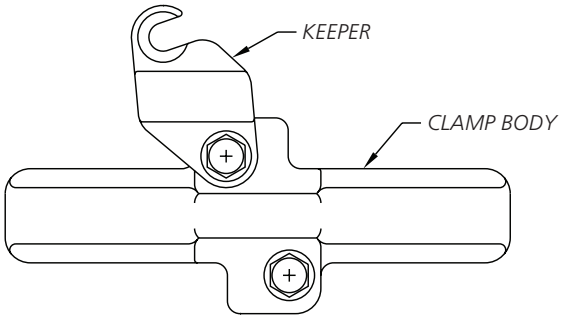
13. Attach grounding lug to grounding pad (side marked "G") on bottom of suspension clamp (using 1/2"-13 thread tapped hole) if grounding is required.

Ref L8881

Installation Instructions for OPGW Trunnion

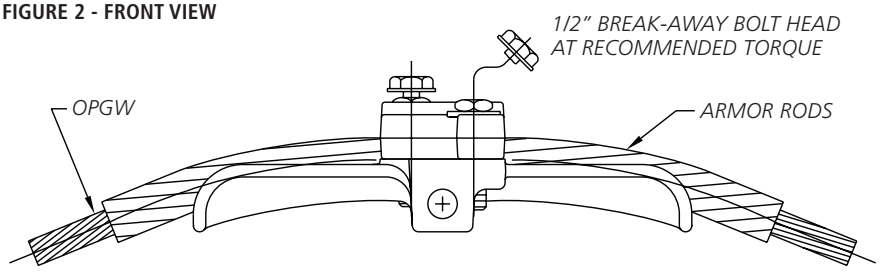
1. Mark center of clamp location on OPGW with ink (not tape).
2. Install armor rods on OPGW aligning center mark of armor rods with center mark on OPGW (per Step 1).
3. Loosen, but do not remove clamp keeper bolts. Rotate clamp keeper 180° from original position (see Figure 1).

FIGURE 1 - TOP VIEW



4. Place OPGW in clamp body and center clamp on armor rod center mark.
5. Return keeper to it's original position.
6. Tighten keeper bolts finger tight and insure that keeper is not cocked on OPGW.
7. Tighten keeper bolts on keeper in 5 ft-lb increments, alternating tightening to insure keepers are not cocked in clamp. Tighten until break-away bolt head shears off (see Figure 2).

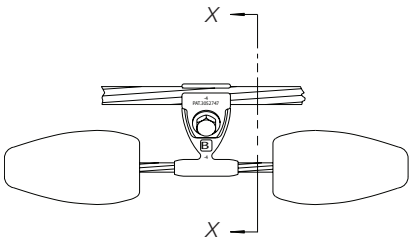
FIGURE 2 - FRONT VIEW

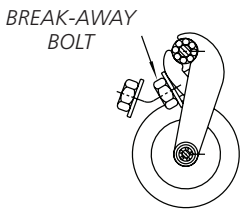


Ref L8882

Installation Instructions for OPGW Vibration Damper

CABLE DIAMETER	BOLT SIZE	BREAK-AWAY TORQUE ft. lbs. (Nm)	
		MIN.	MAX.
.360 - .770	7/16 (M12)	18 (24)	23 (31)
.771 - .970	1/2 (M4)	20 (41)	25 (47)





General information and spacing recommendations:

AFL vibration dampers are produced with carefully designed and controlled dimensions. The dampers should be protected, preferably in their shipping containers, from dirt and foreign material prior to installation. Handling in the field should be with care to avoid mechanical damage.

AFL vibration dampers may be installed without disassembly of the clamp parts.

Obtain the required damper spacing from AFL.

Mechanical Suspension (See page 15)

"One end" applications require a damper installed a distance "B" from the center of the suspension clamp at one end of the span. "Both ends" applications require a damper installed a distance "B" from the center of the suspension clamp at each end of the span.

Armor Grip Type Suspension

"One end" applications require two dampers installed at one end of the span. Install the first damper at the end of the rods and the second damper a distance "D" from the first damper. "Both ends" applications require two dampers installed at each end of the span with the first damper installed at the end of the rods and the second damper installed at the specified "D" spacing.

AFL Bolted Deadend (See page 3)

"One end" applications require two dampers at one end of the span with the first damper spaced a distance "D" from the end or mouth of the deadend and the second damper spaced a distance "D" from the first damper attachment point. "Both ends" applications require two dampers at each end of the span with the first damper spaced a distance "D" from the end or mouth of the deadend and the second damper spaced "D" distance from the first damper attachment point.

Formed Wire Deadend (See page 46)

"One end" applications require two dampers at one end of the span with the first damper placed at the end of the armor rods and the second damper spaced a distance "D" from the first damper attachment point. "Both ends" applications require two dampers at each end of the span with the first damper placed at the end of the armor rods and the second damper spaced a distance "D" from the first damper attachment point.

NOTE: For those spans with a deadend at one end and a suspension unit at the other, a damper application required at one end should be applied to the suspension side of the span. Depending on the type of suspension unit, refer to the appropriate damper placement instructions listed previously.

1. Loosen the bolt so that the clamp may be opened sufficiently to permit cable entry into the clamp groove.

NOTE: The bolt need not be removed.

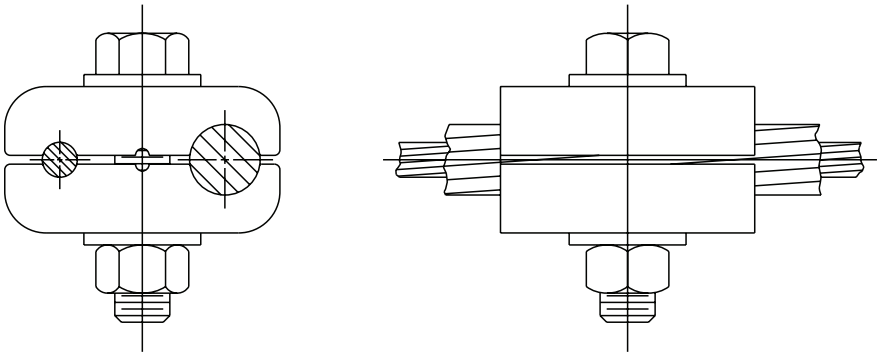
2. Hang the damper on the OPGW at the proper spacing specified and tighten the bolt finger tight.

3. Tighten the bolt with a suitable wrench until the break-away head shears off.

NOTE: The table to the right provides the typical clamp, bolt diameters, and break-away torque range for the OPGW dampers.

Ref L8883

Installation Instructions for OPGW Ground Clamp



1. Clean both run and tap conductors over the length to be clamped with a wire brush to remove oxides.

2. Place connector halves on the conductor, being careful to place the recommended run and tap conductor in the proper clamp groove and to distribute the alnox evenly over the conductor.

3. Bolt bonding P.G. clamp on conductors. Use a backup wrench to restrain the head of the bolt while tightening hardware to avoid bending the fiber optic composite cables. Tighten bolts to the recommended installation torque.
   (1/2" Bolt: 20-25 lbf-ft, M14 bolt: 27-34 Nm)

4. Do not remove alnox that squeezes out when clamp is tightened.

CAUTION: In order to avoid damage to the fiber optic composite cables, it is essential that they be clamped only in the recommended grooves and that the bolts be tightened only to the recommended installation torque.

Installation Instructions for OCA Series Comealongs for Optical Ground Wire (OPGW)

General

OPGW Comealongs are stringing tools designed for pulling optical ground wire up to initial sag tensions. If the required tension is greater than the rated tension of a single comealong, two or more comealongs should be used (refer to Installation Instructions). When desired sag tension is reached, the cable should be dead ended promptly and the comealong removed.

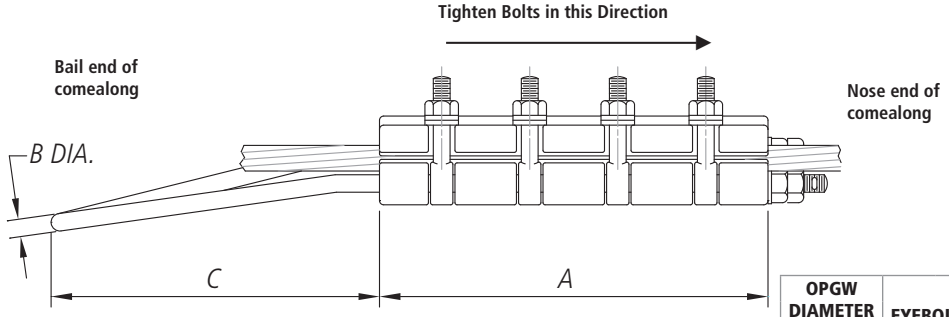
Comealongs must receive periodic maintenance. This practice should consist of a thorough cleaning with close inspection for nicked or rough cable grooves, cracked body, bent eye bolts, or damaged bail. The eyebolts should be kept clean and oiled. The cable groove should be kept clean and dry. After each six months use and at the beginning of each job, all comealongs should be subjected to a pull test equal to its rated strength. If any damage is found, the comealong should be disposed of properly.

Unused Comealongs

1. Loosen bolts so that the comealong may be opened sufficiently. Check for cleanliness of bore and permit conductor entry into the conductor groove.
2. Position the comealong a minimum of 10 feet from the dead end or joint being installed. This will assist in reducing the potential for birdcaging of the conductor during compression.
3. Place the conductor into the conductor groove of the comealong, then close the comealong and finger tighten the bolts.
4. Using a torque wrench, tighten bolts in sequence from bail end to nose of the comealong (see diagram below). It will take a minimum of 6 passes to achieve the correct torque on each bolt. On the first pass, tighten the bolts to 80% of the target torque (1/2" bolt - 32 lb ft, 5/8" bolt - 48 lb ft). On each subsequent pass, tighten the bolts to the target torque (1/2" bolt - 40 lb ft, 5/8" bolt - 60 lb ft), ensuring proper clamping force is achieved.

Used Comealongs

1. Before each job, thoroughly clean the comelaong and closely inspect for nicked or rough conductor grooves, cracked body, bent eye bolts, or damaged bail. If any damage is found, the comealong should be disposed of properly.
2. After cleaning, each comealong should be subjected to a pull test equal to the rated strength stamped on the comealong.
3. Follow sequence 1 through 4 for Unused Comealongs above.



OPGW DIAMETER RANGE (IN.)	EYEBOLTS		DIMENSIONS						WEIGHT	
			A		B		C			
	DIA.	NO.	IN.	MM	IN.	MM	IN.	MM	LB.	KG
0 -.820	1/2"	4	11	279	.5	13	8	203	9	4.08
.821-1.000	5/8"	4	12.5	318	.62	16	8	203	16	7.26

LOAD RATING: **Maximum tension limit is 50% of the rated strength of the OPGW or 5,000 pounds, whichever value is smaller.**

WARNING: **Comealongs are not intended for use as dead ends and are not recommended to hold conductors at sag tension limits for longer than 6 hours.**

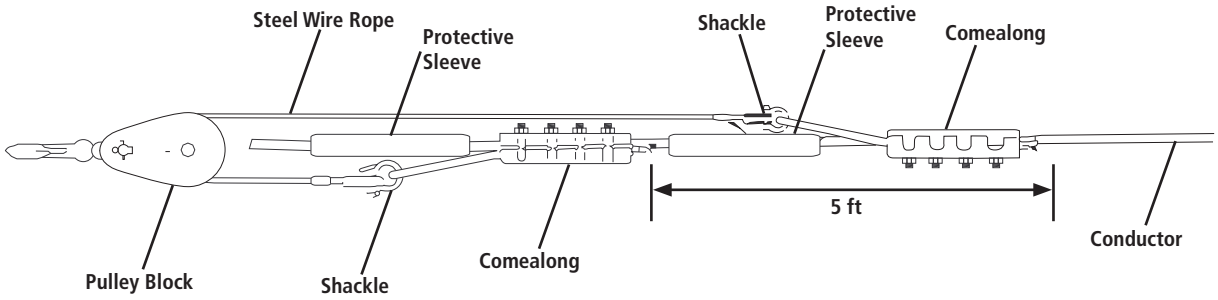
Installation Instructions for OCA Series Comealongs for Optical Ground Wire (OPGW)

Using Comealongs in Tandem

If the installation tension is greater than the rated strength of one comealong, then comealongs must be used in tandem. The comealong bails should be bridled with a sling (consisting of shackles and wire rope) and pulley block to insure equal distribution of the load. To prevent damage to the conductor by the shackles, place protective sleeves over the conductor (per drawing below).

The rated strength of this tandem configuration is 150% of the lowest rated comealong. For example, if one comelaong is rated for 8,000 lbs and the other rated for 10,000 lbs, then these two comealongs in tandem will have a rated strength of 12,000 lbs (150% of 8,000 lbs).

For more information on using comealongs in tandem, contact the ACA Technical Support Team at 1.800.866.7385.



LOAD RATING:	**Maximum tension limit is 50% of the rated strength of the OPGW or 5,000 pounds, whichever value is smaller.**
WARNING:	**Comealongs are not intended for use as dead ends and are not recommended to hold conductors at sag tension limits for longer than 6 hours.**