



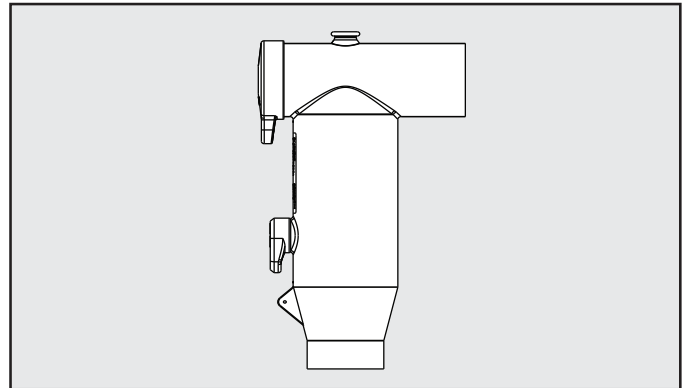
# INSTALLATION INSTRUCTIONS

EPP-4244-10/23

**TE Connectivity's Raychem Asymmetric Compact Elbow Connectors 600A for Copper Tape (CT), Jacketed Concentric Neutral (JCN), and Concentric Neutral (CN) cables up to 35 kV class**

## TE Connectivity's Cable Accessories

## ELBA-35-600-CES



### Safety Instructions

#### **⚠ DANGER**

When installing electrical power system accessories, failure to follow applicable personal safety requirements and written installation instructions could result in fire or explosion and serious or fatal injuries.

#### **⚠ DANGER**

As TE Connectivity (TE) has no control over field conditions which influence product installation, it is understood that the user must take this into account and apply his own experience and expertise when installing product.

#### **⚠ DANGER**

Working around energized high-voltage systems may cause serious injury or death. Installation should be performed by personnel familiar with good safety practice in handling high-voltage electrical equipment. De-energize and ground all electrical systems before installing product.

#### **⚠ DANGER**

Power distribution and transmission products must be properly selected for the intended application. It must be installed and serviced by competent personnel who have been trained and understand proper safety procedures. These instructions are written for such personnel and are not a substitute for adequate training and experience in safety procedures.

#### **⚠ CAUTION**

Read and understand the contents of these instructions before installation and follow all locally approved procedures and safety practices before installing or operating this equipment.

#### **⚠ CAUTION**

These instructions cannot cover all details or variations in the equipment, procedures, or processes described, nor provide directions for meeting every possible contingency during installation, operation, or maintenance. When additional information is desired to satisfy a problem not covered sufficiently for the user's purpose, please contact your TE sales representative. These instructions are not intended to supersede or replace existing safety and operating procedures.

#### **NOTICE**

Upon receipt of a product, inspect it thoroughly for damage and loss of parts incurred during shipment. If damage or loss is discovered, file a claim with the carrier immediately or contact your TE representative.

### Customer Service

For 24 hour customer service, call 800-327-6996.

The Information contained in these installation instructions is for use only by installers trained to make electrical power installations and is intended to describe the correct method of installation for this product. However, TE Connectivity has no control over the field conditions which influence product installation.

It is the user's responsibility to determine the suitability of the installation method in the user's field conditions.

TE Connectivity's only obligations are those in TE Connectivity's standard Conditions of Sale for this product and in no case will TE Connectivity be liable for any other incidental, indirect or consequential damages arising from the use or misuse of the products.

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## General Information

The TE ELBA-35-600 and ELBA-35-610 35 kV class 600A elbows are used to terminate high-voltage cable on compact deadfront apparatus transformers and switchgear or make separable splice or junction connections. They are fully shielded, fully submersible and are interchangeable with all other manufacturers that certify compliance with IEEE standard 386.

If grounding braid is needed for cable shielded, ELB-600-CES-GRD-# would be ordered separately so the CES would not be included in this kit.

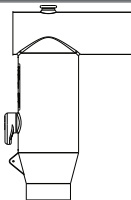








## Before Starting

- Check to ensure that the kit you are going to use fits the cable.
- Refer to the kit label and the title of the installation instructions.
- Components or working steps may have been modified since you last installed this product.
- Carefully read and follow the steps in the installation instructions.

## Suggested Installation Equipment (not supplied with kit)

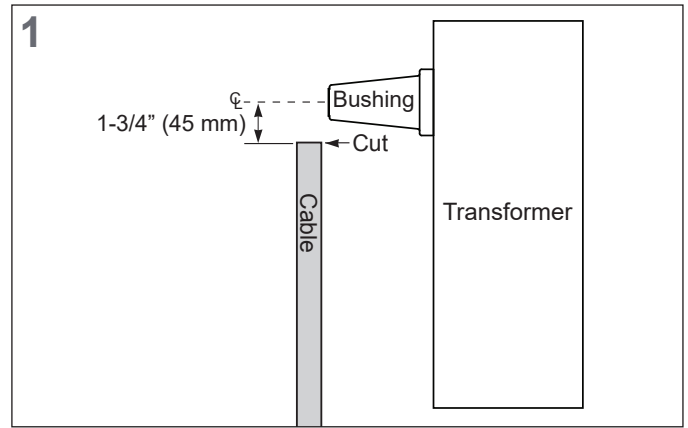
- Cable preparation tools
- Clean, lint-free cloths
- Non-conducting abrasive cloth, 120 grit or finer
- Connector(s) and installation tools

## Kit Contents

S. N.	Contents	Product Images	Qty.
1.	Connector body		1
2.	Back plug		1
3.	Cable adapter		1
4.	Covering cap		1
5.	Jacket sealing tube (optional)		1
6.	Main cable lug		1
7.	Nut		1
8.	Threaded pin M16 - 5/8"		1
9.	Silicone grease		6

## Cut Cable

Position the cable so that it is parallel to the apparatus faceplate and is located in the final assembled position with enough slack to allow movement of elbow to insulated parking bushing. Cut cable 1-3/4" (45 mm) from the centerline of the mating bushing.



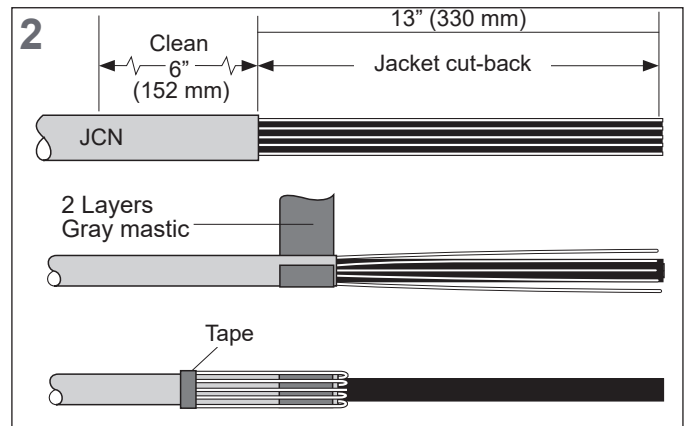
Choose the cable type (Choice 1 below or Choice 2: Copper Tape Shield on page 8, step 23) and follow the directions given.

### CHOICE 1: JACKET CONCENTRIC NEUTRAL

## Prepare Cable

Remove outer jacket 13" (330 mm) from end of cable.

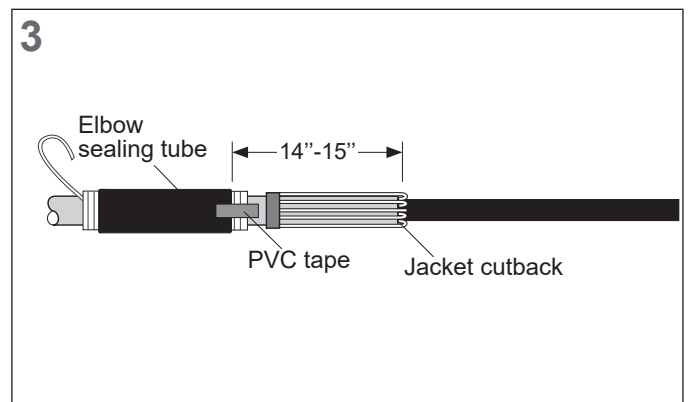
Clean approximately 6 inches of the cable jacket from the cutback using approved solvent. Remove the backing from the gray mastic. Using light tension, wrap two layers of gray mastic onto the jacket at the cutback. Lay the neutral wires evenly over the jacket and press them into the gray mastic being sure that no wires are crossed. Tape the ends of the concentric neutral wires down to cover sharp edges.



## Park Elbow Sealing Tube

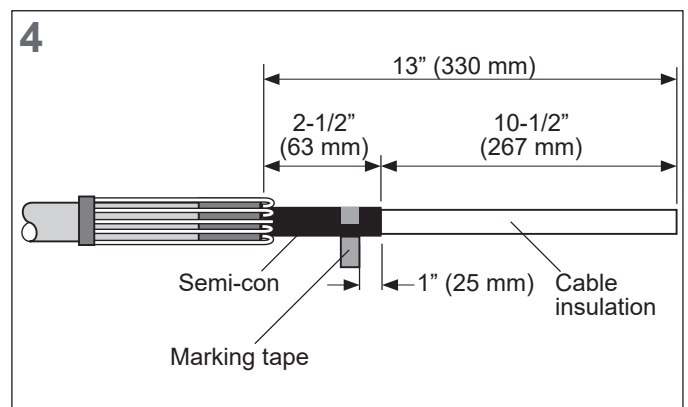
Park tube 14-15" from cable jacket cutback so that it clears the neutral wires.

Temporarily secure black tube to cable jacket with insulating tape.



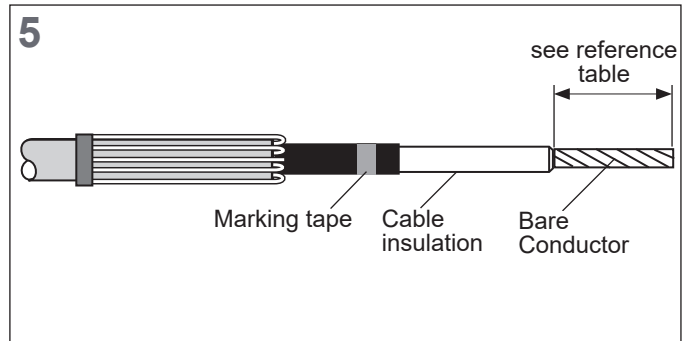
## Semi-con Cutback

Remove semi-con insulation shield 10-1/2" (267 mm) from the end of the cable with a straight, smooth, squared cut. Do not cut or nick the insulation. Wrap two turns of marking tape 1" (25 mm) from end of semi-con shield. This will be a guide for the cable adapter location.



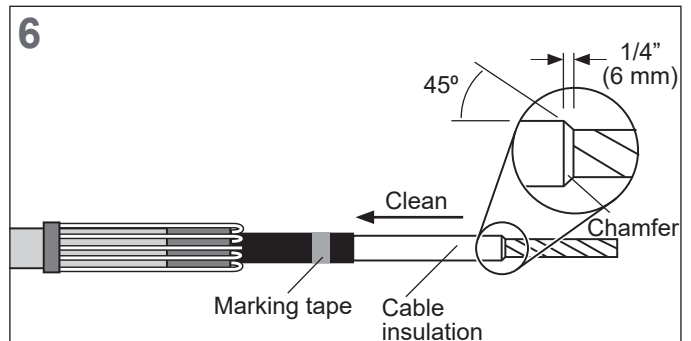
## Remove Insulation

Refer to the strip lengths in shear bolt packaging and confirm with the connector's bore depth. Maximum cut back length is 4-5/8" (118 mm).



## Chamfer and Clean Insulation

Remove sharp edge of insulation by chamfering the end of the cable insulation at a 45° angle, approximately 1/4" (6 mm) back. Thoroughly clean the insulation with a solvent dampened cloth, wiping from conductor toward cable semi-con shield. Ensure that all traces of conductive residue are removed.

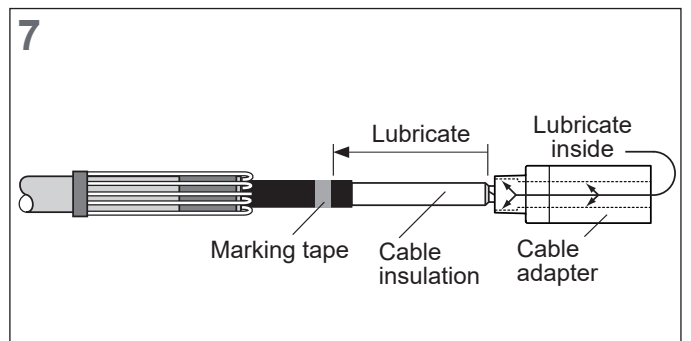


## Lubricate and Install Cable Adapter

Lubricate exposed cable insulation with silicone grease always working toward cable semi-con shield. Lubricate inside of cable adapter. Install cable adapter, small end first, over cable using a twisting motion until it is flush with the edge of the tape marker.

### NOTE

Wipe away excess grease to avoid contamination.



## Ensure Position of Cable Adapter

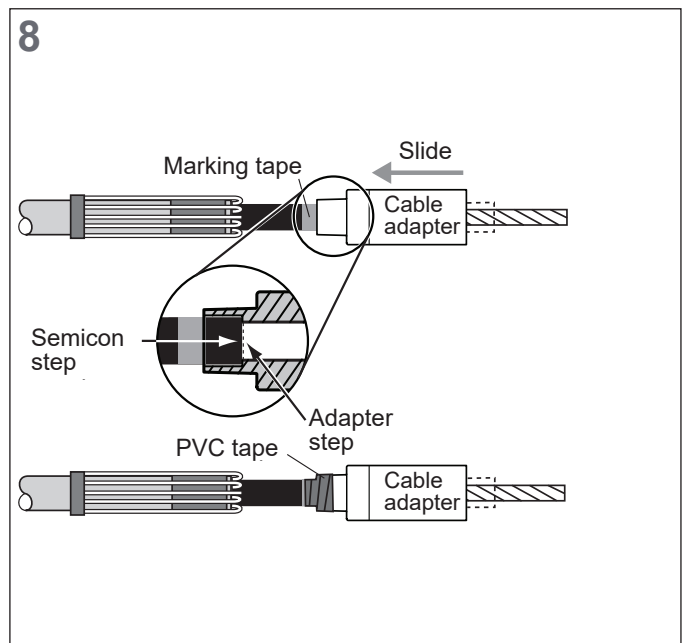
The cable adapter has a step molded into the cable entrance.

When sliding the cable adapter on you should feel a positive stop when the step in the adapter meets the step in the semicon of the cable. The positive stop should be felt at the same location as the tape mark. DO NOT slide adapter past this step. If you suspect you have slid the adapter past the step, pull adapter off and reinstall cable adapter.

When you are certain that the adapter is in the correct position, secure cable adapter in position by wrapping five half lapped layers of PVC tape over the small end of the cable adapter and over the marking tape.

### NOTE

When using shear bolt lug, some insulation may extend beyond the top of the cable adapter.



## Install Connector

### Shear bolt lug:

Prepare conductor by wire brushing just prior to insertion into connector. Fully insert conductor into shear bolt lug.

Connector must be fully seated on cable conductor. Align flats of lug and bushing before installation. Install shear bolt lug per instructions packaged with lug.

Thoroughly clean the connector to remove any installation residue.

## Check Dimension

The distance from the end of the lug to the cable adapter after installation should be between 7" to 8" (175 mm – 200 mm). Otherwise redo assembly.

## Install Elbow on Cable

Clean and evenly lubricate the entire surface of cable adapter with silicone grease. Lubricate inside the cable entrance of the elbow wiping 360° around the entire surface and at least 2" (50 mm) deep. If test point elbow is used, ensure that test point is facing towards installer.

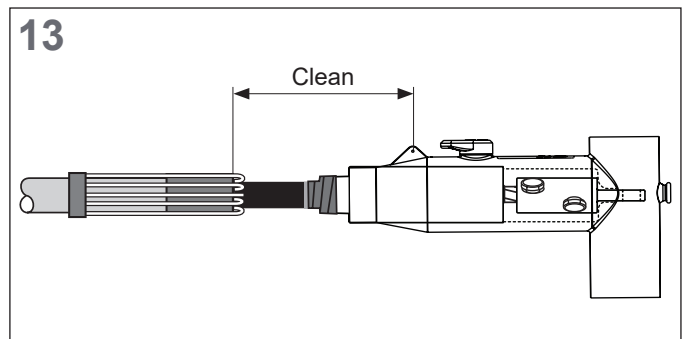
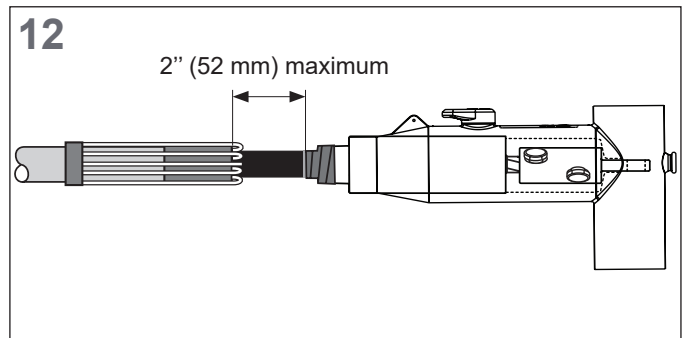
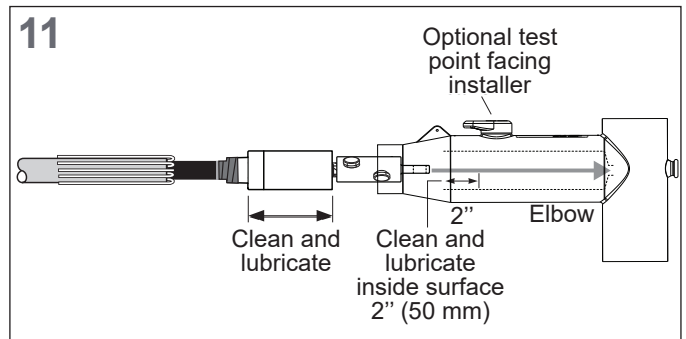
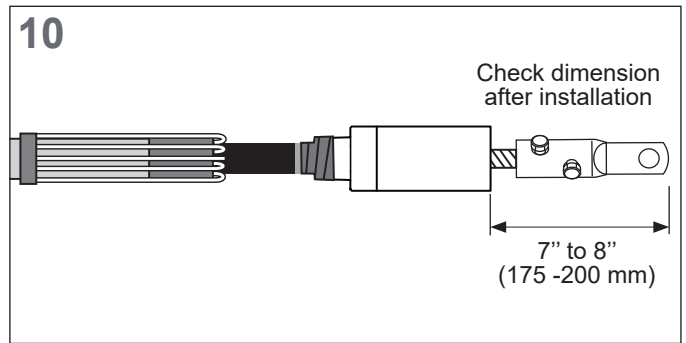
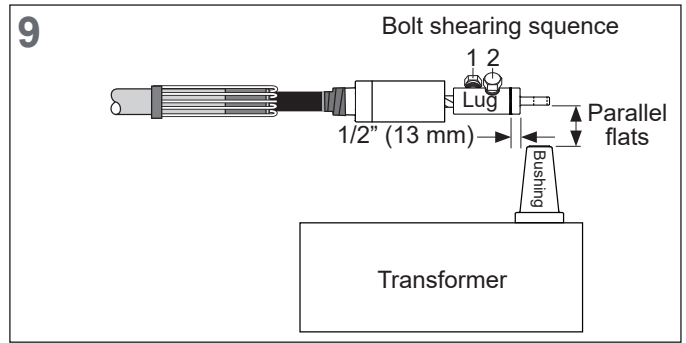
Push elbow onto cable adapter until lug eye is centered in the 600A interface. Ensure that the cable adapter does not move while installing the elbow.

## Verify Dimension

Make sure the gap between the cable jacket cutback and the end of the elbow adapter does not exceed 2" (50 mm).

## Clean Cable

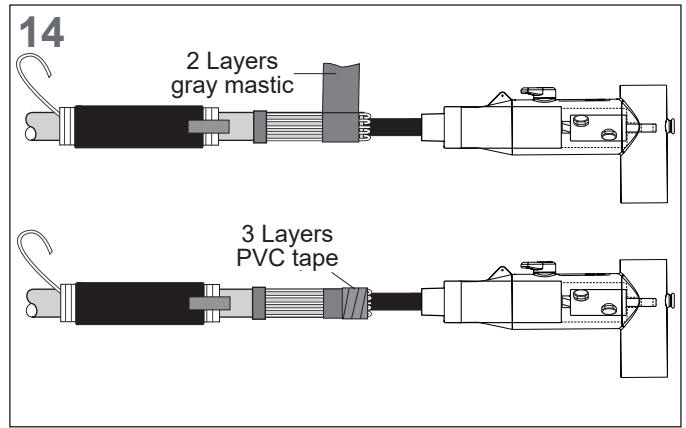
Clean from the elbow grounding eye to the cable jacket cutback using an approved solvent capable of removing silicone grease. Make sure all grease is removed from bottom of elbow.



## Apply 2 Layers of Gray Mastic

Using light tension wrap two more layers of gray sealant over the neutral wires and previously wrapped gray sealant.

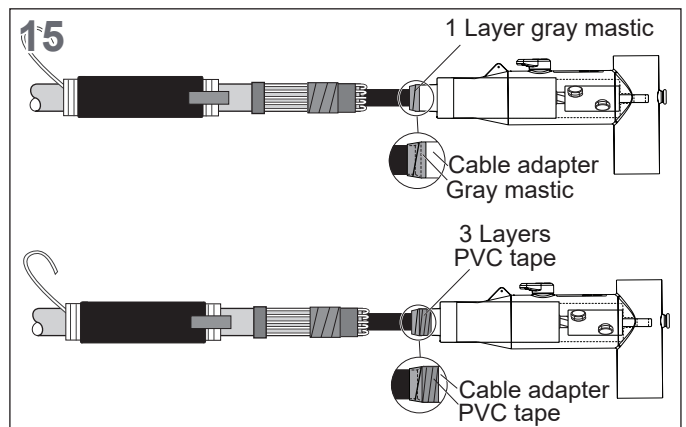
Apply three half lapped layers of PVC tape over half of the gray mastic as shown.



## Apply Gray Mastic to Cable Adapter

Wrap one complete layer of gray mastic at the base of the cable adapter with a slight overlap onto the cable's semicon shield. Knead the mastic together where the 2 ends come together to ensure complete seal will be formed.

Apply three half lapped layers of PVC tape over half of the gray mastic as shown.

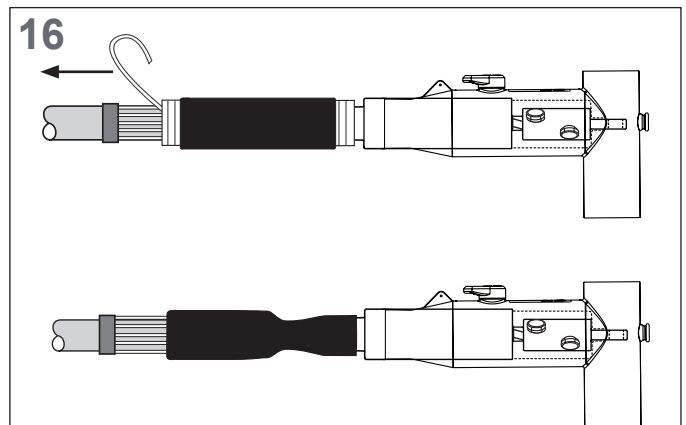


## Position Elbow Sealing Tube; Shrink by Releasing Spiral Holdout

Remove PVC tape. Position elbow tube to overlap gray mastic and PVC tape applied to cable jacket and elbow.

Release the spiral holdout by pulling continuously counterclockwise while holding the elbow sealing tube in place.

The spiral holdout cannot be pulled out all at once. Slowly pull the spiral holdout on top of the cable and then pass it around and underneath the cable until the spiral has been completely removed.



## Assemble Elbow on Bushing

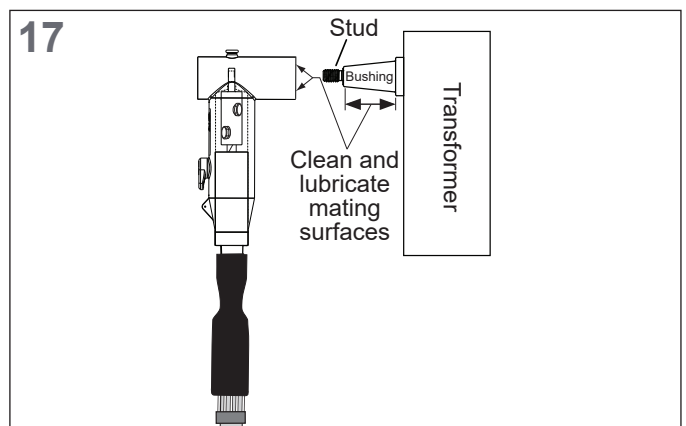
### NOTICE

Ensure the "F" marking on the 5/8 threaded end is facing forward towards the bushing.

Hand tighten the thread stud into the equipment bushing.

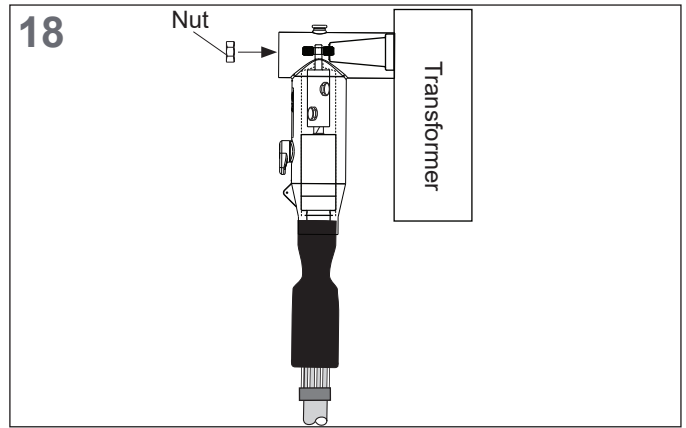
Clean mating surfaces with an approved HV cable cleaner. With the supplied grease, thoroughly lubricate the entire mating surfaces of the elbow and bushing.

Firmly push elbow onto the bushing.



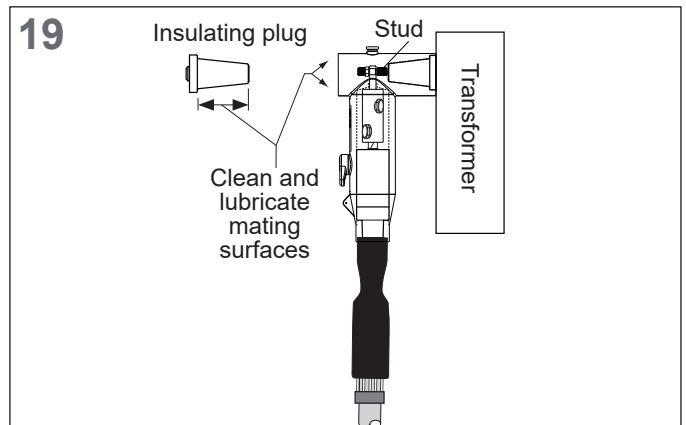
## Secure Connector

Insert hex nut into the body and thread onto the stud to hold the connector in place. Tighten the nut with a 24 mm socket to a torque of 55ft-lbs.



## Prepare Insulating Plug

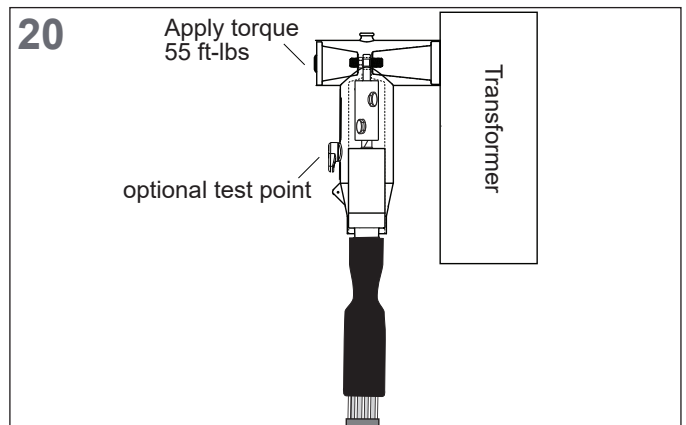
Clean and lubricate the mating surfaces of insulating plug and elbow interface.



## Install Insulating Plug

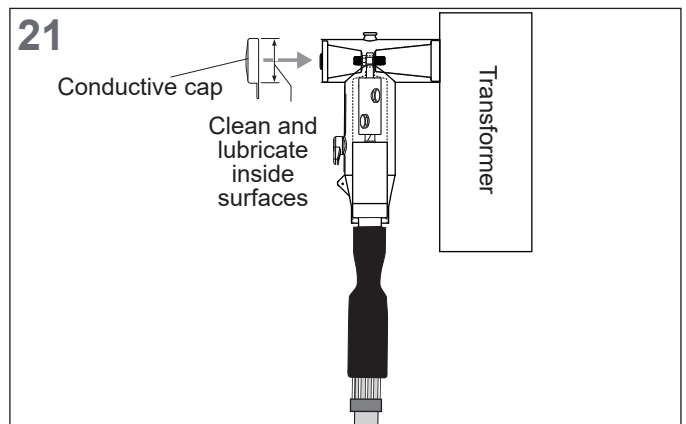
Push plug into the elbow and tighten to apparatus bushing using a torque wrench and 1" socket. Tighten plug clock-wise exerting 55 ft-lbs (75 Nm) of torque.

The insulating plug provides a capacitive test point for detecting system voltage. The ELBA-35-610 elbow has an integral capacitive test point on the body. If the T-body has a test point, follow the VOLTAGE TEST directions on page 13.



## Install Conductive Cap

Clean and lubricate inner surface of conductive cap with lubricant supplied. Push cap onto insulating plug until it snaps into place.



## Ground System

Connect one wire from the shield to the grounding eye of the elbow or use a minimum #14AWG copper drain wire connected to cable's concentric neutral wires or to a common ground point.

### NOTICE

When bundling the concentric neutral wires, ensure that the wires do not become crossed under the jacket seal.

Installation is complete.

### CHOICE 2: COPPER TAPE SHIELD

## Prepare Cable

Remove outer jacket 14" (356 mm) from end of cable.

Remove semi-con insulation shield 10-1/2" (267 mm) from the end of the cable with a straight, smooth, squared cut.

Do not cut or nick the insulation. Wrap two turns of marking tape 1" (25 mm) from end of semi-con shield. This will be a guide for the cable adapter location.

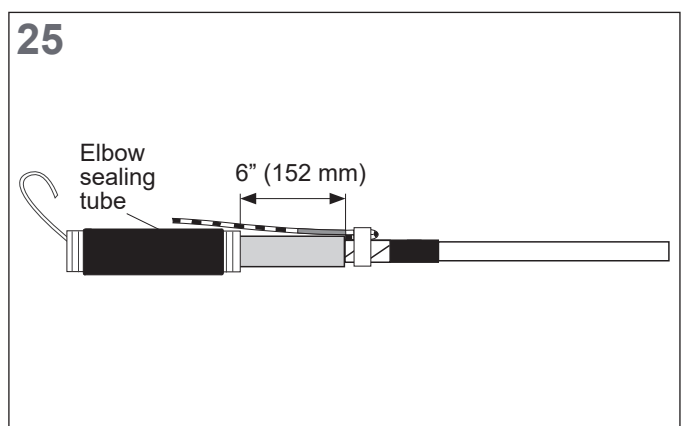
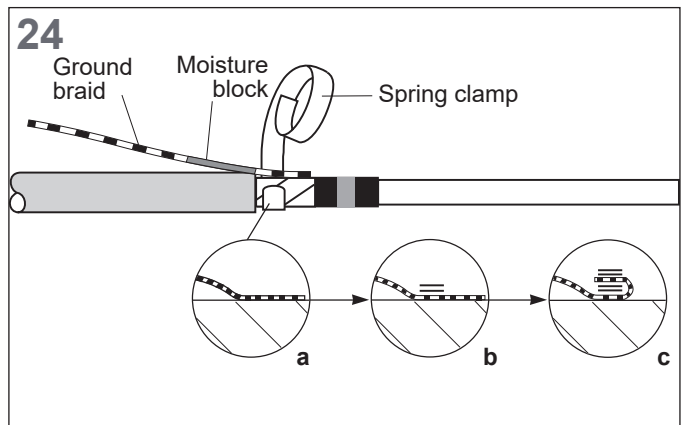
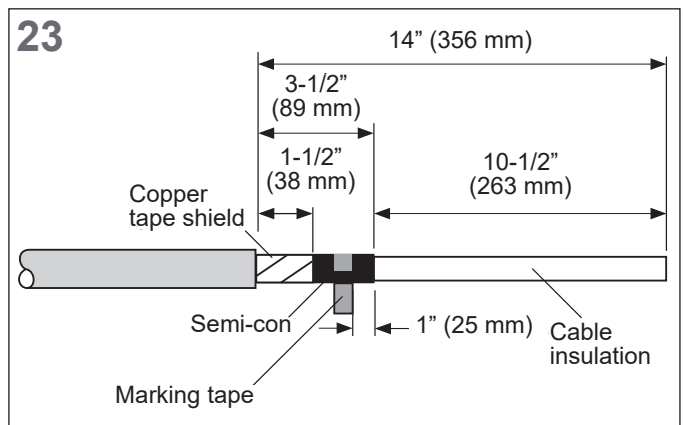
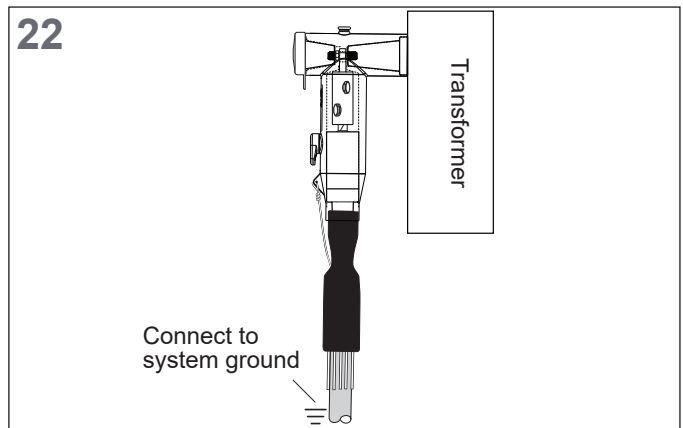
## Install Ground Braid

- Lay the ground braid on the cable with the solder block aligned with the jacket cutback and the short end of the braid over the exposed copper tape shield.
- Attach the braid to the tape shield by placing two wraps of the spring clamp over the braid.
- Fold the short end of the braid back over the spring clamp wraps as shown. Continue to wrap the remaining clamp over the braid. Tighten clamp by twisting it in the direction it is wrapped and secure with the copper foil tape provided.

## Park Elbow Seal

Park elbow seal over cable jacket, 6" from cable jacket cutback.

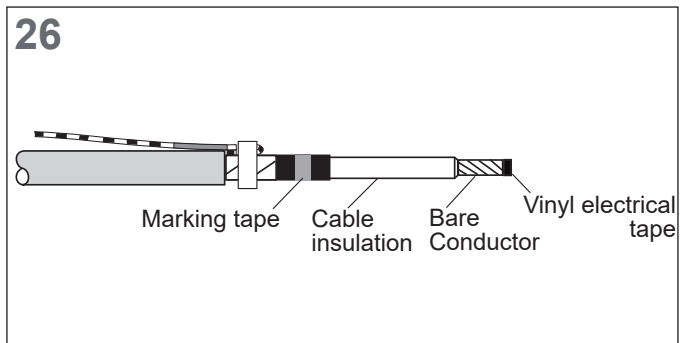
Temporarily secure black tube to cable jacket with insulating tape.





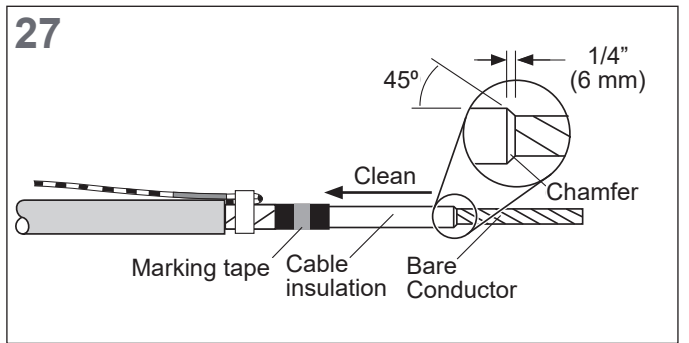
## Remove Insulation

Refer to the strip lengths in shear bolt packaging and confirm with the connector's bore depth. Maximum cut back length is 4-5/8" (118 mm).



## Chamfer and Clean Insulation

Remove sharp edge of insulation by chamfering the end of the cable insulation at a 45° angle, approximately 1/4" (6 mm) back. Thoroughly clean the insulation with a solvent dampened cloth, wiping from conductor toward cable semi-con shield. Ensure that all traces of conductive residue are removed. If using a jacket sealing device park it on the cable now. Follow instructions in the jacket sealing kit after elbow assembly is complete.

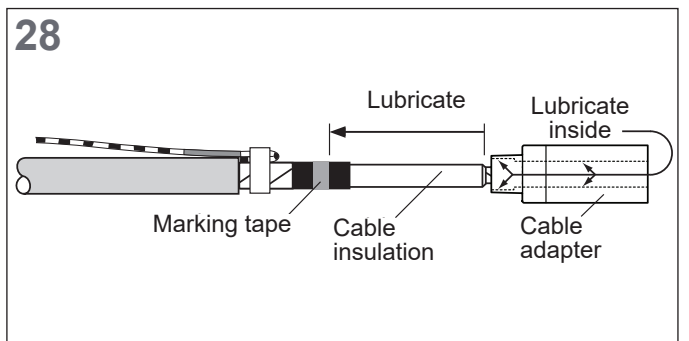


## Lubricate and Install Cable Adapter

Lubricate exposed cable insulation with silicone grease always working toward cable semi-con shield. Lubricate inside of cable adapter. Install cable adapter, small end first, over cable using a twisting motion until it is flush with the edge of the tape marker.

### NOTE

Wipe away excess grease to avoid contamination.



## Ensure Position of Cable Adapter

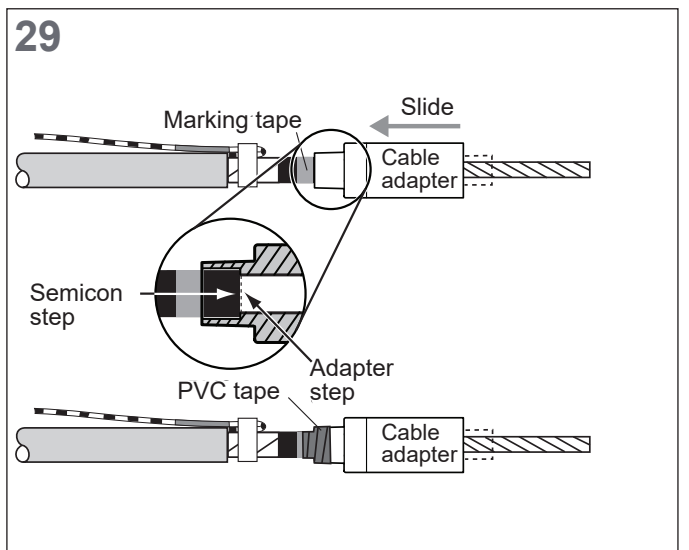
The cable adapter has a step molded into the cable entrance.

When sliding the cable adapter on you should feel a positive stop when the step in the adapter meets the step in the semicon of the cable. The positive stop should be felt at the same location as the tape mark. DO NOT slide adapter past this step. If you suspect you have slid the adapter past the step, pull adapter off and reinstall cable adapter.

When you are certain that the cable is in the correct position, secure cable adapter in position by wrapping five half lapped layers of PVC tape over the small end of the cable adapter and over the marking tape.

### NOTE

When using Shear bolt lug, some insulation may extend beyond the top of the cable adapter.

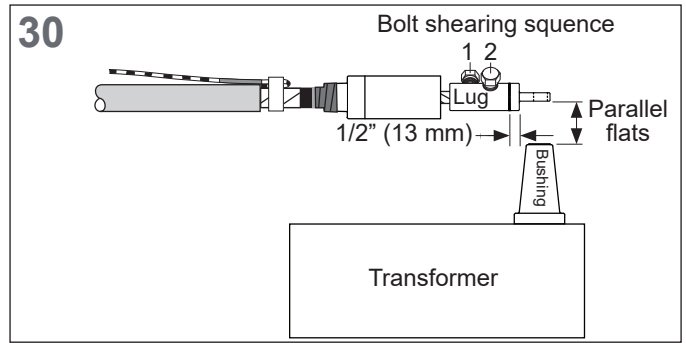


## Install Connector

### Shear bolt lug:

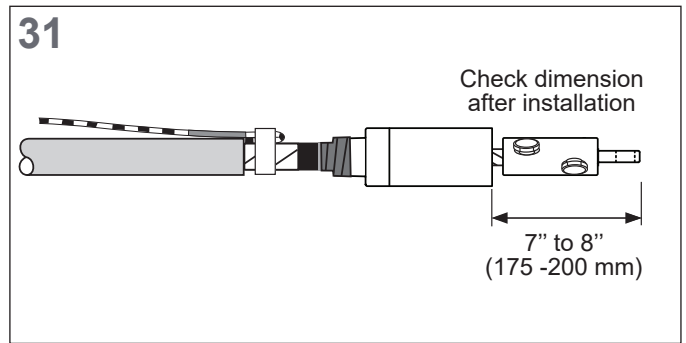
Prepare aluminum conductor by wire brushing just prior to insertion into connector. Fully insert conductor into shear bolt lug.

Connector must be fully seated on cable conductor. Align flats of lug and bushing before installation. Install shear bolt lug per instructions packaged with lug.



## Check Dimension

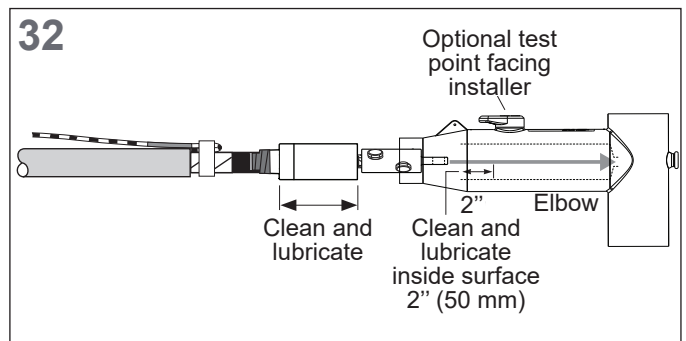
The distance from the end of the lug to the cable adapter after installation should be between 7" to 8" (175 mm – 200 mm). Otherwise redo assembly.



## Install Elbow on Cable

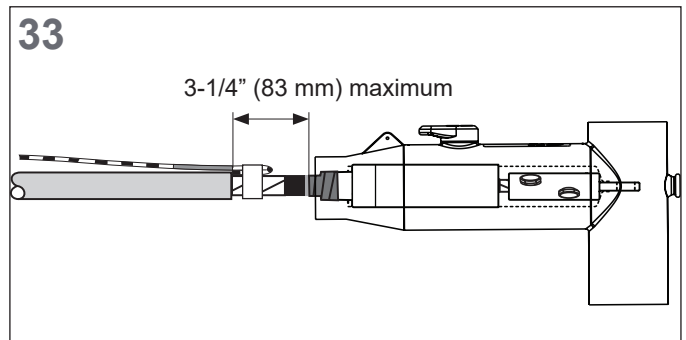
Clean and evenly lubricate the entire surface of cable adapter with silicone grease. Lubricate inside the cable entrance of the elbow wiping 360° around the entire surface and at least 2" (50 mm) deep. If test point elbow is used, ensure that test point is facing towards installer.

Push elbow onto cable adapter until lug eye is centered in the 600A interface. Ensure that the cable adapter does not move while installing the elbow.



## Confirm Elbow Placement

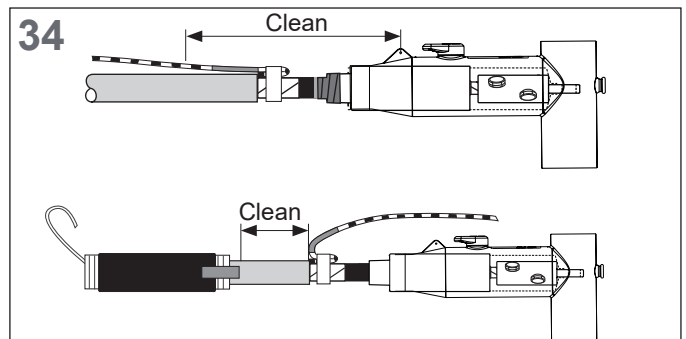
Make sure the gap between the cable jacket cutback and the end of the elbow adapter does not exceed 3-1/4" (83 mm).



## Clean Cable

Clean from the elbow grounding eye to the cable jacket cutback using an approved solvent capable of removing silicone grease. Make sure all grease is removed from bottom of elbow.

Lift ground braid away from the cable jacket. Using an oil-free solvent, clean the jacket for 2-1/2" (60 mm) below the jacket cutback point.

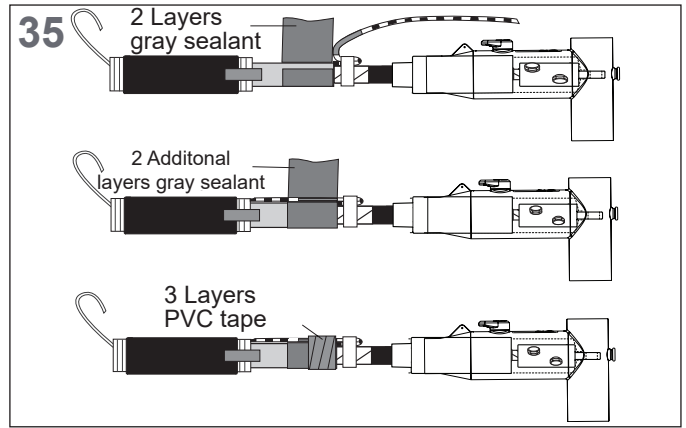


## Apply Gray Mastic on Cable

Remove the backing from the gray sealant. Using light tension, wrap two layers of gray sealant onto the jacket under the braid.

Lay the braid back over the jacket and through the black tube. Press moisture blocked section of braid into the gray sealant. Using light tension wrap two more layers of gray sealant over the braid.

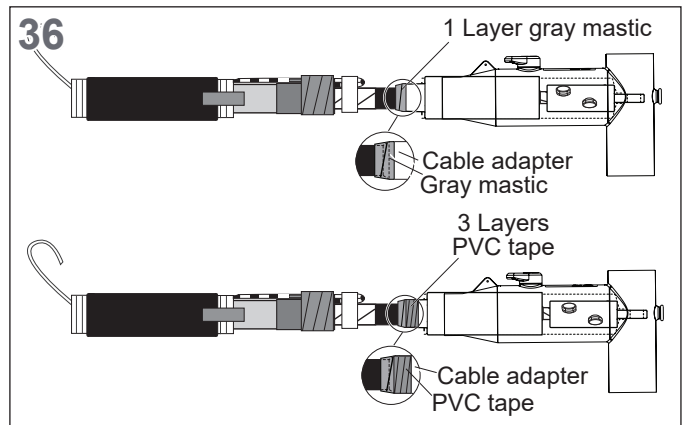
Apply three half lapped layers of PVC tape over half of the gray mastic as shown.



## Apply Gray Mastic to Cable Adapter

Wrap one complete layer of gray mastic at the base of the cable adapter with a slight overlap onto the cable's semicon shield. Knead the mastic together where the 2 ends come together to ensure complete seal will be formed.

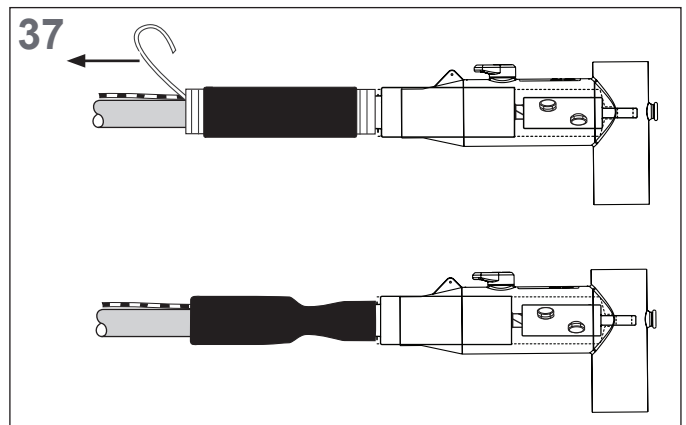
Apply three half lapped layers of PVC tape over half of the gray mastic as shown.



## Position Elbow Sealing Tube; Shrink by Releasing Spiral Holdout

Remove PVC tape. Position elbow tube to overlap gray mastic and PVC tape applied to cable jacket and elbow.

Release the spiral holdout by pulling continuously counterclockwise while holding the elbow sealing tube in place. The spiral holdout cannot be pulled out all at once. Slowly pull the spiral holdout on top of the cable and then pass it aroundff and underneath the cable until the spiral has been completely removed.



## Assemble Elbow on Bushing

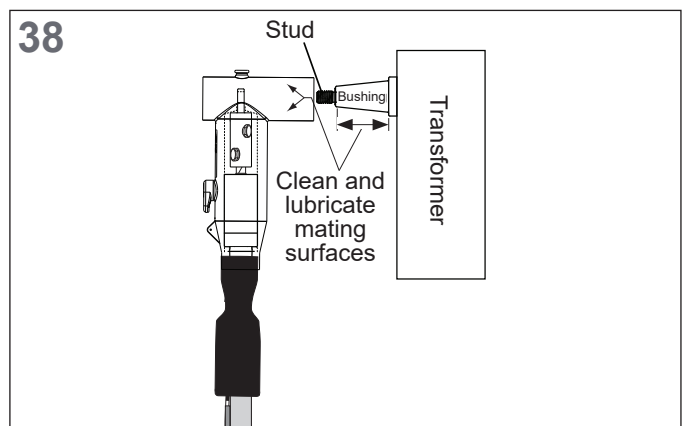
### NOTE

Ensure the "F" marking on the 5/8 threaded end is facing forward towards the bushing.

Hand tighten the thread stud into the equipment bushing.

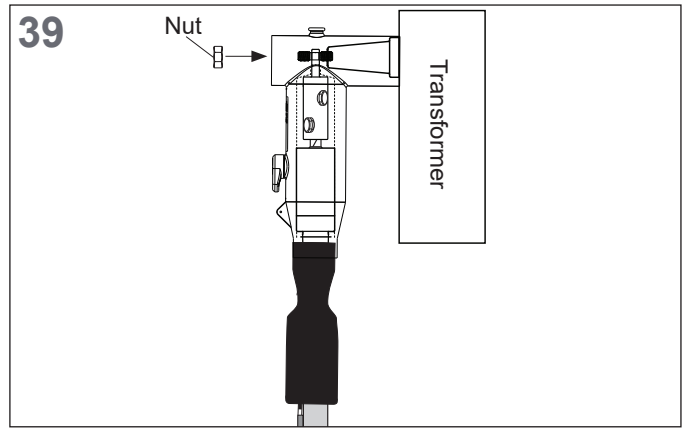
Clean mating surfaces with an approved HV cable cleaner. With the supplied grease, thoroughly lubricate the entire mating surfaces of the elbow and bushing.

Firmly push elbow onto the bushing.



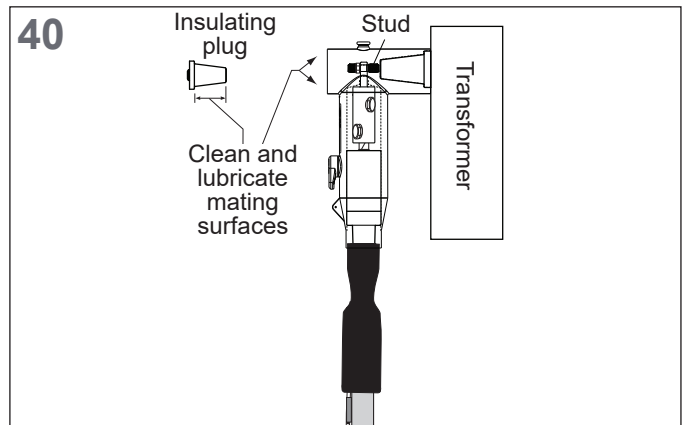
## Secure Connector

Insert hex nut into the body and thread onto the stud to hold the connector in place. Tighten the nut with a 24 mm socket to a torque of 55ft-lbs.



## Prepare Insulating Plug

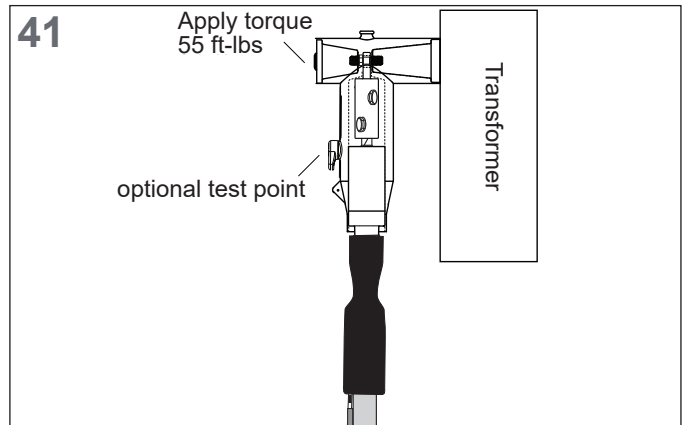
Clean and lubricate the mating surfaces of insulating plug and elbow interface.



## Install Insulating Plug

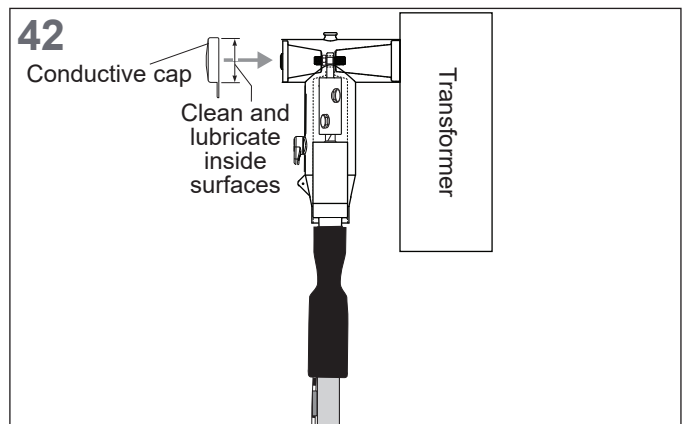
Push plug into the elbow and tighten to apparatus bushing using a torque wrench and 1" socket. Tighten plug clock-wise exerting 55 ft-lbs (75 Nm) of torque.

The insulating plug provides a capacitive test point for detecting system voltage. The ELBA-35-610 elbow has an integral capacitive test point on the body. Follow VOLTAGE TEST directions on page 13.



## Install Conductive Cap

Clean and lubricate inner surface of conductive cap with lubricant supplied. Push cap onto insulating plug until it snaps into place.

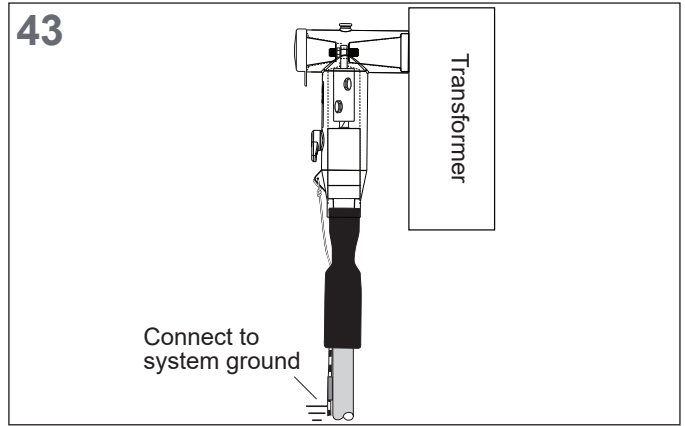


## Ground System

Connect grounding eye of the elbow with a min. #14AWG copper drain wire.

Connect ground to braid or a common ground point.

**Installation is complete.**



## Capacitive Voltage Test

The TE ELBA-35-610 elbow is provided with an integral capacitive test point on the body. Both the ELBA-35-600 and ELBA-35-610 elbow kits contain an insulating plug that has a test point as noted in steps 20 and 41. Complete the following steps to use the test point:

- Remove test point cap with a hotstick. Rather than pulling directly in line with the test point assembly. PEEL OFF AT AN ANGLE.
- Using a suitable sensing device, determine if the cable is energized.

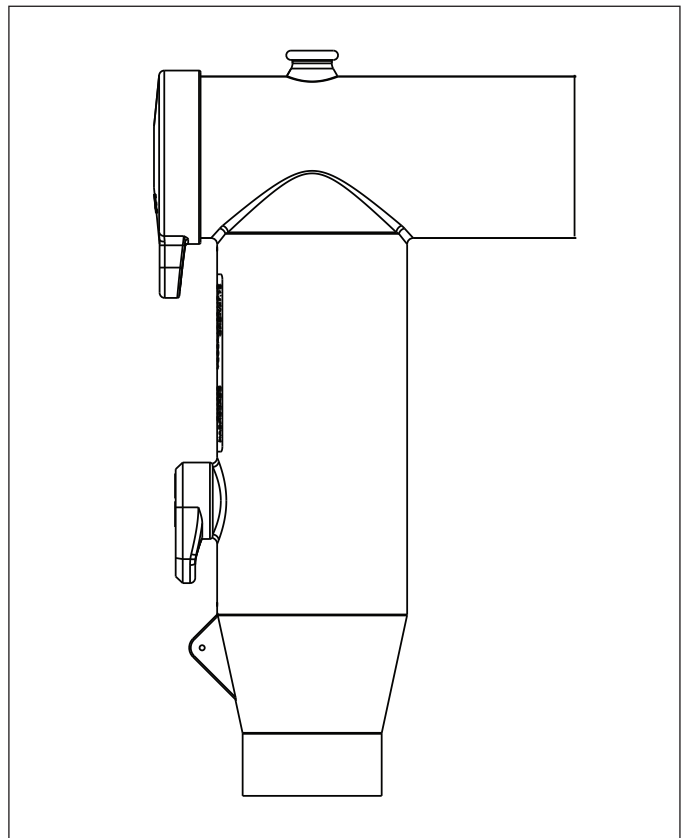
### **⚠ DANGER**

**Use only voltage indicating instruments specifically designed for capacitive test points. Use of conventional voltage sensing devices may provide a false “No Voltage” indication. The test point must be dry and free of contaminants when checking for voltage.**

### **⚠ DANGER**

**To prevent serious or fatal injury treat the elbow as energized until the “No Voltage” test point indication is confirmed by other means.**

- After voltage detection has been made, clean and lubricate the inside surface of the test point cap with silicone grease and replace it on the test point with a hot stick.



**For more information: [te.com/energy](http://te.com/energy)**

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**Please dispose of all waste according to environmental regulations.**

