

**Installation Instruction  
ESD-5312-AU-11/09**

**Outdoor Termination for  
Screened Single Core  
XLPE Insulated  
Cables 36kV  
120-185mm<sup>2</sup>  
without Armour  
with Fibre Optic and  
Composite Sheath**

**Type: OXSU-F**

ENDORSED BY	SIGNATURE	DATE
Wilfred Leung Principal Engineer—Mains RailCorp	<i>W. Leung</i>	28 . 11. 2009

APPROVED BY	SIGNATURE	DATE
Neal Hook Chief Engineer - Electrical Systems RailCorp	<i>N Hook</i>	27/11/2009

APPROVED BY	SIGNATURE	DATE
Andrew Thompson Product Manager Tyco Electronics	<i>A. Thompson</i>	22/12/09

# OXSU-FRCP10

Qty: 1

## Kit Contents

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3	x	HVOT-62/21-500/242	Non Tracking Termination Body - Coated 500 long
3	x	EPPA-222-90	Void Filling Mastic (Black)
3	x	S1085-3-300	Low Temp Sealing Mastic - 300 Long - Red
12	x	205W346-103/89	Skirt (Shed) - Red - Adhesive
<b>The above 4 items are packed in a box labelled OXSU-F6141</b>			
6	x	EPPA-004	Cleaning Tissue
9	x	S1085-3-300	Low Temp Sealing Mastic - 300 Long - Red
3	x	BLMT-95/240-13	Mech Shear Bolt Lug - 95/240 - M12 hole
3	x	BLMT-35/150-13	Mech Shear Bolt Lug - 35-150 - M12 hole
9M	x	EXRM-1956	Nylon Protective Tubing -9M long - white
6	x	S1061-8-300	Sealant Mastic - 300 x 60 - Black
1	x	EPPA-043-3-5000	Textile Tape 50mm X 5000Lg
7.5m	x	MWTM-16/5-A/U-4	Medium Wall Insulation Tubing (Fibre Cover Tubing)
3	x	BOCL-20-1064C004	Branch Cable Clip
3	x	MWTM-95/29-300/S	Medium Wall Insulation Tubing - Coated - 300 Long
3	x	EPPA-029-3-1000	Copper Tie Wire Binder- 1000 long
1	x	ESD-5312-AU-11/09	Installation Instruction

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ESD-1573-AU  
Page : 1 of 1

**Energy Division**

 **Tyco Electronics**

## **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 instruction.**

**Components or working steps may have been improved since you last installed this product.**

**Carefully read and follow the steps in the installation instruction.**

## **General Instructions**

**Use a propane (preferred) or butane gas torch.**

**Ensure the torch is always used in a well-ventilated environment.**

**Adjust the torch to obtain a soft blue flame with a yellow tip.**

**Pencil-like blue flames should be avoided.**

**Keep the torch aimed in the shrink direction to preheat the material.**

**Keep the flame moving continuously to avoid scorching the material.**

**Clean and degrease all parts that will come into contact with adhesive.**

**If a solvent is used follow the manufacturer's handling instructions.**

**Tubing should be cut smoothly with a sharp knife leaving no jagged edges.**

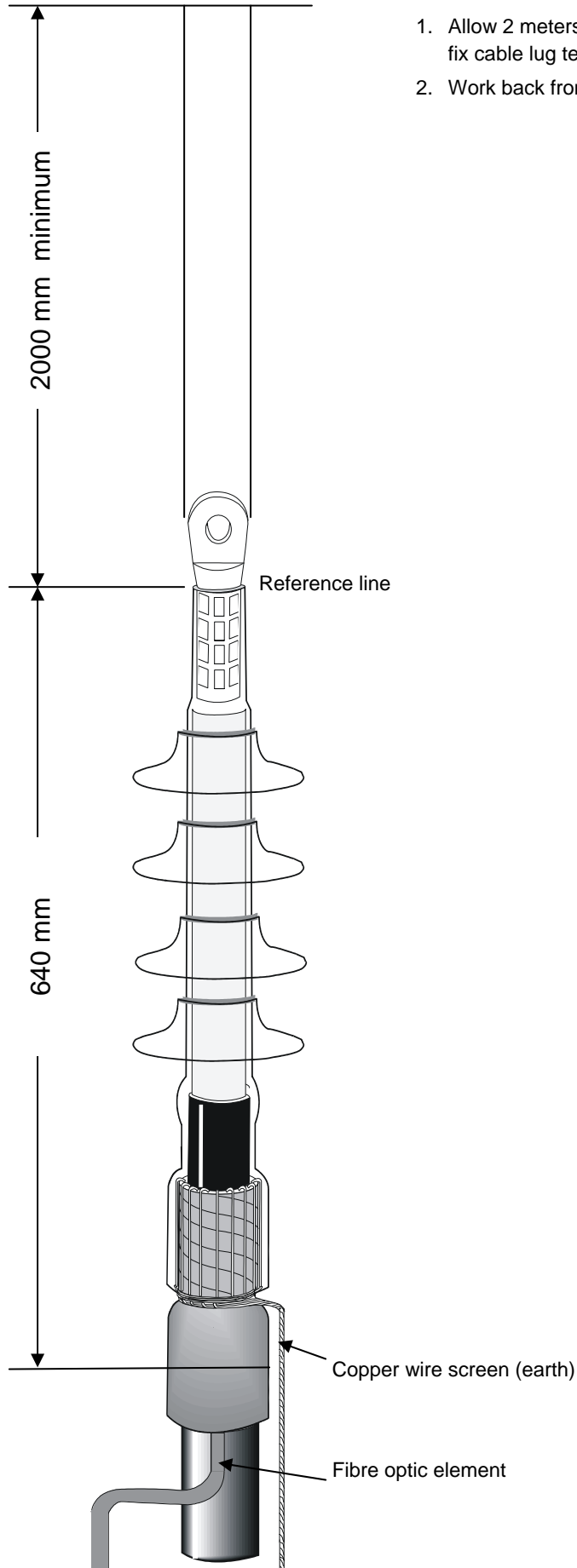
**Start shrinking the tubing at the position recommended in the instruction.**

**Ensure that the tubing is shrunk smoothly all around before continuing along the cable.**

**Tubing should be smooth and wrinkle free with inner components clearly defined.**

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, Tyco Electronics 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. Tyco Electronics' only obligations are those in Tyco Electronics' standard Conditions of Sale for this product and in no case will Tyco Electronics be liable for any other incidental, indirect or consequential damages arising from the use or misuse of the products. Raychem, TE Logo und Tyco Electronics are trade marks.

A1

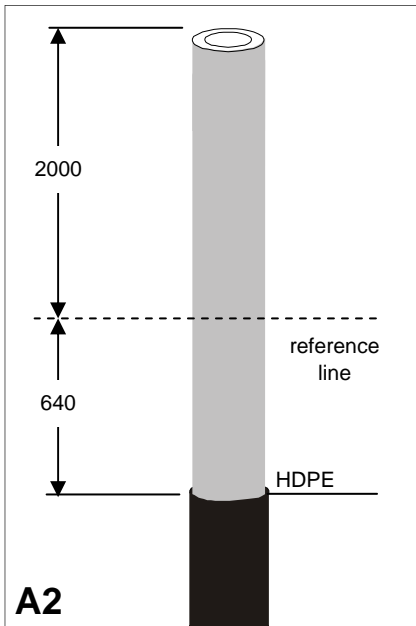


**General Layout**

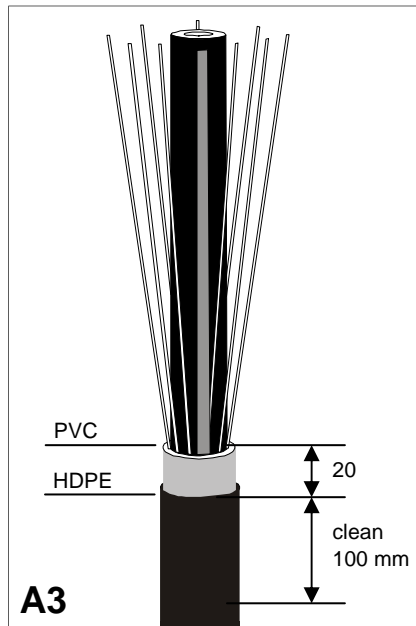
**Note: Dimensions may vary depending on specific construction criteria.**

1. Allow 2 meters + of cable beyond connection point. Establish this point and fix cable lug temporarily to insulator / surge arrester.
2. Work back from the reference line to construct cable termination.

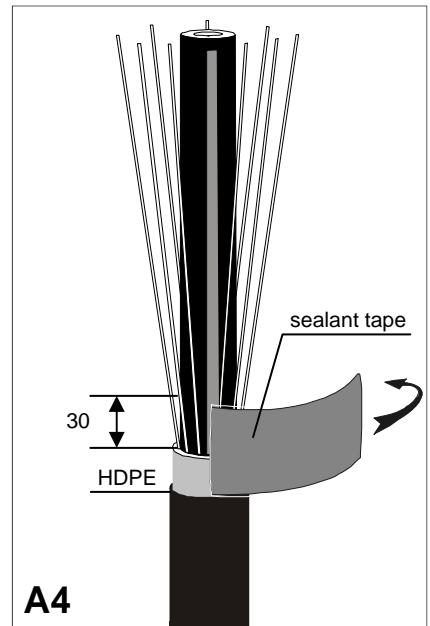
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**A2**  
Build the optical fibre exit from the cable by removing the outer layer of the composite sheath (HDPE) 640mm from reference line



**A3**  
Mark a point 20mm above the HDPE outer sheath cutback on the inner PVC sheath. Remove the inner PVC sheath upwards from this point. Clean and abrade the HDPE outer sheath for 100mm using the cleaning tissue provided in the kit.

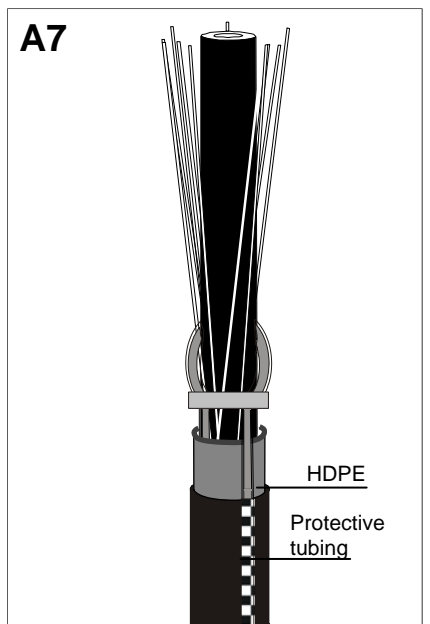
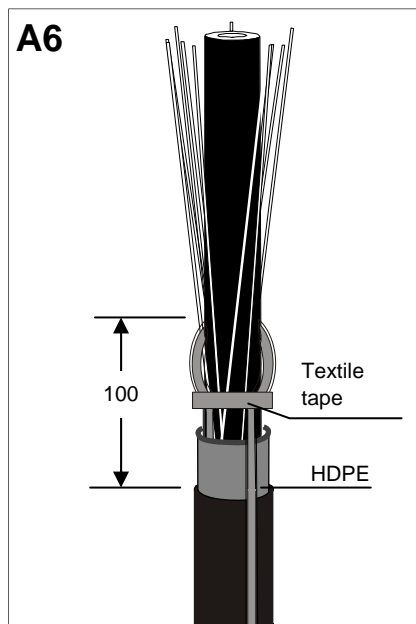
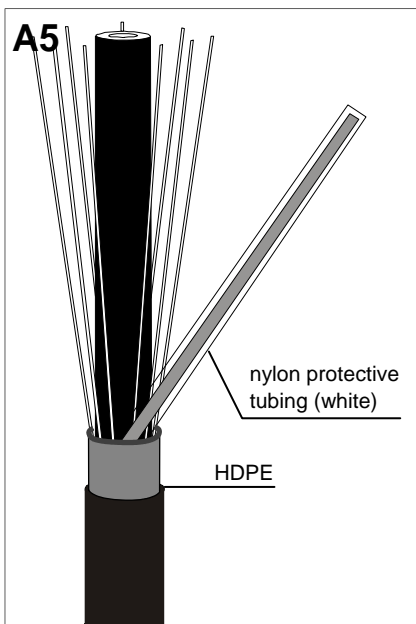


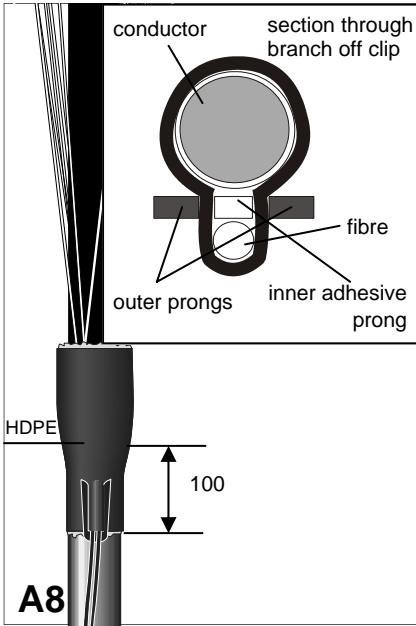
**A4**  
Starting from the HDPE outer sheath cutback and applying upwards, apply a stretched layer of sealant mastic (red) over the inner (PVC) sheath and onto the screen wires for 30mm.

Isolate the fibre optic element. Cut the required length of nylon protective tubing (white) and slide it over the optical fibre cable.

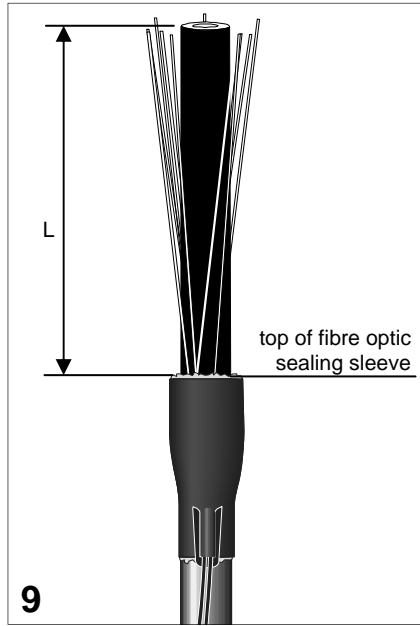
Within 100mm of the HDPE outer sheath cutback, "dress" the fibre optic element around and back down the cable. Gentle heat should be applied to the nylon tubing to facilitate forming, so undue stress is not applied to the fibre element. Secure with textile tape as required. Profile this area with black mastic strips to form a regular diameter in the region of the optic fibre (profiling not shown for clarity.)

Cut the required length of black protective tubing and position it over the nylon tube. Position this tubing level with the HDPE outer sheath cutback.





Position the fibre optic sealing sleeve 100mm lower than the HDPE outer sheath cutback. Fit the branch of clip as shown and shrink the sealing sleeve into position.



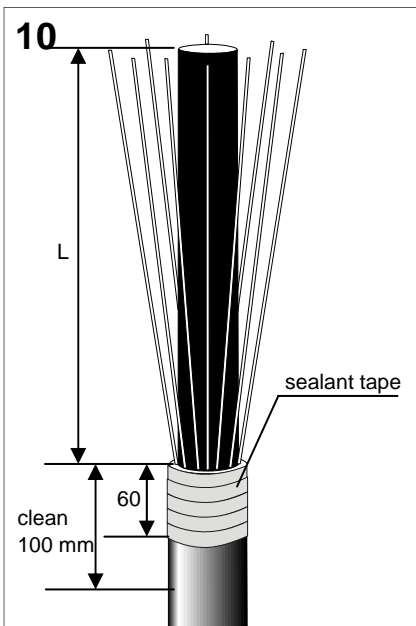
**Important:**  
The installation of the fibre optic sealing sleeve, reinstates a conventional outer sheath layer. The standard termination is then constructed using the top of the fibre optic sealing sleeve as the datum point for cutting the cable length (L) as shown in Tables 1 and 2.

Cut the cable to the required length from the top of the fibre optic sleeve according to dimension L (see table 1) for crimp lugs. For mechanical lug BLMT see table 2. Degrease and clean the end of the fibre optic sealing sleeve for about 100mm using the cleaning tissue in the kit. Wrap the red sealant tape around the end of the fibre optic sealing sleeve for 60mm.

**Table 1**  
**Crimp Link 33kV**

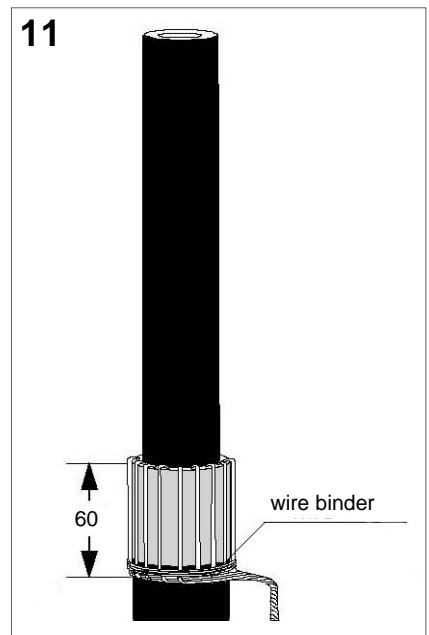
L
[mm]
440

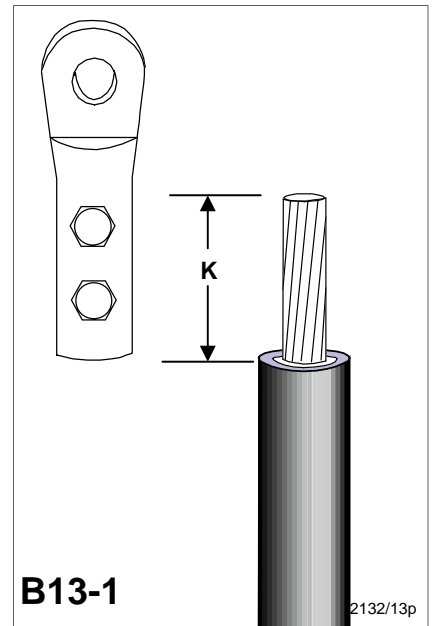
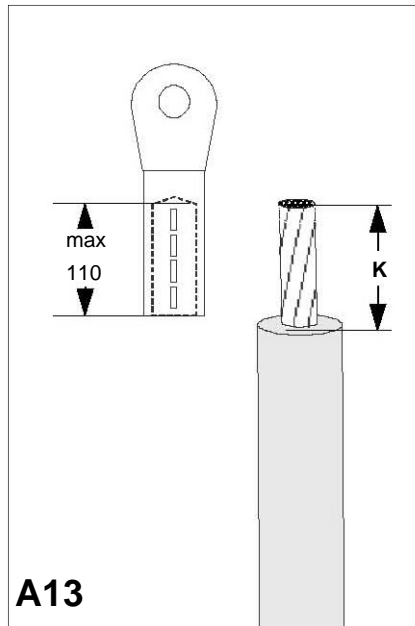
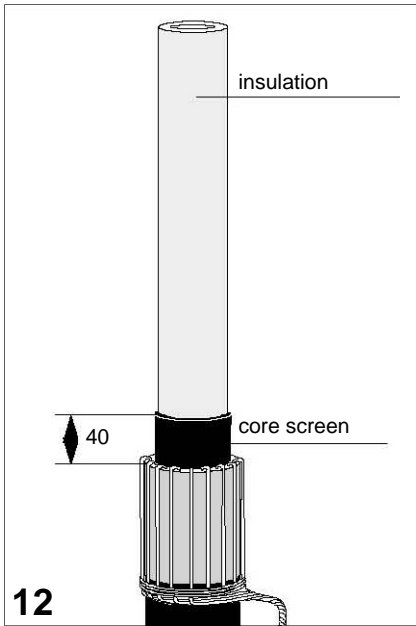
Bend the shielding wires back onto the sealant tape. Avoid crossing the individual wires.  
Fix the shielding wires with a wire binder 60 mm from the end of the fibre optic sealing sleeve.  
Gather the shielding wires together to form an earth lead.



**Table 2**  
**Mechanical Lug BLMT 33kV**

120-185
L
[mm]
425





Thoroughly remove the core screen to 40mm from the fibre optic sealing sleeve. The surface of the insulation should be free from all traces of conductive material. Smooth out any irregularities.  
**Note:** Do not nick the insulation.

### Installation with crimp link

Cut back the insulation according to dimension **K = depth of cable lug barrel hole + 5mm**. Wire brush the conductor and install the cable lug. Degrease and clean the core insulation and the lug using the cleaning tissue supplied in the kit.  
**Note:** Do not use cable lugs with barrel holes deeper than max. 110mm.

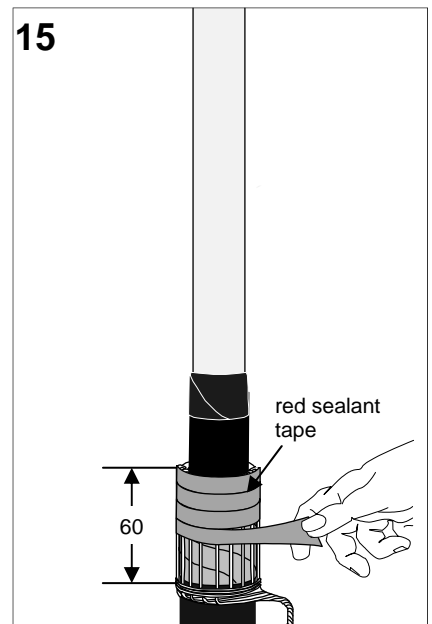
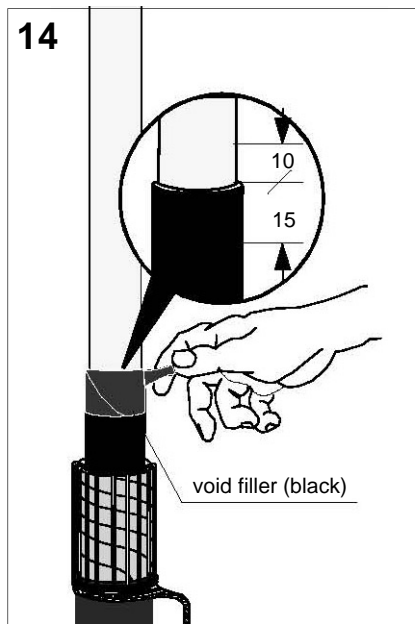
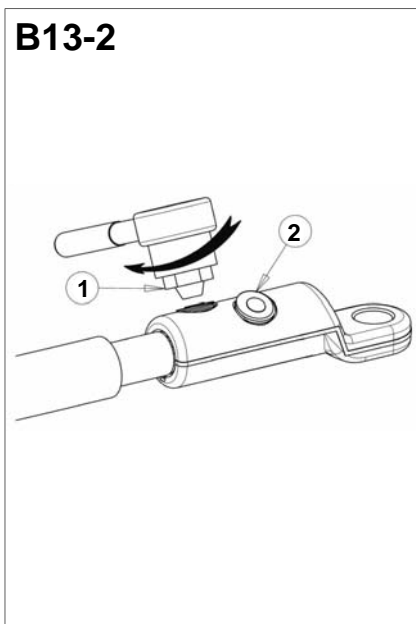
### Installation with mechanical connector

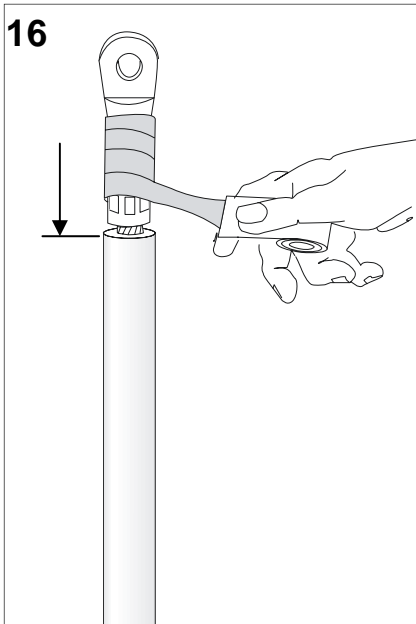
Cut back the insulation according to dimension **K = depth of cable lug barrel hole**. Wire brush conductors. Insert conductors so that the insulation butts up to the end of the connector. Degrease and clean the core insulation and the lug using the cleaning tissue supplied in the kit.

If the larger x-sections are not insertable, remove inserts from the connector bore. Hand-tighten the shear bolts fixing the conductors in place. By half turns, alternatively tighten the shear bolts with a socket wrench following the sequence in the drawing until shear off. The Tyco Electronics battery operated impact wrench IT-1000-023 may be used.

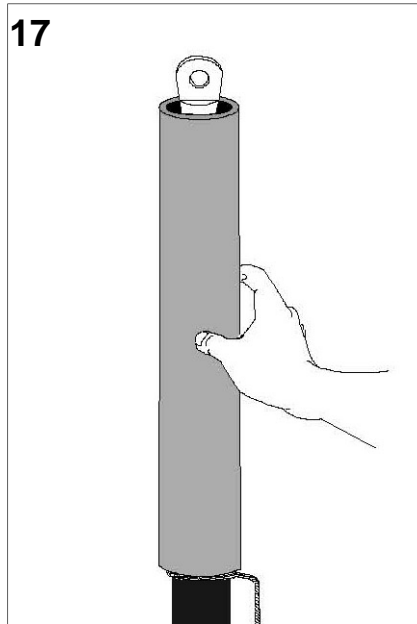
Remove the release paper and wrap the void filling strip (black) around the end of the core screen. Cover 15mm of the core screen and 10mm of the insulation.

Wrap one layer of sealant tape (red) with slight tension starting at the top of the screen wires downwards for 60mm.

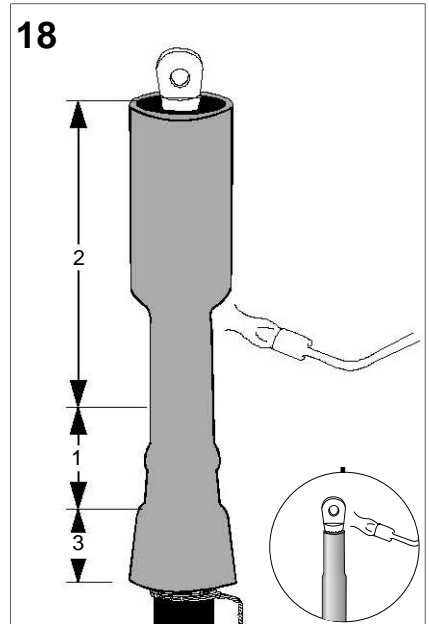




Wrap the red sealant tape around the barrel of the cable lug stretch the tape to half of its width and apply with half overlay. Use the remaining red sealant to fill in the space between the core insulation and the cable lug to leave a smooth transition.  
**Note:** Ensure the top bolt of the mechanical lug is covered.



Preheat the cable lug slightly before placing the tubing over the core. The bottom end of the tubing should be level with the wire binder.

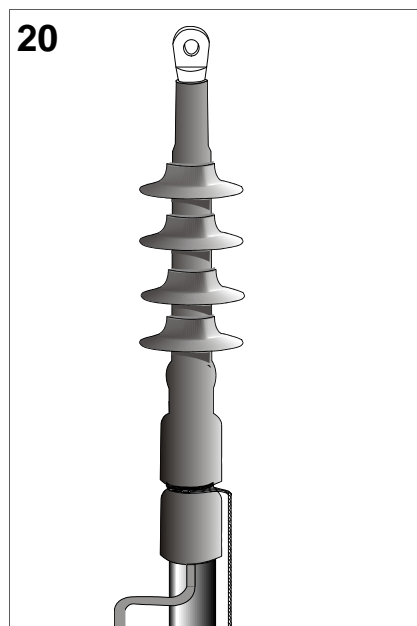
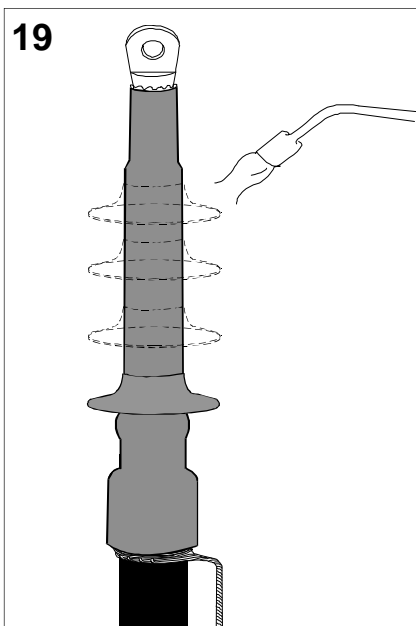


Shrink the tubing down starting at the screen cut **using a soft yellow flame**. Heat the area well but avoid scorching of the surface. Continue shrinking towards the cable lug. Shrink down the bottom end of the tubing. The numbers in the drawing indicate the shrink sequence. Post heat the palm of the cable lug until a bead of mastic is seen around the top of the tubing.

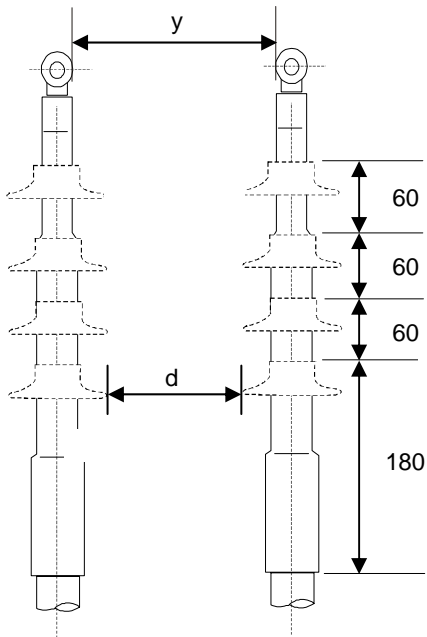
**For outdoor terminations:**

Shrink the skirts into place at the position shown in the drawings on the back page. Start with the first skirt on the lowest position.

**Fibre optic termination complete**

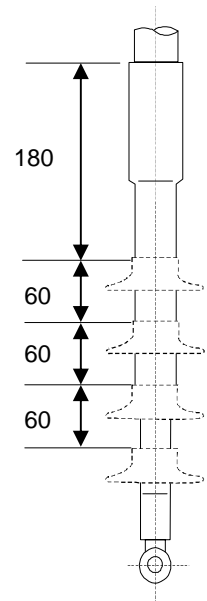




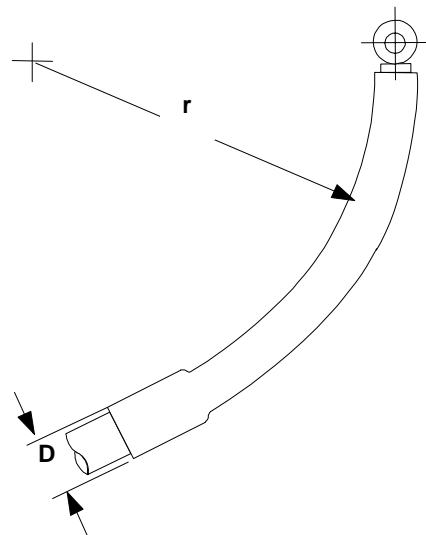
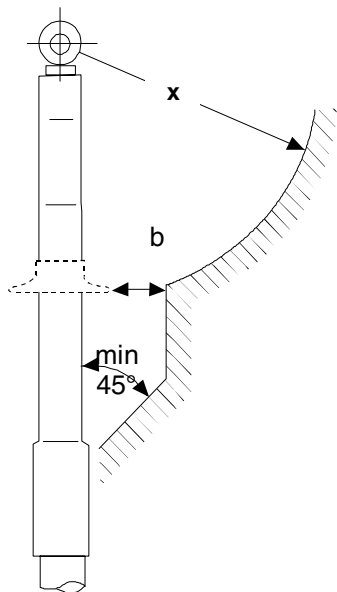


Number of skirts	
kV	Outdoor
36	4

skirt position for reversed installation



Minimum bending radius and clearances



Min. clearances	Max. system voltage (kV)
	<b>36</b>
Air Clearances	
<b>x</b> phase to ground (200kV BIL) [mm]	380
<b>y</b> phase to phase (200kV BIL) [mm]	440
<b>b</b> ph/ground [mm]	35
<b>d</b> between skirts [mm]	25
<b>r</b> min. bending radius $15 \times D$	

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