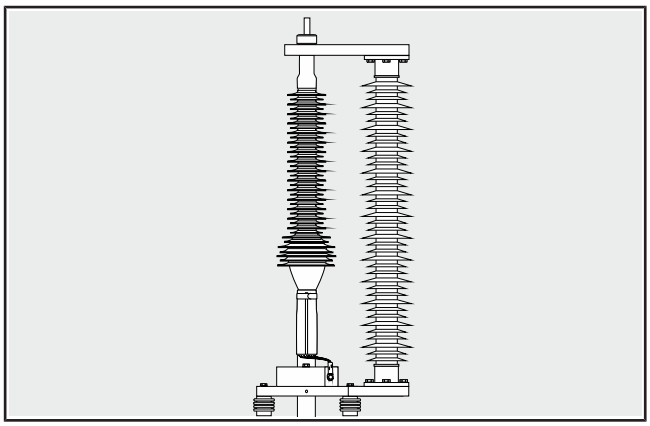
INSTALLATION INSTRUCTIONS

OHVT-FS

EPP-3402-9/24

Dry Type Flexible Termination with Self-Supporting Insulator for Polymeric Insulated Cables with Wire Shield

Up to 145 kV



Cable Accessories

For more information: te.com/energy

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Please dispose of all waste according to environmental regulations.

Table of Contents

1 Important - Read Before Starting

1.1 Intended Use

The kit is intended to be used only for applications as specified in the header of these installation instructions. Any use which does not comply with the intended use will result in an unsafe operation of the installed product.

1.2 Responsibility of Users and Installers

As TE is not familiar with the cables used and the individual installation and installation conditions, it is beyond TE´s responsibility whether the individual installation is appropriate, in particular safe and compliant with the applicable local rules and regulations. The user and/or installer shall care for the conditions under which the individual installation will take place and safeguard a safe, appropriate, and compliant installation.

1.3 Read before Starting the Installation

Make sure that the kit complies with the cable specification. Refer to the kit label as well as the product description and the application named on the header of the installation instructions.

Please note: Components or working steps may have been modified since you last installed this product. Carefully read and follow the steps in the installation instructions.

1.4 General Instructions

Check the cable ends for moisture, if not properly sealed. In case of moisture, cut away enough cable length to remove all moist material.

When shrinking strictly follow the instructions, in particular the working direction of the shrinking procedure.

It is the installer’s responsibility to find the appropriate method of cleaning all parts without leaving any residues.

Clean and degrease all parts that will come into contact with adhesive. If a solvent is used, make sure to follow the manufacturer’s instructions.

1.5 Preparation of the Installation Area

- Check the cable ends for moisture, if not properly sealed. In case of moisture, cut away enough cable length to remove all moist material.
- Before cutting the cable, make sure it is in the final installation position. Do not move after cutting.
- Make sure the cable/s is/are straight in the jointing area (not curved or bent). Refer to the chapter ‘Heating & Straightening’.
- Cable must be correctly aligned with the final position of the accessories and must be secured.
- Make sure the trench/installation area provides adequate space and free length to park the cable components safely so that they do not interfere during installation or can be damaged.
- The installation area must be kept clean and dry during installation. For outdoor installation, use tent or other appropriate shelter.
- All tools, PPE and apparatus used must be kept clean during the installation.
- Obey relevant and local security and safety rules during the installation.

1.6 Stripping the Cable

- Use appropriate stripping tools for smooth and even insulation diameter.
- Adjust the stripping tool to the thickness of the semi-conductive layer.
- Avoid removing too much of the insulation.
- Polish the stripped surface by hand using the supplied abrasive paper beginning with the lowest grid size, or by an appropriate sanding machine and abrasive paper and grades. The surface of the insulation must be even, and free of all traces of conductive material.

1.7 Safety Instructions for Heat-Shrinking

- 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. Avoid pencil-like blue flames.
- Keep the flame moving continuously to avoid scorching the material.
- Keep the torch aimed in the shrink direction to preheat the material.
- Ensure that the tubing is shrunk smoothly all around before continuing.
- The shrunk tubing should be smooth and wrinkle free with inner components clearly defined.

2 Straightening and Heating of the Cable

- Before starting the cable preparation, train the cable end in the straight installation position and fix it.
- Heat and straight the cable for the length of complete installation.
- If the cable has graphite coating, cover the cable with one layer of crepe paper.
- Degrease and clean the oversheath.
- Heat the cable by applying a heating device to the oversheath. Refer to the table for heating time and temperature.
- Before stripping to the required dimensions, cool down the cable to ambient temperature using the slide rails.

Table 1: Heating Period

Cable Cross Section	Heating Time/Temperature
up to 400 mm²	4 h / 80 °C
up to 1200 mm²	5 h / 80 °C
up to 2500 mm²	6 h / 80 °C

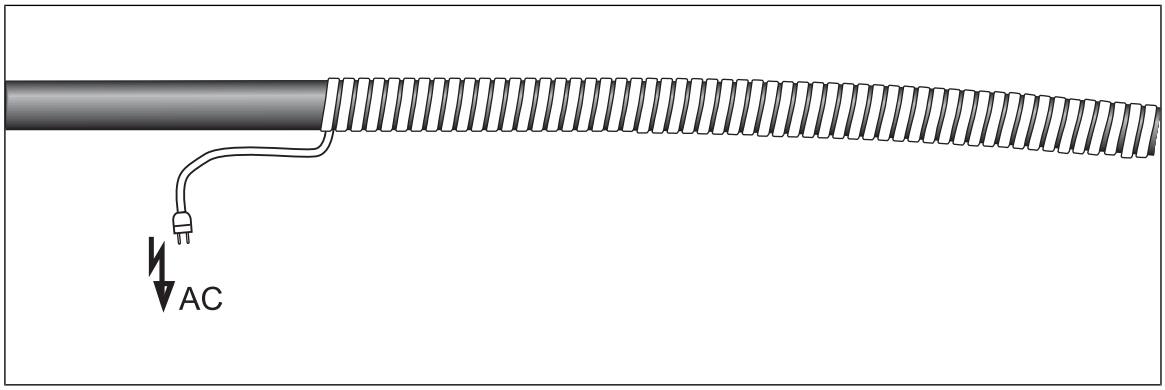

Figure 1

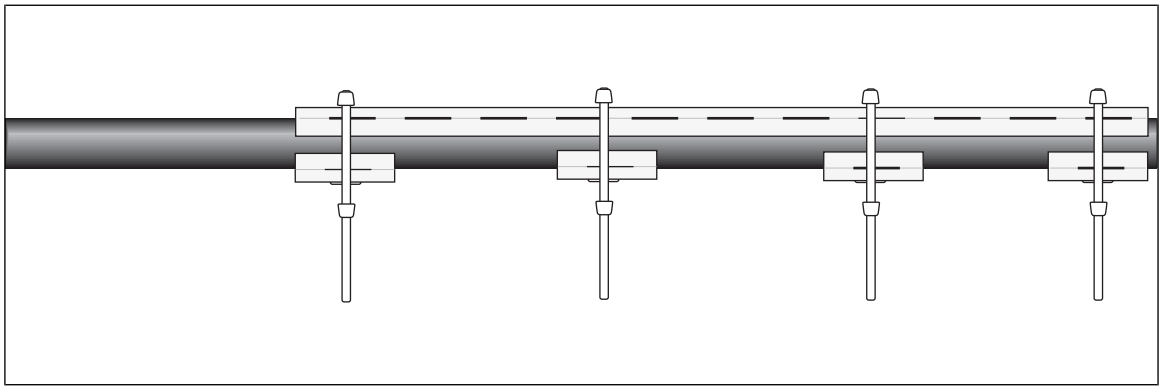

Figure 2

3 Marking Reference Lines

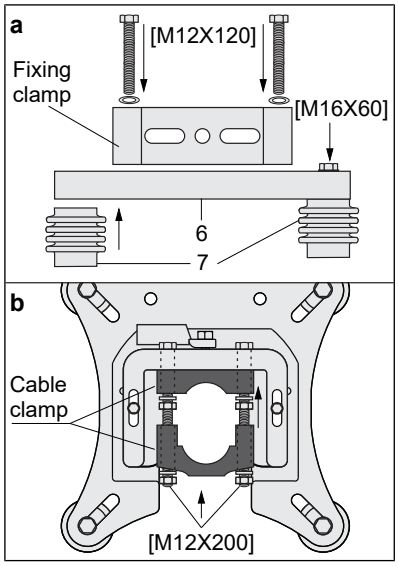

Figure 1

1. Position the support insulators and base plate on the support rack.
2. Temporarily fix the support insulators (7) to the base plate (6) with the larger screws.

NOTICE

If necessary, check and adjust the bores on the support rack.

3. The support insulators have to be installed in a plane.
4. If there is a gap between the support rack and any of the support insulators, use the inserting noncorrosive metal spacers to adjust it.
5. Firmly fix the support insulators to the support rack.
6. Place fixing clamp and cable clamp into the base plate. Make sure it fits properly (see figure1a & 1b).

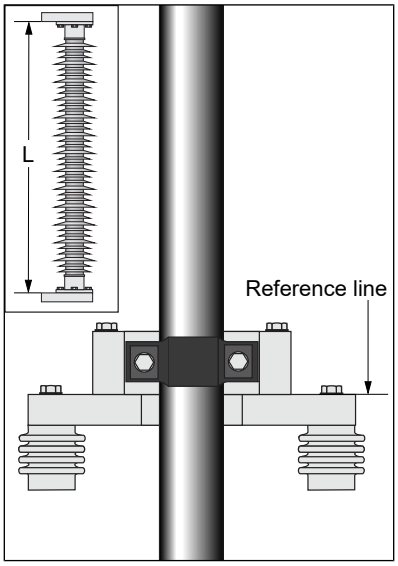

Figure 2

7. Mark the cable as shown from the uppermost edge of the base plate using a marking pen or PVC tape as shown. Make sure that the remaining cable length above the reference line is greater than **L**.

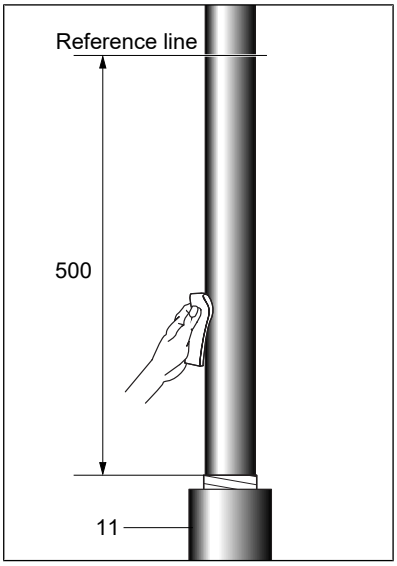

Figure 3

8. Remove the cable clamp and base plate to have sufficient installation space.
9. Remove the graphite coating or any semiconductive layer, if any, up to500 mm below and above the reference line and clean the cable.
10. Cover the cable with crepe paper below the cleaned surface for protecting the long tube. Slide the long tube (11) over the covered cable surface.

4 Cable Preparation

4.1 Cables with Wire Shield and Laminated Foil

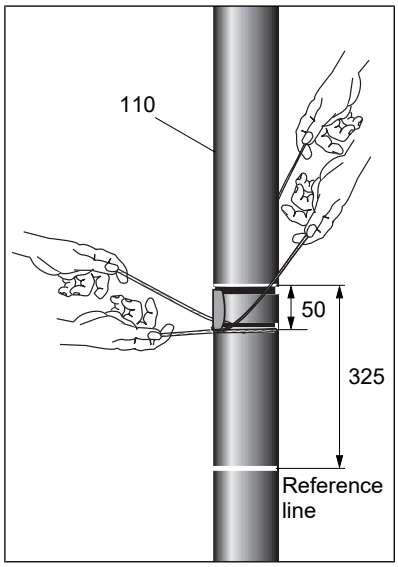

Figure 1

1. 325 mm above the reference line, cut through the outer jacket (110) with the supplied yellow string.
2. Remove the outer jacket from the AL foil (106) by slicing segments away with the string as shown.

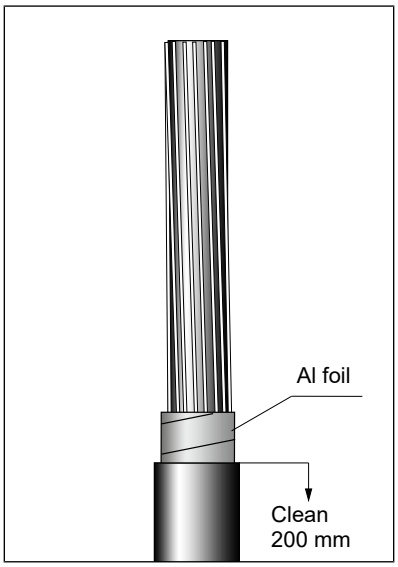

Figure 2

3. Clean the metal foil from oversheath traces.
4. Protect the metal foil with a PVC tape. Remove the oversheath, foil, and bedding.
5. Clean the end of the oversheath for up to 200 mm.

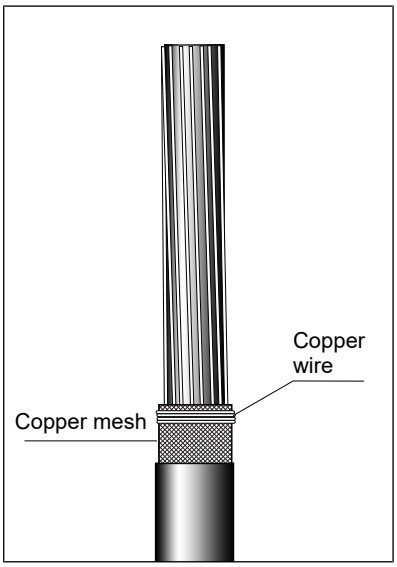

Figure 3

6. Break the edge of Al foil with a rough file.
7. Remove the PVC tape.
8. Smooth the surfaces of the Al foil with a very fine grinding cloth.
9. Wrap three layers of Cu-mesh over the Al foil. Fix the Cu-mesh in place with a wire binder.

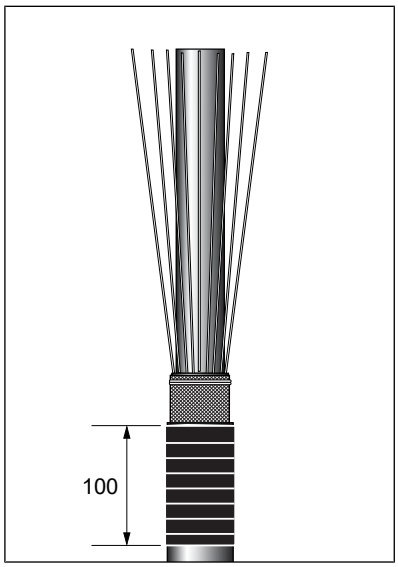

Figure 4

10. Apply black mastic on 100 mm of the oversheath.

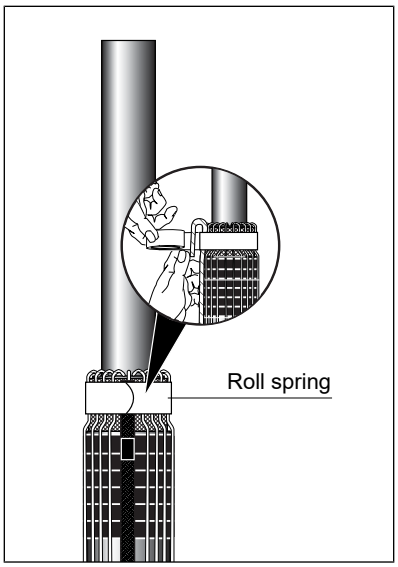

Figure 5

11. Bend back the screen wires.
12. Install the roll spring around the screen wires and fix the copper braid as shown in figure.
13. Tighten the roll spring with a twisting action.
14. Protect the roll spring with PVC tape.

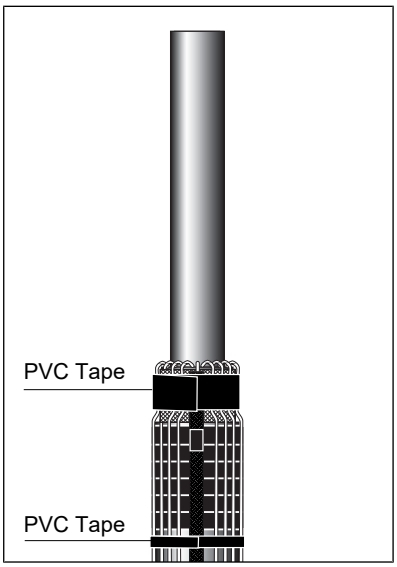

Figure 6

15. Fix the wires and copper braid to the oversheath just below the mastic temporarily by using PVC tape.

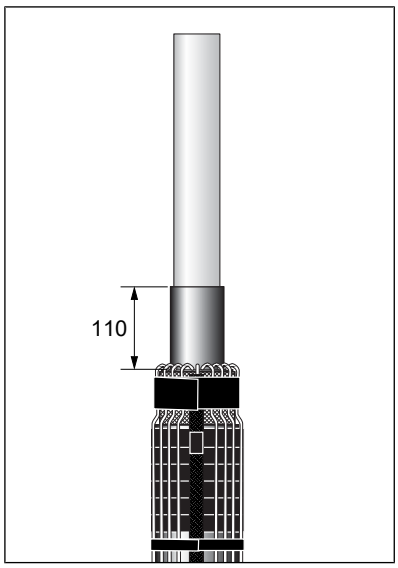

Figure 7

16. Thoroughly remove the core screen to within110 mm of the laminated foil cut. The surface of the insulation should be free from all traces of conductive material.

NOTICE

When stripping the core screen, make sure the cutting depth of the stripping tool is adjusted accurately so it removes the outer semicon layer entirely but does not cut into the insulation.

Continue with Chapter *Preparation of Insulation and Core Screen* on page 10.

4.2 Cables with Wire Shield

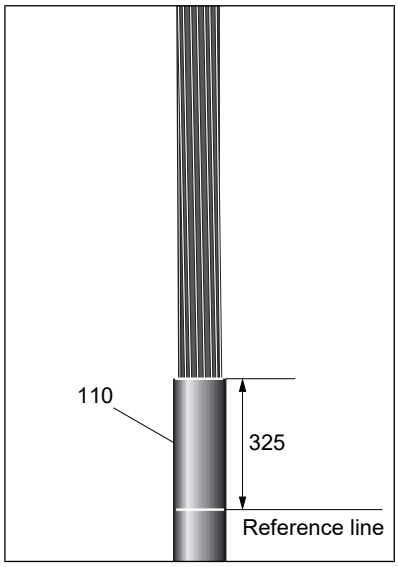

Figure 1

1. Starting 325 mm above the reference line, remove the outer jacket (**110**) of the cable as shown.

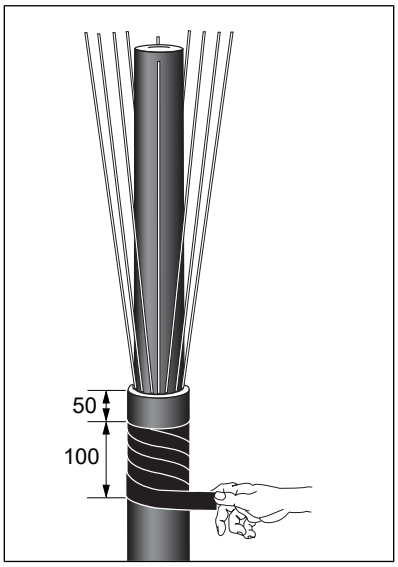

Figure 2

2. Starting from 50 mm below the oversheath cut, apply mastic (black) over 100 mm of the oversheath.
3. Bend back the screen wires.

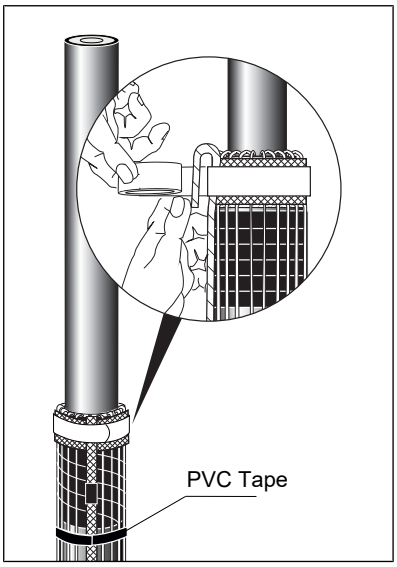

Figure 3

4. Apply one layer of copper mesh around the oversheath cut covering the screen wires.
5. Fix the screen wires and copper braid to the copper mesh with the roll spring.
6. Tighten the roll spring with a twisting action. Protect the roll spring with PVC tape.
7. Fix the wires and copper braid to the oversheath just below the mastic temporarily by using PVC tape.

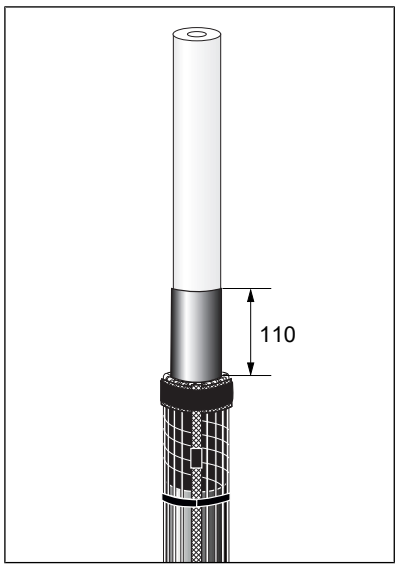

Figure 4

8. Thoroughly remove the core screen to within 110 mm of the oversheath cut. The surface of the insulation should be free from all traces of conductive material.

NOTICE

When stripping the core screen, make sure the cutting depth of the stripping tool is adjusted accurately so it removes the outer semicon layer entirely but does not cut into the insulation.

Continue with Chapter *Preparation of Insulation and Core Screen* on page 10.

4.3 Preparation of Insulation and Core Screen

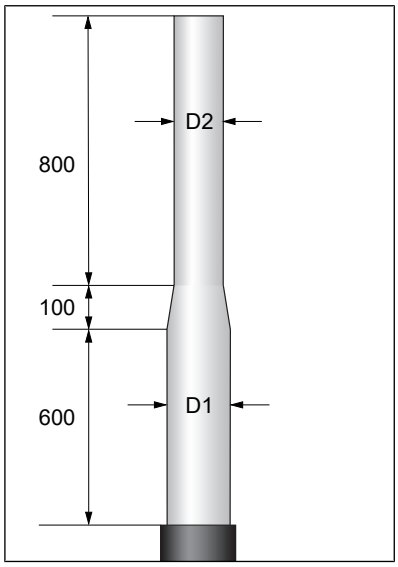

Figure 1

1. Prepare the first half of the cable end to have a diameter Ø D1 for a length of 600 mm.
2. A transition is done for 100 mm and the remaining cable length must be within the range of Ø D2.

See table for the diameter values as well as the drawing for the length dimensions.

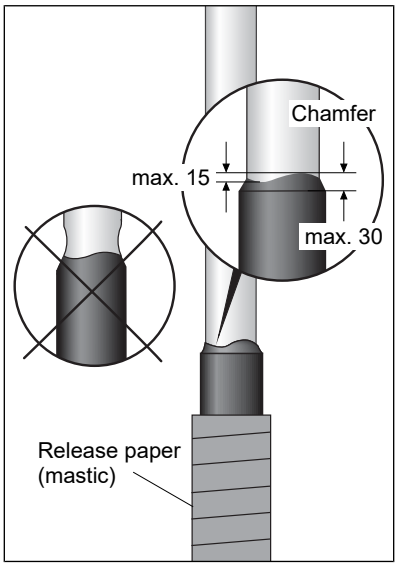

Figure 2

3. Protect the black mastic below the oversheath cut from contamination using the release paper.
4. Chamfer the outer semicon layer on the cut between 20 - 30 mm as shown.
5. Polish the whole length of insulation.

INFORMATION

Make sure that the transition from the outer semicon layer to the insulation corresponds in terms of shape and max. height with wave form in detail.

NOTICE

Do not nick the insulation.

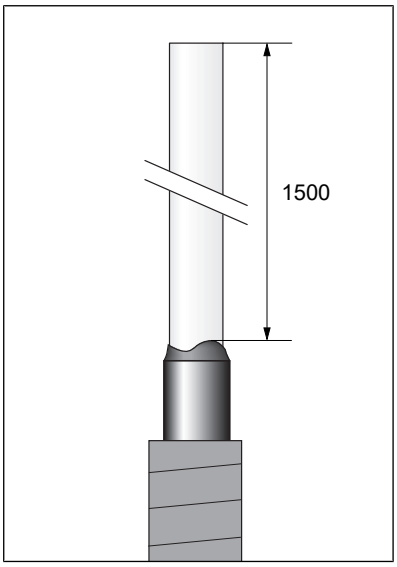

Figure 3

6. Measure the inner length of the silicone body and verify if it is around 1500 mm.
7. Cut the cable according to dimension.

Table 2

Insulation diameter D1 (mm)	Treated Insulation diameter D2 (mm)	Stress Cone inner diameter (mm)	Silicone Body
46.0 - 50.0.0	47±0.5	41.5	DFBODY-46/50
49.5 - 57.0	51.5±0.5	45	DFBODY-49.5/57
56.6 - 63.5	58.6±0.5	51	DFBODY-56/63
63.5 - 71.3	65.5±0.5	58	DFBODY-63/71
71.0 - 78.7	73±0.5	64	DFBODY-71/78

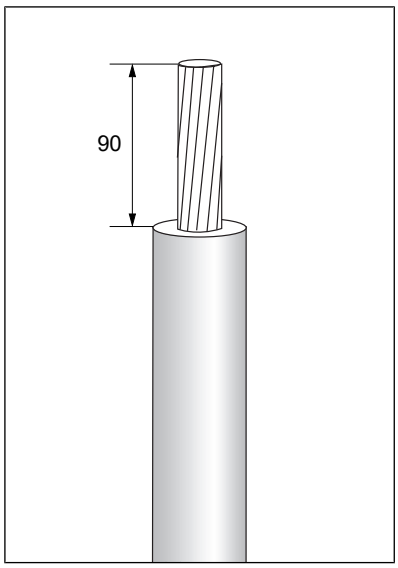

Figure 4

8. Cut back the insulation according to the dimension as shown.

NOTICE

Removal of waterblocking materials must be carried out. Check if the diameter over cable conductor is within the application range of cable lug according to packaging label.

5 Completion of Termination

1. Slide the heat shrink tube over the outer sheath.
2. Measure the diameter D1 and D2 over the prepared insulation and verify if the measured values lie within the application range for the silicone body, see Table 1.

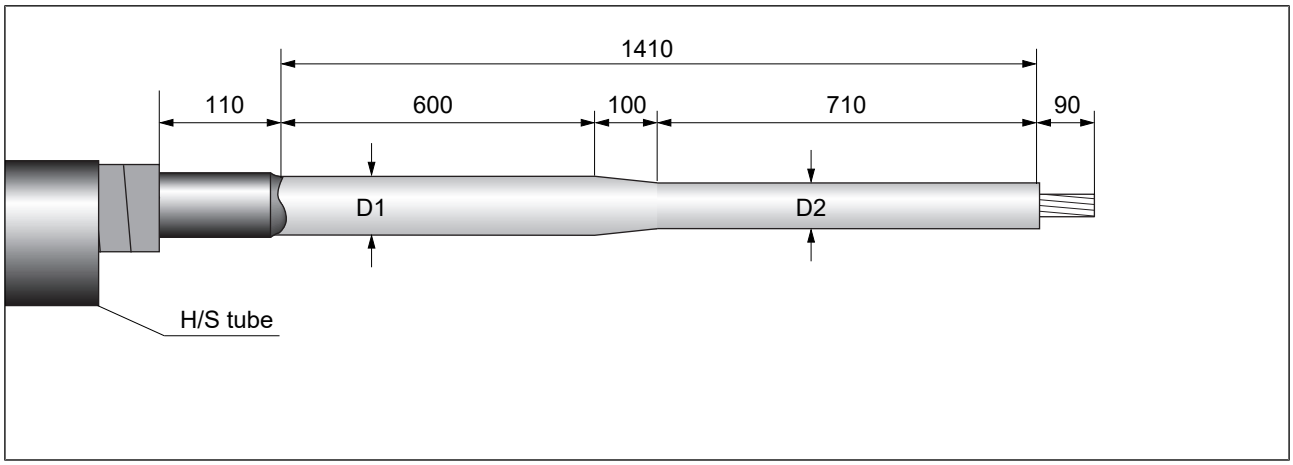

Figure 1

3. Wrap some layer of textile tape onto the conductor to hold the adapter straight on the conductor.
4. Place the adapter on the cable conductor.
5. Protect the conductor with PVC tape.
6. From the highest wave of the semi-con cut mark 70 mm as shown.

NOTICE
Wash and clean your hands before.

7. Wrap a stopper of red PVC tape behind the mark of 70 mm as shown. Thickness of stopper tape must be 15 mm.
8. Clean the cable insulation.
9. Thoroughly lubricate the cable insulation from 170 mm above the mark. Lubricate the inner part of the silicone body with the silicone grease supplied using the PVC stick. Check the inside of the body and make sure that the silicone grease covers the inner surface evenly.

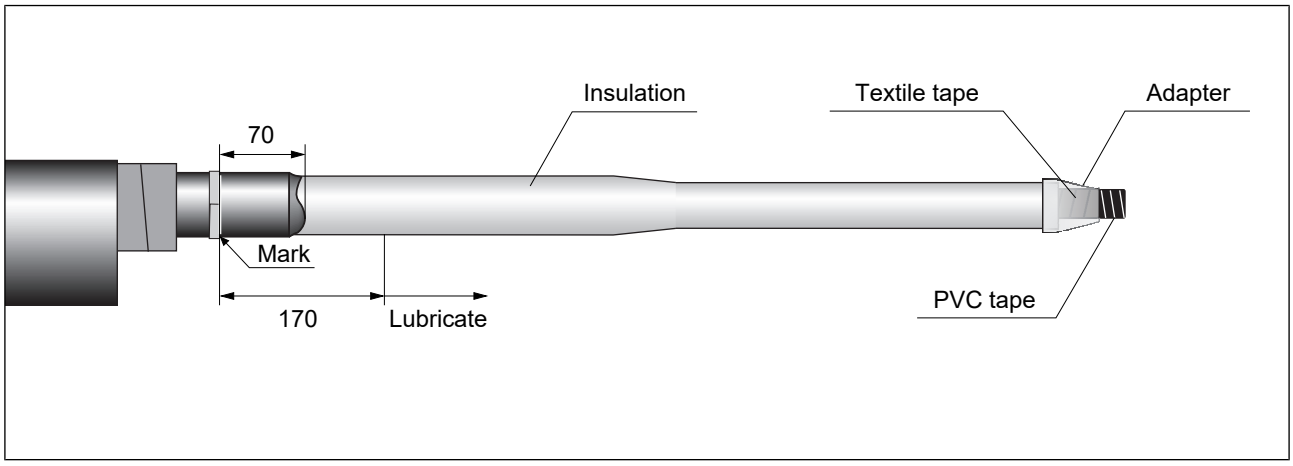

Figure 2

10. Ensure that the silicone body is straight by using the supporting structure materials and packaging.

11. Push the silicone body by using the push-on tool onto the cable core until its collar reaches the marking.

NOTICE

Be careful when pushing the silicone body close to the mark. It must not be moved beyond the 70 mm mark. Make sure to only push the body, do not pull.

The length of the silicone body should not be extended during installation.

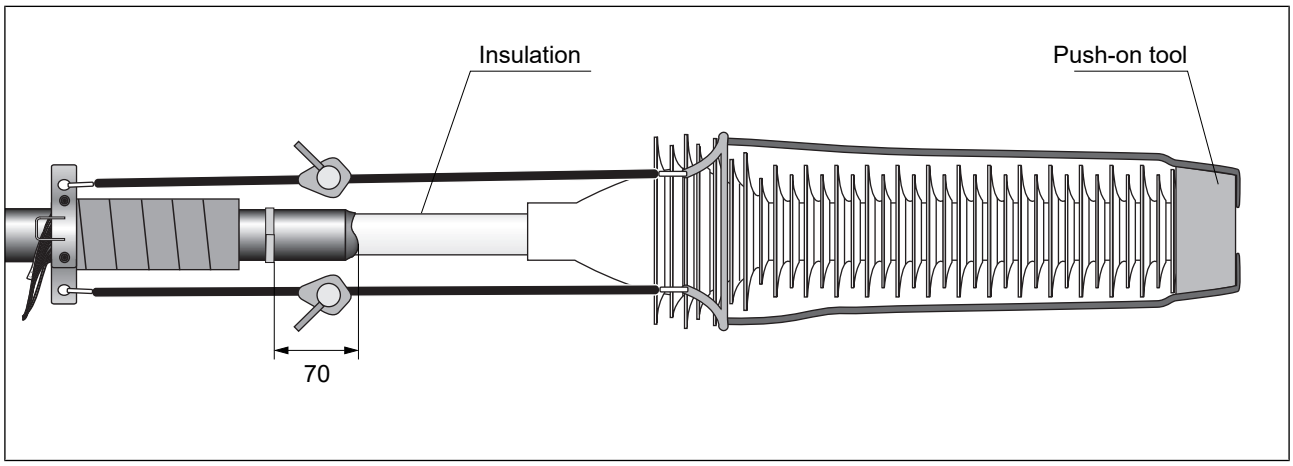

Figure 3

12. Slightly twist the sheds at the top till the top of body is level with the cable insulation cut.
13. Remove PVC tape, textile tape and cone from the conductor.
14. Dismantle the pushing tool.

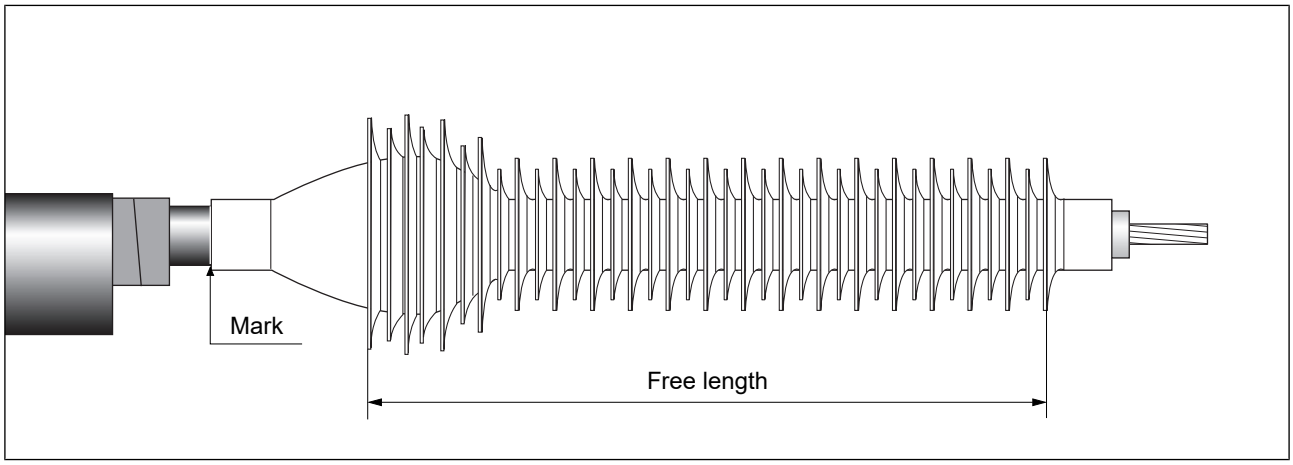

Figure 4

15. To check the elongation of the body after pushing, free length of the body is measured, and this should be in the range of 1110 mm – 1140 mm.

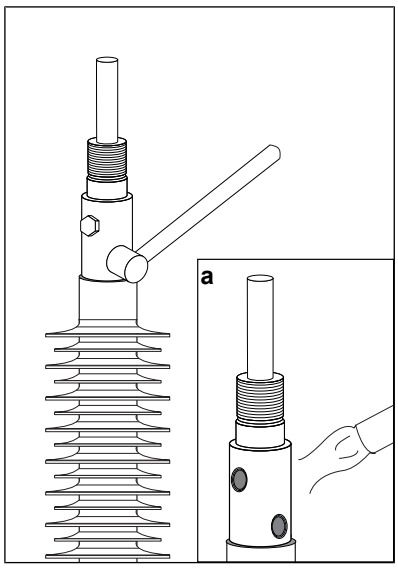

Figure 5

16. Tighten the bolts of the lug.
17. Shear off the bolts starting with the lower one. Use a common box spanner or spanner.
18. Degrease and clean the lug (1) and the cable insulation (103).
19. Heat the lug.

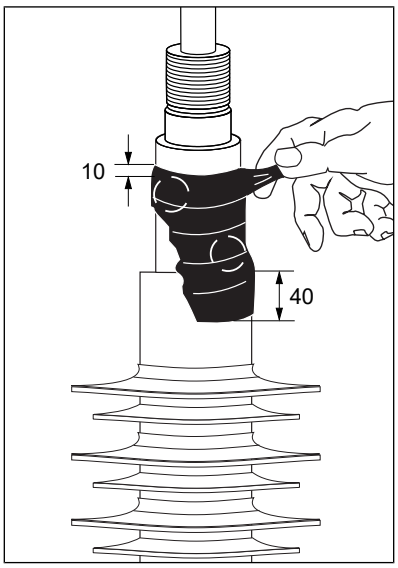

Figure 6

20. Apply 1 - 2 layers of black mastic on the cable lug and build a smooth transition between the silicone body and the lug.
21. Start 10 mm above the upper bolt & stop 40 mm below the lug on the silicone body.

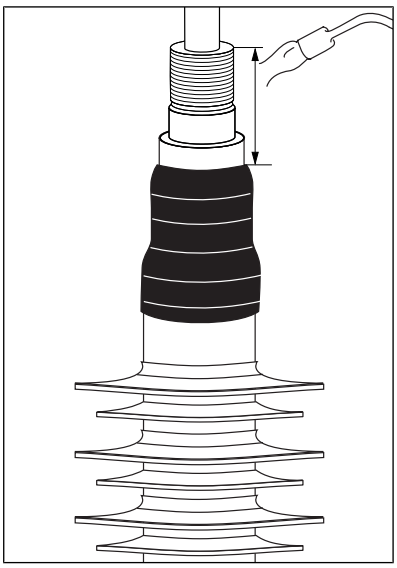

Figure 7

22. Heat the exposed metal part of the lug.

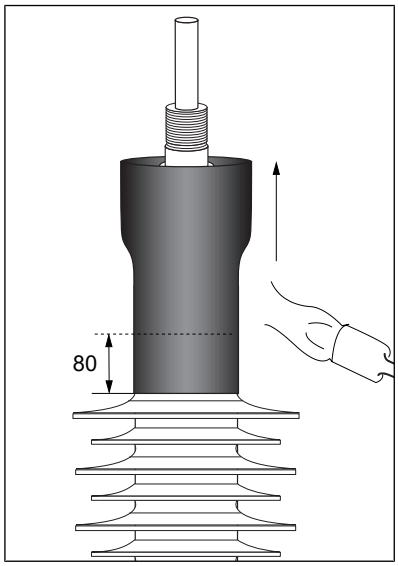

Figure 8

23. Position the sealing sleeve so that it covers the connector barrel and overlaps the silicone body by 80 mm.
24. Shrink it into place, starting at the bottom.

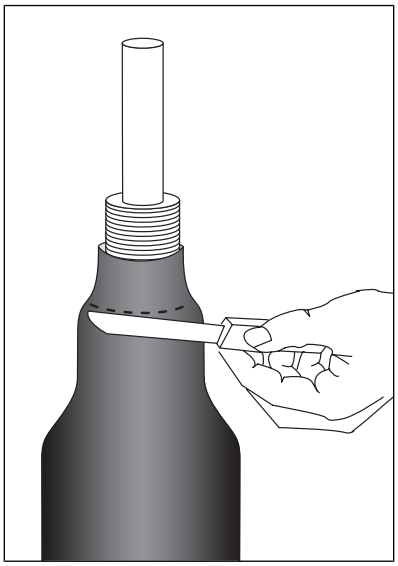

Figure 9

25. In case the tube is longer, cut it at the edge on the cable lug above screw area.

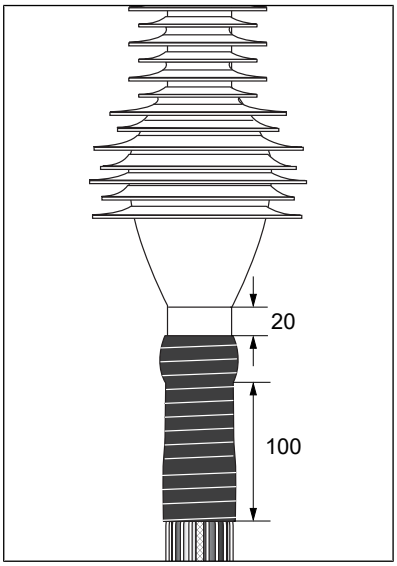

Figure 10

26. Remove the release paper.
27. Starting 20 mm below the conical part of the silicone body, apply black mastic with slight tension and slight overlap (see drawing).
28. Wrap down up to 100 mm below the oversheath cut.

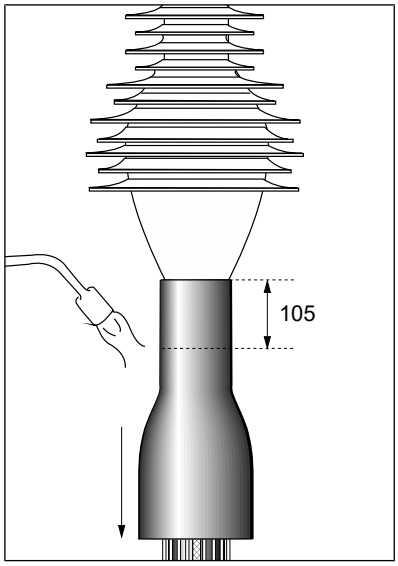

Figure 11

29. Position the heat shrink tube on the silicone body at the collar or approx. 105 mm above the end of silicone body.
30. Shrink into place. Start shrinking at the top, then move downwards.

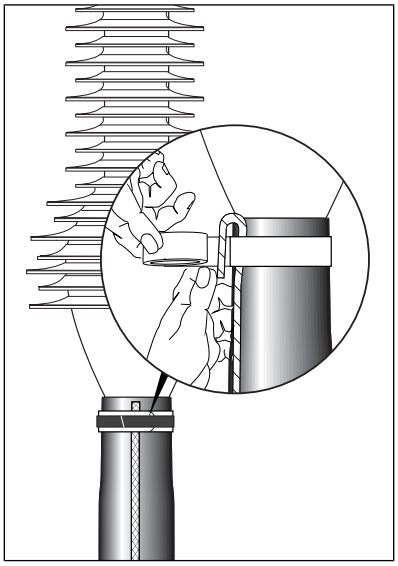

Figure 12

31. Wrap the roll spring twice over the heat shrink tube.
32. Bend the copper braid back over the heat shrink tube, position the end onto the roll spring, and cut it accordingly (see detail).
33. Tighten the roll spring with a twisting action.
34. Protect the roll spring with an adhesive bundle tape. Use a cable tie to fix/hold the roll spring tight.

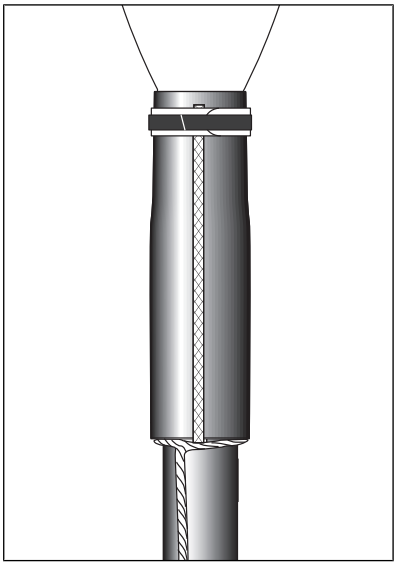

Figure 13

35. Form the earthing lead by twisting the strands together.

6 Completion of Self-Supporting Kit

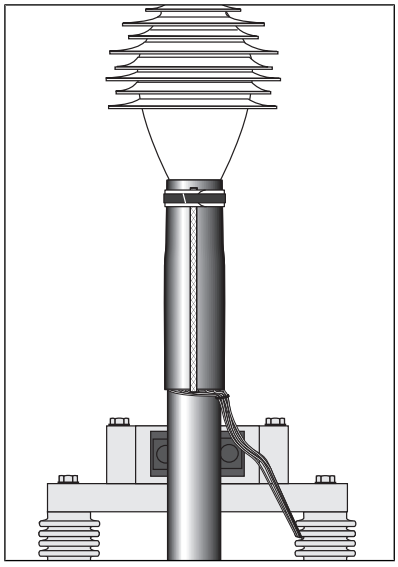

Figure 1

1. Bring the base plate arrangement onto the support rack and align the cable.

NOTICE

Do not fix the cable clamp.

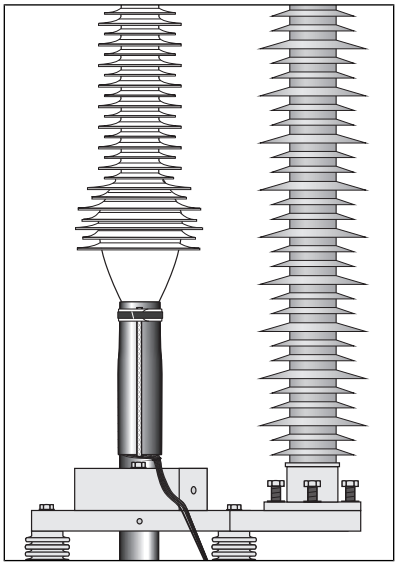

Figure 2

2. Install the self-supporting insulator onto the base plate with screws provided (50 Nm).

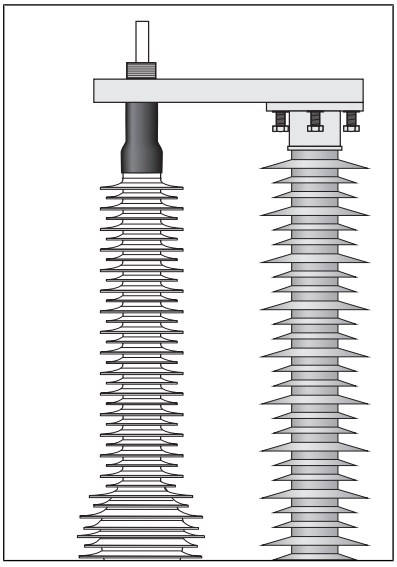

Figure 3

3. Align the pin of the termination with the top plate and install the plate onto the self-supporting insulator (50 Nm).

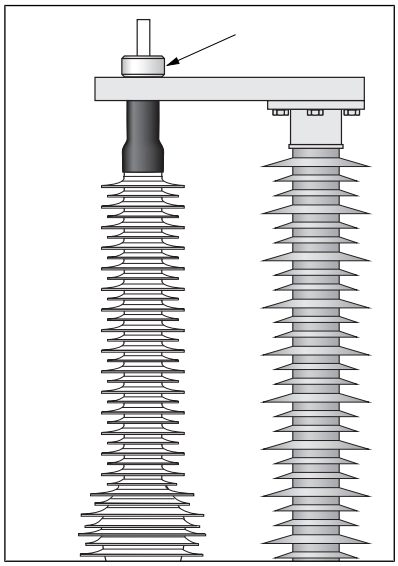

Figure 4

4. Fix the support nut onto the termination top plate firmly.

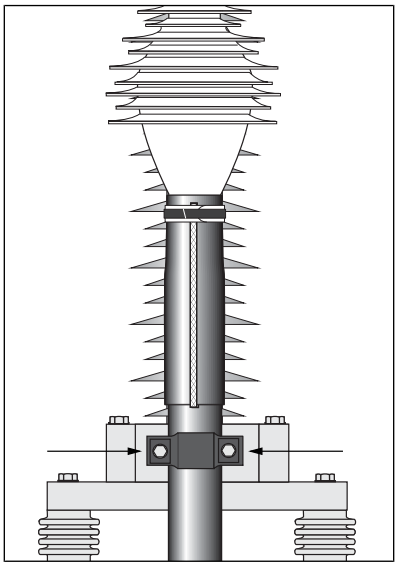

Figure 5

5. Fix the cable with the cable clamp.

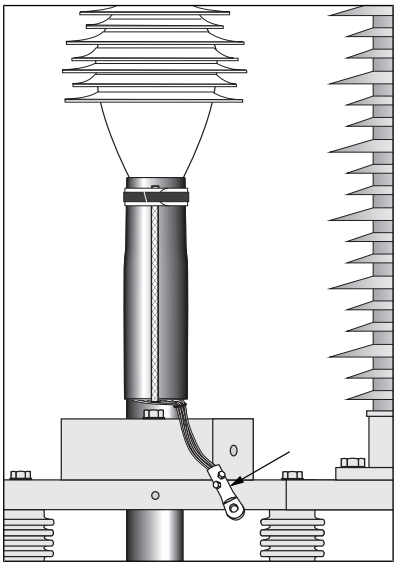

Figure 6

6. Bundle the earth braid and install the mechanical cable lug on the earth wires.

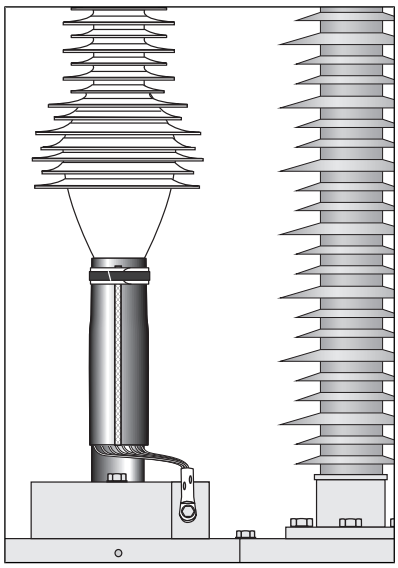

Figure 7

7. Connect the earthing point on the fixing clamp.

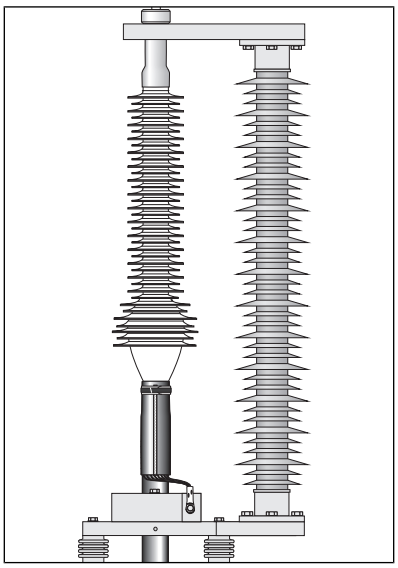

Figure 8

Termination completed.