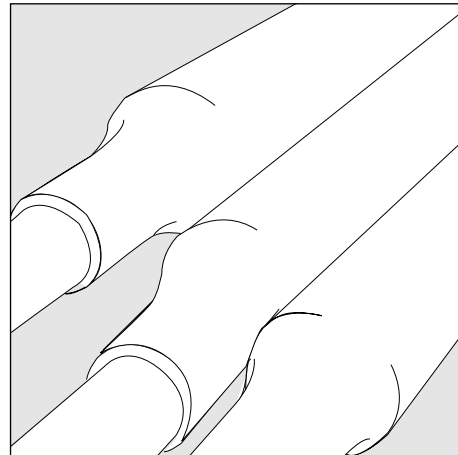




## **TE's Raychem Cable Accessories**



### **Installation Instruction EPP-2483-4/16**

### **Raychem Single Piece Joint for Polymeric Insulated Cables with CAS**

### **Shield Break**

**145 kV**

**EHVS**

To view the TE Energy website:



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# General Instructions

## Before Starting

- Check the kit label and the title of the installation instructions to prove that the cable accessory you are going to use matches the cable.
- Make sure the cable is properly sealed.
- Make sure the cable is in the final installation position.
- Make sure the cable is straight at the jointing position.
- Check the position of the cables to be in alignment to the final position of the accessories.
- Make sure the joint bay/installation area provides adequate space for the cable components to be parked on either cable for later use during the installation.
- The joint bay/Installation area must be kept clean and dry during installation. For outdoor installation use tent or other appropriate shelter.
- Carefully read and follow the steps in the installation instructions. Components or working steps may have been changed/improved since you last installed this product.
- All tools, PPE and apparatus used must be kept clean during the installation.
- Obey relevant and local security and safety rules during the installation.

## Shrinking Heat-Shrink Tubing

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 adhesives.

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

Start shrinking the tubing at the position recommended in the instructions.

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.

## 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.

## Cables with Segmented Conductors

All cut back dimensions and information given in this instructions document refer to cables with non-segmented conductors only. In case of cables with segmented conductors, all insulation or conductive materials have to be removed from the conductor. If the removal of these materials require a longer cut back of the cable insulation, this length needs to be added to the cable cut back dimensions mentioned in the instructions.

NOTE: Special instructions for segmented conductors are available on request.

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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.

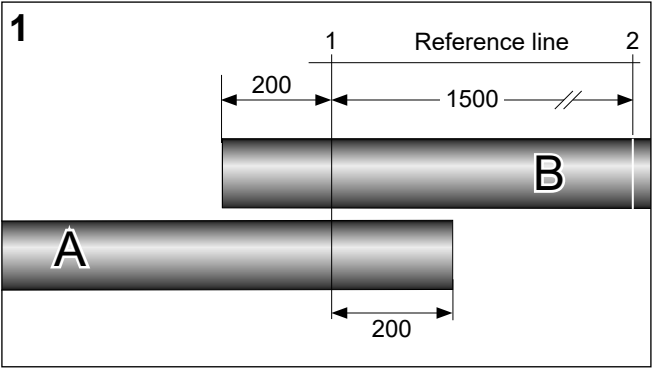
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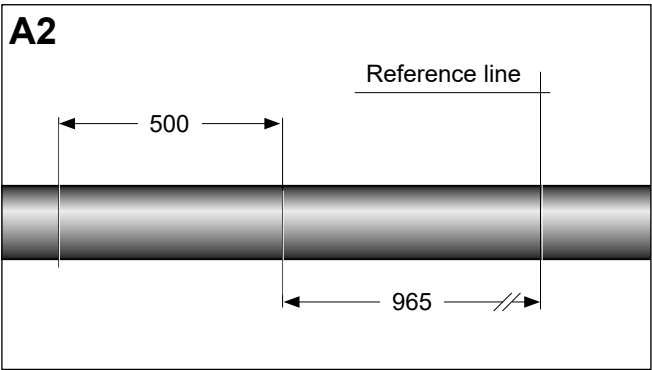
Cable Preparation

Overlap the cables **A** and **B** by 400 mm.

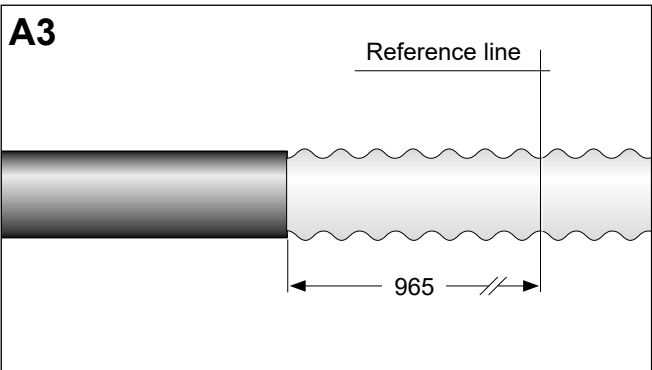


Cable A

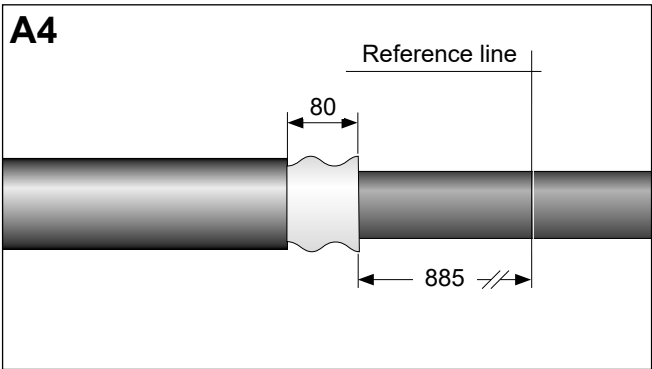
Remove the graphite coating on 500 mm length as shown in the drawing.



Remove the oversheath 965 mm from the reference line.

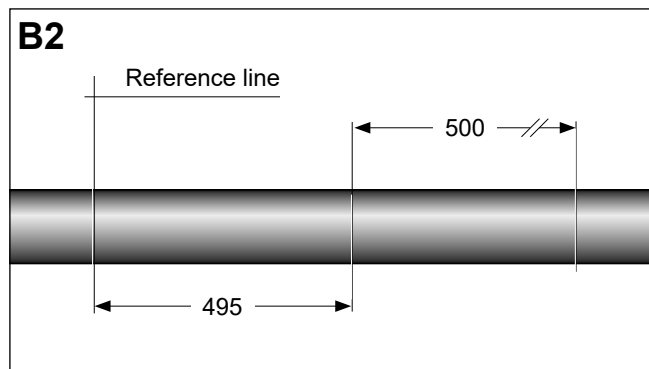


Remove the corrugated copper sheath armour 80 mm from the oversheath cut.

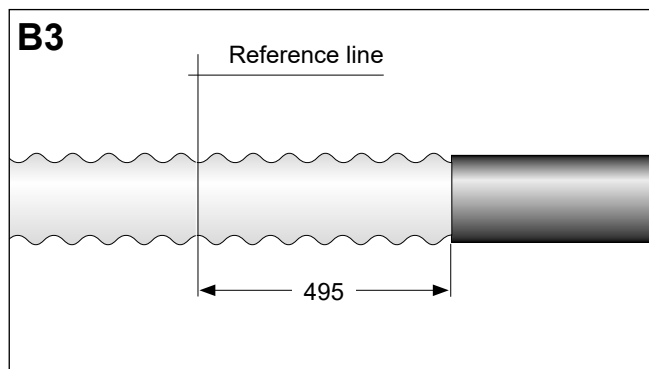


## Cable B

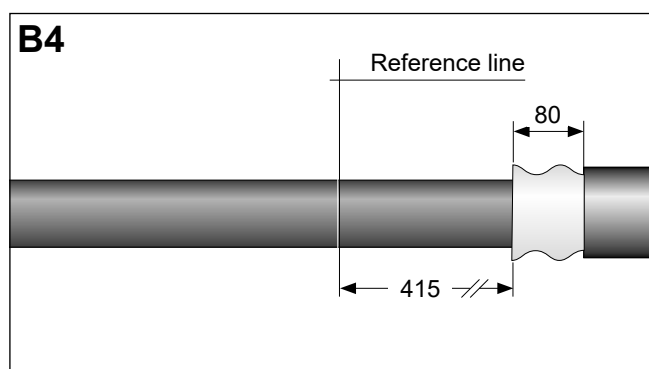
Remove the graphite coating on 500 mm length as shown in the drawing.



Remove the oversheath 495 mm from the reference line.



Remove the corrugated copper sheath armour 80 mm from the oversheath cut.



## Straightening the Cable

Apply spacers of crepe paper on the semicon layer (104) in the positions shown.

Make sure the inner diameter **Di** is maximal 10 mm larger than the outer diameter **Do** of the semicon outer layer.

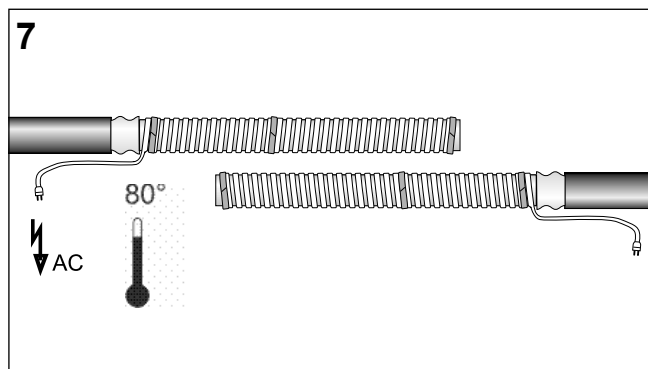
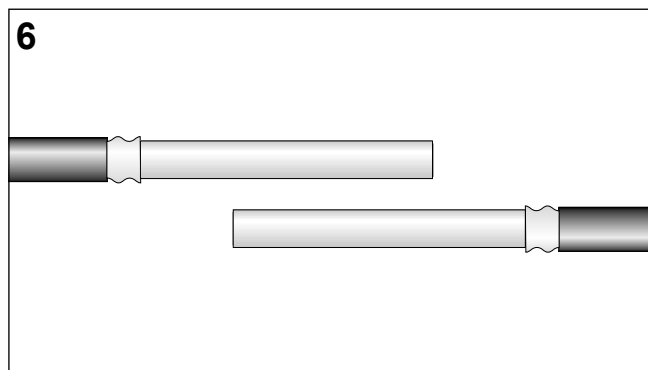
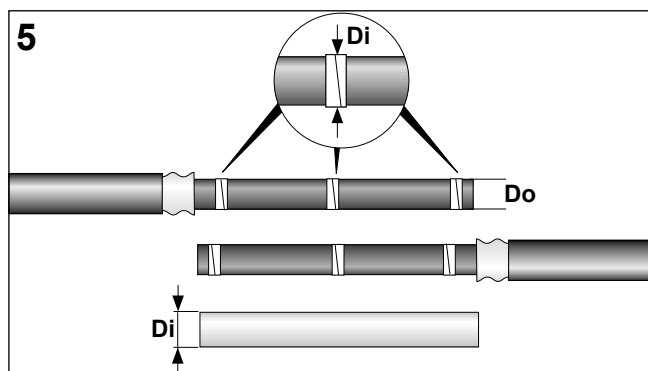
$$Di \leq Do + 10 \text{ mm}$$

Slide the aluminium tube over the cable until it is positioned on the metal sheath rim.

Straight the cable end in the installation position and fix it. Heat the entire cable by applying a heating device to the outer jacket. Before stripping to the required dimensions the cable needs to be cooled down to ambient temperature using slide rails.

Remove the aluminium tube.

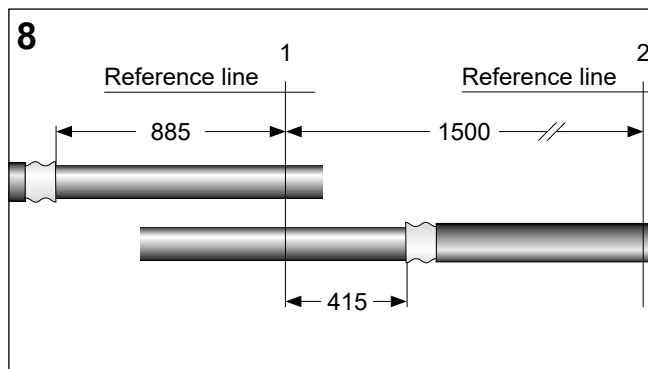
Cable Cross Section	Heating Time/ Temperature
up to 400 mm <sup>2</sup>	4h/80°C
up to 1200 mm <sup>2</sup>	5h/80°C
up to 2500 mm <sup>2</sup>	6h/80°C



In order to check the reference line, bring the cables together. Check the distances as shown.

Cut the cable exactly at the reference line from the oversheath/laminated foil cut as shown in the drawing.

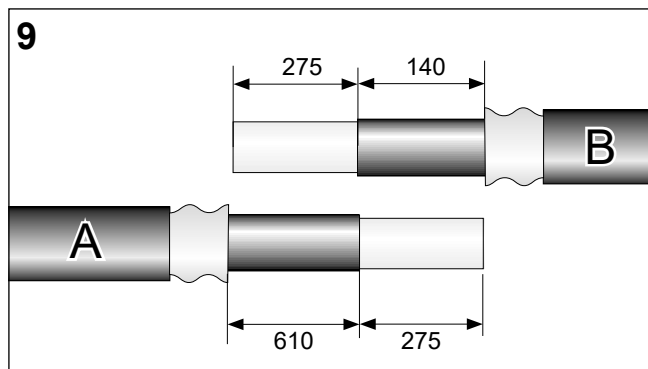
Use a **hacksaw**.



Thoroughly remove the core screen 275 mm from the reference line. The surface of the insulation shall be free from all traces of conductive material.

**Note:** Smooth the insulation as requested on page 3 (General Instructions).

**Note:** Do not damage the insulation.



#### Chamfer the insulation screen:

Abrade and smooth the insulation from the screen cut towards the end.

**Note:** Do not nick the insulation.

Make sure the semicon transition wave shape is in accordance with the values and shape shown in the drawing.

Clean and degrease the insulation with the supplied cleanser in direction of the semicon to prevent contamination.

Take care to ensure that the diameter of the insulation is not reduced close to the transition to the semiconducting layer.

Check dimension **D** in the table below. The finally prepared diameter over insulation shall be within the application range of the joint body and within +/- 2 mm of the connector's outer diameter.

**Table 1**

Tyco Description	D Application Range of Joint Body [mm]
HVCA-EHVS145S-BODY-50/59	50-59
HVCA-EHVS145S-BODY-57/66	57-66
HVCA-EHVS145S-BODY-64/75	64-75
HVCA-EHVS145S-BODY-72/83	72-83
HVCA-EHVS145S-BODY-79/91	79-91
HVCA-EHVS145S-BODY-89/101	89-101
HVCA-EHVS145S-BODY-99/112	99-112

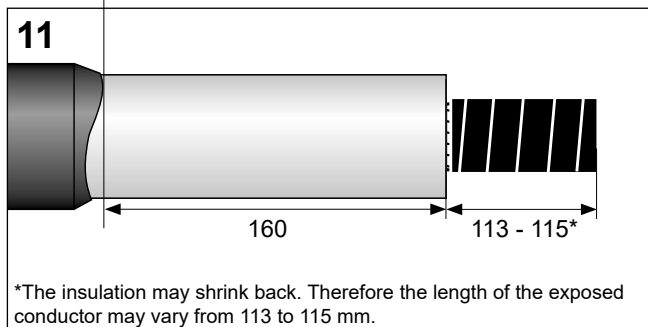
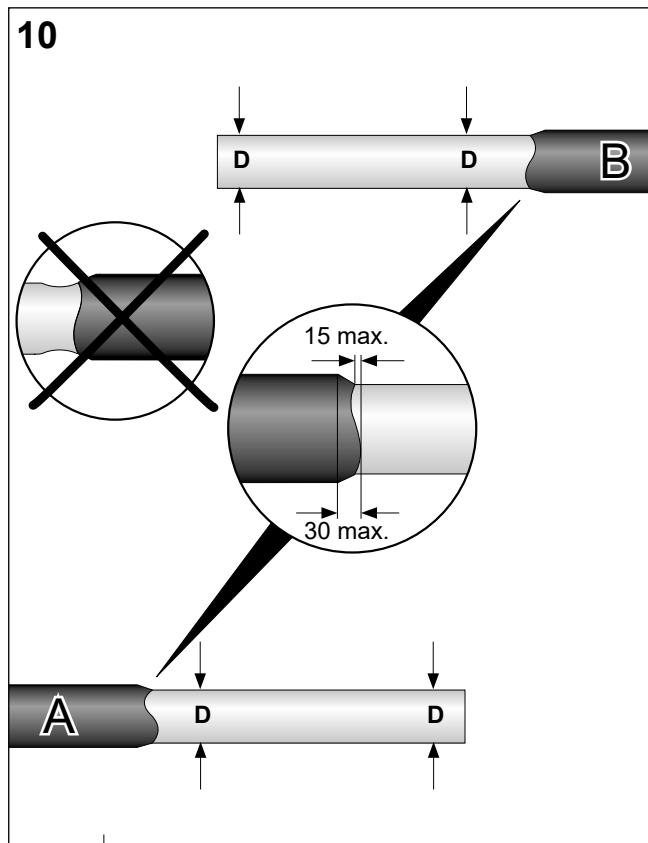
Remove the insulation using a stripper tool according to the dimensions in the drawing.

Deburr the edge of the insulation with sandpaper.

#### Note:

The distance between the tip of the semicon wave edge and the end of the insulation has to be 160 mm.

Cover the cable conductor with PVC tape.

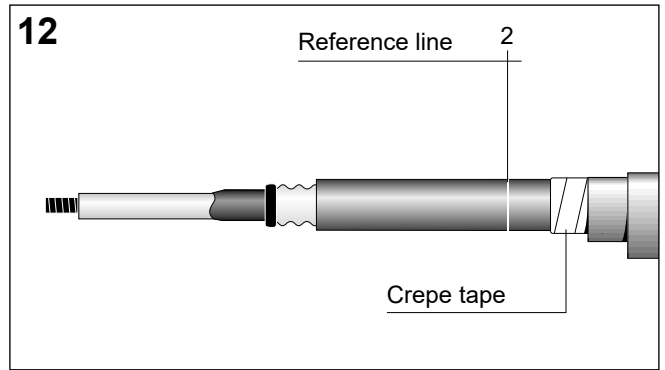


### Cable B

Cover the oversheath with crepe tape. Wrap as much tape around it so that the complete heat shrinkable tubes can be parked on it.

**Note: Leave the marked reference line 2 exposed.**

Slide the combined heat shrinkable tubes over the cable and park the tubings on the crepe tape as shown in the drawing.



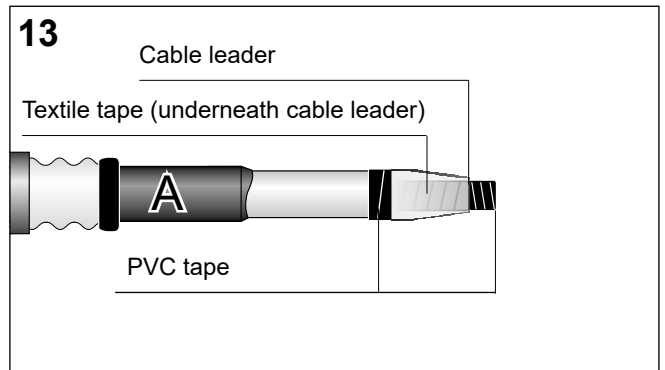
### Cable A

Protect the conductor with PVC tape.

Wrap some layer of textile tape onto the conductor to hold and center the cable leader straight on the conductor of cable side **A**.

Place the cable leader on the cable conductor.

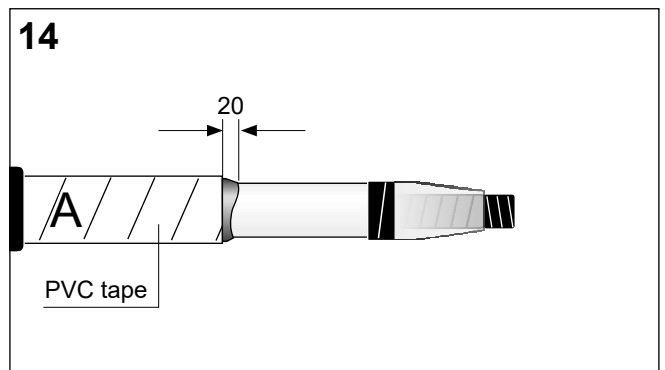
Cover the step at the insulation with PVC tape.



Protect the core screen with the wide white PVC tape up to 20 mm from the semi-conductive cut.

Tape needs to lay side by side without gap.

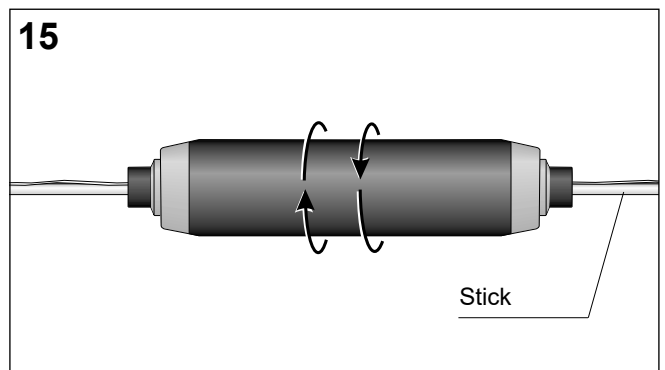
Clean the PVC-tape and the insulation.



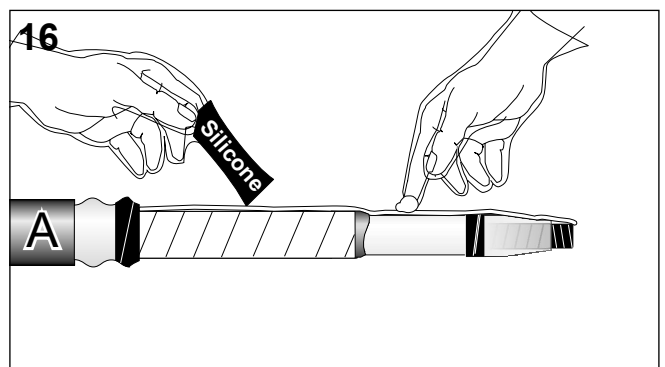
Clean the body.

Grease the stick that is included in the kit and insert it through the joint body.

Thoroughly lubricate the inside of the joint body.



Thoroughly lubricate the cable insulation and PVC tape on cable side **A**.

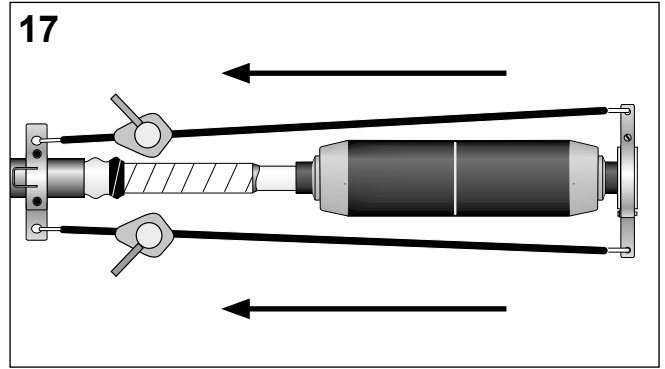


## Completion of the Joint

Fix a cable clamp on the cable oversheath on cable **A**.

Connect two chain blocks to the pulling unit as well as to the cable clamp.

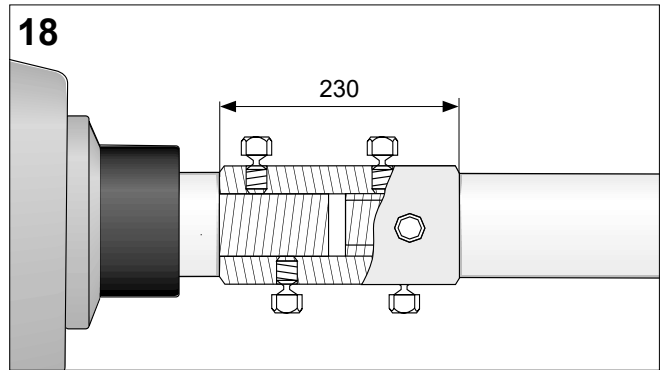
Pull the joint body onto the cable.



Fit the conductors into the connector so that the connector ends are in close contact to the insulation.

(Do not shear off the bolt heads at this stage)

**Note:** The distance between the ends of the cable insulation shall be 230 mm.

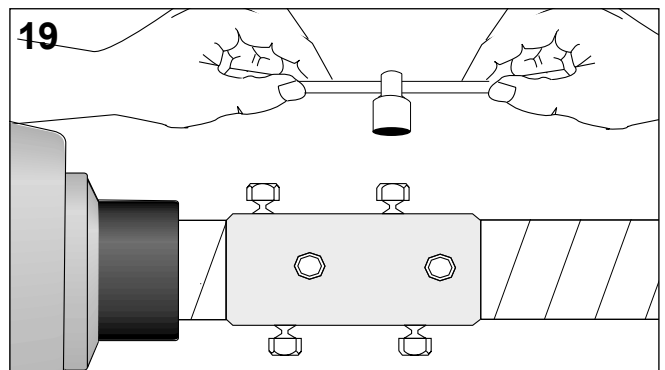


Protect the cable insulation temporarily with non-adhesive tape.

Take up the tension equally on all bolts, using a box spanner. Do not yet shear the bolt heads.

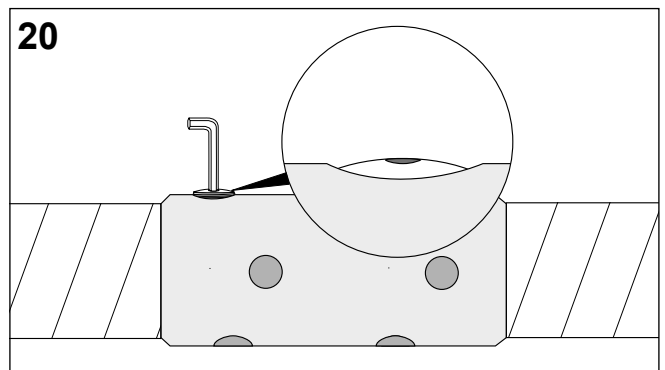
**Note: Make sure that the connector is centered.**

Tighten the bolts until the heads shear off, starting at the center of the connector.



Screw the screw closure into the screw hole until the closure levels up with the outer diameters of connector.

Remove the non-adhesive tape.



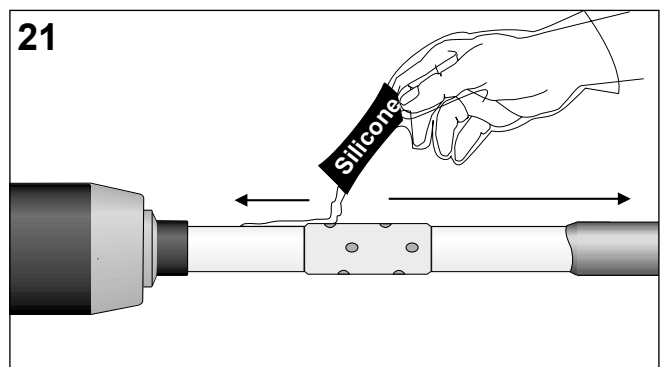
**Note: Wash and clean your hands before.**

Clean the cable insulation and the connector thoroughly using the supplied cable cleaner.

Check the surface of the cable insulation and connector. It shall be smooth and without sharp edges so that it doesn't scratch or damage the inner surface of the joint body.

Always clean from the insulation towards the conductive parts.

Thoroughly lubricate the cable insulation and connectors with silicone grease.



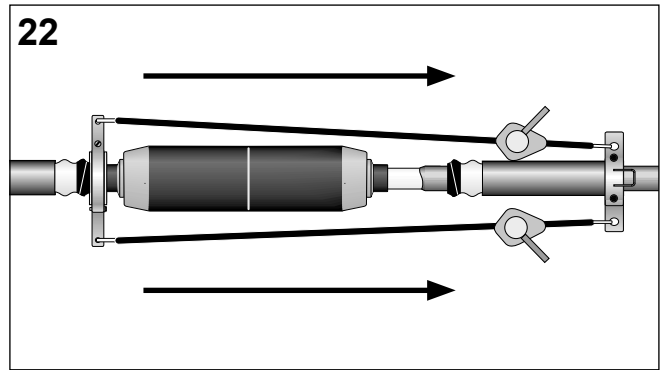


Fix a cable clamp on the cable oversheath on cable **B**.

Connect two chain blocks to the pulling unit as well as to the cable clamp.

Pull the body towards cable **B**.

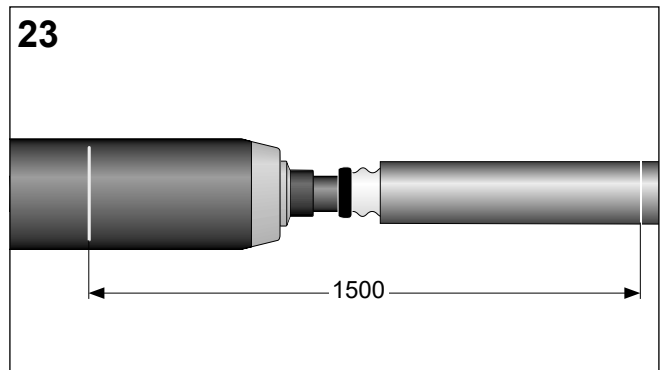
Check the installation position.



Position the joint centrally over the connector. The distance between the joint body center mark and the Ref. 2 mark on the outer sheath is 1500 mm.

Remove the wide white PVC tape at cable side **A** from core screen. Make sure that no PVC tape remains under the joint body.

Clean the semicon screen on both cable ends.

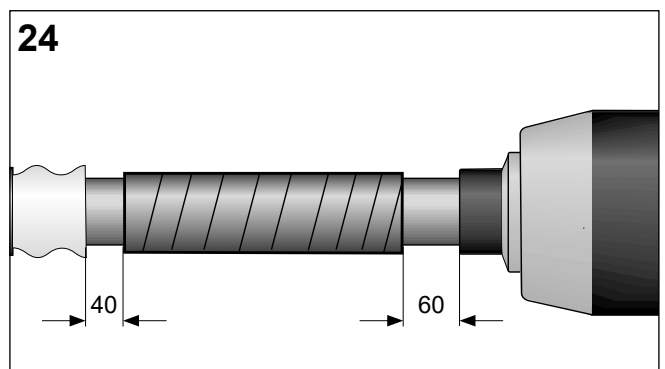


#### Cable A

Remove the PVC tape from the CAS.

Apply conductive tape with 5 mm thickness on the core screen.

Leave 40 mm to the outer sheath cut and 60 mm to the body exposed.

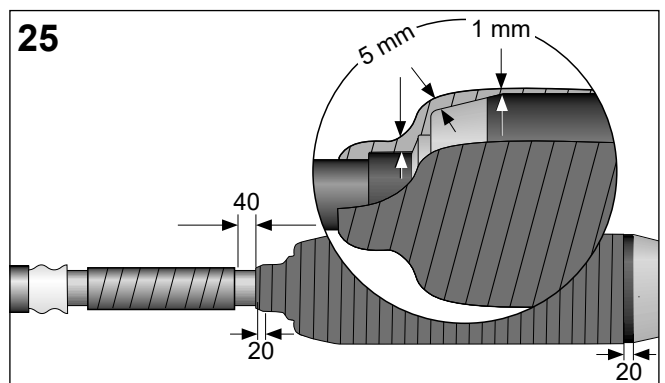


Apply conductive tape with 5 mm thickness starting 20 mm before the silicone body and cover the conical area (as shown).

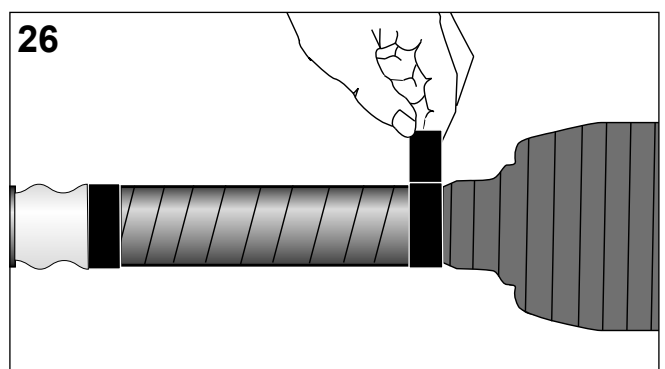
Continue on the straight area of the joint body with one layer of conductive tape with 50 % overlap.

Start to increase the thickness of the conductive tape to 5 mm on the edge of the conical area till 20 mm on the semicon screen.

Leave 40 mm of the semicon screen exposed on both sides.



Using one layer of black mastic, smooth out the lengths of 40 mm between the CAS and the bedding tape as well as between the semi-conductive tape and the bedding tape as shown.

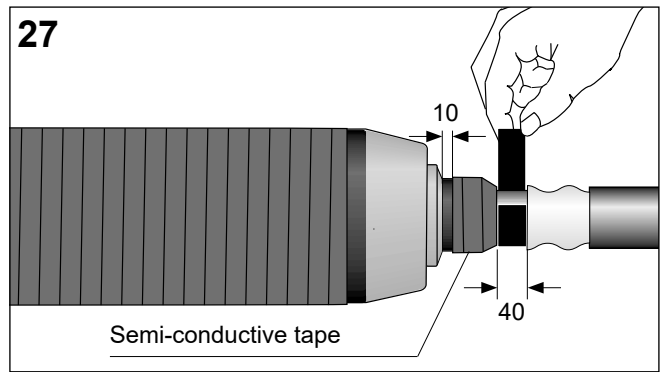


### Cable B

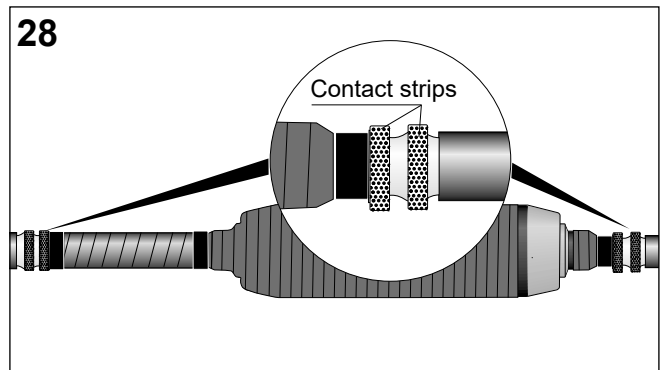
Remove the PVC tape from the CAS.

Apply three layers of semi-conductive tape starting 40 mm on the cable screen and end 10 mm before the transparent part of the joint body (see drawing).

Smooth out the step (40 mm) between CAS and conductive tape with black mastic tape.

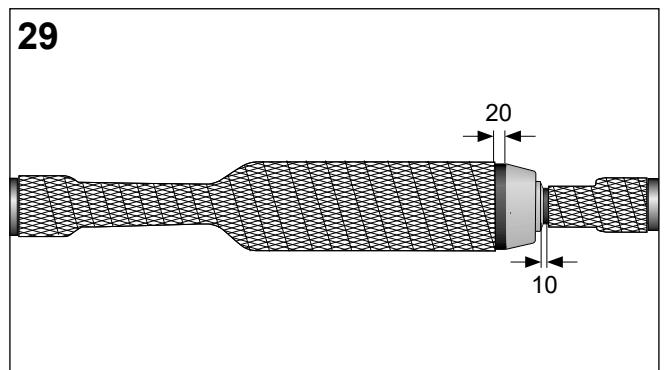


Form 2 punched contact strips into a circular shape and arrange them on the exposed ends of the corrugated aluminum armour.



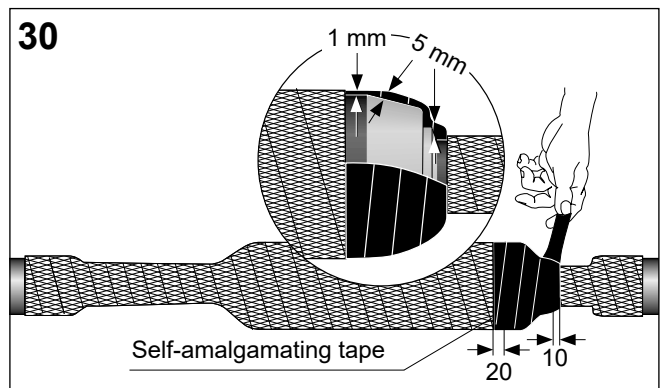
Start wrapping one layer of tinned copper mesh with a 50 % overlap at the oversheath cut. Move onwards to the transparent section of the joint as shown in the drawing. Stop 20 mm before the transparent section.

Continue wrapping one layer of tinned copper mesh at 10 mm from the transparent section as shown.

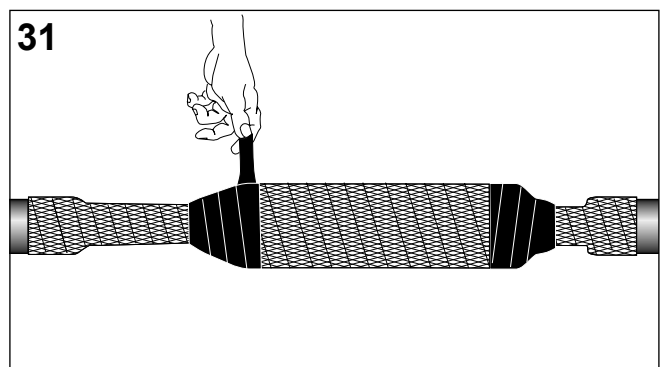


Apply non-conductive self-amalgamating tape with at least 5 mm thickness onto the visible part of the body as shown.

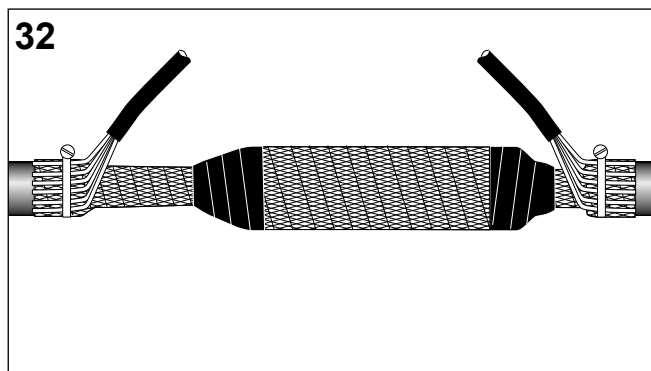
Start 10 mm on the conductive part and stop 20 mm on the semi-conducting part of the body.



Smooth out the step between the joint body and cable A with black mastic tape as shown.

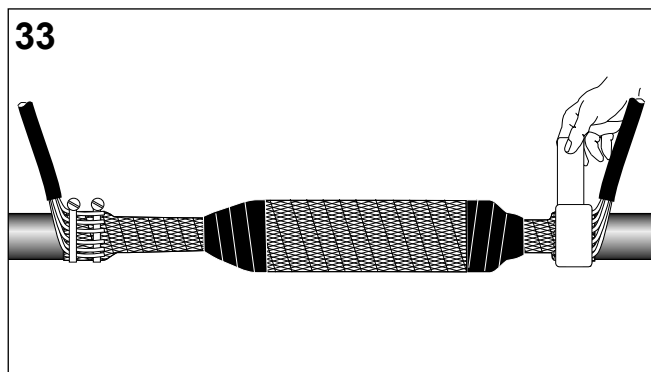


Remove the insulation on the earth leads for 120 mm. Spread the wires and position the wires onto the contact strips close to the oversheath cut. Fix the earth leads with a worm drive clamp on both sides.



Fold the earth leads back over the worm drive clamp and apply a second worm drive clamp.

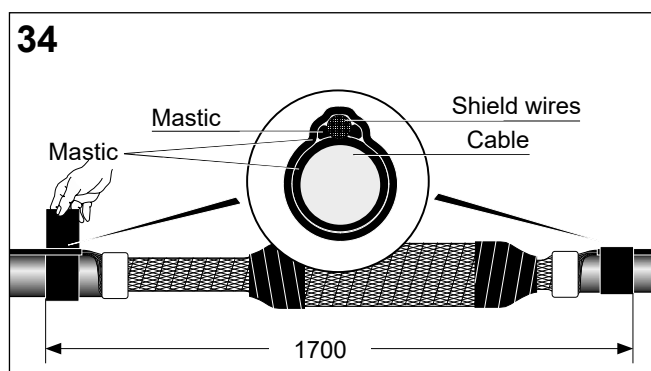
Cover the worm drive clamps with textile tape.



Slightly lift the earth leads and wrap one layer of black mastic around the cable. Do not cover the exposed shield wires.

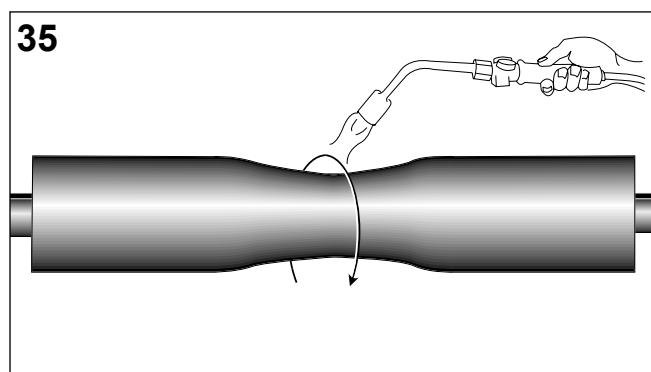
On each side of the earth leads, place a small roll of mastic.

Push the earth leads down and wrap another layer of black mastic around the cable including the earth leads.

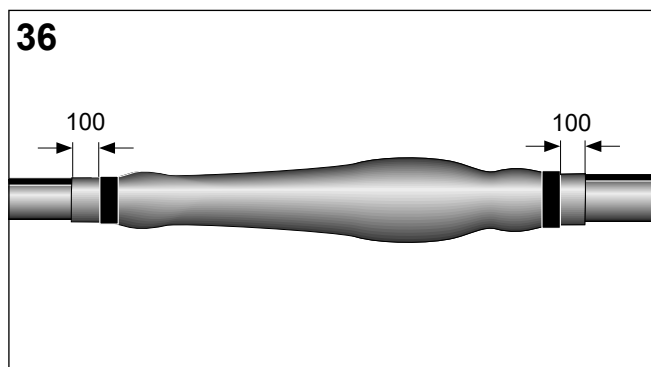


Slide one of the big insulating sleeves over the joint so that it overlaps the end of the oversheath and is placed centrally.

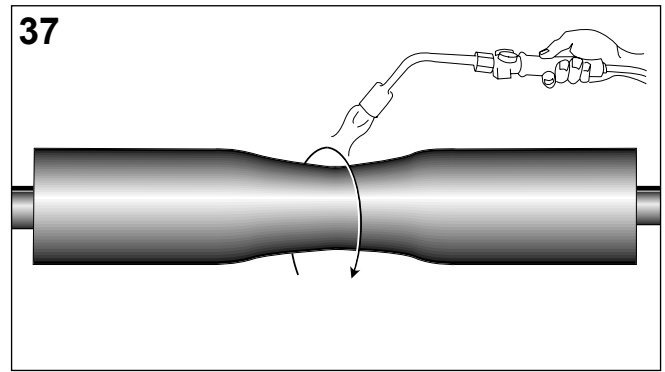
Start shrinking the sleeve down starting at the middle working towards the joint ends.



Apply one layer of black mastic 100 mm from the end of the tube on each side.



Slide the other big insulating sleeve over one cable end so that it overlaps the end of the oversheath. Start shrinking the sleeve down starting at the middle working towards the joint ends.



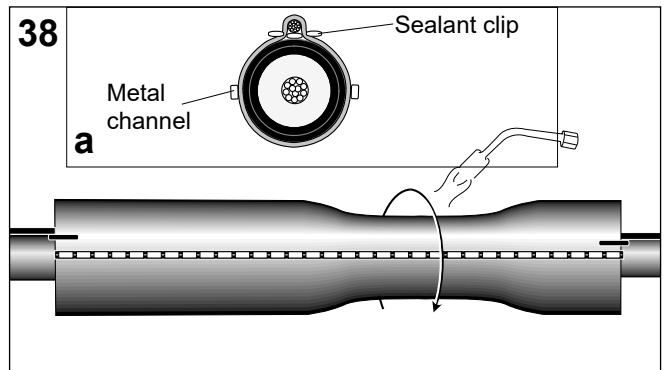
Place the wraparound centrally over the shrunk tubes. Close it at the metal channel.

In the space between the cable and the shield wires push the sealant clip onto the tubing.

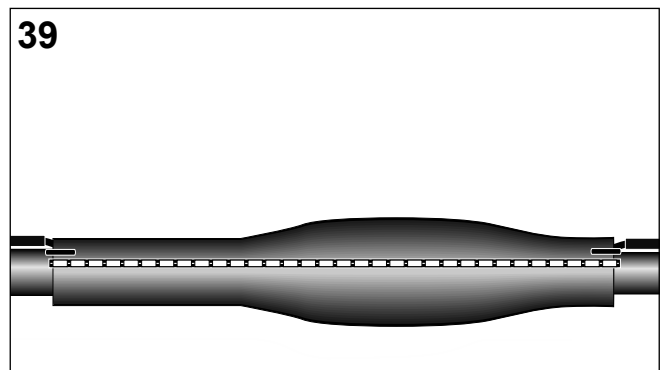
**Note:** Ensure that the sealant clips and the metal channel are shifted by 90° to each other.

Start shrinking the wraparound from the center working towards the ends.

The wraparound is properly shrunk when the temperature sensitive surface has changed from green to black.



**Joint completed.**



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

