Installation Instruction 4280,0036,0B - May 2017 English

TD 123-170
Termination for 123-170 kV cables with extruded insulation

Kabeldon
cable accessories

General for NKT Kabeldon accessories
Components or work steps may have been changed since you last time installed this product.

Read the entire installation instruction carefully before starting the work. Only competent and trained personnel familiar with cables, accessories and safe operating practices should install NKT Kabeldon accessories. This instruction is intended to be a guideline for a proper installation and is not a substitute for adequate training and experience in good safety practices.

NKT Kabeldon 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. NKT Kabeldon's only obligations and liabilities are those stated in NKT Kabeldon's standard conditions of sale for this product and in no case will NKT Kabeldon be liable for any other incidental, indirect or consequential damages arising from the use or misuse of the product.

Read the safety data sheet for the filling compound (if used) before starting the work. Make sure to follow the safety instructions and preparation procedure of the compound before filling.

This instruction applies to cables with an insulation screen that is bonded to the insulation. To remove the insulation screen a special tool, a spokeshave, or a piece of glass are recommended.

Check that the diameter of the cable insulation corresponds to the marking on the package of the relevant accessory, e.g. joint, adapters or stress relief cone.

Parts contained in the accessory kit should be visually inspected for possible damage and installed in accordance with the following instruction.

Cleanliness during the whole installation is of great importance.

Solvents
Use methylated spirits when cleaning cable and accessory components. Make sure to follow the manufacturer´s handling instructions. After cleaning, any surface must be dry.

Cable straightening
The cable must be straightened by special straightening equipment.

Gas torch (if applicable)
Adjust the torch to obtain a soft blue flame with a yellow tip. Keep the flame moving continuously to avoid scorching the material. Keep a fire-extinguisher ready when working with open flame.

Tape designations
ET = Electrical tape, PVC
RULLE = Rubber tape, shall be stretched until the oval markings become circular
ST = Protective tape
IV = Insulating tape, should be applied according to the instructions given on the package.
HL = Conducting tape
SG = Silicone rubber tape
FT = Filler tape
All above tapes must be wound with 50 % overlap unless otherwise stated.

When separate instructions (e.g. for earthing kit) are provided, always read these instructions before starting the work. Make sure to understand when during the installation process these separate instructions shall be used.

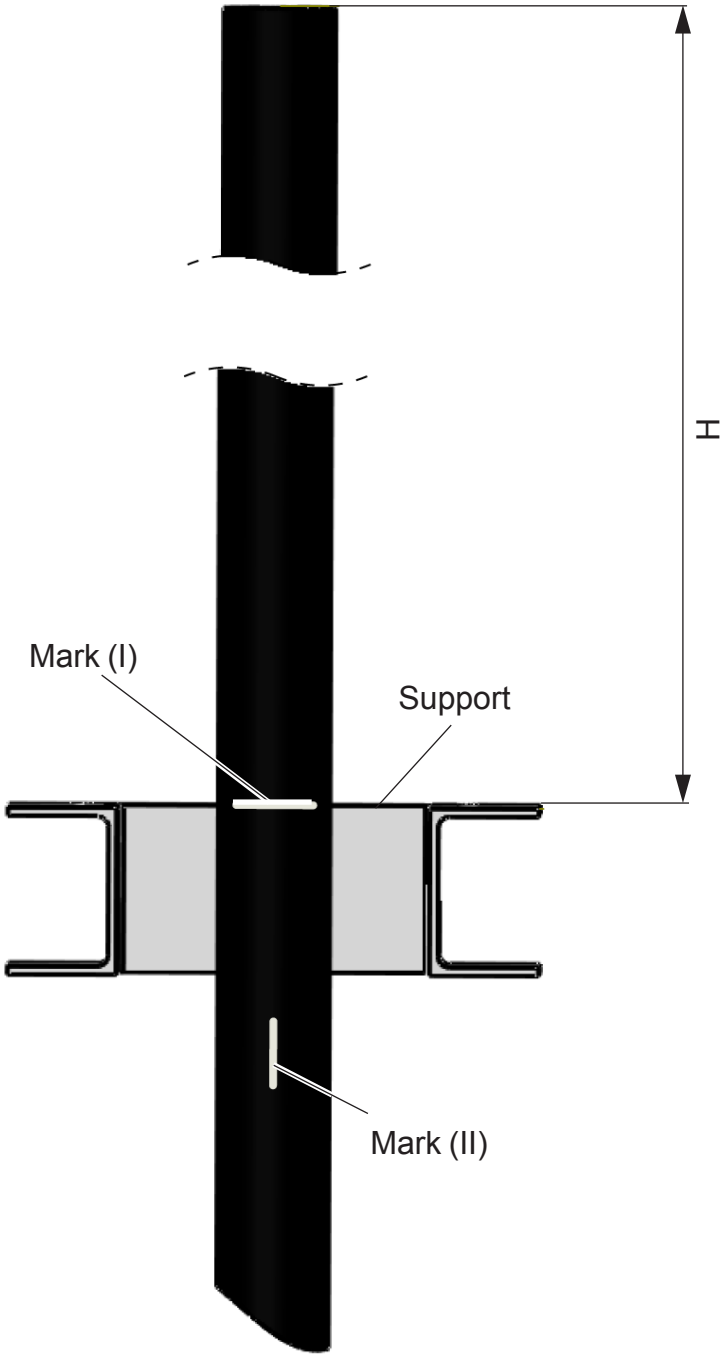
1. Lift the cable into the correct position.

Mark (I) the oversheath at the upper edge of the support. Also make a lengthwise mark (II) on the oversheath approximately 200 mm below mark (I), for the orientation of the insulator.

The work is carried out more easily on the ground with the cable lying horizontally.

Cut off the cable H mm from mark (I).

	H
TD 123	1415
TD 145	1560
TD 170	1775



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2. Mark a distance of D mm from the end of the cable and remove the oversheath from this point to the end of the cable.
If a cable with lead or corrugated sheath is used, use earthing kit JSA 1 Pb, Al.
See instruction 4290.2617 and 4290.7961.
If a cable with aluminium laminate is used, use screen connection kit SCK.
See instruction 4290,6031. p 7-8.
Fold back the screen wires over the edge of the oversheath.
Cable without lead or corrugated sheath or aluminium laminate go to point 4 and 5.

	D
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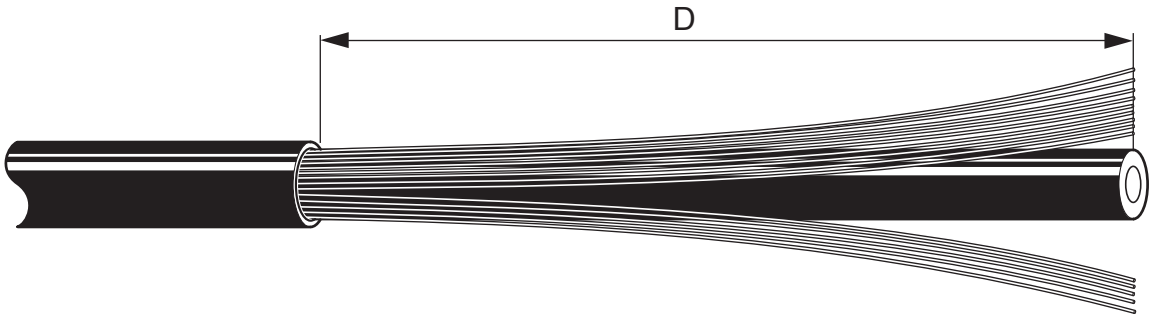
TD 145	1550
TD 170	1760



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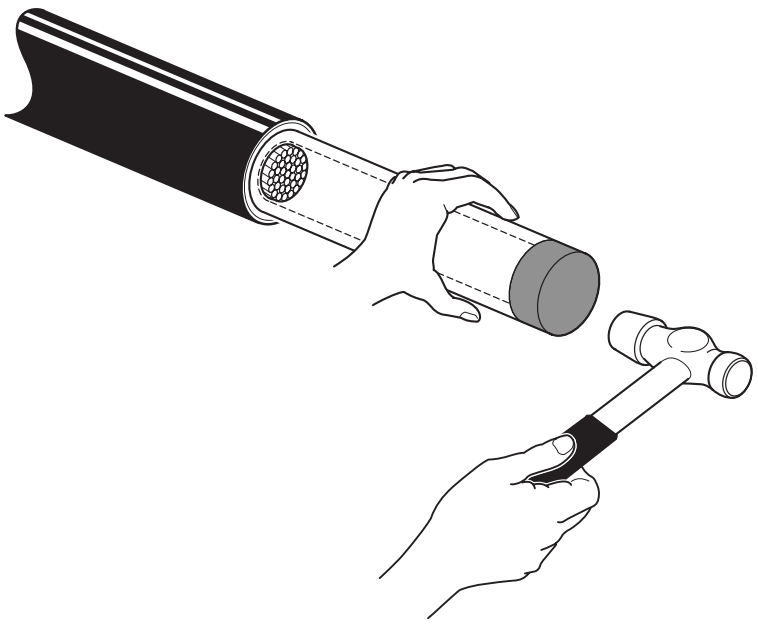
3. Beat the insulation back, e.g. using a pipe and a hammer. Be careful not to bend or damage the conductor wires.



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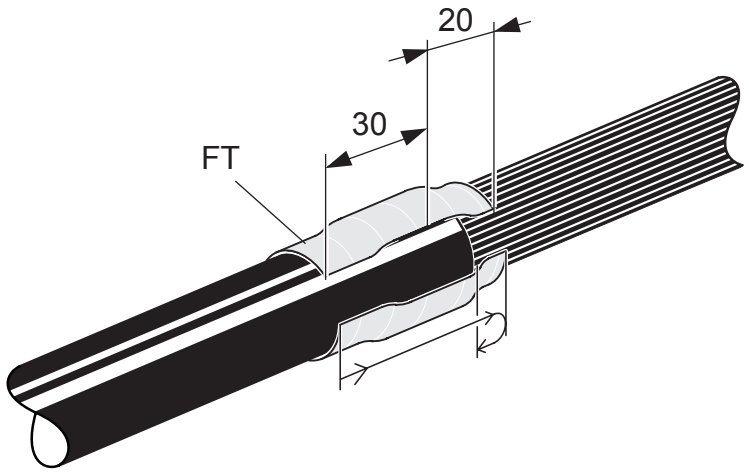
4. Starting 30 mm from the sheath edge, wrap one turn of FT around cable. Then proceed wrapping the FT with a half overlap so that it seals the sheath edge and covers 20 mm of the screen wires. Finish with one extra layer over the screen wires.



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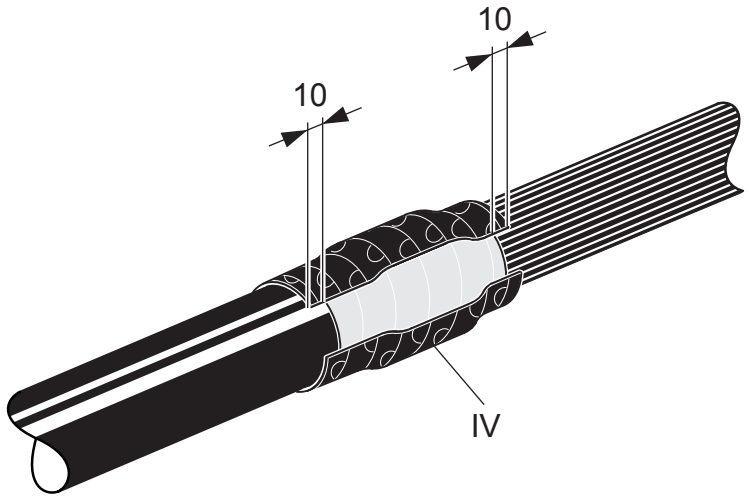
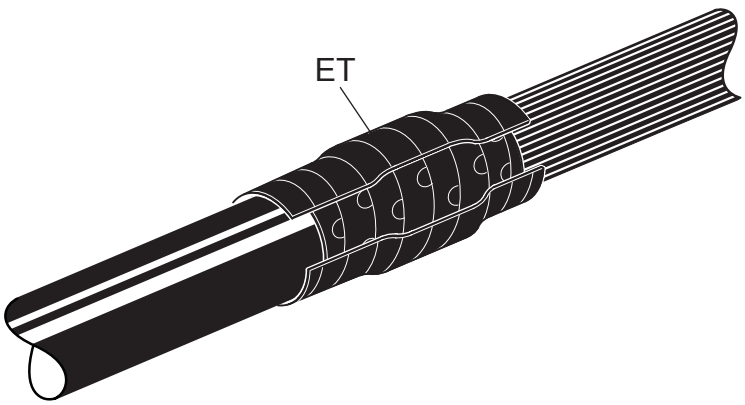
5. Over the FT apply three times of IV tape. Let the IV overlap the FT by 10 mm at each side. Then apply ET twice over the IV.





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NB! It is important that the instructions in sections 6- 11 are followed correctly in order to obtain an even surface where any rubber parts of the accessory is to be positioned.

Always use new and clean abrasive cloth on the insulation!!

6. Make a mark (1) on the insulation screen M mm from the end of the conductor.

	M
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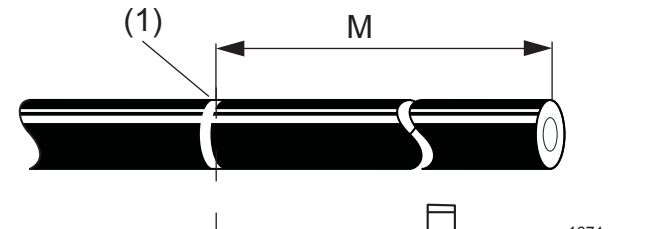
TD 145	1310
TD 170	1525



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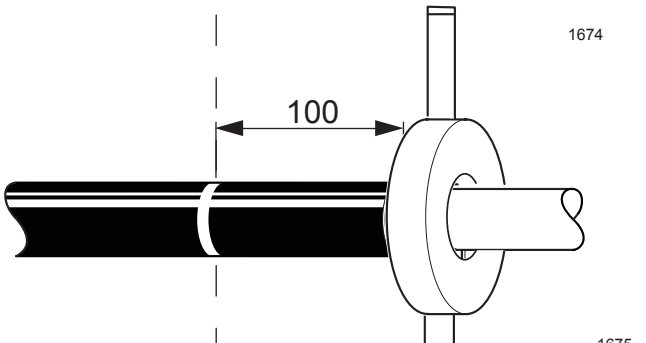
7. Remove the insulation screen with a rotary stripping tool. Do not remove more insulation than needed. At 100 mm from the mark start stepping out the tool turn by turn. Obtain a smooth cone towards the mark, make sure the stripping ends before the mark is reached the stripping ends.



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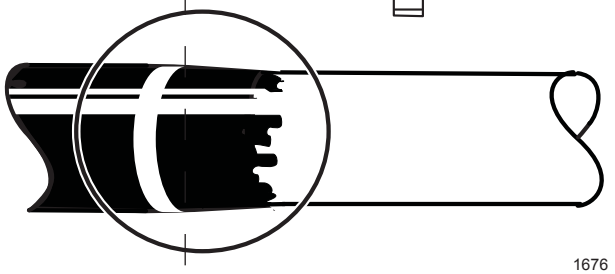
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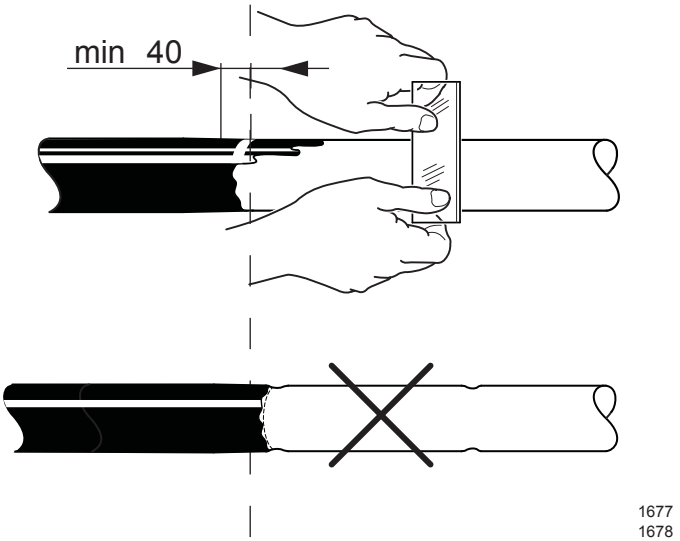
8. Remove the insulation screen up to the mark. Taper min 40 mm of the insulation screen. Use a sharp piece of glass. Make sure that the insulation screen is completely removed between the mark to the end of the cable.

It is extremely important to achieve a smooth transition between the insulation and the insulation screen.



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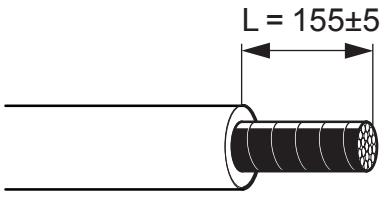
9. Strip the insulation L = 155 +/- 5. Clean the conductor with a wire brush. Tapes, compounds and any insulating materials in the conductor must be removed before installation of the connector. Cover the conductor with ET.



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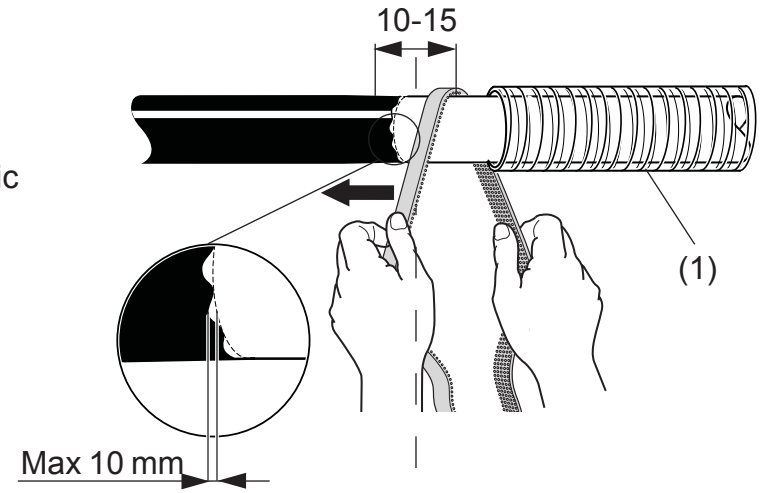
10. Preparation of the insulation screen and transition to insulation.

Cover the insulation by using plastic film (1) up to 20 mm from the insulation screen edge.



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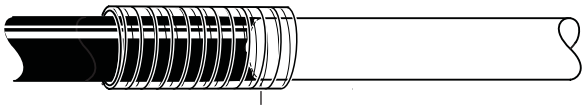
Preparation by hand only:

Do not use any rougher abrasive cloth than 220 grit.
Always finish by using 400 grit abrasive cloth. Always grind from the insulation to the insulation screen. Always clean the insulation before changing to next abrasive cloth. When finished with the transition, cover it with plastic film.

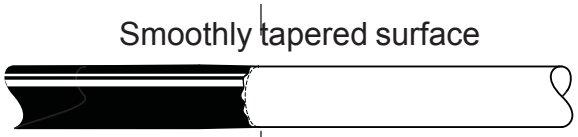
11. Preparation of the insulation

Make sure that the insulation is clean and protected from conductive particles. If the rotary stripping tool left a smooth and even surface without any visul notch it is only necessary to grind/polish the area on which the stress cone will be located and 100 mm above the stress cone. Always clean the insulation before changing to next abrasive cloth.



Preparation by machine:

Do not use any rogher abrasive cloth than 320 grit.
Always finish by using 400 grit abrasive cloth by hand on the place below the stress cone.



Preparation by hand:

Only use abrasive cloth min 220 grit.
Always finish by using 400 grit abrasive cloth.

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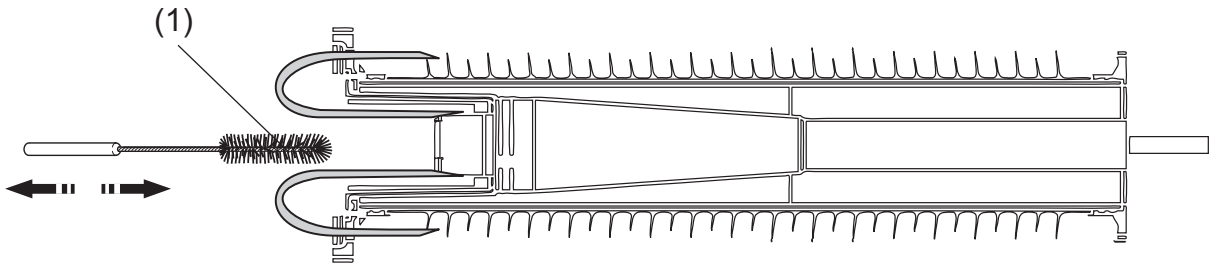
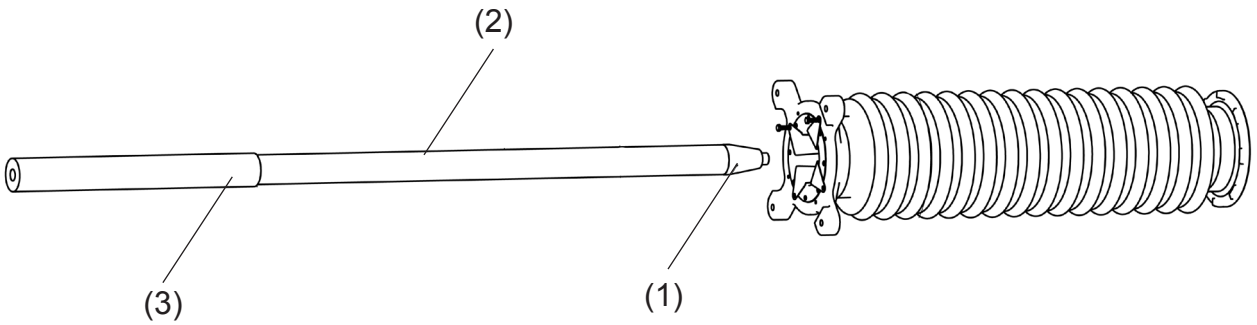
12. Place the cold shrink tube on the cable with the collapsing end in the cable end direction. Fasten the ends of the four braided copper bands on the outside of the insulator.
Clean the entire inside surface of the stress relief cone. Grease (1) the stress relief cone inside the insulator.



13. Place the insulator in line with the prepared cable. Place the sliding cone (1) on top of the cable. Use ET-tape to fasten the cone. Clean the cable insulation with methylated spirits. Grease the cable insulation (2) and the sliding cone with grease down to about 100 mm from the insulation screen (3).



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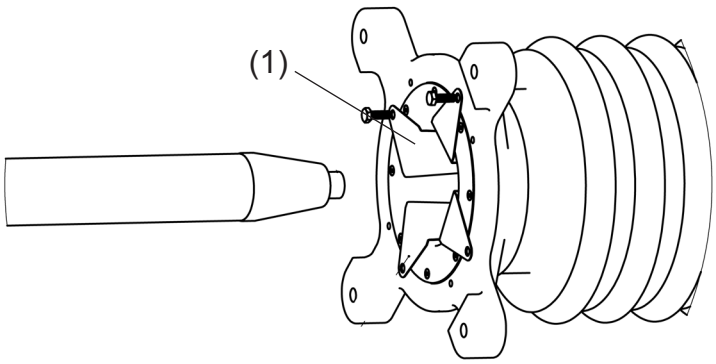
14. Check the sliding fingers (1) that they are smooth without any sharp edges. Place the four sliding fingers according to figure so that the sliding fingers enter the stress relief cone.



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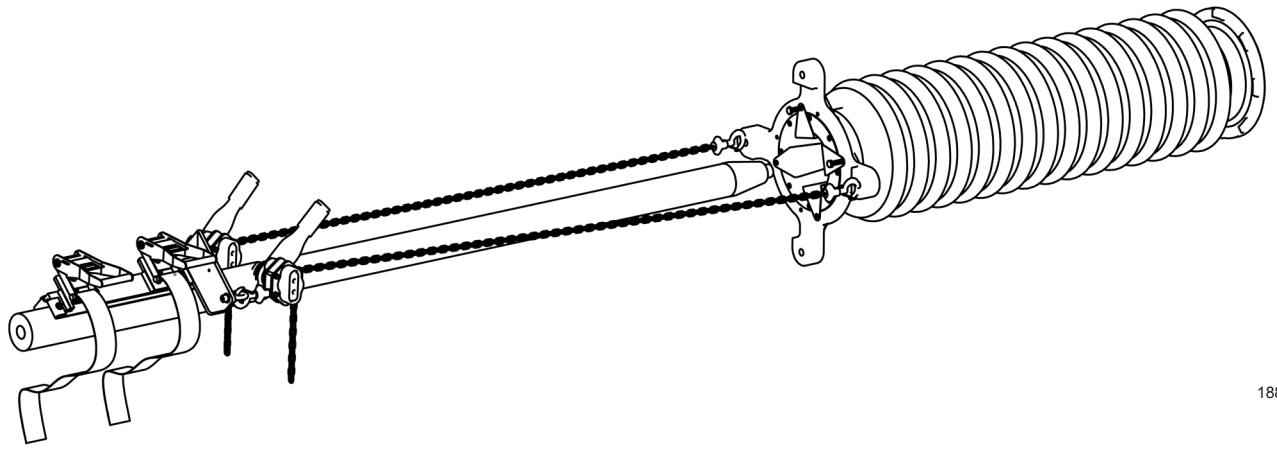
15. Pull the insulator down with the chain blocks to about 100 mm from the edge of the insulation screen. Remove the sliding fingers and then pull the insulator down until the XLPE on top is flush with the top of the insulator. Wipe off excessive grease. Remove the sliding cone and ET on top. The lengthwise mark (II) on the cable should be in the middle between two feets on the insulator. Turn the insulator if necessary.



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16. Appendix 2 shows the assembly of the cover.

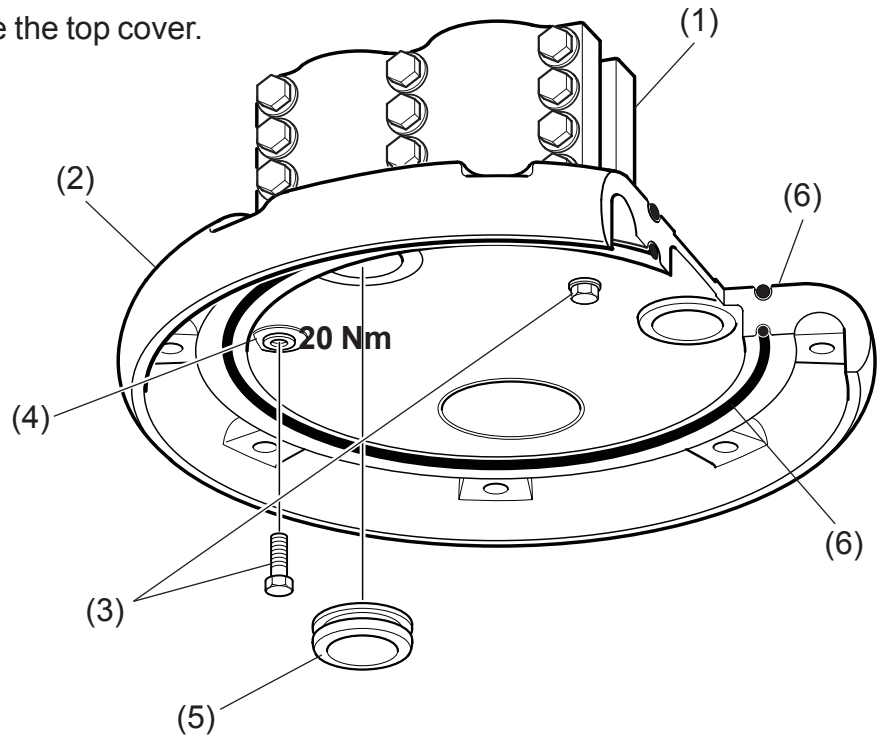
Place the clamp (1) on the top cover (2), mount the M8 bolts (3) with the sealing washers (4) and tighten to 20 Nm.

Mount the two sealings (5) carefully in the top cover filling holes Use e.g. a small screwdriver to make one turn under the collar of each sealing. Check that it seals against the surface on the top cover.

Place the two O-rings (6) in position in the top cover.

Place the top cover on the insulator and orient the top cover to a wanted position for the top bolt. The top cover can be placed with the top bolt in eight positions.

Centre the top cover.



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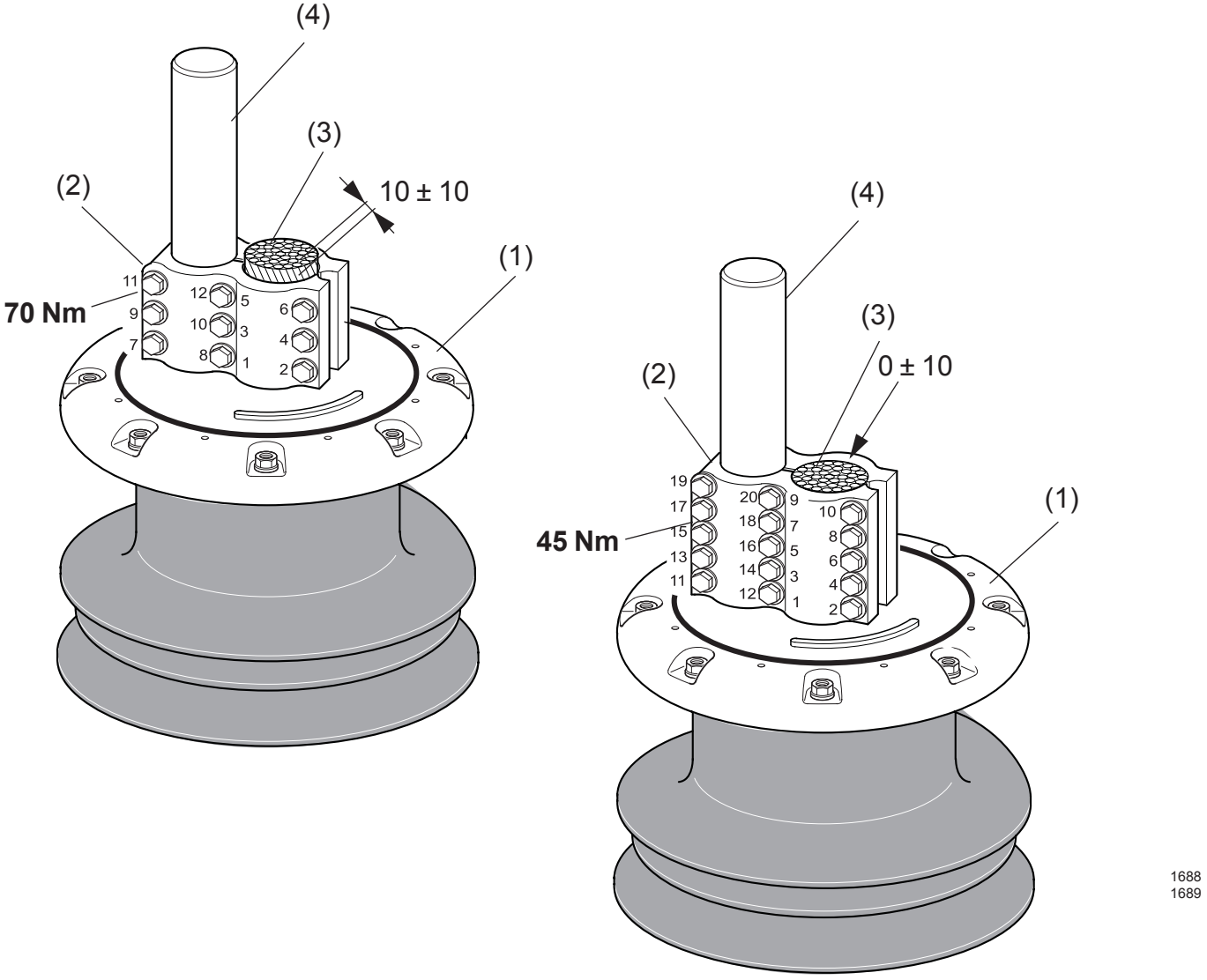
17. Tighten the insulator top cover (1) or bolts in an alternating sequence to a torque of 45 Nm. If the conductor clamp (2) has nine bolts, the conductor (3) of the cable should end 10 ± 10 mm above the clamp. Should the clamp have fifteen bolts, the cable conductor end should be 0 ± 10 mm above the clamp.

Place the top bolt (4) in the clamp. If the clamp has nine M12 bolts, tighten the nine bolts in succession to a torque of 70 Nm, starting with the lowest centre bolt, then the conductor bolts and finally the bolts for the top bolt (see picture).

If the clamp has fifteen M10 bolts, tighten the fifteen bolts in succession to a torque of 45 Nm, starting with the lowest centre bolt, then the conductor bolts and finally the screws for the top bolt (see picture).

NB! Make sure there are no impurities or metal particles on the top cover, cable end or clamp, which might fall into the insulator during installation.



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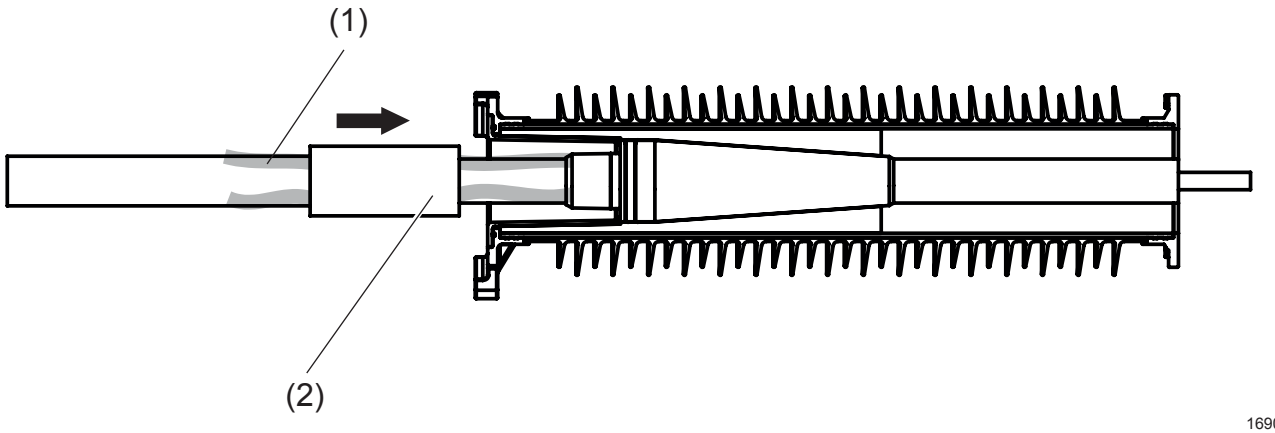
18. Place the two O-rings for the top cover cap in position. Grease the top bolt and the hole in the top cover cap with supplied grease, mount the top cover cap and tighten the M6-screws with approximately 10 Nm.

Mount the sealing on the top bolt and the top cover cap.

19. Fasten the four braided copper bands (1) on the cable. Push the cold shrink tube (2) on to the stress cone. Remove the interior of the cold shrink tube by pulling and rotate.



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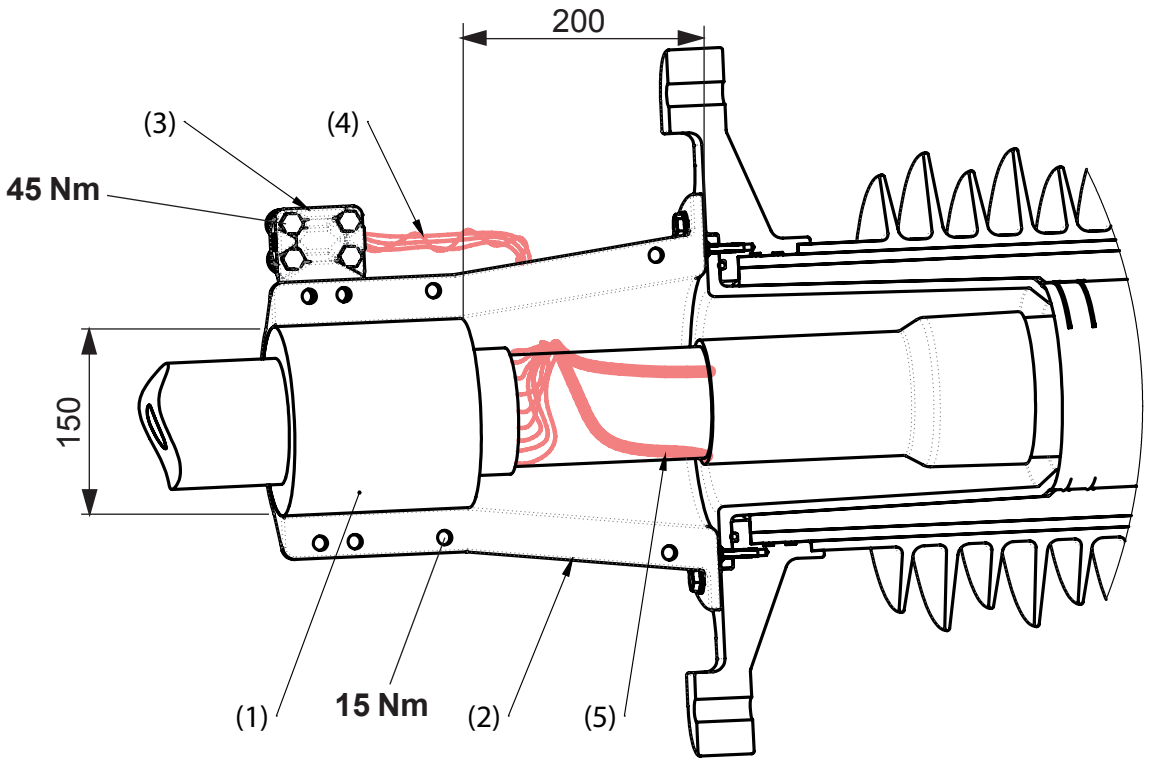
20. Wrap IV on the cable ones between 200 and 300 mm from the insulator. Wind bituminized paper (1) hard over the IV to a diameter of approximately 150 mm. Mount the cable clamps (2) and earthing clamp (3) temporarily. Fold out the screen wires (4) together with the braided copper bands (5) through one of the holes of the cable clamp and connect them to the earthing clamp. Bundle the screen wires using two of the wires. Tighten the bolts to a torque of 45 Nm. Secure the cable with the cable clamps. Thighten the bolts to a torque of 15 Nm. Mount a sealing in the not used hole on the cable clamp.



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21. For cables with a conducting layer on the oversheath.
Remove the outer conducting layer for a distance of 200 mm from the end of the termination. Be careful to remove all conducting material. Do not remove more of the oversheath than necessary.

Apply lashings (1) of copper wire around the cable with a distance of 50 mm and check the resistance with an insulation tester. The resistance must be more than 200 MΩ.

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22. When the termination is to be lifted into its final position, the lifting sling (1) is to be secured around the top of the insulator.

Lift the temination to its final position, check that the insulator gets a level contact with the bracket, if not, adjust with washers.
Tighten the bolts to a torque of ~100 Nm.

Secure the cable to the support. Recomendation is three clamps between 0.5 - 1.5 m from the termination.

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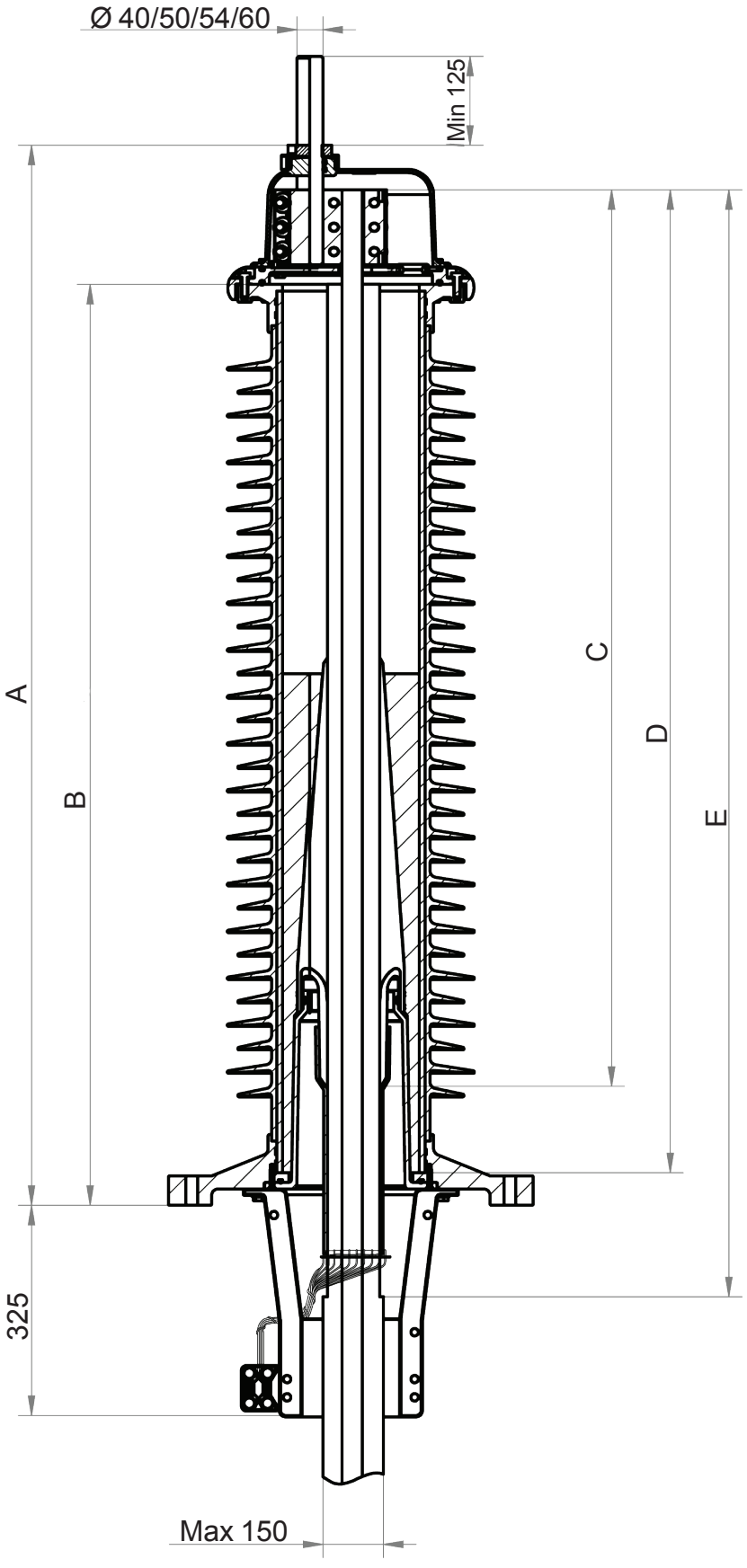
Appendix 1

	A	B	C	D	E
TD 123	1485	1270	1230	1365	1400
TD 145	1630	1414	1375	1510	1550
TD 170	1845	1630	1590	1725	1760



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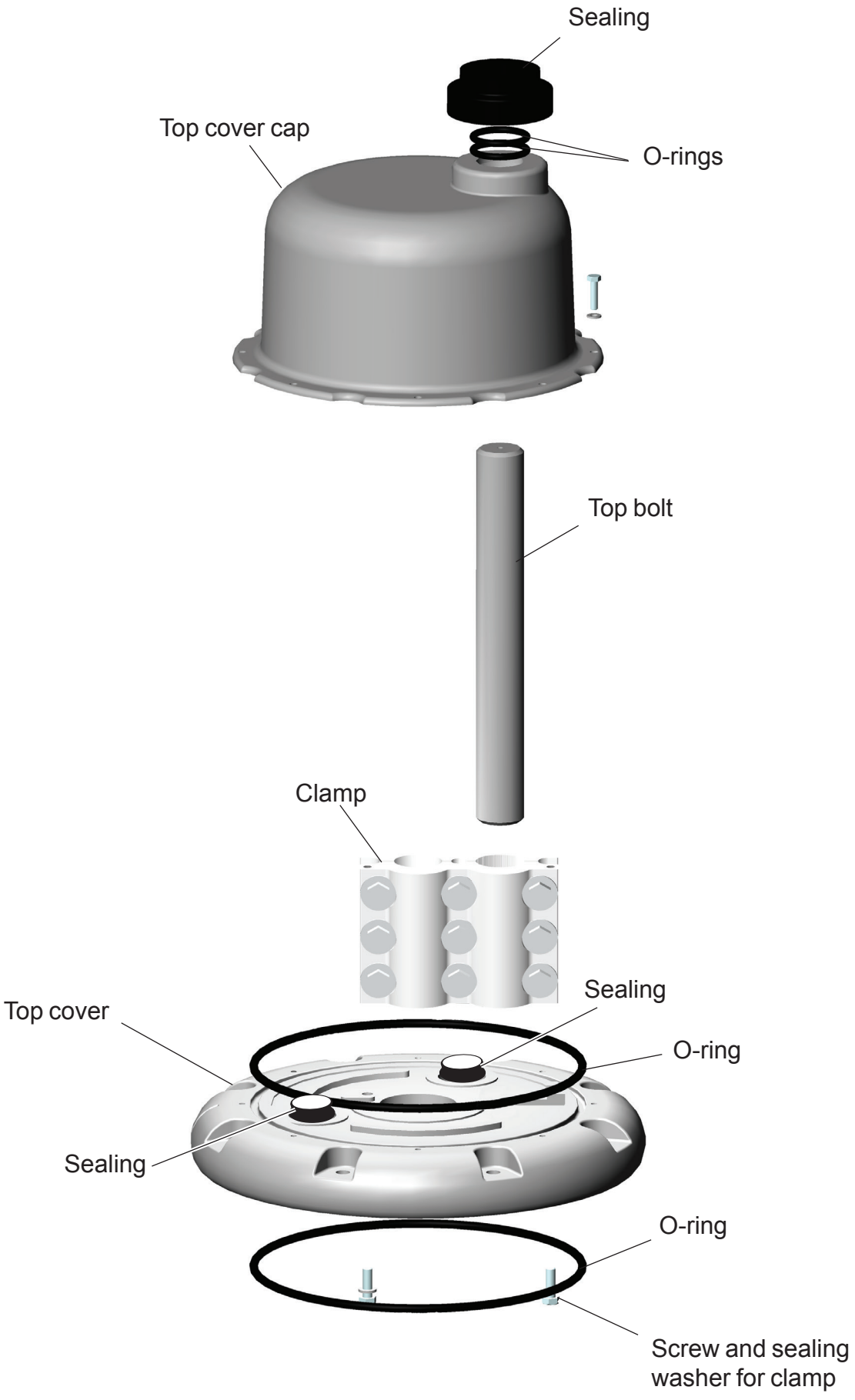
Sealing
Top cover cap
O-rings
Top bolt
Clamp
Sealing
Top cover
O-ring
Sealing
O-ring
Screw and sealing
washer for clamp
1696