

FIST™ MODULAR SPLICE CLOSURE

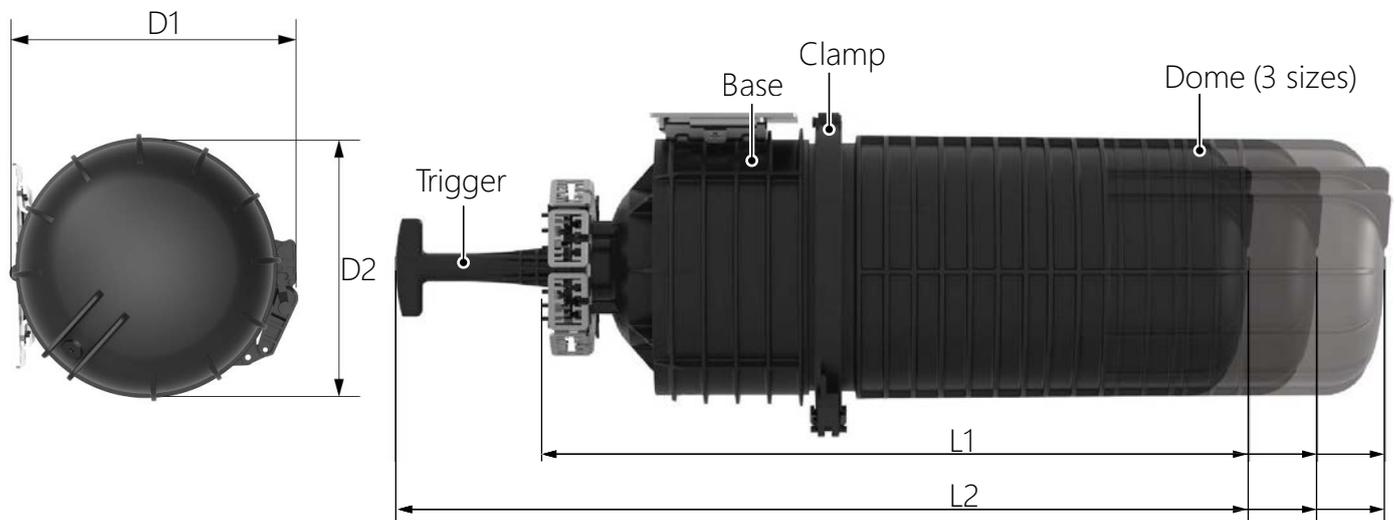
1 About this document

The FIST™ modular splice closure is a modular closure that is composed of different building blocks to meet the specific client needs. This document provides information about the different building blocks and functionalities of the closure and provides the instructions of the installation steps required to install this closure.

Images in this manual are for reference only and are subject to change.

2 General product information

2.1 Sizes and dimensions



Dome size	C (mm)	D (mm)	E (mm)	BF (BE+collar) (mm)
L2 (total length)	772	850	960	1020
L1 (length excl. trigger)	622	700	810	870
D1 (diameter with clamp)	291	291	291	291
D2 (diameter without clamp)	256	256	256	256

2.2 Cable diameter range

The modular splice closure can hold 8 seal segments. The cable diameter ranges from 1 - 27 mm.

2.3 Splice capacity

Splice capacity is dependent on the closure size (C, D and E). The UMS profiles that provide the foundation to mount the modular grooveplates and trays vary in length in the 3 sizes. UMS profiles are mounted back to back, allowing to mount grooveplates and trays on 2 sides.

Dome size	BC	BD	BE	BF (BE+collar)
UMS units	20	36	52	60
SC/SLE trays capacity	40 (20/side)	72 (36/side)	104 (52/side)	120 (60/side)
SE trays capacity	20 (10/side)	36 (18/side)	52 (26/side)	60 (30/side)

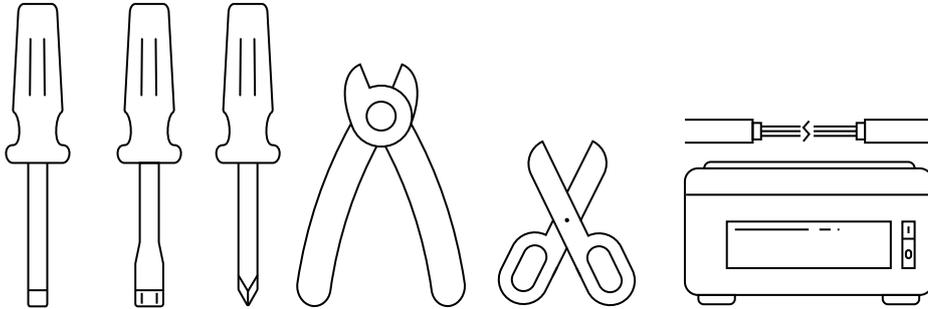
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3 List of acronyms and abbreviations

FIST	Fiber Infrastructure System Technology	SE	Single Element (tray)
MSC	Modular Splice Closure	FAS	Fiber Arrangement System
CTU	Cable Termination Unit	UMS	Universal Mounting System
SKG	Sealing Kit Gel	SOSA	Splice Only Sub Assembly
SLE	SLim Element (tray)	SASA	Splitter Arrangement Sub Assembly
SC	Single Circuit (tray)	POC	Passive Optical Component

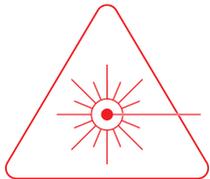
4 Tools



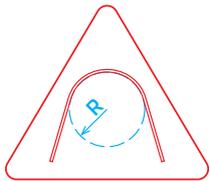
From left to right:

- Flat screw driver
- Socket wrench
- Phillips screw driver
- Small side cutter
- Scissors
- Measuring tape
- Fiber splice equipment and fiber cleaning tools

5 Warnings and Cautions



5.1 Follow the installation instruction steps to ensure the performance of the closure. It is necessary to take precautions and keep the working space clean to protect the closure sealing materials and splices.

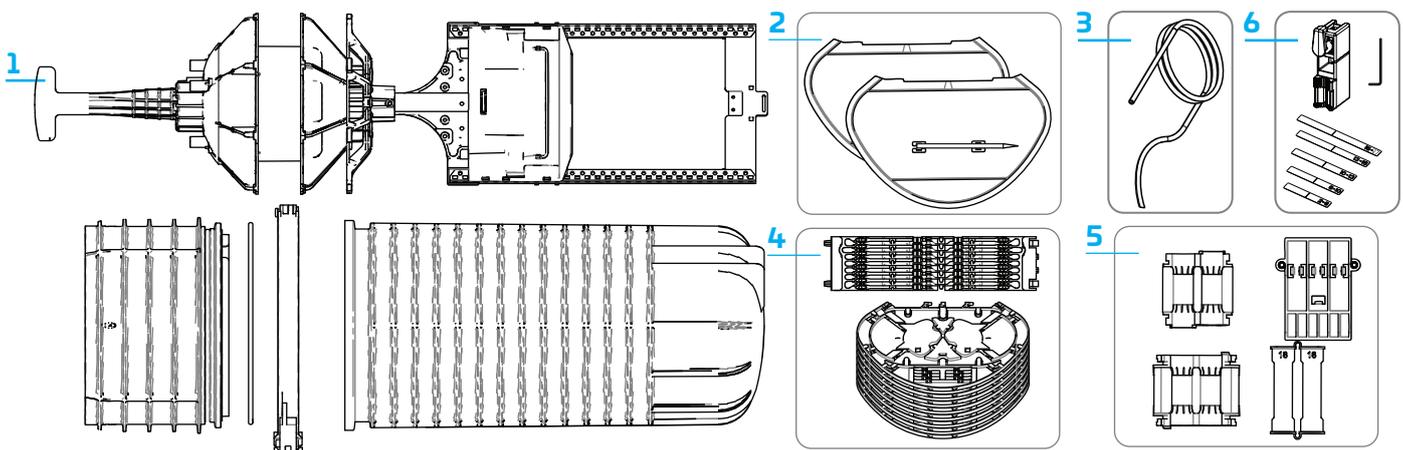


5.2 Exposure to laser radiation can seriously damage the retina of the eye. Do not look into the ends of any optical fiber. Do not assume the laser power is turned off or that the fiber is disconnected at the other end. Looking into the ends of any optical fiber is entirely at your own risk.

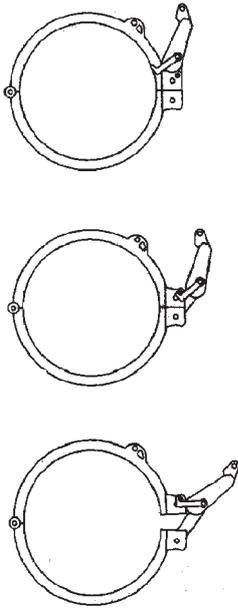
5.3 Fiber optic cables may be damaged if bent or curved to a radius that is less than the recommended minimum bend radius. Always observe the recommended bend radius limit when installing fiber optic cables, subunits and patch cords.

6 Kit contents - principle parts

Description	Qty
1 Empty closure with base, UMS, FAS block with caps, Velcro strap, M5 bolt and washer for central grounding, dome, O-ring and clamp	1
2 Tray covers with fiber guidance pen	2
3 Silicone orange tubing	1
4 SOSA/SASA kits	
5 SKG kits	
6 CTU's	



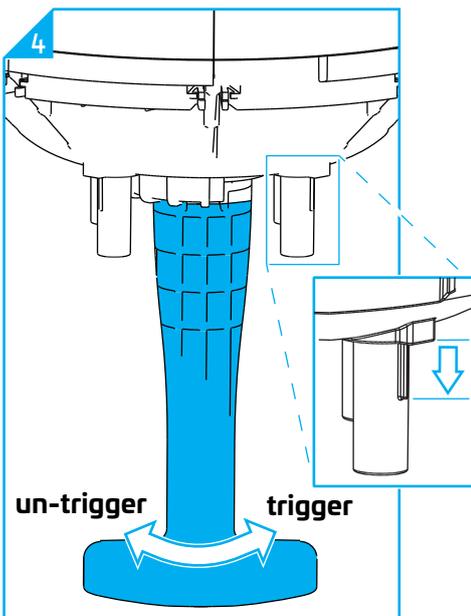
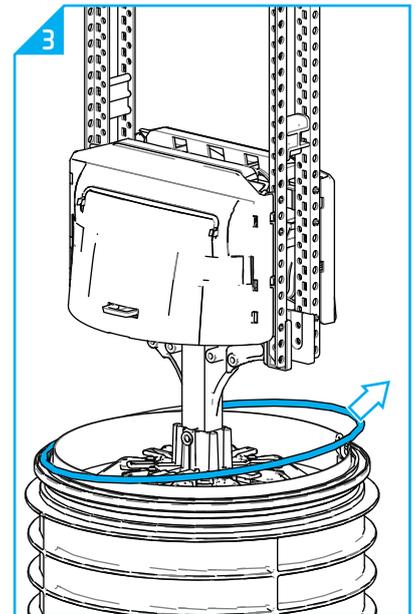
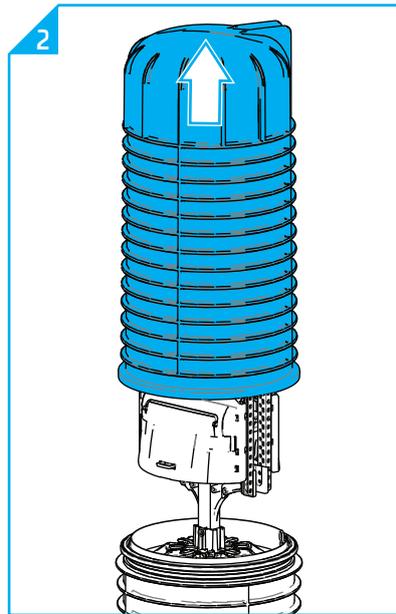
7 Open closure



7.1 Open and remove the clamp.

7.2 Lift the dome over the fiber management system. The fiber management is fully accessible now.

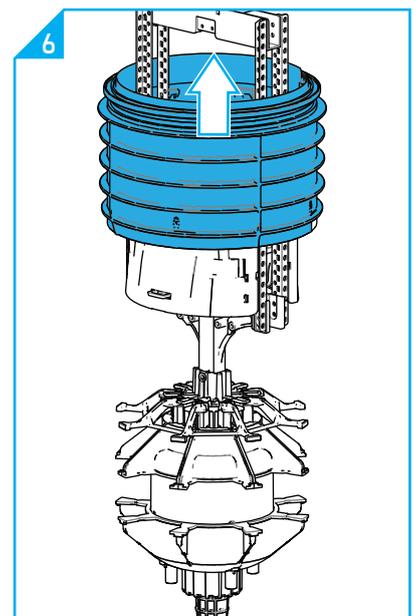
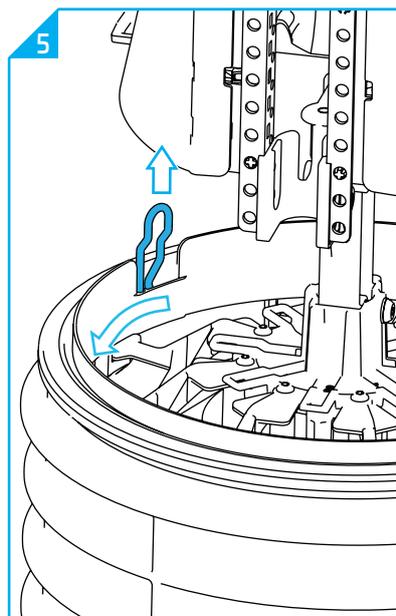
7.3 Park the O-ring.



7.4 To remove the base, the trigger system should be un-triggered. The bottom of the seal block will move down over the studs. When the base is flush with the end of the ribs on the studs, the gel is fully uncompressed and the base can be removed.

7.5 Lift the split pen up. Do not remove. Rotate the base relative to the star bracket.

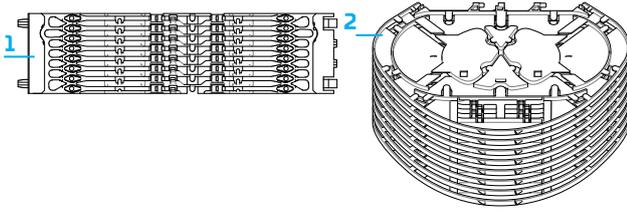
7.6 Lift the base over the fiber management system. The sealing block is now accessible.



8 Prepare closure

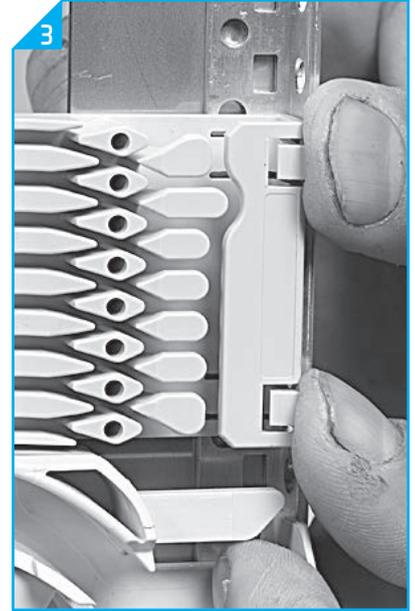
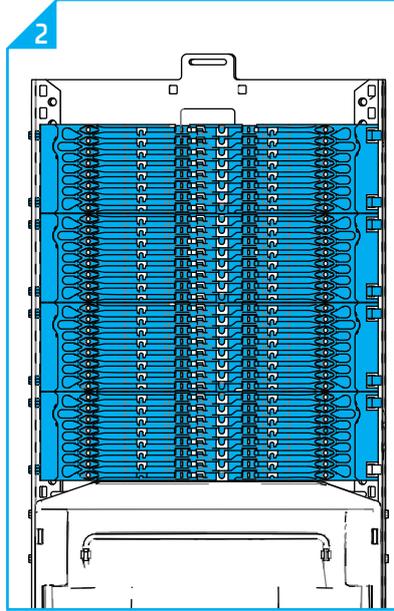
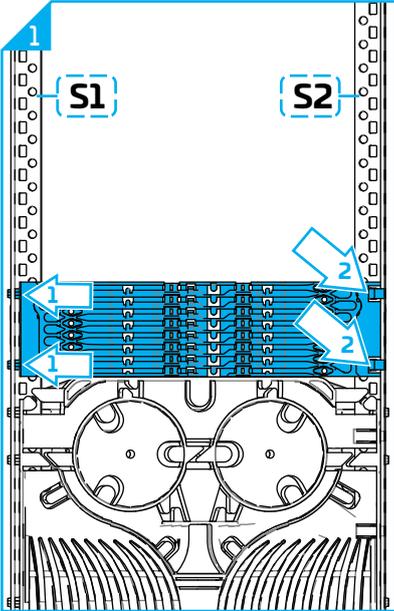
8.1 Install SOSA/ SASA kits

8.1.1 Kit contents



A SOSA/ SASA kit exists of a grooveplate (1) and trays (2). Different tray types can be chosen depending on the application (splicing single element or single circuit, splitter involved,...) and splice protector holder (smouv, ant,..). See eCatalog for all options.

8.1.2 Install grooveplates

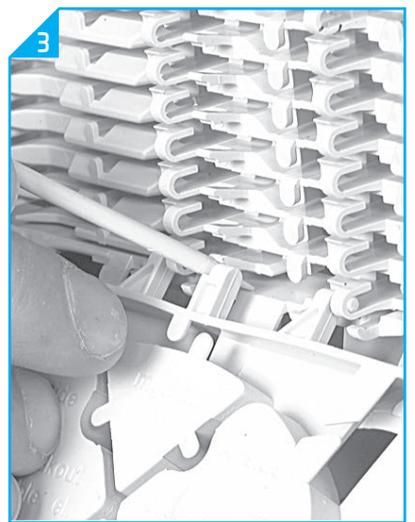
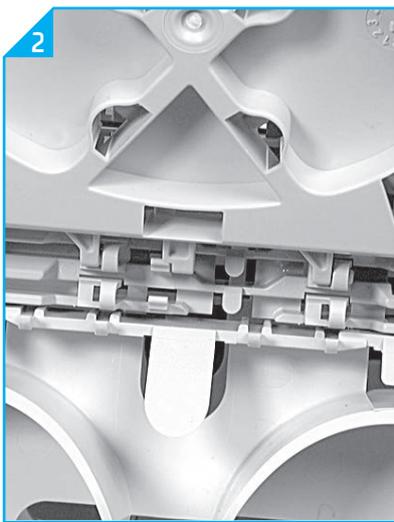
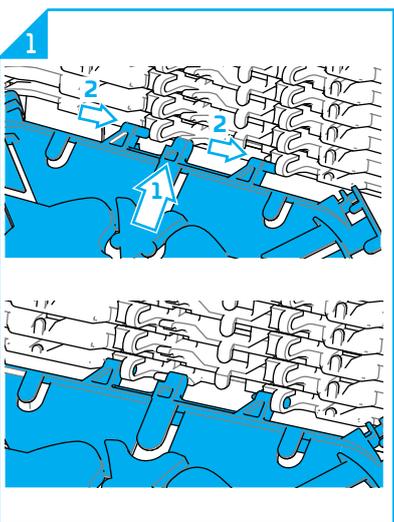


8.1.2.1 Secure the wraparound grooveplate on the UMS profile by putting the plate with the long protrusions in the S1 UMS-profile and sliding the plate in the S2 UMS-profile until it snaps.

8.1.2.2 Install the next grooveplate on top of the installed one, do not leave gaps between grooveplates

8.1.2.3 To remove push the two snapfits at S2 UMS-profile and slide the grooveplate towards S1 UMS-profile.

8.1.3 Install trays



8.1.3.1 Place a tray in the wraparound grooveplate: do this by pushing the lip on the grooveplate slightly up with the tray and move the tray laterally into the hinge cavities. Start from the FAS block side and preferably mount trays as fibering up.

8.1.3.2 When installing SE trays, always leave one hinge between that FAS block and tray or tray and tray.

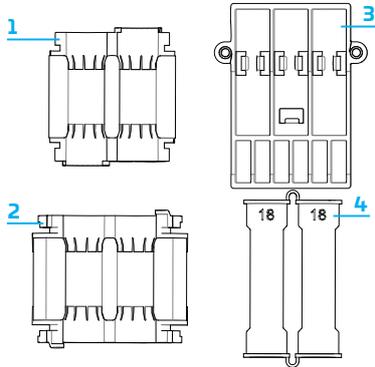
8.1.3.3 To remove the tray put the fiber guidance pen between the lip on the grooveplate and the tray, and move laterally towards S1.

8.2 Install SKG kits

The closure is sealed with in total 8 gel seal segments. This requires that 8 SKG kits should be installed to seal the closure.

8.2.1 Kit contents

Different SKG kits exist, depending on the purpose (cable sealing, closure port sealing (dummy) or grounding). SKG kits to seal the cables differ depending on the cable diameter range, grounding requirements and the amount of cable positions in the gel seal (1-out, 2-out, 3-out, 4-out and 8-out).



An SKG (except SKG-DUMMY and SKG-FDTHR) always contains: a CTU holder, dummy plugs and two pieces of gel seal segments (figure showing example of an SKG2 kit).

1	Inner gel segment
2	Outer gel segment
3	CTU holder
4	Dummy plugs

SKG-DUMMY and SKG-FDTHR contain only 1 gel segment.

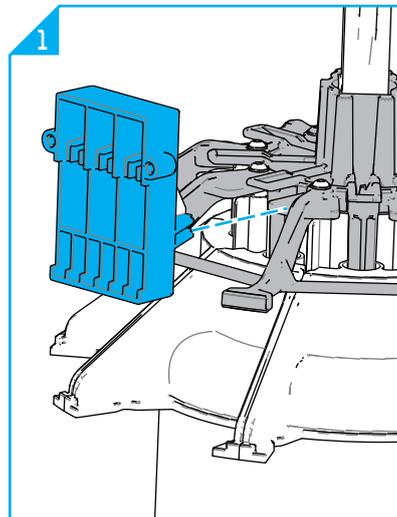
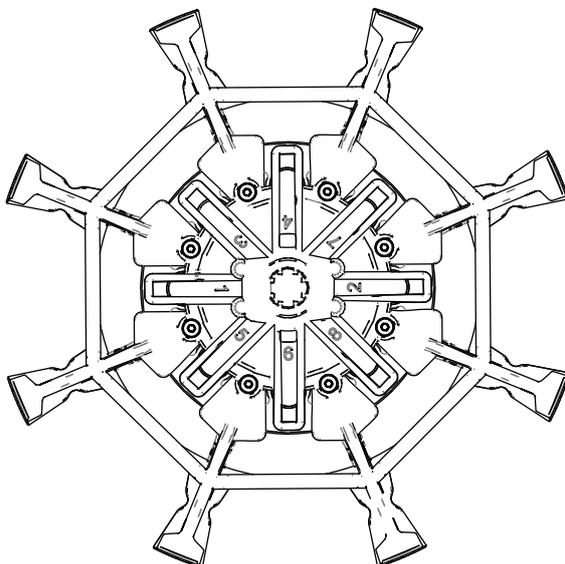
Depending on the cables used in the application different SKG's can be combined. Select the SKG corresponding to the cable diameter used. The cable diameter range of the kit is stamped on the gel seals in the kit. Table below gives an overview of the cable range and amount of cable positions per SKG type:

Gel seal	# cable positions	Cable range (Ø)(mm)	Gel seal	# cable positions	Cable range (Ø)(mm)
SKG1	1	21-27	SKG3	3	6-14
SKG2 18/22	2	18-22	SKG4*	4	4-11
SKG2 13/19	2	13-19	SKG8	8	1-5

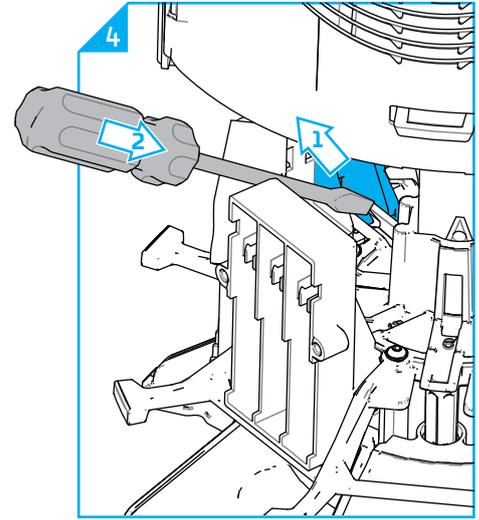
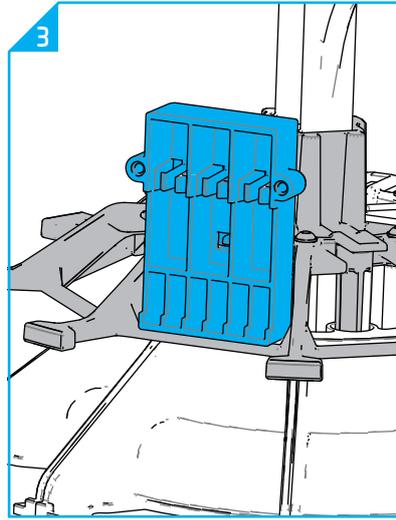
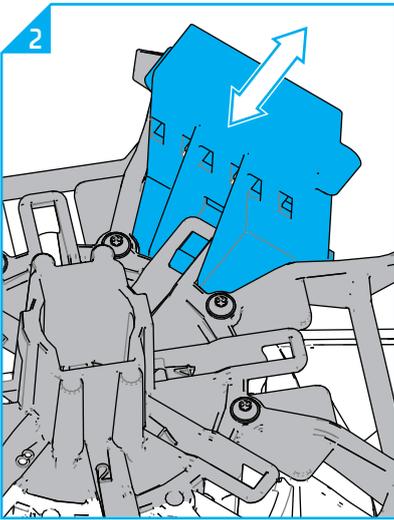
*to secure rigid strength member, always use a 3-, 2-, 1-out gel seal segment.

Make sure to install the selected seal kit in the assigned port. The port numbers are indicated on the star bracket (see figure below).

8.2.2 Install CTU holder



8.2.2.1 Select the assigned port in the starbracket and slide the two slots of the CTU holder over the flanges of that port on the star bracket.

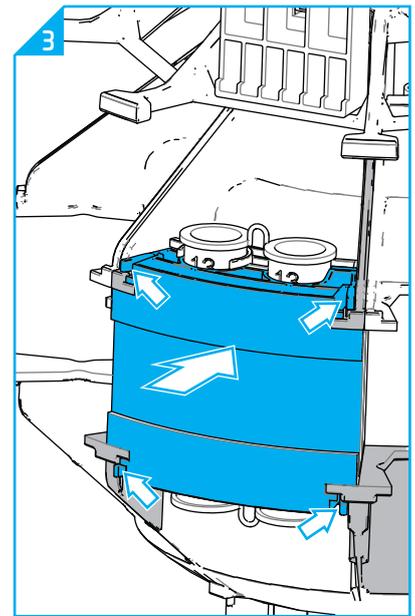
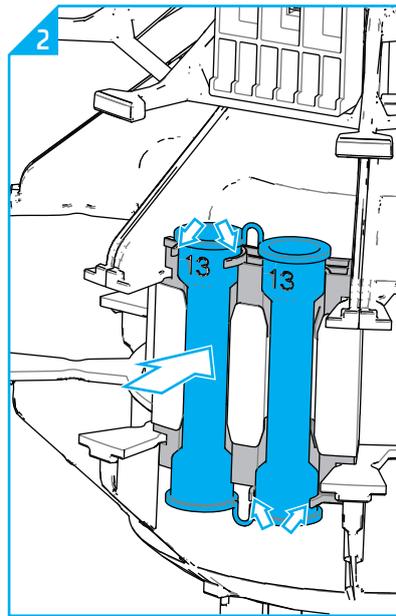
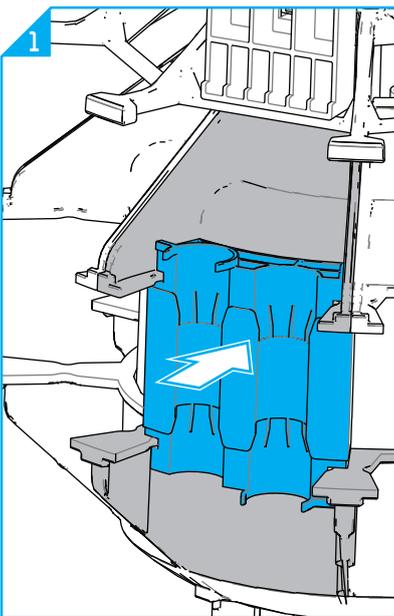


8.2.2.2 The snaphook on the CTU holder will fall into the opening in the bracket. The CTU holder can float to be able to position itself towards the position of the strength member.

8.2.2.3 CTU holder installed

8.2.2.4 To remove the CTU holder in case of mistake, first slide the CTU holder forward so the snaphook can move downward. Then carefully position a screwdriver on the snaphook and push it downwards. Slide the CTU holder out of the star-bracket while keeping the snaphook pushed downwards. **Note:** when cables and subunits are installed, be extra careful.

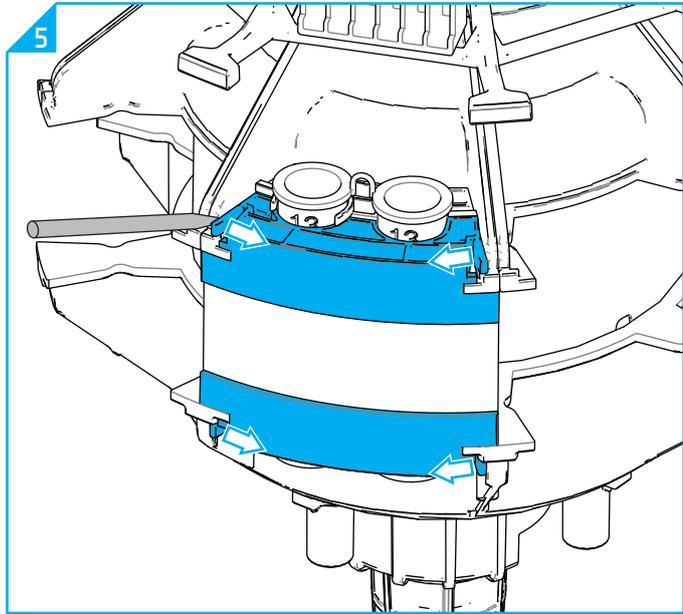
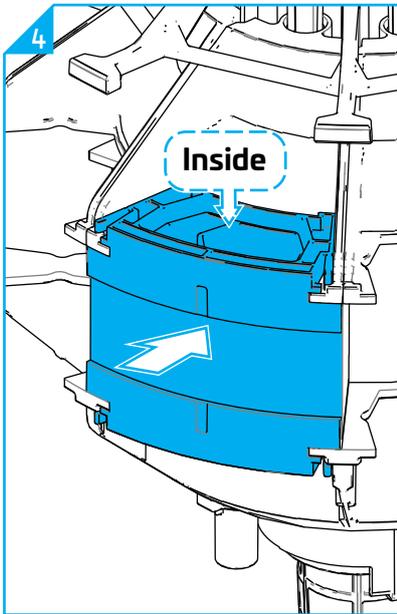
8.2.3 Install gel seal segments



8.2.3.1 To install the gel segments the trigger system should be un-triggered state. Slide the inner gel segment over the 4 ribs of the seal block.

8.2.3.2 Install the dummy plugs. The dummy plugs clicks into the snap features on the inner gel segment.

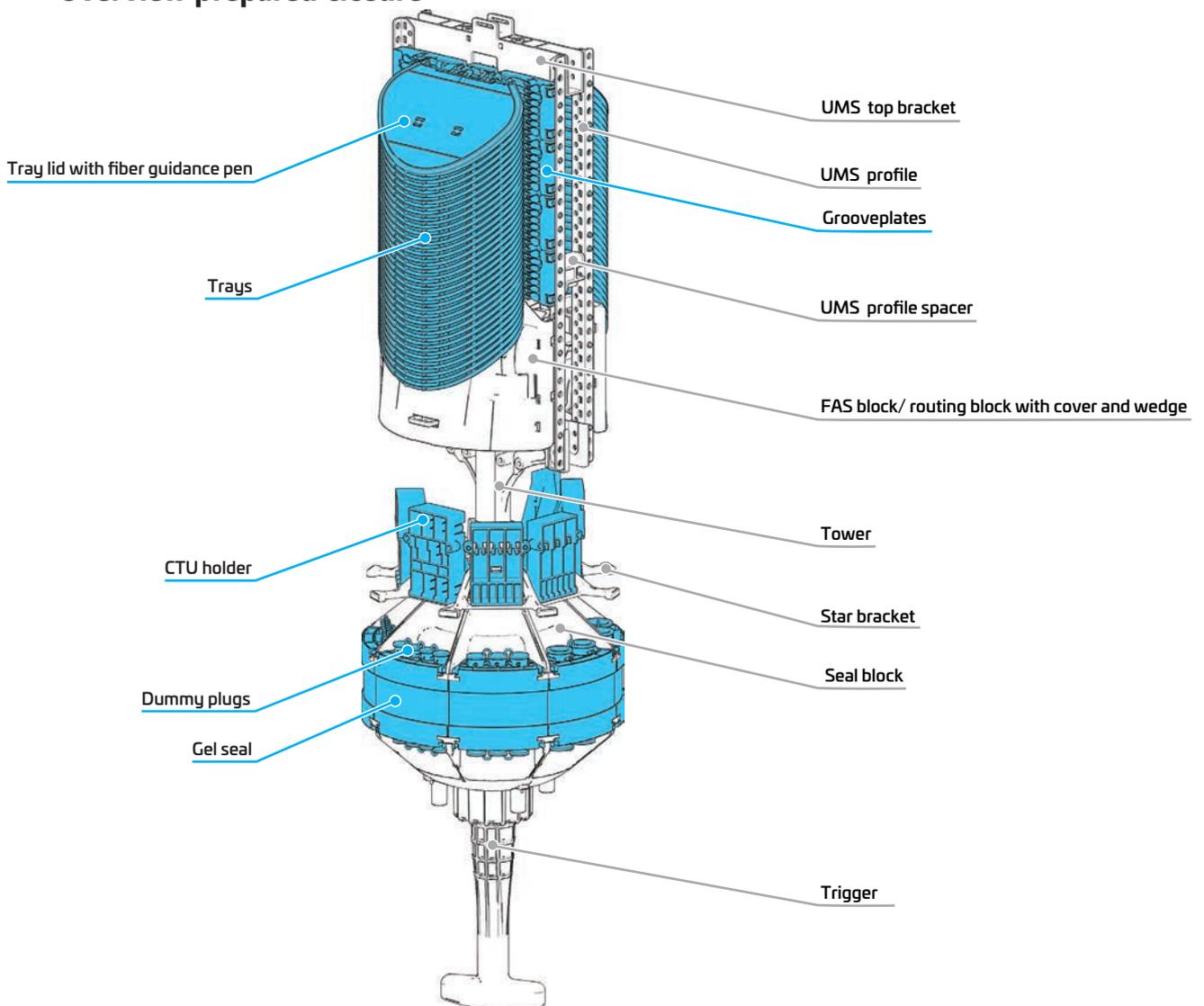
8.2.3.3 Slide the outer gel segment over the 4 ribs until it snaps.



8.2.4 To install a **SKG-DUMMY**, slide the dummy gel seal (one piece) over the 4 ribs until it snaps. Verify the proper orientation of the dummy gel seal, see image above.

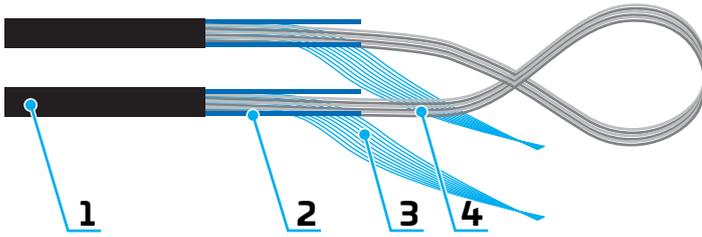
8.2.5 To remove the outer gel segment or the dummy gel seal, push the 4 snaps to the inside, a fiber guidance pen can be used.

8.3 Overview prepared closure



9 Prepare cable

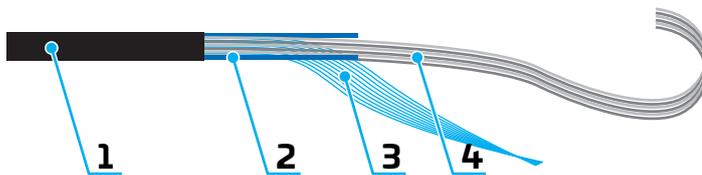
9.1 Looped cable



N.º	Description	Preparation
1	Jacket	BC: Make a midspan* of 350 cm +/- 5 cm BD: Make a midspan* of 370 cm +/- 5 cm BE: Make a midspan* of 390 cm +/- 5 cm
2	Rigid Strength member(s)	See subsection 9.3 or 9.4 depending on the cable diameter and the CTU type used
3	Aramid yarn	See subsection 9.3 or 9.4 depending on the cable diameter and the CTU type used
4	Subunits	Clean the subunits, remove all grease

* Make sure the oscillation point (when present) is in the middle of the midspan.

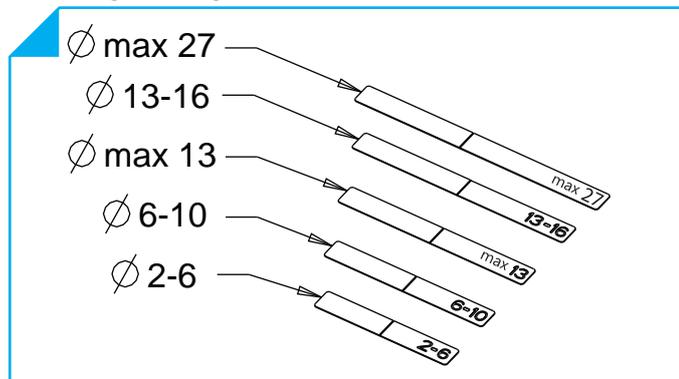
9.2 Butt cable



N.º	Description	Preparation
1	Jacket	Remove the jacket over a distance of 220 cm +/- 5 cm
2	Rigid Strength member(s)	See subsection 9.3 or 9.4 depending on the cable diameter and the CTU type used
3	Aramid yarn	See subsection 9.3 or 9.4 depending on the cable diameter and the CTU type used
4	Subunits	Clean the subunits, remove all grease

9.3 Install CTU on cable (without grounding)

To install grounding, refer to section XX



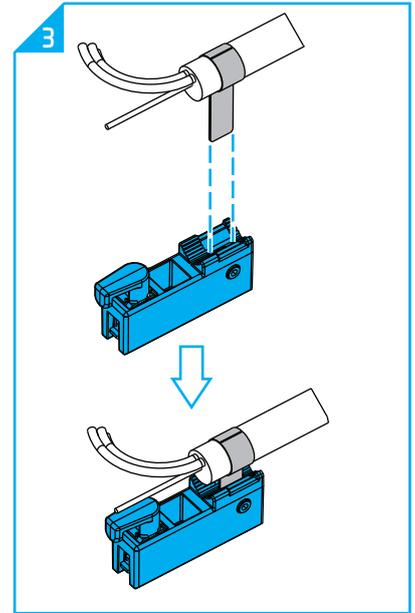
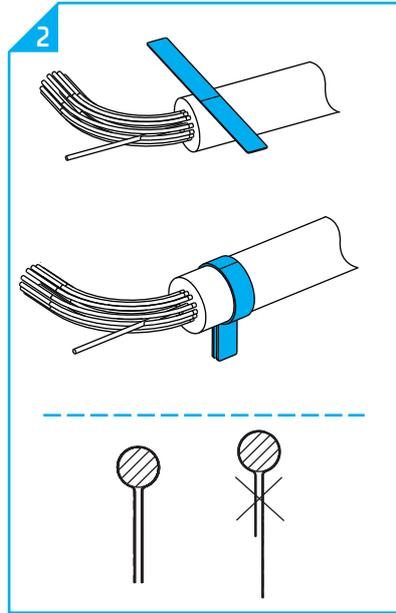
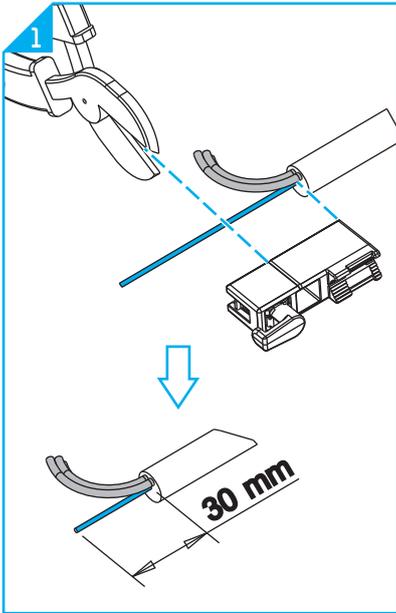
Measure the cable diameter to select the correct CTU and/or the correct cable retention metal strap.

To select the correct cable retention metal strap, the diameter measured should be between the two dimensions indicated on the metal strap. For example, if the measured diameter is 15.5mm, select the 13-16 band.

Depending on cable size and type of strength member, select one of the following sub sections to terminate the strength member.

CTU /strength member type	Subsection
CTU-L / central strength member	9.3.1
CTU-L / dual strength member	9.3.2
CTU-L / aramid yarn	9.3.3
CTU-S / aramid yarn	9.3.4
CTU-G / central strength member	9.3.5
CTU-G / dual strength member	9.3.6
CTU-G / aramid yarn	9.3.7

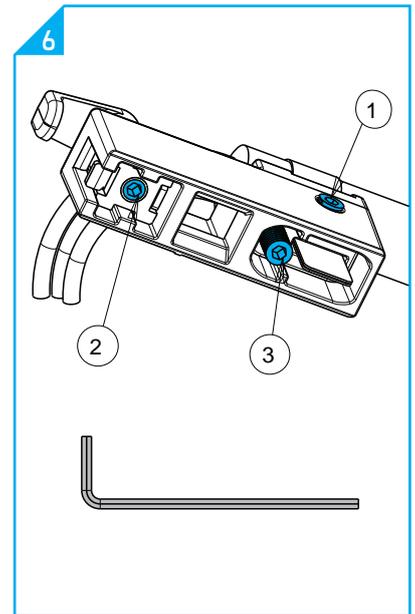
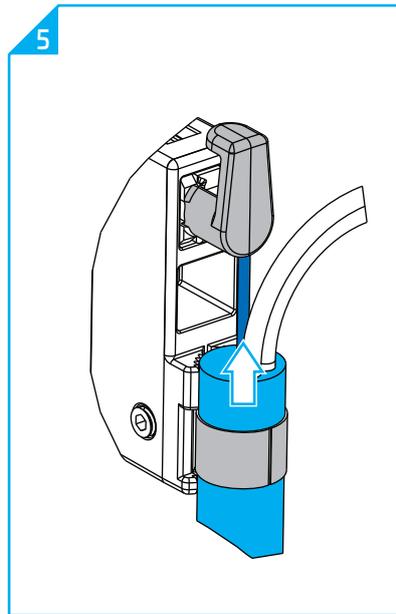
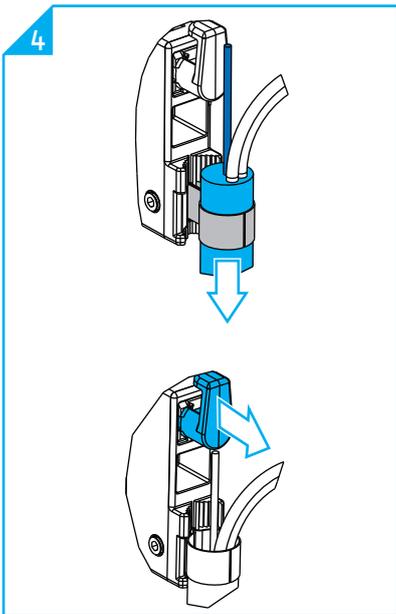
9.3.1 CTU-L - central strength member



9.3.1.1 Cut the strength member to a length of 30 mm. To mark this distance, the line on the side of the CTU can be used. Hold the cable jacket flush with the bottom of the CTU and mark the strength member at the height of the line.

9.3.1.2 Bend the selected metal strap around the cable while maintaining the centerlines (centerline of the metal strap on the center of the cable). Make sure both ends of the metal strap have equal lengths.

9.3.1.3 Insert the wrapped metal strap in the CTU slot.



9.3.1.4 To insert the strength member in the strength member holder, first pull the cable slightly back (making sure the jacket doesn't pass the metal strap), then move the strength member holder forward.

9.3.1.5 then push the cable upwards again until the central strength member butts against the strength member holders top surface.

Note: Some strength members may need to be trimmed in width to fit properly.

9.3.1.6 Tighten the screws with the Allen key included.

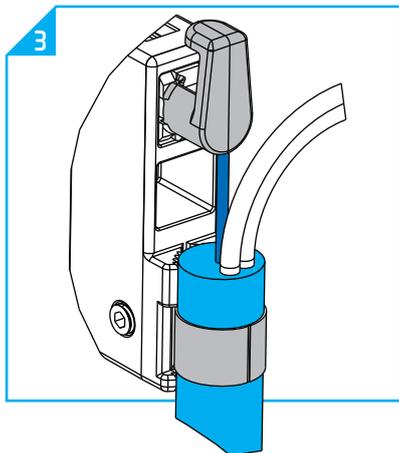
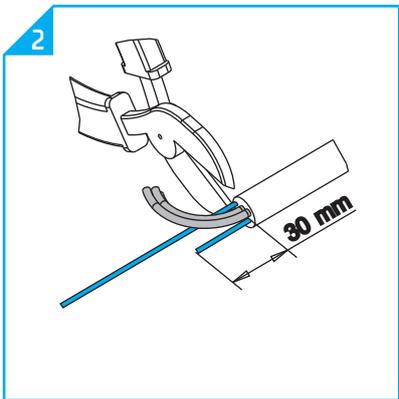
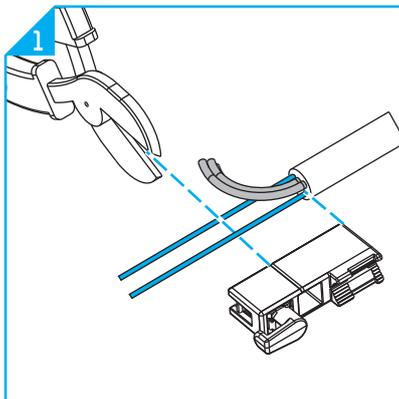
First tighten the screw on the side to secure the metal strap to the CTU. The cable is left unsecured at this point.

Second tighten the screw to secure the strength member.

Third tighten the screw to secure the cable jacket.

The cable is now fully secured to the CTU.

9.3.2 CTU-L - dual strength member

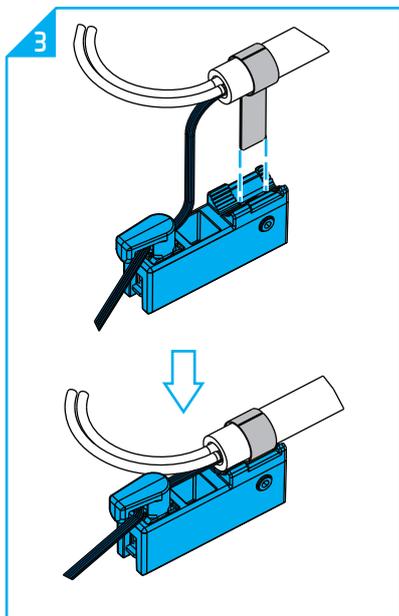
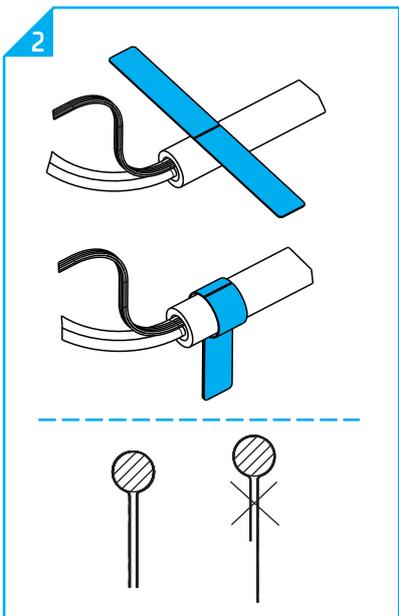
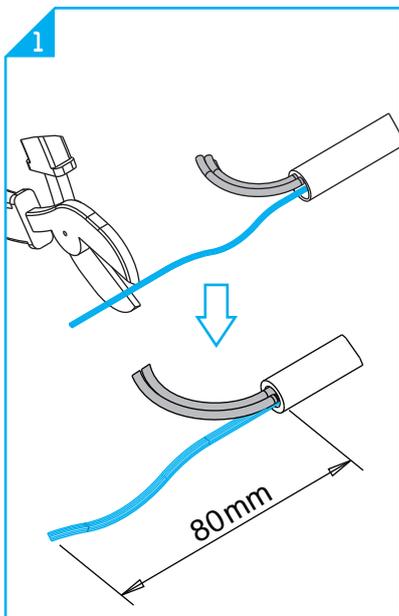


9.3.2.1 Cut one of the two strength members to a length of 30 mm. To mark this distance, the line on the side of the CTU can be used. Hold the cable jacket flush with the bottom of the CTU and mark the strength member at the height of the line

9.3.2.2 Remove the other strength member completely (cut it flush with the cable jacket).

9.3.2.3 Proceed with steps 9.3.1.2 until 9.3.1.5 to secure the cable jacket and the strength member to the CTU. Position the cable such that the remaining strength member is closest to the CTU.

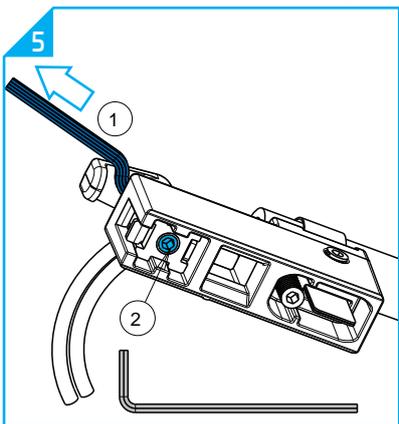
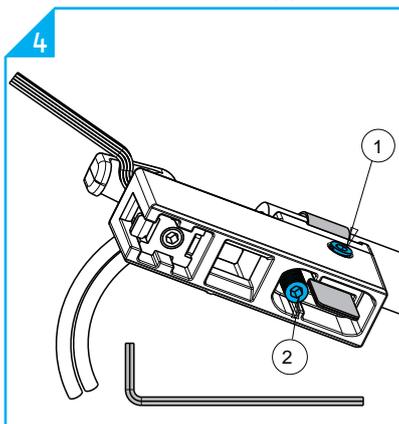
9.3.3 CTU-L - aramid yarn



9.3.3.1 Cut the aramid yarn to a length of 80mm.

9.3.3.2 Bend the selected metal strap around the cable while maintaining the centerlines (centerline of the metal strap on the center of the cable). Make sure both ends of the metal strap are of equal lengths.

9.3.3.3 Insert the wrapped metal strap in the CTU slot. Guide the aramid yarn through the strength member holder.

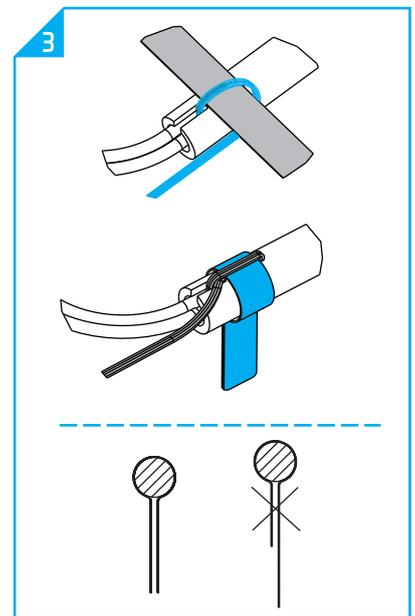
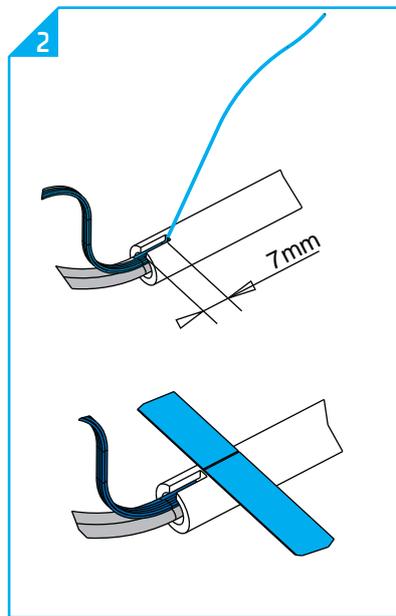
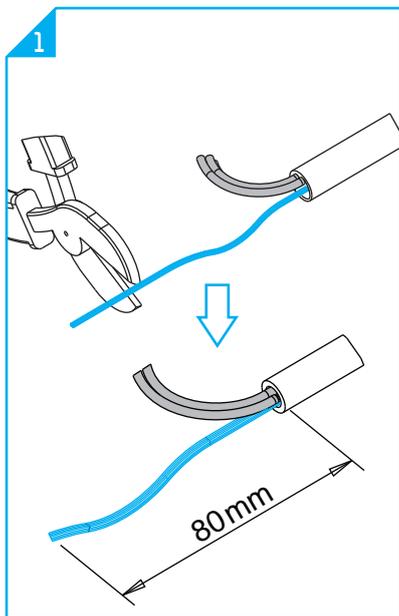


9.3.3.4 Secure the jacket of the cable to the CTU by first tightening the screw on the side and then tightening the screw at the back side of the CTU.

9.3.3.5 Pull on the aramid yarn and secure it in the strength member holder by tightening the screw of the backside of the CTU.

9.3.3.6 Cut the excessive aramid yarn as shown.

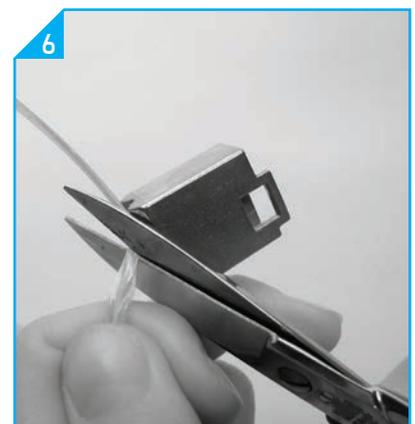
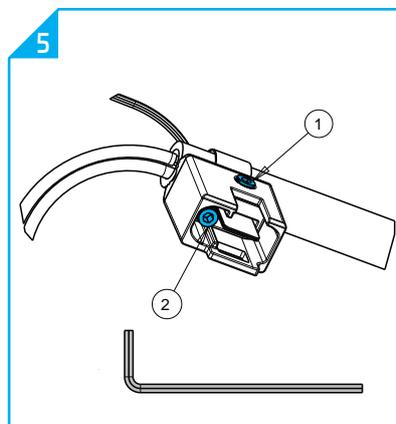
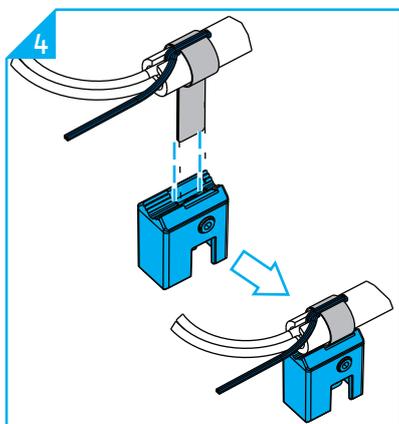
9.3.4 CTU-S - aramid yarn



9.3.4.1 Cut the aramid yarn to a length of 80 mm.

9.3.4.2 Make a slit of 7mm in the jacket by pulling on a part of the aramid yarn. Position the metal strap on the cable maintaining the centerlines

9.3.4.3 Wrap the aramid around the band. Bend the band around the cable making sure both ends are of equal lengths

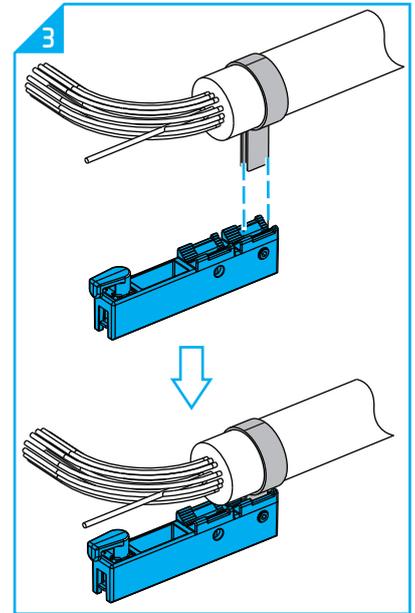
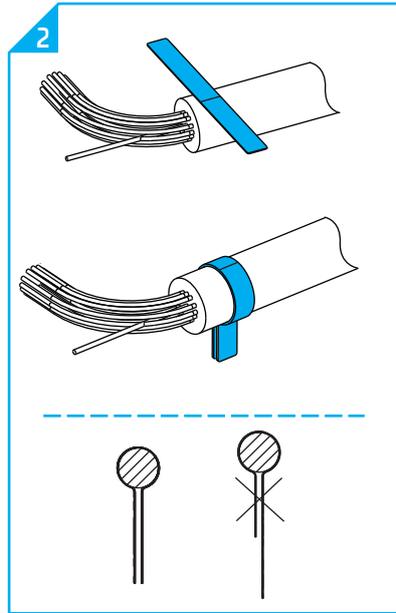
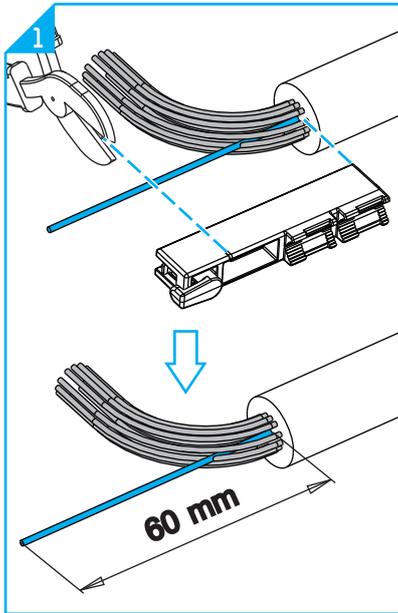


9.3.4.4 Insert the wrapped metal strap in the CTU slot.

9.3.4.5 Secure the jacket of the cable to the CTU by first tightening the screw on the side and then tightening the screw at the back side of the CTU.

9.3.4.6 Cut the excessive aramid yarn as shown.

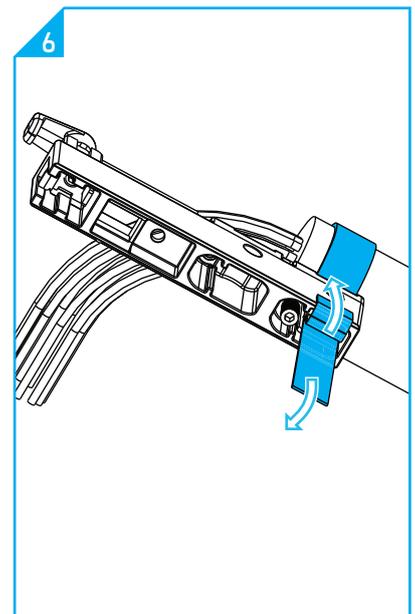
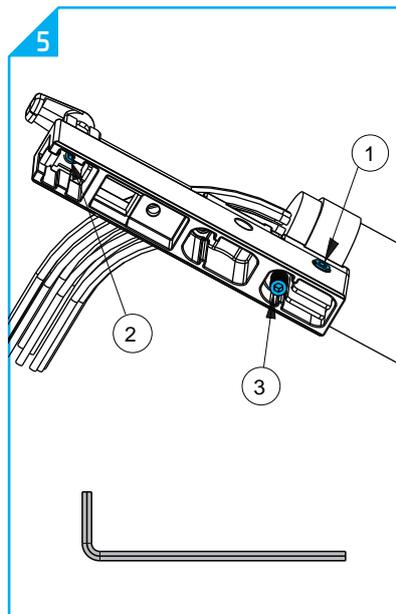
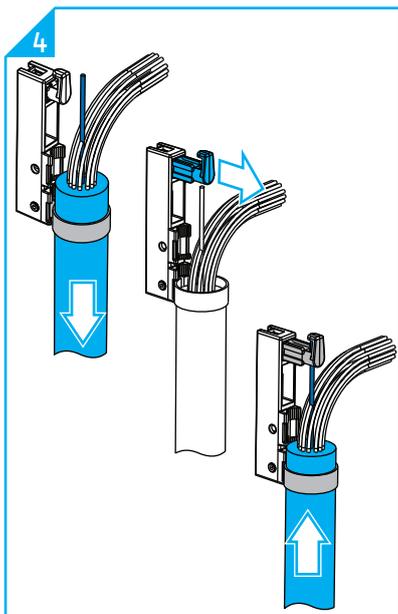
9.3.5 CTU-G - central strength member



9.3.5.1 Cut the strength member to a length of 60 mm. To mark this distance, the line on the side of the CTU can be used. Hold the cable jacket flush with the bottom of the CTU and mark the strength member at the height of the line.

9.3.5.2 Bend the metal strap around the cable while maintaining the centerlines (centerline of the metal strap on the center of the cable). Make sure both ends of the metal strap are of equal lengths.

9.3.5.3 Insert the wrapped metal strap in the first CTU slot.



9.3.5.4 Insert the strength member in the strength member holder. First pull the cable slightly back (making sure the jacket doesn't pass the metal strap), then move the strength member holder forward and then push the cable upwards again until the central strength member butts against the strength member holder's top surface.

Note: Some strength members may need to be trimmed in width to fit properly.

9.3.5.5 Tighten the screws with the allen key.

First tighten the screw on the side to secure the metal strap to the CTU. The cable is left unsecured at this point.

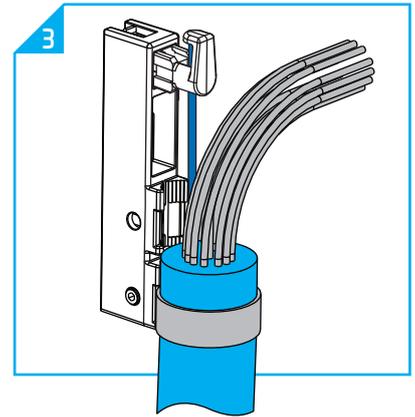
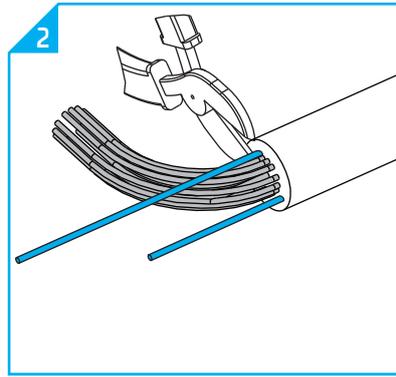
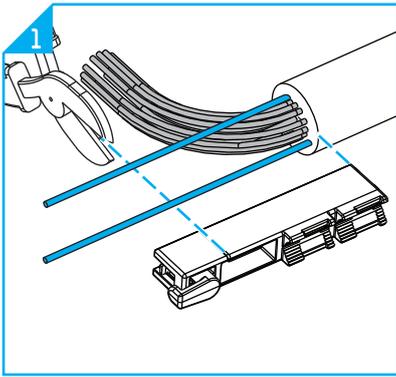
Second tighten the screw to secure the strength member.

Third tighten the screw to secure the cable jacket.

The cable is now fully secured to the CTU.

9.3.5.6 Fold over both ends of the metal strap. Fold the left end towards the left side and the right end to the right side over the outer surface of the CTU.

9.3.6 CTU-G dual strength member



9.3.6.1 Cut one of the two strength members to a length of 60 mm. To mark the distance, the line on the side of the CTU can be used.

9.3.6.2 Remove the other strength member completely (cut it flush with the cable jacket).

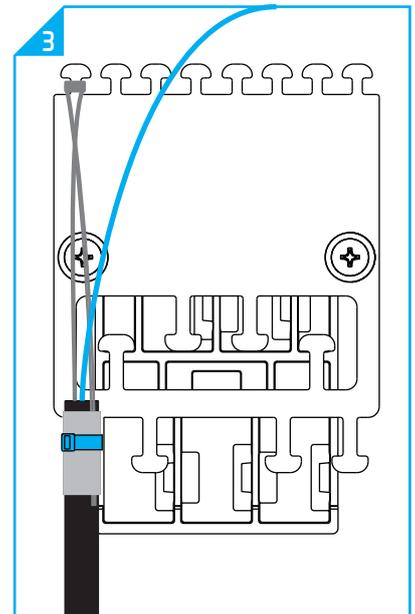
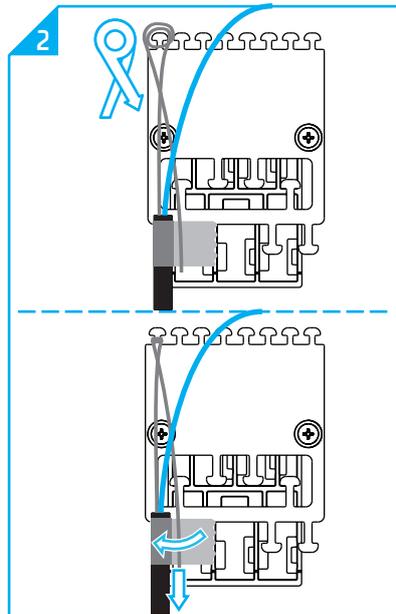
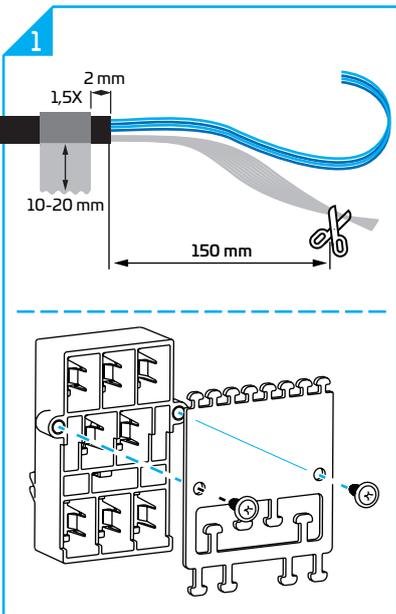
9.3.6.3 Proceed with steps 9.3.5.2 to 9.3.5.6 to secure the cable jacket and the strength member to the CTU. Position the cable such that the remaining strength member is closest to the CTU.

9.3.7 CTU-G - aramid yarn

Also aramid yarn can be secured with the CTU-G. It is the same way of working as explained in section 9.3.3. CTU-L aramid yarn. Make sure to use the first slot to secure the cable with the metal strap to the CTU.

9.4 Metal plate installation

9.4.1 CTU-BRKT 1- aramid yarn

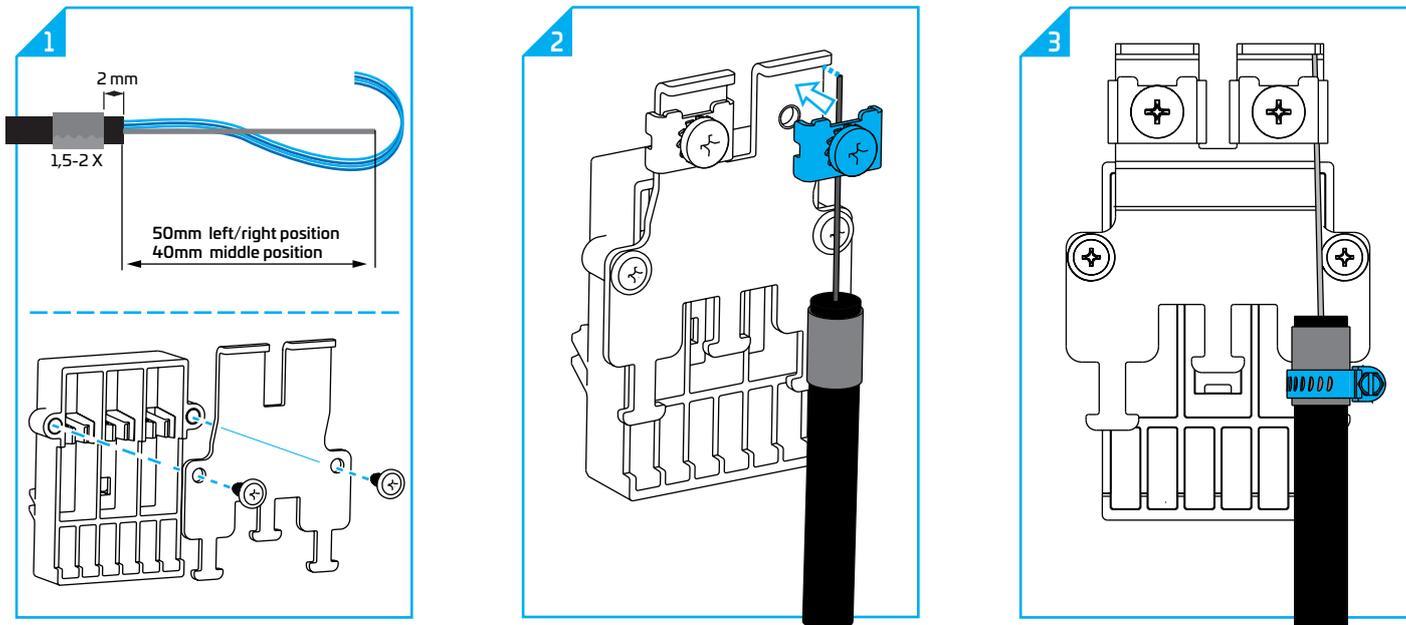


9.4.1.1 Cut the aramid yarn to a length of 150mm. Apply 1,5 turn of felt tape around the cable and keep 10 to 20 mm over length. Secure the metal plate onto the CTU holder with the two ejot screws.

9.4.1.2 Position the cable on top of the metal plate, jacket end located above a large T-shape. Wrap the aramid yarn 1,5 turn around the small T-shape located on the top of the bracket. (Take the T-shape in line with the position of the cable.) Wrap the remaining piece of felt tape around the cable with the aramid yarn in between. Make sure to put tension on the aramid yarn while performing this action.

9.4.1.3 Secure the cable with a cable tie to the bracket on the position where the felt tape is located. The CTU holder can now be installed in the star bracket as explained in section 8.2.2.

9.4.2 CTU-BRKT 2 - hose clamp



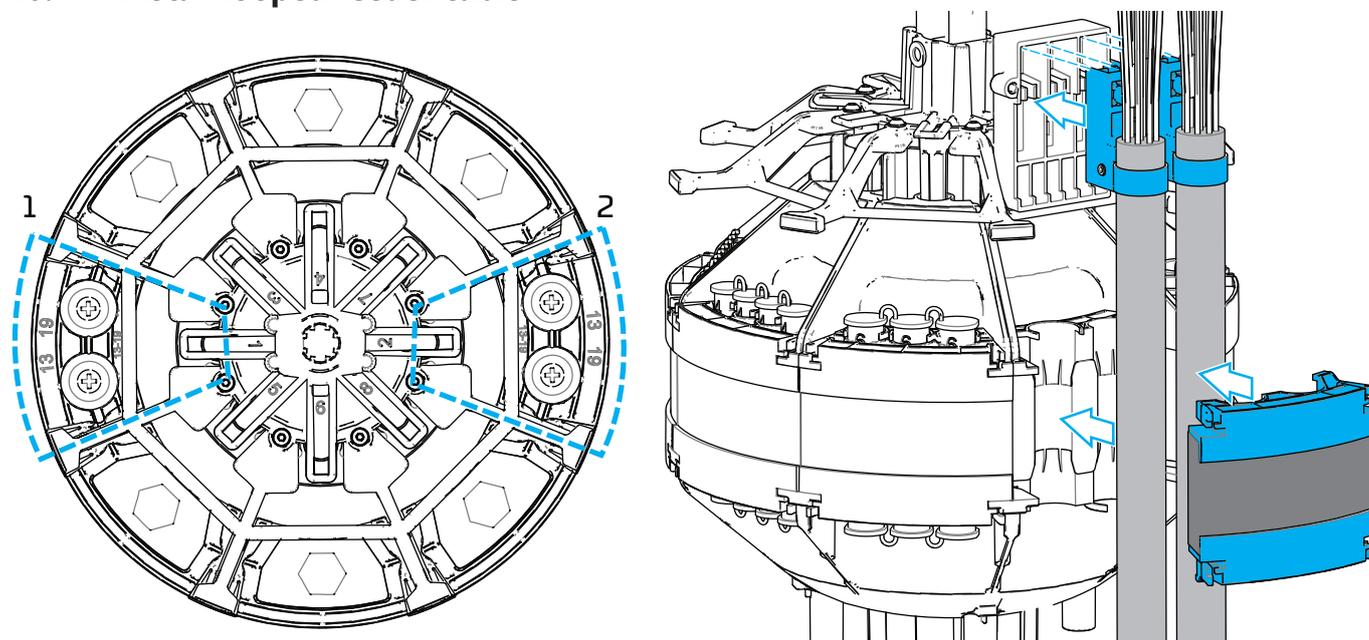
9.4.2.1 Cut the rigid strength member to length, depending on its position on the metal plate. Apply 1.5-2 turns of felt tape around the cable. Secure the metal plate onto the CTU holder with the two ejet screws.

9.4.2.2 Secure the strength member under the metal plates. The end of the strength member should be positioned against the bent side. **The length of the strength member of the cable positioned left and right should be 50mm, the length of the strength member of the cable positioned in the middle should be 40mm.**

9.4.2.3 Secure the cable with a hose clamp to the bracket on the position where the felt tape is located. **Note:** Make sure the position of the hose clamp is as shown in image above. Install the CTU holder in the star bracket as explained in section 8.2.2.

10 Install looped feeder cable

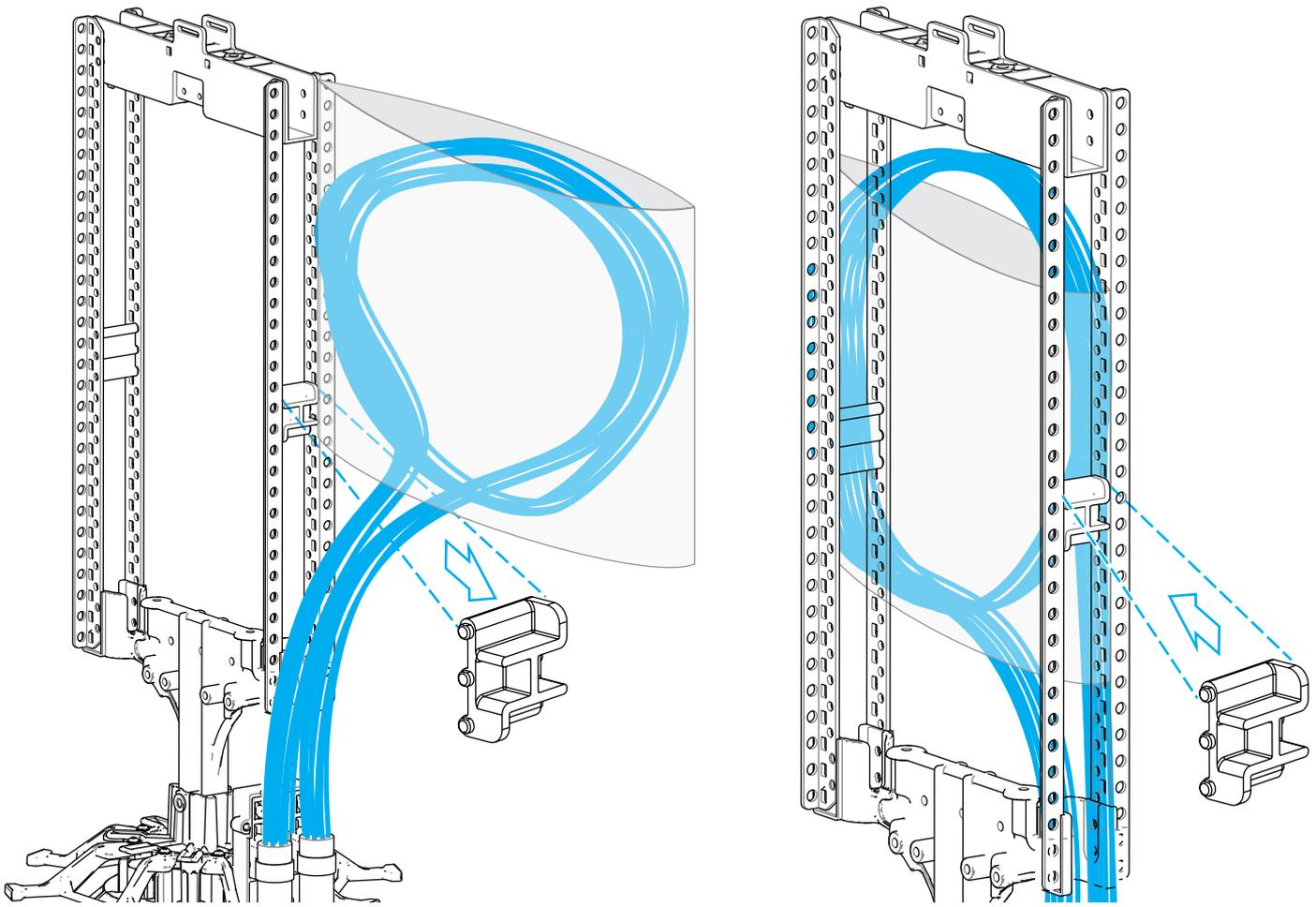
10.1 Install looped feeder cable



10.1.1 The looped feeder cable (both ends) can be positioned in port 1 or in port 2.

10.1.2 Click both CTU's in the CTU holder. Select the two outer positions in the CTU holder.

10.1.3 Place the outer gel segment on top of the cables and push until snap hooks are properly seated.



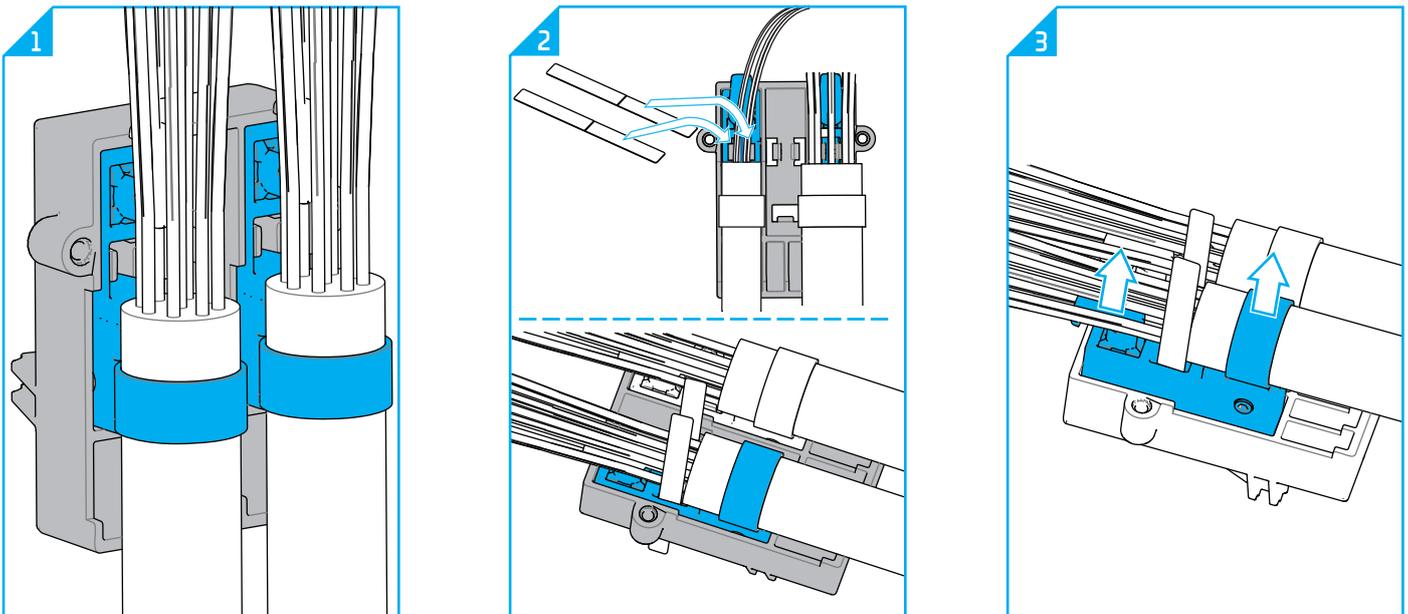
10.1.4 Make some loops of the unused subunits and use cable ties or a plastic bag to keep the loop together.

10.1.5 Remove the UMS spacer to have complete access. The subunits can now slide between the UMS profile.

10.1.6 Re-install the spacer.

Note: Loops can also be stored directly on the trays. Tubes/subunits must be shaved between the two marks and organized in the tube holder area as explained in section 13. Routing towards and on the trays is explained in section 14.

10.2 Remove CTU-L (CTU-G)



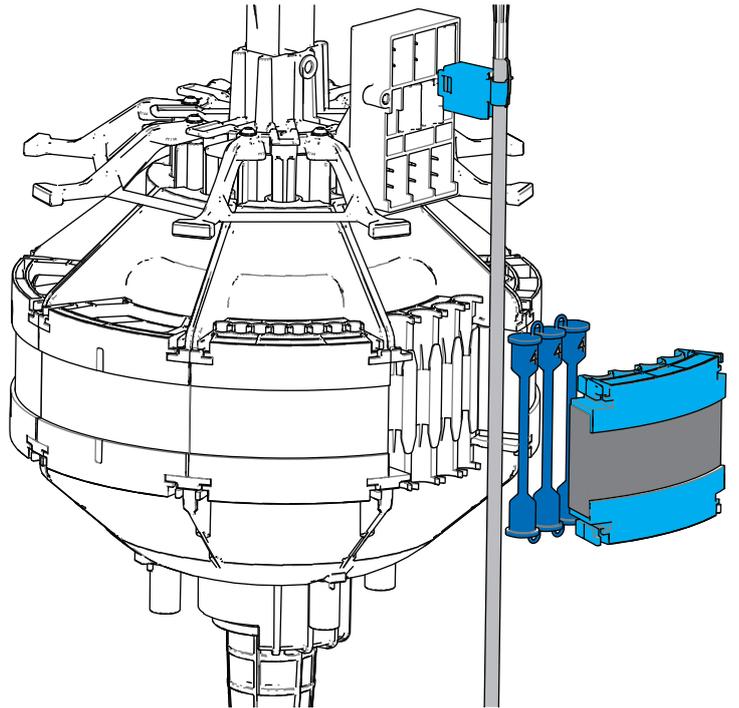
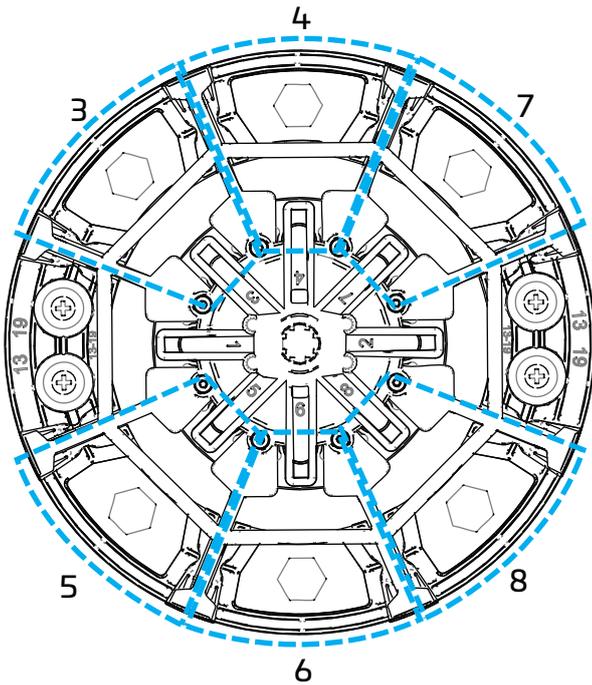
10.2.1 CTU installed in the CTU holder. The 2 snap hooks in the CTU cavity prevent the CTU from being removed.

10.2.2 To remove the CTU, the 2 snap hooks should be pushed to the inside. This can be done by using two metal straps. Push the metal strap between the snap hooks and the metal part. The metal strap should slide down through the CTU holder. Best practice to perform this action, is to lay the closure in flat position.

10.2.3 Grap the CTU with cable on two positions and slide it out its cavity.

11 Install drop cable

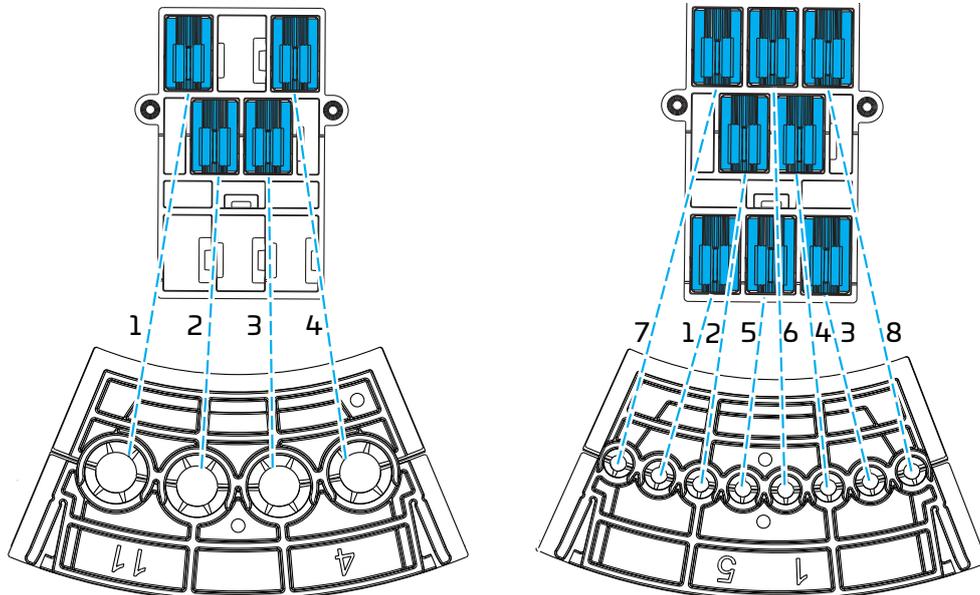
11.1 Install drop cable



11.1.1 Before installing a drop cable, select the gel seal segment and seal port in such a way that a minimum of fibers will cross under and in the FAS block area. Drop cables can be installed in port 3,4,5,6,7 and 8.

11.1.2 Click the CTU in the plastic holder (for more details, see figure 1 and 2 in section 11.3). Make sure dummy plugs are installed in unused cable ports. Place the outer gel segment on top of the cables and push until snap hooks are properly installed.

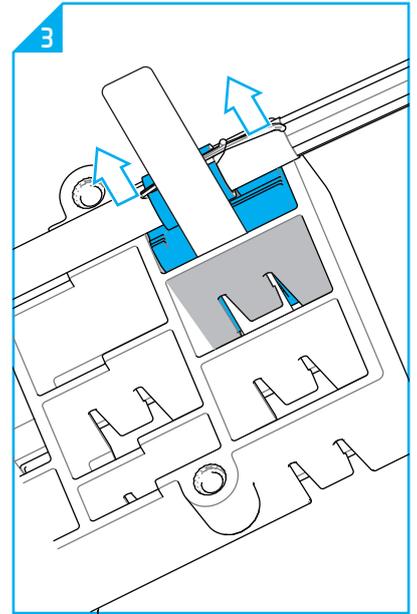
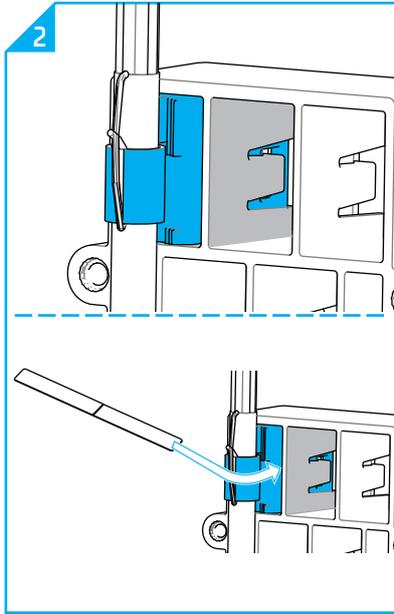
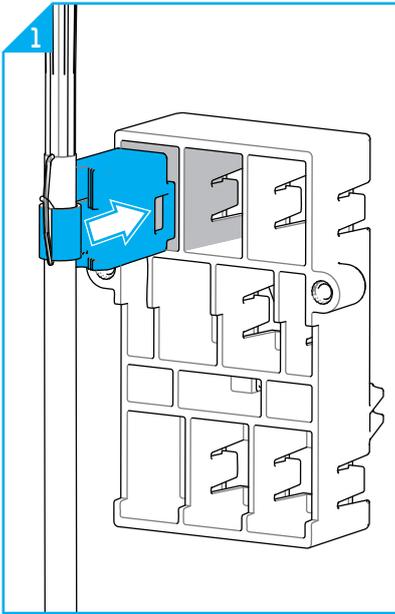
11.2 Install CTU-S in CTU holder



11.2.1 If installing a cable in a 4-out seal port, the position of the cable in the seal port determines the position of the CTU in the CTU holder. Observe image above.

11.2.2 If installing a cable in a 8-out seal port, the position of the cable in the seal port determines the position of the CTU in the CTU holder. To avoid crossings of cables, install the cables in the numerical sequence as shown above.

11.3 Remove CTU-S

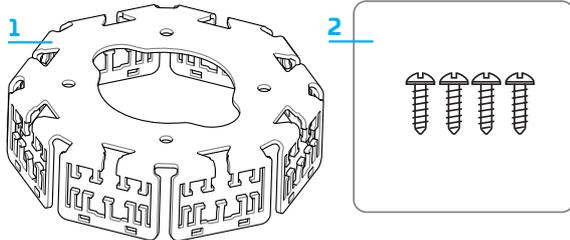


11.3.1 CTU installed in the CTU holder. The snap hook in the CTU cavity prevent the CTU from being removed

11.3.2 To remove the CTU, the snap hook positioned at the left side, should be pushed to the outside. This can be done by using a metal strap Push the metal strap between the snap hooks and the metal part. The metal strap should slide down through the CTU holder. Best practice to perform this action, is to lay the closure in flat position.

11.3.3 Grap the CTU with cable on two positions and slide it out its cavity.

12 External cable fixation

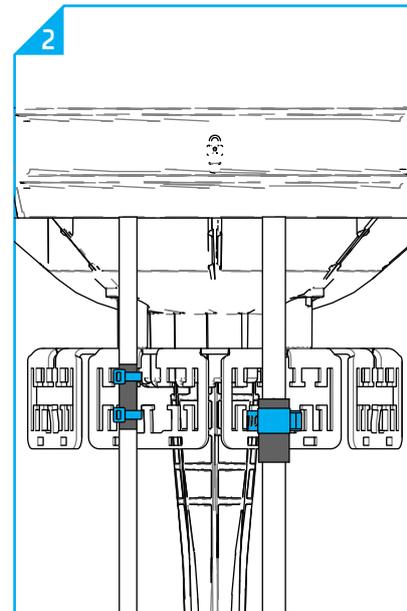
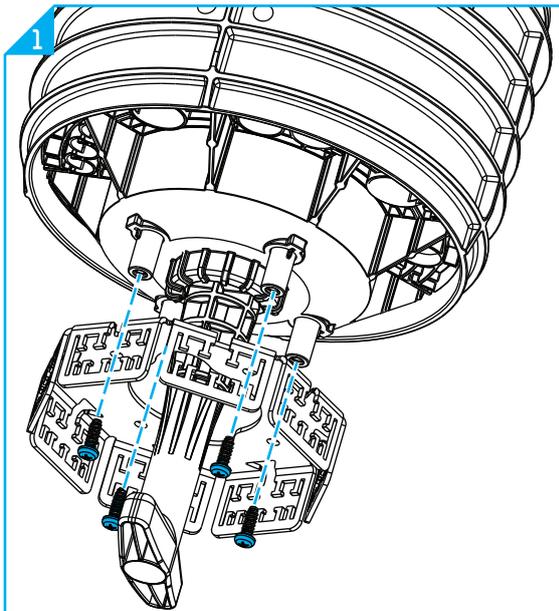


12.1 Kit contents

MSC-EXT/CF exists of a bracket with T-shapes to secure the cable outside the closure and 4 screws to mount the bracket onto the base.

1	Bracket
2	4 Screws

12.2 Installation

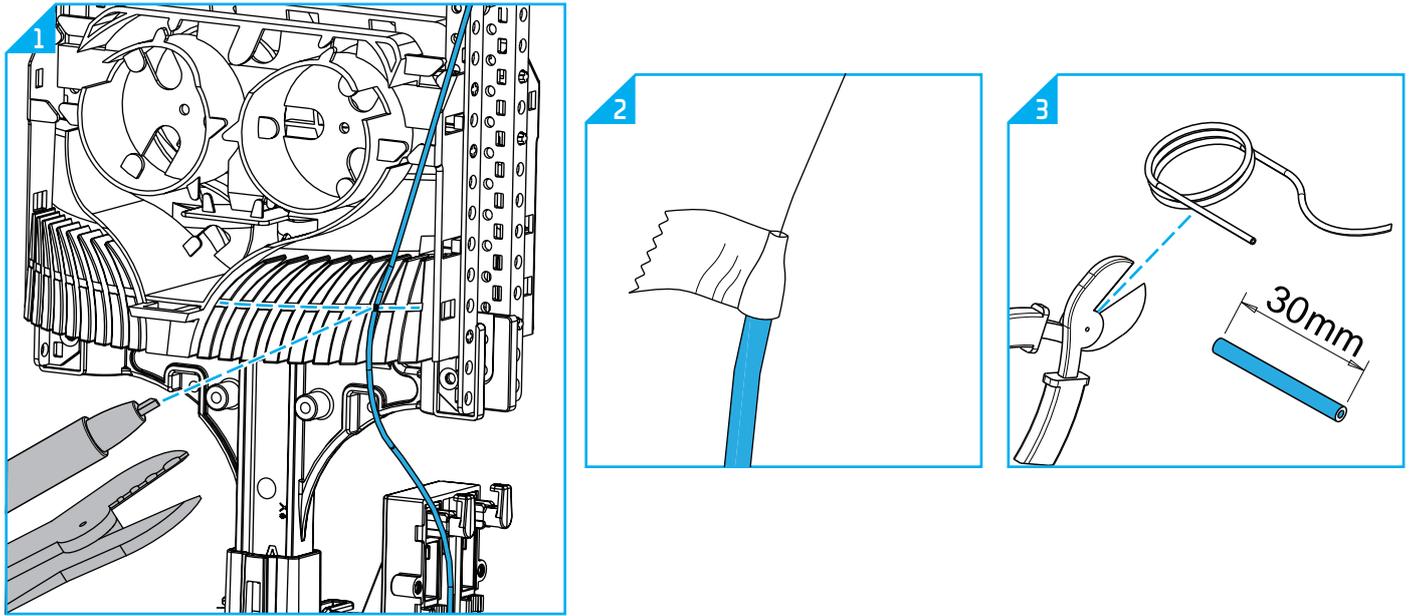


12.2.1 Mount the external cable bracket with the 4 screws onto the base using a Phillips screwdriver. (Preferable before the cables are installed.)

12.2.2 Secure the cable to the T-shapes on the bracket with cable ties or hose clamps.

13 Tube/subunit routing

Remove the hook and loop fastener. If the routing block and the trays are in vertical position, the trays above the FAS should be supported by the wedge (see section 14.2). To remove the FAS cover lift the two snaps on one side of the FAS cover. .

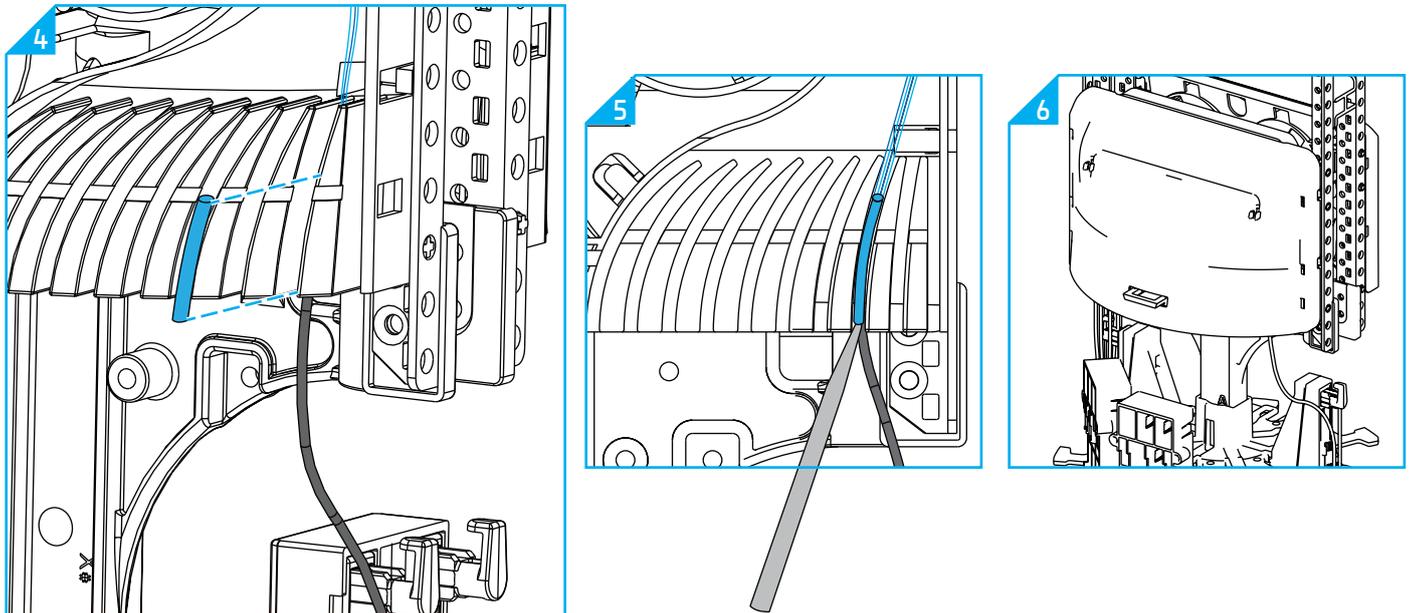


13.1 Select the tubes/subunit with the fibers to be spliced. Position the tube/subunit on top of the channel and mark the tube/subunit at the point indicated with the lines. Strip the tube/subunit between (shaving) or until the mark(s). Degrease and clean the fibers.

Note: The channels in the tube/subunit holder area are designed for tubes/subunits with a maximum diameter of 4 mm.

13.2 When the diameter of the tube/subunit is larger than or equal to 3mm wrap Teflon tape around the transition between the tube/subunit and the fiber.

13.3 Cut a piece of silicone orange tubing of 30mm.

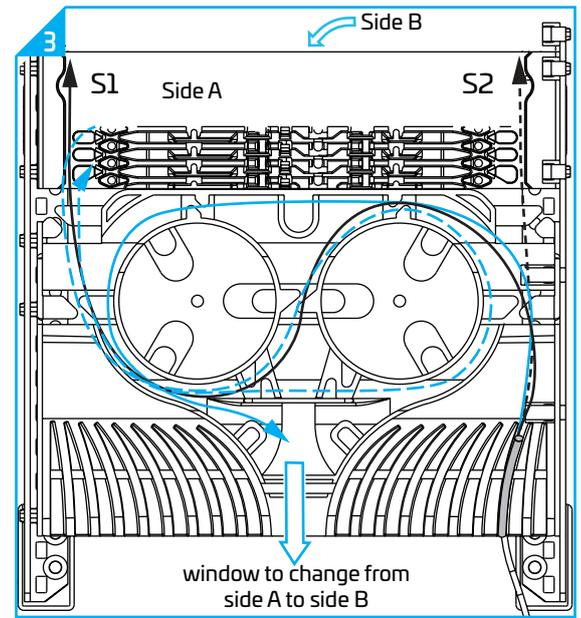
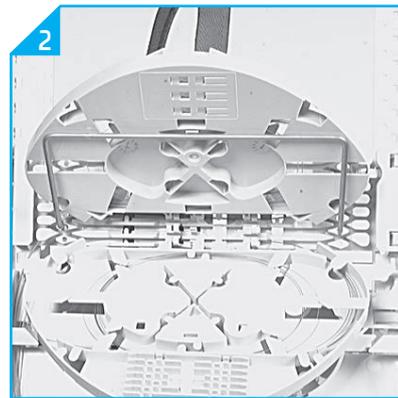
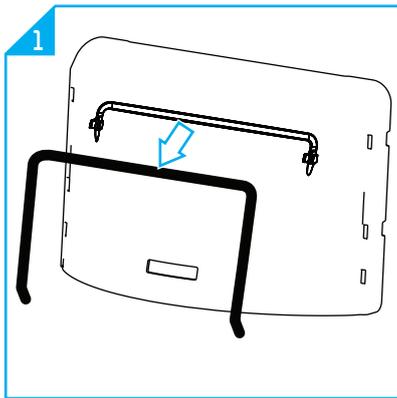


13.4 Insert the tube/subunit (with the Teflon tape) in one of the channels in the FAS block. Press the piece of silicone orange tubing in the channel on top of the tube/subunit. **Note:** Position the tubes/subunits in a logical order, avoid making crosses underneath the FAS block. **Note:** place the end of the orange tube/subunit at the start of the channel. This makes it easier to remove the silicone orange tubing.

13.5 The silicone orange tubing can be removed with a fiber guidance pen. The silicone orange tubing must be temporarily removed to place another tube/subunit in the same channel.

13.6 Continue with section 14 or re-install the FAS cover over the FAS block when installation is done.

14 Fiber routing

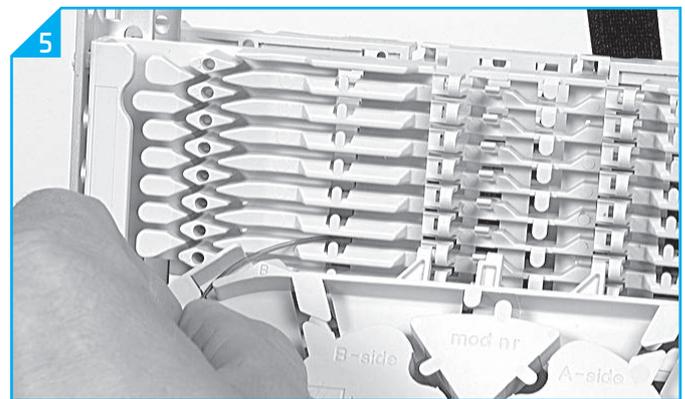
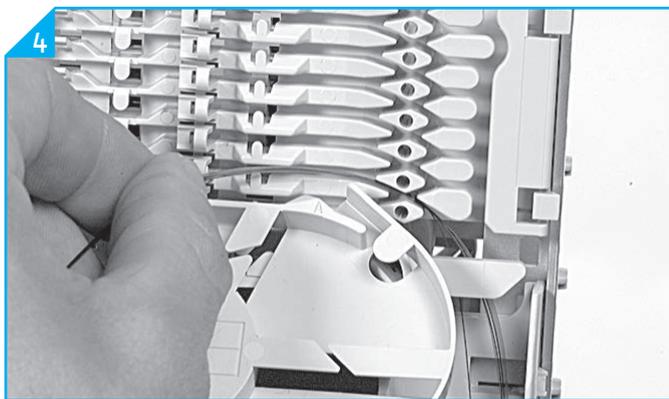


14.1 Remove the hook and loop fastener and the FAS cover to make the FAS accessible. If the routing block and the trays are in vertical position, the trays above the selected tray or FAS should be supported by the wedge to provide access to the selected tray/or FAS. The wedge is located on top the FAS cover. Pull on the wedge to detach the wedge from the FAS cover.

14.2 Position the wedge carefully into the two holes of the wrap around grooveplate. To remove the wedge, use two hands to pull on both ends (near the grooveplate).

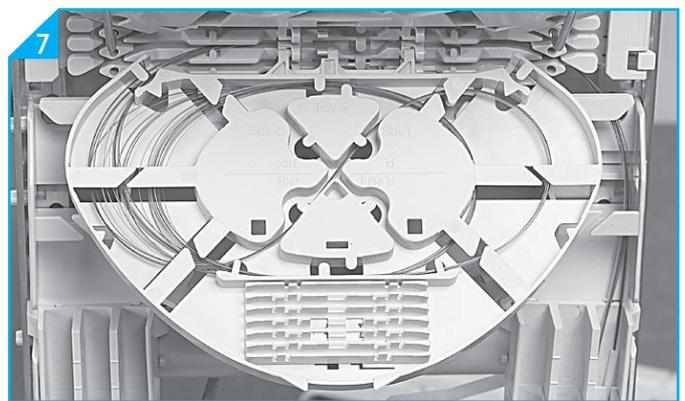
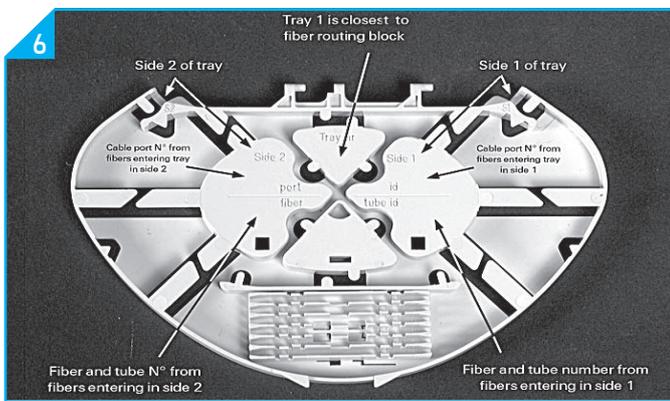
14.3 Only bare fibers (250µm) continue from the tube holder area to the trays. In the FAS area fibers can change direction. Fibers can be routed between side S1 and side S2 over the drums. Fibers can be routed between side A and side B through the window at the bottom of the drums:

Black dotted	routing directly to the tray
Black	routing to the other side of the groove plates (between side S1 and side S2)
Grey/blue	routing to the back side (between side A and side B)
Grey/blue dotted	inter-tray jump. Routing of a fiber from one tray to another entering the tray at the same side.



14.4 Route the fiber in the correct groove of the wraparound grooveplate to the entrance of the identified tray. Fiber must be routed in the groove behind the hinge of the tray!

14.5 Pull gently on the fibers in the tray and make sure that the fibers are well contained in the routing block and wraparound grooveplate.

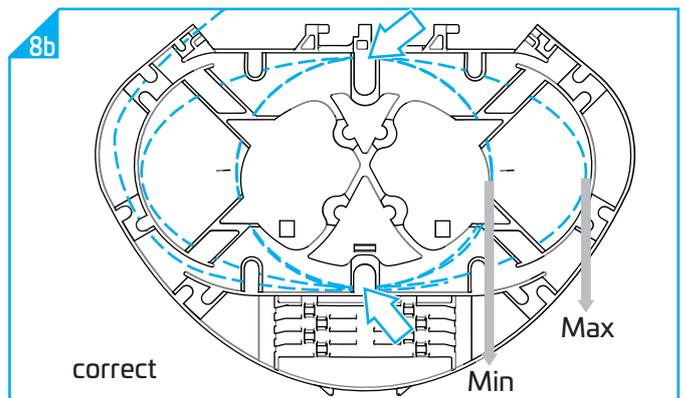
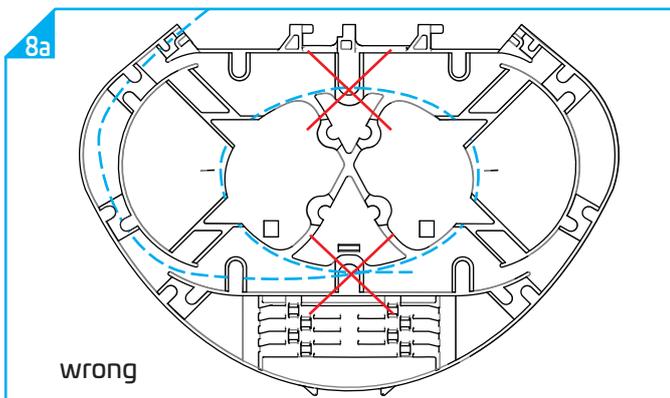


14.6 Routing on the tray is the same for the four types (SC, SE, SLE, Ribbon). Fiber and tube numbering can be done with a permanent marker in the areas as indicated on the image above.

14.7 Store the fibers temporarily on a tray (picture shows an example of a loopback).

Storing dark fibers can be done in different ways:

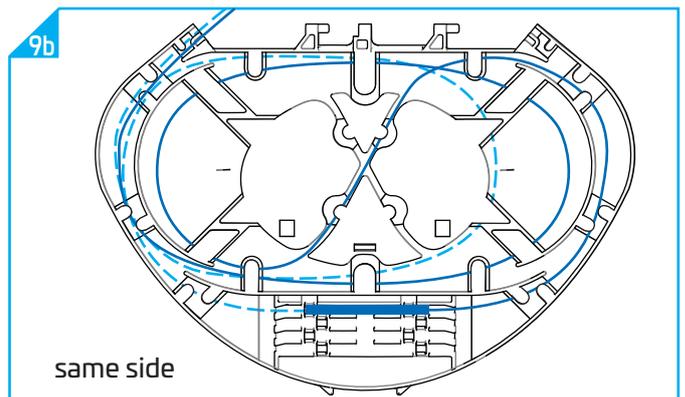
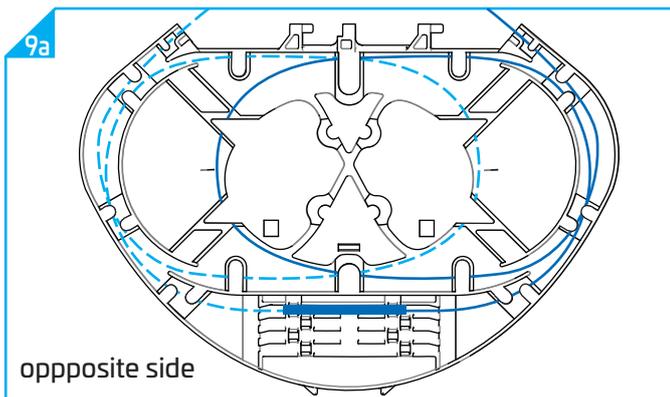
- 1 Organize dark fibers into the different trays, following instructions as described below.
- 2 Organize dark fibers together into the first available tray (i.e. with a max. of 24 cut or 12 loops primary coated fibers in one SE-tray).



14.8 Observe the following rules when storing over-length fibers/dark fiber:

- 1 The fibers may not be routed too tightly around the island.
- 2 Avoid bulging of the fiber.
- 3 Make sure all fibers are properly positioned under the lips.

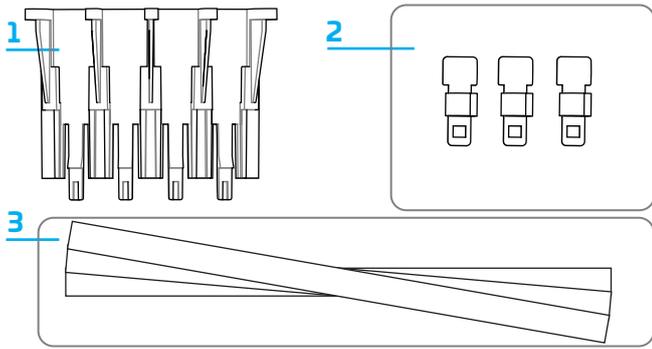
Note: The fiber guidance pen can be used to position all the fibers under the lips and to provide correct routing in the trays.



14.9 Make fusion splice per standard practice and store the splice protector centered in the splice protector holder.

Note: The drums on the tray (islands) can be used to make a crossing/loopback on the tray. If the fibers need to be spliced enter the tray from the same side, one fiber must make an S-shaped loopback on the tray using the openings between the islands (see full line in the image above).

15 Speed pipe/ micro duct installation

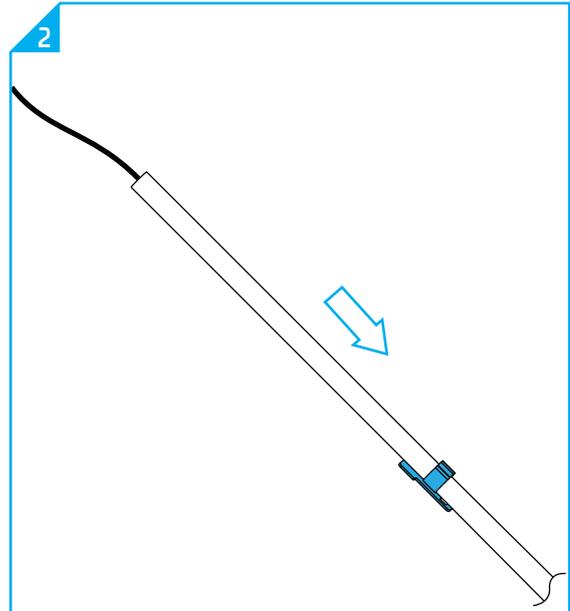
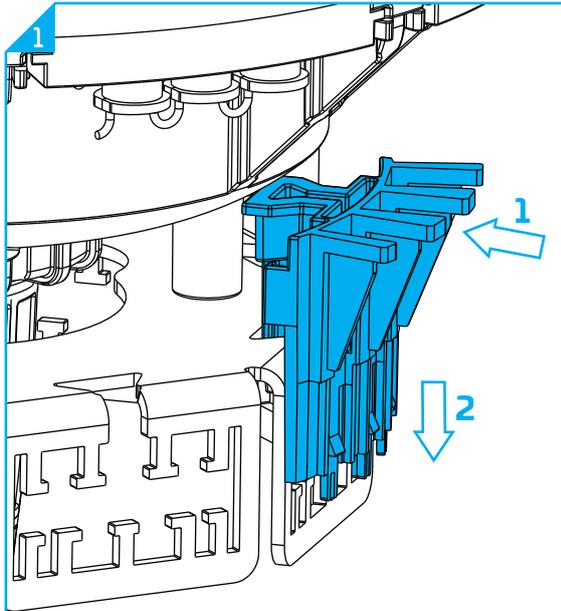


15.1 Micro duct kit

Two types of micro duct kits are available, with and without a piece of micro duct.

	MSC-CRx contains:	MSC-MRx contains:
1	Crimp ring receiver	Crimp ring receiver
2	Crimp rings	Crimp rings
3	-	Micro ducts/speed pipes

15.2 Install crimp ring receiver and crimp ring



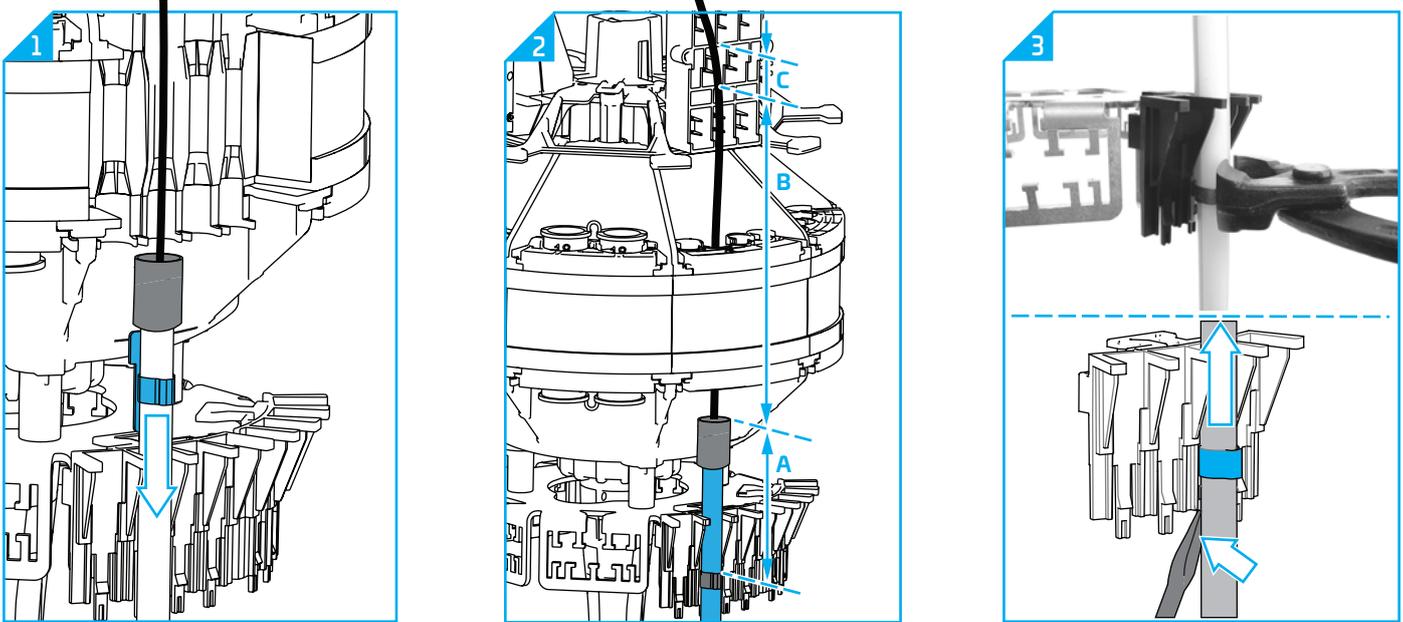
15.2.1 Install the crimp ring receiver on the external bracket. First bring the receiver through the dove tail opening, then slide the receiver downwards until a clicking sound is observed.

Note: See section 12 how to install the external bracket onto the closure.

15.2.2 Install the micro duct over the cable. Install the crimp ring over the cable and the micro duct.

15.3 Gas blocking - outside

Note: installing the gas/water blocking device outside the closure as shown in picture below is Commscopes recommended installation method.



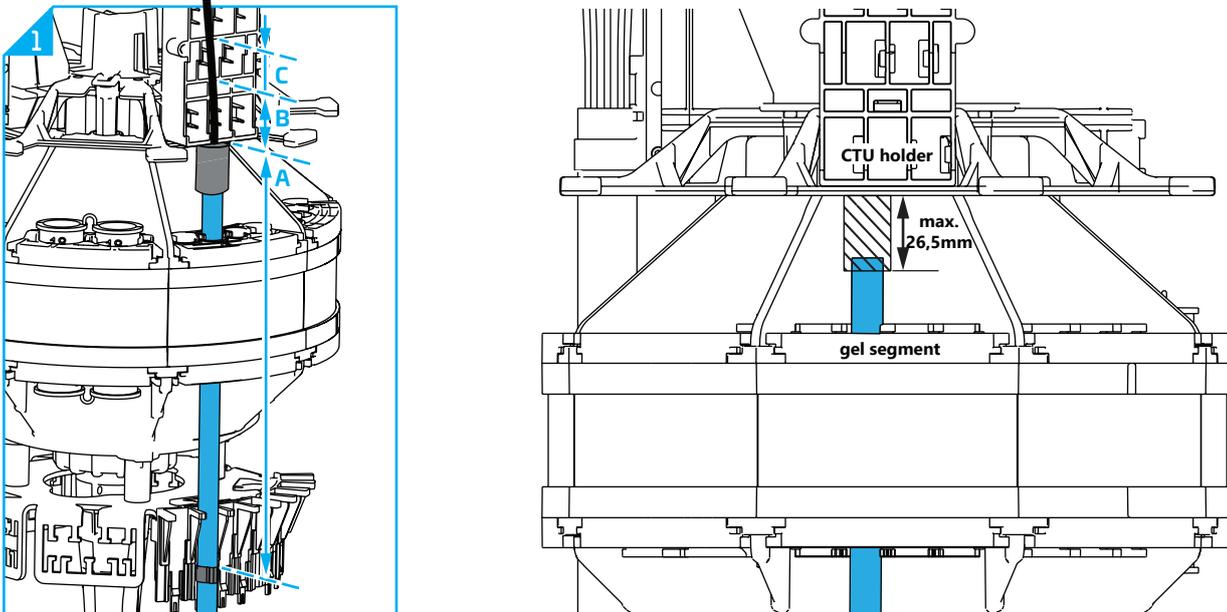
15.3.1 Install the gas/water blocking device per local practice on the micro duct cable transition. Make sure the width of the device fits in the required configuration. Position the cable in the gel port, and slide the crimp ring in the receiver. Make sure the gas/water blocking device is properly positioned between the gel seal segment and the receiver.

15.3.2 Position the micro duct and cable in the gel port and close/secure the crimping (figure 3 top). Mark the position of the CTU (**dim. B and dim. C**) on the cable. Verify to use the correct slot of the CTU holder, see section 11.2

15.3.3 Release the crimp ring and continue with the preparation of the cable outside the closure. Prepare the cable as explained in section 9.2. Install the CTU as explained in section 9.3.4. Slide the crimp ring again in the crimp ring receiver and click the CTU in the CTU holder. Make sure dummy plugs are re-installed in unused cable ports. Install the outer gel segment.

15.4 Gas blocking - inside

Note: this installation method is not advisable.



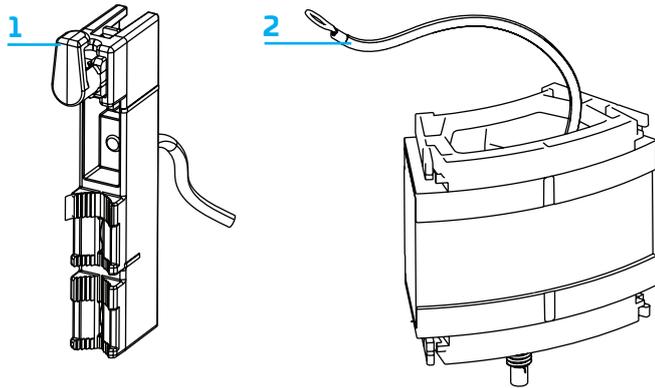
15.4.1 When selecting and installing the gas/water blocking on the micro ducts inside the closure, dimensions above need to be respected. Also verify if the width of the device fits in the required configuration. If the device doesn't fit inside the closure, install the gas blocking outside the closure.

15.4.2 Position **the top of the gas blocking against the star bracket**, and slide the crimp ring in the receiver. Close/secure the crimp ring with and appropriate tool. (See figure 3 in section 15.3). Mark the position of the CTU (**dim. B and dim. C**) on the cable. Verify to use the correct slot of the CTU holder, see section 11.2. Continue with step 15.3.3.

16 Grounding

Grounding can involve two steps. First step is bonding. The cable is bond to the tower. The next step is to earth the closure to an external earth ground.

16.1 Grounding kits

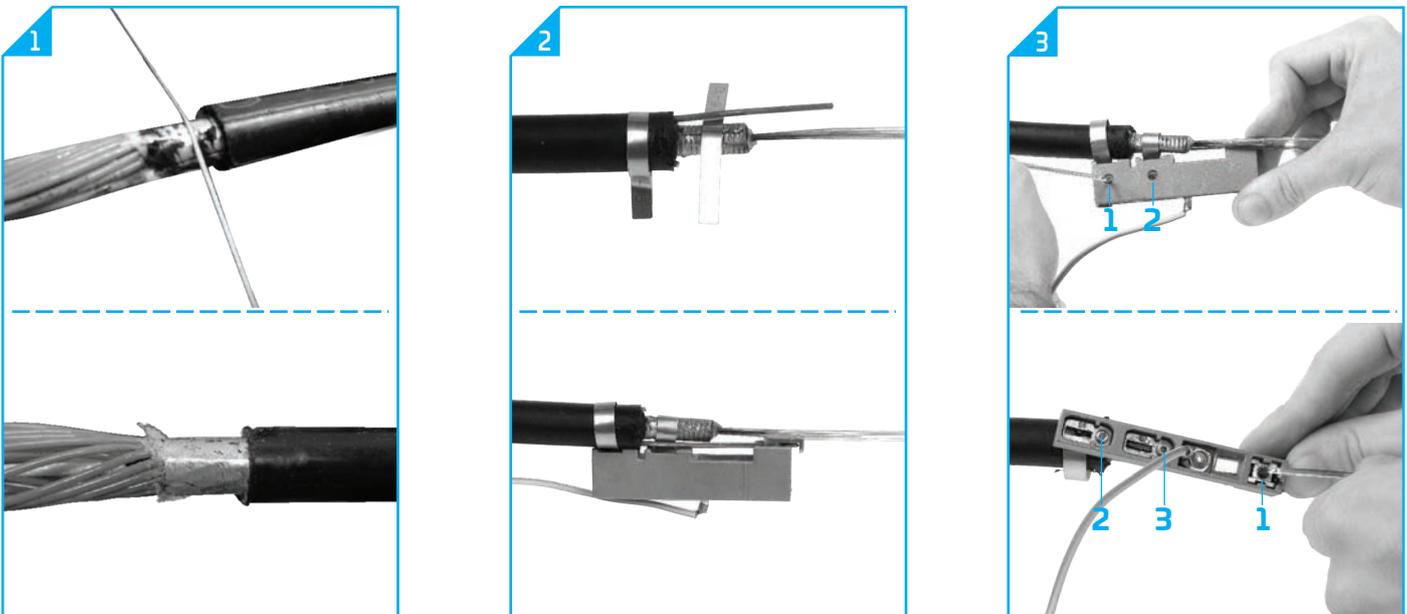


To ground, bond and/or tone cables two kits are applicable: the SKG-FDTHR (feed through) and the CTU-G-GRND (CTU-grounding).

1	CTU_G_GRND
2	SKG_FDTHR

16.2 Bonding of the cable - CTU-G-GRND

Use the CTU-G-GRND to interconnect and install the cable. With this CTU the strength member and cable jacket are secured as explained in section 9.3.5 and 9.3.6. And in addition, the metal carrier and/or the metal jacket is bond to the tower. Prepare the cable as explained in section 9.1 or 9.2 depending on whether it is a looped cable or a butt cable.



16.2.1 Remove 20 mm of the cable jacket to clear the metal layer, if present. A nylon wire can be used to prevent damaging this layer. Verify that the metal surface is as smooth as possible and sand carefully just to remove the coating. Make sure the metal layer is not damaged.

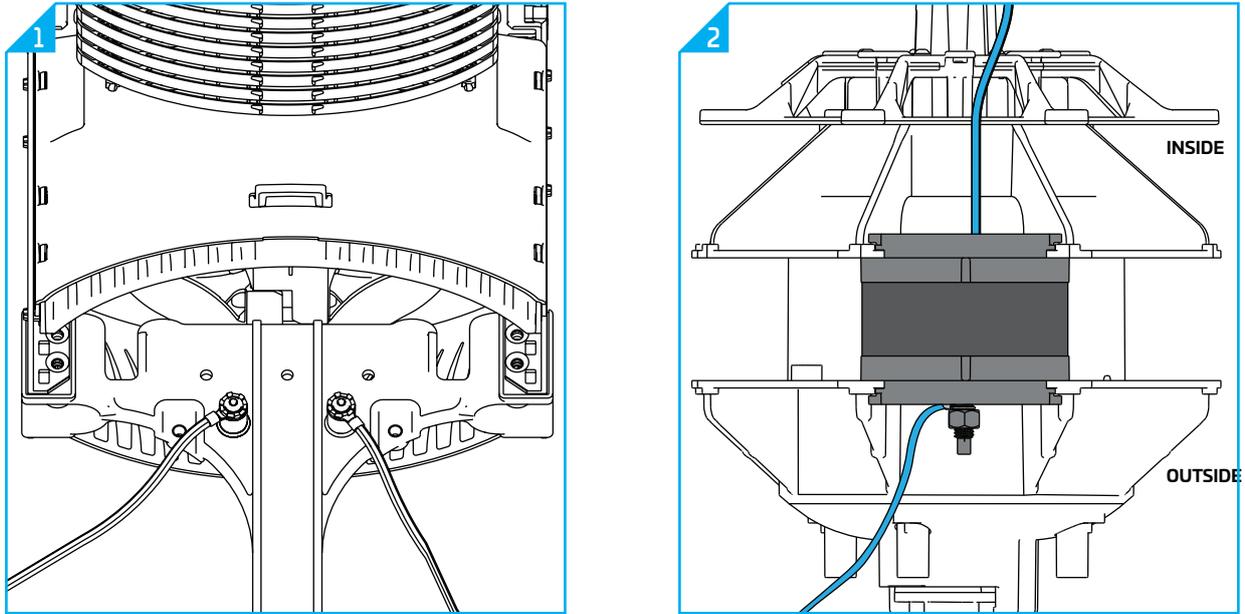
16.2.2 Position the largest metal strap around the cable jacket. Position the shorter metal strap around the metal carrier/ jacket. Bend the metal strap around the cable while maintaining the centerlines (centerline of the metal strap on the center of the cable). Make sure both ends of the metal strap are of equal lengths. Insert the wrapped around bands in the CTU slot. To insert the strength member in the strength member holder, see section 9.3.1.4 and 9.3.1.5.

16.2.3 Tighten the two screws at the side with an allen key. First secure the band around the cable jacket, then secure the band around the metal jacket to the CTU. The cable is still unsecured at this point. Tighten the 3 screws at the back side with an allen key. First secure the strength member, then secure the cable jacket and then the metal jacket. The cable is now fully secured to the CTU.

16.2.4 Attach the other end of the grounding wire to one of the studs on the tower. Use the bolt and the star washer which are pre-installed on the stud. More than one wire can be attached to one stud. (See figure 1 on the next page.)

16.3 Earthing the closure to an external earth ground

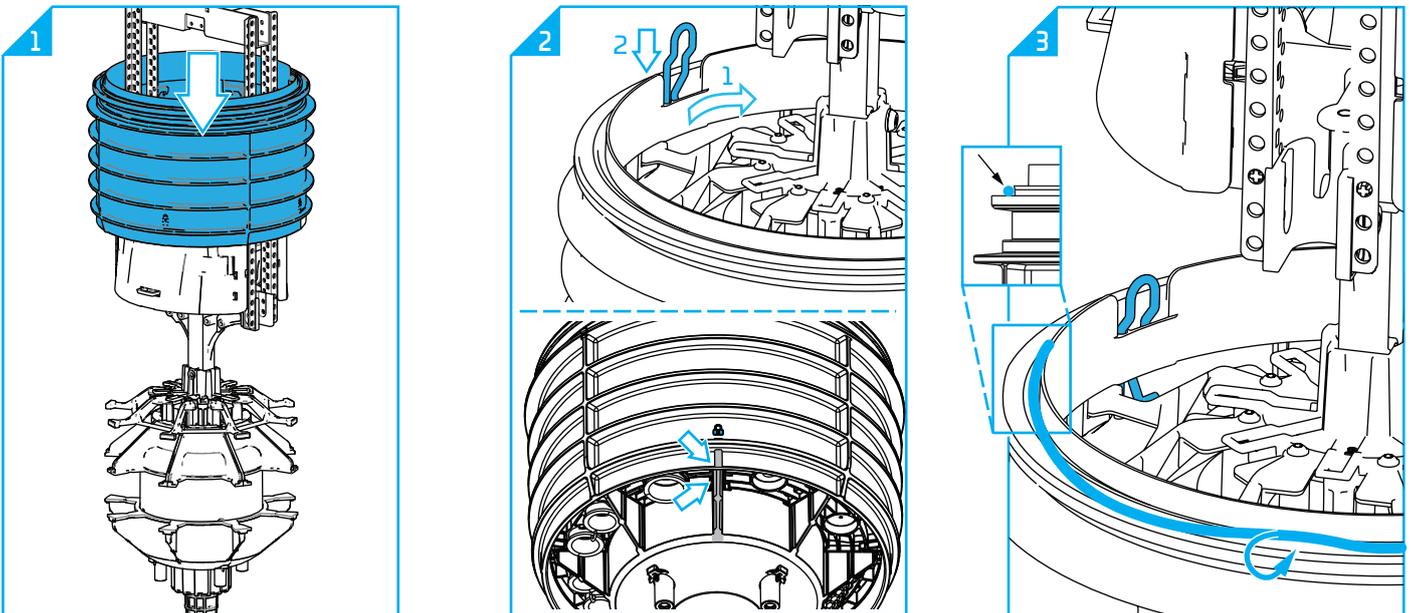
The SKG-FDTHR is required to be able to earth the closure/cable to an external earth ground. This dummy seal is prepared in the factory with a grounding wire attached at the inner side of the dummy seal



16.3.1 Attach the pre-installed wire to the tower with the bolt and the star washer mounted on a stud. More than one wire can be attached to one stud.

16.3.2 The grounding wire to connect the dummy gel seal to an object outside the closure is not included in the kit. Install this grounding wire onto the screw at the outside of the gel segment, using the pre-installed star washer and nut. Tighten the nut with a hex socket wrench, size 13.

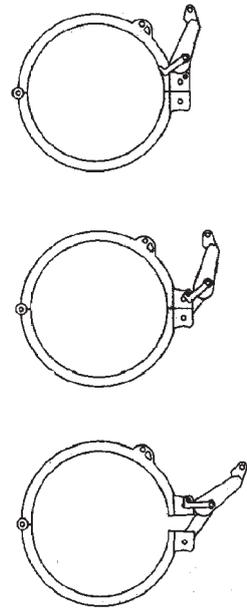
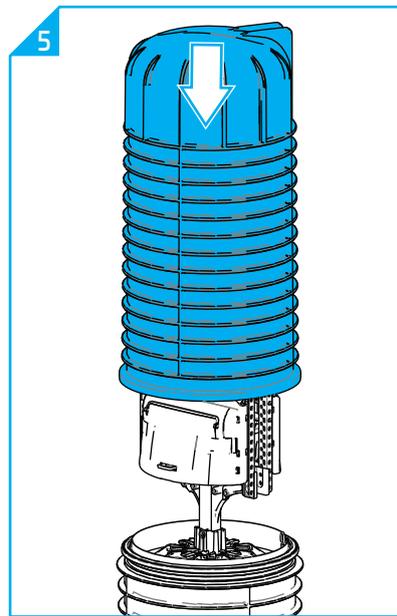
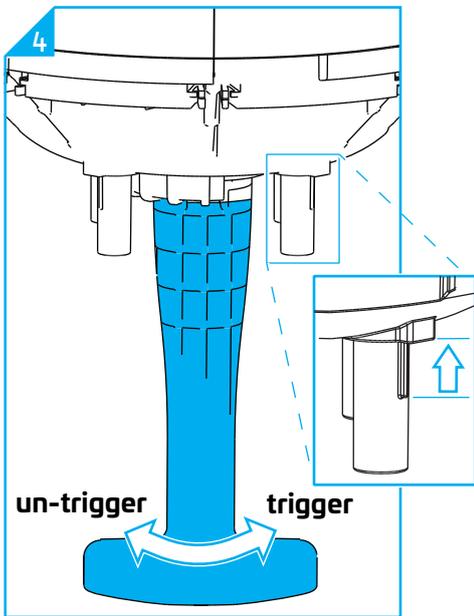
17 Close the closure



17.1 Slide the base over the fiber management system until it is in the end position.

17.2 Rotate the base relative to the star bracket. When the small ribs on the base (indicated with a key lock) are aligned with a rib of the seal block bottom, the base can be locked. Slide the split pen down into its lock position.

17.3 Re-install the O-ring into the groove. **Note:** Make sure the O-ring is dust free!



17.4 Activate the seal mechanism by turning the handle (trigger). If the second rib on the studs appears, then the seal system is properly activated.

17.5 Slide the dome over the fiber management system.

17.6 Install the clamp around the dome and the base and close the clamp

18 Installation/mounting bracket

2 installation/mounting brackets are available to mount and or install the closure:

MSC-MOBRA
MSC-WORKSTAND

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