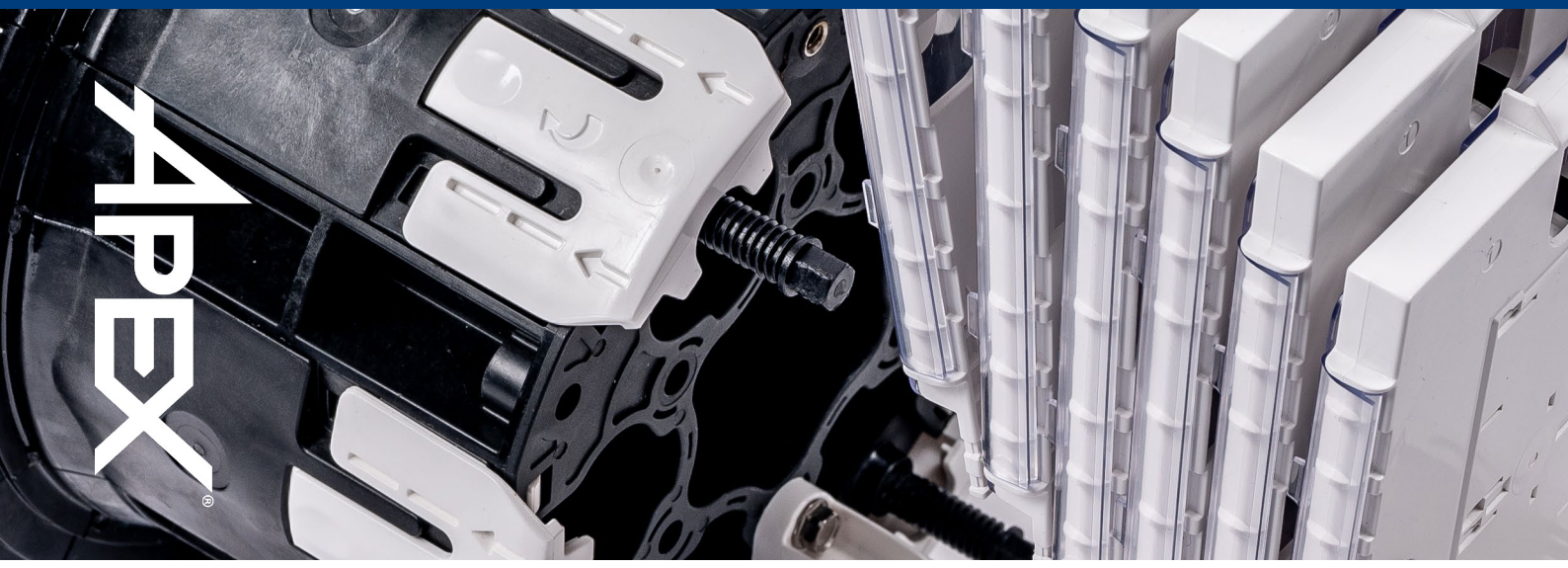
INSTALLATION GUIDE

Installation of Fujikura 432f high-capacity SpiderWeb Ribbon® optical fibre cable.

This guide details the Network Rail-specific installation requirements to build a spliced and mid-access (spliceless) joint.

Scan for Fujikura Network Rail support and to check for updates to this document



CERTIFICATION OF ACCEPTANCE
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CONTENTS

Please use these instructions in addition to the Apex installation guide.

1
REQUIRED PARTS: AX-2S-B-L-6-4-0-X-NR

[a]
Apex closure X-2 or X-2s

[b]
Cable attachment unit (1 x per cable)

[c]
Crown bracket with 6x M6 bcrews

[d]
Hose clamp (1 x per cable)

[e]
Spur bracket (1 x per cable)

2
CROWN BRACKET INSTALLATION

Before the cables can be installed into the Apex the crown bracket must be attached to the base.

1.
Remove the 6 bolts 3/8" from the Apex base [figure 2.1].

2.
Position the crown bracket (no orientation) with the screw holes in the Apex base.

3.
Install the crown bracket using the supplied 6 M6 screws [figure 2.2].

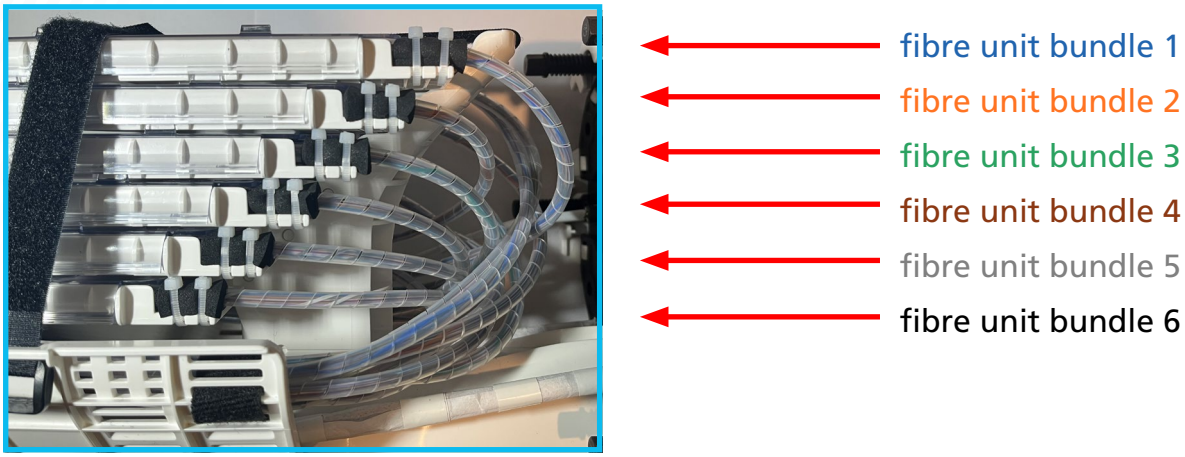
4.
Tighten to 1.12Nm (10in/lb).

[Figure 2.1]

[Figure 2.2]

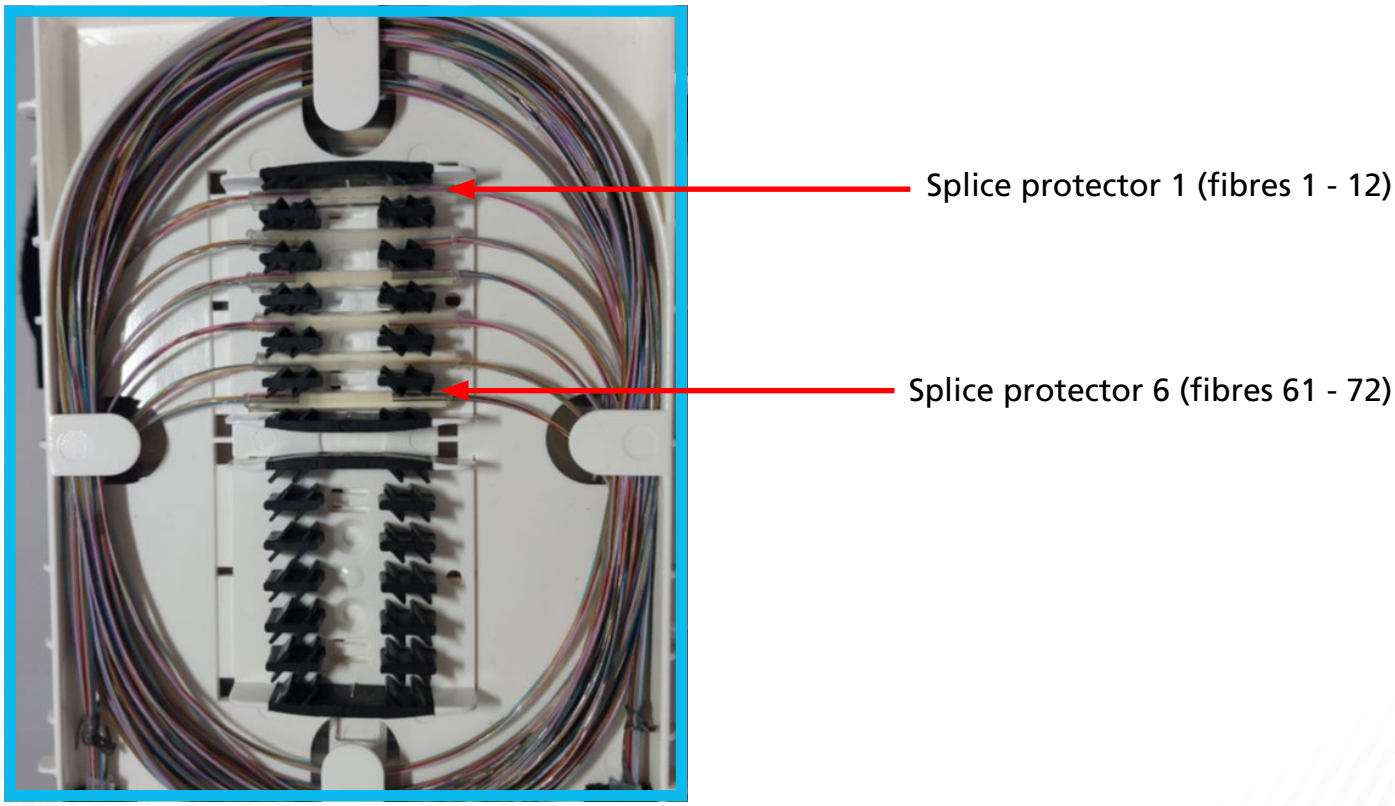
3
SPLICE TRAY ALLOCATION

Each splice tray is allocated 1 unit bundle (72f) from the cable. Build the enclosure starting with the last unit bundle (unit 6 - white), using the lowest splice tray position [figure 3.1].



[Figure 3.1]

Each splice tray holds 6 ribbon splice protectors; only the top 6 are used for 432f cables. Position the splice protectors starting with ribbon 1 at the top [figure 3.2].



[Figure 3.2]

4
CABLE PREPARATION
432f/48f steel tape armour cable

Cable cut lengths

Joint type	Apex	Cut length
Mid-access joint	X-2	4.4m (2.2m in each direction)
Mid-access joint	X-2s	4.2m (2.1m in each direction)
Butt joint	X-2	2.5m
Butt joint	X-2s	2.5m

Table 1

1.
Markup the cable at the length detailed in table 1 and remove the outer sheath and steel tape armour [figure 4.1].

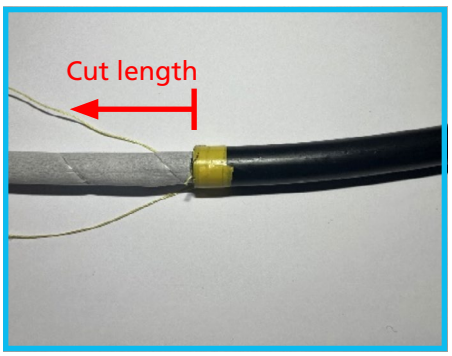


Figure 4.1

2.
Remove the water blocking tape and mark the inner sheath at 80mm from the ring cut [figure 4.2].

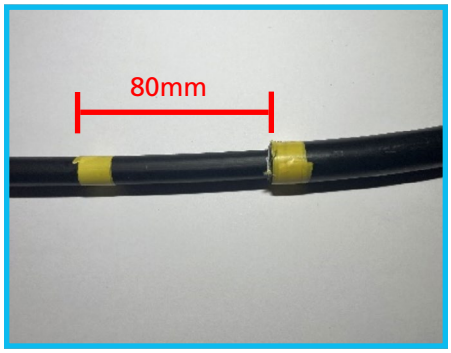


Figure 4.2

3.
Remove the inner sheath to the mark. Cut back the water blocking tape, leaving 220mm from the ring cut. Loosely secure the water blocking tape over the fibres using electrical tape [figure 4.3].

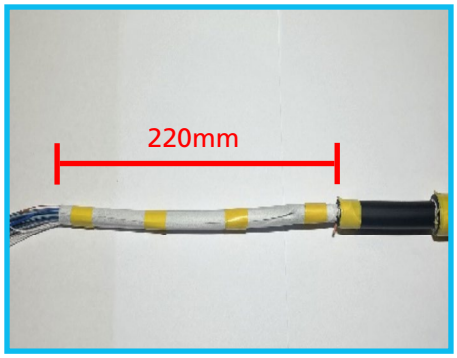
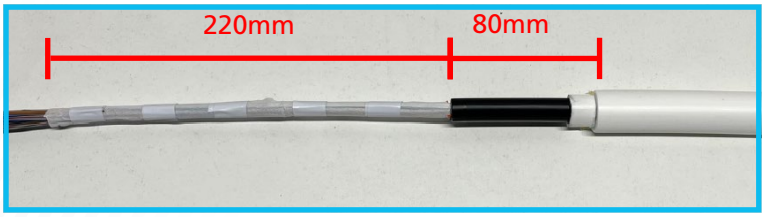
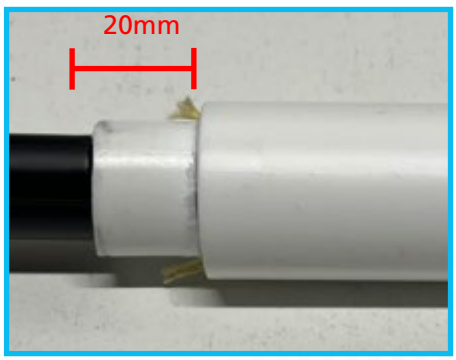


Figure 4.3

R-DISAF



When installing R-DISAF cable. The shock absorbing layer must be removed at 20mm from the outer sheath. All other measurements remain the same.



5
CABLE ATTACHMENT UNIT CAU

CAU preparation and cable attachment

1.
Each cable port in the enclosure requires 1 CAU.

2.
Snap off the top section of the CAU. The top section is not required when installing Fujikura SWR ribbon cables [figure 5.1].

3.
When installing and cable with an inner sheath diameter less than 14mm (0.55”), install the supplied white spacer as shown. 432f and 48f will require the spacer [figure 5.2].

4.
Install the cable into the CAU using the supplied hose clamp and spur bracket [figure 5.3]. Ensure there is 20mm of cable sheath above the hose clamp. Tighten the hose clamp to 3.4nm which is about the maximum you can get using a nut driver hand tool.

5.
The spur bracket must be positioned at the top of the cable [figure 5.4].

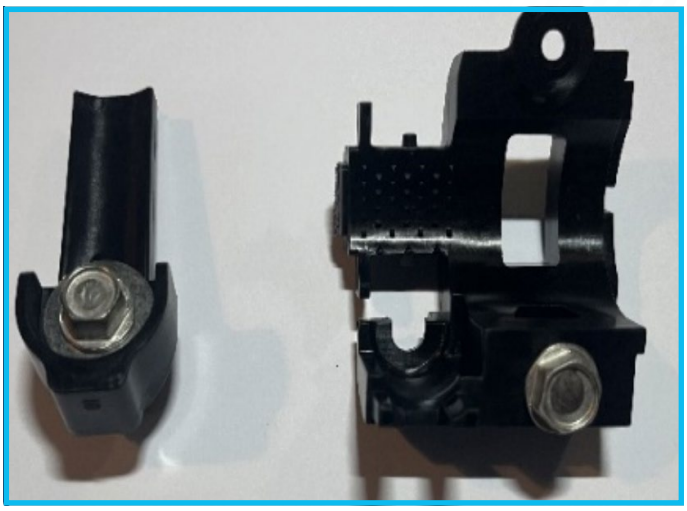


Figure 5.1

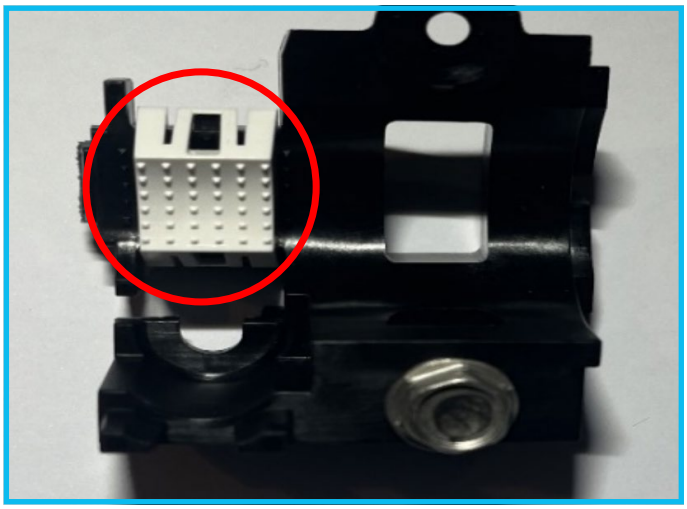


Figure 5.2

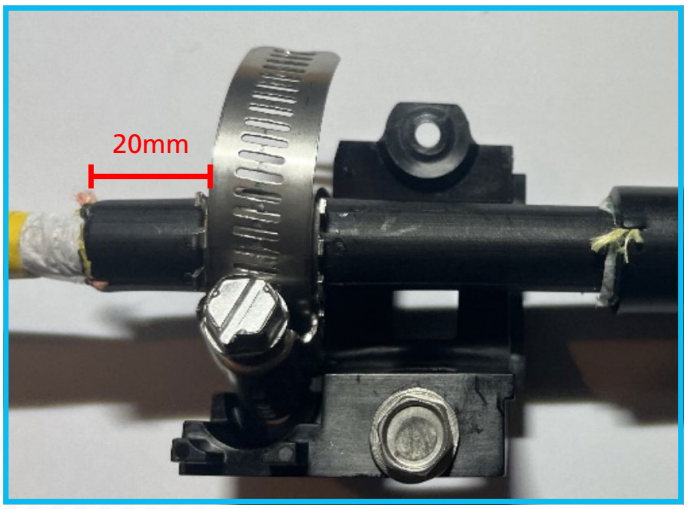


Figure 5.3

Figure 5.4

6
PORT ALLOCATION
Cable port identification 432f/48f.

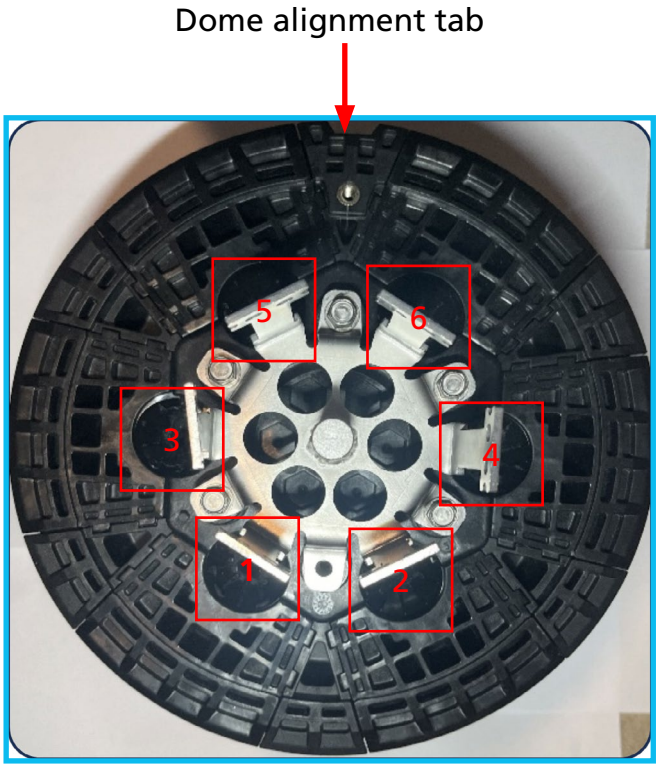
Apex	Port number	Cable
X-2, X-2S	1	432f Trunk 1
X-2, X-2S	2	432f Trunk 2
X-2, X-2S	3	48f (Spur 2)
X-2, X-2S	4	48f (Spur 1)

Table 2

1.
To ensure direct access to the slack basket ports 1 and 2 should be used for the 432f cable entry and exit [table 2].

2.
For additional spur cables use ports 3 and 4.

3.
To aid port identification, numbers are stamped on the base of the Apex [figure 12].



7

CAU INSTALLATION

Installing the CAU into the Apex

1.
Loosen sealing wedge compression screw and open the required Apex port by depressing the sealing wedge latch [figure 7.1].

2.
Ensure the removable gel pack is in position [figure 7.2].

3.
Lay the CAU with attached cable into the cable port on top of the gel pack. Ensure the CAU is fully engaged in the retaining slot [figure 7.2].

Figure 7.1

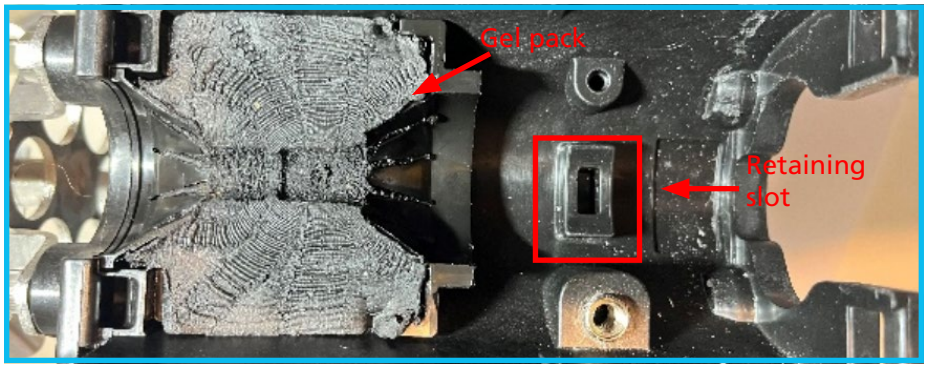


Figure 7.2

4.
Fully tighten the retaining screw [figure 7.3]. Ensure the outer jacket cut is positioned just above the removable gel pack, adjust the positioning if required.

5.
Secure the cable to the crown bracket using the supplied hose clamp and spur bracket [figure 7.4].

6.
Fully tighten the hose clamp, with the spur bracket at the top of the cable, until it is not possible to rotate the cable [figure 7.5].

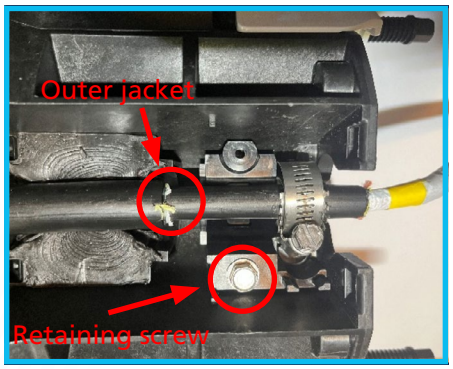


Figure 7.3

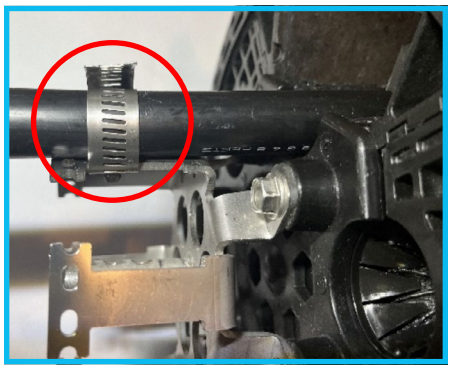
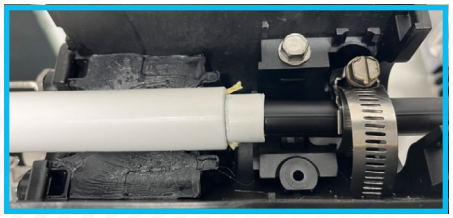


Figure 7.4

Figure 7.5



7.
If installing R-DISAF cable, ensure the outer sheath and shock absorbing layer are positioned above the removable gel seal.

8
SEALING WEDGE INSTALLATION

Closing the cable port using the sealing wedge

1.
Compress the removable gel pack [figure 8.1].

Figure 8.1

2.
Fully loosen the sealing wedge compression screw and manually elongate the wedge gel block [figure 8.2].

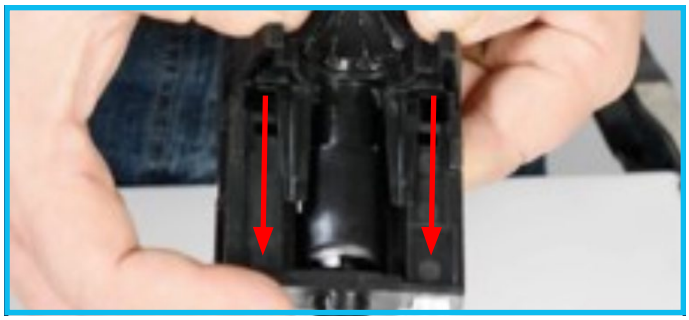


Figure 8.2

3.
Engage the sealing wedge into the slots on the Apex base [figure 8.3].

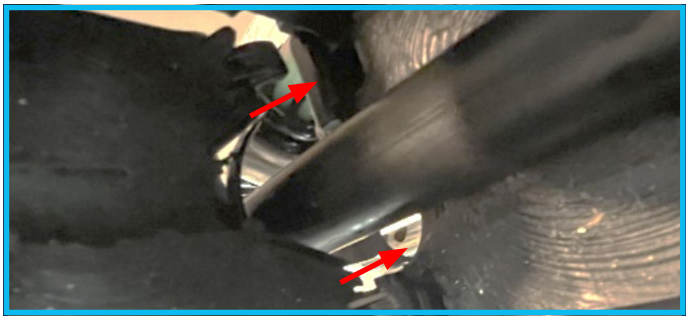


Figure 8.3

4.
Depress the sealing wedge latch and slide towards the base [figure 8.4].

Figure 8.4

5.
Push the sealing wedge down and release the latch to engage with the base.

6.
Fully tighten the sealing wedge compression screw [figure 8.5].

Figure 8.5

9

FIBRE ROUTING TO SPLICE TRAY (BUTT JOINT)

The exact same process is valid for the X-2 and X-2s enclosures (X-2s shown)

1.
Lay the water blocking tape section of the cable into the slack basket [figure 9.1].

2.
Cover the end of the water blocking tape with protective foam and secure it to the basket using two cable ties or Velcro, do not over tighten [figure 9.2].

3.
Loop the fibres to the opposite side of the slack basket [figure 9.3].

4.
Install 320mm of spiral wrap onto one unit bundle (72f). Position the spiral wrap at the slack basket tie point [figure 9.4].

5.
Secure the end of the spiral wrap using Velcro and cable ties. You can group three spiral wraps together in one Velcro. [figure 9.5].

6.
Route the spiral wrapped fibre to the first tray. Pass the fibres behind the splice tray spine as shown in figure 9.6. Secure to the splice tray using foam and two cable ties.

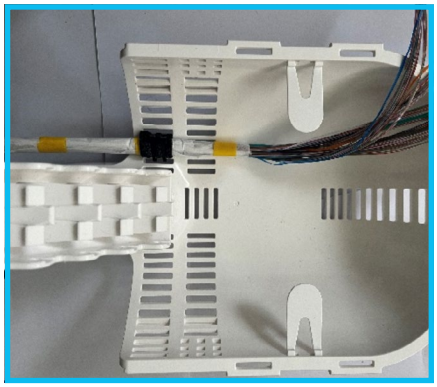


Figure 9.1

Figure 9.2

Figure 9.3

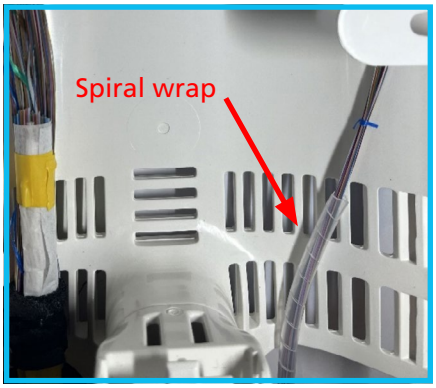


Figure 9.4

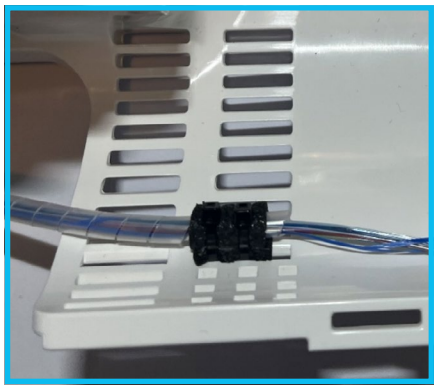


Figure 9.5

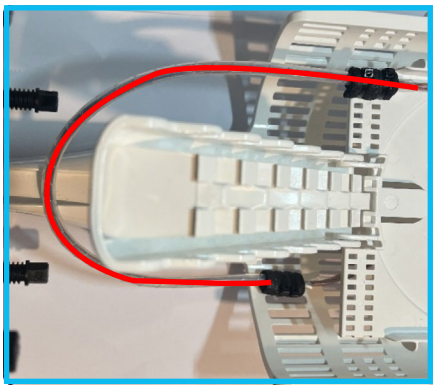


Figure 9.6

7.
Repeat the same process for the second 432f cable, route the unit bundle to the opposite side of the splice tray [figure 9.7].

8.
Continue the same process for each unit binder group in the cable. Each binder group is routed to a separate splice tray. 432f cable will require 6 splice trays [figure 9.8].

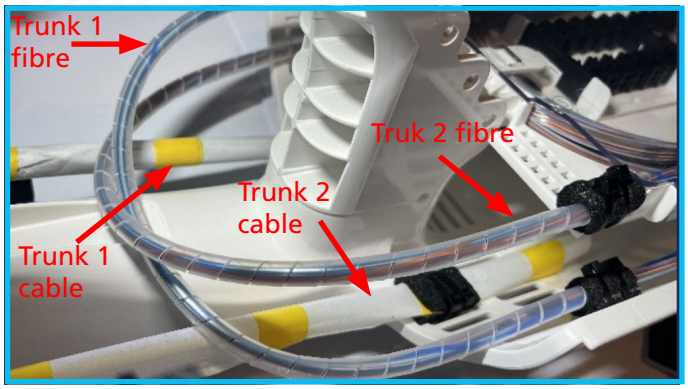


Figure 9.7

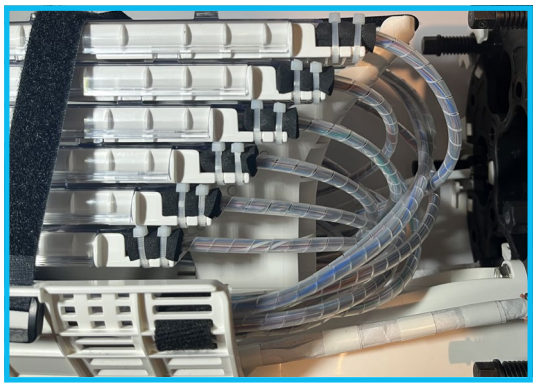


Figure 9.8

10
APEX X-2S SPLICE TRAY LAYOUT
432f routing in the splice tray

1.
Fibres entering the left-hand side of the tray should loop 3 times (>1m) and enter the left-hand side splice protector holders from the top position down [Figure 10.1].

2.
Fibres entering the right-hand side of the tray should loop 3 times (>1m) and enter the right-hand side splice protector holders from the top position down [Figure 10.2].

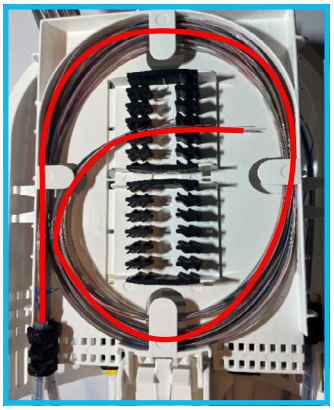


Figure 10.1

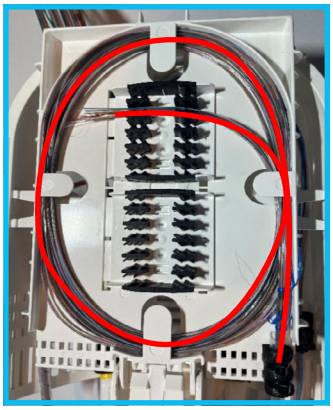


Figure 10.2

3.
The lower splice protector holders are reserved for spur cables. Once spliced all fibres should bend upwards into the splice protector holders.

4.
Once spliced the fibres should be positioned as shown in figure 10.3.

Figure 10.3

11
FIBRE ROUTING MID ACCESS JOINT

The exact same process is valid for the X-2 and X-2s enclosures

1.
Prepare the cable as detailed in section 3 and secure it to the basket using foam and cable ties [figure 11.1].

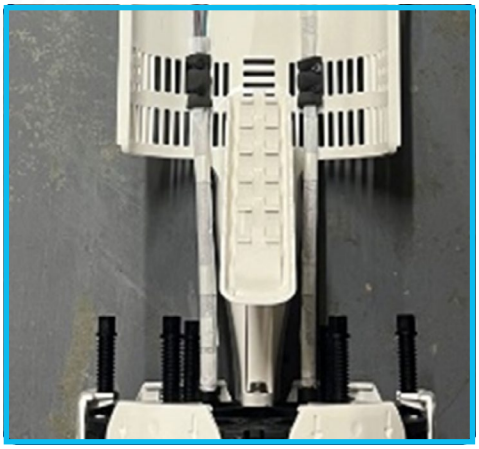


Figure 11.1

2.
Lay the fibres over the basket [Figure 11.2].

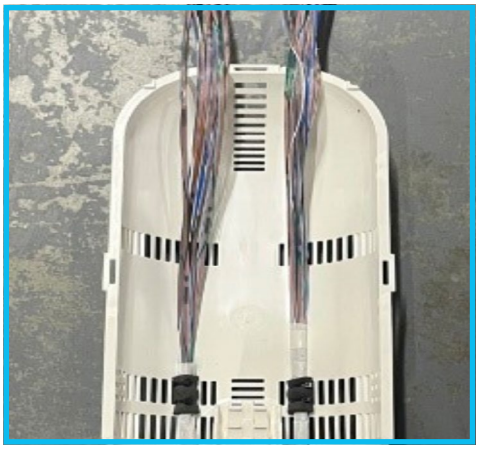


Figure 11.2

3.
Twist the fibres at the top of the basket to reverse the direction [figure 11.3].

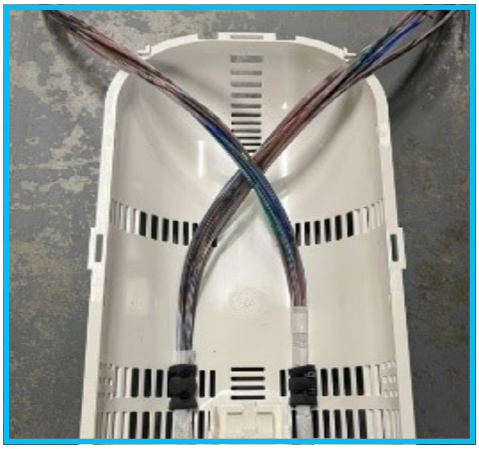


Figure 11.3

4.
Fold the fibres back into the basket and secure with Velcro. The fibres should exit the basket on the opposite side to the cable entry point [figure 11.4].

Figure 11.4

5.
Separate the first unit bundle on each side of the cable. Add 320mm of spiral wrap to each side of the fibre unit bundle [figure 11.5].

6.
Route the spiral wrapped fibre to the first tray. Pass the fibres behind the splice tray spine [figure 11.6].

7.
Secure the bundle to the splice tray using foam and cable ties.

8.
Route the fibre in the tray as shown in figure 11.7.

9.
Repeat for each unit bundle. Each binder group is routed to a separate splice tray. 432f cable will require 6 splice trays

10.
Once complete, secure the spiral wrap bundle at the basket using foam and tie wraps or Velcro.

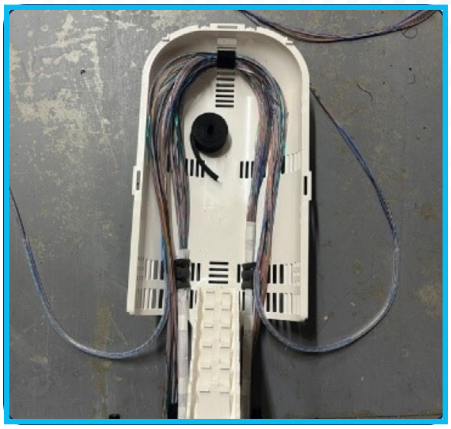


Figure 11.5

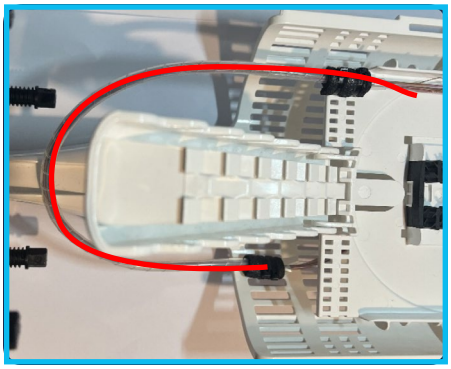


Figure 11.6

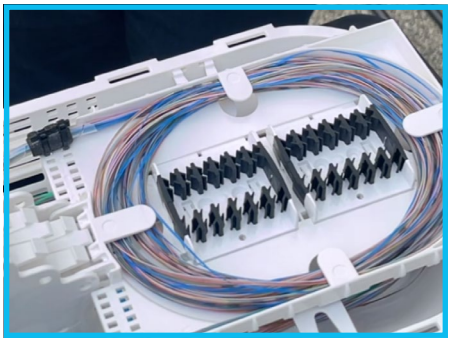


Figure 11.7

12
48F SPUR CABLE INSTALLATION

1.
48f spur cables are installed using the top splice tray only.

2.
Spur cables are installed using cable ports 3 and 4, see table 3 for port allocation.

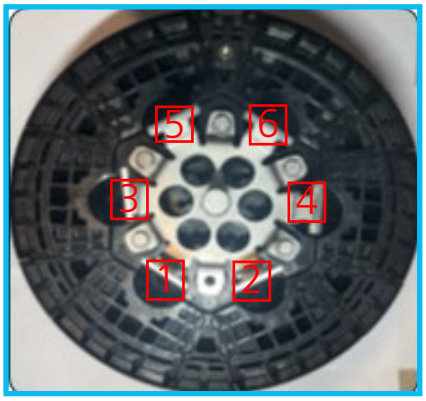


Figure 12.1

Spur type	Port 3	Port 4
Spur 1		48f single spur
Spur 2	48 single spur	

Table 3

14
SPUR CABLE INSTALLATION

Prepare the cable as described in section 4.

1.
Secure the fibres to the basket using foam and cable ties or velcro (figure 14.1).

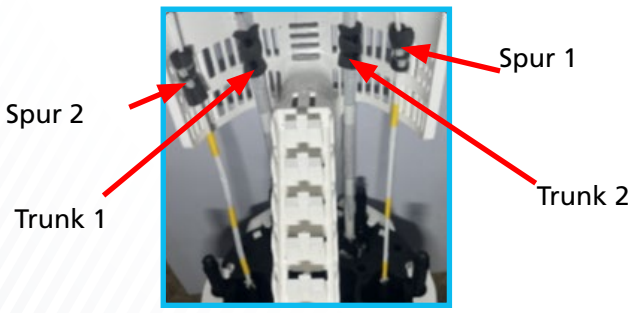


Figure 14.1

2.
Install 320mm of spiral wrap over the fibres and route to the top tray (6). Pass the fibres behind the splice tray spine (figure 14.2).

Figure 14.2

3.
Attach the fibre to the splice tray using foam and cable ties. figure 14.3 shows the single spur, figure 14.2 details the Dual Spur.

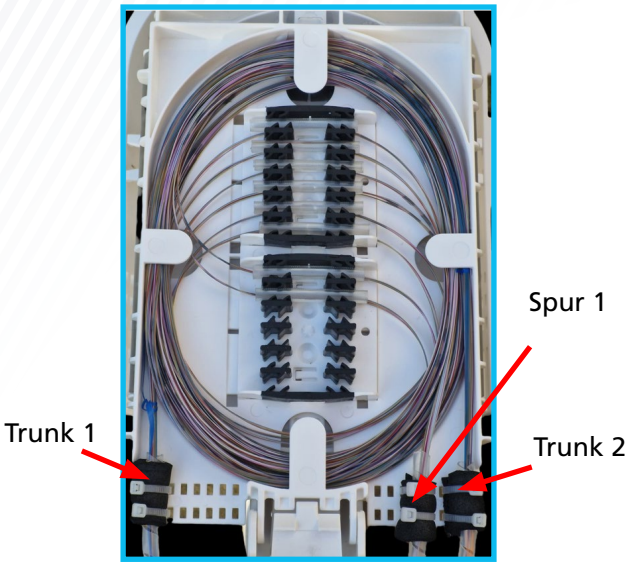


Figure 14.3 - Spur 1

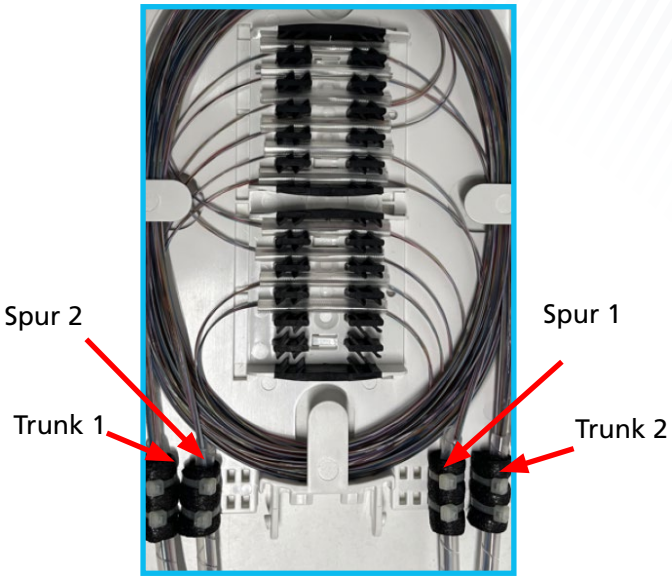


Figure 14.2 - Spur 2

4.
Loop the fibres in the splice tray to create a minimum of 1m of slack in each direction. Splice the single spur cable as detailed in figure 14.3.

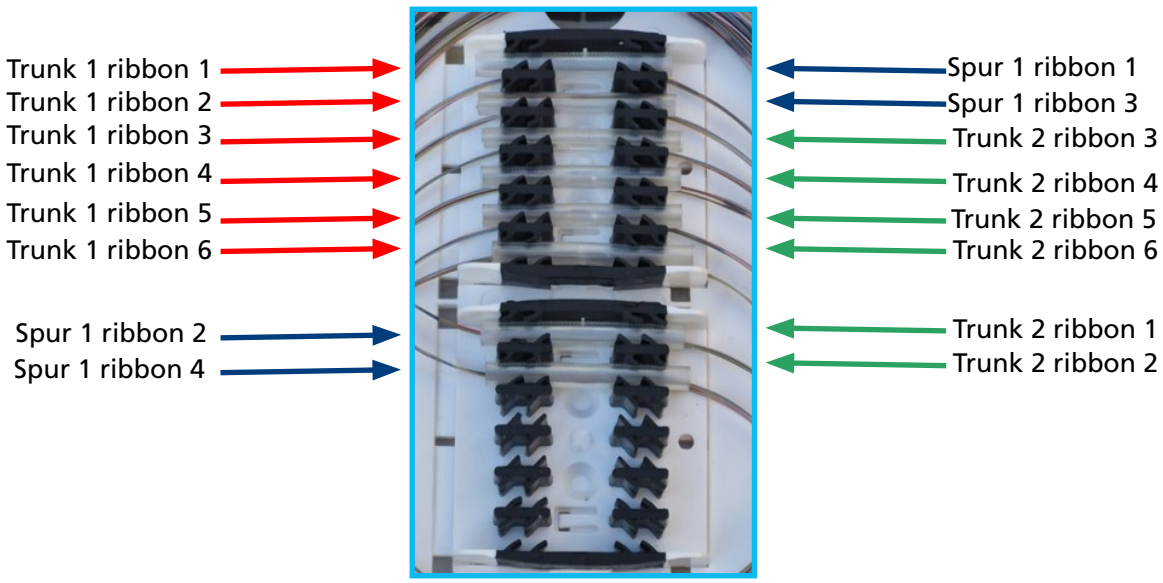


Figure 14.3 - Spur 1

Splicing two spurs as detailed in figure 14.4.

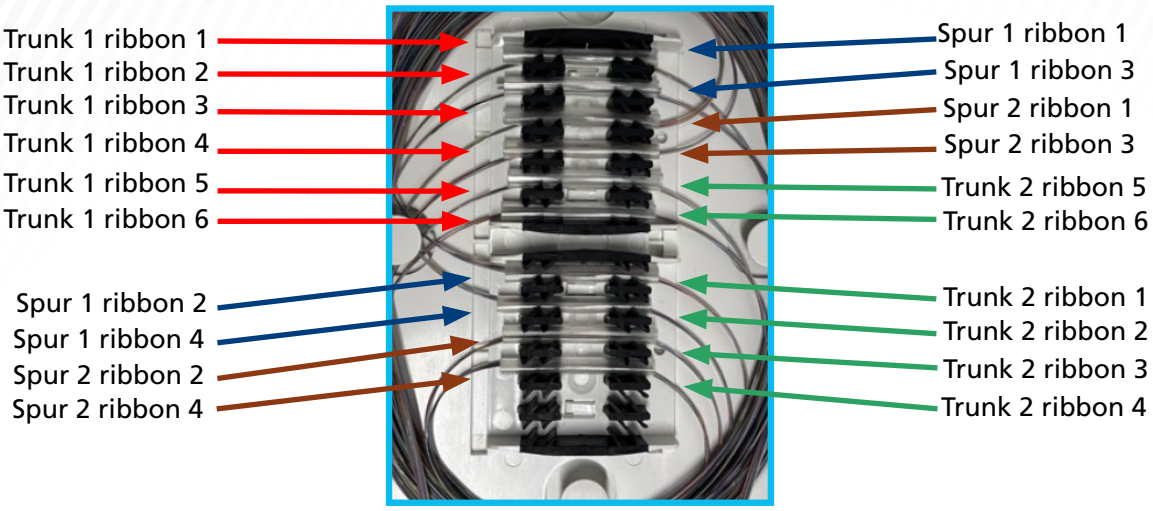


Figure 14.4 - Two spurs

15
TRAY LABELS

Using permanent marker, label each splice tray with the cable identification number. For spur cables, add the cable number to the side of the tray on the same side that the cable enters the splice tray, as shown in figure 15.1 and 15.2.

Figure 15.1 - Tray labelling

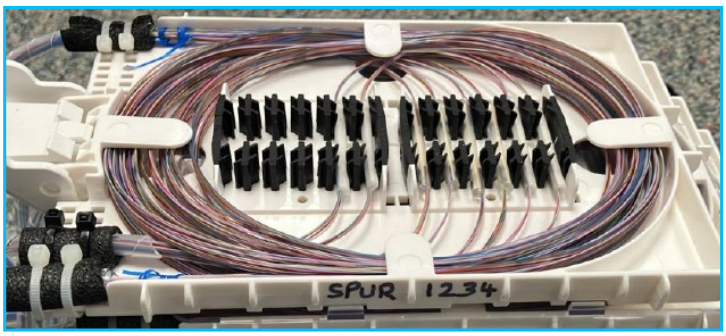


Figure 15.2 - Spur cable tray labelling