

Fiber Splice Box (FSB-A) Installation Instructions



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**Ribbon Optimized
Splicing**



Tray Splicing

1.0 General Product Information

Description

All Systems Broadband offers a Fiber Splice Box designed for indoor splice-only applications. Two configurations are available; Ribbon Optimized Splicing and Tray Splicing.

These aluminum enclosures are designed for high-density splice storage, with emphasis on proper fiber management, versatility of cable port seals, and cable tie-down features. The enclosure can be configured at the time of order for either ribbon optimized splicing, tray fiber splicing or a combination of each.

The enclosure includes four cable ports with various sealing options, using four rubber grommets, compression seals with cable plate or conduit plate. The cable tie-down features may include single cable brackets, dual cable brackets or strength member brackets.

2.0 Safety Precautions



Danger: Direct eye exposure to laser light will cause serious eye damage. Avoid looking directly into an optical fiber, optical connector or optical adapter that is connected to an active light source.



Warning: Wear safety glasses to prevent accidental eye injury. Wear protective gloves and clothing to prevent accidental injury.



Warning: Observe company policies and procedures regarding personal safety.



Warning: Follow local and national safety and construction codes.



Caution: Handle fiber optic cable per manufacturer's recommendation for minimum bend radius, maximum tensile loading, and maximum crush resistance.

3.0 Tools Required

- 216 Tool
- #2 Phillips Screwdriver
- Fiber Optic Cleaning Supplies
- Cable Preparation Tools

4.0 Package Contents

- Fiber Splice Box
 - ◇ Fiber Splice Box Standard Sub-Assembly Kit
 - ◇ Four (4) Rubber Grommets
 - ◇ Combination of other seals and cable retention items
 - ◇ Tie-wraps
 - ◇ Mounting screws
 - ◇ Installation Instructions
- Additional component kits per ordered configuration

Components and accessory kits may be selected at time of order using the ordering guide section of the product datasheet.

Additional product information is available at www.allsystemsbroadband.com.

Installing the Product

5.0 Unpacking

Ensure all components are available per the configuration ordered.

6.0 Mounting

1. Locate an acceptable mounting location for the box.
2. Place the box against the wall; while making sure it is level, mark the four [4] mounting locations at the keyholes.
3. Drill four 1/8" pilot holes at the marks.
4. Install box into position and tighten screws (Figs. 1 & 2).

Note: *There are two basic configurations for the FSB product line.*

- **Tray Splicing (Fig. 1)**
- **Ribbon Optimized Splicing (Fig. 2)**

7.0 Port Choice

Refer to figures 3 & 4 for port and tie-down identification. Consider the destination desired for the fiber tubes when choosing a cable port.

Example: Cables terminated at port 1 or 3 will be stored in a counter-clockwise direction, which provides easy routing to either

- The right (R) side of the tray for Tray Splicing, or
- The left (L) bend control for Ribbon Optimized Splicing

Note: *For Ribbon Optimized Splicing, cables requiring strength Member Brackets can only be used in the lower cable ports (1 and 2).*

Note: *When routing to the tray, always route fiber tubes behind the tray support bracket before attaching to the tray tie-down location (Fig. 3).*

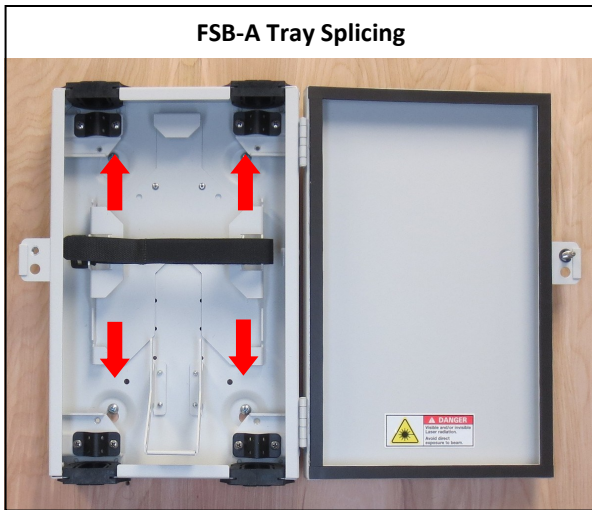


Fig. 1



Fig. 2

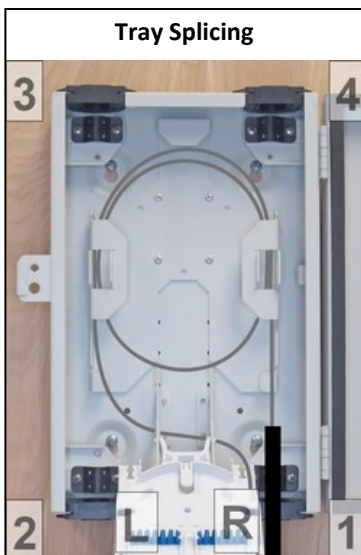


Fig. 3

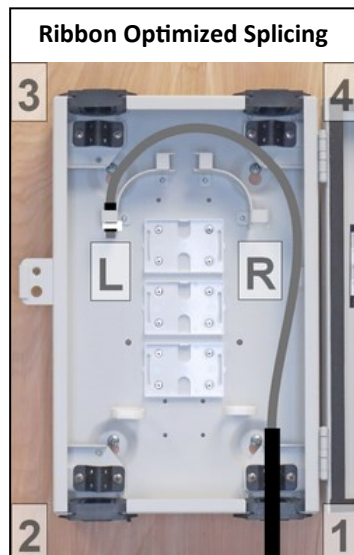


Fig. 4

8.0 Chassis Grounding

All grounding should follow local codes and practices.

Grounding components are available for grounding the box and/or non-dielectric cable(s). Refer to the Ordering Guide section of the product datasheet for details.

If this accessory was selected, a Ground Feed-thru (GFT) will be supplied with the kit.

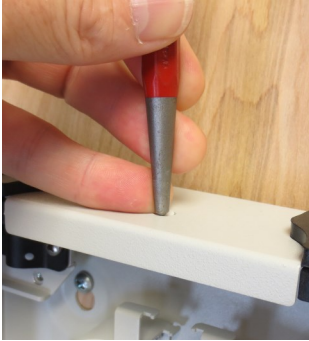


Fig. 5



Fig. 6

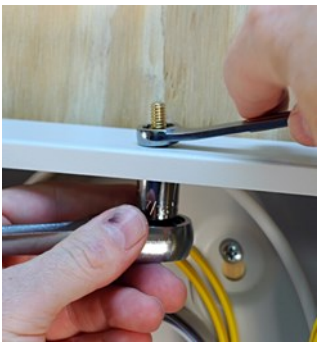


Fig. 7



Fig. 8

1. Locate and remove the small metal knock-out that is nearest to the non-dielectric cable or external ground wire you are connecting (Fig. 5).

Note: *Ensure that the circular masking around the inside of the ground feed-thru knock-out hole is removed before installing the ground feed-thru lug.*

2. Attach Ground Feed-thru lug by placing the longer threaded section into the hole from the outside of the enclosure. Sufficiently tighten the box retaining nut to >40 in-lbs. (Fig. 6, 7 & 8).



Warning: Company practices may apply to stacking order and torquing of various ground components.

3. If included in the kit, attach the external ground wire, then the star washer, and torque external nut per company-approved practices (Fig. 8).
4. If included in the kit, install the braided ground wire to the internal side of the Ground Feed-Thru (GFT) and torque. Orient the eyelet for routing to the port that will contain the non-dielectric cable.

9.0 Cable Preparation & Assembly

Cable Jacket Removal	TRAY SPLICING	RIBBON OPTIMIZED SPLICING
CABLE END:	62", 82" (+1 loop on tray), 102" (+2 loops on tray)	62"
MIDSPAN: (one way, cut downstream) (two way, cut @ midpoint)	64", 84" (+1 loop on tray), 104" (+2 loops on tray) 122" (center reverse point)	97"

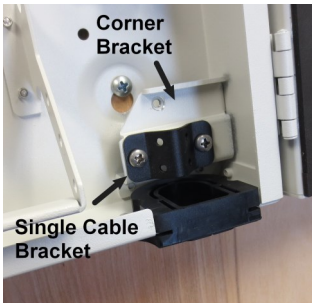


Fig. 9

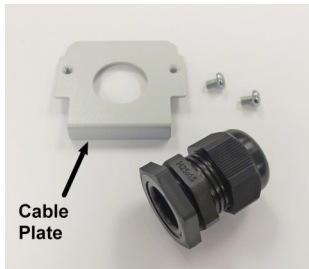


Fig. 10

The cable ring cut should be positioned about an inch or so inboard the selected port corner bracket (Fig. 9). Measure ring cut and remove the outer cable jacket per chart recommendations above.

Follow the cable preparation sequence in order below as needed for cable hardware installation.

Cable Seal, Retention & Grounding Preparations

1. Cable Compression Seal & Cable Plate

Install the two short screws into the cable plate loosely as shown (Fig. 10 & 11). Next, install the cable compression seal into the plate as shown and tighten.

Note: Often times the inner seal will need to be removed for larger cable diameter installations.

Make sure that both the orientation of the screws, plate and seal are correct for port installation (Fig. 12). Next, slide the assembly (seal first) over the fibers, fiber tube(s) and past the ring cut by about 3"; do **not** tighten the seal onto the cable yet. Proceed to step 3 for armor cable and/or step 4 for Strength Member Bracket (SMB) installations.

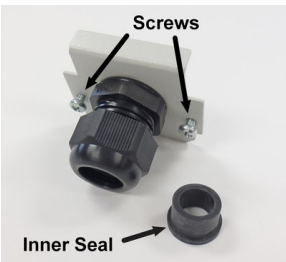


Fig. 11



Fig. 12

2. Rubber Grommet Seal

This is the standard port seal (Fig. 13a). Remove and modify grommet as needed by lifting the winged sections and sliding out (Fig. 13b). It can be installed over the end of the cable(s) by cutting a hole or slitting it and installing it around cable(s) either before or after cable(s) are installed in the port.

3. B-bond (cable clamp)

Install the B-bond onto the cable. Follow company practice to ensure proper connection to the cable armor is made.

Note: Tabbing both sides of the cable, or pulling the rip cords just past the ring cut will make B-bond installation easier and provide two position options for the clamp (Fig. 14a through 14d). Consider orientation of cable in the port before B-bond installation onto the cable. The ground wire can be attached after the cable is installed in the port.



Fig. 13a

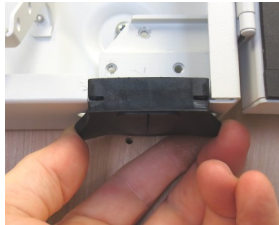


Fig. 13b

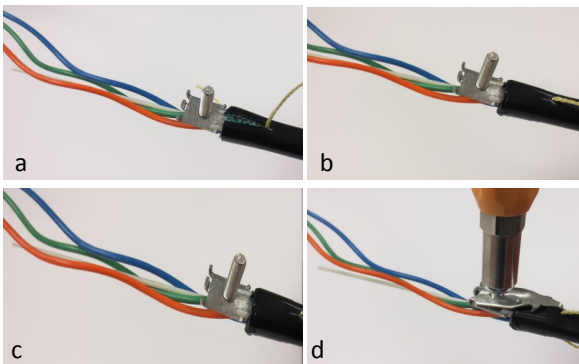


Fig. 14a through 14d

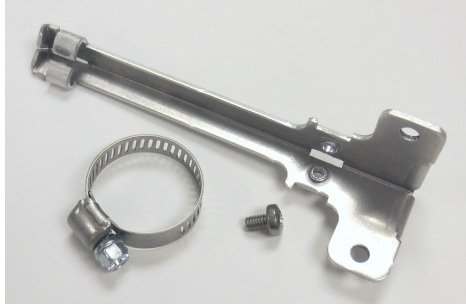


Fig. 15

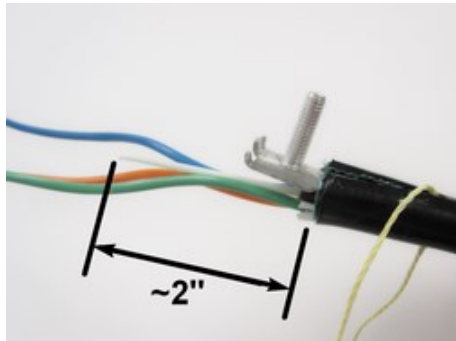


Fig. 16

4. Strength Member Bracket (SMB)

Note: For Ribbon Optimized Spicing, Strength Member Brackets can only be used in the lower two cable ports.

If the cables have rigid strength members and the SMB is used (Fig. 15), trim the strength members to 2"- 2 1/4" from the ring cut (Fig. 16). When installing a SMB onto the cable, take note of the SMB tab position and make sure it will align with the corner bracket slot. Make sure the strength members are pushed in fully against the inside end of the SMB and no fiber tubes are trapped under the strength members (see circle in Fig. 17 & 18). Install the hose clamp into position as shown. While pulling the SMB back against the end of the protruding strength members, tighten hose clamp into position.

Figure 17 shows an installation onto LBT cable, and Figure 18 shows installation onto a CCT ribbon cable.

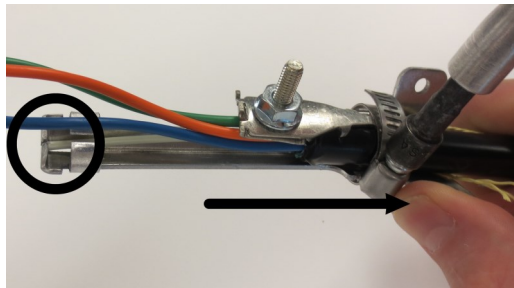


Fig. 17 With Loose Buffer Tube

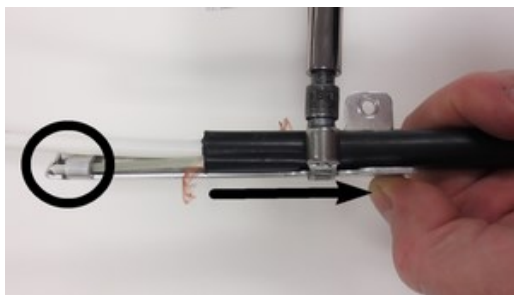


Fig. 18 With Central Core Tube Ribbon

9.1 Install Cable Assembly

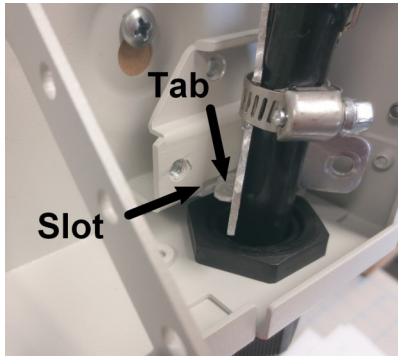


Fig. 19



Fig. 20



Fig. 21

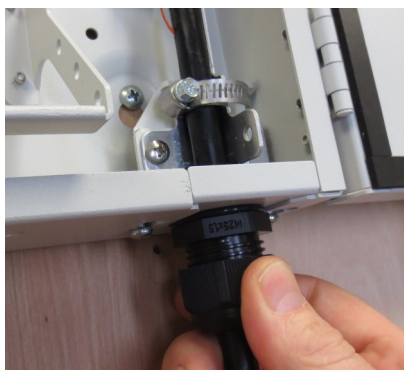


Fig. 22

Remove the single cable bracket of the designated port (Fig. 19, pg. 5). Follow applicable steps below in order to install cables into cable port; skip non-applicable steps as needed.

Note: If installing the Ribbon Optimized configuration and using the upper ports (3 & 4), it's easier to ring cut and remove excess core tube length prior to terminating cable into the port. In this case, ring cut the core tube to 1-1/2" from cable jacket, remove and clean ribbons as needed.

1. Cable Seal & Plate Assembly (without Strength Member Bracket)

Make sure the cable compression seal is not tight onto the cable jacket. With the screws of the plate backed out, install the **Cable Plate** assembly into the port.

- Lower the assembly into the port so the screw heads fit through the keyholes from the inside, and slide the plate back so the sealing flange is flush with the box flange. While pushing the plate back, tighten the external attachment screws (Fig. 20).
- Re-install the single cable plate and screws (identified in Fig. 21). Adjust the cable so the ring cut and/or B-bond extends about an inch past the corner bracket prior to fully tightening down the clamp.
- Tighten the cable compression seal onto the cable jacket (Fig. 22).

2. Strength Member Bracket (SMB)

Install the SMB and cable assembly into the designated port. For Ribbon Optimized Splicing only use ports 1 & 2 with SMB's.

- **If compression seal is also used**, lower the assembly into the port so the screw heads of the plate fit through the keyholes from the inside, and slide the plate back. At the same time, orient the SMB so one of the SMB tabs aligns with the slot into the corner bracket (Fig. 19). Make sure the SMB sits flush with corner bracket and install the short anchor screw provided (Fig. 21). Tighten the cable compression seal to the cable jacket (Fig. 22).
- **If a rubber grommet is used**, install it onto the cable (modify as needed). Insert the assembly into the designated port. At the same time, orient the SMB so one of the SMB tabs aligns with the slot into the corner bracket (Fig. 19). Make sure the SMB sits flush with corner bracket and install the short anchor screw provided (Fig. 21). Make sure the grommet is pushed back so the flange is even with the box port flange.

3. Rubber Grommet

Modify the grommet as needed to install onto the cable. It can either be slit or a hole can be cut, and the cable threaded through the grommet. Install the grommet and cable; make sure the grommet is fully seated into the port and even with the sealing flange of the box.

- **Single Cable Bracket:** While holding cable in place, install single cable bracket and screws, making sure to position the cable ring cut about an inch inboard of the corner bracket. Tighten both screws sufficiently to hold cable in place.



Fig. 23



Fig. 24

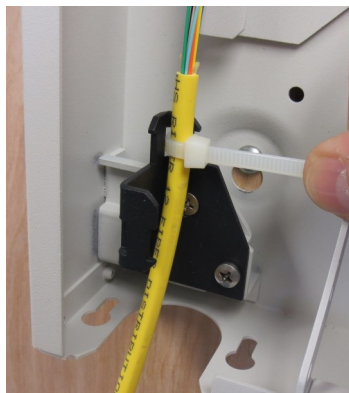


Fig. 25

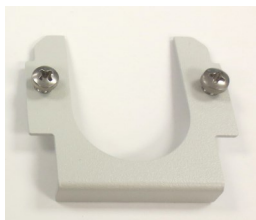


Fig. 26

4. Dual Cable Bracket (DCB)

Install the DCB into the port selected using the supplied hardware. The flat head screw goes into the center top hole (Fig. 23) and two short screws are provided for the other two locations.

- Dual Cable Brackets can be used to double cable port capacity when cables are 7/16" diameter or smaller; a rubber grommet seal is used, no SMB is used.
- Cables can be installed with the rubber grommet in place (if slit) or with smaller cables. The grommet can be installed after cables are secured to the bracket; made easier by slitting from the curved end of the grommet.
- Position the first cable in the lower section of the DCB and secure with either a hose clamp or large tie-wrap (Fig. 24 & 25). Make sure the cable's ring cut extends past the end of the bracket. Position the second cable in the upper section and secure the same way.

Note: Orient the hose clamp away from fibers that may be routed nearby.

- If grommet is not already installed, modify and install now.

5. Ground Wire

Connect and route the ground wire from the Ground Feed-through (GFT) to the B-bond stud and torque per company-approved practice. The star washer should go between the top stranded ground wire eyelet and the top retaining nut.

6. Conduit Plate

Install the short screws into the conduit cable plate leaving them loose (Fig. 26). Next, route and position the 1-1/4" corrugated conduit into the back of the enclosure port. While holding the conduit against the back of the port, install the conduit cable plate by dropping it down so the screws protrude through the keyholes and sliding it to the rear firmly against the corrugated conduit and tighten the screws.



Fig. 27



Fig. 28

Note: Proceed to section 11.0 for Tray Splicing and/or section 12.0 for Ribbon Optimized Splicing (Fig. 27 & 28).

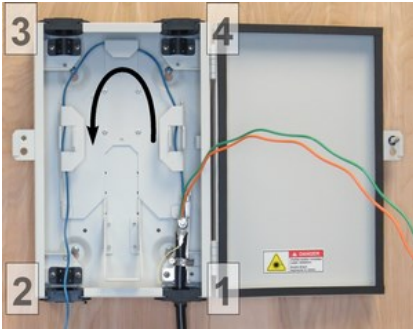


Fig. 29

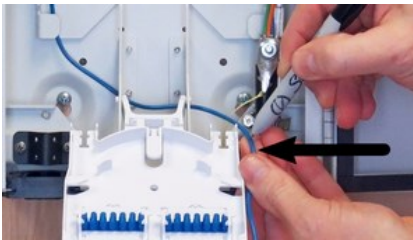


Fig. 30



Fig. 31

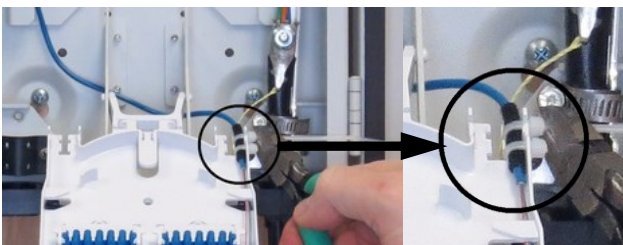


Fig. 32



Fig. 33



Fig. 34

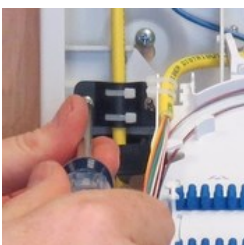


Fig. 35



Fig. 36

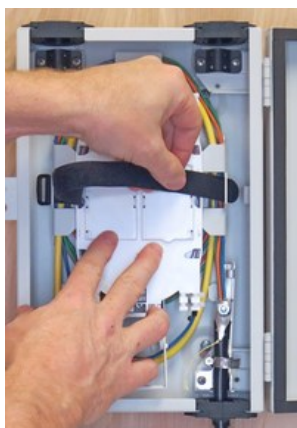


Fig. 37

10.0 Tray Splicing - Routing & Storage

1. Separate the designated fibers/tubes to be spliced and store the slack length desired in the slack basket. Make sure the tube length reaches around/behind the tray tower and to the desired tray tie-down location (Fig. 29).

Important Routing Tips:

- **Always route fiber/tubes behind the tray support tower and to the opposite side of the tray (Fig. 30 & 32).**
 - Counter-clockwise routing from ports 1 & 3 presents fibers to the right side of the tray (Fig. 30 & 32); clock-wise routing from ports 2 & 4 presents fiber to the left side of tray.
 - If needed, an “S” bend can be formed with the designated fiber tube inside the slack basket to change the stored direction. This is sometimes necessary to reach the desired side of the tray.
2. Install trays as needed and route designated fiber tubes first **behind** the tray tower then up to the tray attachment point. Mark fiber tubes just past tie-wrap location (Fig. 30).

Note: For Midspan Applications

- **If fibers to be spliced will be cut dead to the field, cut the designated tubes downstream, close to the exiting side ring cut.**
 - **If splicing both directions (upstream and downstream), cut the designated groups of fibers at the midpoint.**
3. Wrap fiber tube(s) along the tie-wrap area for protection, with 1 -1/2 wraps of felt wrap (Fig. 31).
 4. Secure the fiber tubes to the corner of the tray with the tie-wraps provided (Fig. 32).
 5. Store the unused/midspan fibers inside the slack basket (Fig. 33).
 6. Prior to splicing, fibers can be temporarily stored around the perimeter of the tray for protection.

Note: If splicing twenty-four fibers per tray with 900 micron fiber, the cut length must be minimized to accommodate storage.

Note: In cases where bare 900 micron fibers are routed to the tray, wrap bundles of fibers for protection. Also wrap them anywhere they could be damaged or could rub other hard components (i.e. Strength Member Bracket or B-bond).

7. Use tray label as needed to identify completed splicing (Fig. 36).
8. Use the black tray strap provided to secure the trays (Fig. 37).
9. Close and secure the housing.

11.0 Ribbon on Tray Splicing

Routing

1. Ensure the cable jacket is positioned about 1" inboard of the corner bracket. Route the core tube up the side of the box and over to the opposite side of the slack basket, using a generous bend to avoid kinking the tube (Fig. 38).
2. Mark the core tube as shown, at the top/left of the slack basket (Fig. 39).
3. Ring cut and remove excess core tube length, and wrap core tube with felt wrap about 1/8" from the end of the tube.
4. Attach the core tube to the **top/left** slack basket section, using the provided tie-wraps (Fig. 40 black circle). Once the core tube is routed, ribbons are now ready to be routed to tray.
5. Insert each ribbon into one of the provided transportation tubes. **Allow a 1-2" window for the ribbons to transition from the core tube to the transportation tubes (Fig. 41 black arrow)**. Secure the transportation tubes to the **bottom/left** of the slack basket (Fig. 42 black circle).
6. Install trays as needed and route transportation tubes first **behind** the tray tower, then up to the tray attachment point. Ring cut and remove the excess transportation tube. Secure the transportation tube to the corner of the tray with the tie-wraps provided (Fig. 43 black circle).
7. Route outgoing jumpers (from microtube manifold if used), into **bottom/left** port and over to the opposite side of the slack basket, using a generous bend (Fig. 44).
8. Route jumpers first **behind** the tray tower, then up to the tray attachment point. Ring cut jumpers to expose fiber.
9. Mark the jumpers just past the tie-wrap location. Wrap jumpers with a single loop of the provided felt wrap. Secure jumpers to the corner of the tray with the tie wraps provided (Fig. 45). **A maximum of 6 jumpers should be secured at each attachment point on the tray.**
10. Close and secure the housing.

Deribbonizing

1. Grip between thumb and index finger near the end of desired ribbon. Brush with the index finger across the top of the ribbon until matrix is released from fiber (Fig. 46).
2. Peel back matrix to desired length (Fig. 47).
3. Clean and prep fibers for splicing (Fig. 48).



Fig. 38



Fig. 39



Fig. 40

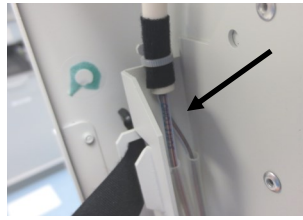


Fig. 41



Fig. 42



Fig. 43



Fig. 44



Fig. 45

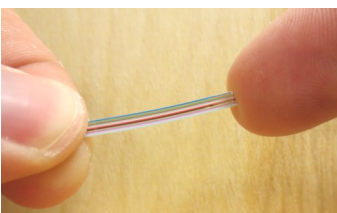


Fig. 46

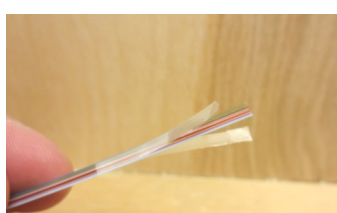


Fig. 47

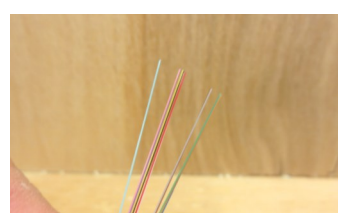


Fig. 48

12.0 Ribbon Optimized Routing & Splicing

Routing

Core Tube Routing Tips

- It is preferred to use the lower ports 1 & 2 (Fig. 49). This also applies to midspan applications.
- Dual Cable Brackets can be used to double port cable capacity when cables are 7/16" diameter or smaller, no SMB is used and a rubber grommet seal is used.
- Ports 3 & 4 cannot accept cables requiring Strength Member Brackets (SMB).

For cables entering the lower ports (1 & 2)

1. Ensure the cable jacket is positioned about 1" inboard of the corner bracket (Fig. 50).
2. Route the core tube up the side of the box and over to the opposite side bend control, using a generous bend to avoid kinking the tube (Fig. 52). Mark the core tube as shown, just past the metal bend control (Fig. 51).
3. Ring cut and remove excess core tube length, and clean the ribbons as needed.
4. Wrap core tube with felt wrap about 1/8" from the end of the tube.
5. Attach the core tube to the **lower/back** bend control section, using the provided tie-wraps (Fig. 55). Once cables tubes are routed, wrapped and secured, ribbons are now ready to be spliced (Fig. 56 & 57).

For cables entering the upper ports (3 & 4)

1. Mark the core tube 1-1/2" past the cable jacket.
2. Ring cut and remove the excess core tube and clean ribbons as needed (adjust cable as needed for access).
3. Position the cable so the core tube extends just past the bend control bracket (Fig. 53). Do not attach the core tubes from the upper ports to the bend controls; let them run along the side.



Fig. 49

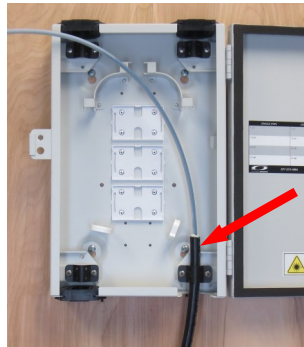


Fig. 50

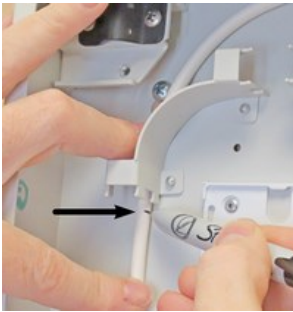


Fig. 51

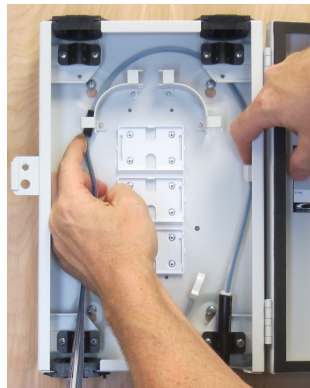


Fig. 52

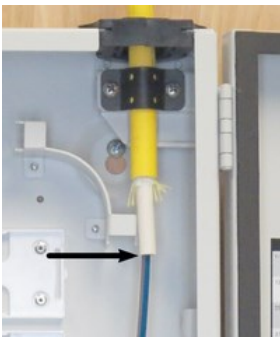


Fig. 53



Fig. 54

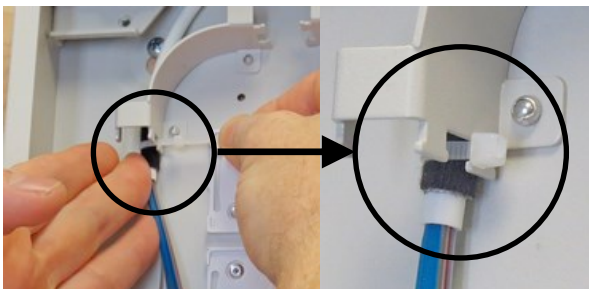


Fig. 55



Fig. 56



Fig. 57

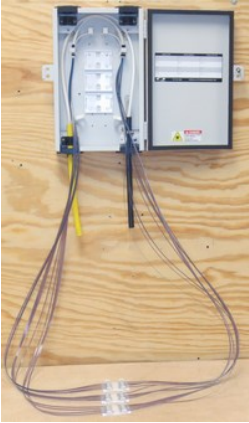


Fig. 58

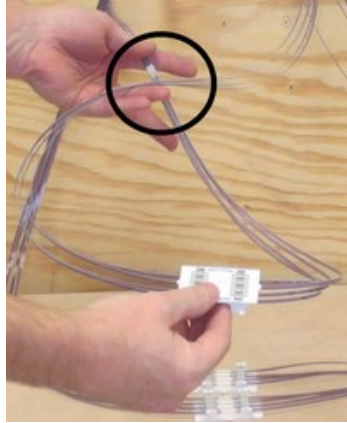


Fig. 59

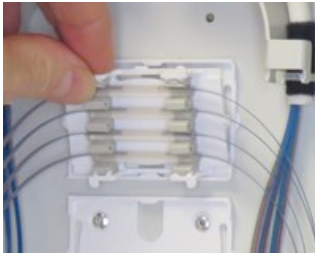


Fig. 60

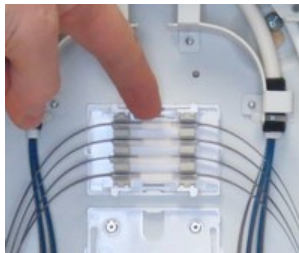


Fig. 61



Fig. 62

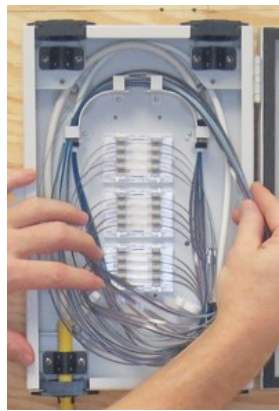


Fig. 63



Fig. 64

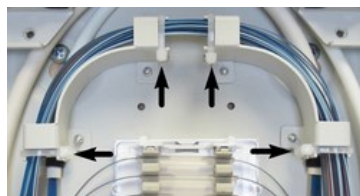


Fig. 65



Fig. 66



Fig. 67

Splicing

1. Measuring from the end of each secured core tube, mark and trim each set of ribbons to **43"** in length.

*** Important Note: The splice length is 43"**

For Midspan Applications

- **It is recommended to use the two lower ports for the midspan cable.**
 - **Cut the designated fibers at 43". The remaining downstream fiber length can be trimmed and discarded.**
 - **It is recommended to store splices first and midspan fibers last for easier future access to the midspan fibers.**
2. Lay out and organize all ribbons to be spliced. **It is important to remove all twists in the ribbons before splicing.**
 3. Splice ribbons and place each completed and cooled splice into the cradle(s) (Fig. 58).
 4. Once all splices are complete, install cradles one at a time.
 - Flip cradle with splices to the left, creating a cross of the ribbons (Fig. 59).
 - Place cradle bottom edge into the bottom of the cradle adapter (Fig. 60).
 - Tilt top of cradle back against the cradle adapter and snap in using your finger. By putting pressure at the tab at the top, the cradle will snap into place (Fig. 61).
 5. Once all cradles are installed, take the group of ribbon loops and flip them to the right, creating a cross of the ribbons in the opposite direction as the first flip (Fig. 62).
 6. Install the ribbons over the bend controls (Fig. 63).
 7. Organize the ribbon groups along each side into the plastic guide clips (Fig. 64).
 8. Install four tie-wraps at the **upper/front** bend control locations (Fig. 65). **Pay particular attention to Figure 66**, being careful to contain the ribbons but avoid putting direct pressure on them.
 9. Check all ribbons to make sure they are contained, arrange as needed. Wrap any metal with felt wrap as needed for ribbon protection. Storage of ribbons is now complete (Fig. 67).
 10. Use door label as needed to identify completed splicing.
 11. Close and secure the housing.

13.0 Customer Service

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