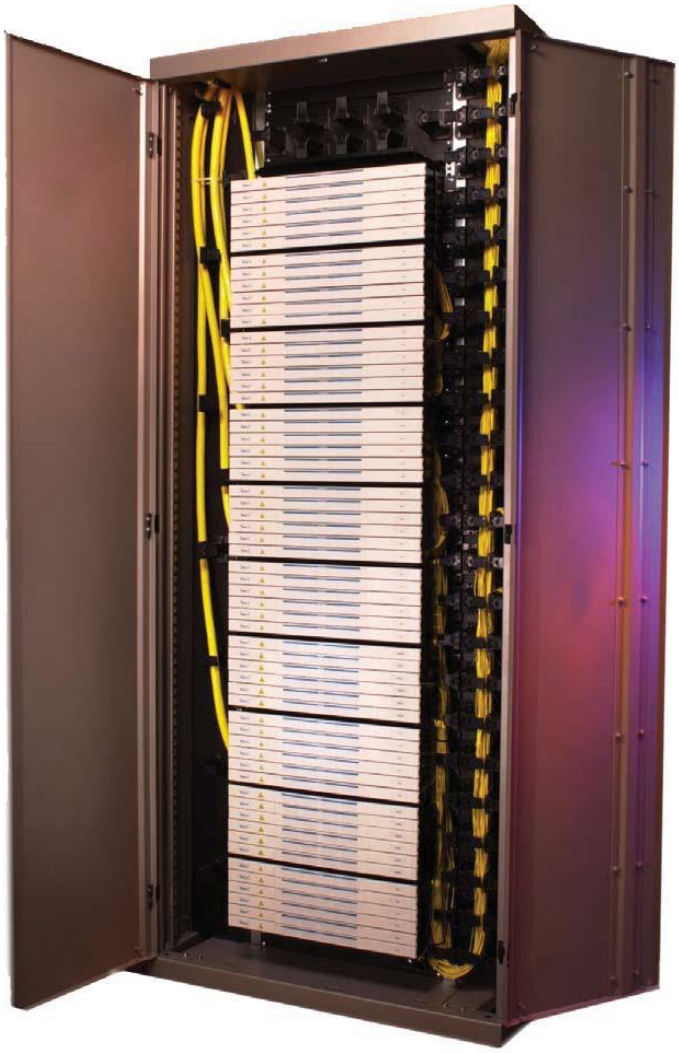
E-Series Optical Patch/Splice Storage Tray-Based System

Installation Guide



Amphenol
NETWORK SOLUTIONS™

Installation Guide, Part Number 136328-3 A1

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About

Amphenol Network Solutions is a global innovative original equipment manufacturer that serves the data and communications markets. We design, manufacture, and distribute products for customers who need an end to end solution for network connectivity, fiber, power distribution and rack management. We collaborate with our customers to deliver product solutions that exceed expectations with innovative designs and world class quality. Amphenol Network Solutions is the industry thought leader on network cable management.

Technical Support

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Chapter 1: Description

1.1 Overview

Figure 1 - ESTF-06TR-4RU

E-Series is an advanced, fiber optic cable management system. The E-Series provides a central location for fiber patching, splicing and storage. Amphenol Network Solutions engineered the E-Series for central office (CO), customer premises or for any ETSI application where rear access to equipment is limited or impractical. Cable management includes articulated links that allow slide-out access to patch adapters mounted on pull-up carriers in addition to slide-out access to splice cassettes. You can order trays with pull-up adapters to accommodate 12 or 24 sets of SC or LC fiber connectors. Trays are available with or without pre-terminated feeder or connectorized pigtails.

1.2 Main Assemblies

- A chassis (rack shelf) assembly
- Any assortment or patch, splice, combination patch/splice and storage trays that slide into the chassis assemblies
- Routing and protection hardware for incoming and outgoing fiber cable
- Industry-standard, multi-fiber cable assemblies and pigtail bundles

Figure 2 - E-Series 1 RU Chassis (ESTF-01TR-1RU) With a Patch/Splice Tray

1.3 Chassis Assemblies

E-Series chassis fit standard 485 mm (19-in.) ETSI racks. Each chassis holds up to six trays:

- 1 RU, 1-Tray Chassis (Model ESTF-01TR-1RU)
- 2 RU, 3-Tray Chassis (Model ESTF-03TR-2RU)
- 3 RU, 4-Tray Chassis (Model ESTF-04TR-3RU)
- 4 RU, 6-Tray Chassis (Model ESTF-06TR-4RU)

Figure 3 - Model ESTF-06TR-4RU Chassis

Each chassis is black with built-in front entry/exit arcs and tray slide receivers. M6 rack mounting screws are included. Standard chassis are available in black.

1.4 Trays

Amphenol Network Solutions offers an assortment of trays for patching, splicing and storage. All trays are black steel with black cable routing arcs and guides. All trays are front corner cable entry and exit through Amphenol Network Solutions' patented, articulated link system along right and left sides of the trays, forming channels that maintain critical bend-radius control when trays are extended and retracted.

From the factory, each tray is configured for either 12 or 24 circuits. The following table outlines the number of possible terminations for each of the four chassis assemblies. Mixing 12 and 24 circuit trays in a single chassis accounts for any standard IFC and OSP cable capacity. Amphenol Network Solutions also offers adapter and splice cassette kits to boost the capacity of 12-circuit patch and splice trays up to 24 circuits.

Chassis Assemblies	12 Terminations per tray, up to	24 Terminations per tray, up to
ESTF-01TR-1RU	12 Circuits Per Chassis	24 Circuits Per Chassis
ESTF-03TR-2RU	36 Circuits Per Chassis	72 Circuits Per Chassis
ESTF-04TR-3RU	48 Circuits Per Chassis	96 Circuits Per Chassis
ESTF-06TR-4RU	72 Circuits Per Chassis	144 Circuits Per Chassis

In a loaded rack or optical distribution cabinet, such as shown on the cover, a single bay or cabinet can hold as many as 1440 terminations (10 chassis x 6 trays per chassis x 24 terminations per tray).

The following paragraphs detail some of the forms and features of each Amphenol Network Solutions E-Series Tray:

- "1.4.1 Patch Trays" on page 3
- "1.4.2 Splice Trays" on page 7

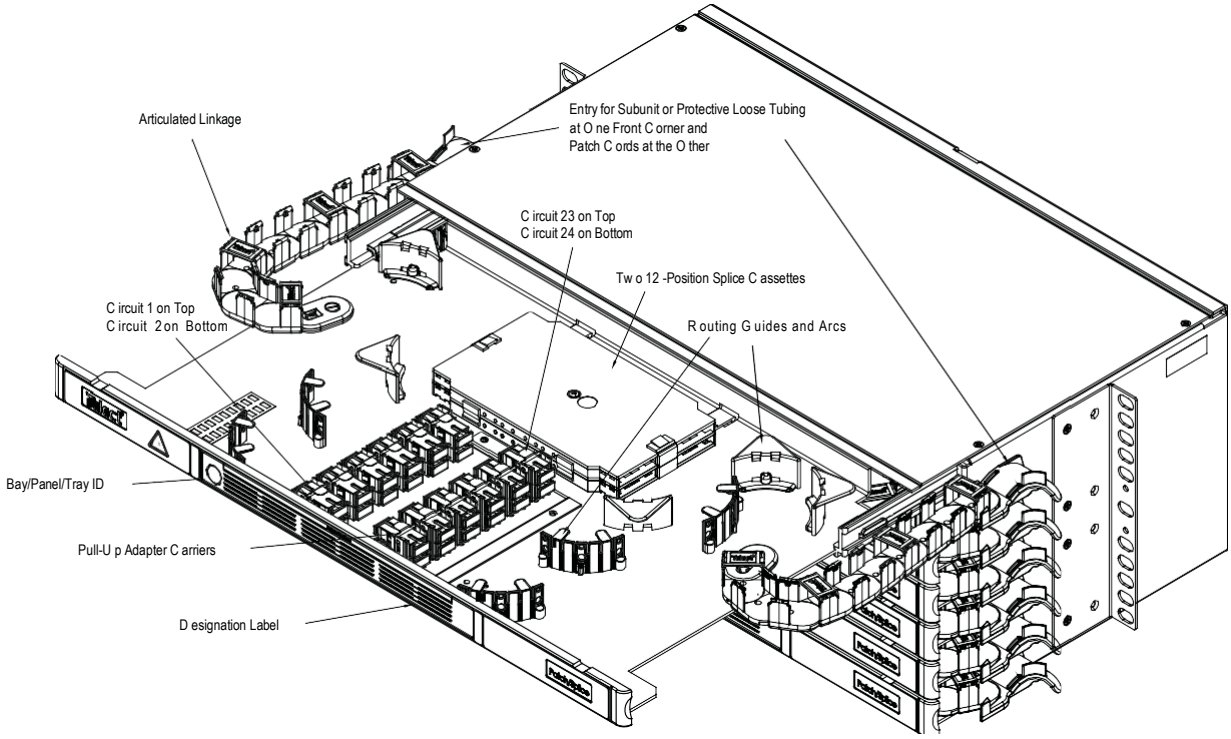


Figure 4 - Tray Components

1.4.1 Patch Trays

From the factory, E-Series Patch Trays have either 12 or 24 adapters. Trays are available with all of the standard choices of adapters and polishes.

Use E-Series Patch Trays for cross-connect patching, interconnections between IFC and network element, and interconnections between network elements.

Figure 5 - Model ESTF-P024-USC-000 Patch Tray

Figure 6 - Model ESTF-P012-ULC-000 Patch Tray

The 6 or 12 pull-up carriers per tray support 2 over-and-under adapters each. Patch trays include on-board retermination storage (about .5 m) for each subunit or loose tube. Also, patch trays come with cable and connector management hardware, tray slides and a designation strip.

The following table lists standard Amphenol Network Solutions E-Series Patch Trays. The “000” at the end of a model number designates that a particular tray does not include factory-installed cable. But factory installed, connectorized IFC is available up to “999” meters, for example, ESTF-P012-USC-500.

Table 1 - Standard Amphenol Network Solutions E-Series Patch Trays

Patch Tray	Ports (Terminations)	Adapters & Polishes
ESTF-P012-USC-000	12	SC/UPC
ESTF-P012-ASC-000	12	SC/APC
ESTF-P012-ULC-000	6	LC/UPC
ESTF-P012-ALC-000	6	LC/APC
ESTF-P024-USC-000	24	SC/UPC
ESTF-P024-ASC-000	24	SC/APC
ESTF-P024-ULC-000	12	LC/UPC
ESTF-P024-ALC-000	12	LC/APC

The following illustrations show typical routing schemes:

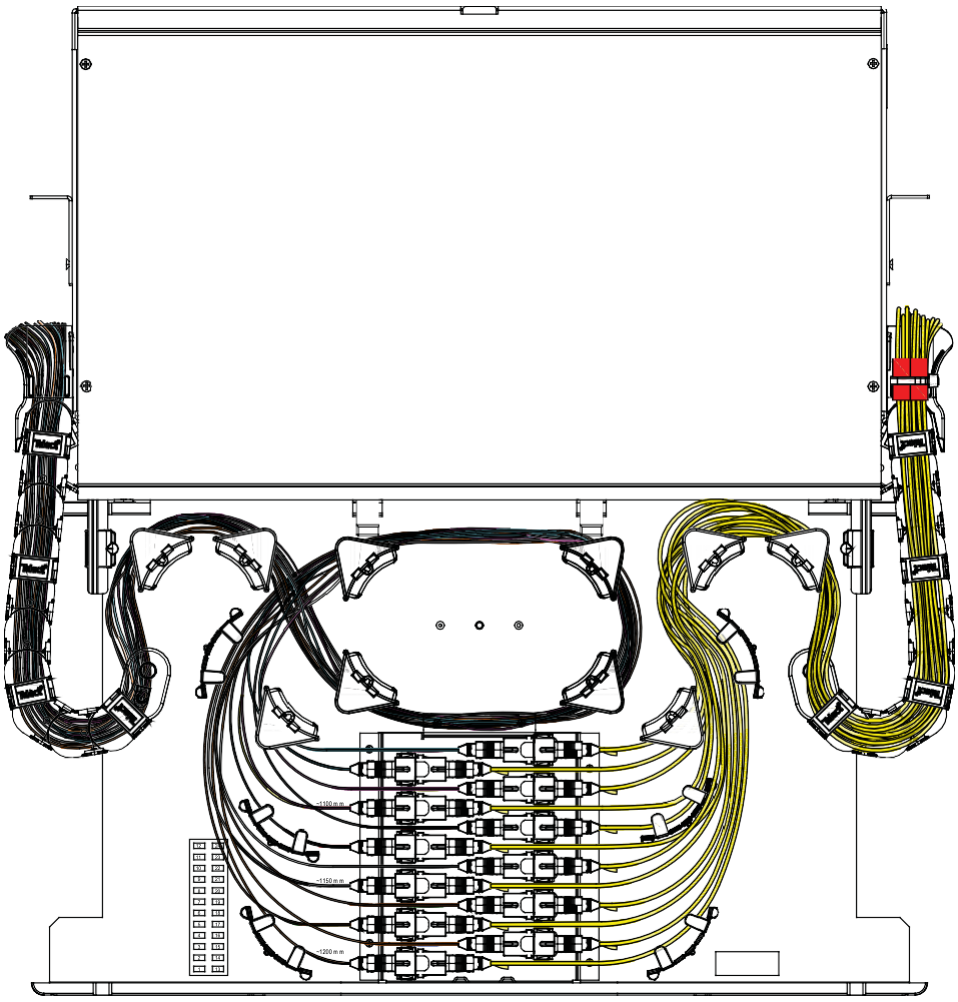


Figure 7 - ESTF-P024-USC-000 with IFC Multi-Fiber on the Left & Jumpers (or Patch Cords) on the Right

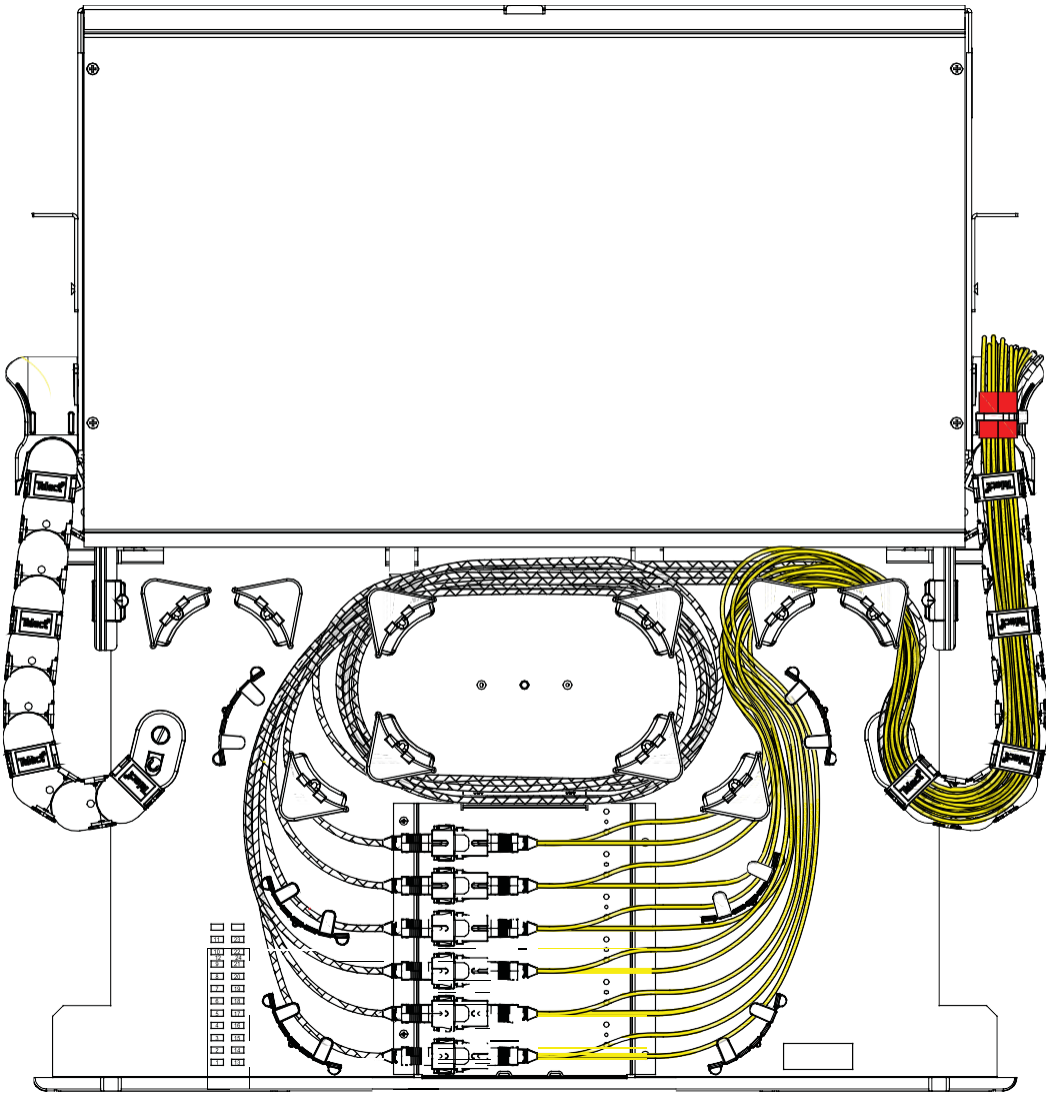


Figure 8 - ESTF-P012-USC-000 with Same-Side Entry of Jumpers and OSP Fiber (in Protective Tubing) on the Right

1.4.2 Splice Trays

E-Series Splice Trays have either one or two, 12-place splice cassettes. ESTR-S012-000-000 (one cassette) accommodates 12 and ESTR-S024-000-000 (two cassettes) accommodates 24 heat-shrink fusion splices. Trays provide on-board retermination storage (about .5 m) for each subunit or loose tube and cassettes provide about 1 m of retermination storage for each fiber strand.

Splice trays include storage arcs, cable and connector management hardware, tray slides and a designation strip.

The “000-000” at the end of splice model numbers designates that the splice trays include neither adapters nor factory-installed fiber.

Figure 9 - Model ESTR-S024-000-000 Splice Tray

Figure 10 - Model ESTR-S012-000-000 Splice Tray

The following illustrations show typical routing schemes:

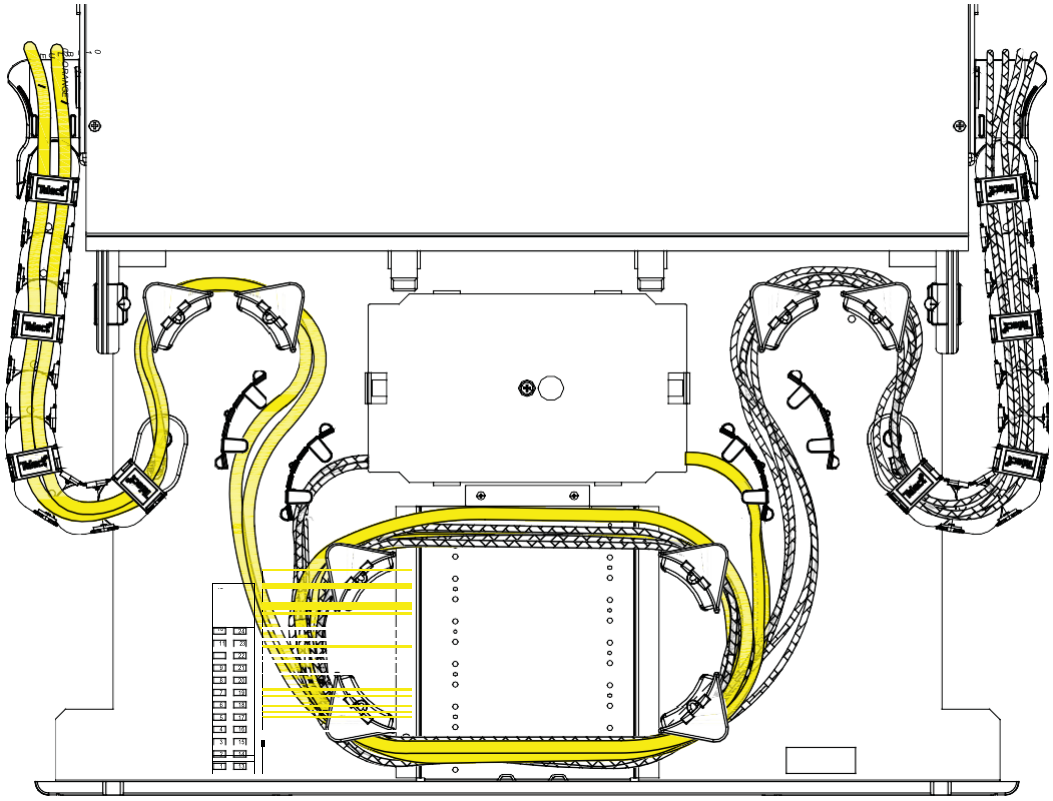


Figure 11 - ESTF-S024-000-000 with IFC Multi-Fiber Subunits on the Left & OSP Multi-Fiber in Protective Tubing on the Right

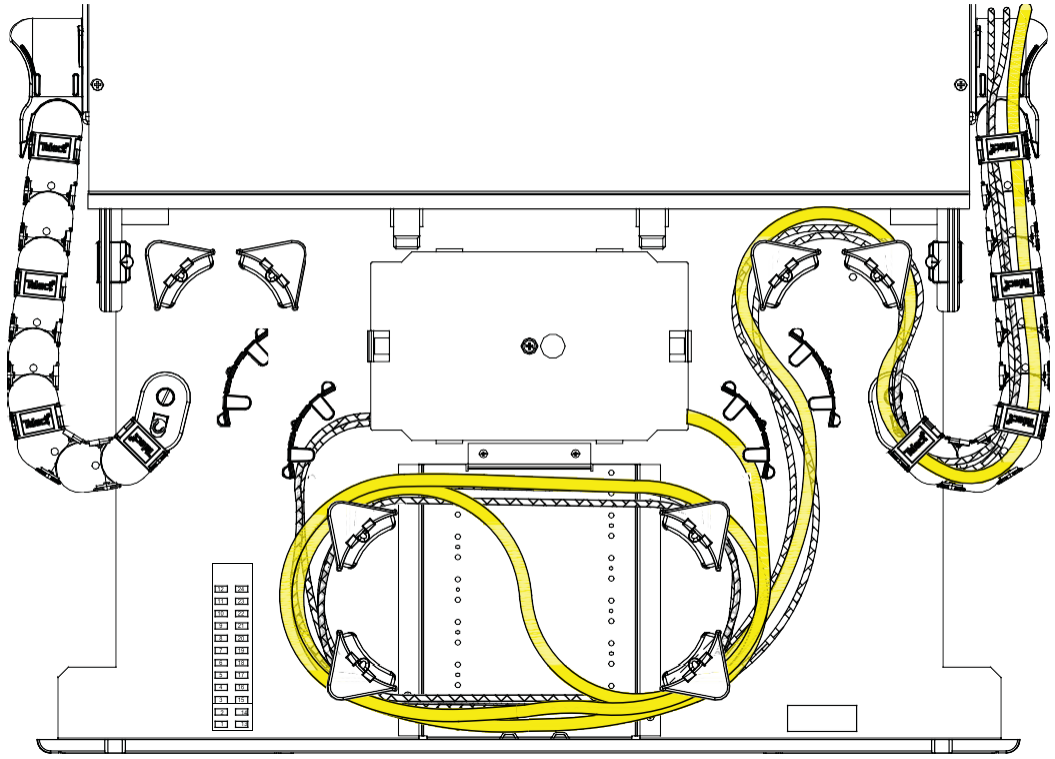


Figure 12 - ESTF-S012-000-000 with Same-Side Fiber Entry on the Right

1.4.3 Combination Patch and Splice Trays

From the factory, E-Series Combination Patch/Splice Trays have either 12 or 24 adapters with one or two 12-place splice cassettes to match. Trays are available with all of the standard choices of adapters and polishes — same as the patch trays.

Figure 13 - Model ESTF-C012-USC-000 Patch/Splice Tray

Figure 14 - Model ESTF-C024-ULC-000 Patch/Splice Tray

Like the patch trays, each pull-up carrier supports two over-and-under adapters. Patch and splice trays include cable and connector management hardware, tray slides and a designation strip.

The trays can be ordered with or without connectorized pigtails.

The following table lists all standard Amphenol Network Solutions E-Series Patch/Splice Trays. In the table, a blank or “0 0 0” at the end of a model numbers designates that a particular patch/splice tray does not include factory-installed connectorized pigtails. “L D D” at the end signifies factory-installed, connectorized 2m pigtails routed from the cassette’s splice holders to the adapters.

The illustration that follows shows the typical routing scheme.

Patch/Splice Tray[a]	Terminations	Adapters & Polishes
ESTF-C012-USC-_ _ _	12	SC/UPC
ESTF-C012-ASC-_ _ _	12	SC/APC
ESTF-C012-ULC-_ _ _	6	LC/UPC
ESTF-C012-ALC-_ _ _	6	LC/APC
ESTF-C024-USC-_ _ _	24	SC/UPC
ESTF-C024-ASC-_ _ _	24	SC/APC
ESTF-C024-ULC-_ _ _	12	LC/UPC
ESTF-C024-ALC-_ _ _	12	LC/APC

a. Blank or 0 0 0 for ordering trays without factory-installed pigtails or 0 0 2 for factory installed, connectorized pigtails

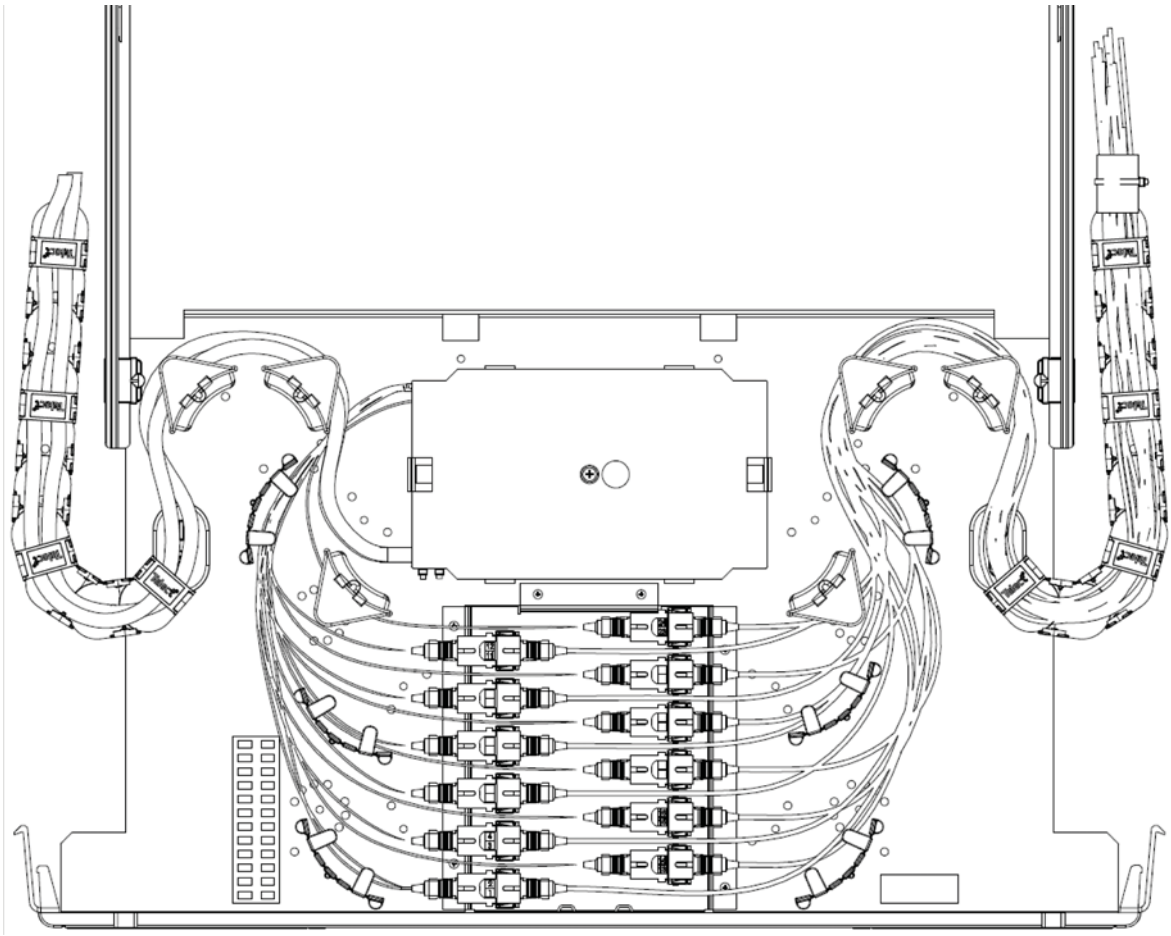


Figure 15 - ESTF-C024-USC-000 with IFC Multi-fiber Subunits on the Left & Jumpers (or Patch Cords) on the Right

1.4.4 Storage Tray

The E-Series Storage Tray (Model ESTR) stores jumper or patch cord slack. Single pass-through storage can vary in lengths from less than 1 m up to nearly 3 m. Maximum number of jumpers or patch cords depends on their diameter versus the capacity of the articulated linkage.

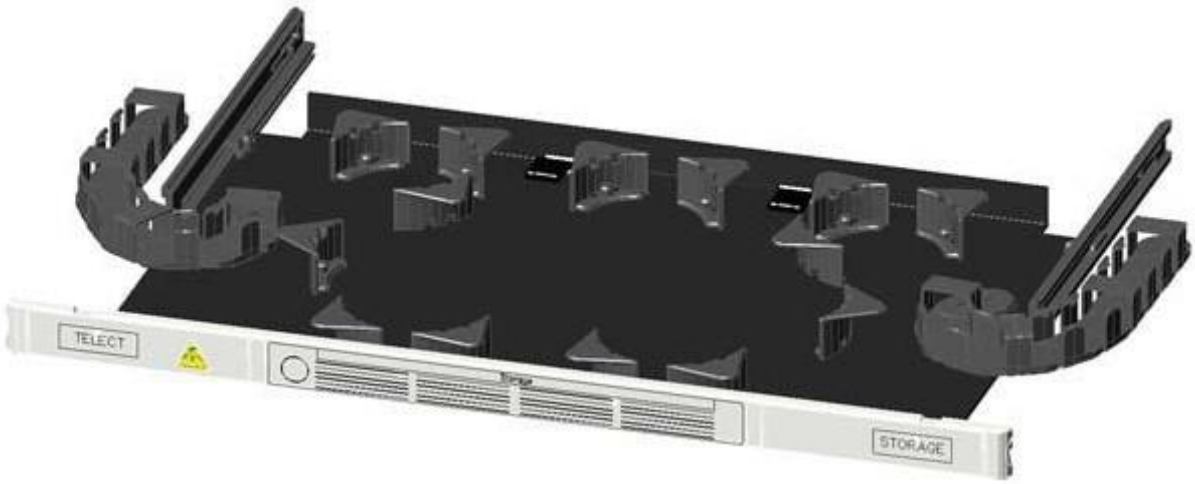


Figure 16 - Model ESTR Storage Tray

The following cabling capacities assume very dense packing. Use this list for comparison purposes only; avoid over-packing:

- ~90 cables (1.75 mm diameter)
- ~64 cables (2 mm diameter)
- ~32 cables (3 mm diameter)

The following illustrations show typical routing schemes. Other schemes are possible. Trays can accommodate combinations of routing schemes. Jumpers and patch cords can enter/exit at opposite corners or at the same-side corner.

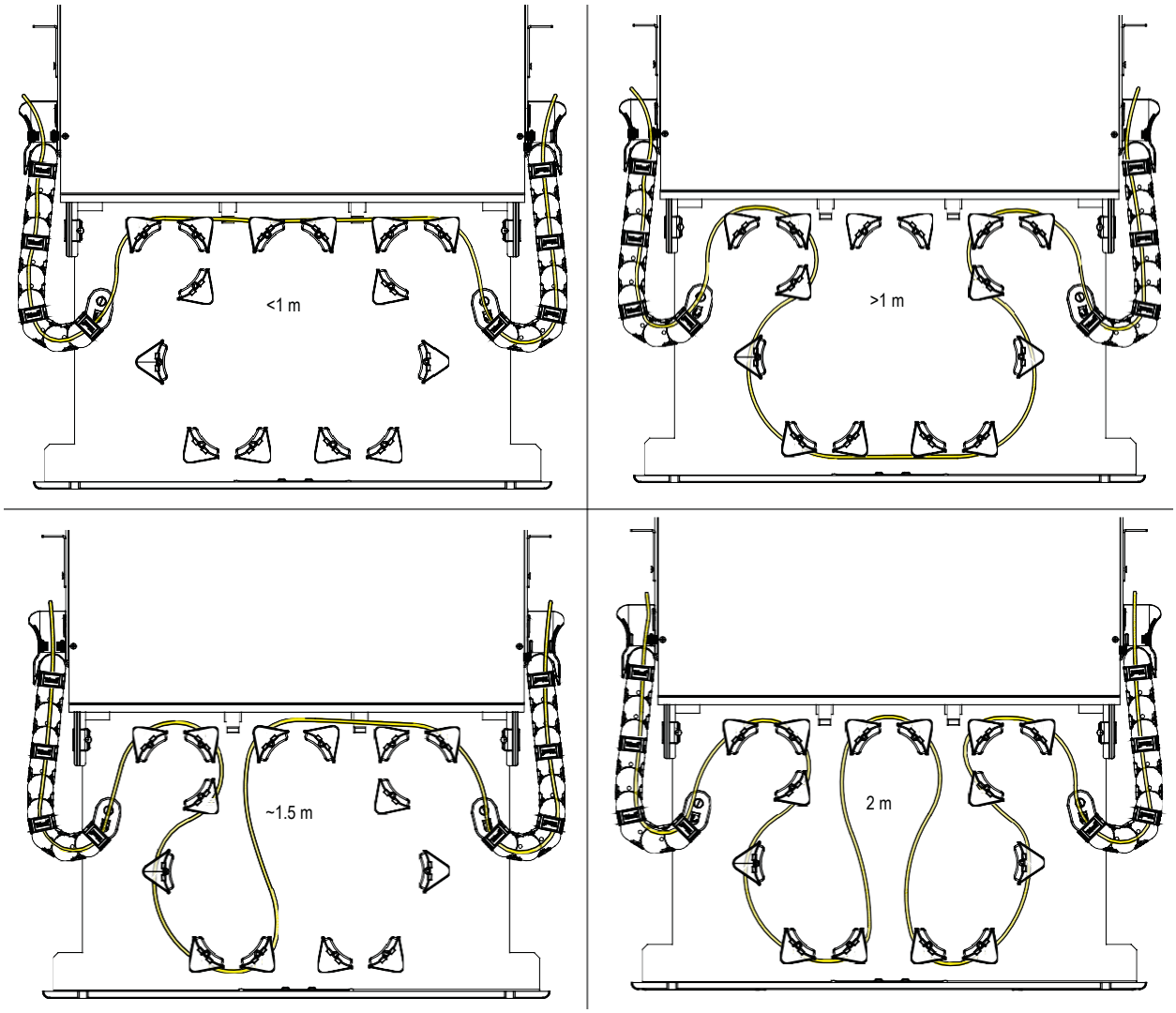


Figure 17 - ESTR Storage Tray Routing Schemes (Opposite Side Entries/Exits)

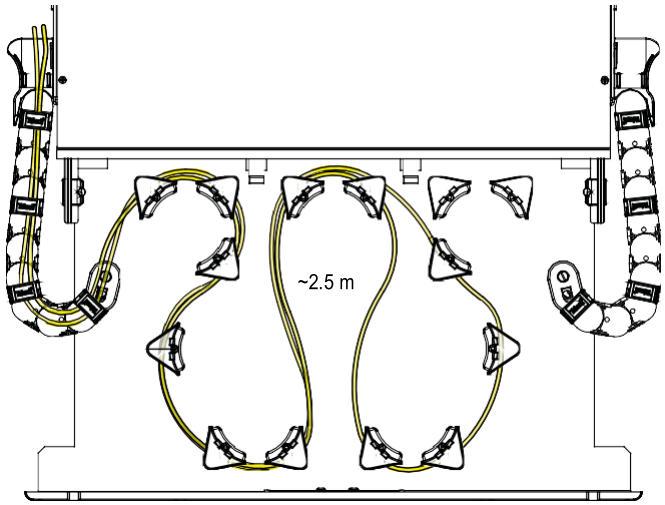


Figure 18 - ESTR Storage Tray Routing Schemes (Same-Side Entries/Exits)

1.5 Specifications

1.5.1 Physical

- **Dimensions:** See the following illustration for access and fit.
- **Chassis Weight (without trays)**:

Chassis Assemblies	Weight (kg)	Weight (lb)
ESTF-01TR-1RU	1.2	2.6
ESTF-03TR-2RU	1.6	3.4
ESTF-04TR-3RU	1.9	4.2
ESTF-06TR-4RU	2.2	4.9

- **Tray Weight** (without cabling): ~1.0 kg to ~1.3 kg (2.2 lb to 2.9 lb)
- **Chassis, Tray Material and Finish**: 060 aluminum with powder-coat black finish
- **Tray Components**: 94 V0 PC/ABS black plastic

1.5.2 Environment

- **Ambient Temperature**: -5° C to 55° C (23° F to 131° F)
- **Relative Humidity**: 0% to 90% and non-condensing

1.5.3 Mounting

Three sets of mounting brackets are included for 485 mm (19-in.) racks with ETSI, EIA and WECO spacing.

1.5.4 Cable Compatibility

- 250µm OSP
- 900µm IFC
- 1.75 mm, 2 mm and 3 mm patch cords and jumpers (Simplex or Duplex)

1.5.5 Adapter Choices

12 or 24 adapter terminations per tray. Add-on kits for 12-port trays available:

- SC/UPC and APC
- LC/UPC and APC

1.5.6 Optical Protections

- **Bend Radius**: >30 mm throughout for all cable routing
- **Eye Protection**: No line-of-sight laser exposure. All adapters have factory-installed “dust” covers.

1.5.7 Optical Performance

E-Series Trays will not influence signal timing or jitter.

1.5.8 Compliance

Designed and built to meet ETSI standards.

Chapter 2: Chassis Installation

ALERT

ALERT! Only qualified personnel may install and maintain this product.

ALERT

ALERT! These instructions presume you have verified that the Amphenol Network Solutions equipment being installed is compatible with the rest of the system, including power, circuit protection, signal characteristics, equipment from other vendors and local codes or ordinances.

NOTES:

- Amphenol Network Solutions is not liable for shipping damage. If the equipment is damaged, notify the carrier and call Amphenol Network Solutions at 509.926.6000.
- Chassis are available with or without trays. Amphenol Network Solutions recommends installing empty chassis on the rack before adding trays in Section 3.

1. Install the rack mounting brackets, as shown on the right.
2. Match rack bracket mounting holes to the rack flange holes. (Two mounting fasteners are required per side.)

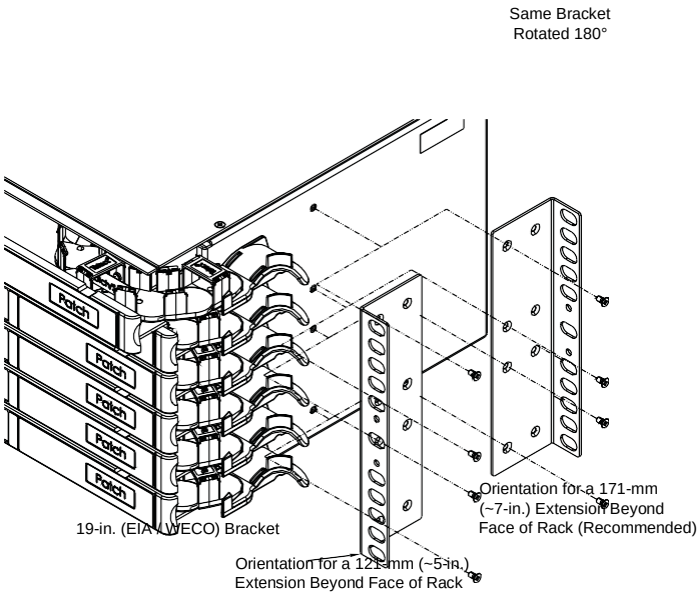


Figure 19 - Installing Brackets

If a rack bracket hole is completely obscured by an entry/exit arc, Amphenol Network Solutions recommends disconnecting the linkage near that arc and then temporarily removing the arc, as follows:

a. Open the corresponding tray to access the first couple of links near the arc.
b. Use a pen or a drift pin (less than 3 mm (~.125 in.) in diameter), insert the point through the hole under the selected link and gently push up while pulling the links apart.
   See Figures 20 and 21.

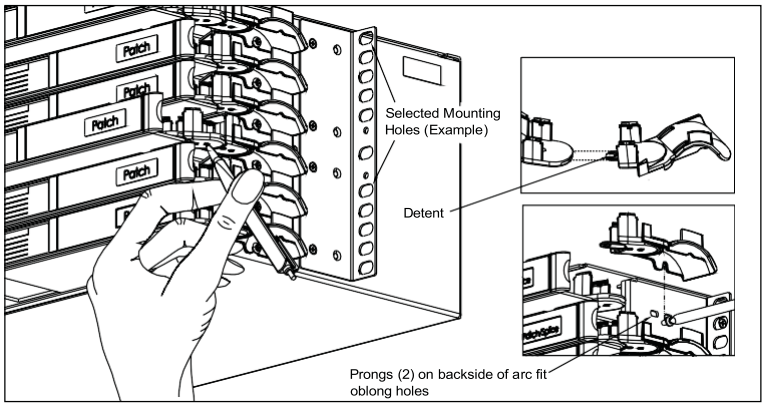


Figure 20 - Disconnecting Linkage Using a Pen Point

The tray removal tool (listed in “Accessories” on page 43), featured in Section 3 for removing trays, has a boss on one end to do this same task.

c. Use a screwdriver to loosen the screw securing the entry/exit arc to the chassis.
d. Lift off the arc and connected links.

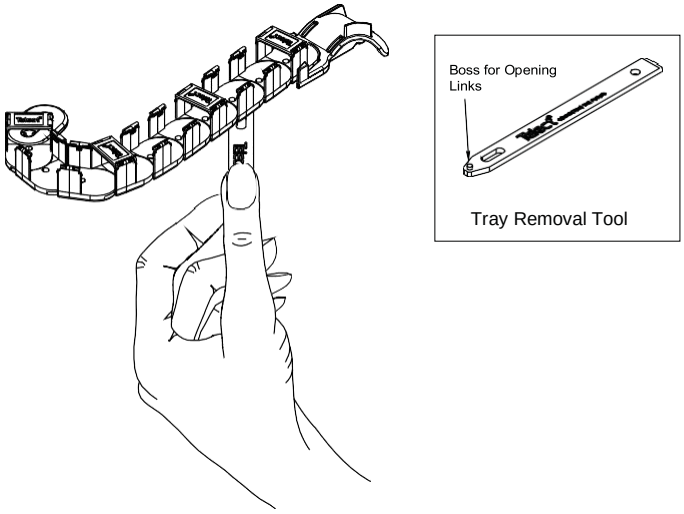


Figure 21 - Disconnecting Linkage Using Tray Removal Tool

3. Install chassis on rack using four fasteners provided, as shown on the right.
4. If applicable, after mounting chassis, reinstall arc(s).

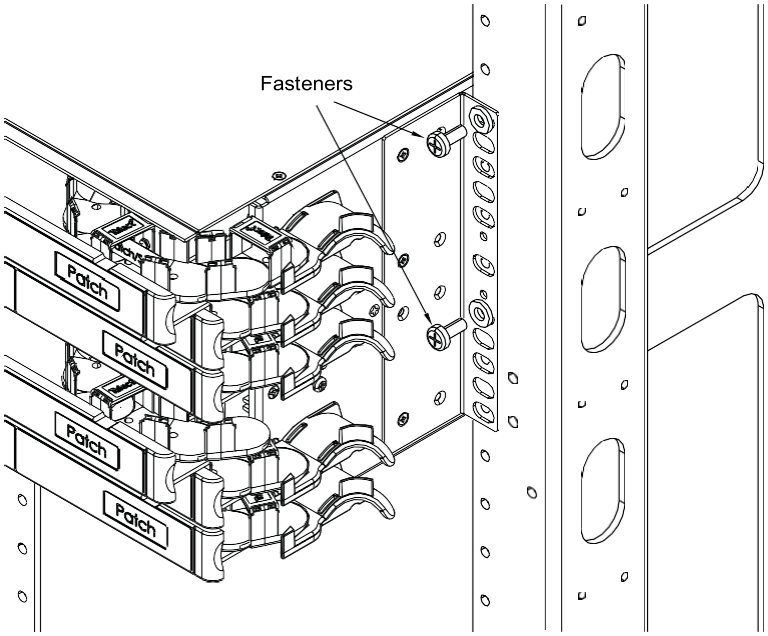


Figure 22 - Mounting Chassis to Rack

Chapter 3: Tray Installation

ALERT

ALERT! Only qualified personnel may install and maintain this product.

ALERT

ALERT! These instructions presume you have verified that the Amphenol Network Solutions equipment being installed is compatible with the rest of the system, including power, ground, circuit protection, signal characteristics, equipment from other vendors and local codes or ordinances.

NOTE: Amphenol Network Solutions is not liable for shipping damage. If equipment is damaged, notify the carrier and call Amphenol Network Solutions at 509.926.6000.

Patch trays with factory-installed, connectorized IFC must be installed on-site. For a pre-cable patch tray, place tray and cable at rear of rack and separate tray from container. Pre-cabled panels are mounted on a shipping container surrounded by a coil of cable.

Trays include slides that slip into receivers provided in the chassis. After installing a tray, a stop on the receiver and a catch on the slide prevent the tray from being removed. Tray slides and chassis receivers are shown in the following illustration.

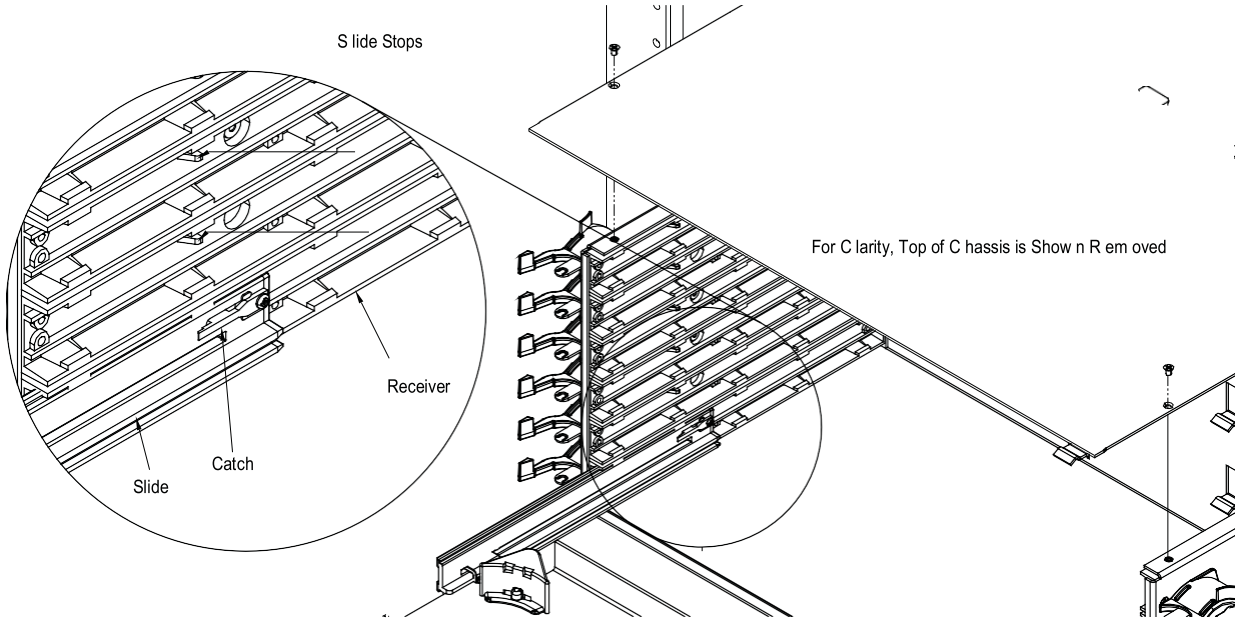


Figure 23 - Installing Trays

If you need to remove a tray, fully extend the tray and then **gently** pry open the plastic catch, shown below, about 3 mm (~ .125 in.) or just enough to clear the slide stop on the receiver. (Use only about 3 mm but not more. The catch is easily deformed. If deformed, the catch won't prevent the tray from slipping out of the chassis after reinstallation.) If you plan on routinely rearranging the chassis trays — before cabling, of course — Amphenol Network Solutions offers a tray removal tool that makes removal easier. Figure 24 shows the tray removal tool in use.

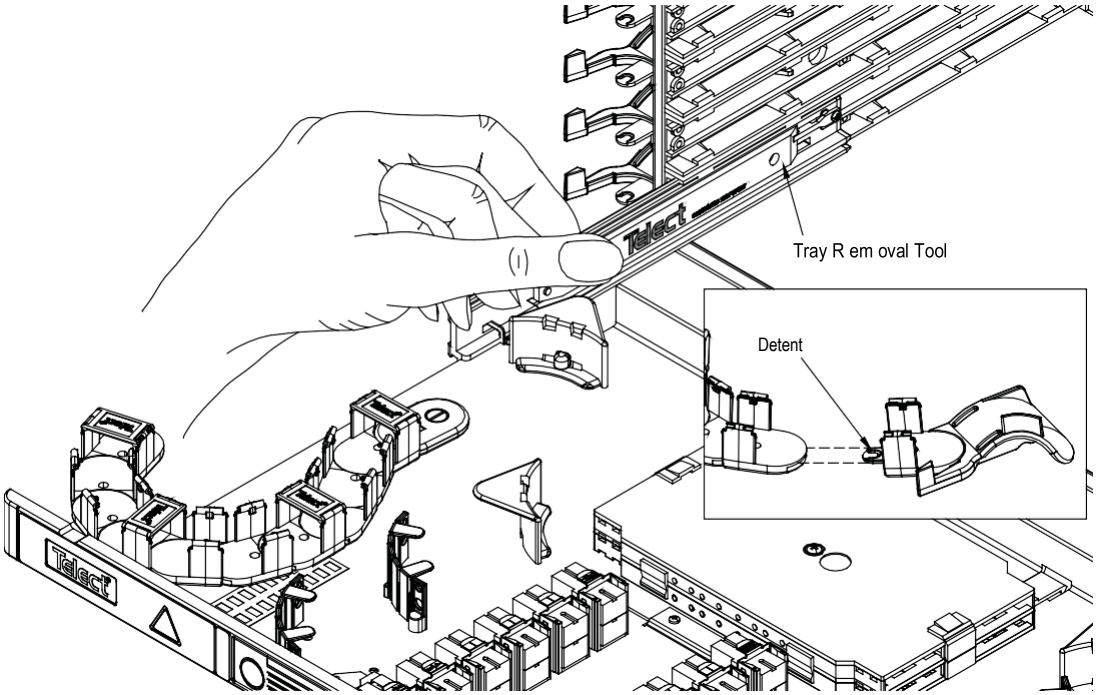


Figure 24 - Using the Tray Removal Tool

To connect the linkage on the tray to the entry/exit arcs, simply slip the lead link over the tang on the arc, as shown in the inset above. A detent prevents the flexible linkage from coming apart.

Chapter 4: Splice Tray Cabling

ALERT

ALERT! Only qualified personnel may install and maintain this product.

WARNING

WARNING! Fiber cables transmit invisible infrared light. To avoid eye damage or blindness, never look directly into fibers or connectors.

Figure 25 shows an uncabled 24-position splice tray (ESTR-S024-000-000).

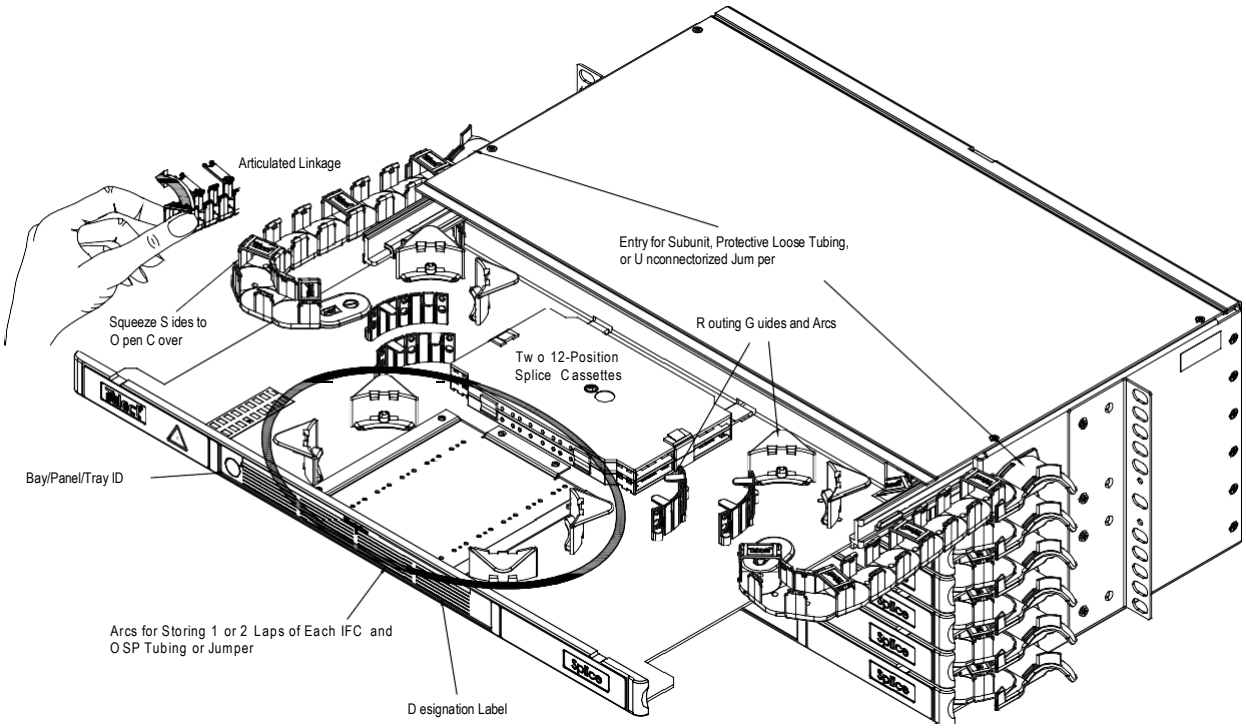


Figure 25 - E-Series 24-Position Splice Tray (Model ESTF-S024-000-000)

Please read through this entire procedure before beginning. To install cabling:

1. Assign chassis and trays codes on the designation label.
2. Start cabling in the lowest tray (Tray 1), in the lowest Chassis (Chassis 1) and work upward.
3. Dress multi-fiber cabling.

The following illustrations contain breakout specifications for the Amphenol Network Solutions intra-facility cable (IFC) with 900-µm fibers and the Amphenol Network Solutions dry, flexible indoor/outdoor (I/O) cable with 250-µm fibers. The chassis will accommodate most other types of dry or single-armored multi-fiber cable, with or without a strength member:

- For IFC, best practice suggests using an IFC Breakout Kit along with bend-control protective loose tubing. (See Section 8, “Accessories.”) The tubing needs to span the distance from the breakout kit, normally anchored with cable ties to the rack, to the cassette(s).

  For robust, large diameter subunits, the feeder cable can be anchored with cable ties directly to the rack, close by the tray’s entry/exit arc. The subunits are routed directly to the cassette entrance(s).

- For I/O cable and other types of outside plant (OSP) cable, use a breakout box along with 3 mm (dia.) bend-control protective tubing. The tubing needs to span the distance between the breakout box, normally bolted to the rack and the cassette(s). The breakout box also provides an anchor for a strength member and room for a grounding kit.

- For total tray entrance on the left (or on the right)[1], one set of tubes will need to cross over at the storage arcs to reach the other side of the cassette. The cross-over set of cables needs to be dressed about 400 mm (~80 in.) longer than the other set. (An example of a cross-over is shown on Page 9.)

The ends of all subunits and loose tubing will be anchored at the cassette entrance where the strands break out from the tubing.

4. Disassemble the cassette assembly. (Steps continue on page 26.)

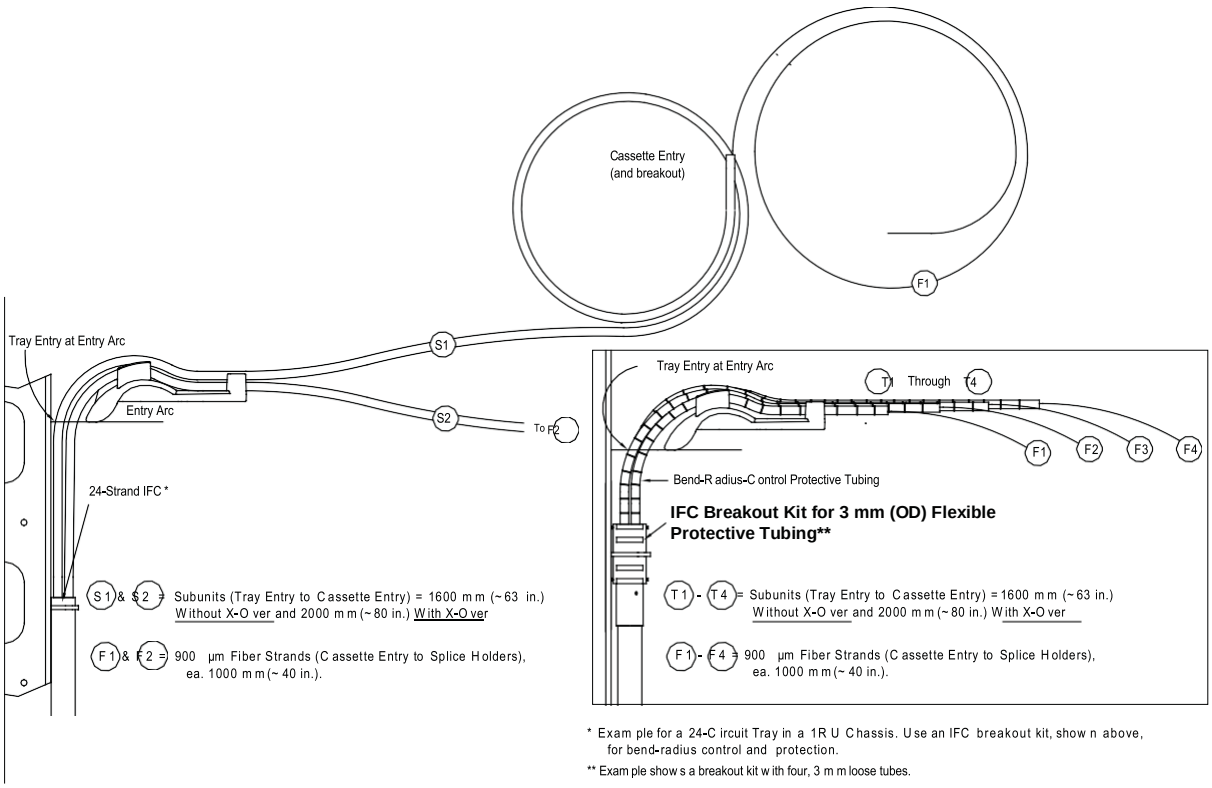


Figure 26 - IFC Breakout Specifications

1. 12-place splice trays only.

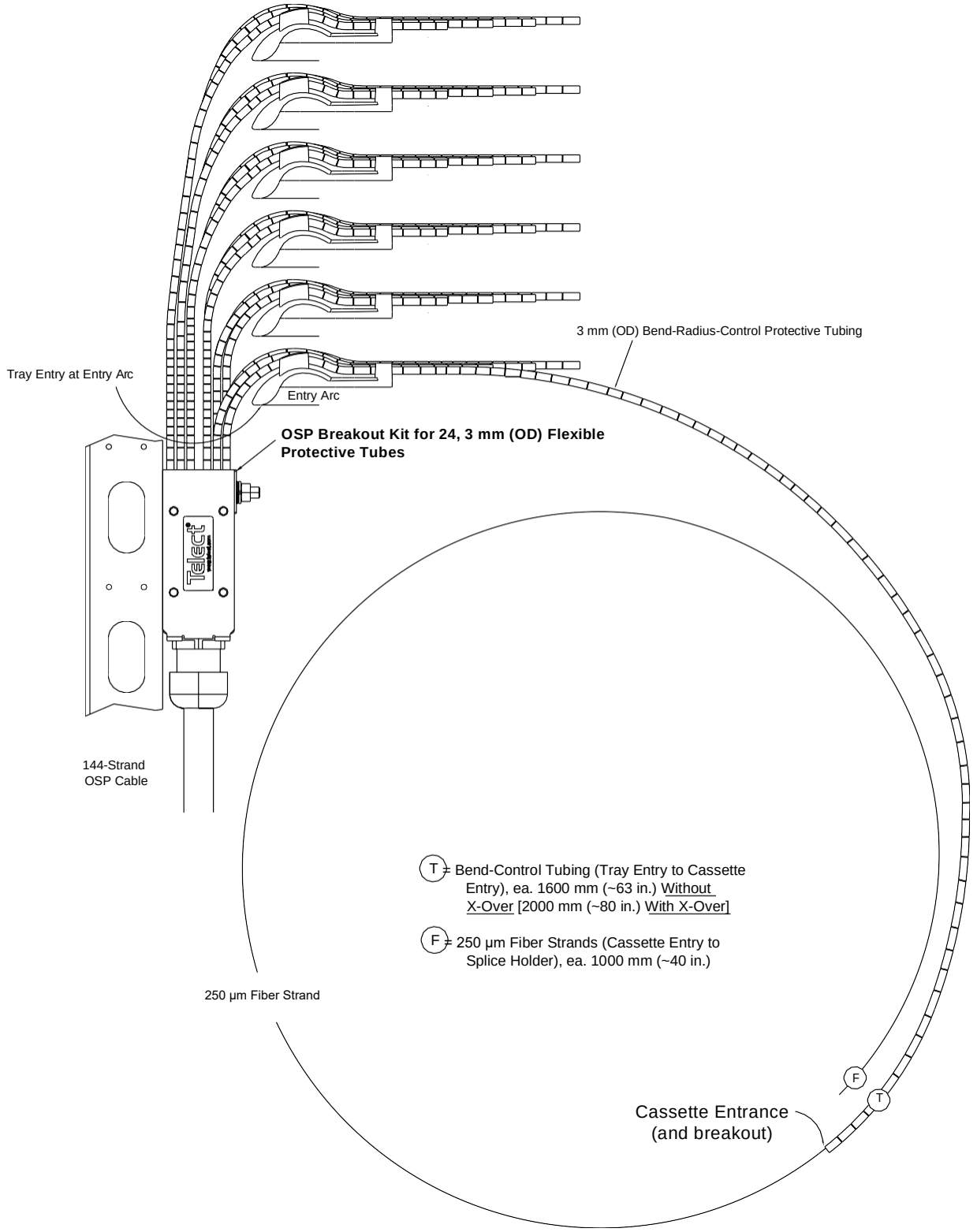


Figure 27 - I/O Cable Breakout Specifications

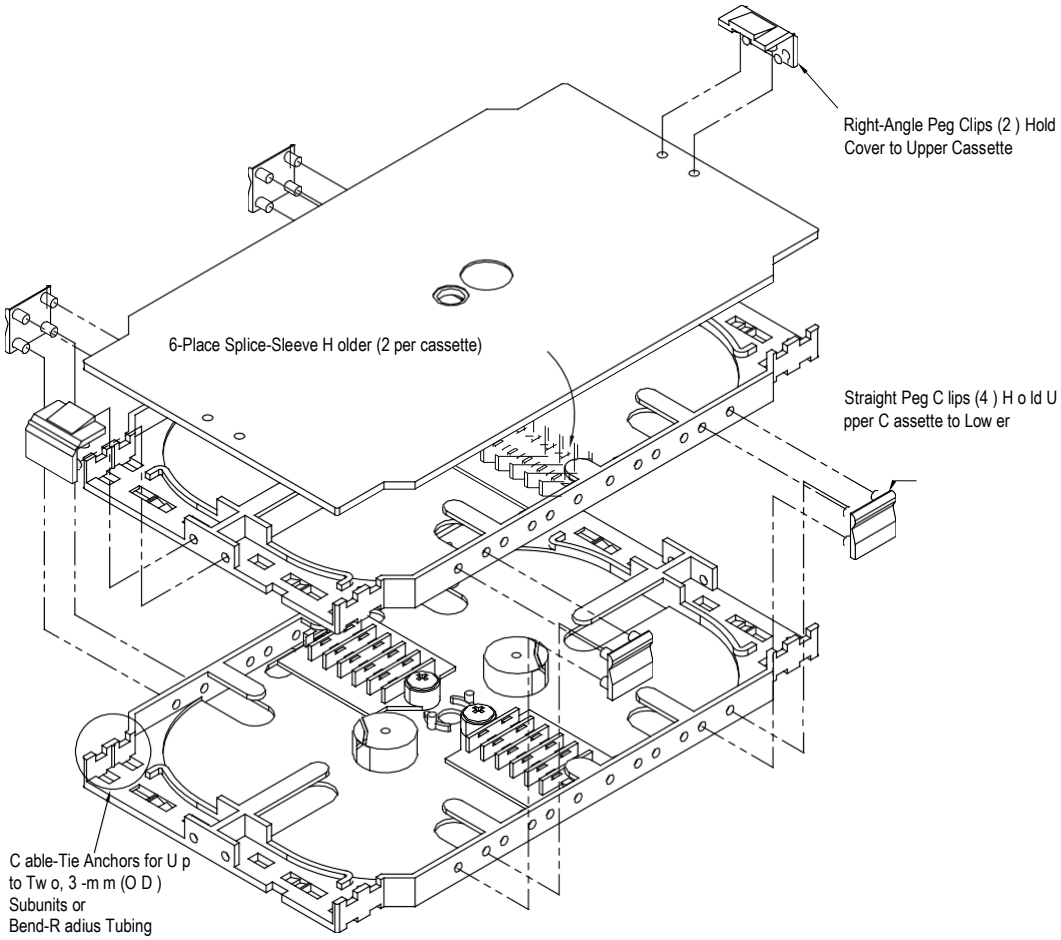


Figure 28 - Cassette Assembly (Exploded)

5. Start with the bottom cassette (if applicable):

   a. Slip on the first splice sleeve, dress and clean the ends of the first fiber pair. Splice pair and insert sleeve into splice holder, as shown in Figure 29.
   b. Continue with the next pair.

   The following illustration shows the first splice. In this example, notice that the fiber at the right side of the top 6-position splice holder and the fiber at the left of the bottom holder will be routed counter-clock wise in the cassette. Conversely, the top-left and bottom-right fibers will be routed clockwise.
   In the example shown:

   - IFC subunits enter the tray from the left and are anchored by two cable ties to the right side of the cassette.
   - OSP fiber strands in bend-control, protective loose tubing enter the tray on the right and are anchored by cable ties to the left side of the cassette.

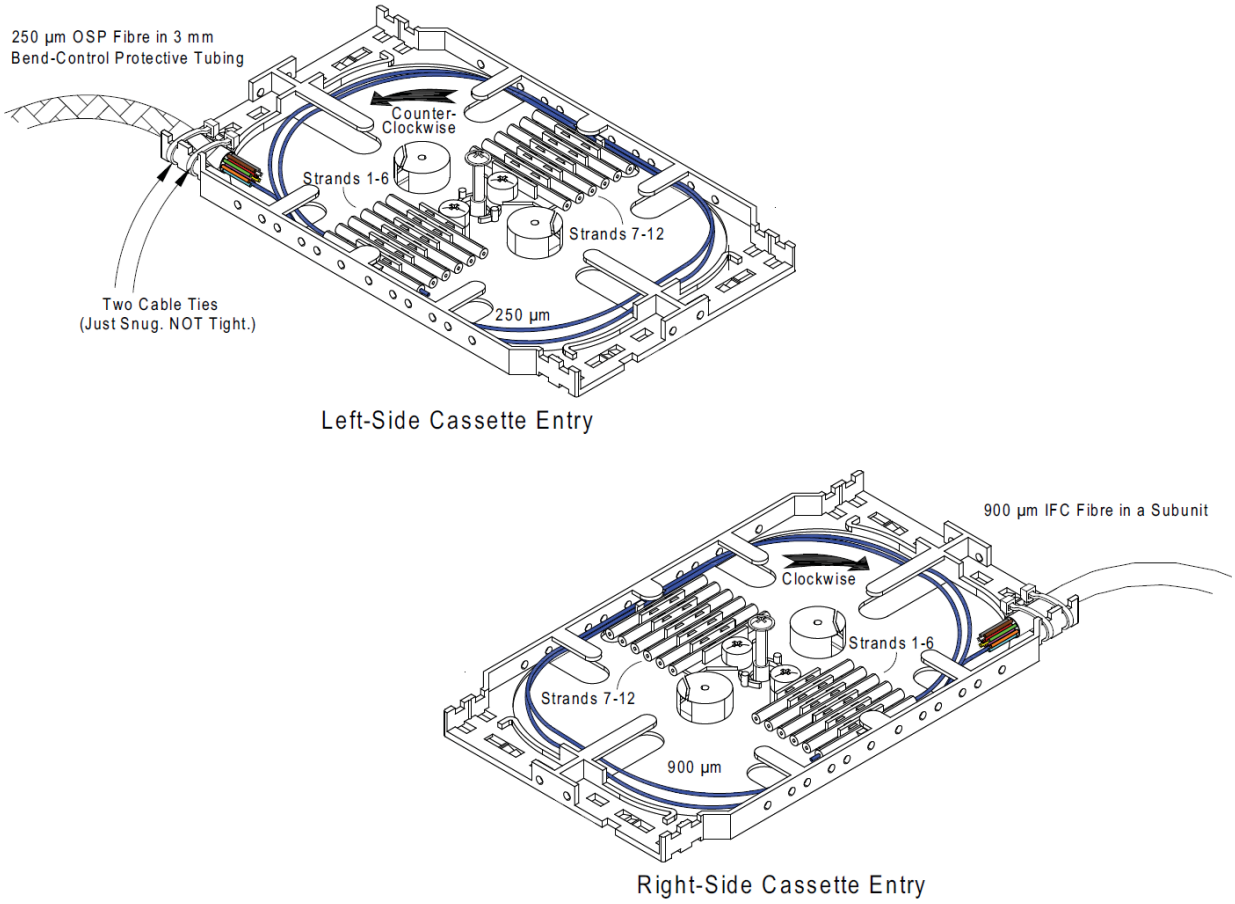


Figure 29 - Clockwise vs. Counter-Clockwise Routing in a Cassette

c. When finished with the cassette, bundle all fiber strands for counter-clockwise routing —OSP strands in this example — and wrap at least twice around the inside of the cassette. Similarly, do the clockwise (IFC) fibers.
d. When finished with bottom cassette of a 24-port panel, use the straight peg clips to fasten the top cassette over the bottom.

6. When finished with the top cassette, use right-angle peg clips to reinstall the cover of the cassette assembly.
7. Resecure the cassette assembly to the tray.
8. Fit lead-in tubing into the linkage and around the four storage arcs adjacent to the cassette assembly: (Start with the tubing that is least likely to require future access — in this case, the OSP loose tubing.) Refer to Figure 30.

a. Squeeze the sides of the covered links on the right- and left-side linkages to pop open the covers.
b. Wrap tubes (anchored to the left side of the cassette) twice (counter-clockwise) around the storage arcs, through the right-side linkage, to the right-side tray entrance.

c. Then close the right-side link covers.
d. Repeat for tubing anchored to the right side of the cassette, this time wrapping it clockwise from the cassette to the left-side tray entrance.

9. Make sure all link covers are closed before closing tray. Open and close the tray to check for binding.

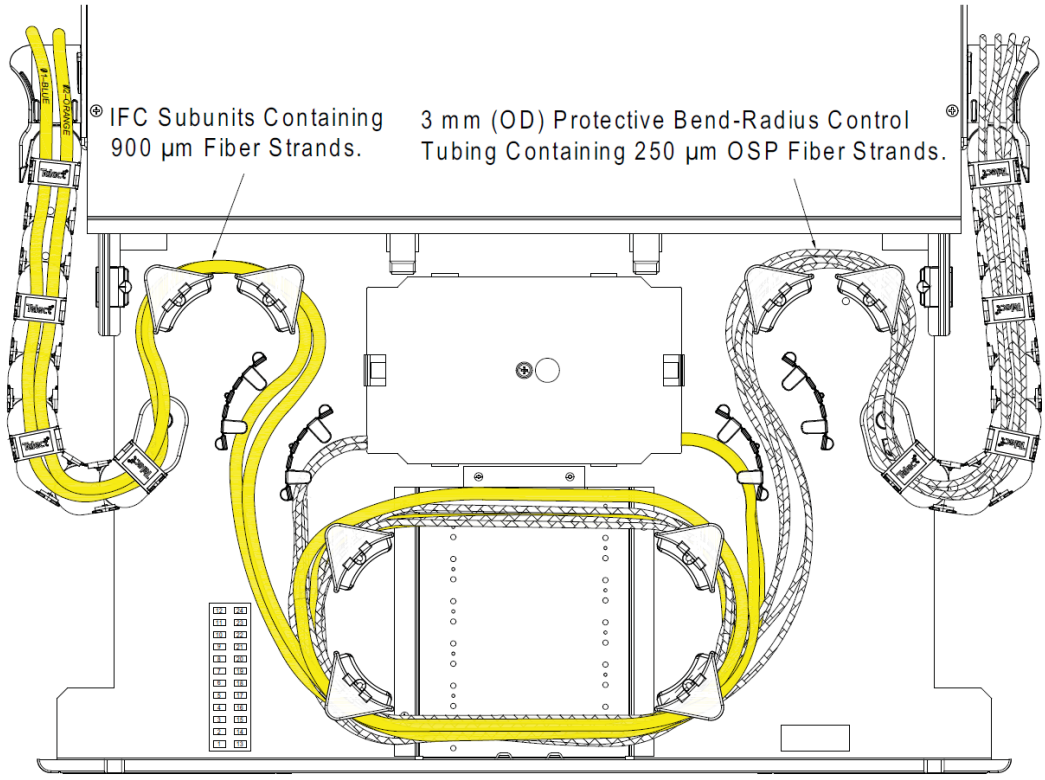


Figure 30 - Example of a 24-Circuit Interconnect Between OSP Fiber Entering on the Right and IFC Fiber Entering on the Left

Chapter 5: Patch Tray Cabling

ALERT

ALERT! Only qualified personnel may install and maintain this product.

WARNING

WARNING! Fiber cables transmit invisible infrared light. To avoid eye damage or blindness, never look directly into fibers or connectors.

Figure 31 shows an uncabled 24-position patch tray (ESTR-P024-USC-000).

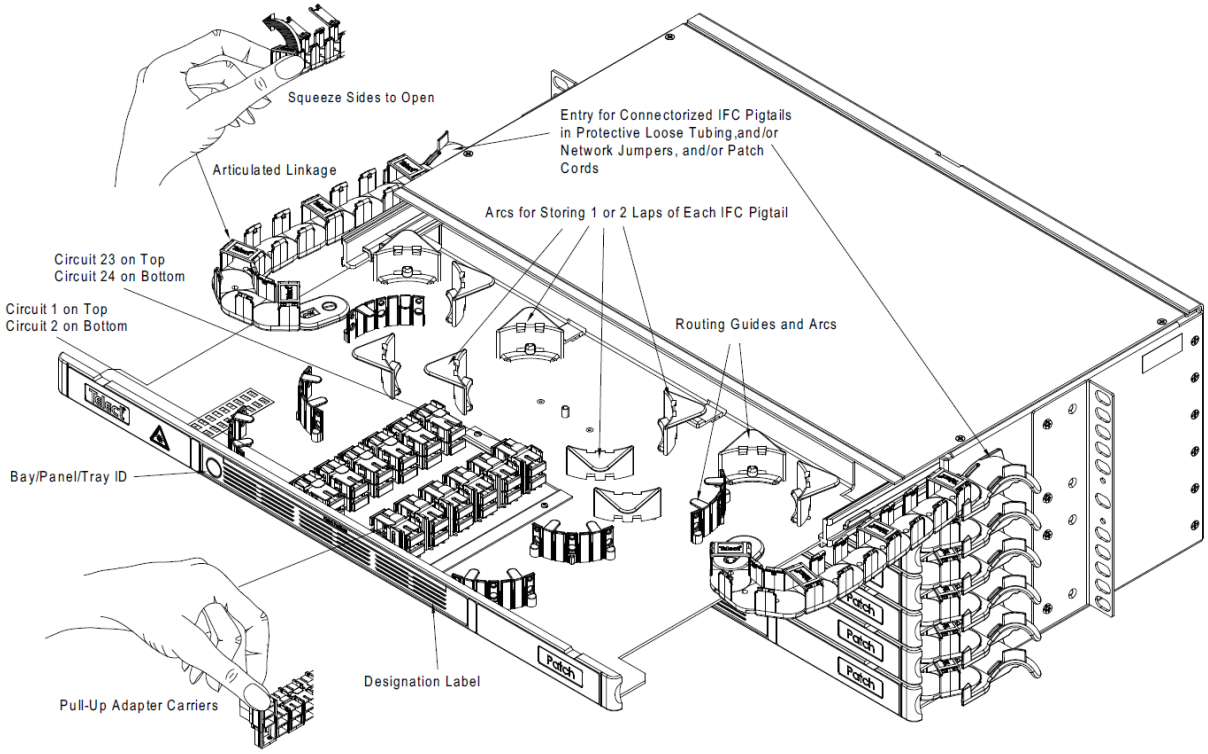


Figure 31 - E-Series 24-Position Patch Tray (Model ESTF-P024-000)

Please read through this entire installation procedure before beginning. To install cabling:

1. Assign chassis and trays codes on the designation label.
2. Start cabling in the lowest tray (Tray 1), in the lowest Chassis (Chassis 1) and work upward.
3. For patch trays with factory-installed IFC, go to Step 5.
4. For non-factory-installed, connectorized IFC, refer to the following breakout specifications:

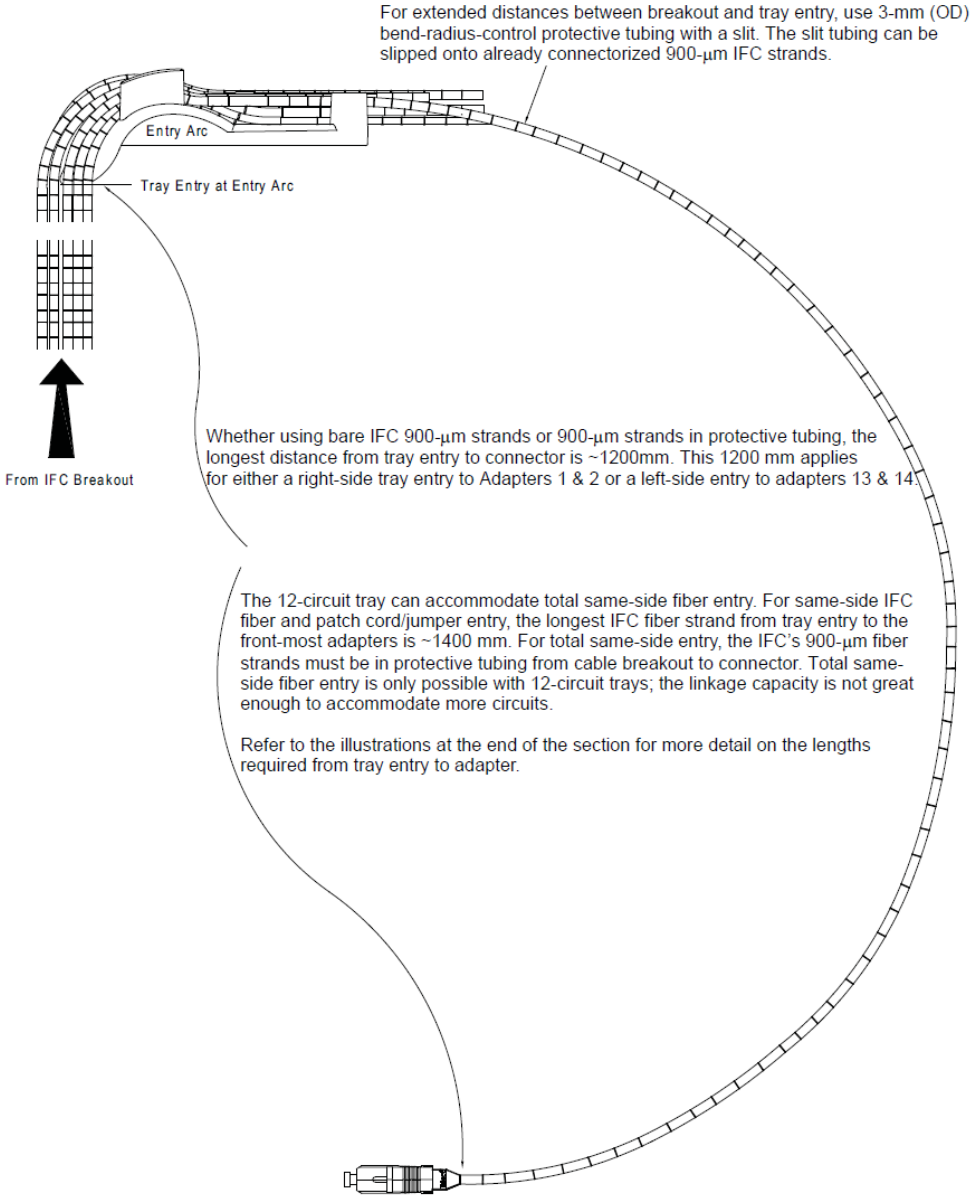


Figure 32 - IFC Multi-fiber Breakout Specifications

5. Start with Adapter 2[1] – the bottom adapter on the bottom-left carrier. Raise the carrier and remove the bottom adapter dust cover.

1. It's easiest to connect the bottom connector on the carrier before the top.

You can choose to begin with any of the cable sets (IFC, jumpers or patch cords). However, if you choose to enter feeder, jumpers and patch cords at the same tray entrance, Amphenol Network Solutions recommends starting with the IFC first; in short, start with the connector set that you will least likely access again.

6. Remove the dust cover from the corresponding IFC pigtail, jumper or patch cord. Inspect the polish for dirt. If necessary, see “7.3.1 Cleaning Connectors & Adapters” on page 41 to clean the connector and/or adapter.
7. Connect the pigtail, jumper or patch cord.
8. Record circuit assignments on designation label.
9. Repeat with Adapter 1 and Connector 1. Then lower that carrier and continue with the next.
10. After a cable set is finished, squeeze the sides of the covered links on the right-and left-side linkages to pop open the covers.
11. Route the fiber, as shown in Figures 33 and 34.

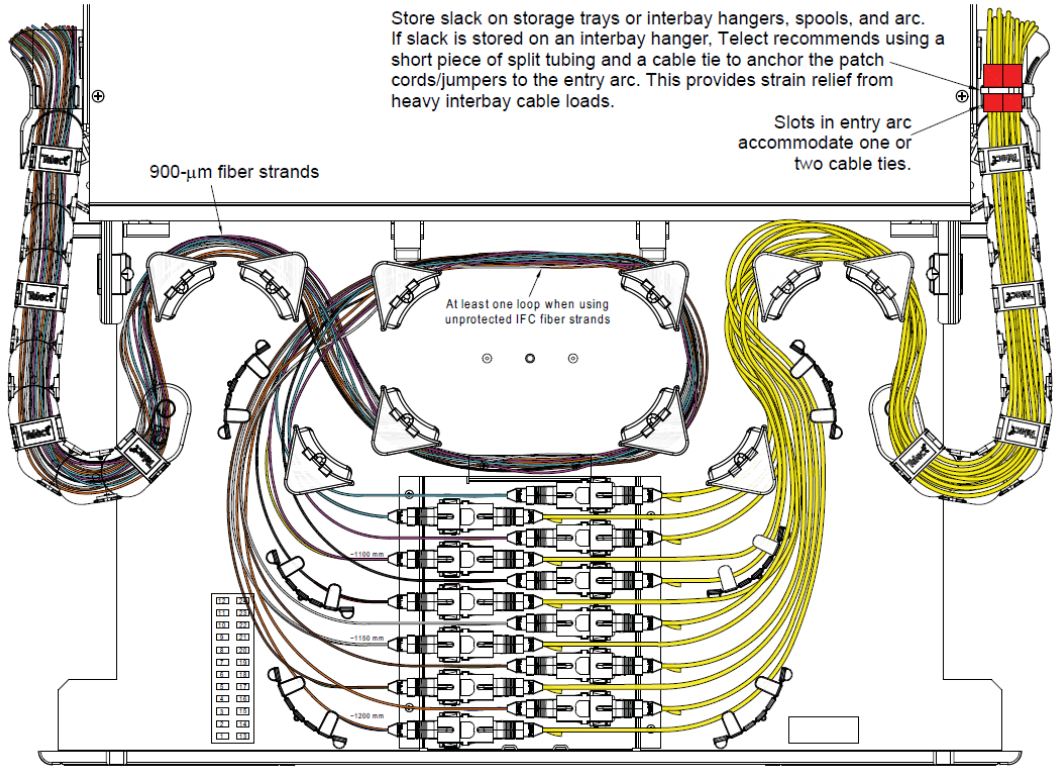


Figure 33 - ESTF-P024-USC-000 with IFC Multi-fiber on the Left & Jumpers on the Right

The storage arcs adjacent to the adapter field are intended mainly for slack storage of fiber strands, subunits and loose tubing from the IFC. Slack storage of jumpers and patch cords should be done in an E-Series Storage Tray or on an interbay storage rack with hangers and spools.

12. Close the link covers for that cable set.
13. When finished with all cabling, use a piece of split tubing and one or two cable ties to anchor the patch cords or jumpers to the entry/exit arc. This provides strain relief from heavy interbay cable loads.
14. Make sure all link covers are closed before closing the tray. Open and close the tray to check for binding.

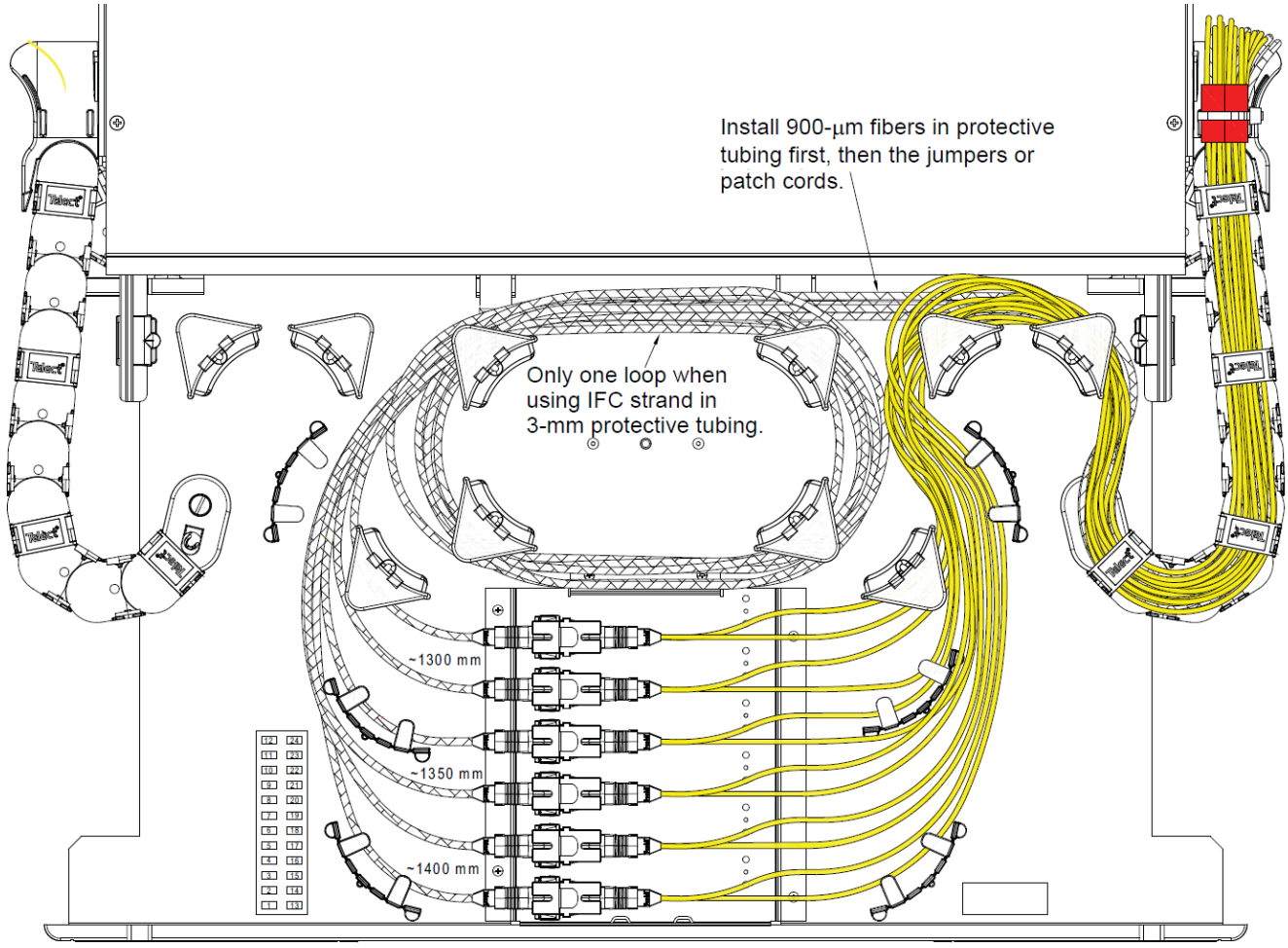


Figure 34 - ESTF-P012-USC-000 with Same-Side Entry on the Right

Chapter 6: Splice-Patch Tray Cabling

ALERT

ALERT! Only qualified personnel may install and maintain this product.

WARNING

WARNING! Fiber cables transmit invisible infrared light. To avoid eye damage or blindness, never look directly into fibers or connectors.

Figure 35 shows an uncabled 24-position patch/splice tray (ESTR-C024-USC-000). Patch/splice trays can be ordered with connectorized pigtails installed between the adapters and the cassette(s)' splice holders.

Please read through this entire procedure before beginning. To install cabling:

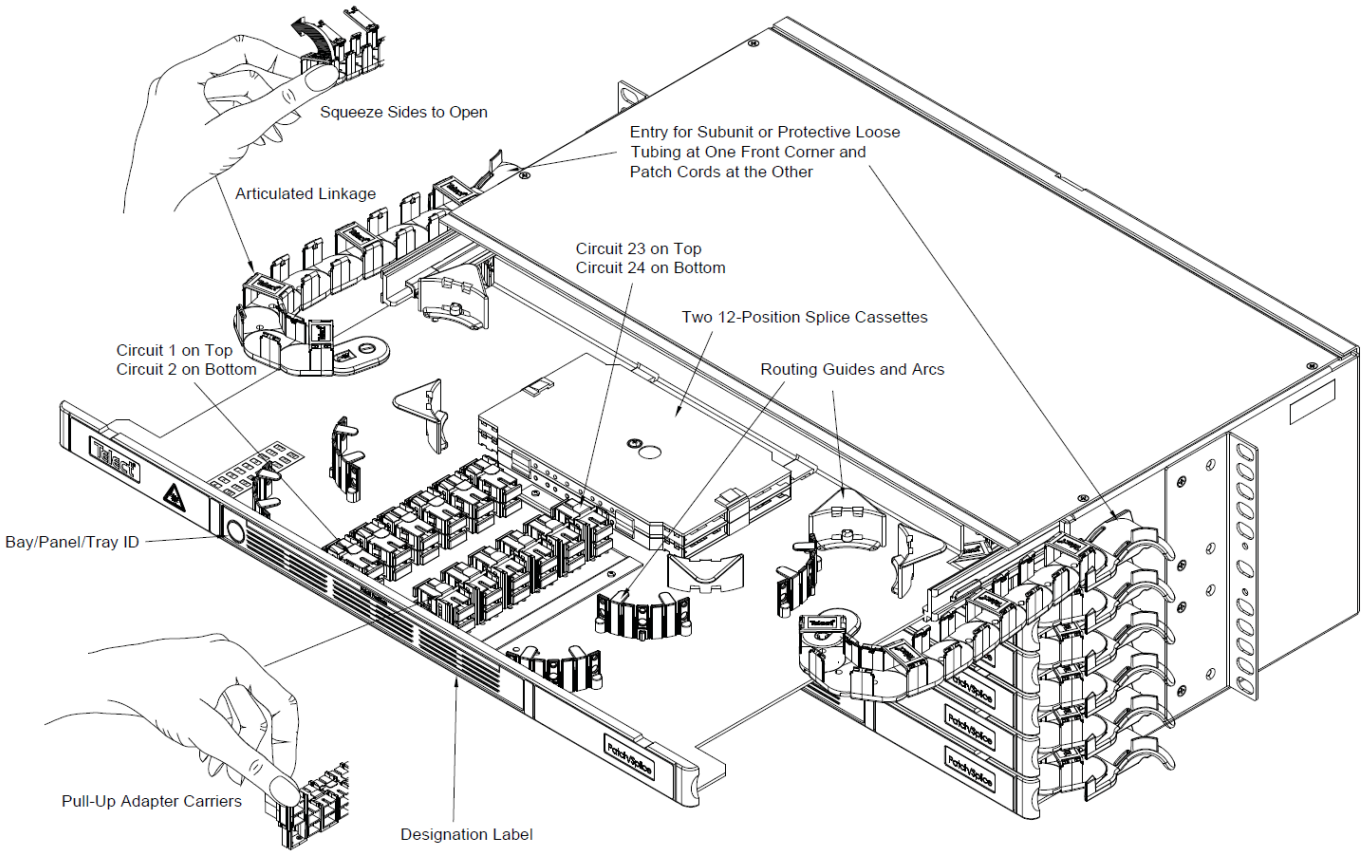


Figure 35 - E-Series 24-Position Patch/Splice Tray (Model ESTF-C024-USC-000)

1. Assign chassis and trays codes on the designation label.
2. Start cabling in the lowest tray (Tray 1) in the lowest Chassis (Chassis 1) and work upward.
3. Dress multi-fiber cabling.

The following illustrations contain breakout specifications for Amphenol Network Solutions' intra-facility cable (IFC) with 900-µm fibers and Amphenol Network Solutions' dry, flexible indoor/outdoor (I/O) cable with 250-µm fibers. The chassis will accommodate most other types of dry or single-armored multi-fiber cable, with or without a strength member:

- For IFC, best practice suggests using an IFC Breakout Kit along with bend-control, protective loose tubing. (See Section 8, "Accessories.") The tubing needs to span the distance from the breakout kit, normally anchored with cable ties to the rack, to the cassette(s).

  For robust, large diameter subunits, the feeder cable can be anchored with cable ties directly to the rack, close by the tray's entry/exit arc. The subunits are routed to the cassette entrance(s).

- For I/O cable and other types of outside plant (OSP) cable, you must use a Breakout Box along with 3 mm (dia.) bend-control protective tubing. (See Section 8, "Accessories.") The tubing needs to span the distance between the breakout box, normally bolted to the rack and the cassette(s).

  The breakout box also provides an anchor for a strength member and room for a grounding kit.

The ends of all subunits and loose tubing will be anchored at the cassette entrance where the strands break out from the tubing.

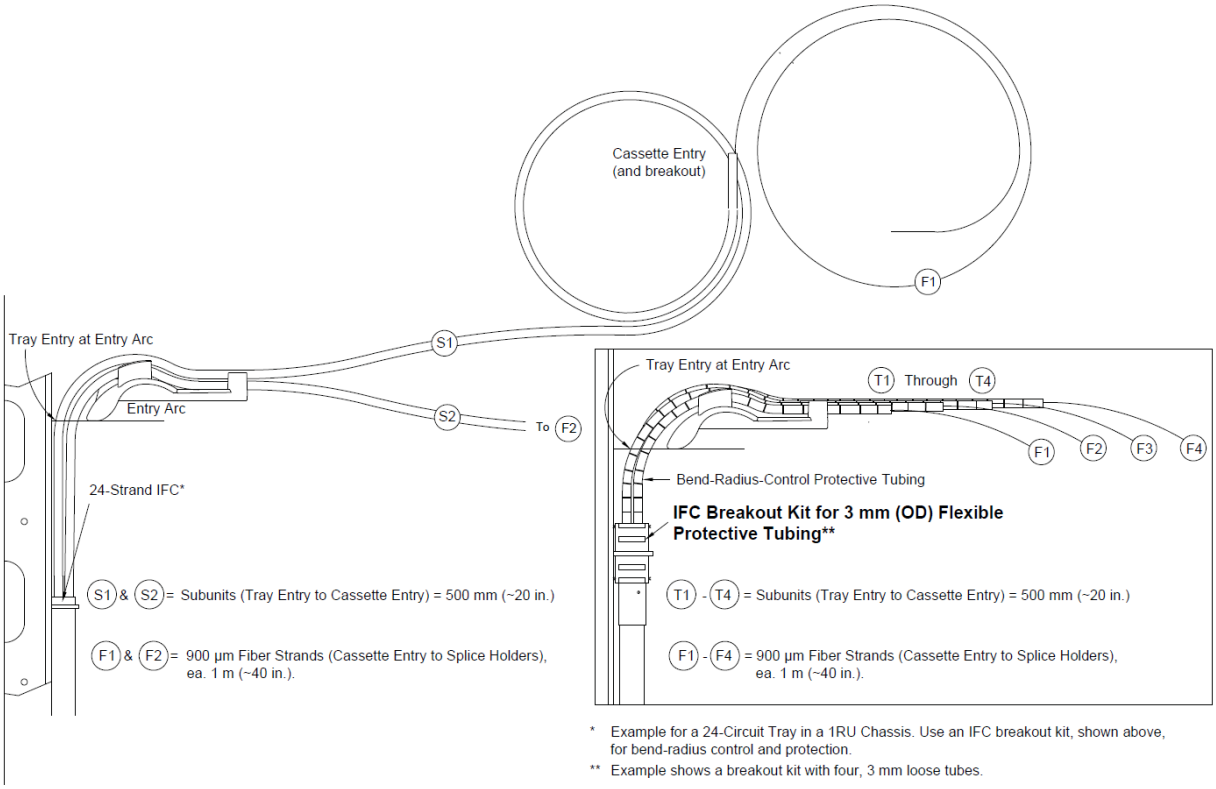


Figure 36 - IFC Breakout Specifications

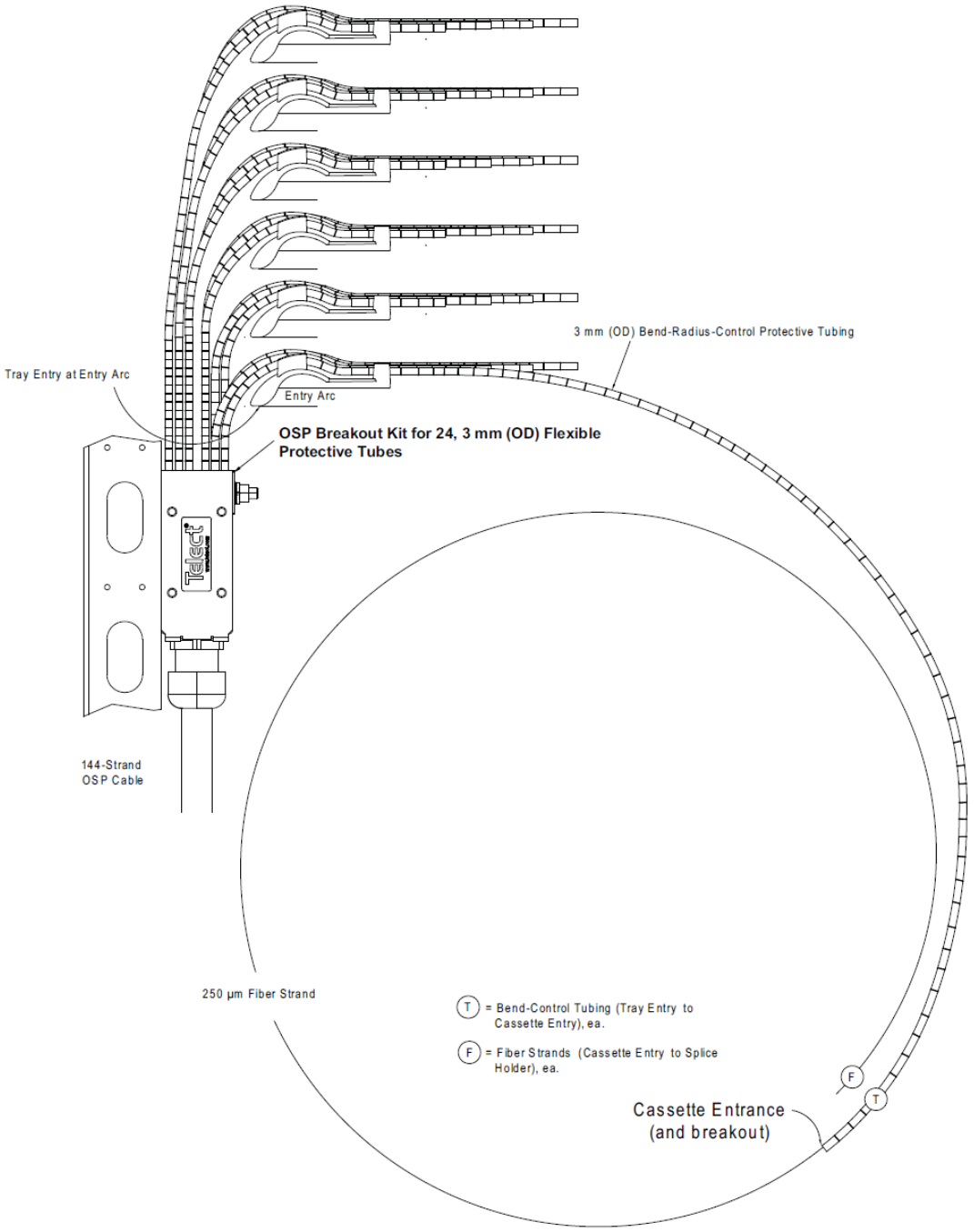


Figure 37 - I/O Cable Breakout Specifications

4. Disassemble the cassette assembly.

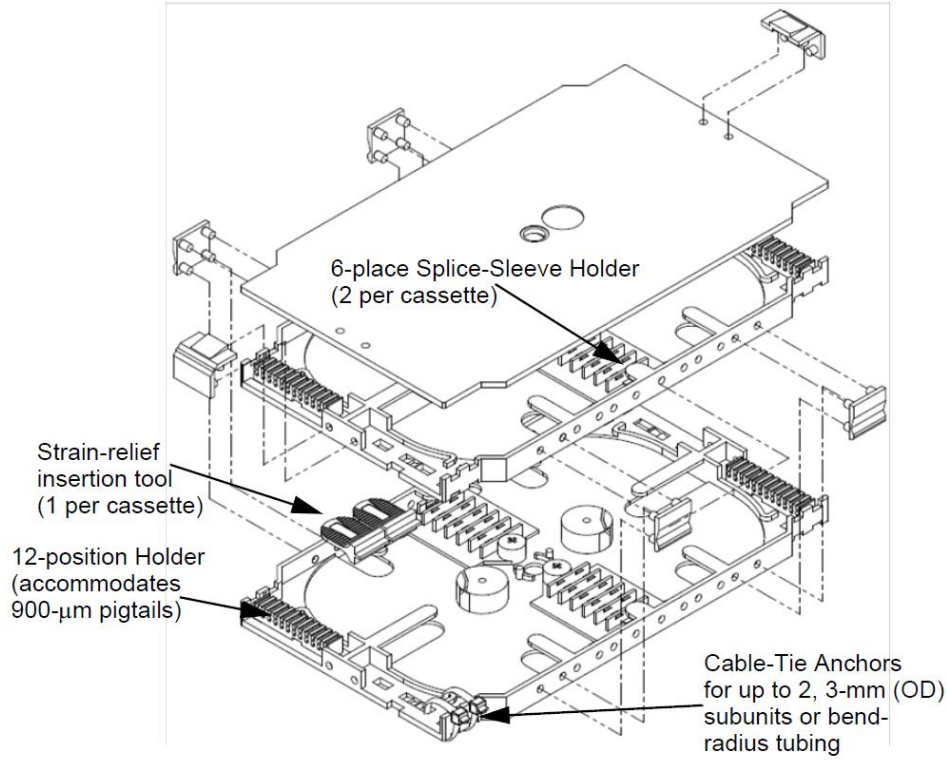


Figure 38 - Cassette Assembly (Exploded)

5. Start with the bottom cassette (if applicable):

   a. Slip on the first splice sleeve, dress and clean the ends of the first fiber pair.
   b. Splice the pair and insert the sleeve into the splice holder.
   c. Continue with the next pair.

   Figures 39 and 40 show the first splice between the first feeder and first pigtail strands. Notice that the feeder fiber at the top right side of the top 6-position splice holder and the fiber at the left side of the bottom holder will be routed counter-clockwise in the cassette. Conversely, the top-left and bottom-right pigtail fibers will be routed clockwise.

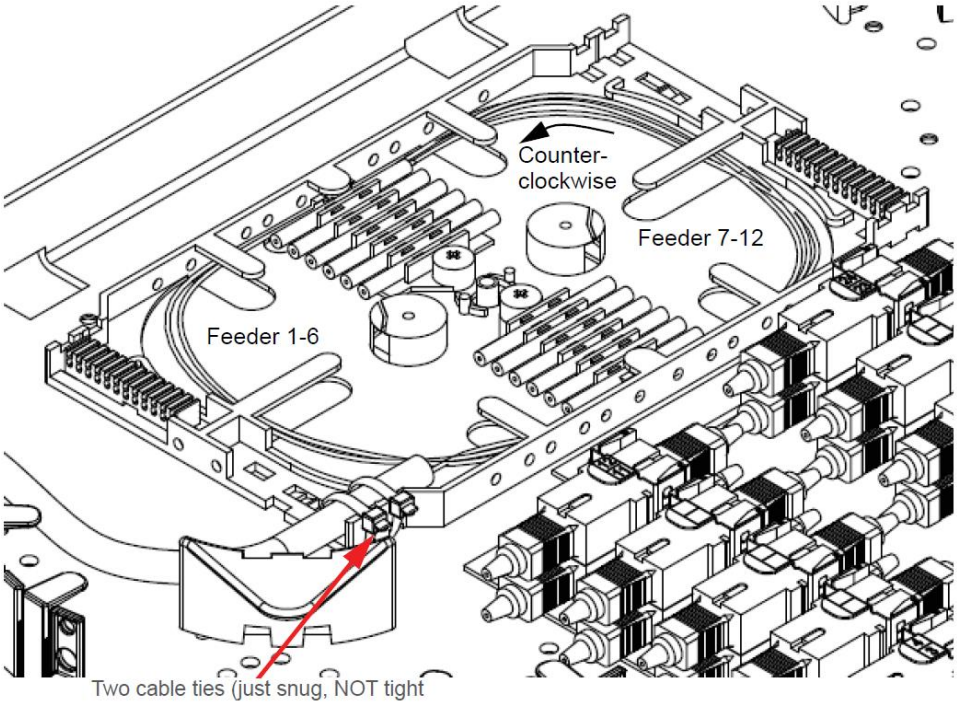


Figure 39 - First Feeder

- IFC subunits or OSP strands in bend-controlled protective loose tubing enter the tray from the left and are anchored by two cable ties to the lower-left entrance of the cassette.
- Connectorized 900-µm pigtails, whether factory installed or constructed on-site, enter the upper-left entrance of the cassette.

d. When finished with the cassette, bundle all fiber strands for counter-clockwise routing — feeder strands in this example — and wrap at least twice around the inside of the cassette.
Similarly, do the counter-clockwise (pigtail) fibers.
e. Use two cable ties to anchor the feeder subunit or loose tube to the lower-left entrance of the cassette.
f. Use the strain-relief insertion tool to insert the 900-µm pigtails into the 12-position holder positioned at the upper-left entrance of the cassette.
g. When finished with bottom cassette of a 24-port panel, use the straight peg clips to fasten the top cassette over the bottom.

6. When finished with the top cassette, use right-angle peg clips to re install the cover of the cassette assembly.
7. Resecure the cassette assembly to the tray.
8. Squeeze the sides of the covered links on the right- and left-side linkages to pop open the covers.
9. Fit feeder tubing into the left-side linkage.
10. Close the link covers on the left-side linkage.

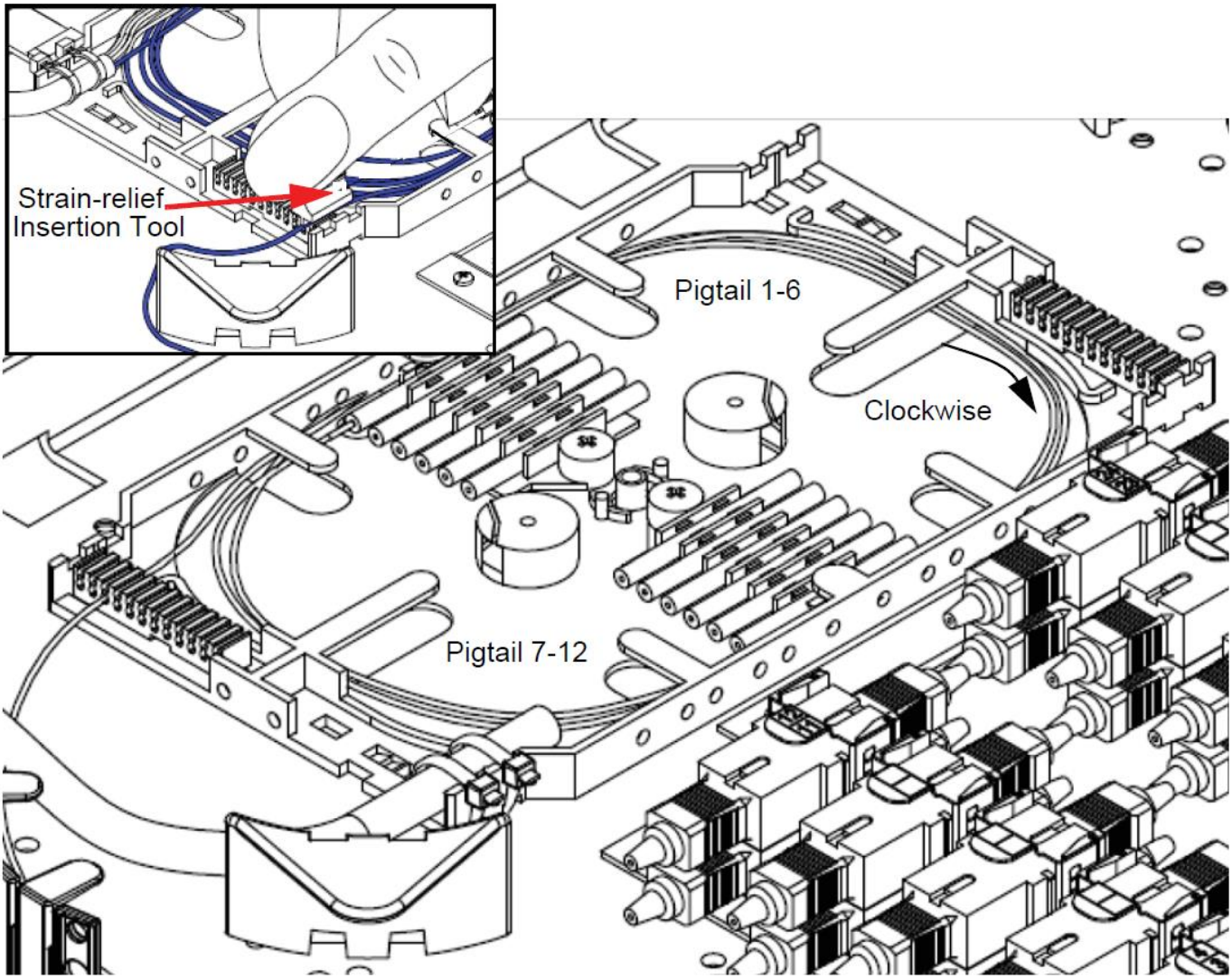


Figure 40 - First Pigtail

11. If they are not factory-installed, connect the pigtail connectors to the left end of the adapters, as follows:

    a. Start with Adapter 2 (It's easiest to connect the bottom connector on the carrier before the top.), the bottom adapter on the bottom-left carrier. Raise the carrier and remove the bottom adapter dust cover.
    b. Remove the dust cover from the corresponding pigtail. Inspect polish for dirt.

If necessary, go to “7.3.1 Cleaning Connectors & Adapters” on page 41 for instructions to clean the connector and/or adapter.

c. Connect the pigtail connector.
d. Record feeder assignments on designation label.
e. Repeat with Adapter 1 and Connector 1. Then lower that carrier and continue with the next.
f. Route the fiber, as shown in Figure 41.

12. Repeat Step 11 for the jumpers or patch cords entering the tray on the right.
13. Close the link covers on the right-side linkage.
14. When finished with all cabling, use a piece of split tubing and one or two cable ties to anchor the patch cords and/or jumpers to the entry/exit arc. This provides strain relief from heavy interbay cable loads.
15. Make sure all link covers are closed before closing tray. Open and close the tray to check for binding.

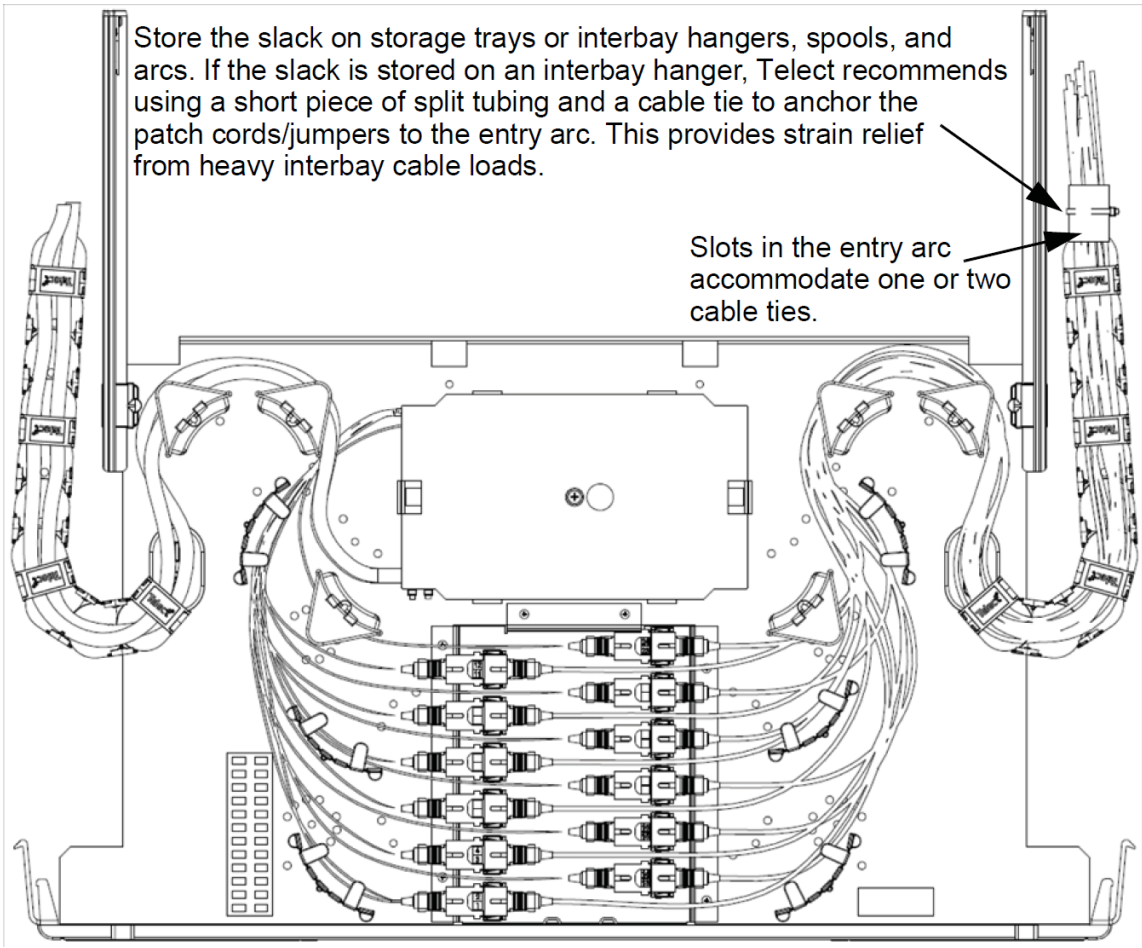


Figure 41 - Routing the Fiber

Chapter 7: Service

CAUTION

CAUTION! Only qualified technicians may install and maintain this product.

7.1 In-Warranty Service

Contact Amphenol Network Solutions quality call center at 509.926.6000 or e-mail us at getinfo@amphenol-ns.com. Amphenol Network Solutions will ship a new replacement product, along with a return shipping label and authorization information. When you receive your replacement product, pack up the defective product and return it to Amphenol Network Solutions using the return label, box and any additional information provided.

7.2 Repacking the Shipment

1. Tag the equipment showing owner's name, address and telephone number, together with a detailed description of the problem.
2. Use the original shipping container if possible. If you do not have it, package the equipment in a way to prevent shipping damage. Include the RMA inside the container and legibly print the RMA number on the outside of the package, near the shipping address.
3. Insure the package. Amphenol Network Solutions is not liable for shipping damage.

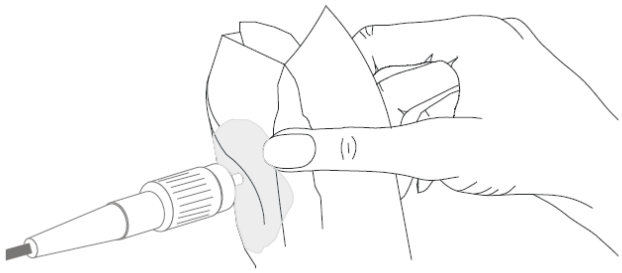
7.3 Maintenance

7.3.1 Cleaning Connectors & Adapters

The major causes for poor performance (high insertion loss) are 1) attenuation due to overly sharp or too many close radius bends in the fiber cable, 2) loose connections and 3) dirty connectors or adapters. If you experience insertion loss greater than 25 dB, check for sharp bends and loose connections. Clean all polished ferrules on pigtails and both ends of the patch cord or jumper.

Though Amphenol Network Solutions includes dust caps with all adapters and connectors, it isn't always possible to ensure that fiber ferrules stay clean. If you need to clean connectors and adapters, Amphenol Network Solutions recommends many of the fine systems and solutions available commercially. Special formulation for cleaning fiber faces allows the commercial solvent to stay liquid long enough to dissolve impurities quickly and thoroughly, yet evaporate quickly after wiping dry. Always allow the ferrules to air dry thoroughly before reconnection. You may use "canned air" to clean away debris initially, but don't use an aerosol after cleaning polished surfaces.
Most aerosols contain contaminants.

If a commercial solution isn't available, you may use reagent-grade ethyl alcohol, nominally USP ≥ 99%, available at pharmacies:



1. Remove both connectors from the adapter.
2. Blow compressed gas (compressed air or canned compressed gas that is clean, dry and oil-free) through the adapter.
3. Moisten a lint-free wipe with the ethyl alcohol.
4. Wipe completely around the ferrule of the connector twice. Repeat with a dry wipe.
5. Moisten the center area of a third wipe and pass the face of the ferrule from the moistened area outward toward the dry area. Do twice.
6. Allow ferrule to air dry. Do not wipe the ferrule or allow it to touch anything after completion of this step and before the ferrule is inserted into the adapter. Do not cover with a dust cap.
7. Insert the connector into the adapter.
8. Repeat Steps 2 through 7 for each connector.

7.3.2 Adapter Replacement

NOTES:

- Adapter replacement will interrupt service on working circuits.
- You need to remove the top adapter to access and remove a bottom adapter.
- When inserted in the carrier, the keyways on SC adapters should always be on top.

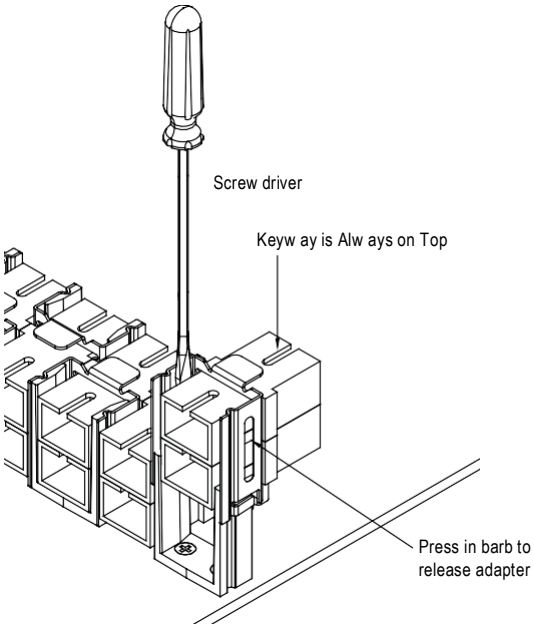


Figure 42 - Replacing SC Adapters

1. Open the tray.
2. Pull up the adapter carrier.
3. If not marked, mark the connectors for reconnection before removing fiber cables on top and bottom adapters.
4. If necessary, cover the cable connectors with clean dust caps.
5. See the following illustration and use a small screwdriver to push in the barbs on each side of the top adapter while jockeying the top adapter out of the carrier.

   The adapter and adapter array may be different than the one shown in the illustration.

6. If necessary, repeat for the lower adapter.

Appendix A: Fiber Color Code

Pigtail/Position	Color	Color Abbreviation
1	Blue	BL
2	Orange	OR
3	Green	GR
4	Brown	BR
5	Slate	SL
6	White	WH
7	Red	RD
8	Black	BK
9	Yellow	YL
10	Violet	VI
11	Rose	RS
12	Aqua	AQ
13	Blue & Black	D/BL
14	Orange & Black	D/OR
15	Green & Black	D/GR
16	Brown & Black	D/BR
17	Slate & Black	D/SL
18	White & Black	D/WH
19	Red & Black	D/RD
20	Black & Black	D/BK
21	Yellow & Black	D/YL
22	Violet & Black	D/VI
23	Rose & Black	D/RS
24	Aqua & Black	D/AQ