CORNING

Enhanced Management Frame — Housing Installation

P/N 003-580
Issue 8

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003-580-FR	Enhanced Management Frame — Housing Installation Cadre de gestion amélioré — Installation du boîtier (French)

Table of Contents

1. General

This document describes the recommended procedure for installing housing assemblies, which can hold either splitter modules or termination modules, into the Enhanced Management Frame (EMF).

- The housing assemblies can be ordered with modules installed and stubbed, ready for installation into the frame per the directions found in Section 2, “Install Stubbed Housing Assembly” on page 3.
- Housing assemblies can be ordered empty, ready for the installation of modules as shown in Section 3, “Install Empty Housing into Frame” on page 4.
- Splitter Module Installation: Splitter modules occupy two module slots in the housing. Ensure that two adjacent slots are available in the housing assembly and install the splitter module as described in Section 4, “Installing Splitter Modules” on page 5.
- Termination Module installation:
  - The termination modules can be factory-stubbed and field-installed into the empty housing assembly per the directions in Section 5, “Installing Factory-Stubbed Termination Modules” on page 5.
  - Or the termination modules can be field-spliced to a cable stub and field-installed into the housing assembly per the directions in Section 6, “Installing Field-Spliced Termination Modules” on page 7.

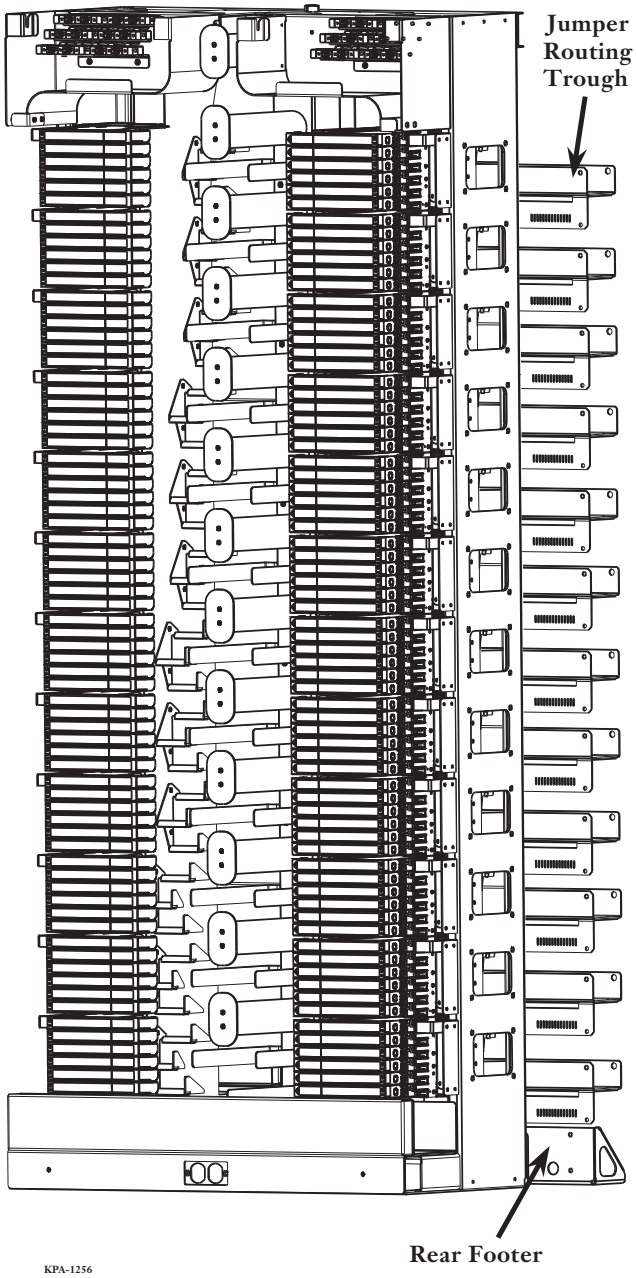


Figure 1

- Jumper installation is explained in Section 10, “Connect Jumpers to Modules” on page 23.
- Jumper routing is described in Section 11, “Route Jumpers” on page 24, with illustrations of acceptable and unacceptable routing configurations. The uniform jumper length feature simplifies jumper routing by eliminating the need to cut jumpers to specific lengths when routing within a single frame.

A rear trough for jumper routing allows jumpers to transition easily to other frames (Figure 1).

2. Install Stubbed Housing Assembly

CAUTION: Fiber optic cable is sensitive to excessive pulling, bending, and crushing forces. Consult the cable specification sheet for the cable you are installing. Do not bend the cable more sharply than the minimum recommended bend radius. Do not apply more pulling force to the cable than specified. Do not crush the cable or allow it to kink. Doing so may cause damage that can alter the transmission characteristics of the cable; the cable may have to be replaced.

Step 1: Pull cable from reel (Figure 2).

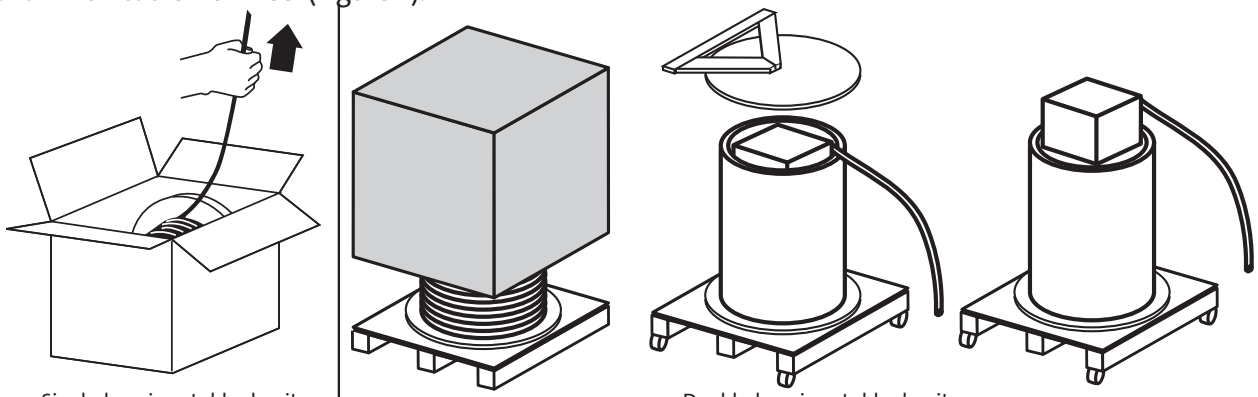


Figure 2

Step 2: Feed cable up through opening at the top of the frame (Figure 3) and secure to the lances at the top of the frame with a cable tie.

Step 3: Starting from the bottom of the frame, slide the housing into the frame.

Step 4: Secure housing to the frame with the screws provided.

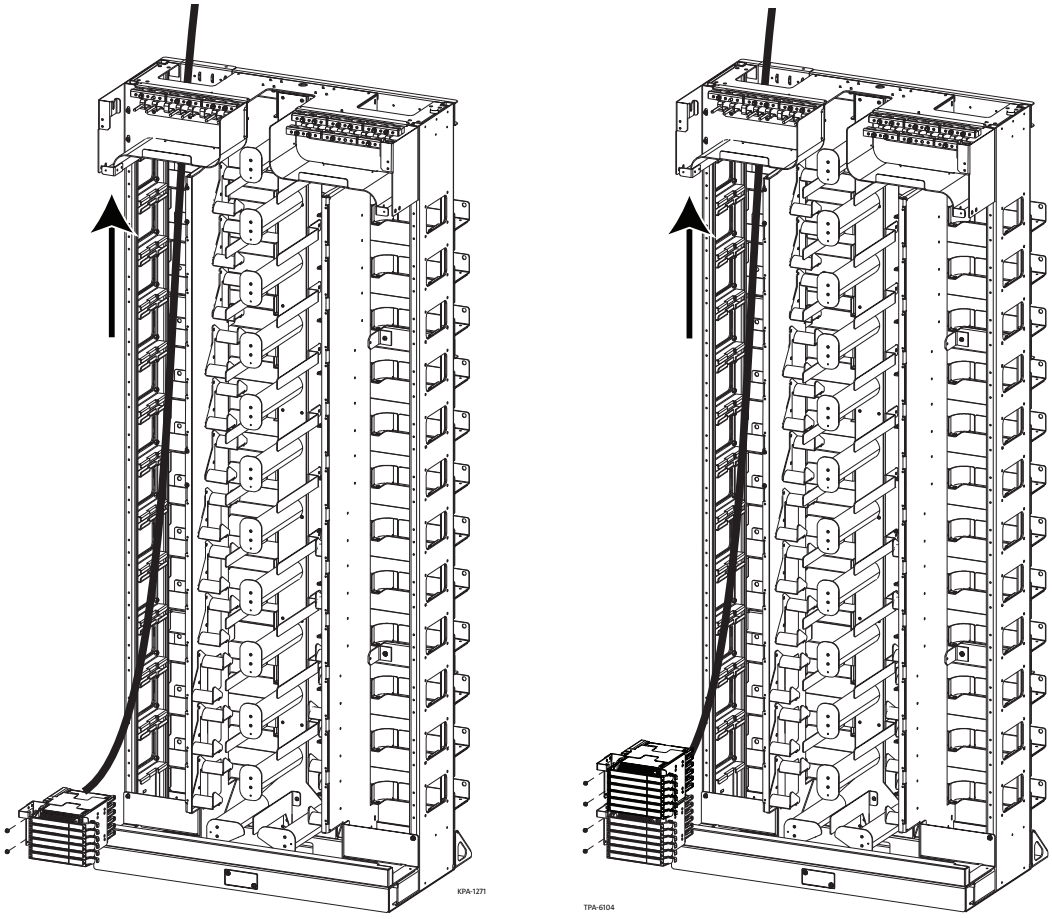


Figure 3

3. Install Empty Housing into Frame

CAUTION: The wearing of cut-resistant safety gloves to protect your hands from accidental injury when using sharp-bladed tools and armored cable is strongly recommended. Use extreme care when working with severed armor. There will be a sharp edge where armor is cut. To minimize the chance of injury from the cut armor, cover the exposed edge with a wrap of electrical tape. To minimize the chance of injury from sharp-bladed tools, always cut away from yourself and others. Dispose of used blades and armor scrap properly.

CAUTION: Recommend the use of safety glasses (spectacles) conforming to ANSI Z87, for eye protection from accidental injury when handling chemicals, cables or fiber. Pieces of glass fiber are very sharp and have the potential to damage the eye.

CAUTION: Fiber optic cable is sensitive to excessive pulling, bending, and crushing forces. Consult the cable specification sheet for the cable you are installing. Do not bend the cable more sharply than the minimum recommended bend radius. Do not apply more pulling force to the cable than specified. Do not crush the cable or allow it to kink. Doing so may cause damage that can alter the transmission characteristics of the cable; the cable may have to be replaced.

Step 1: Starting from the bottom of the frame, slide the empty housing into the frame (Figure 4).

Step 2: Secure the housing to the frame with the screws provided.

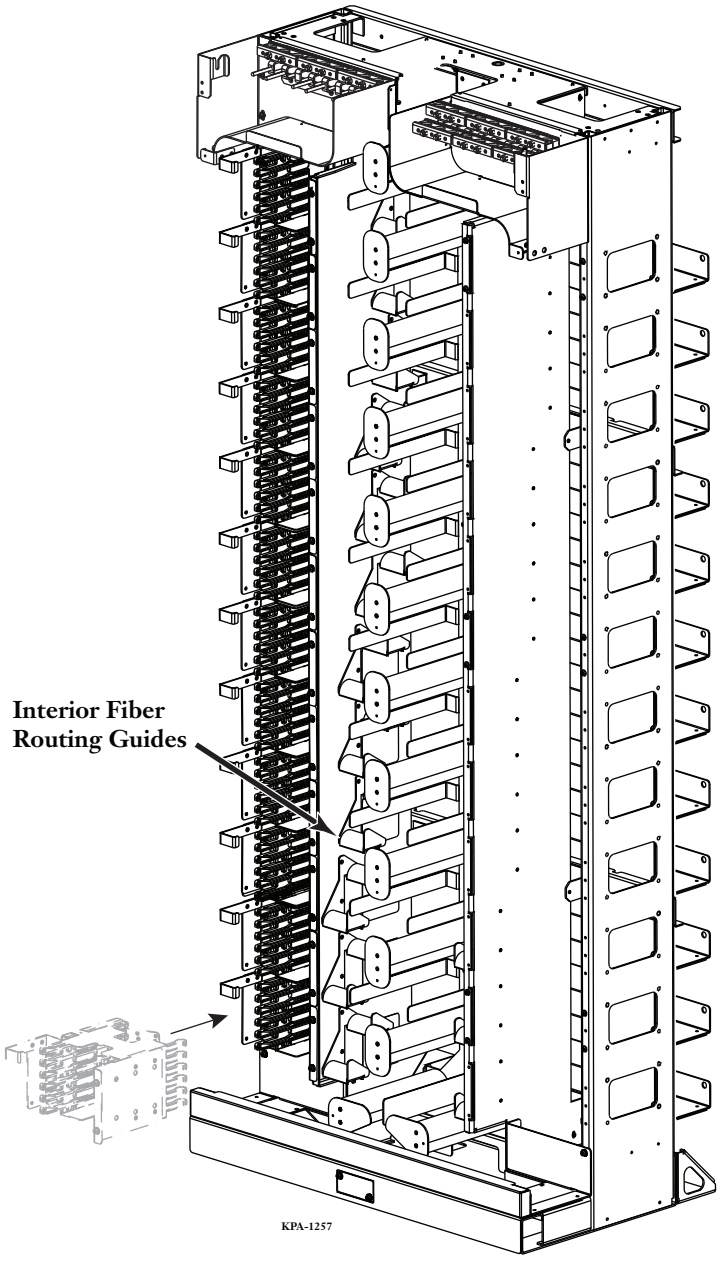


Figure 4

4. Installing Splitter Modules

Step 1: Determine the location for installation of the splitter module, ensuring that two slots are available for the module.

Step 2: Slide the module into the slots as shown in Figure 5.

Step 3: Proceed to Section 10, “Connect Jumpers to Modules” on page 23, to connect the input fiber to the aqua input adapter and to mate the jumpers for distribution.

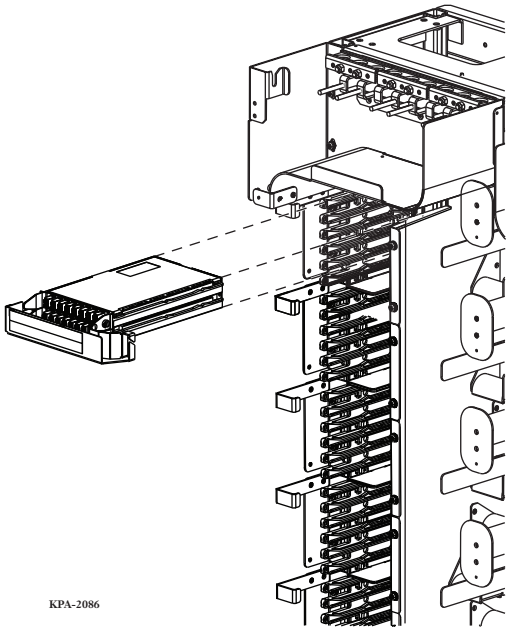


Figure 5

5. Installing Factory-Stubbed Termination Modules

Step 1: Strain-relieve the cable (Figure 6).

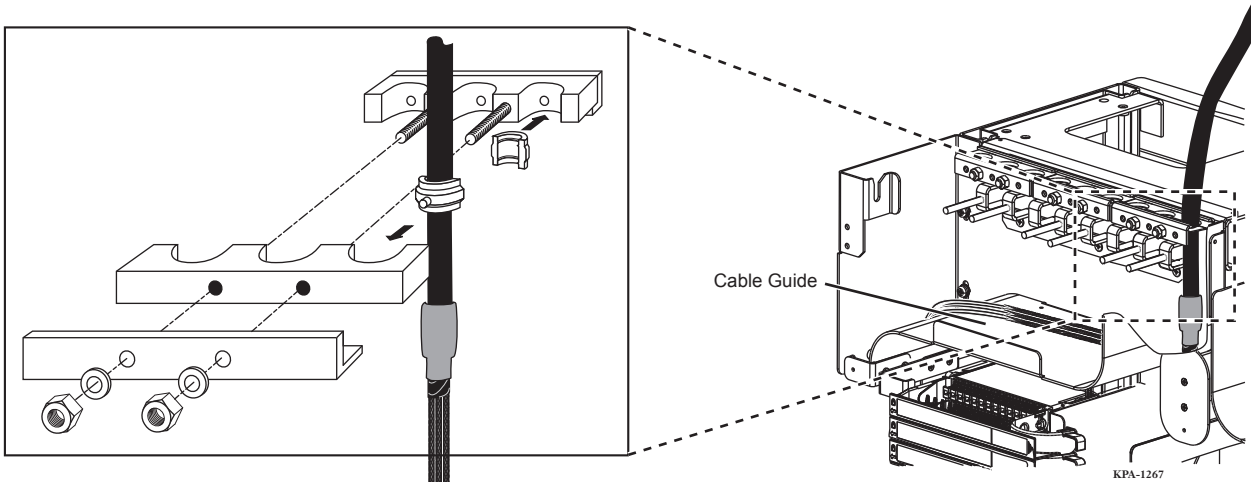


Figure 6

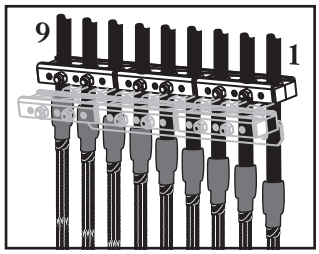
IMPORTANT: *The maximum cable diameter with no cable grip is 23 mm (0.9 inches). Install maximum number of cables in each cable grip. If necessary, use friction tape to adjust cable diameter to clamp size.*

Part Number	Cable grip number/size	Cable Diameter								
		OD 5 mm (0.20 in.)	OD 5.5 mm (0.22 in.)	OD 6 mm (0.24 in.)	OD 7 mm (0.27 in.)	OD 8.5 mm (0.33 in.)	OD 10 mm (0.39 in.)	OD 11.5 mm (0.45 in.)	OD 13 mm (0.51 in.)	OD 17.5 mm (0.70 in.)
A0388952	#1 - 8 mm (0.32 in.)	1	1	1	1					
A0388954	#2 - 10.5 mm (0.40 in.)	2				1				
A0388955	#3 - 13 mm (0.50 in.)	4	3	3	2		1	1		
A0388956	#4 - 16 mm (0.63 in.)	6	4	4	2	1			1	
A0388957	#5 - 17.5 mm (0.70 in.)	7	5	5	4	3				
A0388958	#6 - 20.5 mm (0.80 in.)	9	8	7	5	4	2			1

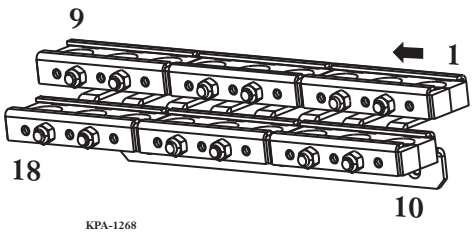
Step 2: Select appropriate cable strain-relief slot by referring to cable installation sequence in Figure 7.

Step 3: Open selected clamp and insert grips sized to fit cable(s) being installed. Refer to table above for number and sizes of cable grips to use.

Step 4: Secure clamp cover over cable at least 0.25 inches from the cable sheathing.



Stagger distance of heatshrink tubing from clamp to provide maximum room for subsequent cable installations. Position first heatshrink tubing approximately 3 inches above the cable guide.



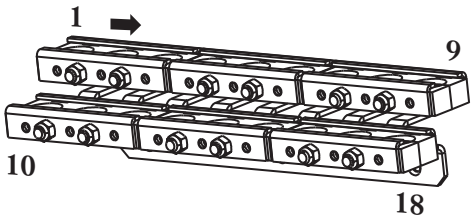
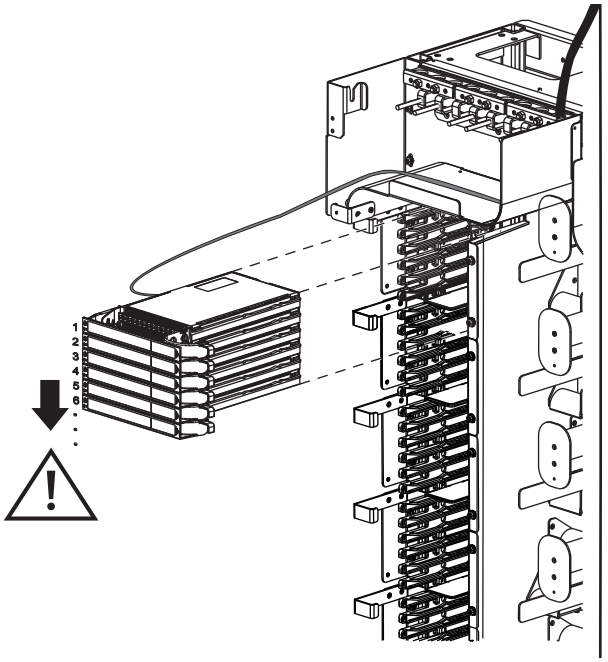


Figure 7

Step 5: Beginning at the top of the highest available empty housing assembly, insert the module into the housing (Figure 8).

Step 6: Dress the tubes inside the module and cable channel.



Push tubes inside the module while sliding the module into the housing.

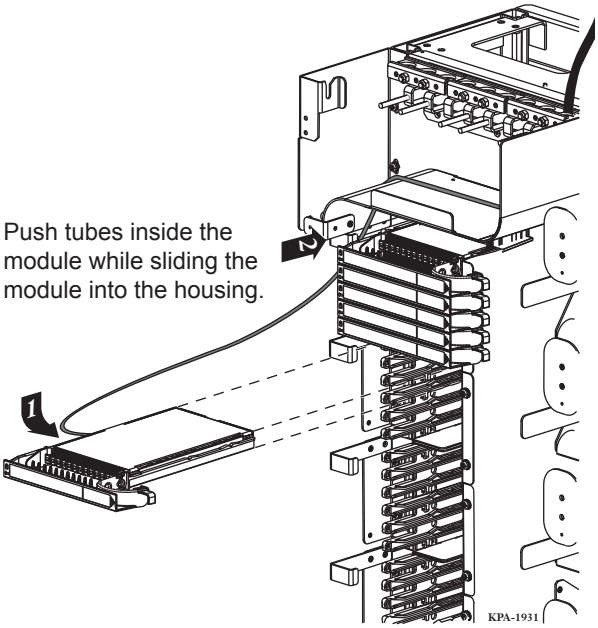


Figure 8

Step 7: Affix the designation label to the handle (Figure 9).

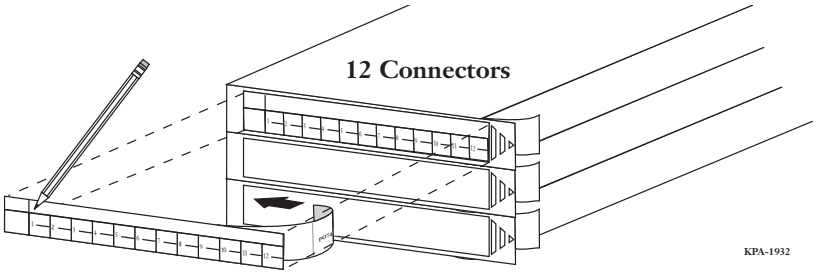


Figure 9

6. Installing Field-Spliced Termination Modules

Field-spliced termination modules may be ordered in two configurations:

- Adapters only (for 12 SC or 24 LC connectors)
- Adapters with pre-installed pigtails (with preterminated SC or LC connectors)

6.1 Prepare Distribution Cable (4-, 6-, 8-, 12- and 24-fiber)

NOTE: *Use Corning MIC® 2.0 cable for installation into 24-fiber modules.*

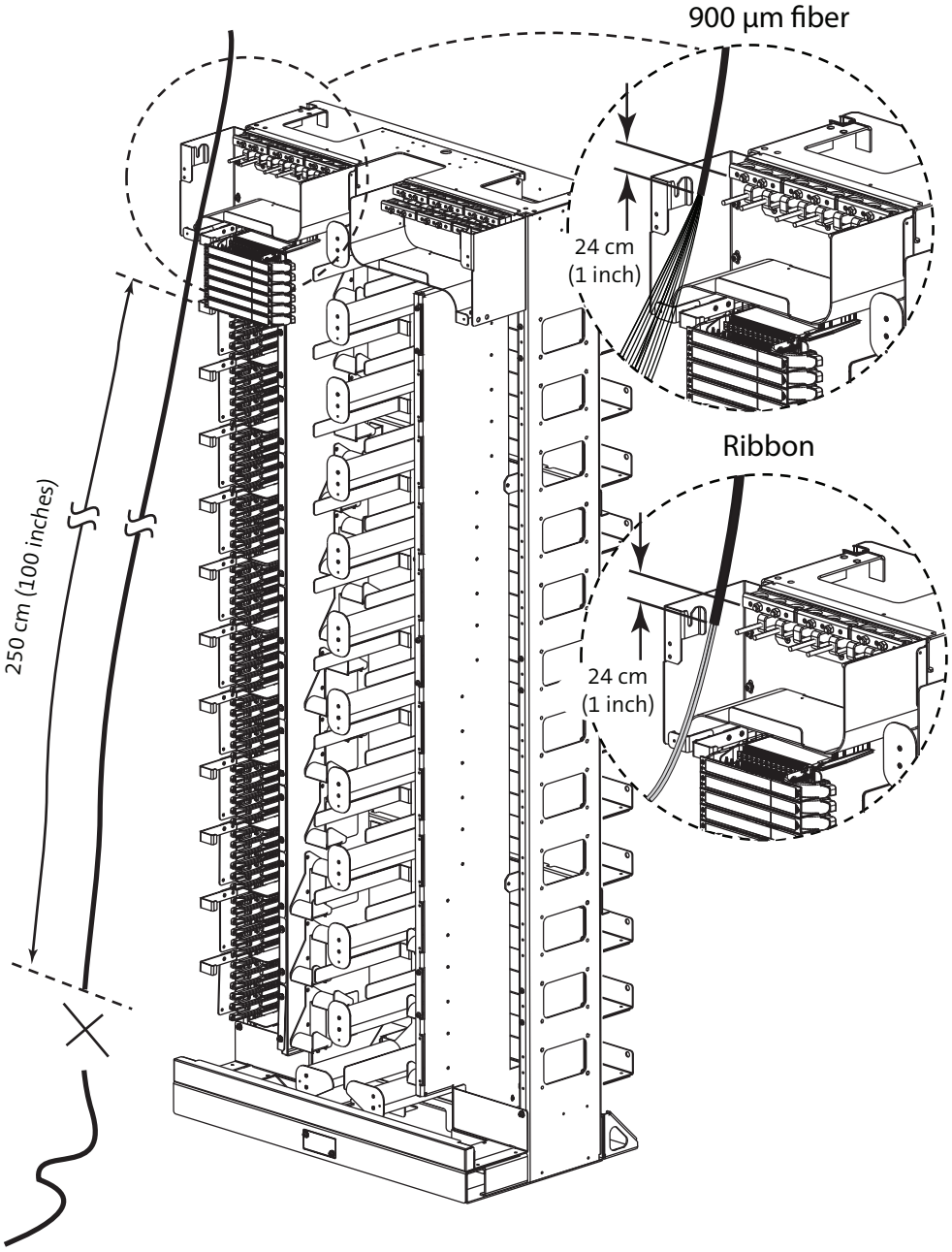


Figure 10

Step 1: Measure 250 cm (100 inches) from bottom of housing in which the module to be terminated is located and cut cable (Figure 10).

Step 2: Cut away sheath to 24 mm (1 inch) below the cable clamp (see Figure 10 inserts).

Step 3: **(900 µm fiber only)** Remove core wrap and strength member, where applicable (Figure 11).

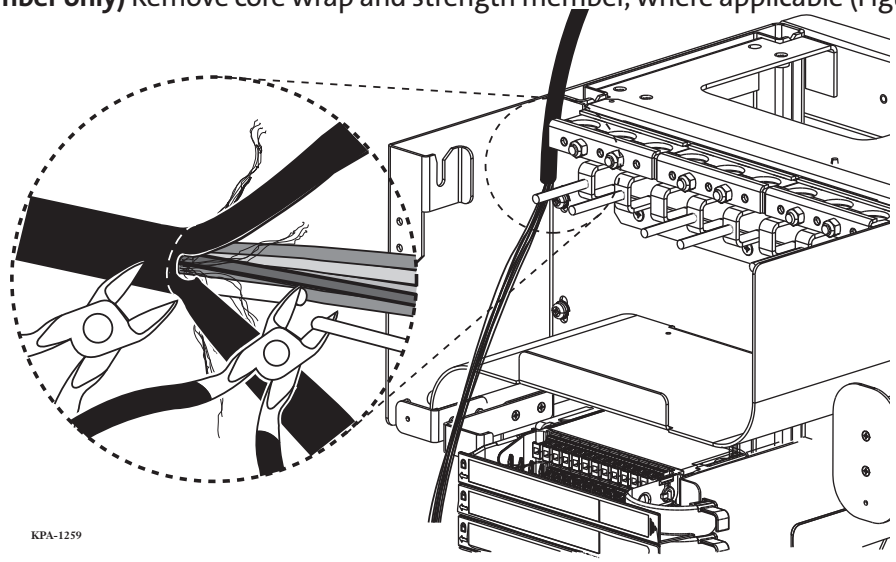


Figure 11

Step 4: Divide fibers/ribbons into groups of up to 4, 6, 8, 12, or 24 as needed to feed corresponding module (Figure 12).

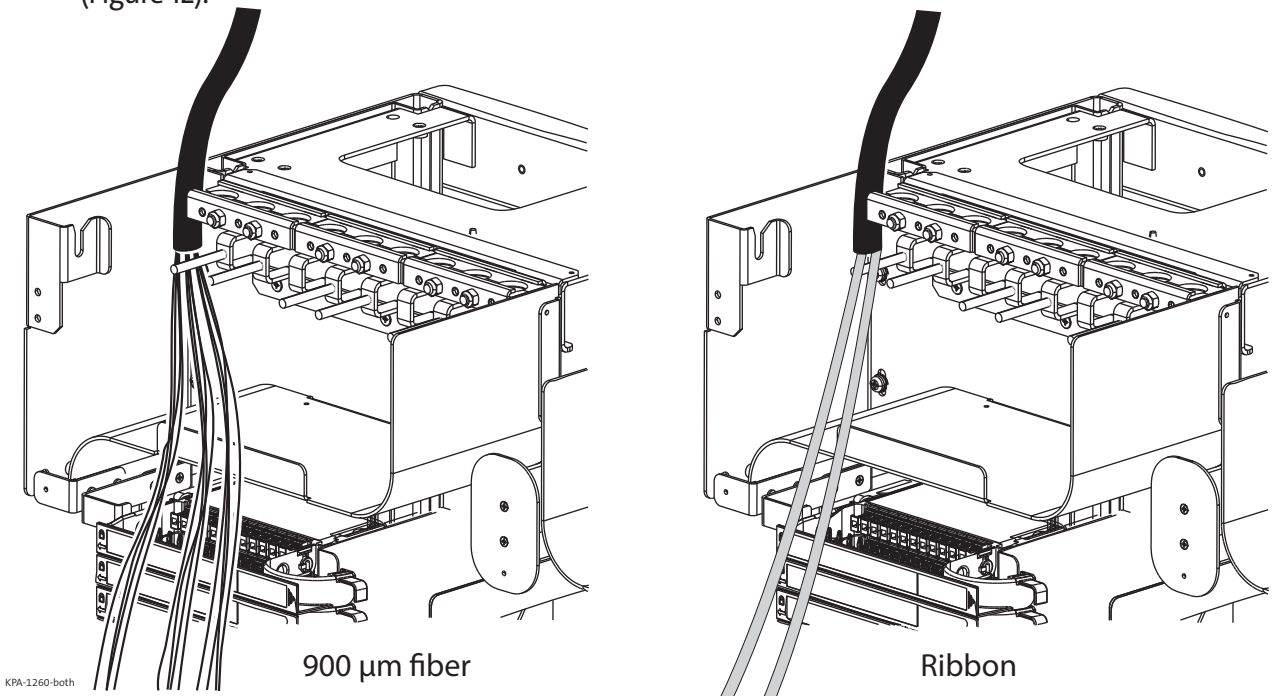


Figure 12

NOTE: *Remove all sheathing to the front strain-relief location. Replace the inner sheathing with tubing. This applies only to unstubbed modules and provides room to dress fibers back into the modules once the frame is fully loaded.*

Step 5: Determine size/type and length of tubing (Figure 13).

Number of 900 µm fibers	Use	Number of 12-fiber ribbons	Use
12	Black braided tubing	1	Black braided tubing
		2	Size 2 transport tubing

- Measure from sheath to module position.
- Add 145 cm (57 inches) to this length, then cut tubing.

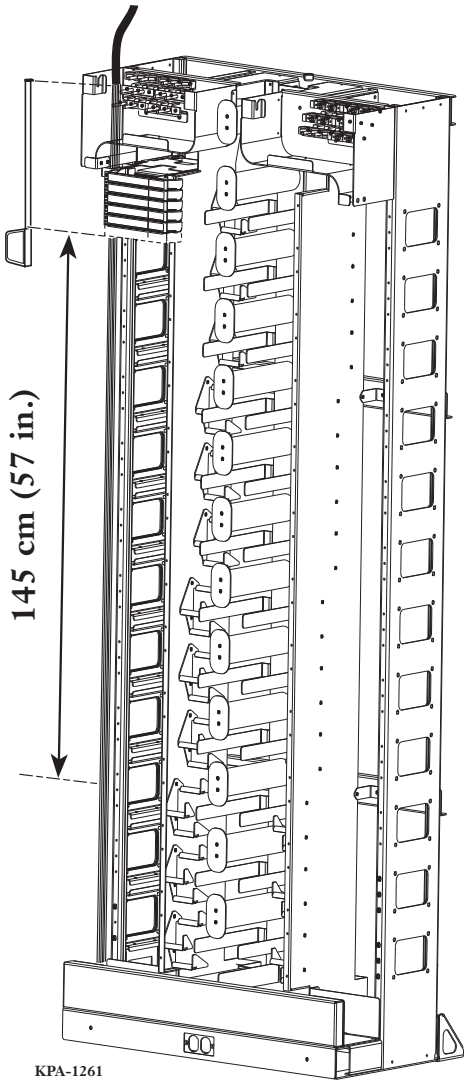


Figure 13

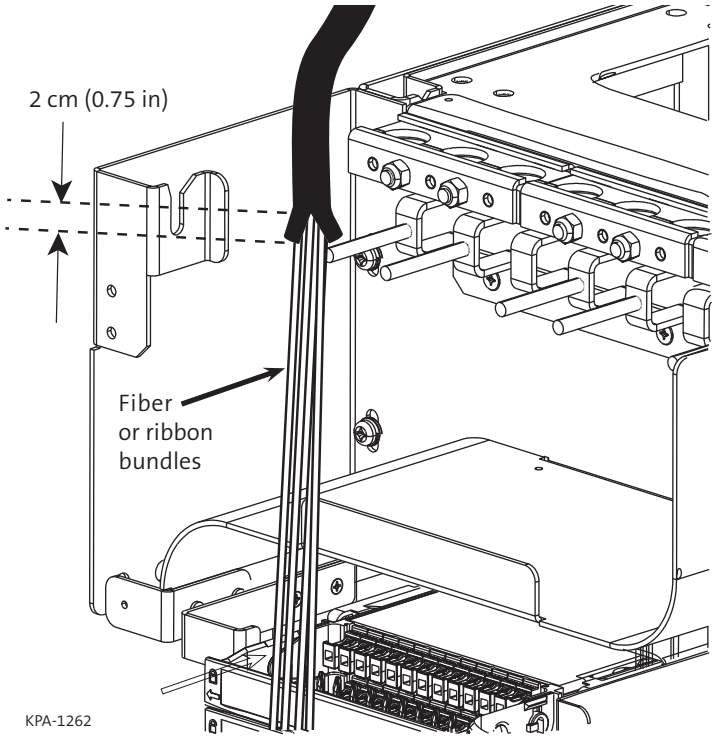


Figure 14

NOTE: *A maximum of 12 single fibers or one 12-fiber ribbon is recommended per black braided tubing. A maximum two 12-fiber ribbons or two 12-fiber subunits is recommended per transport tube for use in 24-fiber modules.*

Step 6: Slit sheath 2 cm (0.75 inches) as shown in Figure 14.

Step 7: If installing 900 µm fiber into braided tubing, proceed to Section 6.2.

Step 8: If installing ribbon fibers, slide appropriate transport tubing over the ribbons, up to the cable sheath. Skip to Section 6.3.

6.2 Installing Braided Tubing onto 900 µm Fiber

Refer to the table at Step 5 in Section 6.1 to determine the appropriate braided tubing to use.

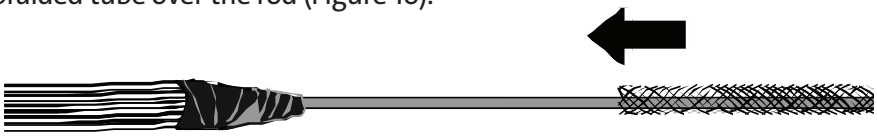
NOTE: *A maximum of 12 single fibers or one 12-fiber ribbon is recommended per black braided tubing. A maximum two 12-fiber ribbons or two 12-fiber subunits is recommended per transport tube for use in 24-fiber modules.*

Step 1: Attach plastic rod supplied with tubing to the end of the fiber bundle (Figure 15).

KPA-0002

Figure 15

Step 2: Push the braided tube over the rod (Figure 16).

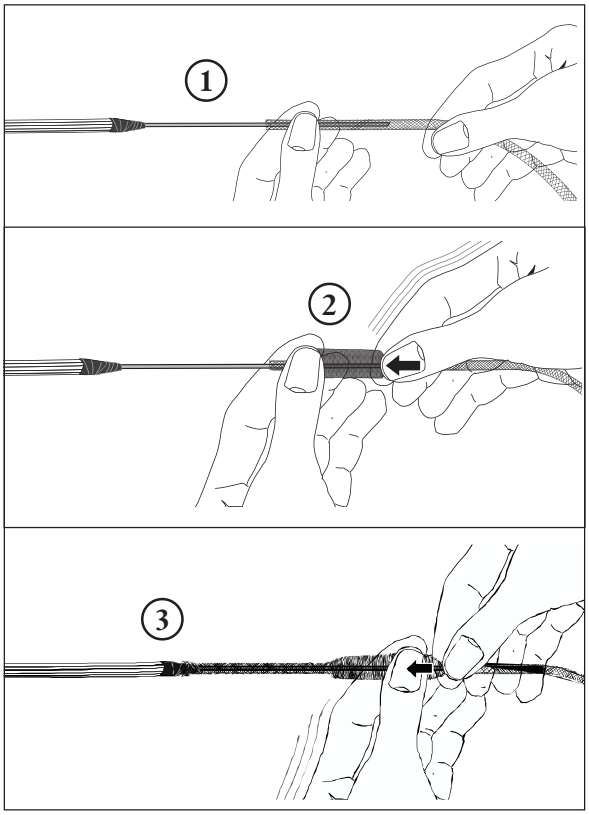


KPA-0003

Figure 16

Step 3: Hold the tube as shown in Figure 17 with the plastic rod inserted in the end of the tubing.

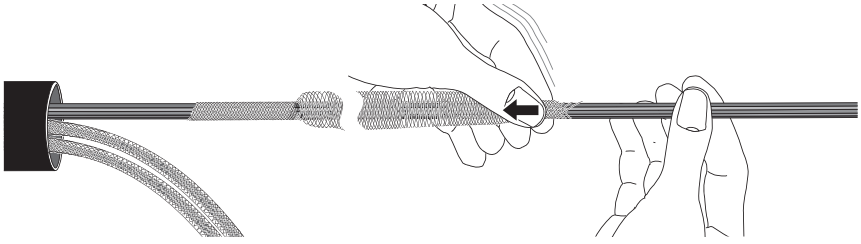
- Compress the tube to expand its diameter.
- Move the compressed length up the plastic rod and over the fiber bundle.
- Repeat this procedure until the rod appears through the end of the braided tubing (Figure 17).



KPA-1263

Figure 17

Step 4: Push the tube up to the cable sheath (Figure 18).



KPA-1264

Figure 18

6.3 Finish Cable Preparation

Step 1: If not previously done, slide appropriate tubing over the ribbons, up to the cable sheath.

Step 2: Insert tubing under slit in sheath (Figure 19).

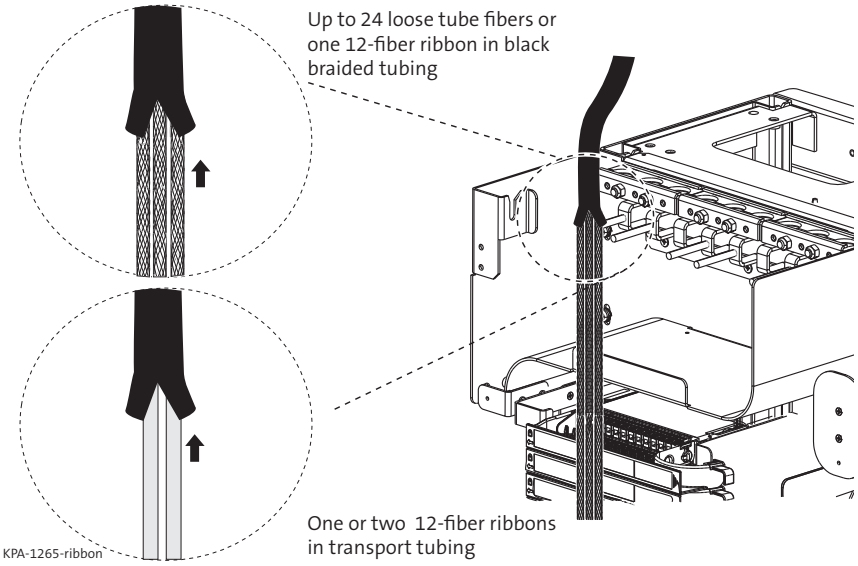


Figure 19

Step 3: Tape joint and cover with heatshrink tubing (Figure 20).

IMPORTANT: *Taping to 25 mm (1 inch) is important to protect braided/transport tubing from heat. DO NOT heat the tubing.*

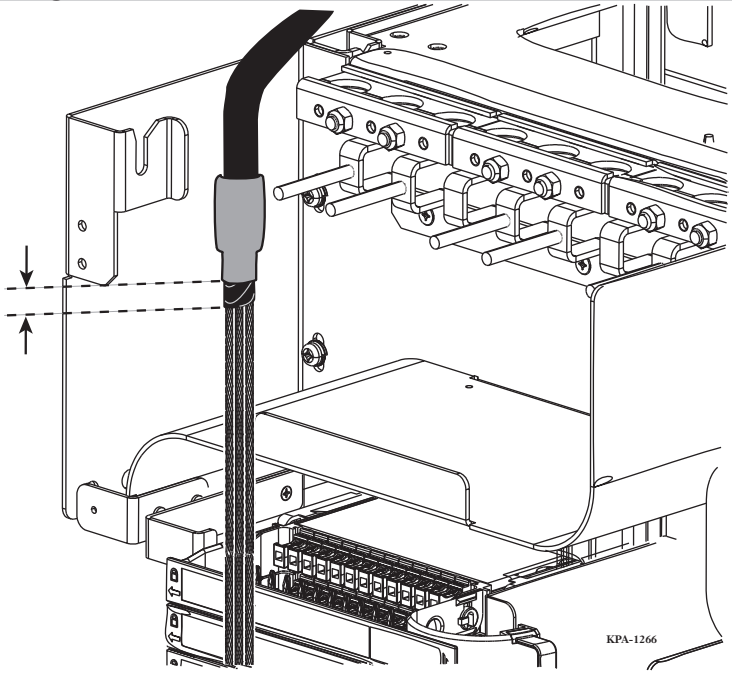


Figure 20

Step 4: If installing 900 µm fiber into braided tubing, proceed to Section 6.4 to complete the procedure.

Step 5: If installing ribbon fibers, skip to Section 7.

6.4 Finish Braided Tubing Installation

Step 1: Gently remove the extra slack in the braided tubing by sliding your hand down the braided tube (Figure 21). Do NOT pull on braided tubing!

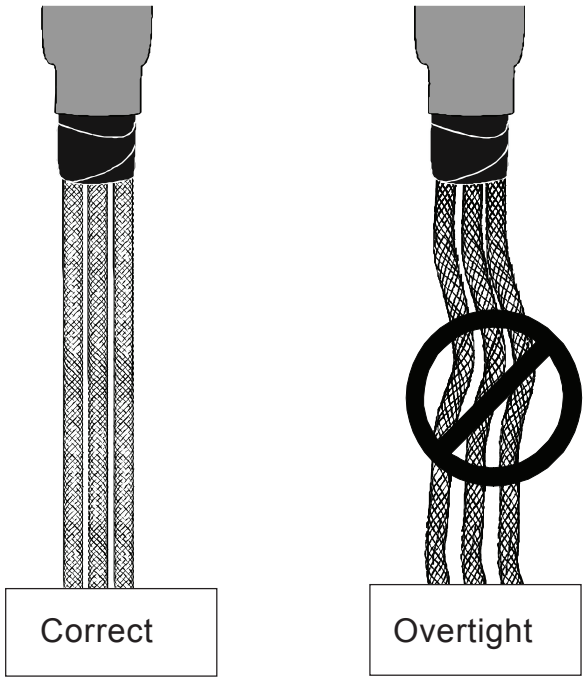


Figure 21

Step 2: Remove plastic rod (Figure 22) and reuse, if necessary.

Step 3: Tape braided tubing end.

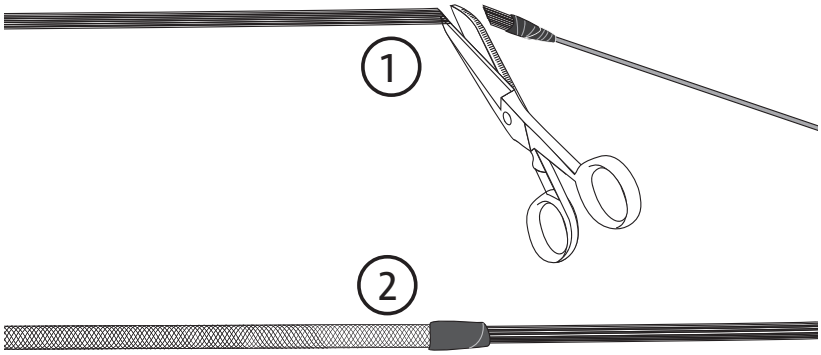


Figure 22

7. Strain-relieve Cable

Step 2: Strain-relieve the cable (Figure 23).

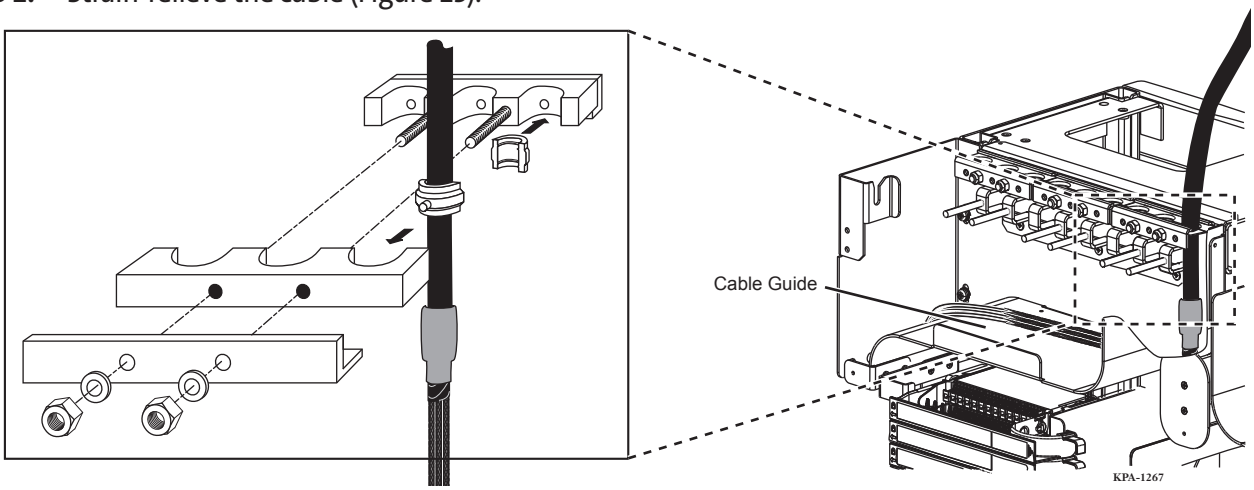


Figure 23

NOTE: *The maximum cable diameter with no cable grip is 23 mm (0.9 inches). Install maximum number of cables in each cable grip. If necessary, use friction tape to adjust cable diameter to clamp size.*

Part Number	Cable grip number/size	Cable Diameter								
		OD 5 mm (0.20 in.)	OD 5.5 mm (0.22 in.)	OD 6 mm (0.24 in.)	OD 7 mm (0.27 in.)	OD 8.5 mm (0.33 in.)	OD 10 mm (0.39 in.)	OD 11.5 mm (0.45 in.)	OD 13 mm (0.51 in.)	OD 17.5 mm (0.70 in.)
A0388952	#1 - 8 mm (0.32 in.)	1	1	1	1					
A0388954	#2 - 10.5 mm (0.40 in.)	2				1				
A0388955	#3 - 13 mm (0.50 in.)	4	3	3	2		1	1		
A0388956	#4 - 16 mm (0.63 in.)	6	4	4	2	1			1	
A0388957	#5 - 17.5 mm (0.70 in.)	7	5	5	4	3				
A0388958	#6 - 20.5 mm (0.80 in.)	9	8	7	5	4	2			1

Step 3: Select appropriate cable strain-relief slot by referring to cable installation sequence in Figure 24.

Step 4: Open selected clamp and insert grips sized to lift cable or cables being installed. Refer to table above for number and sizes of cable grips to use.

Step 5: Secure clamp cover over cable within 0.25 inches of the cable sheathing.

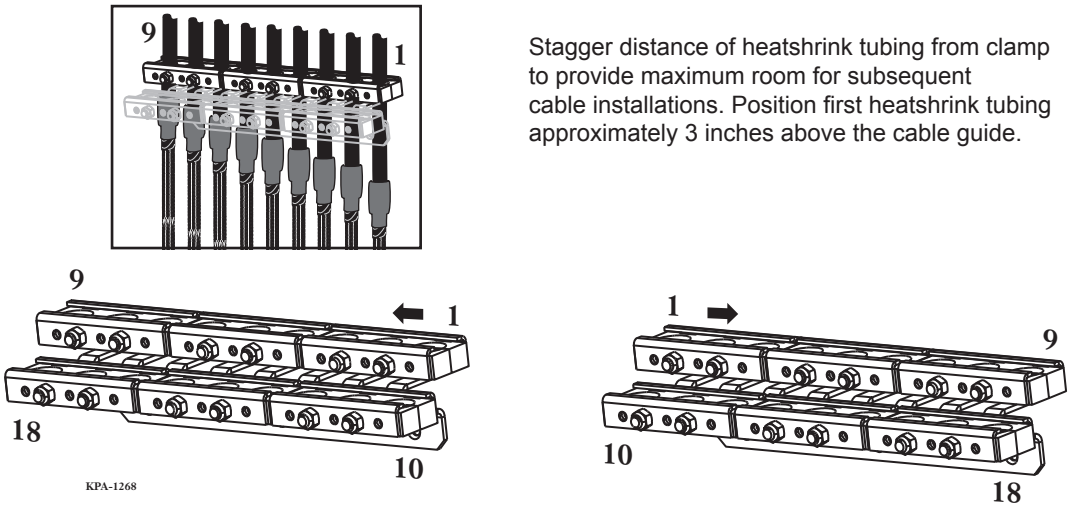


Figure 24

8. Connecting Input Fiber to the Termination Modules

For simplification, only left side installation is shown. Repeat procedures for right side modules (Figure 25). Cable ties 7.6 cm (3 inches) and a protective tube (p/n P0727835) are provided in each module.

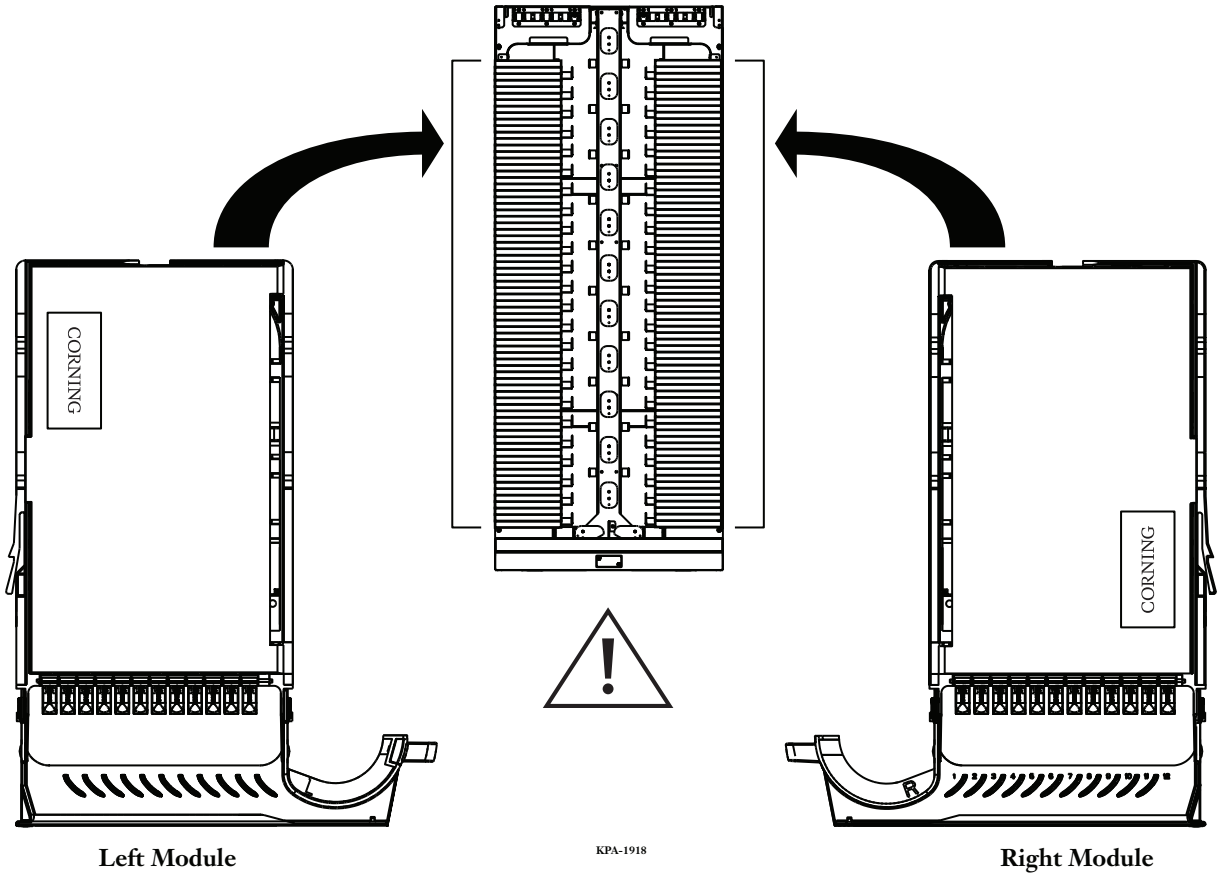


Figure 25

Place the module on a work surface and open the cover (Figure 26). A shelf (ordered separately) attaches to the front of the frame to facilitate work operations.

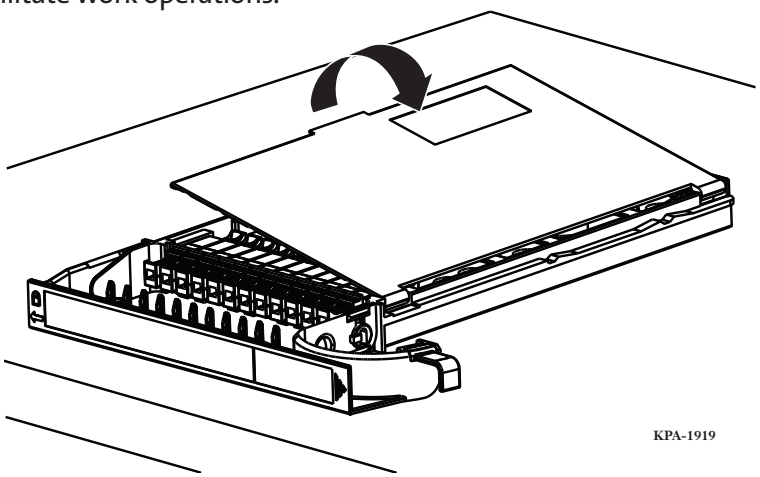


Figure 26

8.1 Splice Input Fiber inside Single-Density Termination Module

The single-density module comes in four configurations:

- With SC connector adapters
- With SC connector adapters and pre-installed SC-connectorized pigtails
- With LC connector adapter panel
- With LC connector adapter panel and pre-installed LC-connectorized pigtails

Step 1: Fasten the end of one tube inside the module (Figure 27).

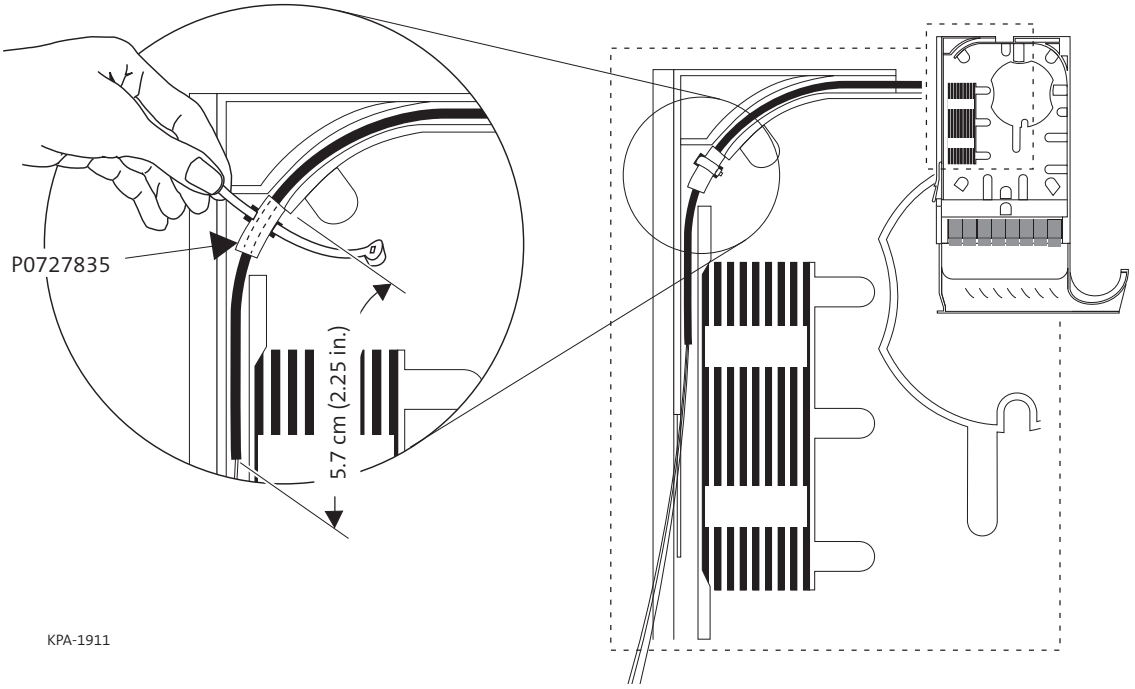


Figure 27

Step 2: Loosely wrap fibers/ribbons around hub, leaving enough length to reach the splicing equipment.

Step 3: If equipped with pre-installed pigtails, bring the raw ends of the fibers/ribbons to the splicing equipment..

Step 4: If pigtail is 900 µm fiber, splice a pigtail fiber to each input fiber (Figure 28).
OR
If pigtail is ribbon fiber, mass fusion splice the pigtail ribbon to the input ribbon.

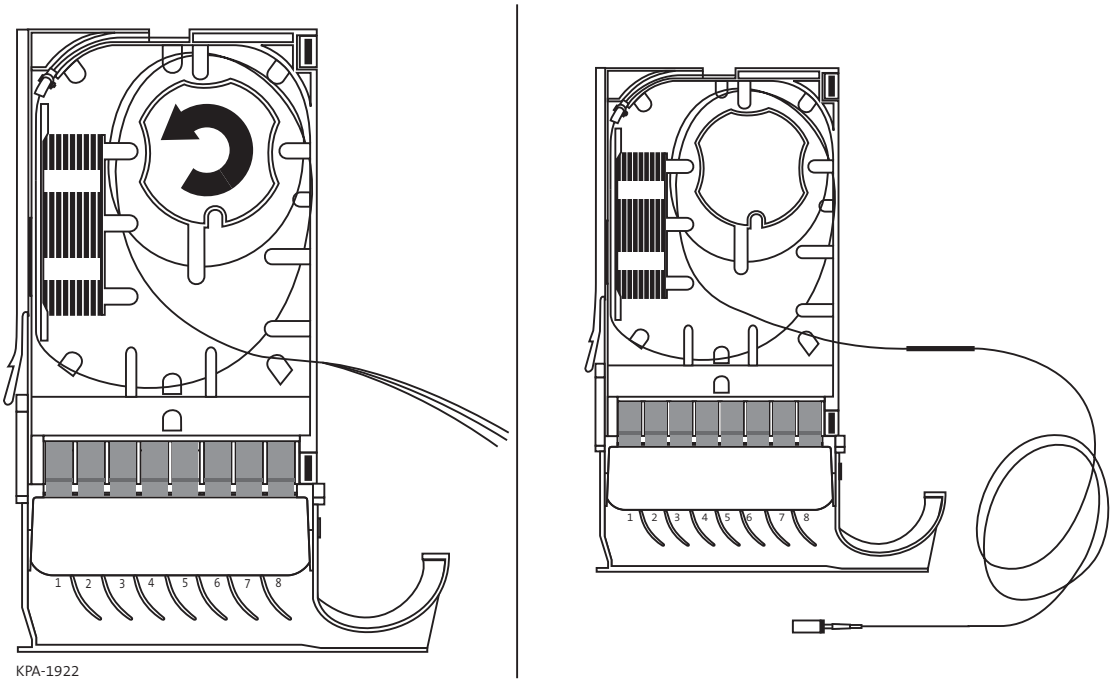


Figure 28

Step 5: Number and store the first splice point in the module inside the heatshrink splice insert (Figure 29) or inside the Q-pak splice insert (Figure 30) in the order shown for each insert.

Heatshrink Splice Insert

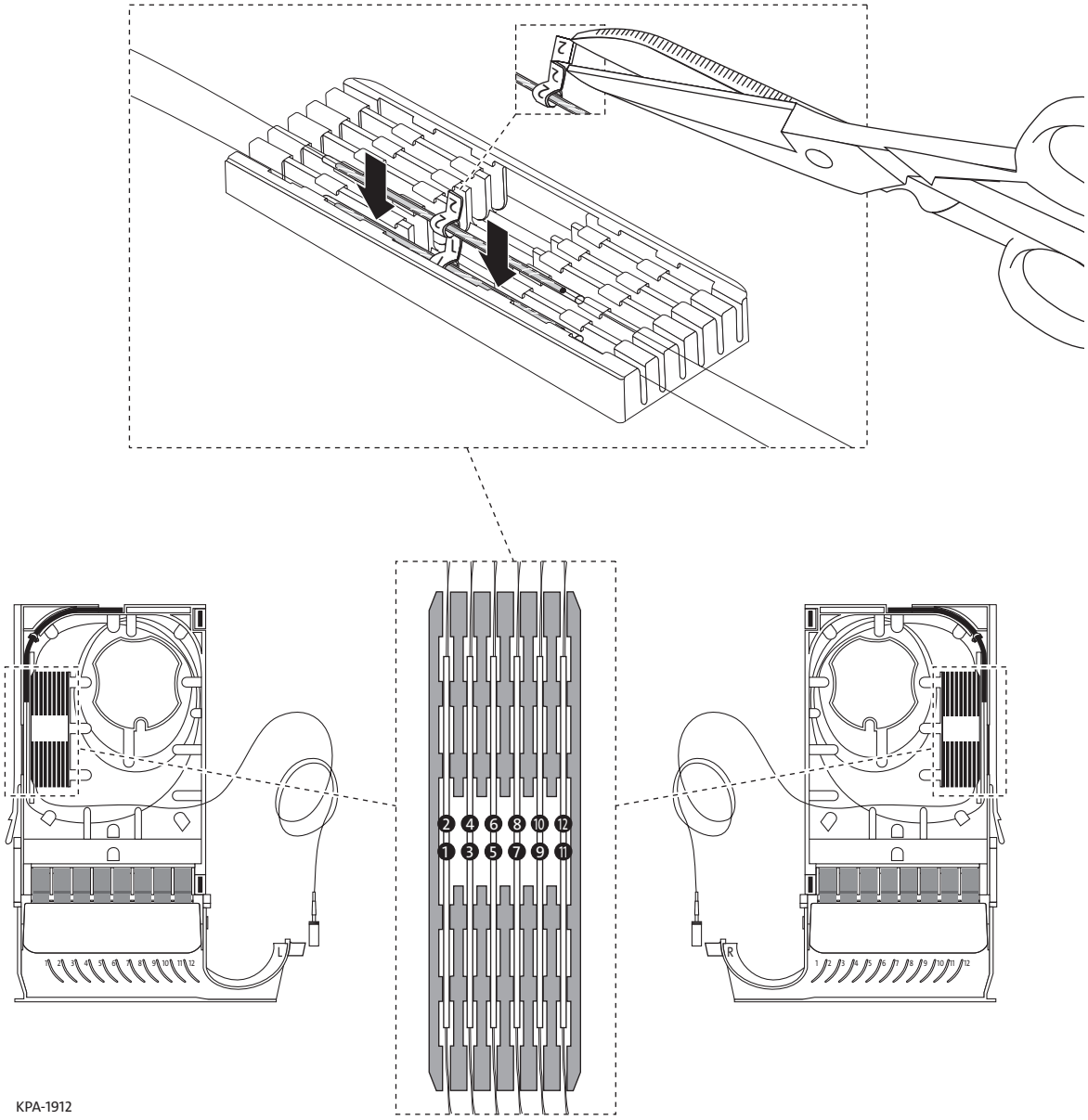


Figure 29

Q-Pak Splice Insert

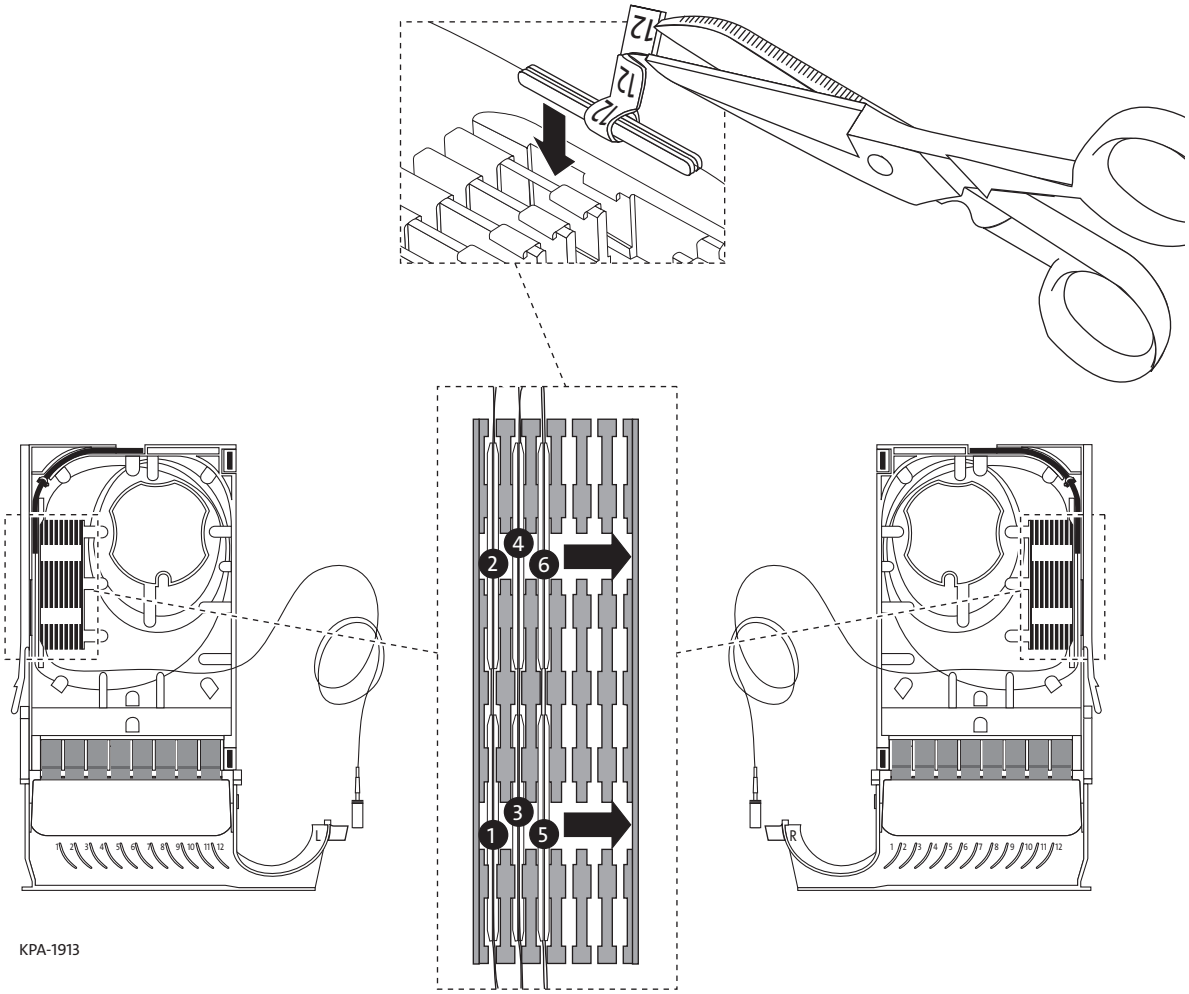


Figure 30

8.2 Splice Input Fiber inside Double-Density Termination Module

The double-density module comes in two configurations:

- With LC adapters
- With LC adapters and pre-installed LC-connectorized pigtails.

Step 1: Fasten the end of one tube inside the module (Figure 31).

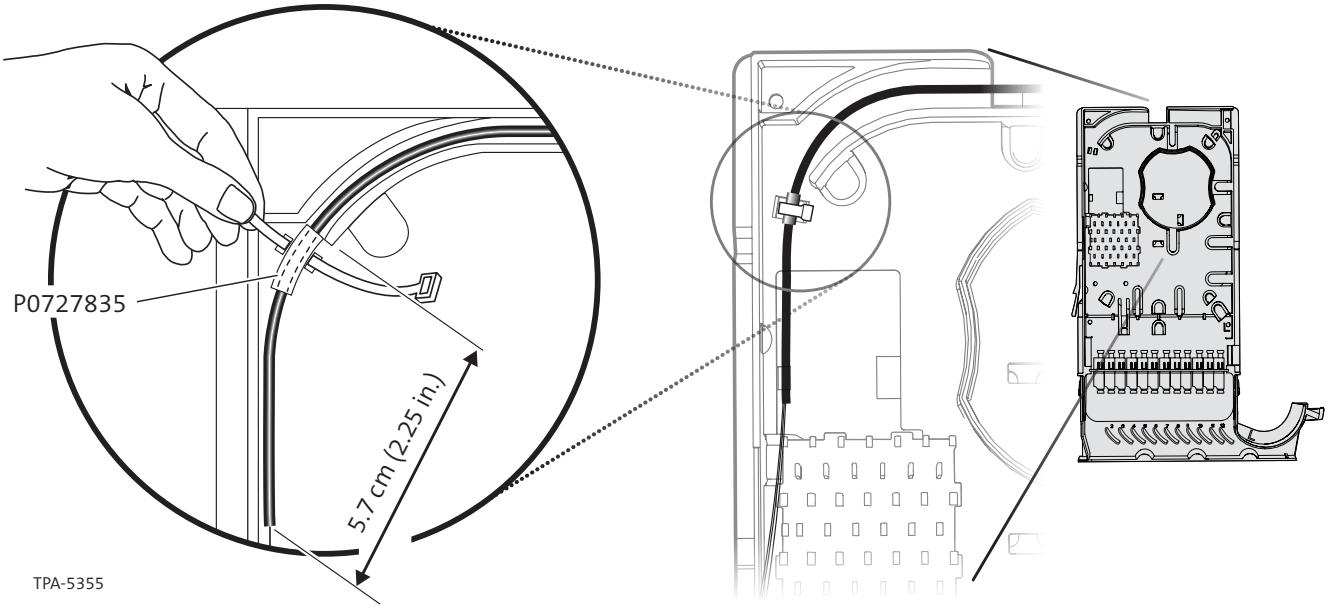


Figure 31

Step 2: Loosely wrap fibers/ribbons around hub, leaving enough length to reach the splicing equipment.

Step 3: If equipped with pre-installed pigtails, bring the raw ends of the fibers/ribbons to the splicing equipment..

Step 4: If pigtail is 900 µm fiber, splice a pigtail fiber to each input fiber (Figure 32).
OR
If pigtail is ribbon fiber, mass fusion splice the pigtail ribbon to the input ribbon.

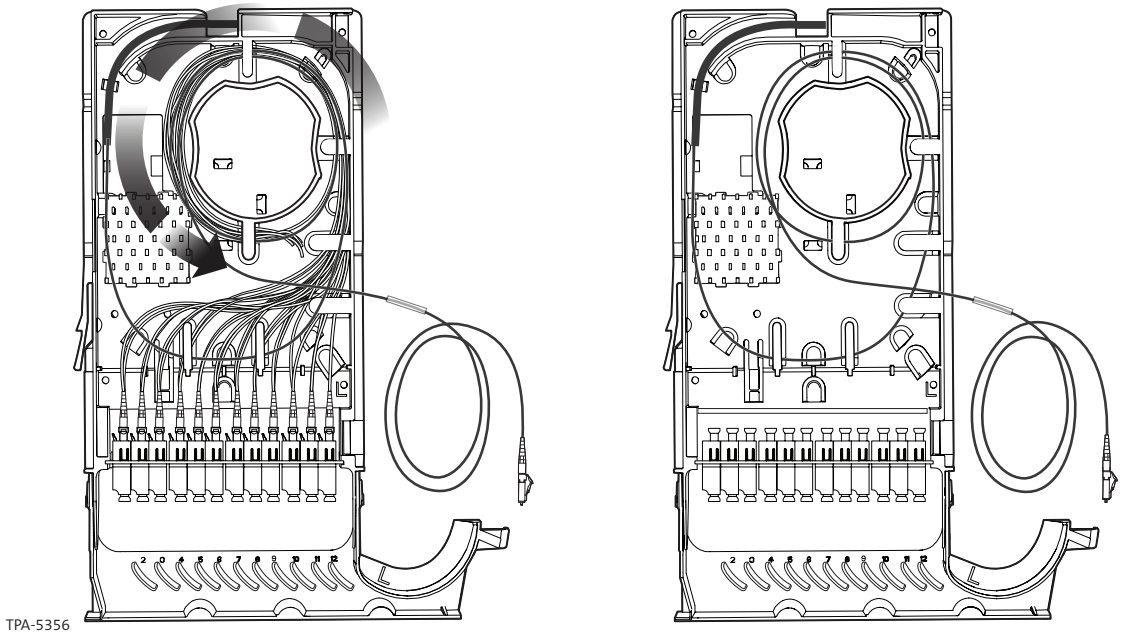


Figure 32

Step 5: Number and store the first splice point in the module inside the heatshrink splice insert (Figure 33) in the order shown for each insert.

Heatshrink Splice Insert

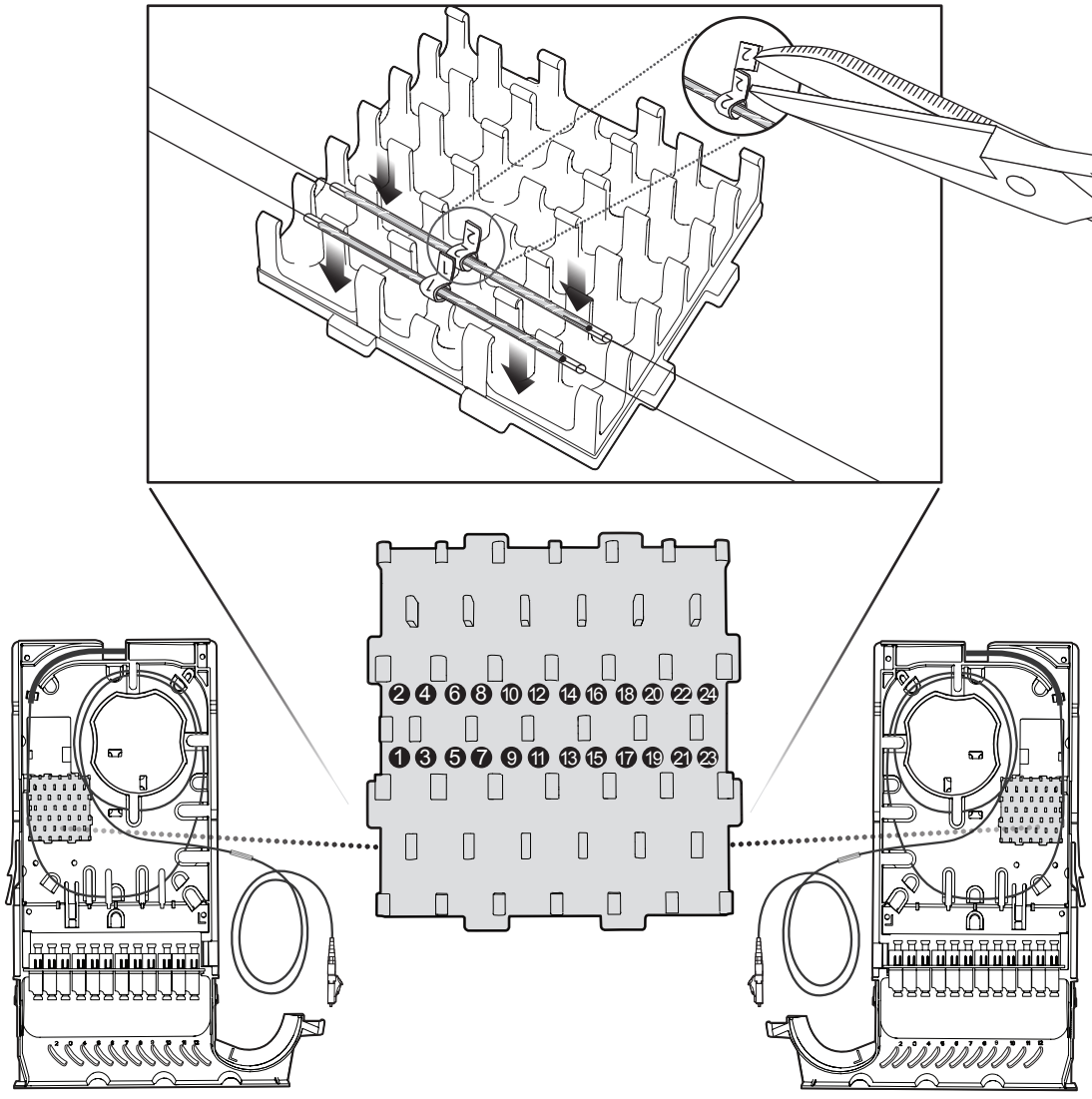


Figure 33

8.3 Install Connectors into Adapters

Step 1: If connectors are not factory-installed in the adapters, unlatch the first adapter base under the module. Remove adapter (Figure 34).

NOTE: *SC adapters and connectors are shown in this section. However, 24 LC connectors can be installed into the double-density modules.*

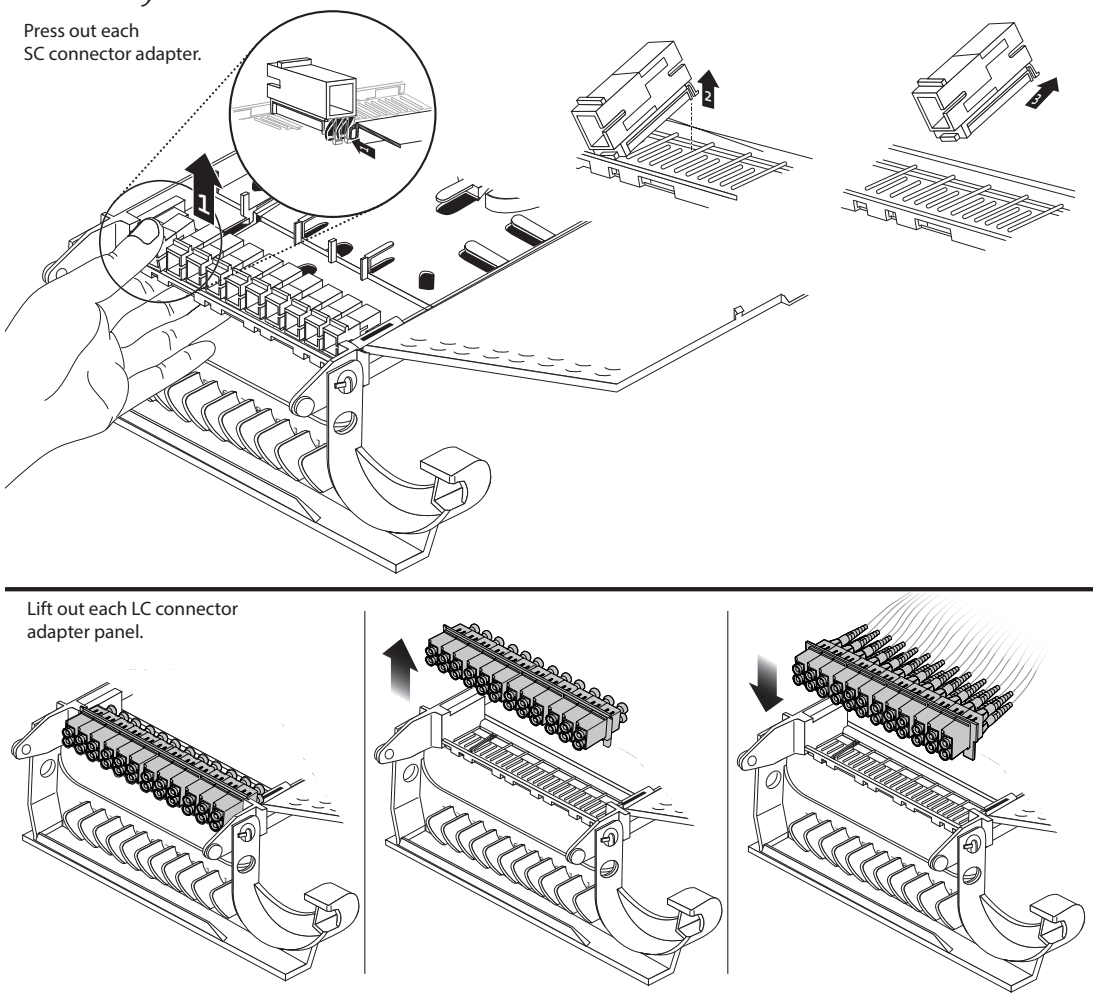


Figure 34

Step 2: Remove dust caps, clean connectors and adapters, then insert connector into adapter (12 SC connectors or 24 LC connectors) (Figure 35).

Step 3: Insert connected SC connector adapters(Figure 36) or slide the connectorized LC connector adapter panel back into the slots in each side of the module (Figure 35).

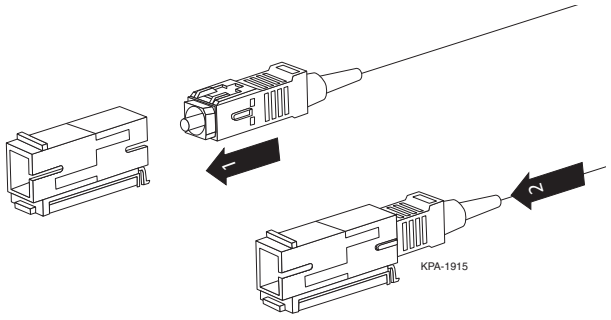


Figure 35

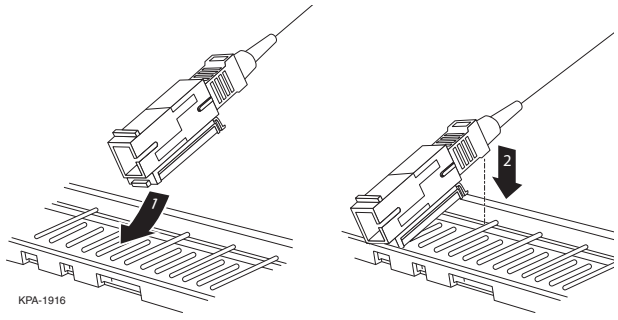


Figure 36

Step 4: For each pigtail, repeat from Step 2 of Section 8.1 for single-density modules or from Step 2 of Section 8.2 for double-density modules.

Step 5: Close the module cover.

9. Store Slack in Module

Step 1: Turn module over and place tube under retaining clip (Figure 37).

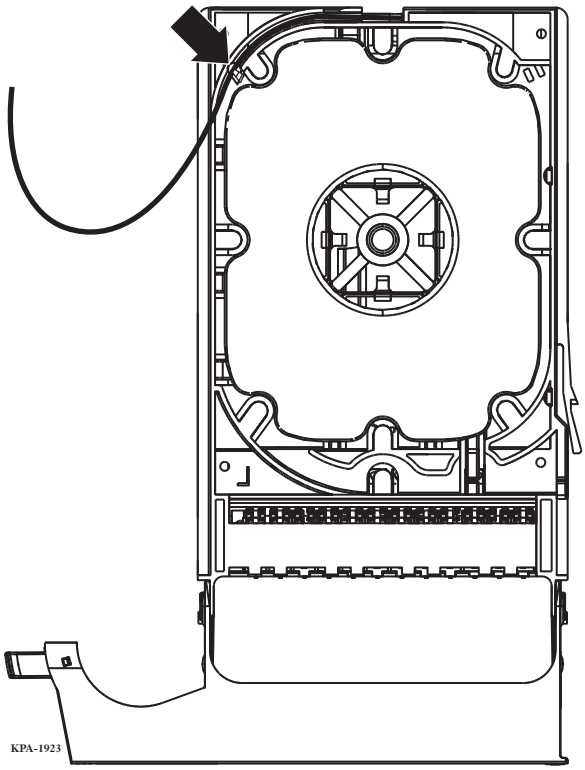


Figure 37

Step 2: Raise guard into open position (Figure 38). Do not remove.

Step 3: Hold tube in straight position (tightened) (Figure 39).

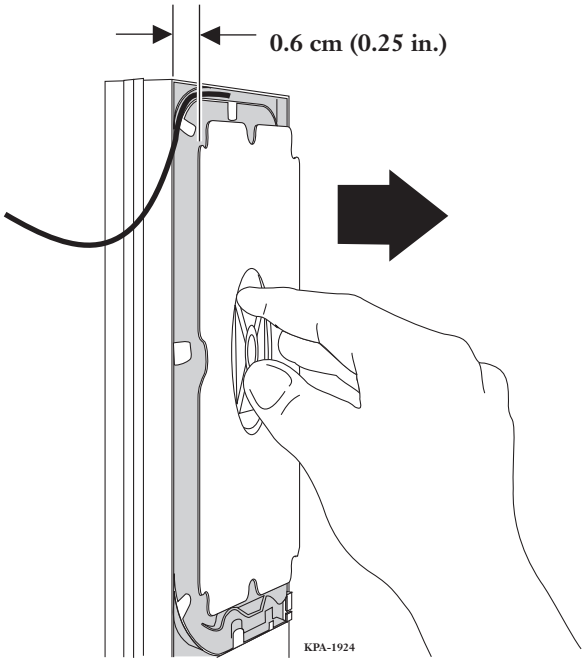


Figure 38

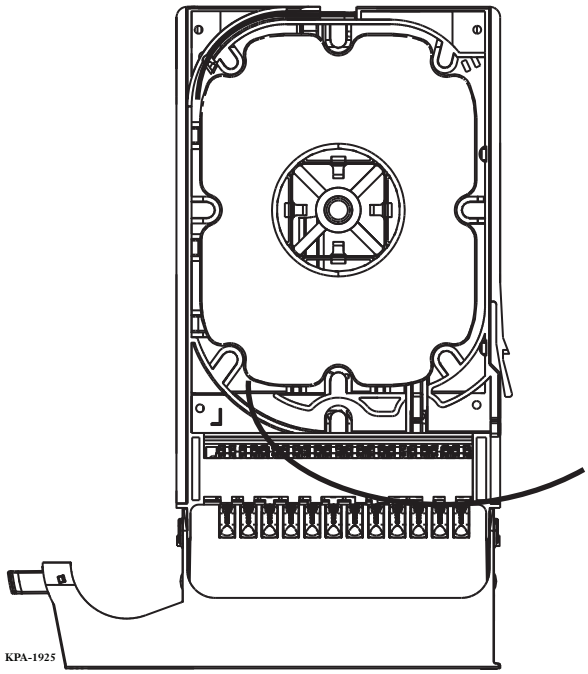


Figure 39

Step 4: Rotate the MODULE (Figure 40) (NOT the cable) two full 360-degree turns.

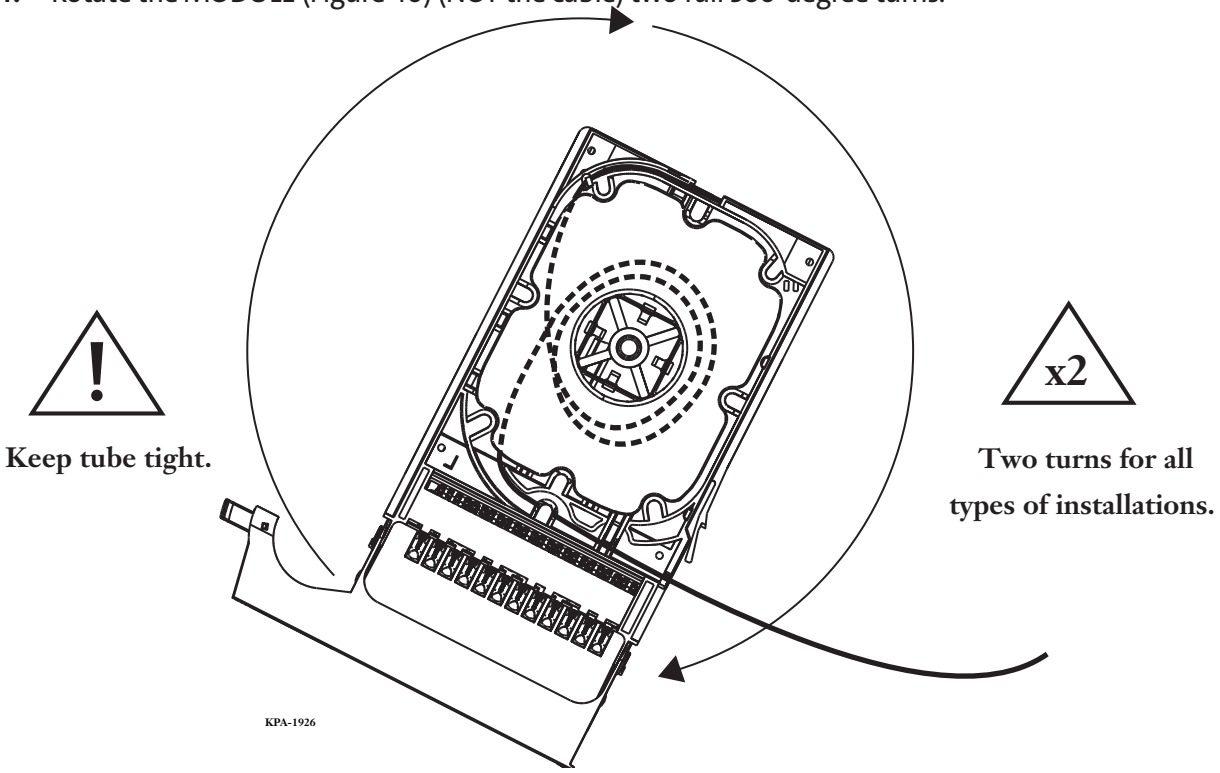


Figure 40

Step 5: Place tube under retaining latches (Figure 41).

Step 6: Close the guard (Figure 42).

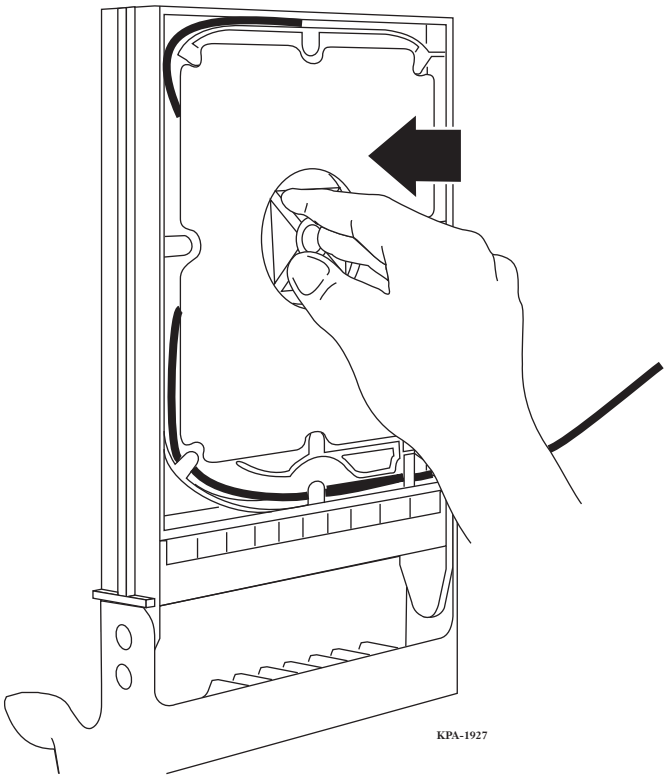


Figure 41

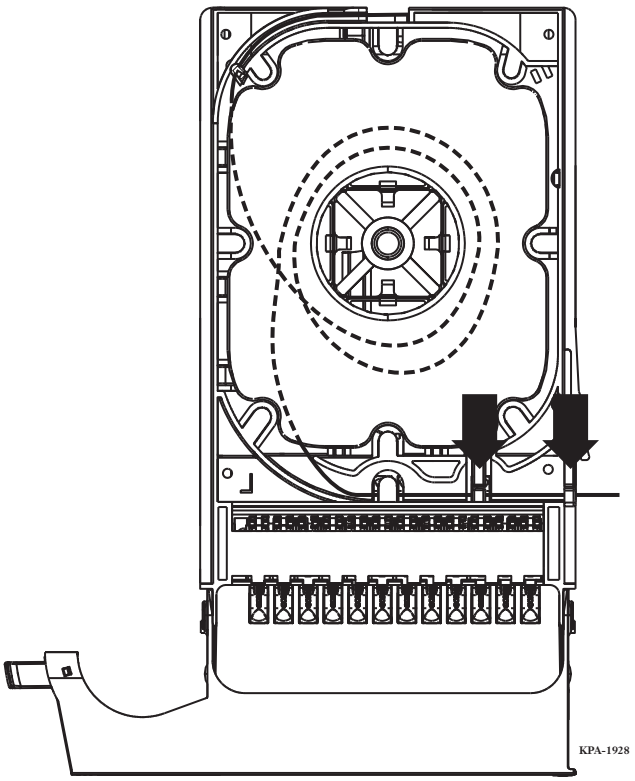


Figure 42

Step 7: Insert module into housing, starting at the top of the housing (Figure 43) and dress tubes inside the module and cable channel.

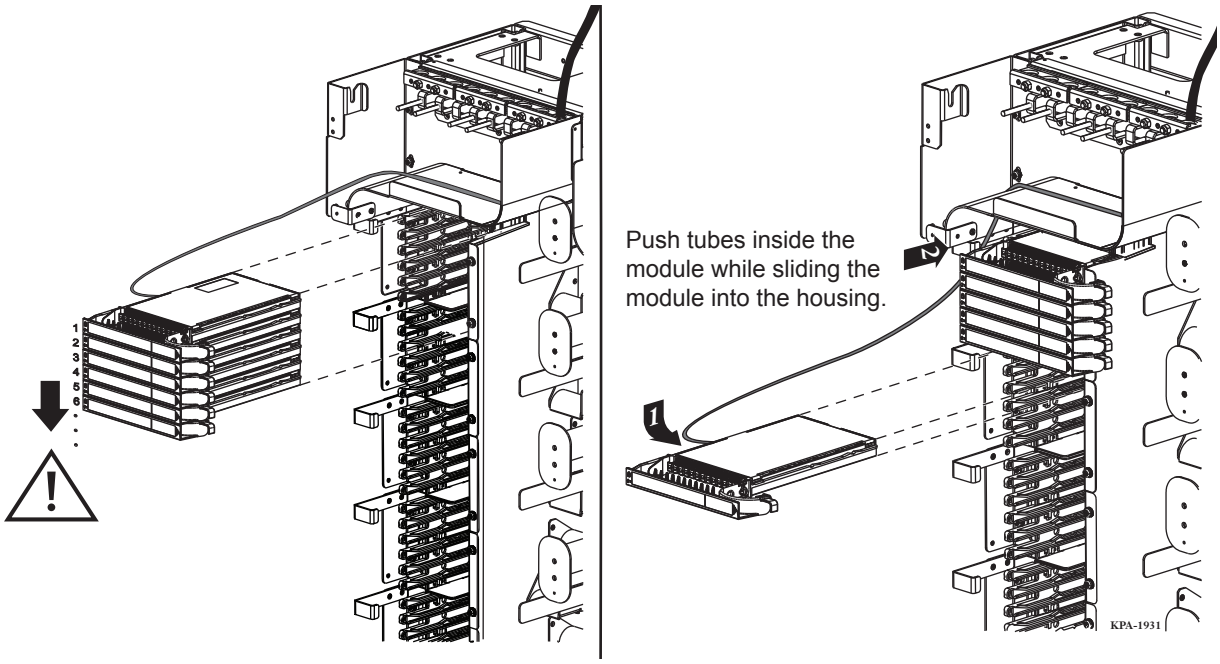


Figure 43

Step 8: Affix the designation label to the handle (Figure 44).

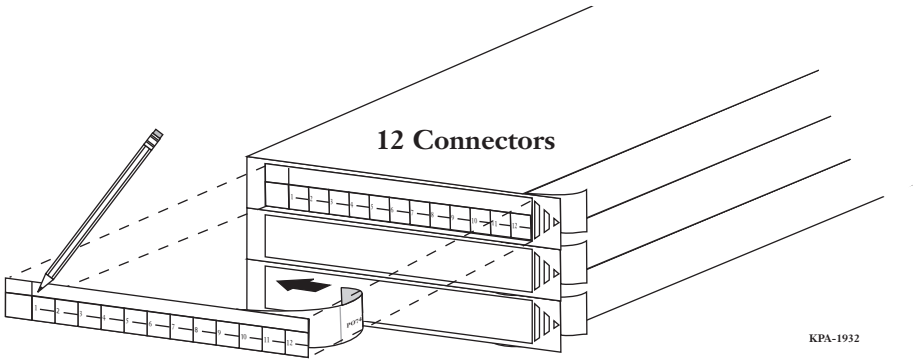


Figure 44

10. Connect Jumpers to Modules

CAUTION: If you are installing outside plant cable or temperature fluctuates widely along any part of the cable, the central member must be strain-relieved. Failure to do so may result in damage to the cable as temperature varies. If the entire length of cable is located in a controlled environment where temperature fluctuation is minimal, it is not necessary to secure the central members. The cable can be strain-relieved by sheath retention alone..

The Enhanced Management Frame housing assembly can accommodate splitter modules or termination modules. The jumper connecting procedure is the same for both types of modules, with the exception of the connections for the input side of the splitter module.

Step 1: Pull module out to detent position (Figure 45).

IMPORTANT: *If jumper cords are too taut to pull out easily, refer to Section 12, "Servicing Modules" on page 28 for the proper method for relieving the tension on the cords before continuing to pull the module out.*

Step 2: Press buttons on each side of the module (Figure 46) and lower the handle.

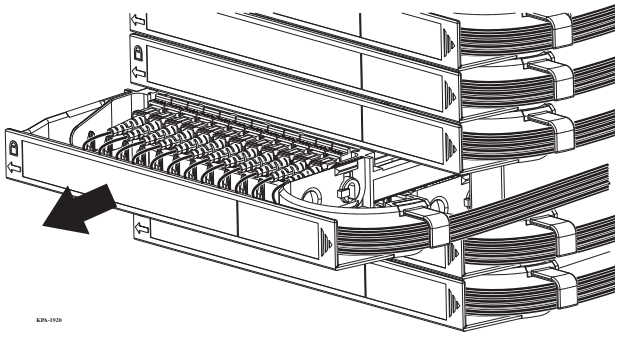


Figure 45

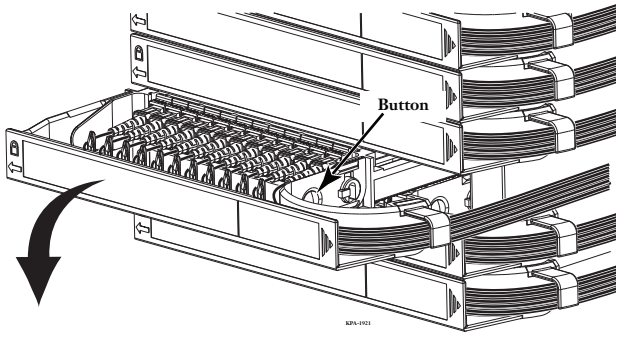


Figure 46

Step 3: Remove dust caps and clean adapters and connectors per standard company practices or as described in Section 13. Connect jumpers (Figure 47) as required.

IMPORTANT: *Splitter modules have an aqua adapter indicating the input. Connect the IN jumper to the aqua adapter.*

Step 4: Raise handle. Dress jumper cords (Figure 48) to the side of the module.

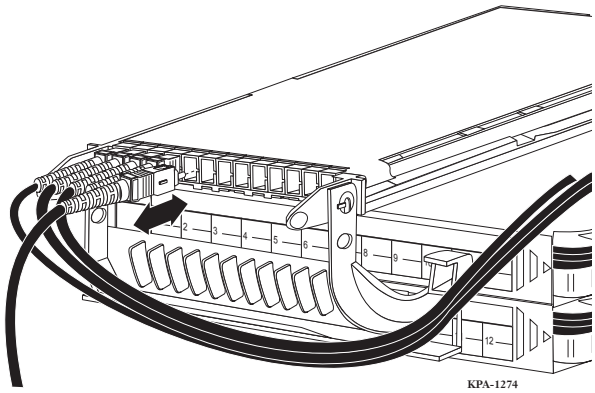


Figure 47

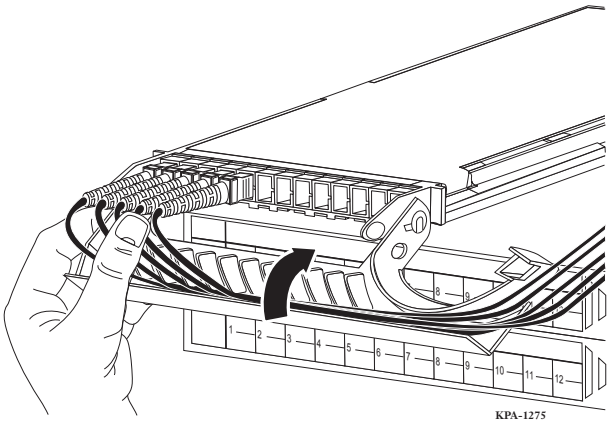


Figure 48

Step 5: Push module back into the housing and dress jumper cords in frame as described in Section 11.

IMPORTANT: *Guide fibers while inserting module to avoid pinching fibers.*

11. Route Jumpers

11.1 Within One Frame (Intraframe)

When routing jumpers within one frame, use a single-fiber jumper length of 5.5 meters (17.5 feet) to eliminate the need to cut jumpers to a specific length. Determine location of jumper termination. If the termination is within the same frame, proceed to step 1. If the jumper termination is within another frame, skip to Section 11.2

Step 1: Pull the modules to be connected forward to the detent position (Figure 45). Press the buttons on each side of the module to drop the handle (Figure 46).

Step 2: Remove dust caps from originating point adapter and the connector. Clean adapter and connector per standard company practices or as described in Section 13.

Step 3: Insert connector into the adapter.

Step 4: Route jumper slack up over the routing guide that is higher than the module and down the side of each housing as shown in Figure 49. Route slack around the lower transition spools. Pull the remaining slack over the highest routing spool the slack will reach in the Interbay Storage Unit (IBU).

Step 5: Remove dust caps from termination point adapter and the connector. Clean both, and insert connector into the adapter.

Step 6: Close modules after slack is stored.

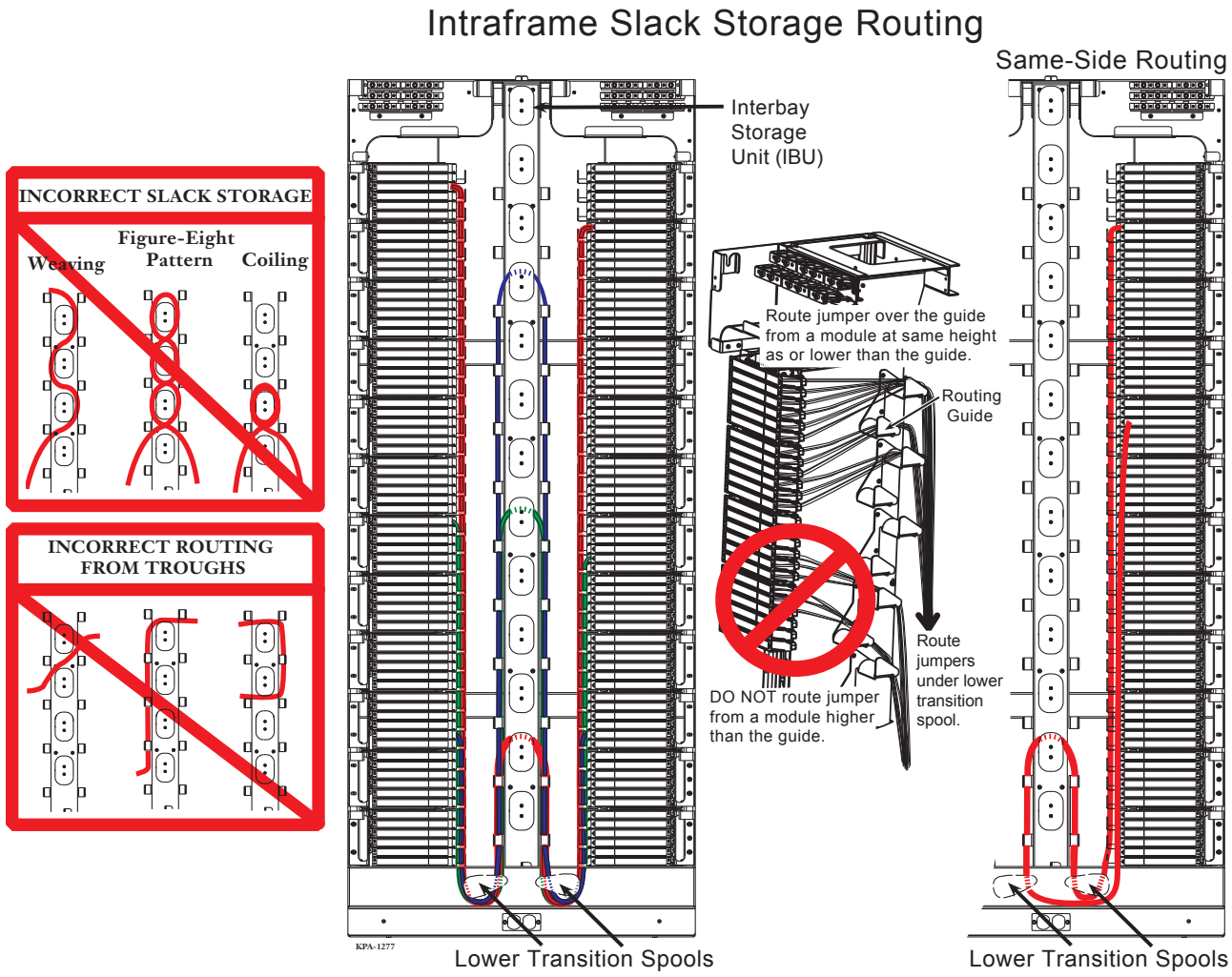


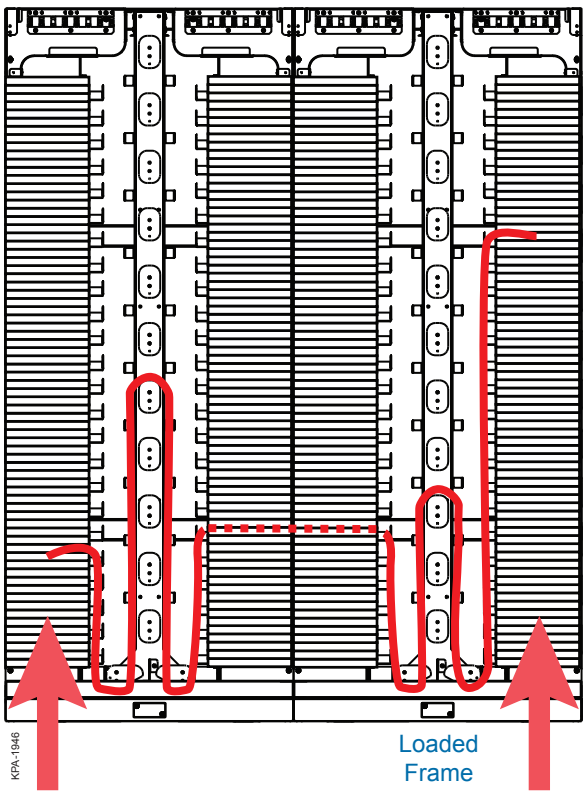
Figure 49

11.2 To Adjacent EMF Frames (Interframe)

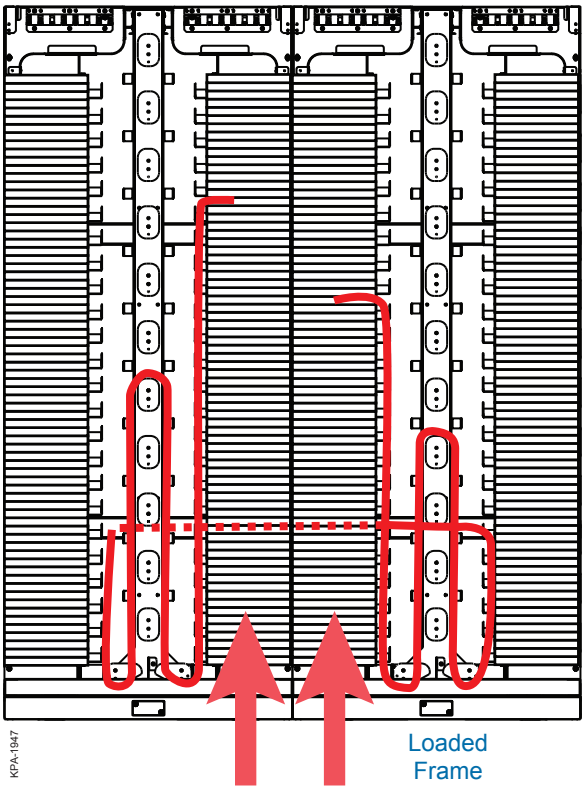
Possible Connection Combinations and Routing Paths

NOTE: *Start fiber routing from the most densely loaded frame. Take up slack in destination frame.*

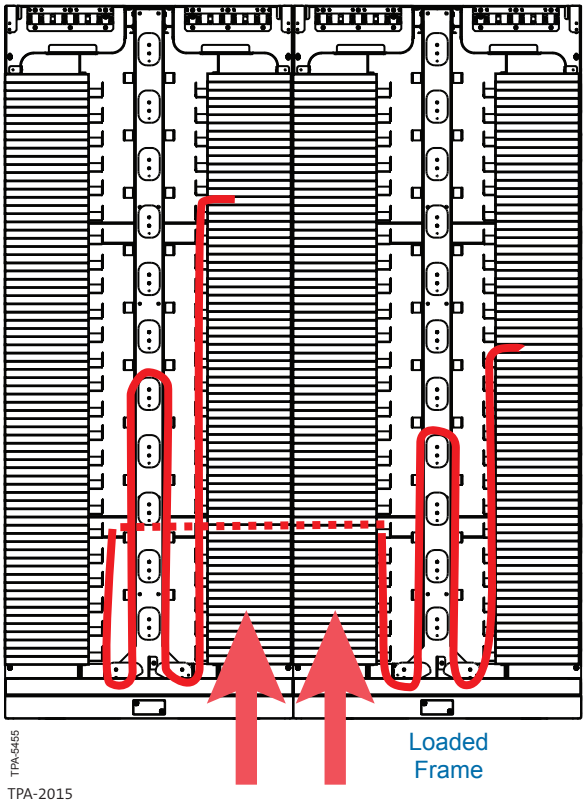
Outside Module to Outside Module



Inside Module to Inside Module



Inside Module to Outside Module



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Outside Module to Inside Module

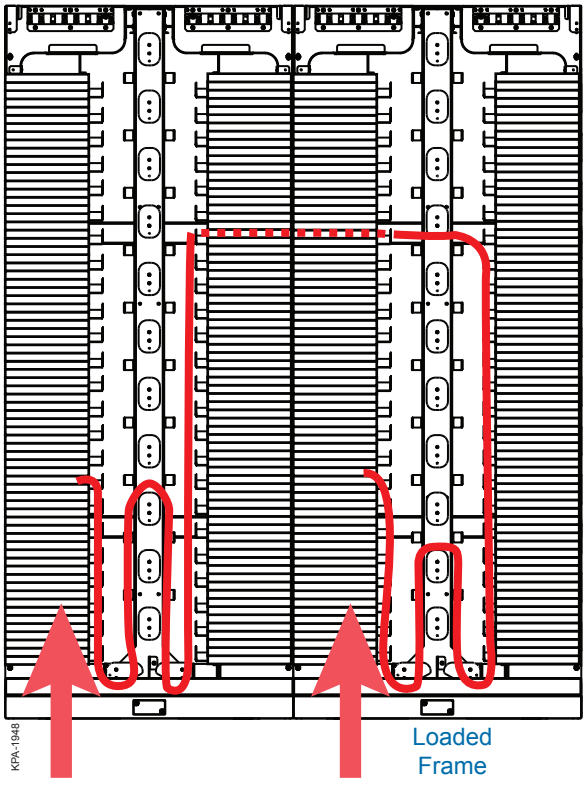

Figure 50

General Rules

When routing jumpers to adjacent frames, use a length of 7 meters (22.5 feet), plus 1.5 meters (5 feet) for every additional frame passed.

- Start routing jumper at frame with the heaviest load of fiber (for clarity this is called the source frame).
- Place slack in the frame with the least fiber load (the destination frame).
- Always use troughs to transition between frames.
- Always route fiber under a transition spool as fiber enters or leaves a frame.
- Distribute fiber between different troughs and spools in the IBU to minimize fiber loading.
- Refer to SRP 003-580, booklet SRP 003-599 attached to frame, or routing labels on the end of spools for jumper routing and distribution.
- If the fiber must pass overhead to cross an aisle or other passageway, route it up through the top of the IBU in the center of the frame (Figure 51).

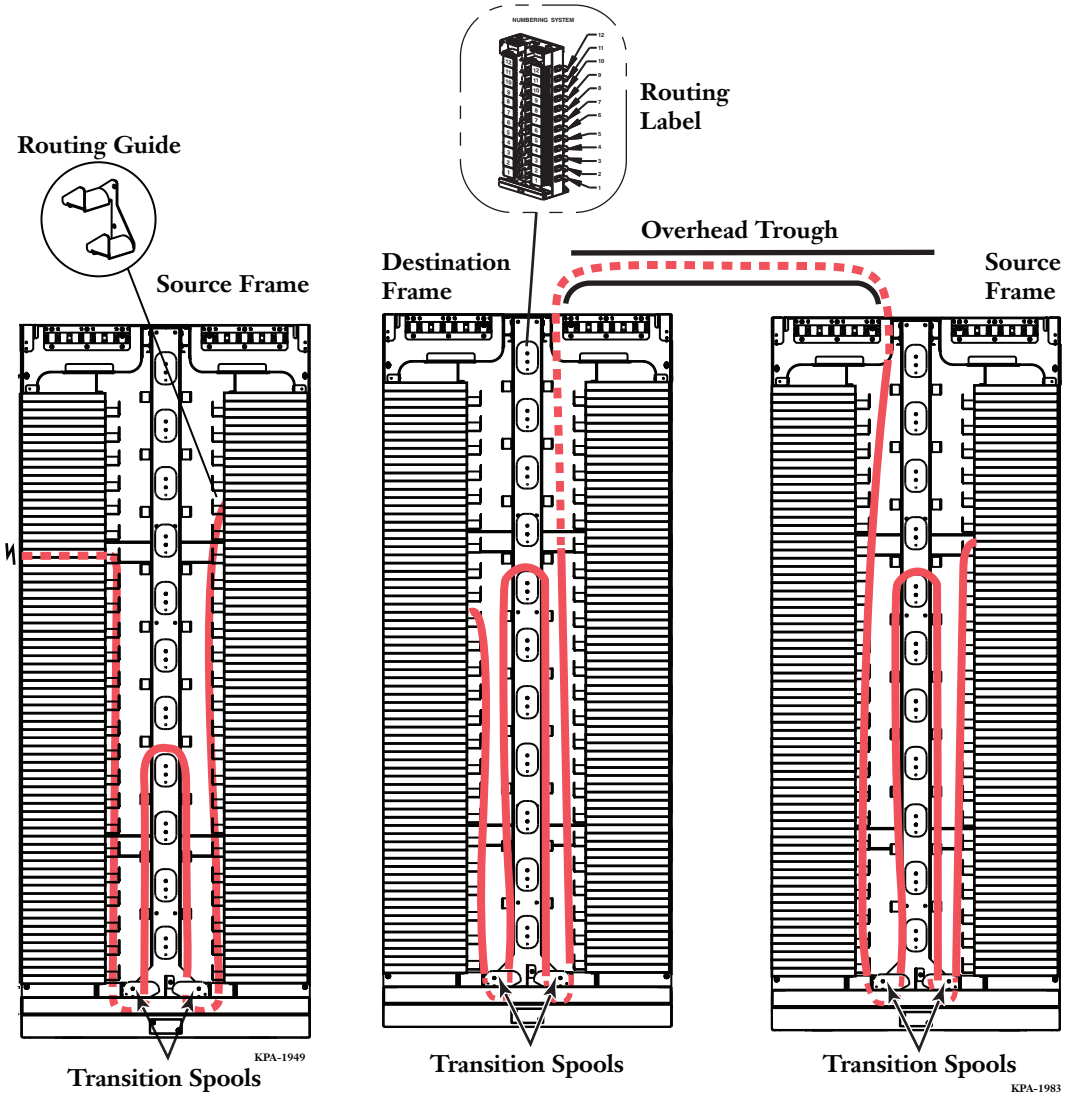

Figure 51

Step 1: Pull the modules to be connected forward to the detent position (Figure 45). Press the buttons on each side of the module to drop the handle (Figure 46).

Step 2: Remove dust caps from termination point adapter and the connector. Clean adapter and connector per standard company practices or as described in Section 13.

Step 3: Connect jumpers to module on most densely loaded frame. Possible connections and suggested routing paths are illustrated in Figure 50.

Step 4: Raise the handle in the source frame and push the jumpers down into the handle routing fins (Figure 48).

Step 5: Dress jumpers around the side of the module and up over the side guide (Figure 51).

Step 6: Route jumpers loosely under the transition spool on the same side of the IBU as the module, up through the opening into a trough, and lay it along the trough to the destination frame. To achieve the optimal slack storage, move the jumper cord up or down to a different trough or to a higher or lower IBU spool on the source frame. NOTE: If the jumper must pass overhead to cross an aisle or other passageway, route it up through the top of the IBU in the center of the frame, as shown in Figure 51 on the right.

Step 7: Insert the end of the jumper through to the front of the frame on the side of the IBU opposite from the destination module where the jumper will be connected (Figure 52).

Step 8: Route the jumper under the transition spool, up over a center spool on the IBU, and down under the second transition spool. When selecting a spool on the IBU to hold the jumper, select the highest spool that the jumper will reach without pulling on the jumper.

Step 9: Dress the jumper over the side guide as shown in Figure 52.

Step 10: Clean adapter and connector per standard company practices, or at a minimum as described in Section 13. Mate the connector to the destination module.

Step 11: Close both the source and destination modules. Dress jumper in both frames so it lies neatly with the other jumpers.

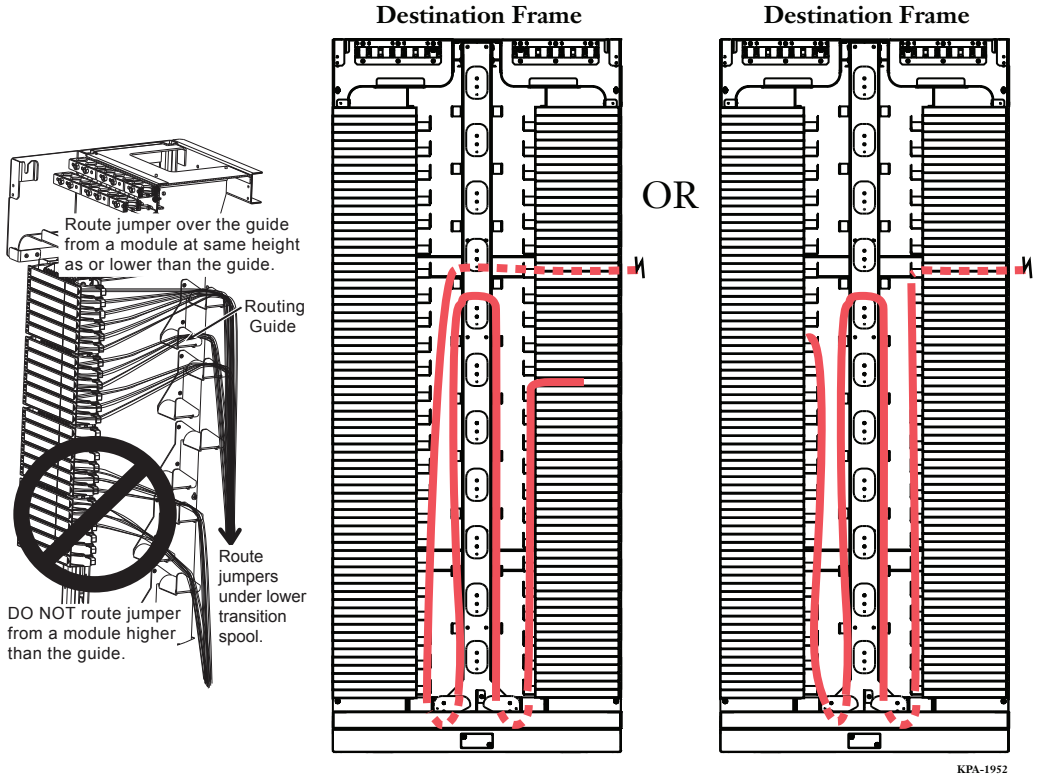

Figure 52

11.3 From Adjacent FMS Frames (Interframe)

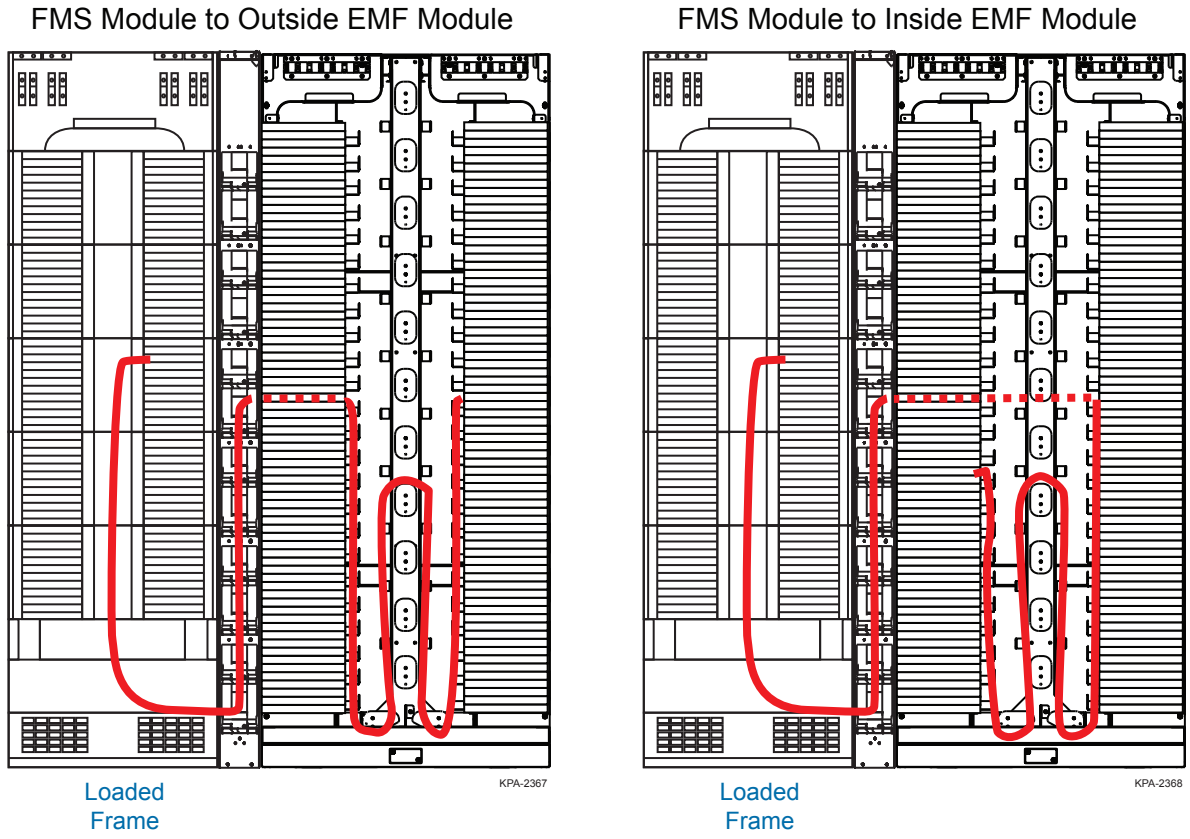

Figure 53

NOTE: *If routing from a low module to a low module in the other frame, use a higher trough to take up more of the slack and avoid congestion in the bottom of the FMS frame.*

12. Servicing Modules

If the fiber load is so heavy that the module cannot be pulled out to the detent position without putting strain on the jumper cord, take the following steps to relieve the tension.

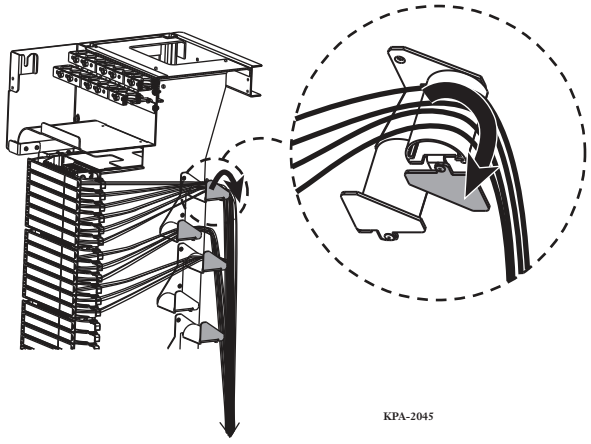

Figure 54

Step 1: Trace the jumper cord from the module being serviced back to the side guide over which it is routed.

Step 2: Separate the cord from the other fibers by lifting it above the others at the side guide.

Step 3: Rotate the side guide arm until it drops below the plastic radius guide (Figure 54).

Step 4: Drop the cord in front of the side guide. If necessary, rotate the side guide back up to prevent other cords from falling off during servicing. (If end hits the radius guide when rotating the arm back up, flex the arm out until it clears the radius guide.)

Step 5: Pull the module forward to the detent position or completely remove the module for servicing.

Step 6: Once servicing is complete, replace the module into the housing or push back into place. If necessary, rotate the side guide back down. Replace the cord over the side guide; rotate the side guide back up.

13. Connector Care and Cleaning

WARNING: Isopropyl alcohol is flammable with a flashpoint at 54ºF. It can cause irritation to eyes on contact. In case of contact, flush eyes with water for at least 15 minutes. Inhalation of vapors irritates the respiratory tract. Exposure to high concentrations has a narcotic effect, producing symptoms of dizziness, drowsiness, headache, staggering, unconsciousness and possibly death.

- Always keep dust caps on connectors and adapters when not in use.
- Ensure dust caps are clean before reuse.
- Use optical cleaning materials as standardized by your company.
- Clean the connector before every mating, especially for test equipment patch cords (jumpers).
- A minimum level of cleaning is listed below. Local procedures may require more rigorous cleaning methods.

Step 1: Remove plugs from the connector adapter.

Step 2: Wipe the connector ferrule twice with a lint-free wiping material moistened with isopropyl alcohol. Then wipe across the end of the ferrule.

Step 3: Repeat previous step with a dry wipe.

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