Installation Instructions
for 1 and 2-fiber UniCam® Connectors

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Corning Cable Systems
LANscape®
Fiber Cabling Solutions for Premises Networks

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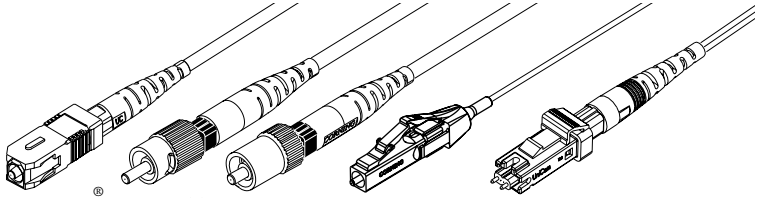
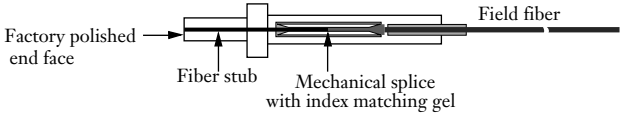
Introduction

This manual describes how to assemble Corning Cable Systems UniCam LC, MT-RJ compatible, SC, ST-compatible, and FC connectors. This document describes assembly of both multimode and single-mode connectors.





The patented UniCam connector is a mini-pigtail housed in a connector body. There is a fiber stub already bonded into the ferrule in the factory, where the end-face of the ferrule is polished to a PC finish. The other end of the fiber is cleaved and resides inside the connector. The field fiber is cleaved and inserted into the connector until it "butts up" against the fiber stub. A simple rotating cam actuation process completes the connector with no epoxy or polishing required. After strain relieving the fiber to the connector, it is ready to be mated to another connector inside an adapter.

A very important advantage of the UniCam connector design over other no-cure connectors is that the fiber is fully protected from the environment. The epoxy process and polishing process in the factory are carefully performed to make certain the UniCam connector will last virtually the entire life of the network.

The most significant advantages of the UniCam connector are clear when using it for installation at the outlet. The only tools required are a stripper, a cleaver, the installation tool, and an alcohol pad. As a result, assembly space can be kept to a minimum, set-up is quick, and assembly is relatively fast and easy with no consumables.

When taking into account the material, labor and consumables of connectorization, the UniCam connector is the most cost-effective in most instances.

Based on economics, performance, and ease of use, the UniCam connector is recommended as the connector of choice for the MC, IC, HC, and the Work Area Telecommunications Outlet. In addition, the UniCam connector is recommended as the connector of choice for the end-user when performing moves, adds, changes, or repairs in the network.

Please become familiar with the entire manual before starting to assemble a connector.

Precautions

Safety Glasses

WARNING: *The wearing of safety glasses to protect the eyes from accidental injury is strongly recommended when handling chemicals and cutting fiber. Pieces of glass fiber are very sharp and can easily damage the cornea of the eye.*

Chemical Precautions Isopropyl Alcohol

WARNING: I*sopropyl Alcohol is Flammable. Flashpoint = 54°F. Can cause irritation to eyes on contact. In case of eye contact, flush eyes with water for at least 15 minutes. Inhaling fumes may induce mild narcosis. In case of ingestion, consult a physician. Use with adequate ventilation.*

Fiber Precautions

WARNING: *Cleaved glass fibers are very sharp and can pierce the skin easily. Do not let cut pieces of fiber stick to your clothing or drop in the work area where they can cause injury later. Use tweezers to pick up cut or broken pieces of the glass fibers and place them on a loop to tape kept for that purpose alone. Good housekeeping is very important.*

Cable Handling Precautions

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 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.*

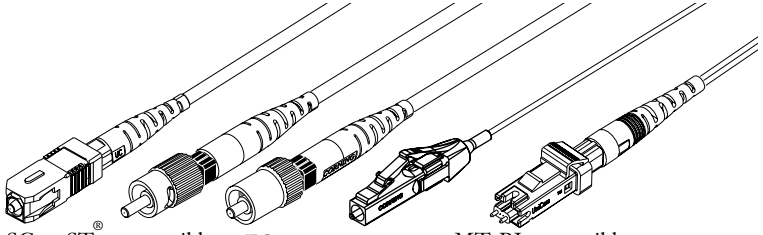
Laser Handling Precautions

 **WARNING:** *Laser light can damage your eyes. Laser light is invisible. Viewing it directly does not cause pain. The iris of the eye will not close involuntarily as when viewing a bright light. Consequently, serious damage to the retina of the eye is possible. Never look into the end of a fiber which may have a laser coupled to it. Should accidental eye exposure to laser light be suspected, arrange for an eye examination immediately.*

 **WARNING:** *DO NOT use magnifiers in the presence of laser radiation. Diffused laser light can cause eye damage if focused with optical instruments. Should accidental eye exposure to laser light be suspected, arrange for an eye examination immediately.*

Getting Started

1. Getting Started



1.1 General

1.1-1 This section provides an overview of how to order and assemble Corning Cable Systems UniCam LC, MT-RJ compatible, SC, ST-compatible, and FC connectors. In addition, this section provides a list of the four tool kits available for assembling 1 and 2-fiber UniCam connectors.

1.2-1 Please become familiar with the appropriate sections of this manual before starting to assemble a connector.

1.2. UniCam Tool Kit Contents

1.2-1 Table 1-1 describes Corning Cable Systems UniCam Tool kits and their contents:

Contents	TKT-UNICAM	TKT-UNICAM- ELITE	TKT-UNICAM-CTS	TKT-UNICAM-CTS-SF
Basic fiber preparation, stripping, marking tools; training video; complete installation instructions; tool bag.	√	√	√	√
TL-UC01 CTS Compatible UniCam Installation Tool	√	√	√	√
FBC-001 "Score and Snap" Fiber Cleaver	√		√	√
TKT-012-2F UNICAM CLEAVER/HANDLER COMBO KIT "High Performance" FBC-012 Fiber Cleaver, with 1-fiber and 2-fiber handlers.		√		
TEST-UNICAM-CTS UniCam Continuity Test System (CTS) includes CTS jumpers and CTS adapters for use with Pinned MT-RJ UniCam, No Pin MT-RJ UniCam, LC, SC, and ST-compatible UniCam.		√	√	
TEST-UNICAM-CTS-SF UniCam Continuity Test System (CTS) for single-fiber connectors only. Includes CTS jumpers and CTS adapters for use with LC, SC, and ST-compatible UniCam connectors.				√
VFL-350 Visual Fault Locator for use with CTS system.		√		

Table 1-1

1.2-2 The following tools and materials from the UniCam tool kits are required to complete the basic, non-CTS installations described in this manual**:**

- 2 in. scissors (Corning Cable Systems p/n 100294-01)
- Tweezers (100312-01)
- Fiber cleaver - either:

  FBC-012 (TKT-012-2F UNICAM CLEAVER/HANDLER COMBO KIT**)**

  or

  FBC-001 fiber cleaver (FBC-001)
- Alcohol wipes (1508001-01)
- Medium black marker (2104007-01)
- Tape (2104047-01)
- UniCam Installation Tool (TL-UC01)
- UniCam length gauge (2104282-01)
- UniCam crimp tool (3201007-01)
- Stripping tool (3205004-01)
- 203 µm No-Nik® stripper (3205007-01)
- Jacket stripper (3206001-01)

In addition, a Corning Cable Systems TKT-CCK Connector Cleaning Kit is recommended for routine connector maintenance.

1.3. Ordering Information – Corning Cable Systems UniCam Connectors

Part Number	Multimode Connectors	Part Number	Single-mode Connectors
95-000-40	SC Multimode, 62.5um, composite ferrule		
95-000-41	SC Multimode, 62.5um, ceramic ferrule	95-200-41	SC Single-mode, Super PC
95-050-41	SC Multimode, 50um, ceramic ferrule	95-200-42	SC Single-mode, Ultra PC
95-050-41-X	SC Multimode, 50um, SX+, ceramic ferrule		
95-000-50	ST Multimode, 62.5um, composite ferrule		
95-000-51	ST Multimode, 62.5um, ceramic ferrule	95-200-51	ST Single-mode, Super PC
95-050-51	ST Multimode, 50um, ceramic ferrule	95-200-52	ST Single-mode, Ultra PC
95-050-51-X	ST Multimode, 50um, SX+, ceramic ferrule		
95-000-61	FC Multimode, 62.5um, ceramic ferrule	95-200-61	FC Single-mode, Super PC
		95-200-62	FC Single-mode, Ultra PC
95-000-99	LC Multimode, 62.5, ceramic ferrule		
95-050-99	LC Multimode, 50um, ceramic ferrule	95-200-99	LC Single-mode, Ultra PC
95-050-99-X	LC Multimode, 50um SX+, ceramic ferrule		
92-001-97-P-E	MT-RJ, Multimode, 62.5um, with pins		
92-001-97-NP-E	MT-RJ, Multimode, 62.5um, no pins	92-201-97-P-E	MT-RJ, Single-mode, with pins
92-051-97-P-E	MT-RJ, Multimode, 50um, with pins	92-201-97-NP-E	MT-RJ, Single-mode, no pins
92-051-97-NP-E	MT-RJ, Multimode, 50um, no pins		
92-051-97-P-E-X	MT-RJ, Multimode, 50um, SX+, with pins		
92-051-97-NP-E-X	MT-RJ, Multimode, 50um, SX+, no pins		

Table 1-2

1.4 Critical Steps for 1 and 2-fiber UniCam Connectors

General

1.4-1 This section identifies **CRITICAL STEPS** that must be performed correctly to ensure successful installation of 1 and 2-fiber UniCam connectors. *This section is only a guide. After noting these critical steps, refer to the appropriate sections of this manual for complete instructions and precautions.*

1.4-2 Critical Steps

1. When loading connectors into the tool, the wrench handle on the installation tool must be in the **up** position (Figure 1).

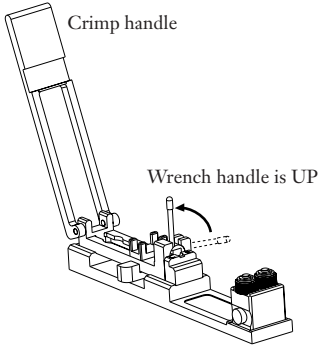


Figure 1

2. Verify that the connector cam on each connector is in the **open** position (Figure 2). Connector cams may move slightly in shipment (Figure 2):

MT-RJ, FC, and ST®-compatible connectors are in their open position when the cam key is positioned **90°from the the "up" label molded on the dust cap**.

SC connectors are in their open position when the cam key is positioned **90° from the date code**.

LC connectors are in their open position when the central groove on the cam is positioned **90° from the latch** which secures the front dust cap.

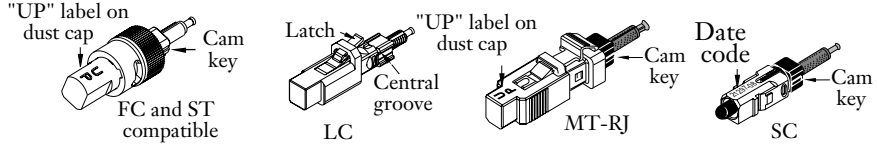


Figure 2

3. Place the connector into the tool correctly. The "date code" on SC, the "up" on the dust cap of ST-compatible, FC, and MT-RJ, or the latch of LC connectors must be up. **The lead-in tube must rest fully on the crimp platform as shown in the detail insets of Figure 3.** The dust cap must remain on the connector when placing it into the tool. Note: *Be sure the connector is fully seated in the tool.*

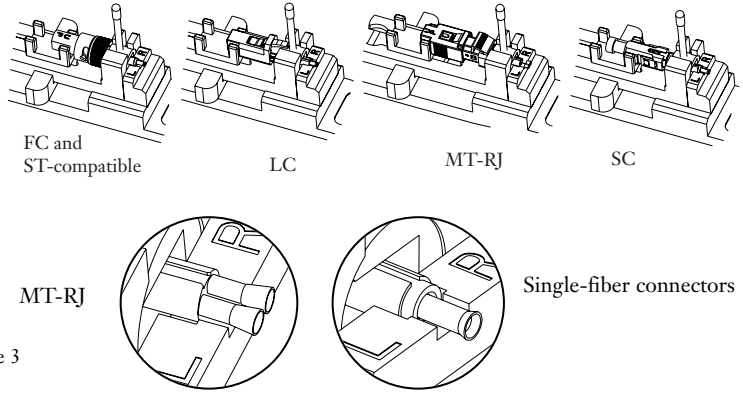


Figure 3

4. Slide the appropriate strain relief boot onto the fiber or cable (Figure 4).

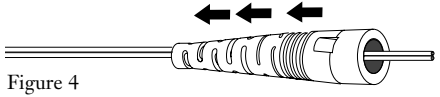


Figure 4

5. Strip approximately 40mm (1.5 inches) of fiber to bare fiber. Some fibers have clear coatings over the glass that are difficult to see.

Ensure all coatings are removed and the fiber is clean. Wipe the fiber clean with 90%+ isopropyl alcohol. Any coating left on the bare fiber will not fit into the connector splice and will have adverse effects on performance.

Critical Note: *Make the **visual mark** on the coated buffer (Figure 5). Later in the assembly process, this mark will provide you visual feedback that the field fiber has made contact with the stub fiber.*

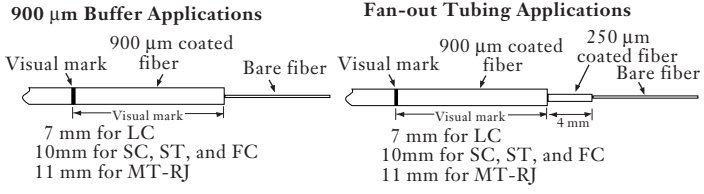


Figure 5

6. For LC, FC, SC, and ST-compatible installations on 2.9 mm single fiber cables and LC connectors on 1.6 / 2.0 mm single-fiber cables, position the crimp ring to secure the aramid yarn.

Fiber Cleave Length

7. ***The cleave is the most critical step in installing the UniCam connector.*** For consistent results, the Corning Cable Systems FBC-012 cleaver is recommended. However, any cleaver capable of producing quality cleaves at 8.5mm of bare fiber (+1.5/-0.5mm) can be used. Regardless of the cleaver used, ensure the fiber is prepared, cleaned, and the visual mark added to the buffer, before the cleave is performed.

For the FBC-012 Cleaver, load the fiber(s) into the appropriate handler as described in the appropriate connector section of this manual.

Place the handler into the FBC-012 cleaver so that the edge of the fiber coating lightly contacts the edge of the left-hand cleaver pad (Figure 6). **Visually align** the fiber coating with the edge of the pad as shown in Figure 6. Do not simply slide the handler over against the stop.

While holding the handler in this position, slowly press the cleaver's handle as far as it will go. Gently release the handle and remove the fiber handler from the cleaver.

Open the handler door, remove the fiber.

Once the fiber is cleaved, do not clean the fiber, or allow it to contact anything. If the cleave does contact something, start again.

Proceed to step 8

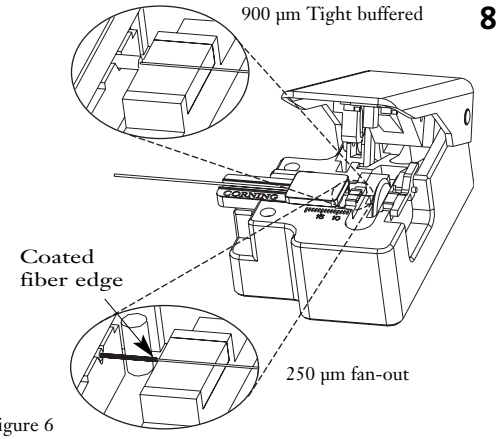


Figure 6

For the FBC-001 Cleaver, position the marks so that the buffer coating lines up with the fiber guide's stop (or at the 8.5 mm mark on older cleavers) and the end of the fiber is secured under the spring loaded fiber clamp (Figure 7a).

Press down the cleaver arm until it touches the fiber guide. This will apply enough pressure to "score" the fiber. Only light pressure is necessary.

Release the cleaver arm, then gently flex the fiber guide to break the fiber (Figure 7b). If the fiber guide is flexed excessively to break the fiber, a poor cleave will result. If this occurs, re-prep and re-cleave the fiber. **Once the fiber is cleaved, do not clean the fiber, or allow it to contact anything. If the cleave does contact something, start again at Step 5.**

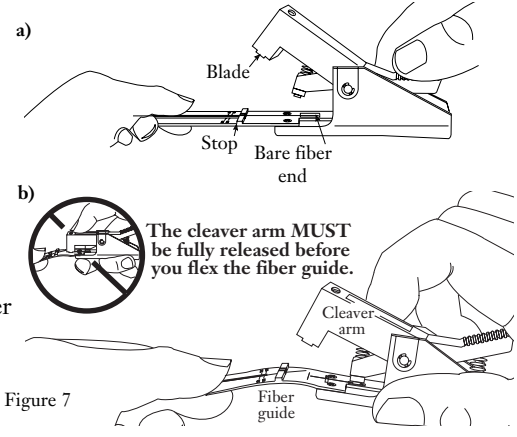


Figure 7

8. Press the index roller release button and load the buffered fiber(s) between the rollers. While pulling the fibers through the rollers, insert the fiber into the connector's lead-in tube until you feel it firmly stop against the connector's fiber stub. The index rollers will rotate, allowing the fiber to pull through. Use the rollers to apply inward pressure on the fibers so that a slight bow forms in the buffered fibers between the connector and the clamp. This bow is critical- it will ensure the fibers maintain contact with the stub fiber during Step 9.

Marks on fibers should be within 2 mm of the lead-in tube (Figure 8).

Never place bare fibers in the rollers.

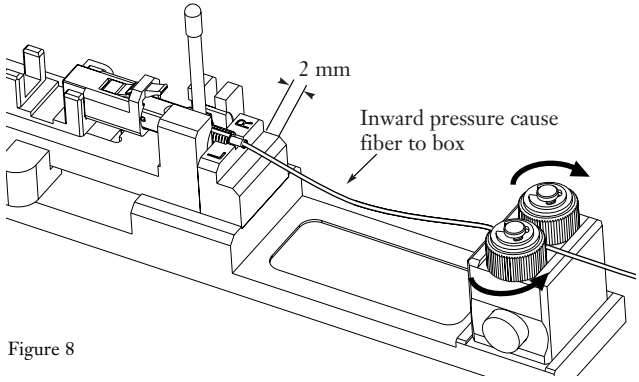


Figure 8

9. To cam the connector, rotate the wrench handle down until it stops. ***The wrench handle must stay down after this step (Figure 9).***

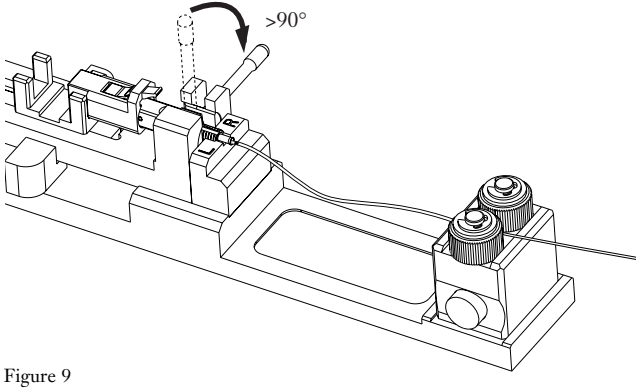


Figure 9

10. Rotate the crimp handle 180° until it contacts the lead-in tube (Figure 10). Push the handle down firmly and lift it back up.

Before removing the connector, be sure that the lead in tube appears crimped.

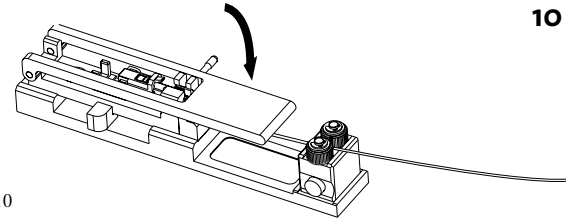


Figure 10

11. With the wrench handle remaining down (Figure 11):

a) Press the release button and lift straight up on the fiber to remove it.

b) Move the slider handle back and lift out the connector.

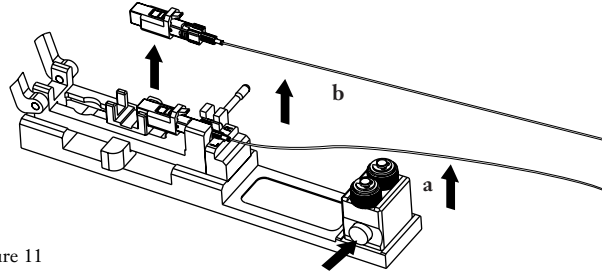


Figure 11

12. Depending on the connector type, add the appropriate hardware, additional strain relief, and connector boots (Figure 12).

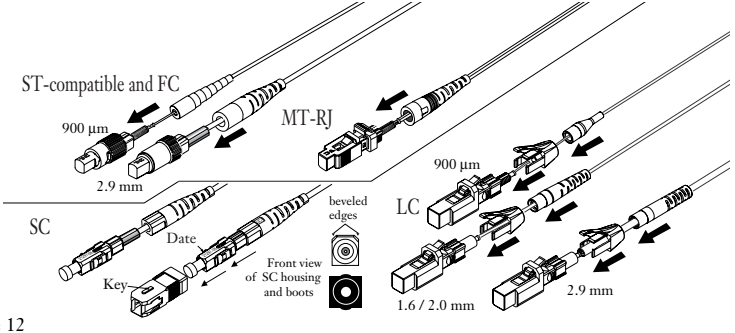


Figure 12

Installation Tools

2. Installation Tools

This chapter describes how to use the tools required to install UniCam connectors. Depending upon your tool kit, some of the following instructions may not be relevant for your installation.

The following tools are described in this section:

2.1 TL-UC01 UniCam Installation Tool

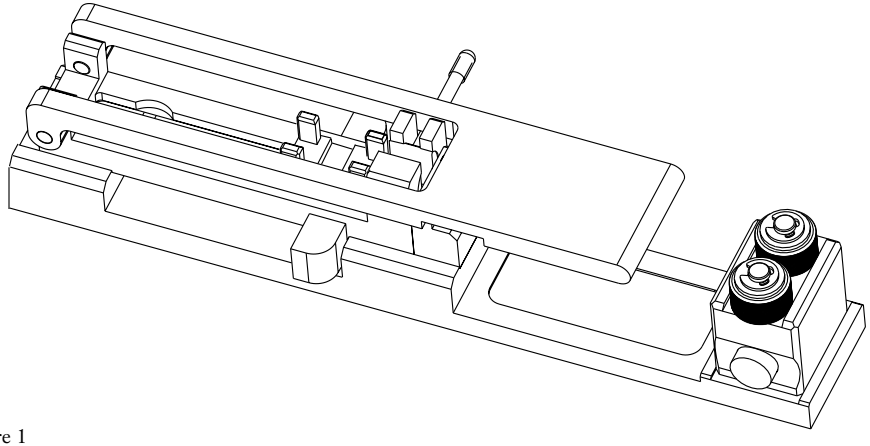


Figure 1

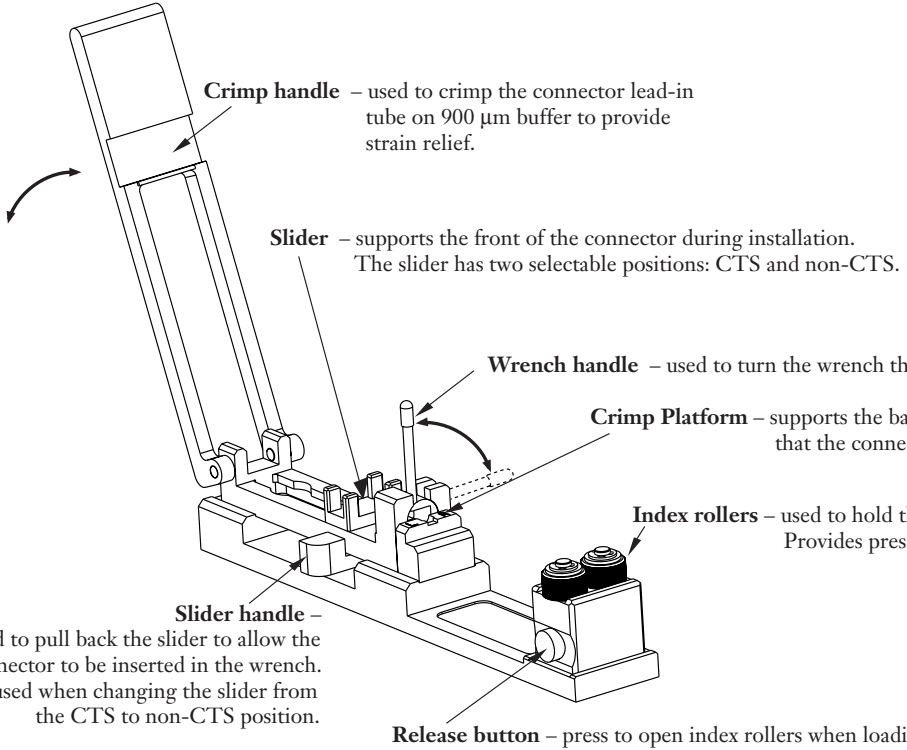
1. General

1.1 This section describes the components and maintenance of the TL-UC01 UniCam Installation Tool (Figure 1). As use of the tool is connector and fiber-specific, refer to the connector sections of this manual for installation instructions.

1.2 The TL-UC01 UniCam Installation tool is designed to install SC, FC, ST-Compatible, LC-Compatible, and MT-RJ Compatible UniCam connectors on a variety of fiber types. It can be used for both multimode and single-mode connectors.

1.3 Please read through this entire chapter and the relevant connector installation section before using the UniCam tool to install UniCam connectors.

2. Features and Components



Crimp handle – used to crimp the connector lead-in tube on 900 µm buffer to provide strain relief.

Slider – supports the front of the connector during installation. The slider has two selectable positions: CTS and non-CTS.

Wrench handle – used to turn the wrench that rotates the connector cam, aligning the fibers.

Crimp Platform – supports the back of the connector during installation. It is critical that the connector be positioned in the crimp platform correctly.

Index rollers – used to hold the fibers during insertion into the connector. Provides pressure to keep the fiber stubs butted during cam step.

Slider handle – Used to pull back the slider to allow the connector to be inserted in the wrench. Also used when changing the slider from the CTS to non-CTS position.

Release button – press to open index rollers when loading or unloading fiber.

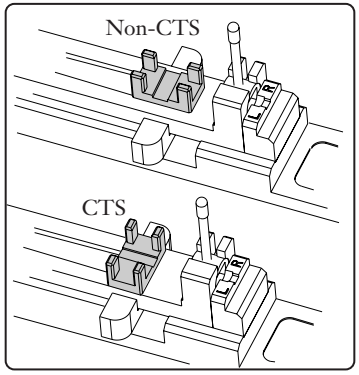


Figure 2

3. Maintenance

3.1 Before using the TL-UC01 UniCam Installation Tool, inspect the following components:

Wrench Handle – the wrench handle should rotate freely.

Crimp Handle – the crimp handle should rotate freely.

Slider Handle – the slider handle should pull smoothly to the rear and return to its original position under spring force.

Slider – the slider should rotate smoothly when the slider handle is pulled fully back against its stop.

Index Rollers – the index rollers should spin easily in one direction, and immediately lock in the opposite direction. The index rollers should contact each other until the release button is pressed. Do not attempt to force the rollers to spin in the "locking" direction.

Index Roller Release Button – the release button should move smoothly against its return spring.

3.2 If the Index Rollers become dirty, they may be cleaned with an alcohol wipe.

2.2 Continuity Test System

1. General

1.1 This section describes the Continuity Test System (CTS) provided in the **TEST-UNICAM-CTS kit.**

1.2 **The CTS system** includes:

- Splitter box for use with MT-RJ connectors
- SC-ST jumper
- ST-LC jumper
- SC duplex to pinned MT-RJ jumper
- SC duplex to non-pinned MT-RJ jumper
- Couplers for use with MT-RJ, SC, LC, and ST-compatible connectors.

The CTS jumpers can be used for both single-mode and multimode connectors.

The VFL-350 (provided in the TKT-UNICAM-ELITE kit or available separately) is the recommended light source for the system, although any Visual Fault Locator that accepts 2.5 mm ferruled connectors may be used. The operation of the VFL-350 is fully described in the following chapter of this section.

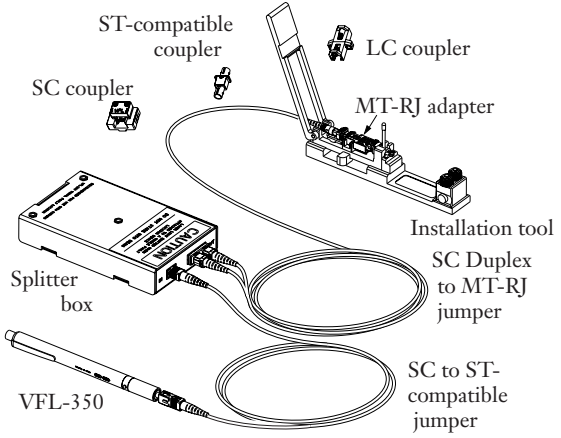


Figure 1

2. Operating Instructions

Note: Refer to the appropriate connector section of this manual for full instructions on loading connectors and couplers into the TL-UC01 installation tool.

2.1 **For MT-RJ connectors**, set up the continuity tester as shown in Figure 2:

a) Insert the SC connector on one end of the jumper into the IN port of the CTS splitter.

b) Insert the ST-compatible connector end of the jumper into the VFL-350.

c) **Pinned MT-RJ connectors** use the SC duplex / non-pinned MT-RJ CTS jumper. Install the SC duplex connectors into the OUT ports of the CTS splitter box.

Non-pinned MT-RJ connectors use the SC duplex / pinned MT-RJ CTS jumper. Install the SC duplex connectors into the OUT ports of the CTS splitter box.

d) Route the other end of the jumper through the open area of the crimp handle of the UniCam installation tool, and plug the MT-RJ connector into the CTS coupler and its connector (Figure 3).

Critical Step: *Make sure the routing will permit the crimp handle to swing fully down on the tool's crimp platform without damaging the jumper.*

Skip to step 2.3

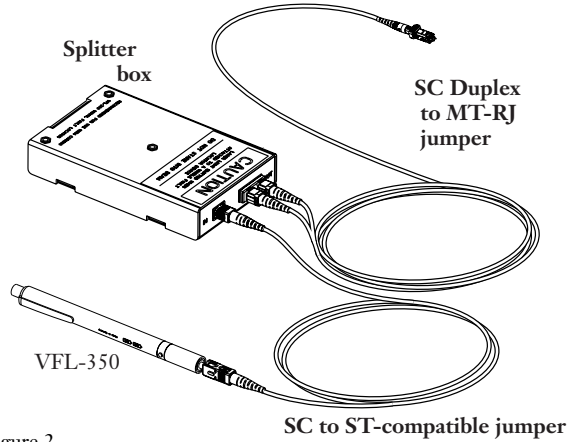


Figure 2

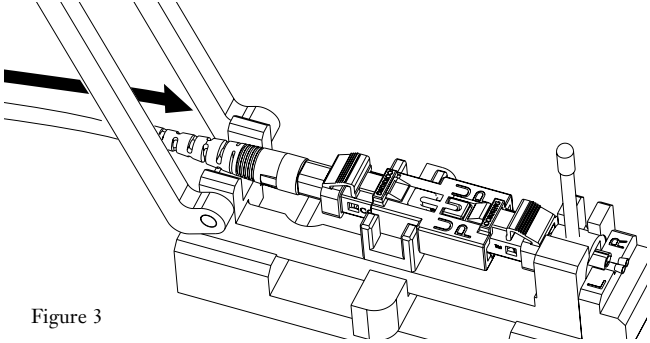


Figure 3

2.2 For SC, LC, and ST-compatible connectors, the splitter box is not required. To use the VFL-350 :

For SC connectors:

a) Insert the **ST-compatible** connector on the end of the SC-ST-compatible jumper into the VFL 350 (Figure 4, top).

Skip to step b.

For LC connectors:

a) Insert the **ST** connector on the end of the ST-LC jumper into the VFL 350 (Figure 4, lower).

Skip to step b.

For ST-compatible connectors:

a) Insert the **SC** connector on the end of the SC-ST-compatible jumper into the VFL-350 (Figure 4, lower).

b) Route the other end of the jumper through the open area of the crimp handle of the UniCam installation tool and plug the connector into the CTS coupler and its UniCam connector (Figure 5).

Critical Step: *Make sure the routing will permit the crimp handle to swing fully down on the tool's crimp platform without damaging the jumper.*

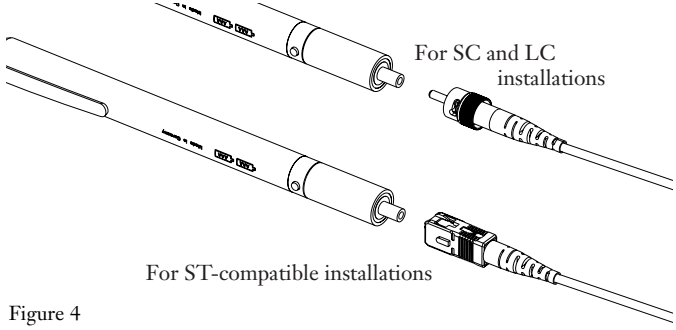


Figure 4

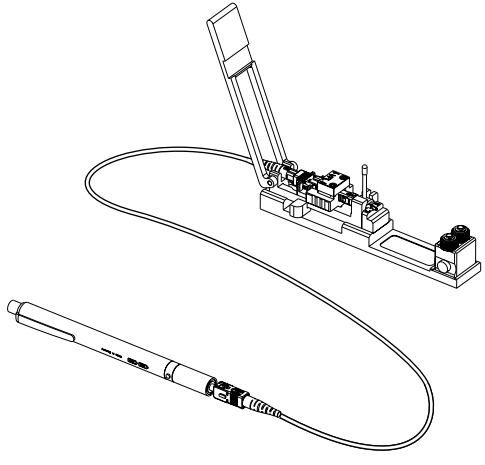


Figure 5

2.3 Turn on the VFL light source. A glow should be visible in the area of the cam (see Figure 6) when the CTS system is on.

2.4 Carefully insert the cleaved fiber(s) into the lead-in tube(s) of the connector until you feel them firmly stop against the connector's fiber stub(s).

- Guide the fibers in straight. Do not bend or angle them.
- If you feel resistance at the entry funnel, pull the fibers back out a short distance and re-insert.

Note: *If you have stripped and cleaved the fiber to the correct length, the end of the buffer marks should stop within 2 mm (0.08 in.) of the lead-in tube If the marks are not visible, the fibers may have been broken. Remove the connector, re-strip and recleave the fibers, and begin with a new connector.*

2.5 Apply the inward pressure to the field fiber(s) /cable as described in the connector installation instructions (Figure 6).

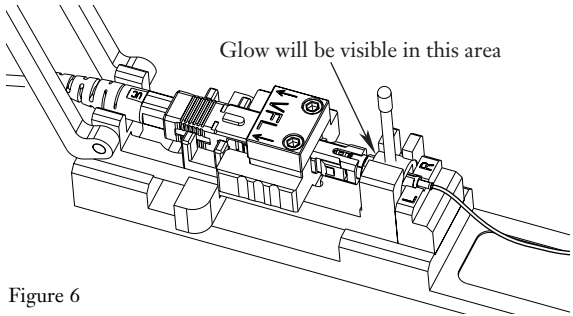


Figure 6

2.6 Rotate the wrench down until it stops. It is normal for the wrench to rotate beyond 90° (an audible click from the tool is normal). The fiber is now held inside the splice (Figure 7). **The glow from the connector's cam should noticeably dim after the wrench is rotated fully down.**

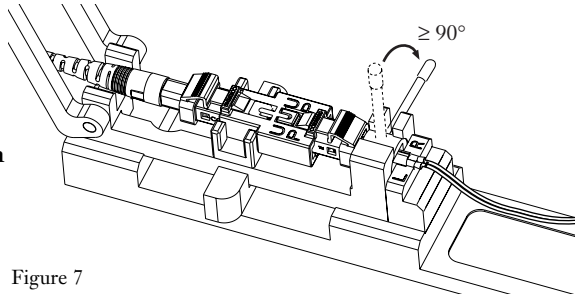


Figure 7

2.7 Carefully flip the crimp handle 180° until it contacts the crimp tube. Push down firmly to crimp (Figure 8). The tool cannot over crimp the connector.

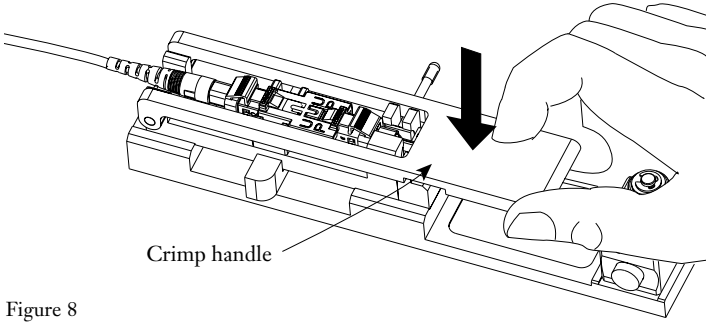


Figure 8

2.8 Turn off the light source and complete the installation as described in the connector installation sections.

2.3 VFL-350 Visual Fault Locator

1. General

1.1 The Corning Cable Systems VFL-350 emits either continuous or 3 Hz flashing visible laser light at a wavelength of approximately 635 nm to perform continuity checks and locate faults in both multi- and single mode fibers optical fibers and components (Figure 1).

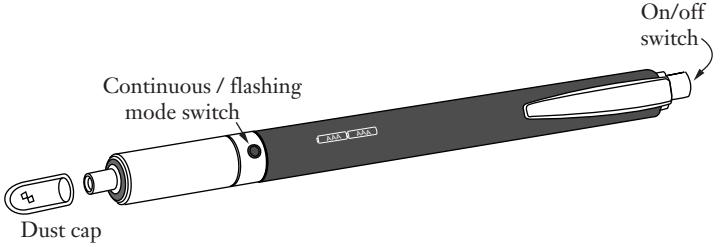


Figure 1

1.2 The VFL-350 makes use of a Class 2 laser with a power output of less than 1mW. Under normal operations, the laser light is not dangerous.

1.3 As shipped, the VFL-350 is suitable for standard 2.5 mm single fiber connector ferrules. Corning Cable Systems CTS kits, e.g TKT-UNICAM- CTS, contain a splitter which will permit use of a VFL-350 with 2-fiber connectors.

1.4 The VFL-350 has the following general specifications:

Power requirements: 2 AAA alkaline batteries (provided)
Battery life: Approximately 40 hours in flashing mode
Operating temperature -10to +40 C
Storage temperature -40to +70 C

2. Precautions

LASER PRECAUTIONS

CAUTION: LASER RADIATION. DO NOT STARE INTO BEAM. CLASS 2 LASER PRODUCT. EN 60825-1/94.

3. Operating the VFL-350

3.1 To operate the VFL-350:

a) After removing the dust cap, fully insert the connector ferrule into the adapter on the front of the locator (Figure 2).

b) Turn the locator on by pressing the on /off switch at the end of the unit.

c) Press the continuous / flashing mode switch on the side of the locator for the continuous setting.

d) Replace the dust cap on the VFL after you have completed the fault location or continuity check.

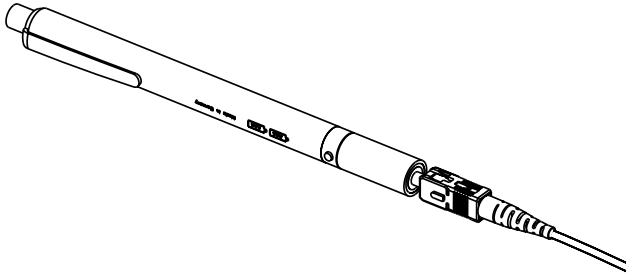


Figure 2

4. Battery Replacement

4.1 To replace the batteries in the VFL-350 (Figure 3):

a) After turning the VFL-350 off, unscrew the laser unit on the front of the locator.

b) Insert two AAA alkaline batteries as shown in Figure 3.

c) Screw the laser unit back into place.

d) Properly dispose of the used batteries.

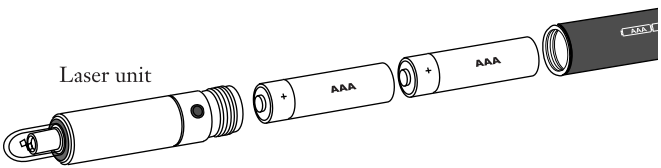


Figure 3

2.4 FBC-012 Cleaver with 1 and 2-Fiber Handlers

1. General

1.1 This procedure provides an overview on how to use the FBC-012 high precision cleaver in UniCam connector installations (Figure 1). Equipped with interchangeable fiber holders for both one and two fiber cleaves, the FBC-012 cleaver is suitable for both single-mode and multimode fiber applications.

1.2 This procedure assumes that you have stripped and cleaned the fiber to be cleaved according to the appropriate fiber stripping procedure.

1.3 Refer to the FBC-012 cleaver instructions (S46999-L6051-P451) for complete precautions, operating instructions, and maintenance information.

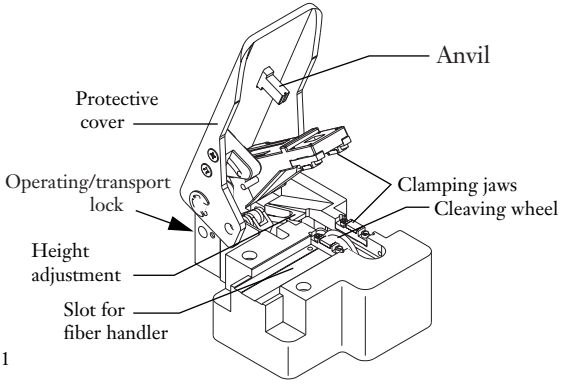


Figure 1

1.4 This section contains precautions and maintenance steps common to both fiber handlers, followed by:

- MT-RJ connector installation with the two fiber handler (Section 5, page 28).
- SC, LC, FC, and ST-compatible connector installation with the single- fiber handler (Section 6, page 32).

2. Precautions

2.1 Refer to the UniCam Installation instructions in this manual and FBC-012 cleaver operating instructions (S46999-L6051-P451) for additional precautions.

Safety Glasses

WARNING: *The wearing of safety glasses to protect the eyes from accidental injury is strongly recommended when handling cutting fiber. Pieces of glass fiber are very sharp and can damage the cornea of the eye easily.*

Chemical Precautions

WARNING: *Isopropyl alcohol is flammable with a flashpoint at 54°F. It can cause irritation to eyes on contact. In case of eye contact, flush eyes with water for at least 15 minutes. Inhaling fumes may induce mild narcosis. In case of ingestion, consult a physician.*

Cable Handling Precautions

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.*

Fiber Precautions

WARNING: *Cleaved glass fibers are very sharp and can pierce the skin easily. Do not let cut pieces of fiber stick to your clothing or drop in the work area where they can cause injury later. Use tweezers to pick up cut or broken pieces of the glass fibers and place them on a loop of tape kept for that purpose alone. Good housekeeping is very important.*

3. Tools and Materials

3.1 In addition to the cleaver, you will need:

- a loop of tape
- tweezers
- alcohol and wipes

4. Maintenance

4.1 To open the FBC-012 from its transport position, slide the lock on the back of the cleaver to its operating position (Figure 2).

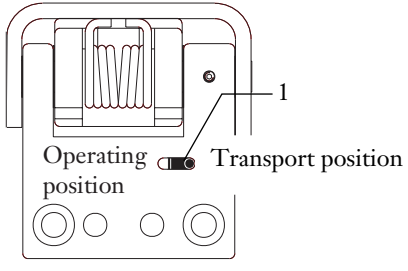


Figure 2

4.2 The FBC-012 cleaver is equipped with a 12 position cleave blade. Each blade position is rated for 2,000 individual cleaves (1,000 2-fiber MT-RJ cleaves).

Rotate the blade to the next unused position after 2,000 individual cleaves or 1,000 MT-RJ cleaves. After all 12 blade positions have been used, replace the blade with p/n FBC-012-01. Refer to the FBC-012 cleaver operating instructions (S46999-L6051-P451) for complete blade rotation and replacement procedures.

4.3 Refer to the FBC-012 cleaver operating instructions (S46999-L6051-P451) for complete maintenance procedures. Make sure that the cleaver has the proper setting for your fiber, is free of dirt and debris, and is otherwise ready for use.

4.4 Inspect the following areas of the fiber handlers prior to use (Figures 3 and 4) :

Two-fiber Handler

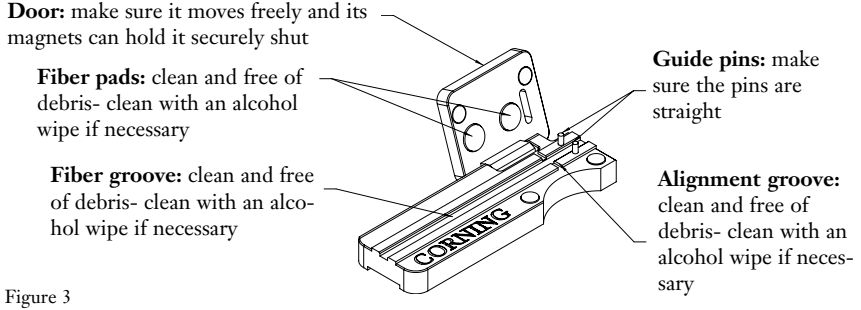


Figure 3

Single-fiber Handler

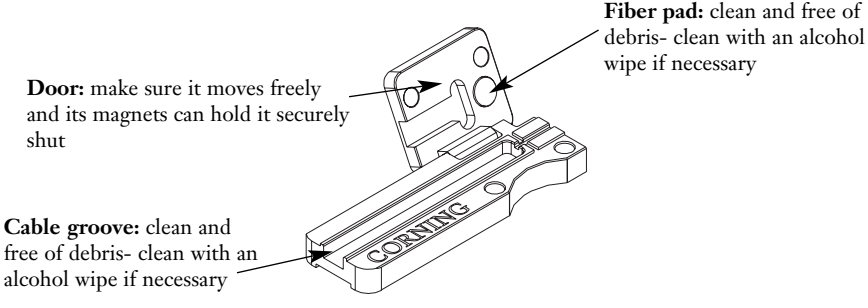


Figure 4

5. MT-RJ Connector Installation with the Two-fiber Handler

5.1 The High Performance 2 Fiber UniCam Fiber Handler is designed to allow a Corning Cables Systems FBC-012 cleaver to simultaneously cleave two 900 µm tight buffered, or two 900 µm fan-out fibers for use in the UniCam MT-RJ connector. The handler and cleaver may be used in both single-mode and multi-mode fiber applications.

This procedure should be used along with appropriate UniCam connector installation instructions and the instructions packaged with the FBC-012 cleaver.

5.2 Prepare the fibers for cleaving per the connector instructions.

Critical Step – *The buffer marks must be made on the fibers per the connector instructions.*

5.3 Open the door on the 2-fiber handler.

5.4 Prior to placing the fibers in the handler, align them, ensuring that the ends of the fibers' coatings are lined up (Figure 5).

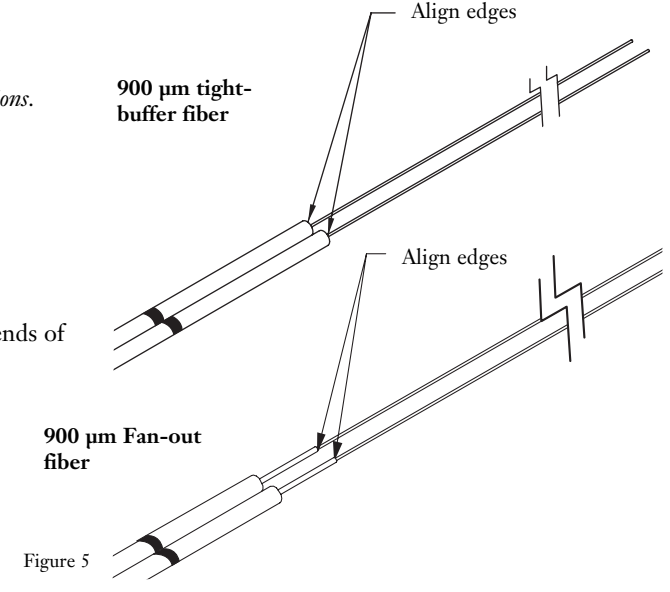


Figure 5

5.5 Using the two pins as a guide, place the fibers into the groove in the handler. The bare fiber should not contact the handler – only place coated fiber in the groove (Figure 6).

Critical Step – *Do not drag the bare fibers against the handler. Only coated fiber should contact the groove in the handler.*

5.6 Verify that the ends of the fibers' coatings are still aligned, and position the fibers in the handler, such that the buffer marks fall within the indicated alignment slot (Figure 6).

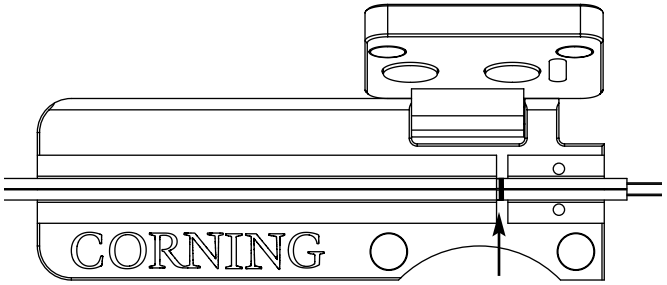
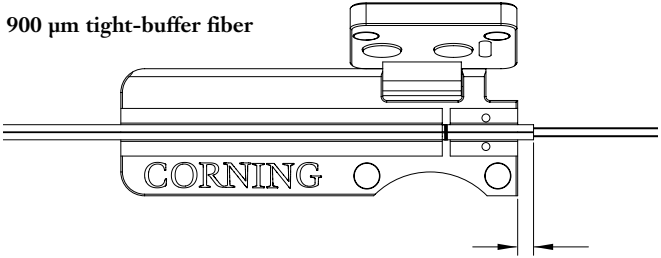


Figure 6

5.7 Verify that the fibers are not crossed in the groove, and gently close the door on the handler.

- Ensure that the ends of the fibers' coatings are still aligned.
- If the coating ends are not aligned and protruding at least 1mm from the handler (Figure 7), open the handler door, remove the fibers and reload them in the handler.

900 µm tight-buffer fiber



900 µm Fan-out fiber

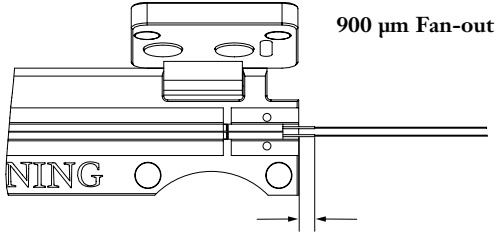


Figure 7

If there is not at least 1 mm of coated fiber protruding from the handler, open the handler door, remove the fiber, and reload the fiber in the handler

5.8 Carefully position the handler in the cleaver so that the edges of the fibers' coatings butt against the edge of the left-hand elastomeric pad (Figure 8). The coating should lightly contact the pad's edge. No pressure is required.

IMPORTANT: *The fibers must be visually aligned with the edge of the elastomeric pad during this step. Do not simply slide the handler against the stop. Poor cleave quality and incorrect cleave length will result.*

Critical Steps – *The fibers should lay flat across the fiber pads. If the fibers are crossed, gently brush their free ends to straighten them.*

The fibers' coatings should not extend onto the pad. Clamping coated fiber in the pad may result in poor cleave quality and incorrect cleave lengths.

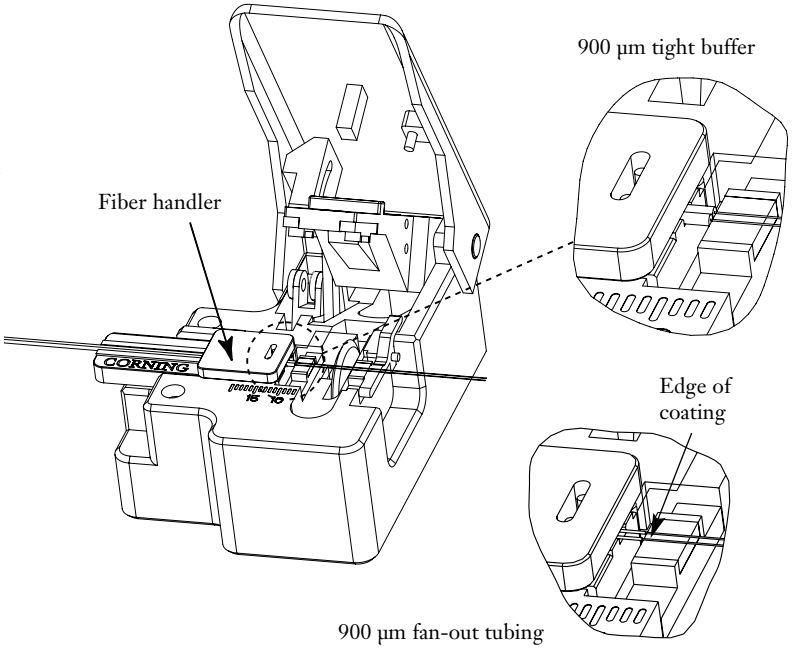


Figure 8

5.9 While gently holding the handler in position, with the coating butted against the elastomeric pad, slowly press the cleaver's handle down as far as it will go (Figure 9).

Gently release the handle and remove the handler from the cleaver.

5.10 Use tweezers to remove the scrap fiber ends and place them on a loop of tape kept for that purpose alone.

5.11 Open the door on the handler and remove the cleaved fibers.

5.12 The fibers are now ready for installation per the MT-RJ connector instructions.

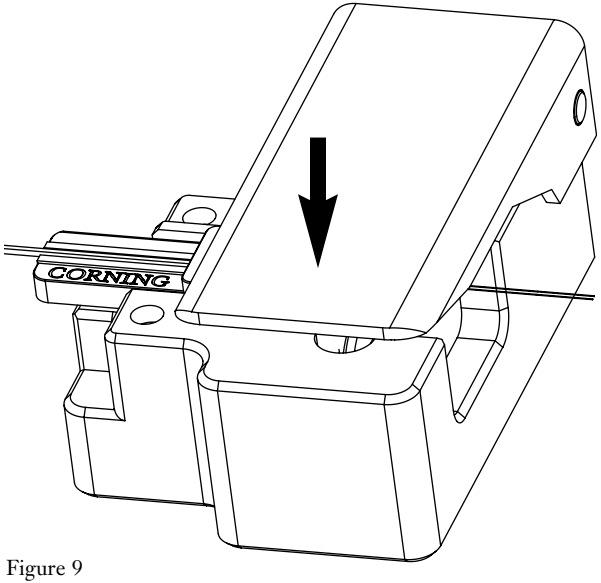


Figure 9

6. UniCam Single-Fiber Handler for the FBC-012 Cleaver

General

6.1 The Single-Fiber Handler is designed to allow a Corning Cable Systems' FBC-012 cleaver to cleave the following fiber types for use with single-fiber UniCam connectors:

- 900 µm tight-buffered (TB)
- 900 µm fan-out (FO)
- Single-fiber jacketed cable up to 2.9 mm diameter
- 250 µm fan-out tubing (FTB)

The single-fiber UniCam handler (Figure 10) and the FBC-012 cleaver may be used in both single-mode and multimode fiber applications.

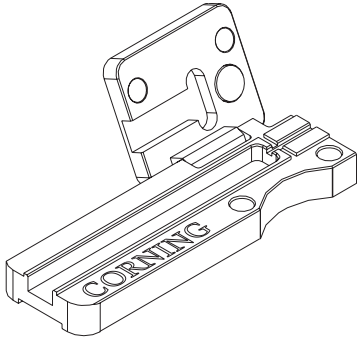


Figure 10

Fiber Loading

6.2 Prepare fiber for cleaving per the connector instructions.

Critical Step - *The buffer marks must be made on the fiber per the connector instructions.*

6.3 Open the door on the single-fiber handler. Verify the handler is clean and free of debris in the fiber groove.

6.4 Place the fiber into the groove in the handler.

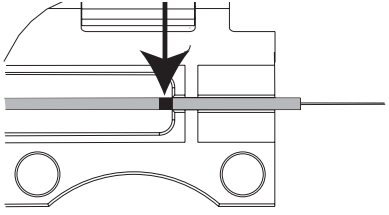
Critical Step — *Do not drag the bare fiber against the handler. Only coated fiber should contact the groove in the handler. Bare fiber must not contact the groove.*

6.5 Align the fiber in the handler as indicated for the connector/fiber type being installed (Figures 11 through 14).

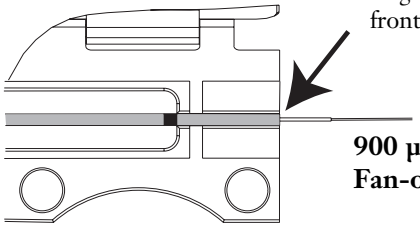
UniCam SC /FC/ ST-compatible connectors

900 µm Tight-buffered

Align buffer mark with edge of cable groove



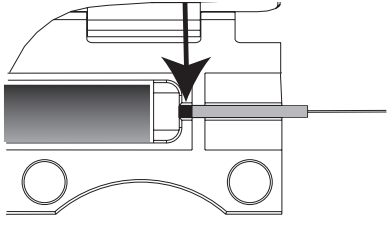
Align end of fan-out with front edge of handler



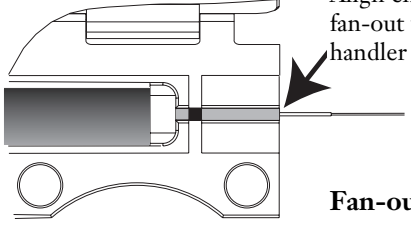
900 µm (Outside Diameter) Fan-out

2.9 mm Single-fiber cable

Butt 2.9 mm jacket edge against edge of cable groove



Align end of 900 µm OD fan-out with front edge of handler



Fan-out Tubing 250 µm

Figure 11

UniCam LC connectors

900 µm Tight-buffered

Align buffer mark with alignment groove

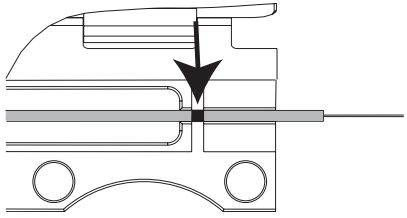


Figure 12

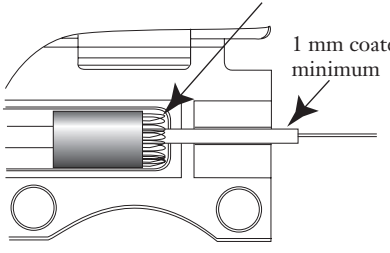


Figure 13

1.6 / 2.0 / 2.9 mm Jacketed Cable

Align end of fan-out with
front edge
of handler

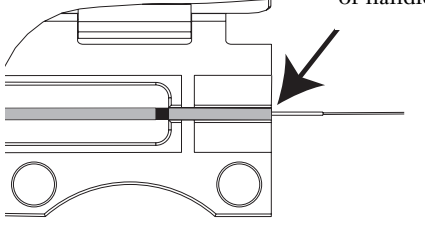


Figure 14

900 µm (Outside Diameter) Fan-out

6.6 Gently close the door on the handler. Ensure that at least 1 mm of coated fiber protrudes from the handler.

6.7 Position the handler in the cleaver so that the edge of the fiber coating aligns with the edge of the left-hand elastomeric pad (Figure 15). The coating should lightly contact the pad's edge. No pressure is required.

If there is not at least 1 mm of coated fiber protruding from the handler, open the handler door, remove the fiber, and reload the fiber in the handler

IMPORTANT: *The fiber must be visually aligned with the edge of the elastomeric pad during this step. Do not simply slide the handler against the stop. Poor cleave quality and incorrect cleave length will result.*

Critical Steps — *The fiber should lay flat across the fiber pad.*

When cleaving fan-out, align the edge of the 250 µm coating with the fiber pad. The fiber coating should not extend onto the pad. Clamping coated fiber in the pad may result in poor cleave quality and incorrect cleave lengths.

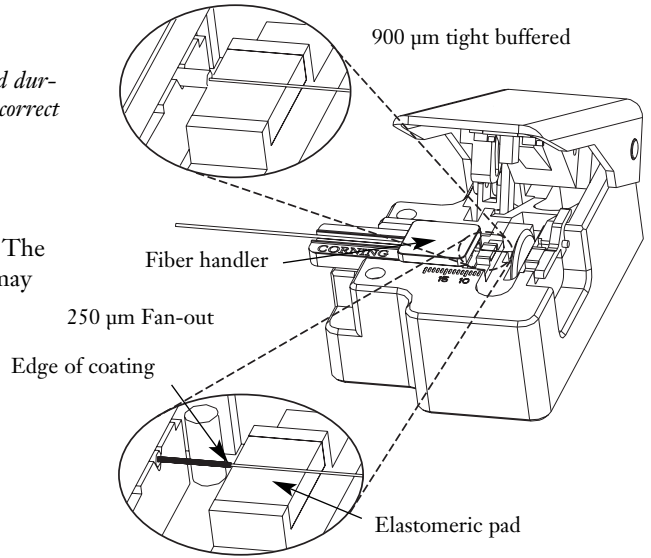


Figure 15

6.8 While carefully holding the handler in position, with the coating butted against the elastomeric pad, slowly press the cleaver's handle as far as it will go (Figure 16).

Gently release the handle and remove the handler from the cleaver.

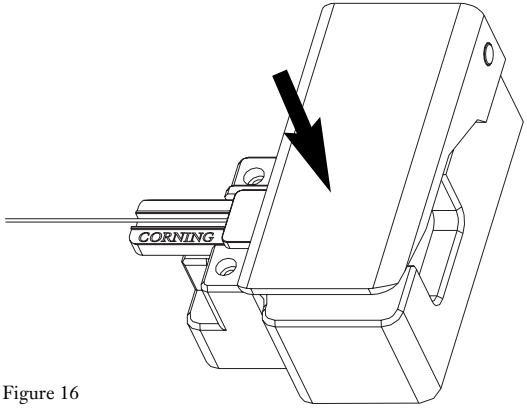


Figure 16

6.9 Use tweezers to remove the scrap fiber end from the cleaver and place it on a loop of tape kept for that purpose alone.

6.10 Open the door on the handler and remove the cleaved fiber.

6.11 The fiber is now ready for installation per the connector instructions.

2.5 Corning Cable Systems Stripping Tool for Buffers

1. General

1.1 This procedure describes how to use a Corning Cable Systems stripping tool for buffers (p/n 3206001) to score semi-rigid buffer tubes and to cut outer jacketing on tight buffered pigtails and furcation tubing.

1.2 The buffer stripping tool is a plier-type wire stripper. The notches in the tool's jaws are marked with both AWG (American Wire Gauge) and metric hole sizes (Figure 1).

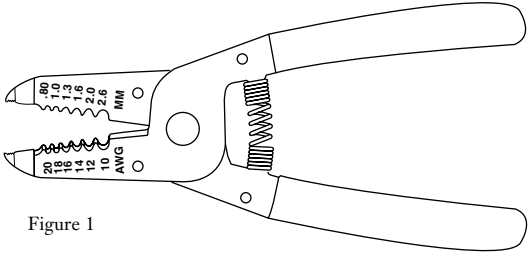


Figure 1

2. Precautions

Safety Glasses

WARNING: *The wearing of safety glasses to protect the eyes from accidental injury is strongly recommended when handling cutting fiber. Pieces of glass fiber are very sharp and can damage the cornea of the eye easily.*

Cable Handling Precautions

WARNING: *Cleaved glass fibers are very sharp and can pierce the skin easily. Do not let cut pieces of fiber stick to your clothing or drop in the work area where they can cause injury later. Use tweezers to pick up cut or broken pieces of the glass fibers and place them on a loop of tape kept for that purpose alone. Good housekeeping is very important.*

Tool Precautions

CAUTION: *When using this tool to strip buffers, do NOT attempt to slide severed tubing or jacketing off the fibers with the sliding motion commonly used to strip copper wire with this tool. Doing so may break the fibers.*

3. Stripping Procedure

3.1 Select the correct size notch for the buffer you are stripping from Table 1.

Cable Jacket Diameter	**AWG Size**
1.6 mm	18
2.0 mm	16
2.9 mm	14

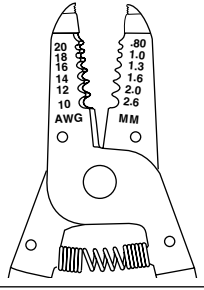


Table 1

3.2 Close the tool over the buffer. For consistent results, hold the tool perpendicular to the buffer (Figure 2).

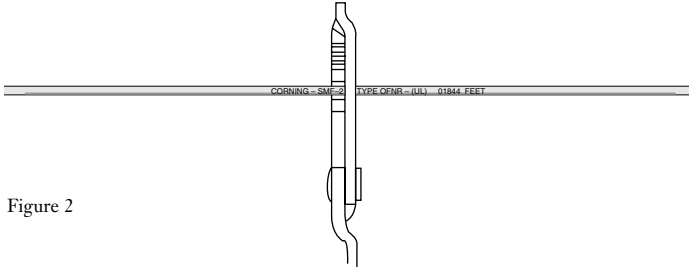


Figure 2

3.3 Squeeze the tool shut to cut the jacketing. If the material is not cleanly cut with the first effort, rotate the tool slightly and complete the cut. Remove the tool and carefully slide the jacketing off the yarn by hand.

2.6 Stripping Fiber Coating with a 203 µm No-Nik® Tool

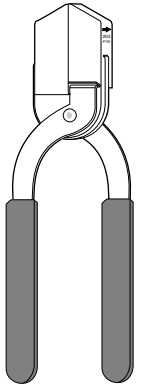


Figure 1

1. General

1.1 This procedure describes how to strip fiber coating with a 203 µm size No-Nik tool (Figure 1).

1.2 The 203 µm tool (Corning Cable Systems part number 3205007-01) is identified by its red handles and the size marking on the blade housing.

1.3 *Always use the stripping tool specified in the Corning Cable Systems SRP applicable to the cable you are stripping.*

1.4 For further details about this No-Nik tool, see the manufacturer's instructions which accompany the tool.

Safety Glasses

WARNING: *The wearing of safety glasses to protect the eyes from accidental injury is strongly recommended when handling chemicals and cutting fiber. Pieces of glass fiber are very sharp and can damage the cornea of the eye easily.*

Fiber Precautions

WARNING: *Cleaved glass fibers are very sharp and can pierce the skin easily. Do not let cut pieces of fiber stick to your clothing or drop in the work area where they can cause injury later. Use tweezers to pick up cut or broken pieces of the glass fibers and place them on a loop of tape kept for that purpose alone. Good housekeeping is very important.*

Cable Handling Precautions

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.*

3. Tools and Materials

3.1 In addition to the No-Nik tool, this procedure may require emery cloth (optional)

4. Checking the Tool

4.1 Before using the tool:

- Open the tool and make sure that the blades are clean and free from any coating fragments that might prevent the tool from making a clean cut.
  If necessary, clean the tool as described in the manufacturer's instructions.

- Check the tool's blades on a piece of scrap fiber to make sure that the tool is sharp enough to make a clean cut through the coating. To do so:

  a) Place the fiber in the V-grooves of the tool and squeeze the handles.

  b) Release the fiber from the tool without moving the tool down the fiber.

  c) Check the cut with a magnifier. The cut should be clean and complete (Figure 2).

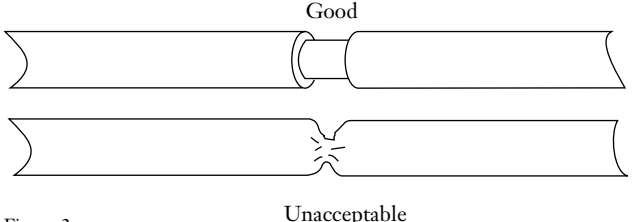


Figure 2

5. Using the Tool

5.1 Grasp the buffered fiber between the thumb and forefinger of your left hand.

If the fiber slides easily through your fingers, hold it with a piece of emery cloth.

5.2 To strip a fiber:

a) Hold the No-Nik tool in your right hand so that the directional arrow is visible and pointing to the right.

b) Open the tool with its handles. Note the actual location of the blades in the blade housing (Figure 3).

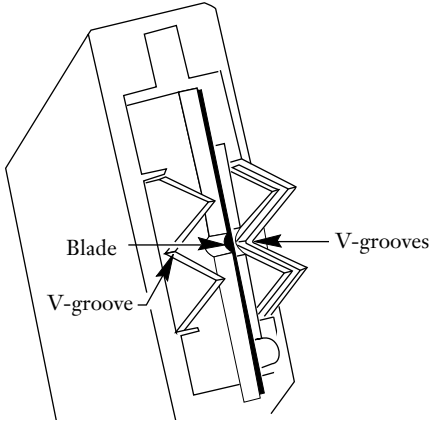


Figure 3

CAUTION: *Some connector installations may require you to position the tool's arrow towards the cable jacket and use the tool to score the coating as close as possible to the edge of the jacket. Consult the fiber stripping instructions for the cable and/or connector you are installing to determine if the stripping tool must be removed after step d) and the coating or buffer removed by hand, or if the No-Nik tool may be used to "push" the coating off the fiber. Failure to follow the instructions may result in a broken fiber or incorrect strip length.*

c) Place the fiber in the V-grooves in the blade housing so that no more than 2 mm (0.08 in.) of coated fiber extends beyond the housing (Figure 4). This positioning will provide a total strip length of 6 mm (0.25 in).

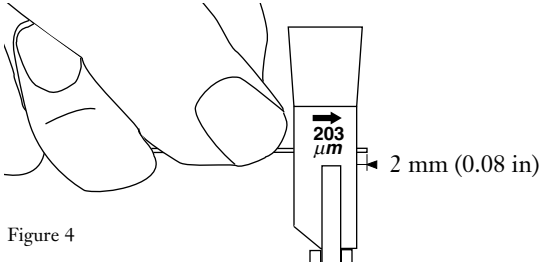


Figure 4

d) Clamp down on the fiber and make the cut in the buffer by squeezing the No-Nik tool handles together. Pause briefly to allow the coating to pull away from the fiber.

e) Depending upon the installation instructions you are following, either:

- remove the tool and pull the buffer off the fibers by hand (Figure 5)...

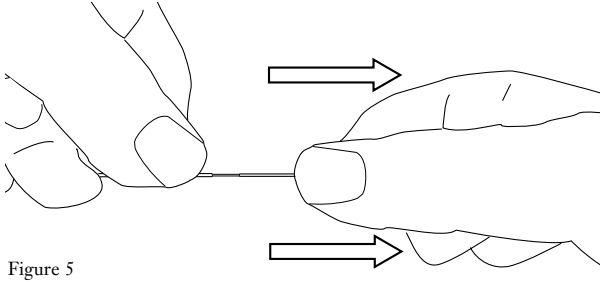


Figure 5

- or place your right thumb along the left side of the tool. Push the No-Nik tool along the fiber axis in a smooth, straight stroke to slide the severed piece of coating off of the fiber (Figure 6).

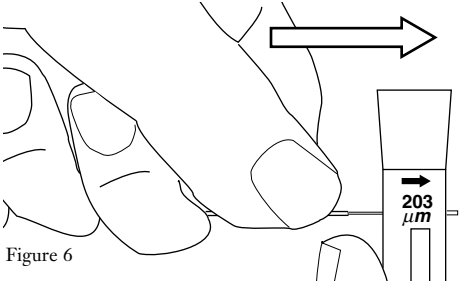


Figure 6

5.3 To strip lengths of fiber greater than 6 mm, repeat the steps in 5.2, removing additional 6 mm lengths until the desired length of glass fiber has been exposed.

2.7 Corning Cable Systems Fiber Optic Stripping Tool p/n 3205004-01

1. General

1.1 This procedure describes how to use a Corning Cable Systems fiber stripping tool part number 3205004-01 (Figure 1).

1.2 This fiber stripping tool has been factory adjusted to strip the 250 µm (0.01 in.) diameter strippable fiber coating from 125 µm (0.005 in.) diameter fibers. This tool is not designed for 900 µm (0.035 in.) diameter coated fibers.

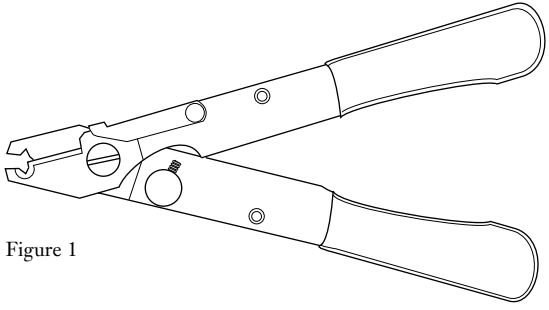


Figure 1

2. Precautions

Safety Glasses

WARNING: *The wearing of safety glasses to protect the eyes from accidental injury is strongly recommended when handling cutting fiber. Pieces of glass fiber are very sharp and can damage the cornea of the eye easily.*

Cable Handling Precautions

WARNING: *Cleaved glass fibers are very sharp and can pierce the skin easily. Do not let cut pieces of fiber stick to your clothing or drop in the work area where they can cause injury later. Use tweezers to pick up cut or broken pieces of the glass fibers and place them on a loop of tape kept for that purpose alone. Good housekeeping is very important.*

Cable Handling Precautions

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.*

3. Stripping Procedure

3.1 For the most consistent results:

a) Hold the tool perpendicular to the fiber (Figure 2).

b) Make sure the fiber is in the V-notch.

c) Gently squeeze the tool shut.

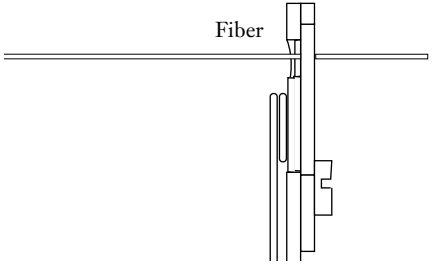


Figure 2

d) Strip the fiber coating in 50.8 mm (2 in.) increments (Figure 3) with a smooth, straight pull.

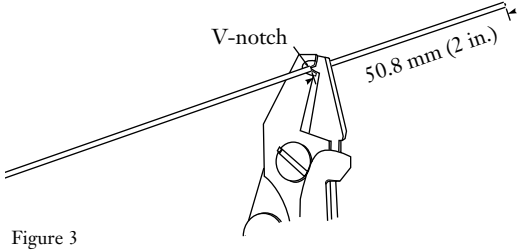


Figure 3

3.2 Gently wipe the fiber with an alcohol-soaked,lint- free tissue or wiper to remove any remaining residue.

2.8 FBC-001 Optical Fiber Cleaver

1. General

1.1 The FBC-001 Fiber Cleaver (Figure 1) uses the score and snap method to quickly provide good quality fiber cleaves for fusion or mechanical splicing.

1.2 This procedure assumes that you have stripped and cleaned the fiber to be cleaved according to the appropriate fiber stripping procedure.

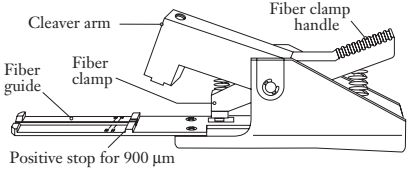


Figure 1

2. Precautions

Safety Glasses

WARNING: *Corning Cable Systems strongly recommends that you wear safety glasses to protect your eyes from accidental injury when handling chemicals, cutting fiber, or using compressed air to clean this cleaver. Pieces of glass fiber are very sharp and can damage the cornea of the eye easily.*

Glass Fiber Precautions

WARNING: *Cleaved glass fibers are very sharp and can pierce the skin easily. Do not let cut pieces of fiber stick to your clothing or drop in the work area where they can cause injury later. Use tweezers to pick up cut or broken pieces of the glass fibers and place them on a loop of tape kept for that purpose alone. Good house-keeping is very important.*

3. Tools and Materials-

3.1 In addition to the cleaver, you will need the following items:

- Vinyl tape
- Tweezers

4. Procedure

4.1 Press down on the handle to open the cleaver's fiber clamp (Figure 2).

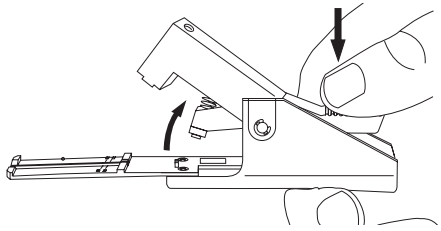
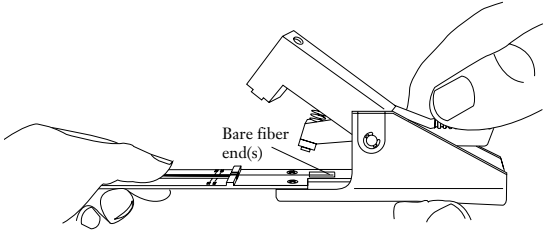


Figure 2

4.2 With your other hand, place the fiber(s) in the fiber guide so that the end of the fiber is under the fiber clamp and the end of the fiber coating lines up with the stop (Figure 3).

DO NOT FLEX THE FIBER GUIDE AT THIS TIME.



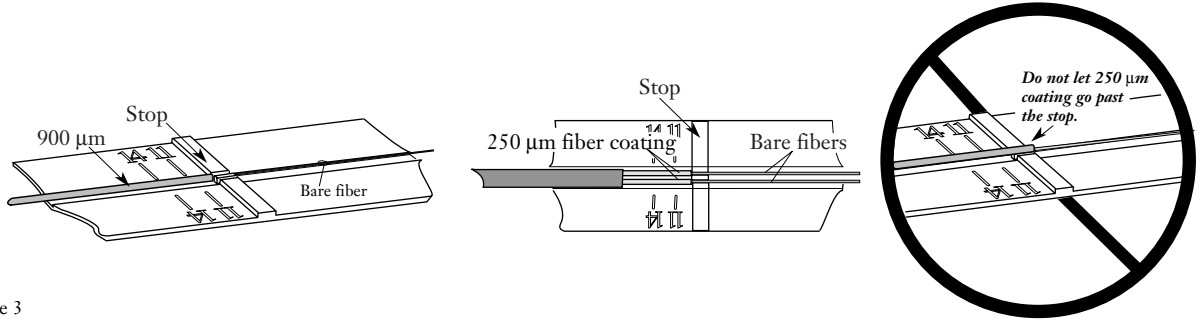


Figure 3

4.4 Press down the cleaver arm until it just touches the fiber and guide (Figure 4). This will apply enough pressure to properly score the fiber(s).

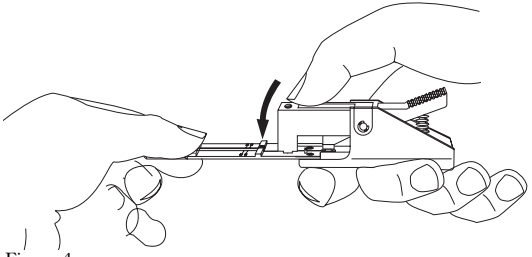


Figure 4

4.5 **CRITICAL STEP:** Gently release the cleaver arm.

4.6 Flex the fiber guide to snap the fiber(s) (Figure 5). The fiber is now ready for splicing.

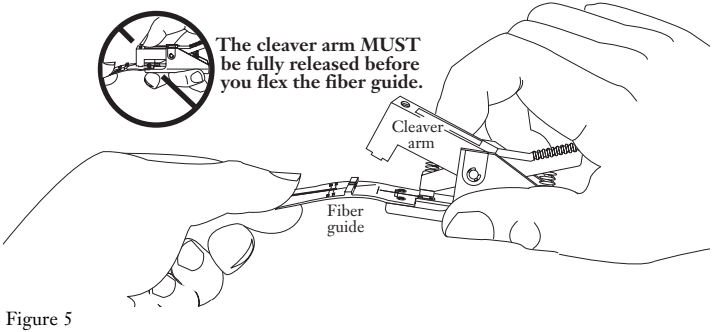


Figure 5

4.7 Press down on the cleaver's handle to once again lift the fiber clamp. Remove the end piece of fiber with tweezers and place the fiber on a loop of tape for proper disposal (Figure 6).

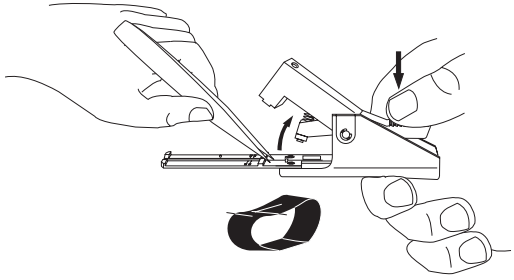


Figure 6

5. Maintenance

5.1 Thoroughly clean the cleaver after each use. Small fiber remnants left in the cleaver may cause damage to parts during later use.

5.2 Periodically clean the cleaver's blade, fiber guide, and fiber clamp with an alcohol-soaked wipe, followed by a cleaning with compressed air. ***ALWAYS WEAR EYE PROTECTION WHEN CLEANING WITH COMPRESSED AIR.***

Guide Replacement

5.3 To replace the fiber guide, you will need:

- new guide (p/n 100962-01)
- small Phillips head screwdriver.

5.4 To replace the fiber guide (Figure 7):

a) Use the screwdriver to remove the two screws located in front of the fiber clamp.

b) Press the handle to open the clamp, and remove the old guide.

c) Place the new guide under the clamp, being careful to line up the screw holes.

d) Release the fiber clamp. Reinsert the screws and tighten. DO NOT OVER-TIGHTEN THE SCREWS.

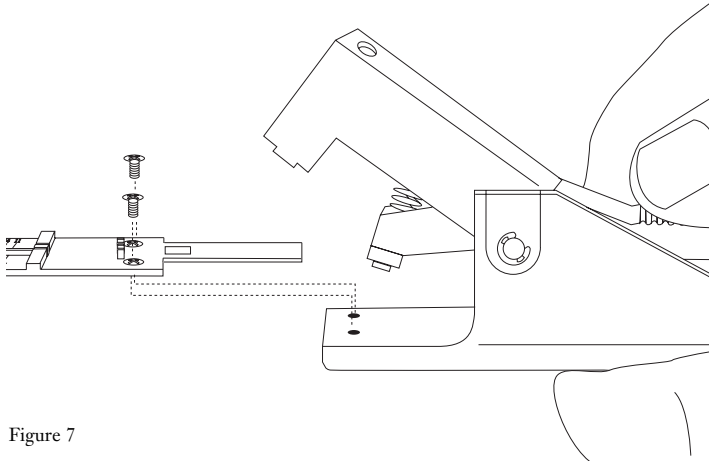


Figure 7

MT-RJ
Compatible

3. MT-RJ Compatible Connectors

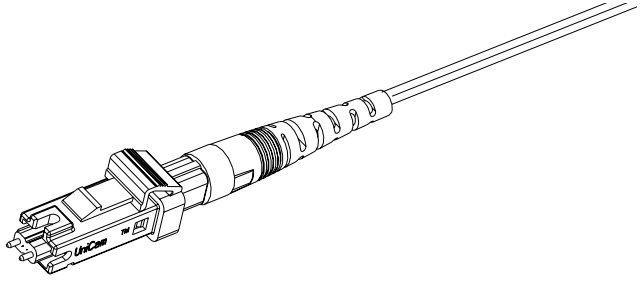


Figure 3-1

3.1. General

3.1-1 In this chapter you will learn how to assemble a two fiber, field-installable Corning Cable Systems UniCam MT-RJ compatible connector (Figure 3-1).

3.1-2 This chapter describes how to install UniCam MT-RJ compatible connectors on:

- 900 µm tight-buffered fiber
- Buffer Tube Fan-outs

3.1-3 Please read through the entire chapter before starting to assemble a connector. Connector testing and maintenance are covered in Chapter 6 of this manual.

3.1-4 For complete instructions on using the tools described in this chapter, refer to the ***Installation Tools*** section of this manual.

3.2 Components

3.2-1 Each UniCam MT-RJ compatible connector package contains the parts shown in Figure 3-2.

Note: *Do not remove the dust caps from the connector until instructed to do so. The dust caps provide vital protection against damage and contamination.*

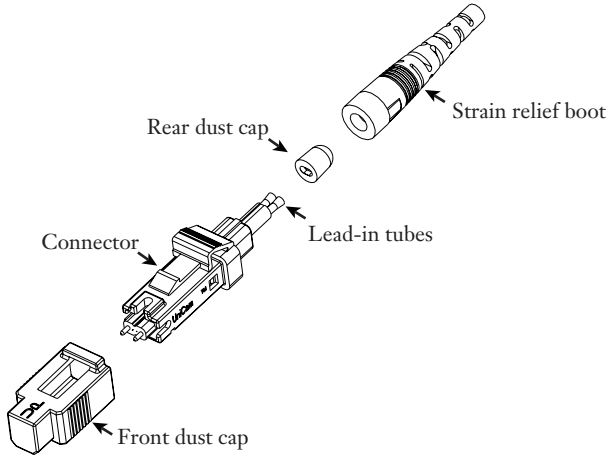


Figure 3-2

3.3 Connector Preparation

3.3-1 The UniCam installation tool is designed to position the fibers into the connector, rotate the cam that aligns the fibers, and crimp the buffered fibers in place (Figure 3-3). The tool makes connector assembly easy and accurate.

3.3-2 Flip the crimp handle open and rotate the wrench so that the handle is up (Figure 3-3).

CTS For installations using the CTS system, rotate the slider to the CTS position by pulling the slider handler fully back, and while holding it, rotating the slider to the desired orientation (Figure 3-4).

For complete CTS system instructions, refer to page 17 in this manual.

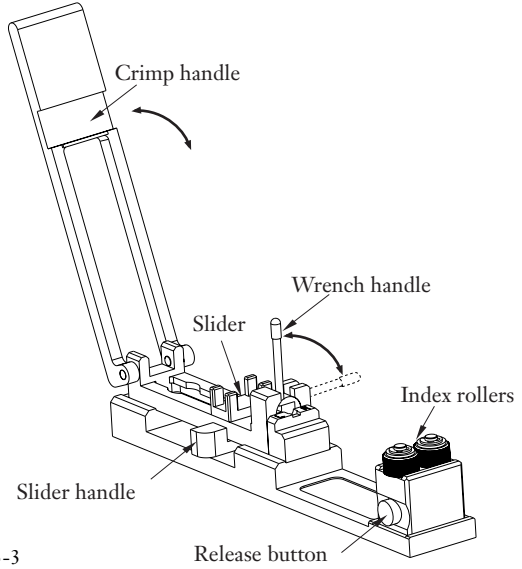


Figure 3-3

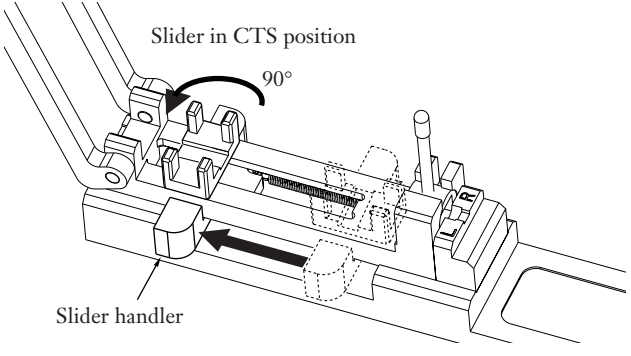


Figure 3-4

3.3-3 Remove the connector components from the bag. Examine the connector to make sure it is in the open position. The connector is in the open position when the key on the cam is positioned 90° from the "UP" lettering on top of the dust cap (Figure 3-5).

Note: The connector will not fit in the tool unless the wrench handle is up and the cam is open.

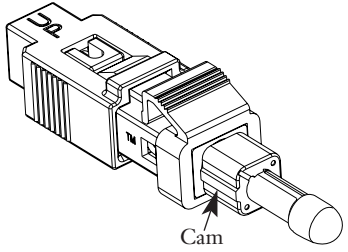


Figure 3-5

3.3-4 Remove the rear dust cap from the connector (Figure 3-6).

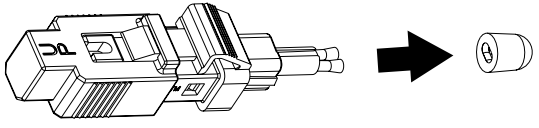


Figure 3-6

Loading the Connector

3.3-5 Use the appropriate steps below:

CTS

If you are using the CTS system, remove the front dust cap from the connector and plug the connector into the WIDE end of the CTS coupler (Figure 3-7)

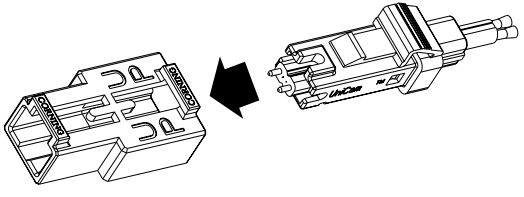
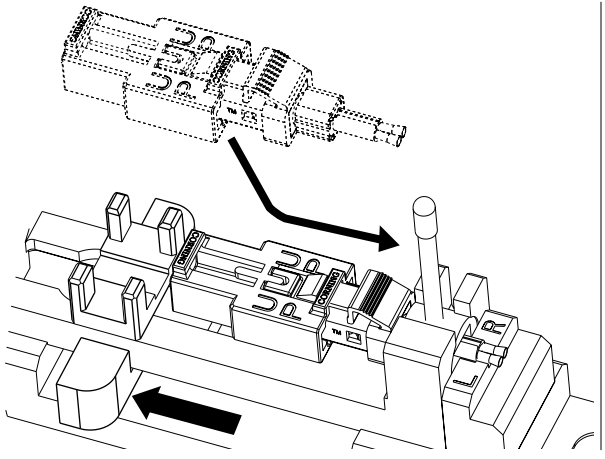


Figure 3-7

For both CTS and non-CTS installations,

After pulling back and holding the slider handle, insert the connector, with the latch "up", into the tool until the crimp tubes rest on the crimp platform as shown in Figure 3-8.

CTS



Non-CTS

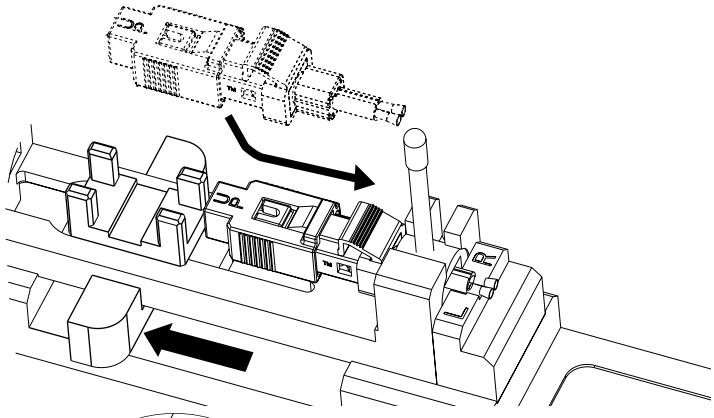
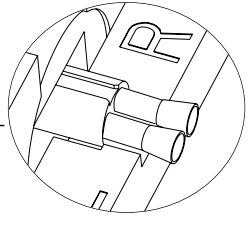


Figure 3-8

Critical Step: *The crimp tubes must rest on the crimp platform as shown at right.*



If the connector does not slide into the tool when gently pushed, check to make sure the connector is in the open position described in step 3.3-3, the wrench handle is up, and you are inserting the connector with the date code up.

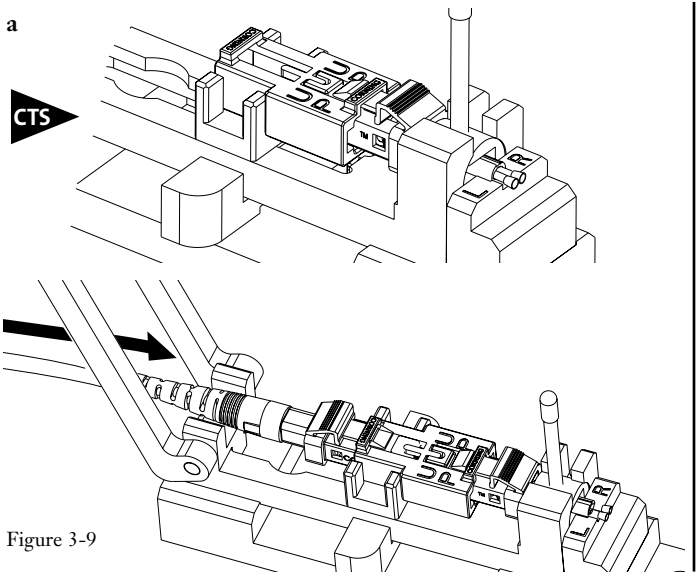
For CTS installations :

1. Slowly release the slider handle and guide the CTS coupler into the slider as shown in Figure 3-9 a, top view.

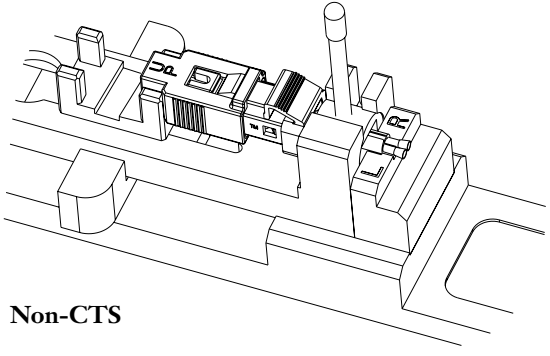
2. Guide the CTS jumper through the arms of the crimp handle, and plug the CTS jumper into the front of the CTS coupler. Make sure the jumper latches into the coupler (Figure 3-9 a, lower view).

For non-CTS installations: Slowly release the slider handle and guide the dust cap into the slider (Figure 3-9b).

a



b



Non-CTS

Figure 3-9

3.4 Fiber Preparation - 900 µm Tight-buffered Fibers

3.4-1 Slide the 900 µm boot (small end first) down both fibers until it is out of the way (Figure 3-10).

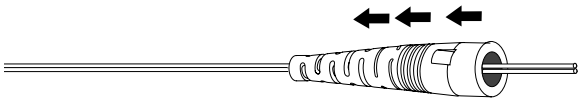


Figure 3-10

3.4-2 Measure and mark 40 mm (1.5 in) from the end of each buffered fiber (Figure 3-11).

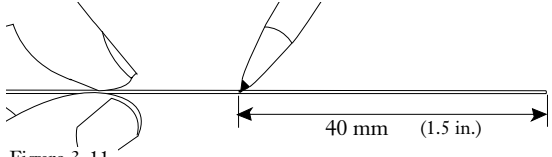


Figure 3-11

3.4-3 Remove this 40-mm section of each buffer with the 203 µm No-Nik tool in small increments (Figure 3-12).

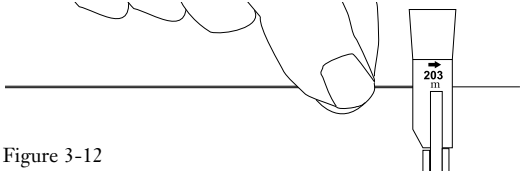


Figure 3-12

3.4-4 Mark each buffer 11 mm (0.43 in) back from the strip point with a permanent ink marker (Figure 3-13).

Critical Step: *This mark must be made on the buffer. It is a visual aid to indicate when the field fibers contact the fiber stub.*

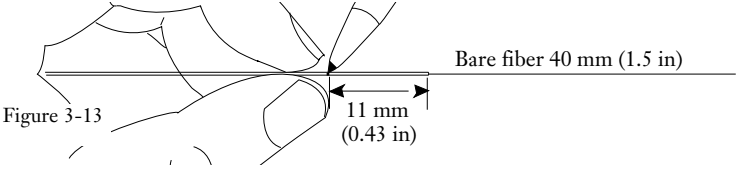


Figure 3-13

3.4-5 Clean both bare fibers with two passes of an alcohol wipe. Do not touch the bare fibers after cleaning them. Do not remove the 11 mm marks. Proceed to Step 3-6, *Fiber Cleaving*.

3.5 900 µm OD Fan-out Preparation

3.5-1 Slide the 900 µm boot (small end first) down the tubing until it is out of the way (Figure 3-14).

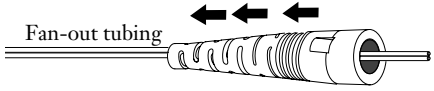


Figure 3-14

3.5-2 Working with one piece of fan-out tubing at a time:

a) Feed the 250 µm coated fiber through the fan-out tubing until 44 mm (1.7 in) of fiber protrudes from the end of the tubing.

b) Measure and mark the 250 µm-coated fiber 4 mm from the end of the fan-out tube (Figure 3-15).

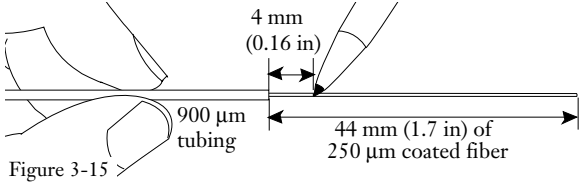


Figure 3-15

Critical Step

c) Remove the 250 µm coating to the 4mm mark with the stripping tool. It is important to leave 4mm of 250 µm fiber extending beyond the 900 µm tubing. This allows the fibers to touch before the 900 µm tubing bottoms out inside the connector.

d) Mark the fan-out tube 11 mm (0.43 in) back from the strip point with a permanent marker (Figure 3-16).

Critical Step: *This mark must be made on the buffer. It is a visual aid to indicate when the field fibers contact the fiber stub.*

e) Repeat steps a-d for the second fiber.

3.5-3 Clean the bare fibers with two passes of an alcohol wipe. Do not touch the bare fibers after cleaning them. Do not remove the 11 mm marks.

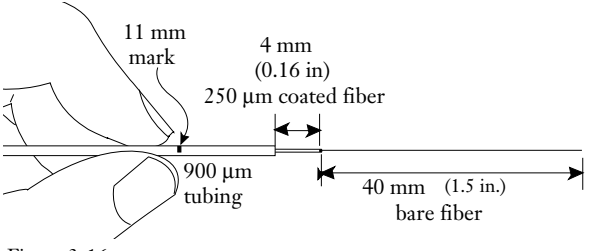


Figure 3-16

3.6 Fiber Cleaving

Note: *This section describes the use of the FBC-012 cleaver supplied with the TKT-UNICAM-ELITE Kit. For complete instructions on using the FBC-012, see chapter 2.4 of Installation Tools section of this manual. If you are using the FBC-001 cleaver, refer to the FBC-001 instructions in chapter 2.8 of the Installation Tools section of this manual.*

If you are using any other cleaver, cleave the fibers to 8.5mm +1.5/-0.5.

Critical Step - *The buffer marks must be made on the fiber per the Fiber Preparation instructions.*

3.6-1 Open the door on the 2-fiber handler.

3.6-2 Prior to placing the fibers in the handler, align them, ensuring that the ends of the fibers' coatings are lined up (Figure 3-17).

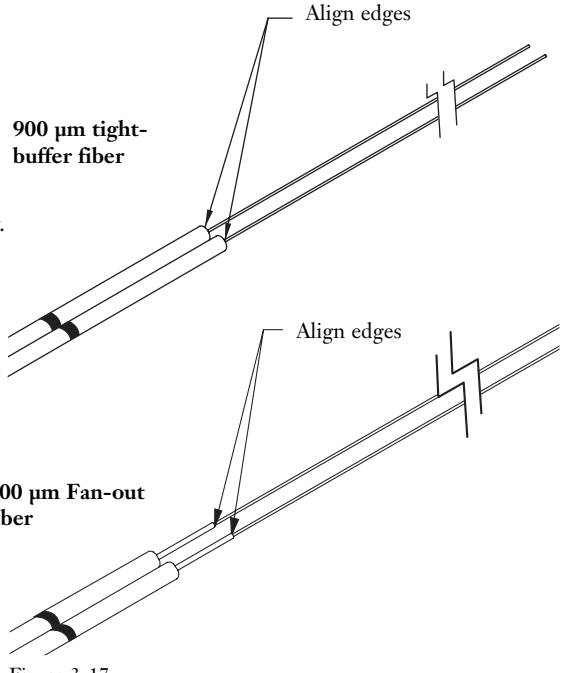


Figure 3-17

3.6-3 Using the two pins as a guide, place the fibers into the groove in the handler. The bare fiber should not contact the handler – only place coated fiber in the groove (Figure 3-18).

Critical Step – *Do not drag the bare fibers against the handler. Only coated fiber should contact the groove in the handler.*

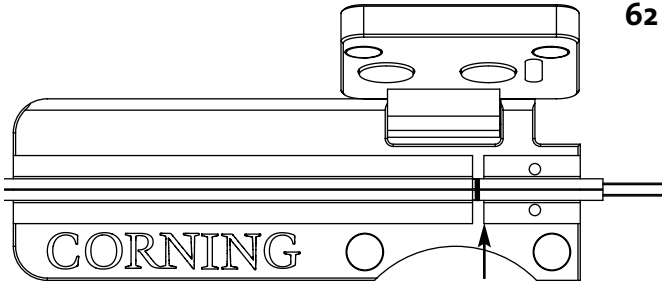


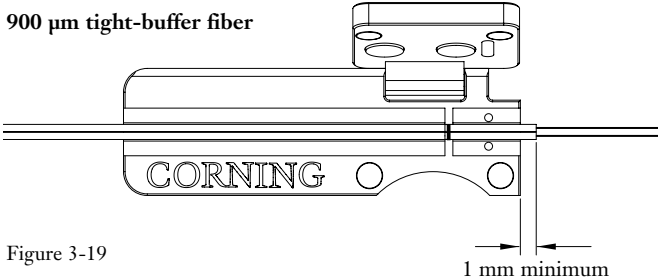
Figure 3-18

3.6-4 Verify that the ends of the fibers' coatings are still aligned, and position the fibers in the handler, such that the buffer marks fall within the indicated alignment slot (Figure 3-19).

3.6-5 Verify that the fibers are not crossed in the groove, and gently close the door on the handler.

- Ensure that the ends of the fibers' coatings are still aligned.
- If the coating ends are not aligned and protruding at least 1mm from the handler (Figure 3-19), open the handler door, remove the fibers and reload them in the handler.

900 µm tight-buffer fiber



900 µm Fan-out fiber

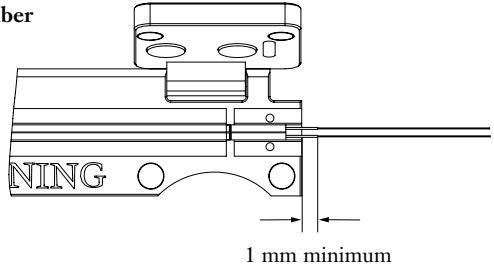


Figure 3-19

If there is not at least 1 mm of coated fiber protruding from the handler, open the handler door, remove the fiber, and reload the fiber in the handler

3.6-6 Carefully position the handler in the cleaver so that the edges of the fibers' coatings butt against the edge of theleft-hand elastomeric pad (Figure 3-20). The coating should lightly contact the pad's edge. No pressure is required.

IMPORTANT: *The fibers must be visually aligned with the edge of the elastomeric pad during this step. Do not simply slide the handler against the stop. Poor cleave quality and incorrect cleave length will result.*

Critical Steps – *The fibers should lay flat across the fiber pads. If the fibers are crossed, gently brush their free ends to straighten them.*

The fibers' coatings should not extend onto the pad. Clamping coated fiber in the pad may result in poor cleave quality and incorrect cleave length

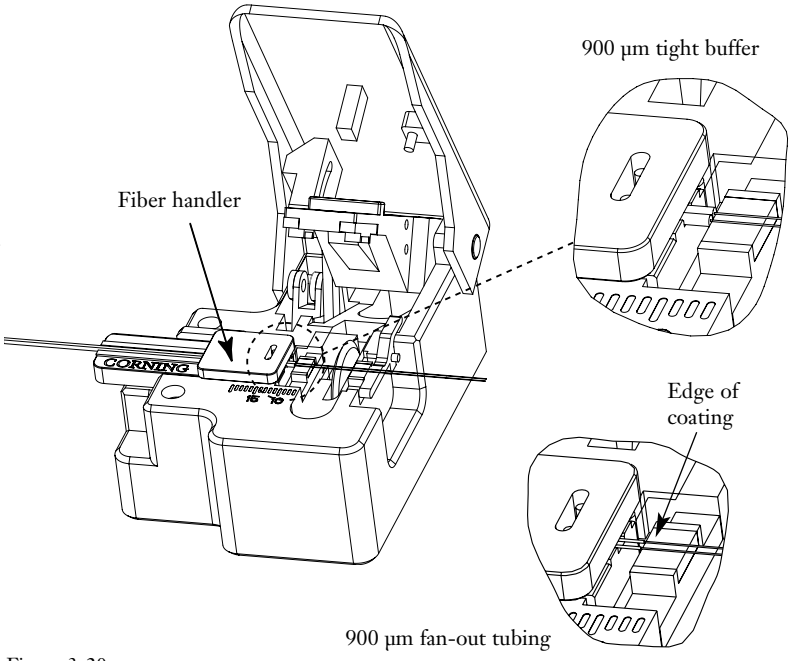


Figure 3-20

3.6-7 While gently holding the handler in position, with the coating butted against the elastomeric pad, slowly press the cleaver's handle down as far as it will go (Figure 3-21).

Gently release the handle and remove the handler from the cleaver.

3.6-8 Use tweezers to remove the scrap fiber ends and place them on a loop of tape kept for that purpose alone.

3.6-9 Open the door on the handler and remove the cleaved fibers.

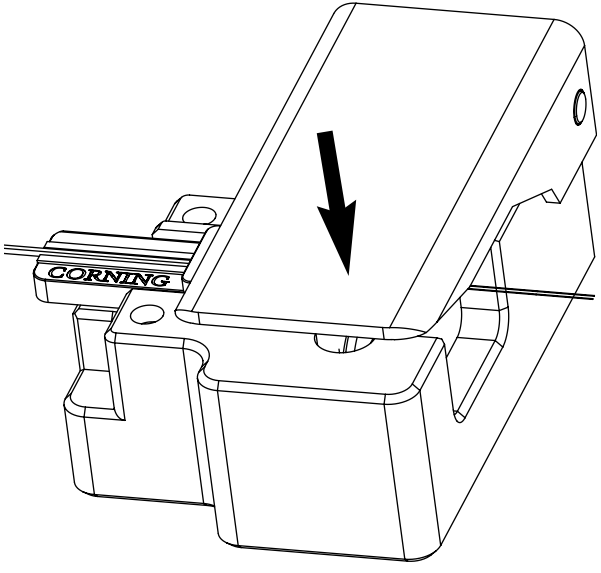


Figure 3-21

3.7 Connector Installation

3.7-1 Align the cleaves on the two fibers.

3.7-2 Press the release button on the fiber index, and place the two fibers between the rollers (Figure 3-22). Make sure the fibers are fully seated between the rollers, and the cleaves remain aligned.

Critical Step: ***The cleaved fibers must remain aligned after the fibers are placed in the rollers.***

3.7-3 While pulling the the fibers through the rollers, insert them into the connector crimp tubes until you feel them firmly stop against the connector's fiber stubs.

- Ensure that the fibers will maintain the system polarity.

IMPORTANT: *Maintaining optical system polarity is essential for a fiber optic system to work properly. Refer to* Maintaining System Polarity with MT-RJ Connectors i*n Section 6 of this manual for detailed information.*

- Guide the fibers in straight. Do not bend or angle them.
- If you feel resistance at the entry funnel, pull the fibers back out a short distance and re-insert.

Note: *If you have stripped and cleaved the fiber to the correct length, the buffer mark should be within 2 mm (0.08 in.) of the lead-in tubes (Figure 3-23).If this mark is not visible, the fibers may have been broken. Remove the connector, re-strip and recleave the fibers, and begin with a new connector.*

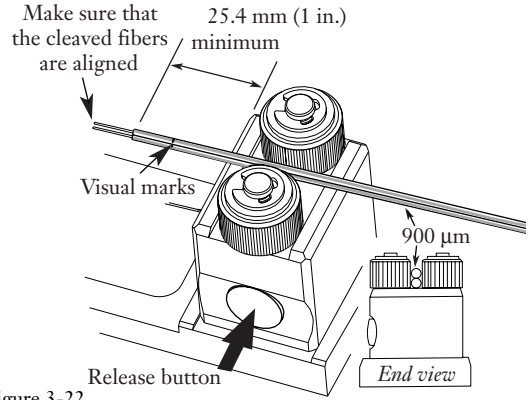


Figure 3-22

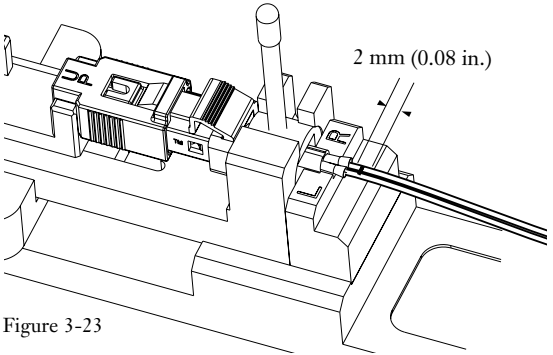


Figure 3-23

Critical Step: *The bow created in step 3.7-4 is critical. It will ensure the fiber maintains contact with the connector's stub fiber during the next step.*

3.7-4 Lightly pinch the index rollers on the fibers, and slowly rotate the rollers until a slight bow forms in both fibers between the connector and the index rollers (Figure 3-24).

Note that you may chose to maintain inward pressure by hand instead of using the fiber index rollers.

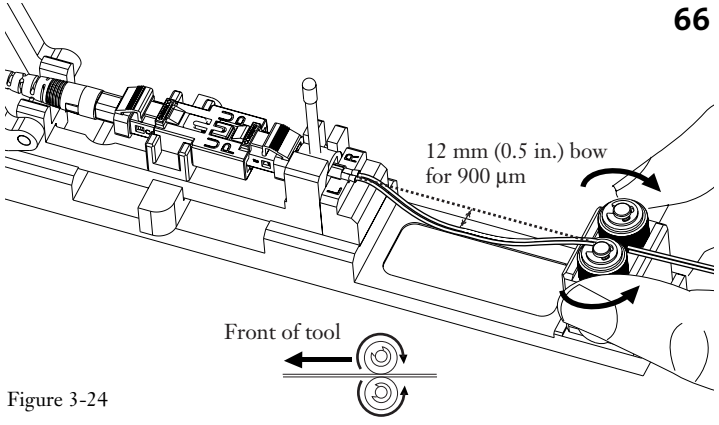


Figure 3-24

3.7-5 Rotate the wrench down until it stops (Figure 3-25). It is normal for the wrench to rotate beyond 90°.

DO NOT ROTATE THE WRENCH BACK UP.

CTS

If you are using the CTS system, the glow from the connector's cam should noticeably dim **after** the wrench is rotated fully down. If the glow is not significantly dimmed, rotate the wrench up, remove both fibers from the connector, and repeat the installation process.

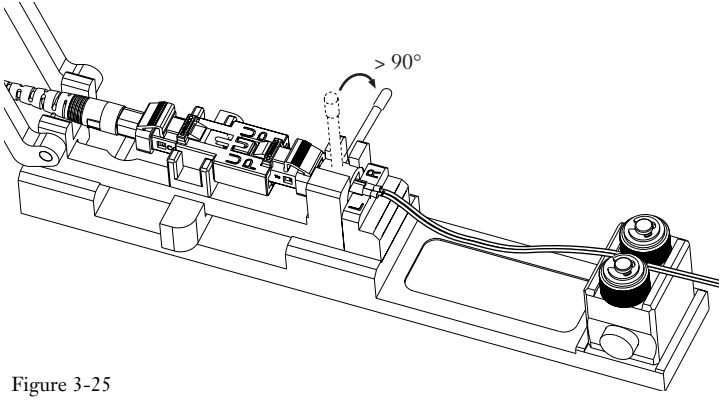


Figure 3-25

3.7-6 Carefully flip the crimp handle 180° until it contacts the crimp-tubes. Push down firmly to crimp. The tool cannot over-crimp the connector (Figure 3-26).

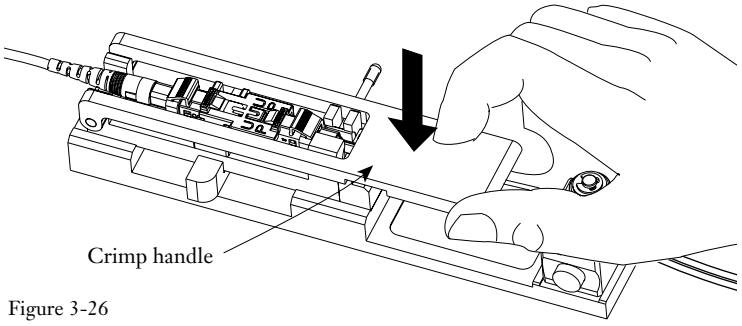


Figure 3-26

3.7-7 Flip the crimp handle back. You should see a flat impression in the crimp tubes, indicating a proper crimp (Figure 3-27).

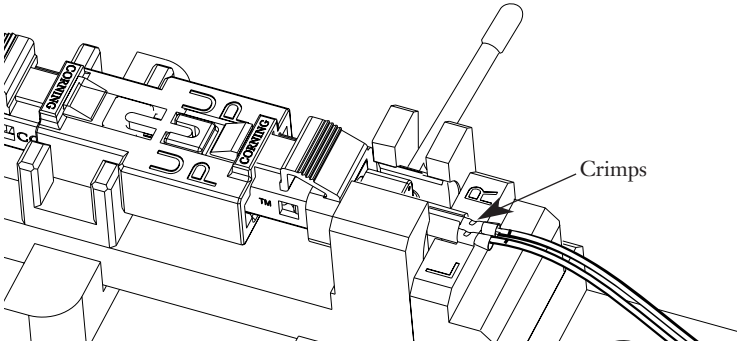


Figure 3-27

3.7-8 Remove the fiber from the index rollers by pressing the release button and lifting it out (Figure 3-28).

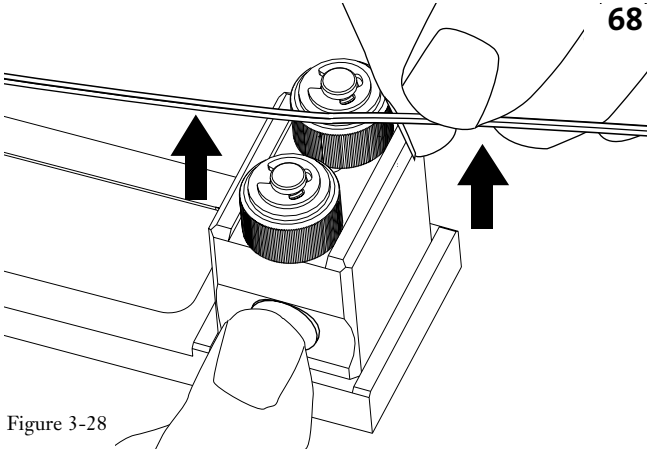


Figure 3-28

3.7-9 Leave the wrench handle down.

Pull the slide handle back and remove the connector by lifting it and its fibers straight up and out of the tool (Figure 3-29).

Do not pull the fibers or cable away from the crimped tube. Handle the connector only.

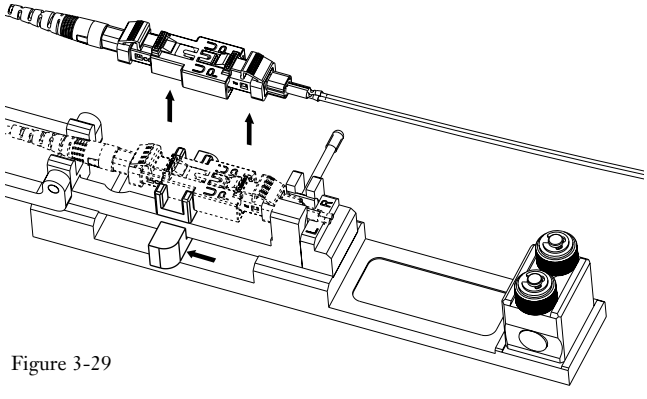


Figure 3-29

CTS

3.7-10 If you are using the CTS system, remove the connector from the CTS coupler and replace the front dust cap (Figure 3-30).

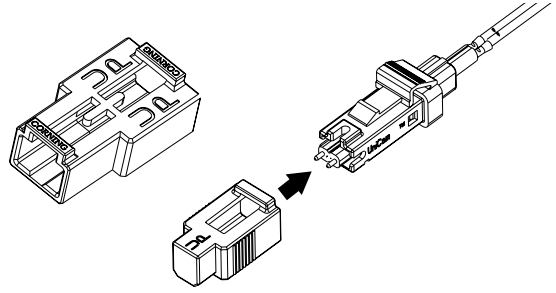


Figure 3-30

3.7-11 Slide the boot up the back of the connector until it reaches the cam (Figure 3-31).

3.7-12 The connector is now ready to use. Leave the front dust cap on until you are ready to insert the UniCam connector into a coupler sleeve.

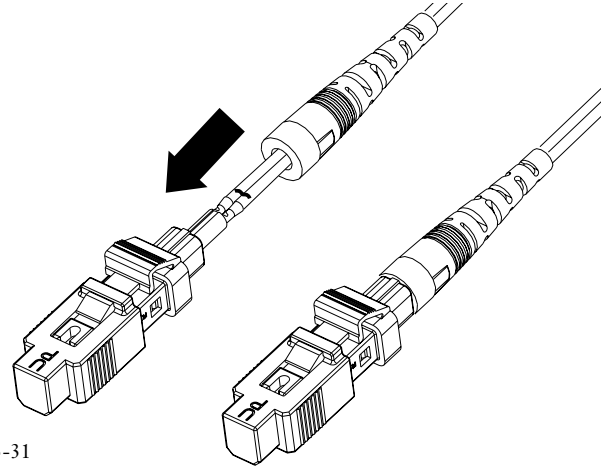


Figure 3-31

LC
Compatible

4. LC Compatible Connectors

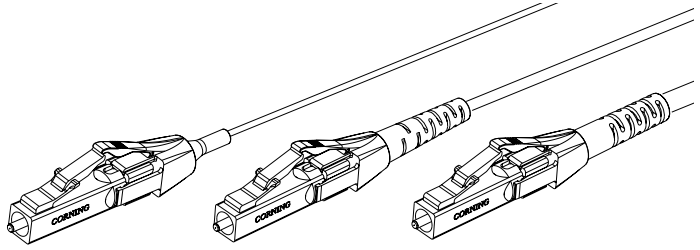


Figure 4-1

4.1 General

4.1-1 In this chapter you will learn how to assemble a field-installable Corning Cable Systems LC UniCam connector.

4.1-2 This chapter describes how to install UniCam LC compatible connectors on:

• 900 µm tight-buffered fiber • Buffer tube Fan-outs • 1.6 mm and 2.0 mm single-fiber cables • 2.9 mm single-fiber cables

4.1-3 Please read through the entire chapter before starting to assemble a connector. Connector testing and maintenance are covered in Chapter 6 of this manual. For complete instructions on using the tools described in this chapter, refer to the ***Installation Tools*** section of this manual.

4.2 Components

4.2-1 Each LC UniCam connector package contains the parts shown in Figure 4-2.

Note: *Do not remove the dust caps from the connector until instructed to do so. The dust caps provide vital protection against damage and contamination.*

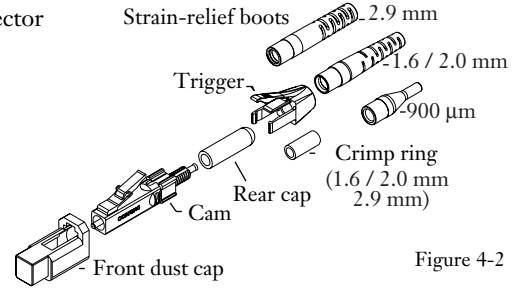


Figure 4-2

4.3 Connector Preparation

4.3-1 The UniCam installation tool is designed to position the fiber into the connector, rotate the cam that aligns the fibers, and crimp the buffered fiber in place. The tool makes connector assembly easy and accurate.

Critical Step

4.3-2 Flip the crimp handle open and rotate the wrench so the handle is up (Figure 4-3).

CTS

For installations using the CTS system, rotate the slider to the CTS position by pulling the slider handler fully back, and while holding it, rotating the slider to the orientation shown in the lower inset of Figure 4-3.

For complete CTS system instructions, refer to page 17 in this manual.

4.3-3 Remove the connector components from the bag. Remove and discard the cap from the rear of the connector.

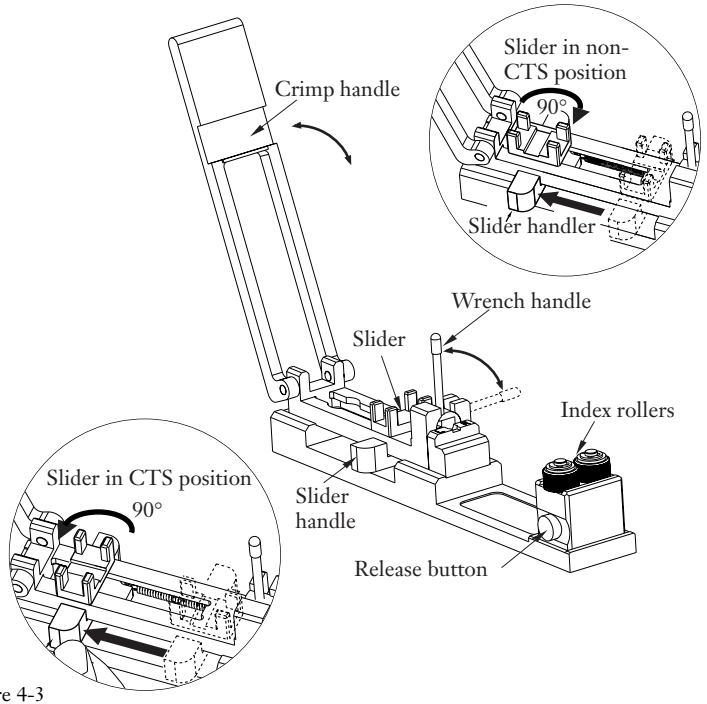


Figure 4-3

4.3-3 Remove the connector components from the bag. Remove and discard the cap from the rear of the connector (Figure 4-4).

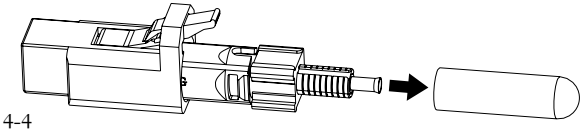


Figure 4-4

4.3-4 Examine the connector to make sure it is in its open position. On LC connectors the cam is in its open position when the central groove on the cam is 90° from the latch which secures the front dust cap (Figure 4-5).

Note: The connector will not fit in the tool unless the wrench handle is up and the cam is open.

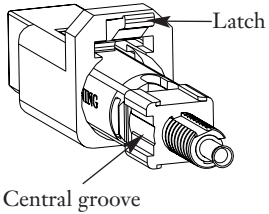


Figure 4-5

CTS

4.3-5 If you are using the CTS system, remove the front dust cap from the connector and plug the connector into either side of the LC CTS coupler (Figure 4-6).

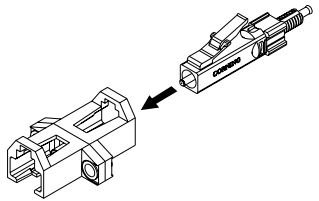


Figure 4-6

Leave the front dust cap ON if you are <u>not</u> using the CTS system (Figure 4-7).

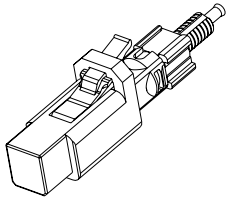


Figure 4-7

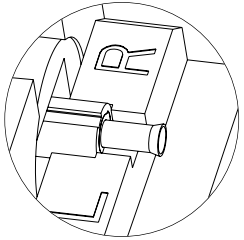
For installations using a CTS system, refer to step 4.3-6 for instructions on connector placement in the installation tool. If you are not using a CTS system, skip to step 4.3-7.

CTS

4.3-6 With the slider in its CTS position, load the coupler and connector as follows (Figure 4-8):

1. Guide the CTS jumper through the arms of the crimp handle and plug the CTS jumper into the front of the CTS coupler. Make sure that the jumper's connector is secured into the coupler.
2. Pull back and hold the slider at the the end of its travel.
3. Insert the CTS coupler and the UniCam connector into the tool and guide the UniCam through the wrench until the crimp tube rests on the crimp platform.
4. Slowly release the slider handle and carefully guide the CTS adapter into the slider. The tabs on the CTS adapter should rest against the slider. Do not attempt to place the CTS adapter tabs within the slider. See the bottom image in Figure 4-8.

Critical Step: *The crimp tube must rest on the crimp platform as shown in the inset. If the connector does not slide into the tool when gently pushed, check to make sure the connector is in the open position described in step 4.3-3, the wrench handle is up, and you are inserting the connector with its proper side up.*



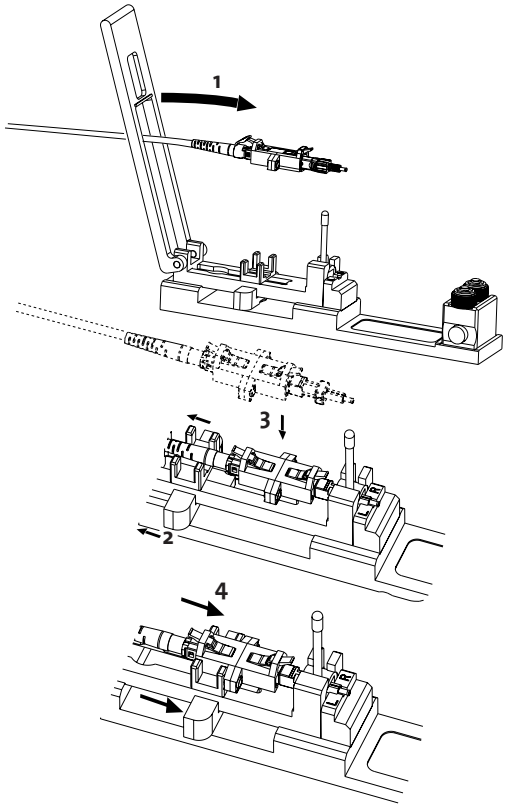


Figure 4-8

If you are not using a CTS system:

4.3-7 To place the connector in the installation tool :

1 Pull back and hold the slider. Insert the connector into the wrench (Figure 4-9).

A gentle push should be adequate to insert the connector. Do not attempt to force the connector into the tool – doing so could damage the connector.

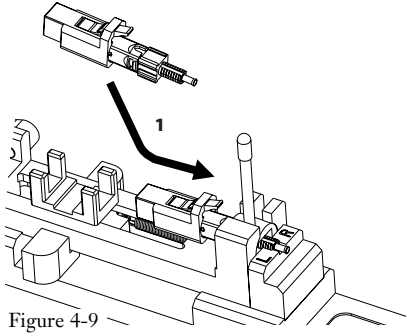


Figure 4-9

2 Slowly release the slider handle and guide the slider into position on the connector's front dust cap (Figure 4-10).

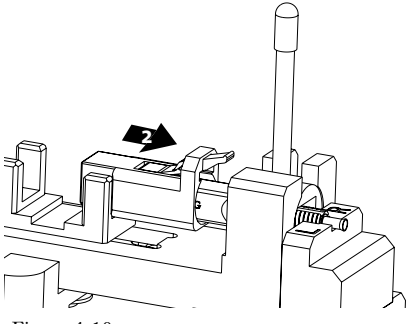
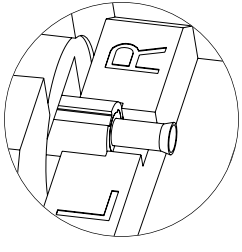


Figure 4-10

Critical Step: *The crimp tube must rest on the crimp platform as shown. If the connector does not slide into the tool when gently pushed, check to make sure the connector is in the open position described in step 4.3-4, the wrench handle is up, and you are inserting the connector with its proper side up.*



4.4 Fiber Preparation - 900 µm Tight-buffered Fibers

4.4-1 Slide the 900 µm boot (small end first) and then the trigger down the fiber until they are out of the way (Figure 4-11).

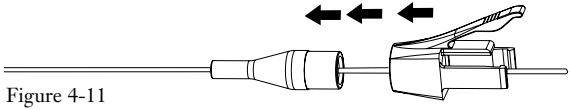


Figure 4-11

4.4-2 Measure and mark 40 mm from the end of the buffered fiber (Figure 4-12).

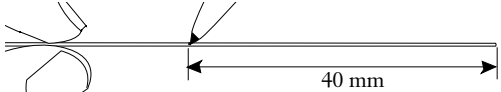


Figure 4-12

4.4-3 Remove this 40-mm section of the buffer with the 203 µm No-Nik, tool (Figure 4-13).

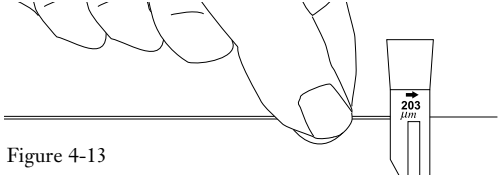


Figure 4-13

4.4-4 Mark the buffer 7 mm back from the strip point with a permanent ink marker (Figure 4-14).

Critical Step: *This mark must be made on the buffer. It is a visual aid to indicate when the field fiber contacts the fiber stub.*

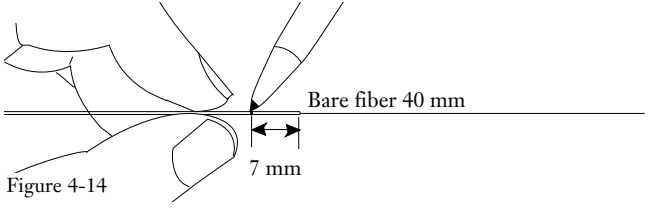


Figure 4-14

4.4-5 Clean the bare fiber with two passes of an alcohol wipe. Do not touch the bare fiber after cleaning it. Do not remove the 7 mm mark. Proceed to Section 4.7, Fiber Cleaving.

4.5 Fiber Preparation - 1.6 mm, 2.0 mm, and 2.9 mm Single-fiber Cables

4.5-1 Slide the required boot (segmented end first) and then the trigger down the cable until they are out of the way (Figure 4-15).

Note: *Take your time and do the next four steps correctly. Excessive yarn length will have to be trimmed later. Yarn too short may result in weak strain relief for the connector.*

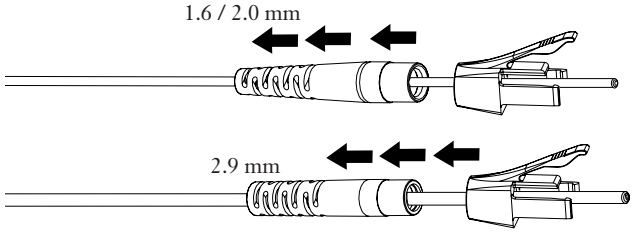


Figure 4-15

4.5-2 Measure and mark 40 mm from the end of the cable's outer jacket (Figure 4-16).

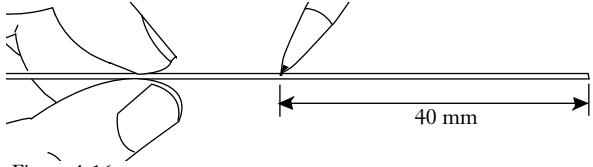


Figure 4-16

4.5-3 Refer to Table 1 on page 38 for the correct AWG opening and strip off the 40-mm section of outer jacket with the buffer stripping tool (Figure 4-17).

4.5-4 Use scissors to trim the aramid yarn flush to the end of the outer jacket.

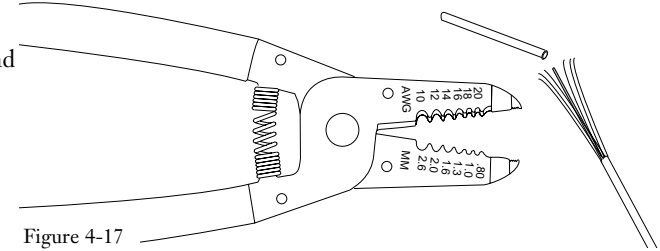


Figure 4-17

4.5-5 Measure and mark 11 mm from the end of the outer jacket (Figure 4-18).

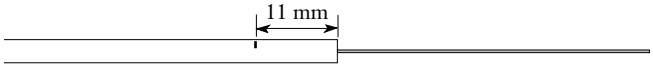


Figure 4-18

4.5-6 Strip off the 11-mm section of outer jacket. You should have 11 mm of aramid yarn showing.

4.5-7 Fold the aramid yarn back over the cable jacket and slide the crimp ring about 5 mm down the yarn to hold it out of the way (Figure 4-19).

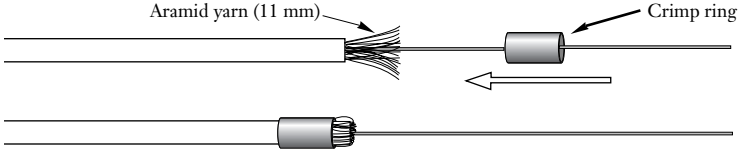


Figure 4-19

4.5-8 Measure and mark the 900 µm buffer coating 9 mm from the end of the cable jacket (Figure 4-20).

Place an additional mark on the buffer 2 mm from the the edge of the jacket.*This mark is a visual aid to indicate when the field fiber contacts the fiber stub.*

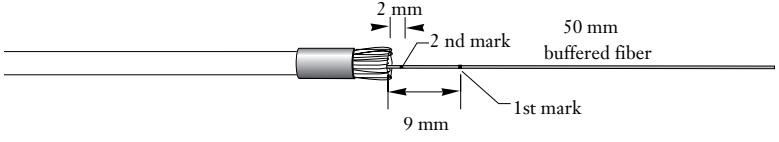


Figure 4-20

Critical Step: *This mark must be made on the buffer. It is a visual aid to indicate when the field fiber contacts the fiber stub.*

4.5-9 Remove approximately 40 mm of coating to the first mark with the 203 µm No-Nik tool (Figure 4-21).

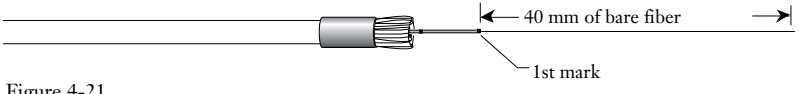


Figure 4-21

Important: Check the locations of the second mark after stripping – it must be 2 mm from the edge of the jacket. If necessary, work the buffer back into its original position in the jacket as follows (Figure 4-22):

1. Grasp the cable about 60 cm behind the strip point.

2. Pull the cable until the second mark is 2 mm from the edge of the jacket.

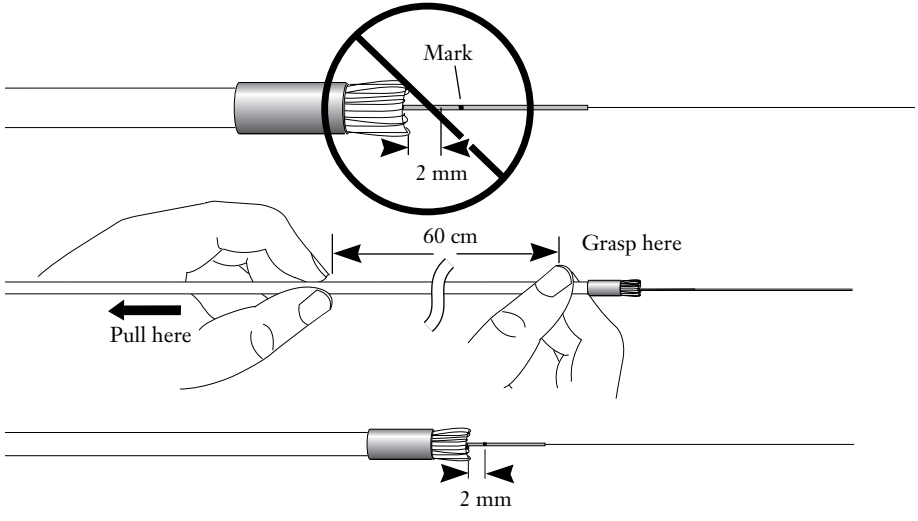


Figure 4-22

4.5-10 Clean the bare fiber with two passes of an alcohol wipe. Do not touch the bare fiber after cleaning.

Proceed to Section 4.7, **Fiber Cleaving**.

4.6 900 µm OD Fan-out Preparation

4.6-1 Slide the 900 µm boot (small end first), then the trigger, down the tubing until it is out of the way (Figure 4-23).

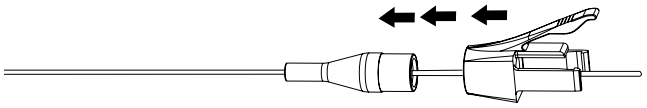


Figure 4-23

4.6-2 Feed the 250 µm coated fiber through the fan-out tubing until 44 mm of fiber protrudes from the end of the tubing.

4.6-3 Measure and mark the 250 µm-coated fiber 4 mm from the end of the fan-out tube (Figure 4-24).

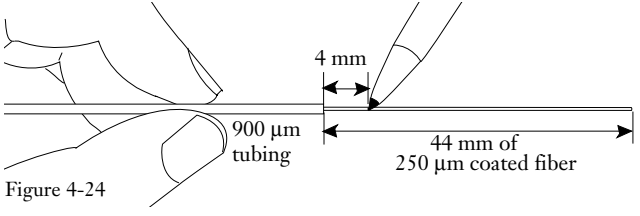


Figure 4-24

Critical Step

4.6-4 Remove the 250 µm coating to the 4mm mark with the stripping tool. It is important to leave 4 mm of 250 mm fiber extending beyond the 900 µm tubing. This allows the fibers to touch before the 900 mm tubing bottoms out inside the connector.

4.6-6 Mark the fan-out tube 7 mm back from the strip point with a permanent marker (Figure 4-25).

Critical Step: This mark must be made on the buffer. It is a visual aid to indicate when the field fiber contacts the fiber stub

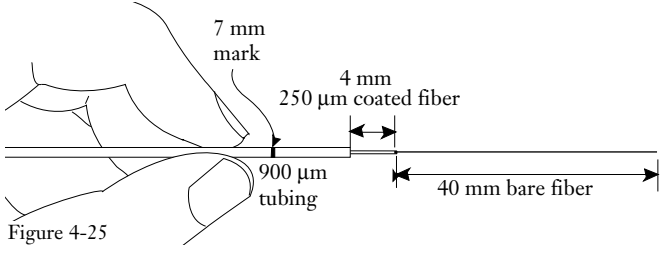


Figure 4-25

4.6-7 Clean the bare fiber with two passes of an alcohol wipe. Do not touch the bare fiber after cleaning it. Do not remove the 7 mm mark.

4.7 Fiber Cleaving

Note: *This section describes the use of the FBC-012 cleaver supplied with the TKT-UNICAM-ELITE Kit. For complete instructions on using the FBC-012, see the Installation Tools section of this manual. If you are using the FBC-001 cleaver, refer to the FBC-001 instructions in the Installation Tools section of this manual.*

If you are using any other cleaver, cleave the fibers to 8.5mm +1.5/-0.5

Critical Step - *The buffer marks must be made on the fiber per the connector instructions.*

4.7-1 Open the door on the single-fiber handler. Verify the handler is clean and free of debris in the fiber groove.

Critical Step - *Make sure that you applied the buffer marks called for in Sections 4.4 -4.6 before moving to the next step.*

4.7-2 Place the fiber into the groove in the handler.

Critical Step — *Do not drag the bare fiber against the handler. Only coated fiber should contact the groove in the handler. Bare fiber must not contact the groove.*

4.7-3 Align the fiber in the handler as in shown in Figures 4-26 through 4-28.

1.6 /2.0 / 2.9 mm Jacketed Cable

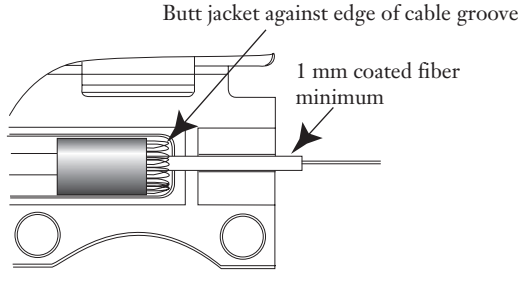


Figure 4-26

900 µm Tight-buffered

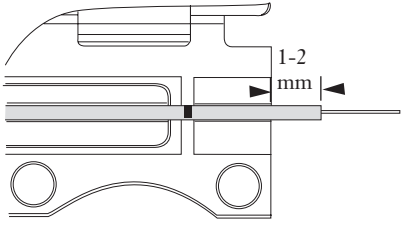


Figure 4-27

900 µm (Outside Diameter) Fan-out

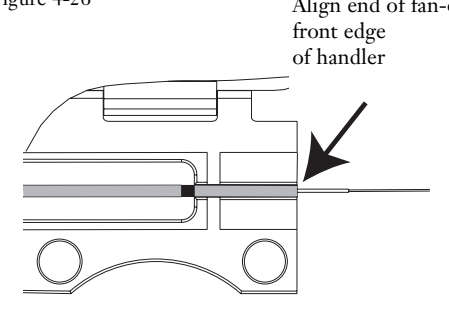


Figure 4-28

4.7-4 Gently close the door on the handler. Ensure that at least 1 mm of coated fiber protrudes from the handler.

If there is not at least 1 mm of coated fiber protruding from the handler, open the handler door, remove the fiber, and reload the fiber in the handler

4.7-5 Position the handler in the cleaver so that the edge of the fiber coating aligns with the edge of the left-hand elastomeric pad (Figure 4-29). The coating should lightly contact the pad's edge. No pressure is required.

IMPORTANT: *The fiber must be visually aligned with the edge of the elastomeric pad during this step. Do not simply slide the handler against the stop. Poor cleave quality and incorrect cleave length will result.*

Critical Step — *The fiber should lay flat across the fiber pad.*

When cleaving fan-out, align the edge of the 250 µm coating with the fiber pad. The fiber coating should not extend onto the pad. Clamping coated fiber in the pad will result in poor cleave quality and incorrect cleave lengths.

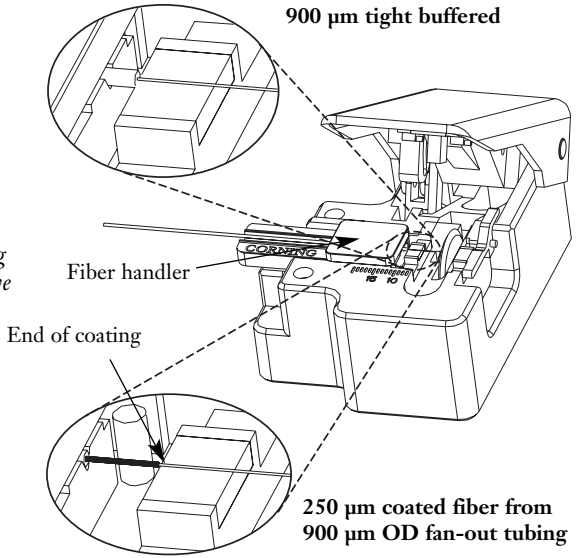


Figure 4-29

4.7-6 While carefully holding the handler in position, with the coating butted against the elastomeric pad, slowly press the cleaver's handle as far as it will go (Figure 4-30).

Gently release the handle and remove the handler from the cleaver.

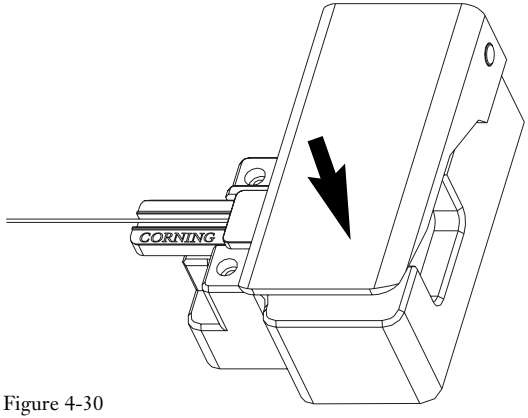


Figure 4-30

4.7-7 Use tweezers to remove the scrap fiber end from the cleaver and place it on a loop of tape kept for that purpose alone.

4.7-8 Open the door on the handler and remove the cleaved fiber.

4.8 Connector Installation

4.8-1 Press in the release button on the UniCam tool's fiber index, and place the fiber between the rollers. Make sure the fiber is fully seated between the rollers (Figures 4-31 and 4-32) before removing your finger from the button.

900 µm

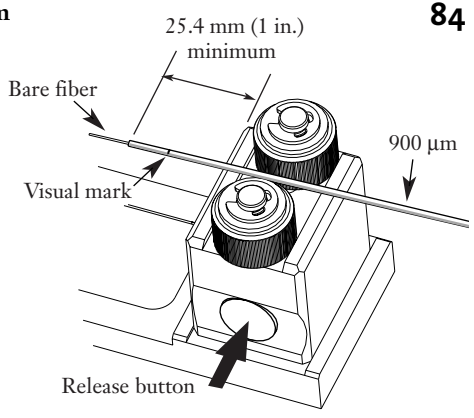


Figure 4-31

1.6, 2.0, or 2.9 mm

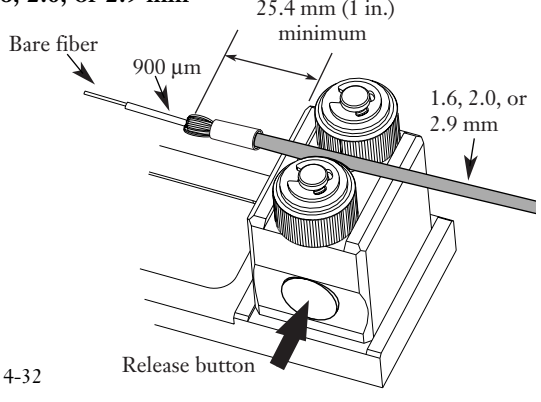


Figure 4-32

4.8-2 While pulling the fiber through the rollers, insert the fiber into the connector's crimp tube until you feel it firmly stop against the connector's fiber stub. The index rollers will rotate, allowing the fiber to pull through.

- Guide the fiber in straight. Do not bend or angle it.
- If you feel resistance at the entry funnel, pull the fiber back out a short distance and re-insert.

Notes: If you have stripped and cleaved the fiber to the correct length, the buffer mark should stop within 2 mm of the lead-in tube (Figures 4-33 and 4-34).

If this mark is not visible, the fiber may have been broken. Remove the connector, re-strip and recleave the fiber, and begin with a new connector.

For jacketed fibers, the buffer mark must be visible between the lead-in tube and the aramid yarn to assure that the fibers butt together. If you don't see the mark, pull the fiber out of the connector, and start over again with new cable preparation.

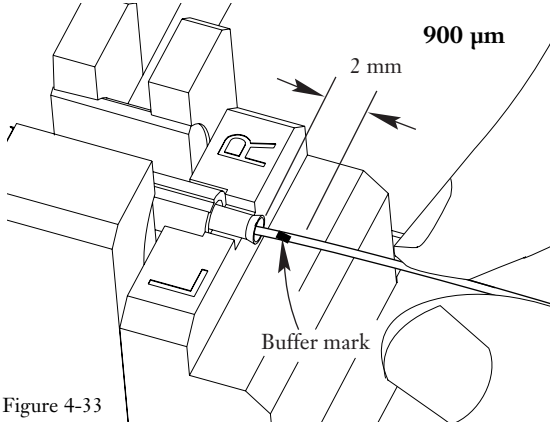


Figure 4-33

1.6, 2.0, or 2.9 mm

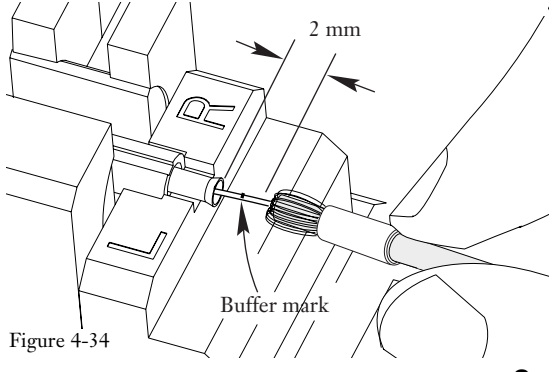


Figure 4-34

Critical Step: *The bow created in step 4.8-3 is critical. It will ensure the fiber maintains contact with the connector's stub fiber during the next step.*

4.8-3 For installations on 900um fiber –lightly pinch the index rollers on the fiber, and slowly rotate the rollers until a 12 mm (0.5 in.) bow forms in the fiber between the connector and the index rollers (Figure 4-35).

Note that you may chose to maintain inward pressure by hand instead of using the fiber index rollers.

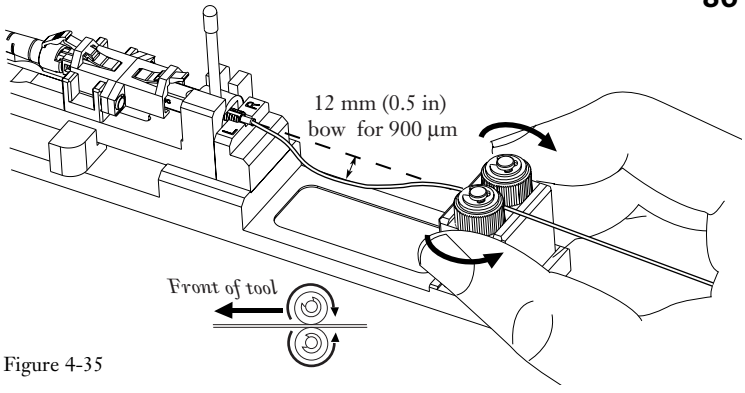


Figure 4-35

For installation on 1.6, 2.0, or 2.9mm cables - lightly pinch the index rollers on the fiber, and slowly rotate the rollers until the cable jacket just begins to bow between the connector and the index rollers (Figure 4-36).

Note that you may chose to maintain inward pressure by hand instead of using the fiber index rollers.

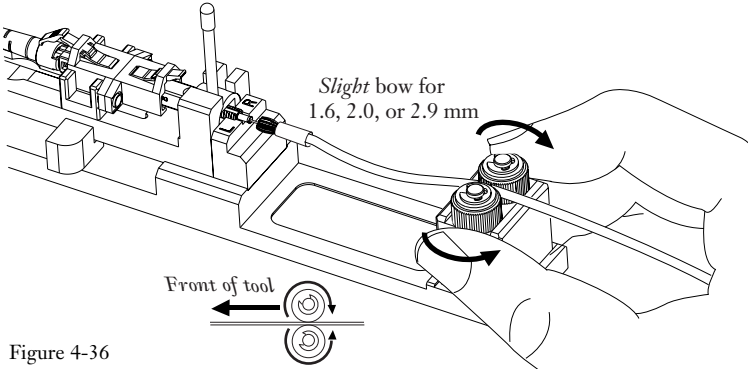


Figure 4-36

4.8-4 Rotate the wrench down until it stops (Figure 4-37). It is normal for the wrench to rotate beyond 90°.

DO NOT ROTATE THE WRENCH BACK UP.

CTS If you are using the CTS system, the glow from the connector's cam should noticeably dim **after** the wrench is rotated fully down.

If the glow is not significantly dimmed, rotate the wrench up, remove the fiber from the connector, and repeat the installation.

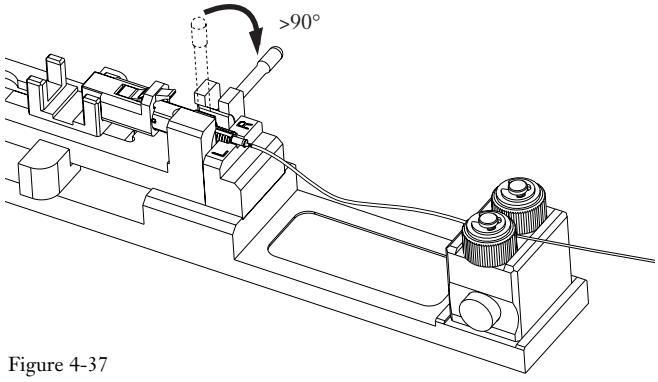


Figure 4-37

4.8-5 Carefully flip the crimp handle 180° until it contacts the crimp tube. Push down firmly to crimp. The tool cannot over-crimp the connector (Figure 4-38).

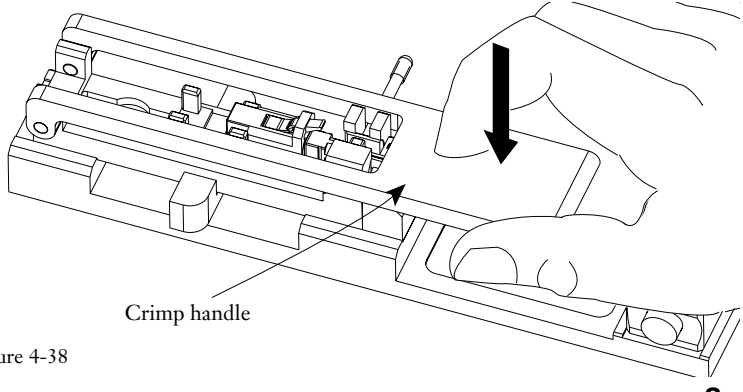


Figure 4-38

4.8-6 Flip the crimp handle back. You should see a flat impression in the crimp tube, indicating a proper crimp (Figure 4-39).

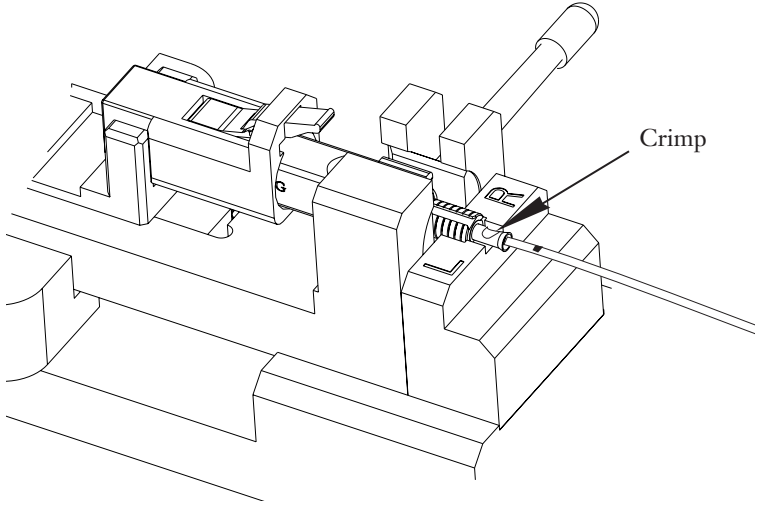


Figure 4-39

4.8-7 Remove the fiber from the index rollers by pressing the release button and lifting it out (Figure 4-40).

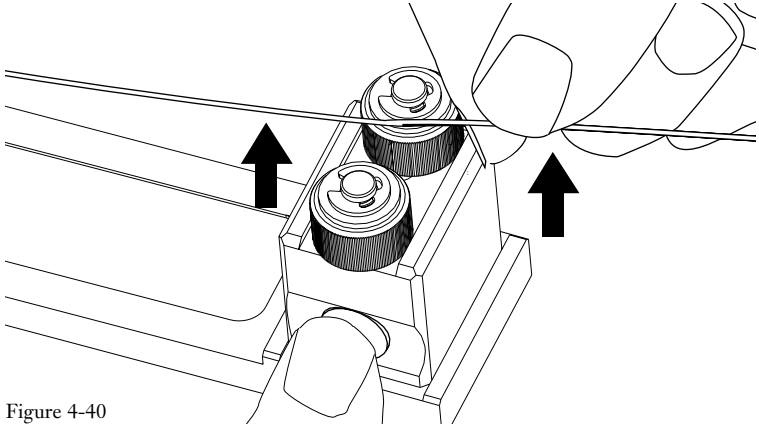


Figure 4-40

4.8-8 Leave the wrench handle down. Pull the slide handle back and remove the connector by lifting it and its fiber (900 µm) or jacketed cable straight up and out of the tool (Figure 4-41). Do not pull the fibers or cable away from the crimped tube. Handle the connector only.

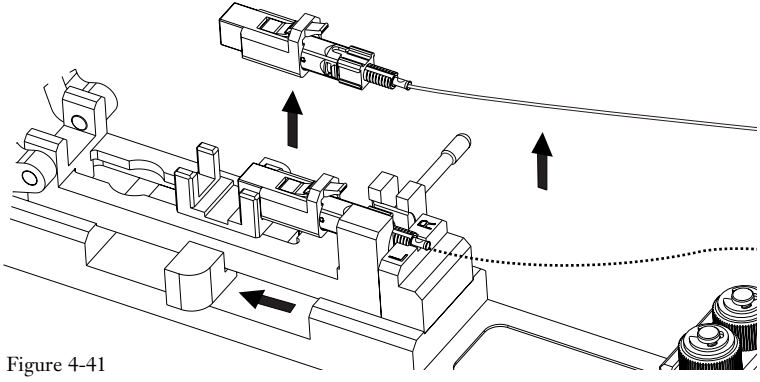


Figure 4-41

CTS

4.8-9 If you are using the CTS system, remove the connector from the CTS coupler and replace the front dust cap (Figure 4-42).

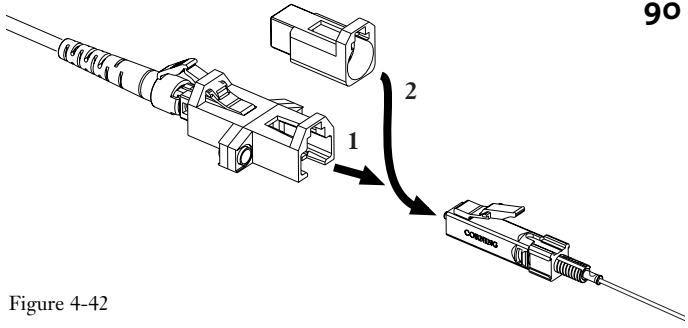


Figure 4-42

1.6 mm, 2.0 mm and 2.9 mm Single-fiber Cables:

If you are working on a 900 µm installation, skip to step 4.8-14 on page 92.

4.8-10 Hold the cable and slide the crimp ring back along the cable jacket to free the aramid yarn. Flare the yarn around the buffered fiber (Figure 4-43).

The ends of the yarn should be within 1 mm of the back of the square cam. If the yarn is too long, trim it now.

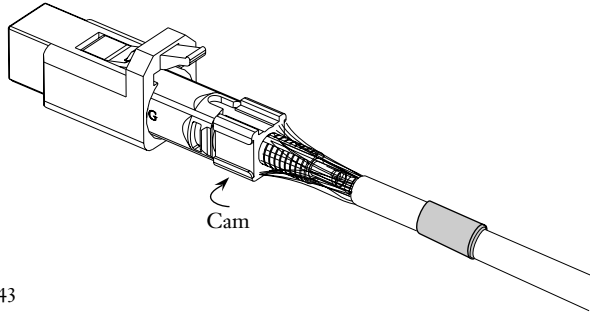


Figure 4-43

4.8-11 Hold the connector and push the crimp ring over the aramid yarn and against the back of the connector's cam (Figure 4-44).

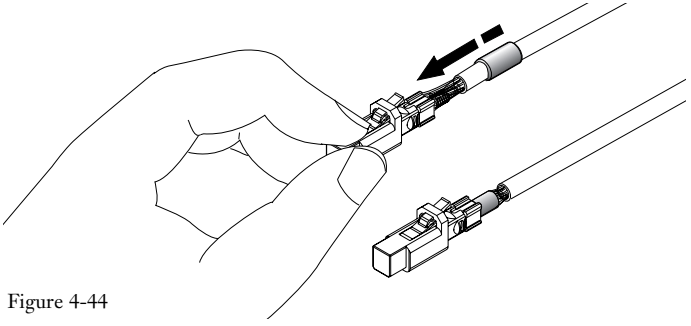


Figure 4-44

> **CAUTION:** *Use only the crimp tool supplied with the UNICAM tool kit (part number 3201007-01). Other similar-appearing crimp tools, e.g., tools with part numbers 3201001-01 and 3201002-01, will over-crimp causing increased attenuation.*

4.8-12 Place the connector crimp ring into the opening of the crimp tool jaws (Figure 4-45).

4.8-13 Squeeze the handles shut until they automatically release to crimp the crimp ring onto the connector. Remove the connector and cable from the tool.

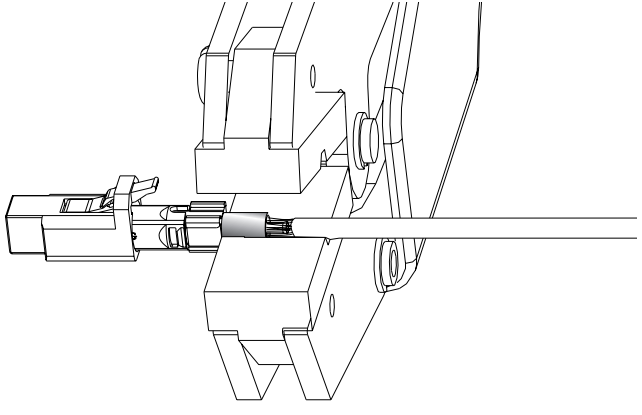


Figure 4-45

SC, FC, ST®
Compatible

4.8-14 Slide the trigger up to the back of the connector (over the crimp ring for jacketed connectors) and latch its arms into the windows on the housing (Figure 4-46).

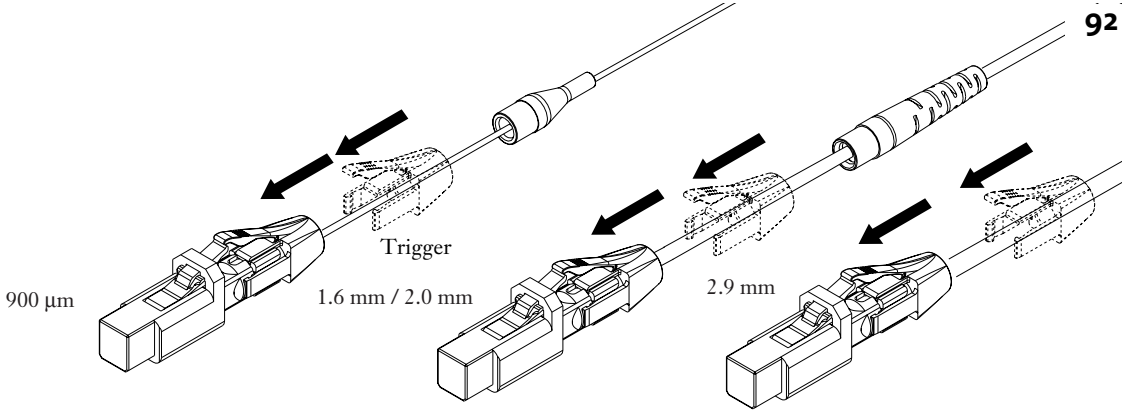


Figure 4-46

4.8-15 While holding the connector by the front dust cap, slide the strain relief boot up the back of the connector and under the tigger until it stops (Figure 4-47).

Note: On jacked applications, a slight twisting motion may be required to seat the strain relief boot within the trigger.

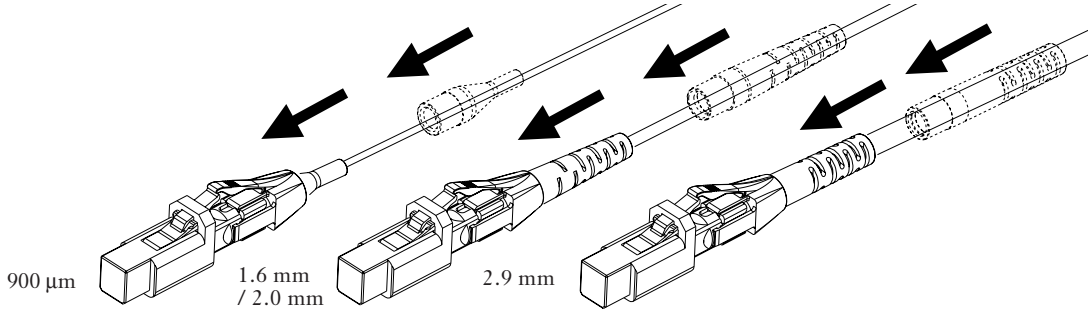


Figure 4-47

4.8-16 The connector is now ready for use. Leave the front dust cap on until you are ready to insert the UniCam LC connector into an adapter sleeve**.**

5. SC, FC, and ST-Compatible Connectors

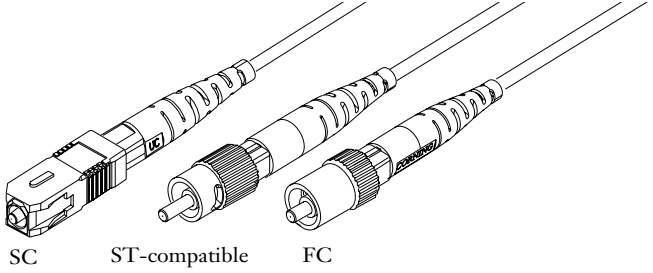


Figure 5-1

5.1 General

5.1-1 This chapter describes how to assemble Corning Cable Systems UniCam SC, ST-compatible, and FC single-fiber connectors (Figure 5-1). This document describes assembly of both multimode and single-mode connectors.

5.1-2 Three types of installations are described in this procedure:

- 900 µm tight-buffered fibers
- 2.9 mm single-fiber cables
- 250 µm furcated fibers (900 µm fan-out or 250 FTB).

5.1-3 Please read through the entire chapter before starting to assemble a connector. Connector testing and maintenance are covered in Chapter 6 of this manual.

5.1-4 For complete instructions on using the tools described in this chapter, refer to the ***Installation Tools*** section of this manual.

5.2 Components

5.2-1 Each UniCam connector package contains the parts listed in Figures 5-2 through 5-4 for the connector type described.

NOTE: *Do NOT remove the dust cap from the connector until you have been instructed to do so. The dust caps provide vital protection against damage and contamination.*

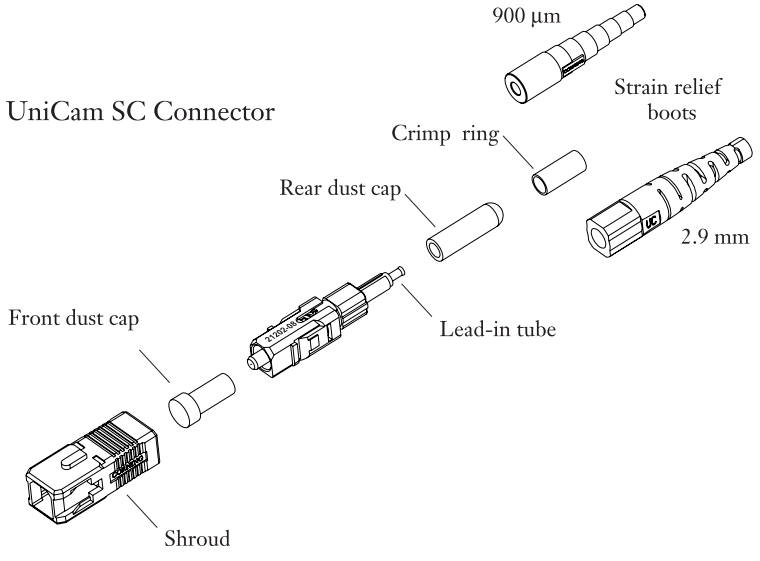


Figure 5-2

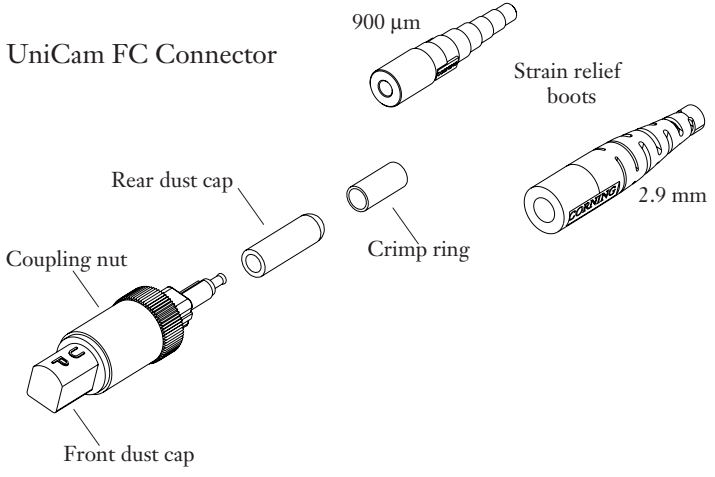


Figure 5-3

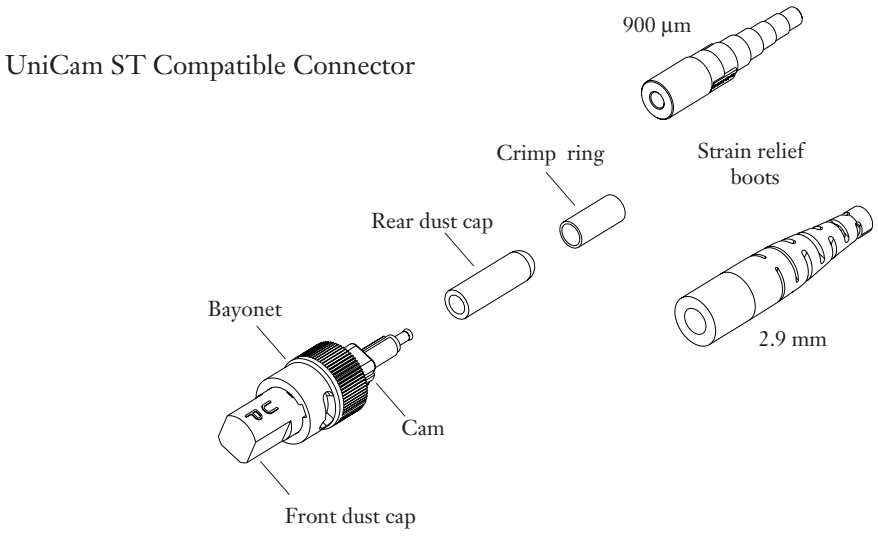


Figure 5-4

5.3 Connector Preparation

5.3-1 The UniCam installation tool is designed to position the fiber into the connector, rotate the cam that aligns the fibers, and crimp the buffered fiber in place. The tool makes connector assembly easy and accurate. A separate crimp tool is required to secure the aramid yarn when present in the cable.

Critical Step

5.3-2 Flip the crimp handle open and rotate the wrench so that the handle is up (Figure 5-5).

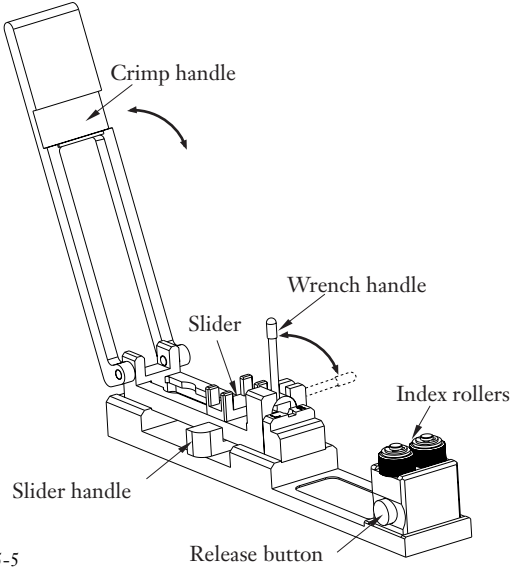


Figure 5-5

CTS For installations using the CTS system, rotate the slider to the CTS position by pulling the slider handler fully back, and while holding it, rotating the slider to the desired orientation (Figure 5-6).

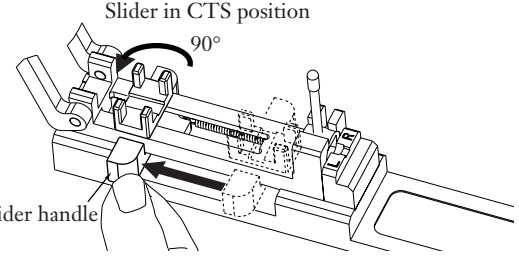


Figure 5-6

5.3-3 Remove the connector components from the bag. Examine the connector to make sure it is in the open position.

For the SC, the connector is in the open position when the key on the cam is positioned 90° from the date code printing on top of the connector (Figure 5-7 a).

For FC or ST-compatible connectors, the connector is in its open position when the key on the cam is positioned 90° from the rounded side of the dust cap with the label "UP" (Figure 5-7 b and c).

The connector will not fit into the installation tool unless the wrench handle is up and the cam is open .

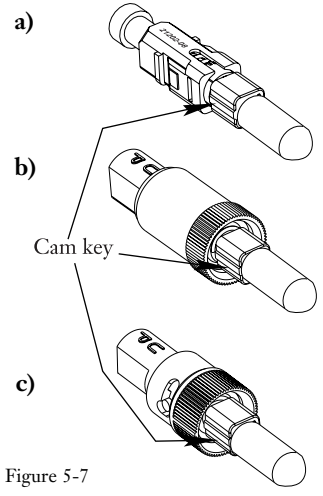


Figure 5-7

5.3-4 Remove the rear dust cap from the connector (Figure 5-8).

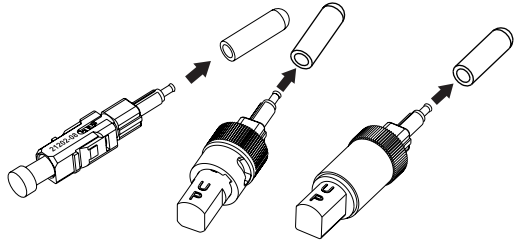
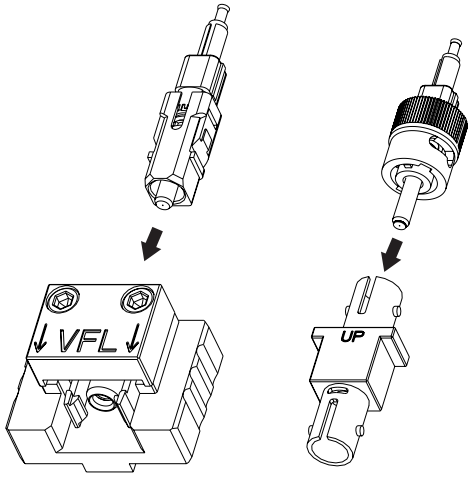


Figure 5-8

CTS

5.3-5 If you are using the CTS system, remove the front dust cap from the connector and plug the connector into the appropriate CTS coupler as shown in Figure 5-9.



CTS coupler for SC connectors

CTS coupler for ST-compatible connectors

Figure 5-9

Leave the front dust cap ON if you are <u>not</u> using the CTS system (Figure 5-10).

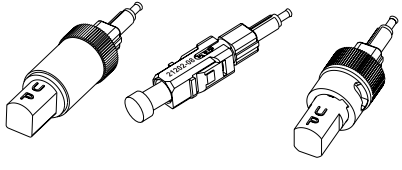


Figure 5-10

For installations using a CTS system, refer to step 5.3-6 for instructions on connector placement in the installation tool. If you are not using a CTS system, skip to step 5.3-7.

CTS

5.3-6 With the slider in its CTS position, load the coupler and connector as follows:

ST-compatible Connectors (Figure 5-11):

1. Guide the CTS jumper through the arms of the crimp handle and plug the CTS jumper into the front of the CTS coupler. Make sure that the jumper's connector is secured into the coupler.
2. Pull back and hold the slider at the the end of its travel.
3. Insert the CTS coupler and the UniCam connector into the slider.
4. Slowly release the slider handle and carefully guide the connector through the wrench until the crimp tube rests on the crimp platform.

Critical Step: *The crimp tube must rest on the crimp platform as shown in the inset. If the connector does not slide into the tool when gently pushed, check to make sure the connector is in the open position described in step 5.3-3, the wrench handle is up, and you are inserting the connector with its proper side up.*

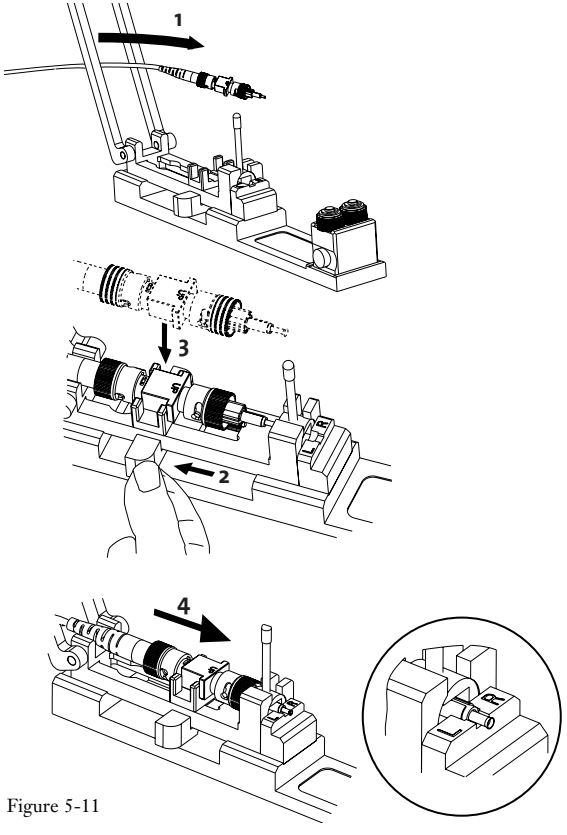


Figure 5-11

CTS

SC Connectors (Figure 5-12):

1. Guide the CTS jumper through the arms of the crimp handle and plug the CTS jumper into the front of the CTS coupler. Make sure that the jumper's connector is secured into the coupler.
2. Pull back and hold the slider at the the end of its travel.
3. With the slider held back, carefully insert the SC UniCam connector into the wrench.

   A gentle push should be adequate to insert the connector. Do not attempt to force the connector into the tool – doing so could damage the connector.
4. Slowly release the slider handle and guide the slider against the back of the coupler.

Critical Step: *The crimp tube must rest on the crimp platform as shown in the inset. If the connector does not slide into the tool when gently pushed, check to make sure the connector is in the open position described in step 5.3-3, the wrench handle is up, and you are inserting the connector with its proper side up.*

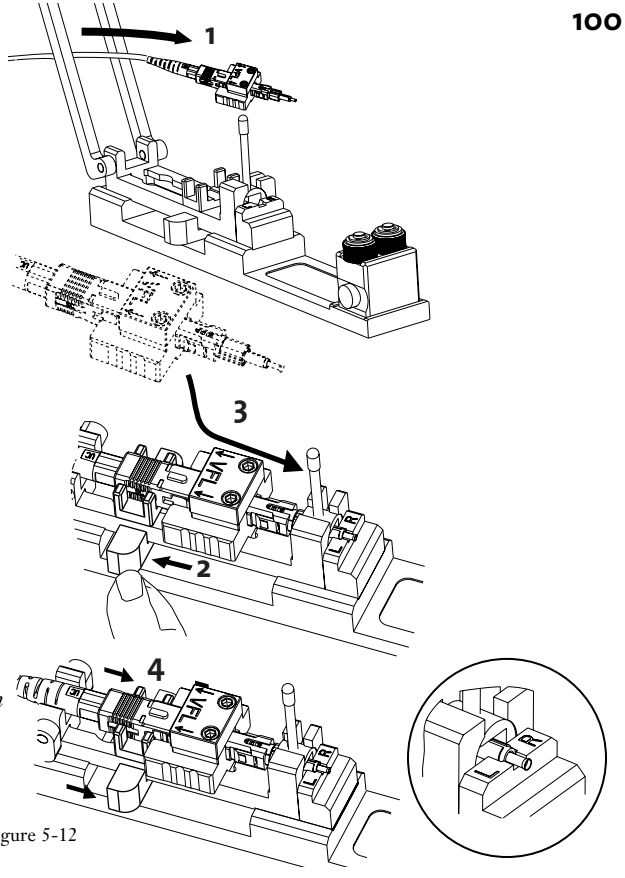


Figure 5-12

5.3-7 If you are not using a CTS system (Figure 5-13):

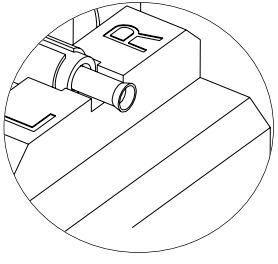
To place the connector in the installation tool

1 Pull back and hold the slider at the the end of its travel. With the slider held back, insert the connector into the wrench.

A gentle push should be adequate to insert the connector. Do not attempt to force the connector into the tool – doing so could damage the connector.

2 Slowly release the slider handle and guide the slider into position on the connector's dust cap.

Critical Step: *The crimp tube must rest on the crimp platform as shown below. If the connector does not slide into the tool when gently pushed, check to make sure the connector is in the open position described in step 5.3-3, the wrench handle is up, and you are inserting the connector with its proper side up.*



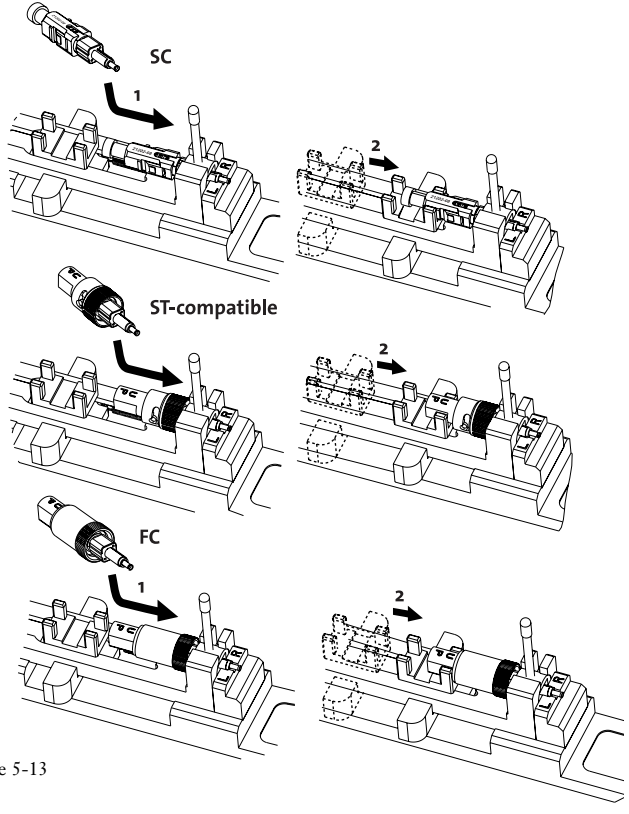


Figure 5-13

5.4 Fiber Preparation - 900 µm Tight-Buffered Fiber

5.4-1 Slide the 900 µm boot (small end first) down the fiber until it is out of the way (Figure 5-14).

Figure 5-14

5.4-2 Measure and mark 40 mm (1.5 in) from the end of the buffered fiber (Figure 5-15).

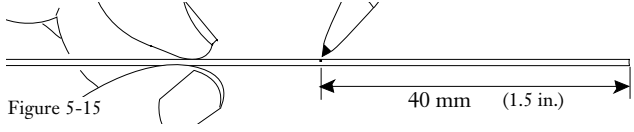


Figure 5-15

5.4-3 Remove this 40-mm section of the buffer with the 203 µm No-Nik, tool (Figure 5-16).

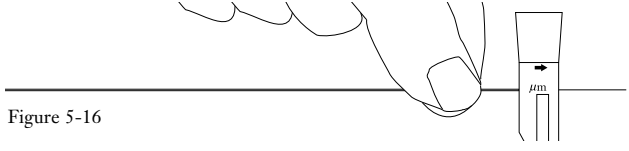


Figure 5-16

5.4-4 Mark the buffer 10 mm (0.39 in) back from the strip point with a permanent ink marker (Figure 5-17).

Critical Step: *This mark must be made on the buffer. It is a a visual aid to indicate when the field fiber contacts the fiber stub.*

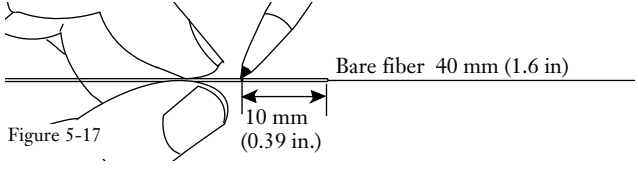


Figure 5-17

5.4-5 Clean the bare fiber with two passes of an alcohol wipe. Do not touch the bare fiber after cleaning it. Do not remove the 10 mm mark.

Proceed to Section 5.7, *Fiber Cleaving*, on page 109.

5.5 Fiber Preparation - 2.9 mm Single-fiber Cable

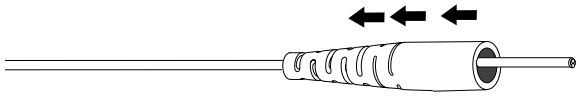


Figure 5-18

5.5-1 Slide the 2.9 mm boot (small end first) down the cable until it is out of the way (Figure 5-18).

Note: *Take your time and do the next four steps correctly. Excessive yarn length will have to be trimmed later. Yarn too short may result in weak strain relief for the connector.*

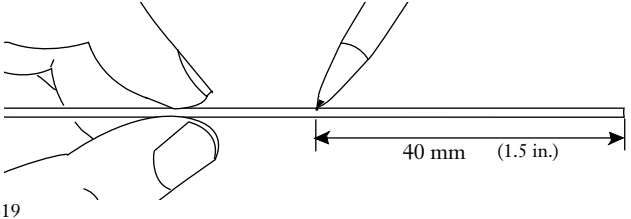


Figure 5-19

5.5-2 Measure and mark 40 mm (1.5 in) from the end of the cable's outer jacket (Figure 5-19).

5.5-3 Strip off the 40-mm section of outer jacket with the 16 AWG opening of the buffer stripping tool (Figure 5-20).

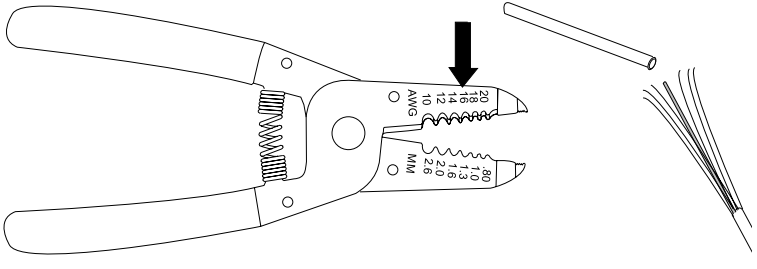


Figure 5-20

5.5-4 Use scissors to trim the aramid yarn flush to the end of the outer jacket.

5.5-5 Measure and mark 11 mm (0.43 in) from the end of the outer jacket (Figure 5-21).

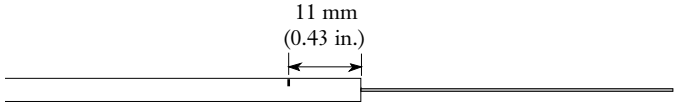


Figure 5-21

5.5-6 Strip off the 11-mm section of outer jacket. You should have 11 mm of aramid yarn showing.

5.5-7 Fold the aramid yarn back over the cable jacket and slide the crimp ring about 5 mm (0.2 in) down the yarn to hold it out of the way (Figure 5-22).

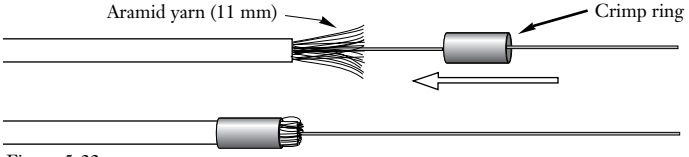


Figure 5-22

5.5-8 Measure and mark the 900 µm buffer coating 10 mm (0.39 in) from the end of the cable jacket (Figure 5-23).

Place an additional mark on the buffer at the edge of the jacket.*This mark is a visual aid to indicate when the field fiber contacts the fiber stub.*

Critical Step: *This mark must be made on the buffer. It is a a visual aid to indicate when the field fiber contacts the fiber stub.*

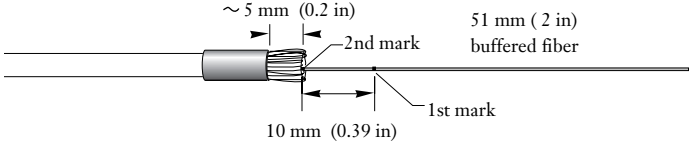


Figure 5-23

5.5-9 Remove approximately 41 mm (1.6 in) of coating to the first mark with the 203 µm No-Nik tool (Figure 5-24).

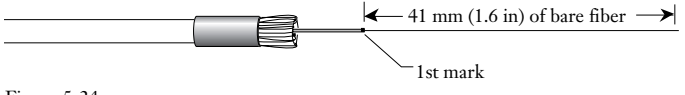


Figure 5-24

Important: Check the locations of the second mark after stripping – it must be near the edge of the jacket. If necessary, work the buffer back into its original position in the jacket as follows (Figure 5-25):

1. Grasp the cable about 60 cm (24 in.) behind the strip point.

2. Pull the cable until the second mark is again near the jacket.

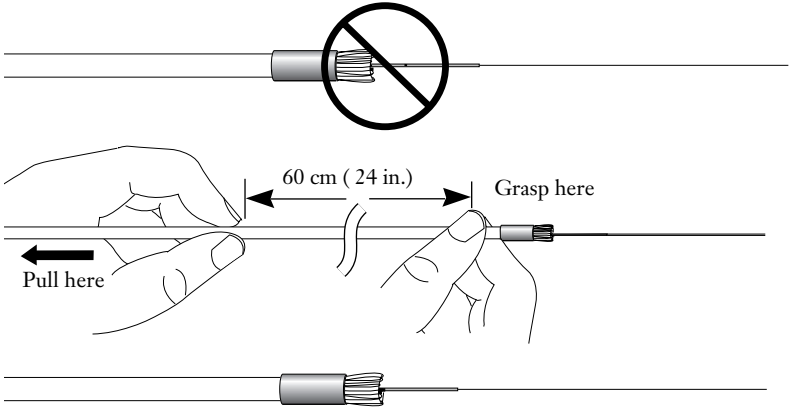


Figure 5-25

5.5-10 Clean the bare fiber with two passes of an alcohol wipe. Do not touch the bare fiber after cleaning.

Proceed to Section 5.7, **Fiber Cleaving**, on page 109.

5.6 Fiber Preparation - 250 µm Furcated Fibers

Note: This section describes connector installation on 250 µm fibers installed in:

- 900 µm OD Fan-out Tubing - see step 5.6-1.
- FTB 250 µm Fan-out tubing (2.9 mm jacket) - see step 5.6-7.

900 µm OD Fan-out Tubing

5.6-1 Slide the 900 µm boot (small end first) down the tubing until it is out of the way (Figure 5-26).

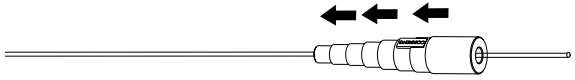


Figure 5-26

5.6-2 Feed the 250 µm coated fiber through the fan-out tubing until 44 mm (1.7 in) of fiber protrudes from the end of the tubing.

5.6-3 Measure and mark the 250 µm-coated fiber 4 mm from the end of the fan-out tube (Figure 5-27).

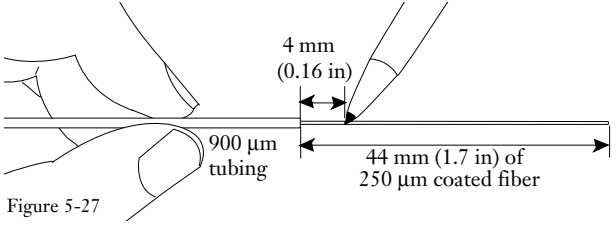


Figure 5-27

Critical Step

5.6-4 Remove the 250 µm coating to the 4 mm mark with the stripping tool. It is important to leave 4 mm of 250 µm fiber extending beyond the 900 µm tubing. This allows the fibers to touch before the 900 µm tubing bottoms out inside the connector.

5.6-5 Mark the fan-out tube 10 mm (0.39 in) back from the end of the 900 µm tubing with a permanent marker (Figure 5-28). *This mark is a visual aid to indicate when the field fiber contacts the fiber stub.*

Critical Step: *This mark must be made on the buffer. It is a a visual aid to indicate when the field fiber contacts the fiber stub.*

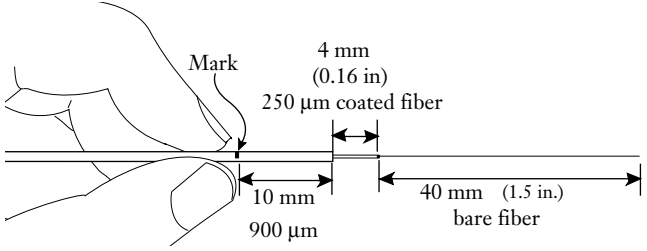


Figure 5-28

5.6-6 Clean the bare fiber with two passes of an alcohol wipe. Do not touch the bare fiber after cleaning it. Do not remove the 10 mm mark.

Proceed to Section 5.7, *Fiber Cleaving*, on page 109.

FTB 250 µm Fan-out Tubing

5.6-7 Slide the 2.9 mm boot (small end first) down the cable until it is out of the way (Figure 5-29).

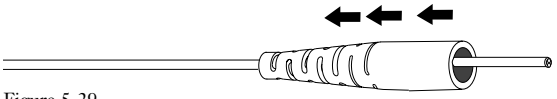


Figure 5-29

Note: *Take your time and do the next five steps correctly. Excessive yarn length will have to be trimmed later. Yarn too short may result in weak strain relief for the connector.*

5.6-8 Measure and mark 11 mm (0.43 in) from the end of the outer jacket (Figure 5-30).

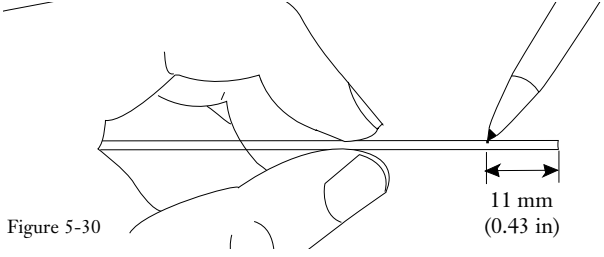


Figure 5-30

5.6-9 Strip off the 11-mm section of outer jacket with the 16 AWG opening of the buffer stripping tool (Figure 5-31).

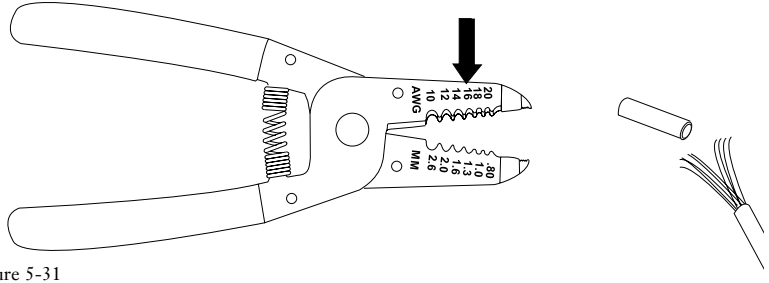


Figure 5-31

5.6-10 Fold the aramid yarn back over the cable jacket and slide the crimp ring about 5 mm (0.2 in) down the yarn to hold it out of the way (Figure 5-32).

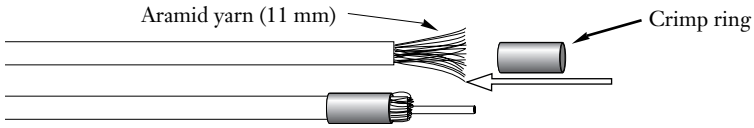


Figure 5-32

5.6-11 Feed the 250 µm coated fiber through the fan-out tubing until 44 mm (1.7 in) of fiber protrudes from the end of the tubing (see Figure 5-33).

5.6-12 Measure and mark the 250 µm-coated fiber 4 mm from the end of the 900 µm fan-out tube (Figure 5-33).

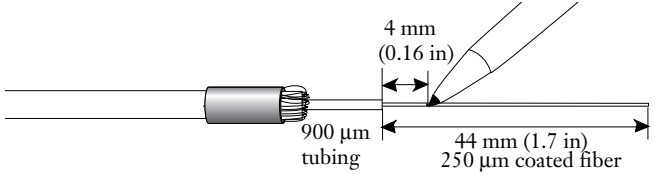


Figure 5-33

Critical Step

5.6-13 Remove the 250 µm coating to the 4 mm mark with the stripping tool.

It is important to leave 4 mm of 250 µm fiber extending beyond the 900 µm tubing. This allows the fibers to touch before the 900 µm tubing bottoms out inside the connector (Figure 5-34).

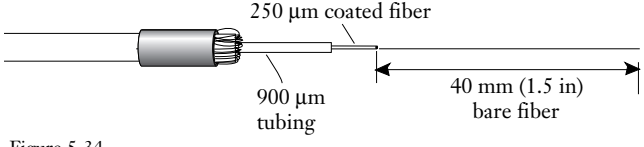


Figure 5-34

5.6-14 Clean the bare fiber with two passes of an alcohol wipe. Do not touch the bare fiber after cleaning it.

5.7 Fiber Cleaving

Note: *This section describes the use of the FBC-012 cleaver supplied with the TKT-UNICAM-ELITE Kit. For complete instructions on using the FBC-012, see the Installation Tools section of this manual. If you are using the FBC-001 cleaver, refer to the FBC-001 instructions in the Installation Tools section of this manual. If you are using any other cleaver, cleave the fibers to 8.5mm +1.5/-0.5.*

Critical Step - *The buffer marks must be made on the fiber per the connector instructions.*

5.7-1 Open the door on the single-fiber handler. Verify the handler is clean and free of debris in the fiber groove.

Critical Step - *Make sure that you applied the buffer marks described in the Fiber Preparation Sections before moving to the next step.*

5.7-2 Place the fiber into the groove in the handler.

Critical Step — *Do not drag the bare fiber against the handler. Only coated fiber should contact the groove in the handler. Bare fiber must not contact the groove.*

5.7-3 Align the fiber in the handler as indicated for the connector/fiber type being installed (Figures 5-35 and 5-36).

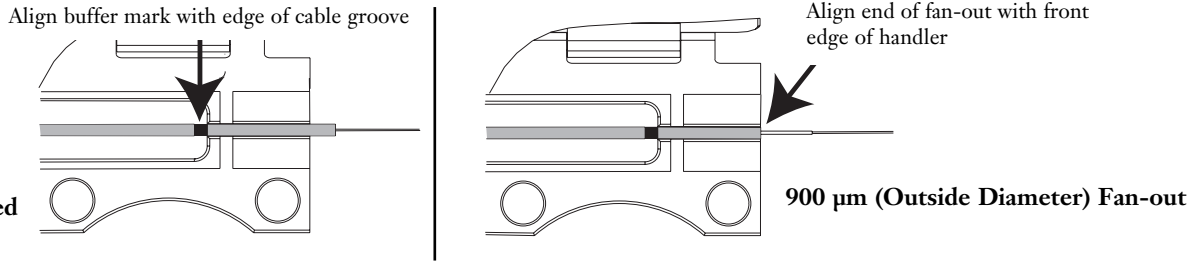
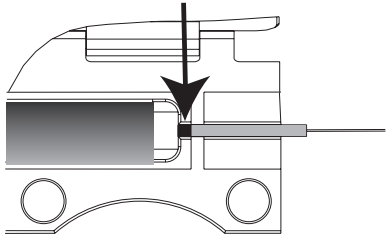


Figure 5-35

Butt 2.9 mm jacket edge against edge of cable groove

2.9 mm Single-fiber cable



Align end of 900 µm OD fan-out with front edge of handler

Fan-out Tubing 250µm

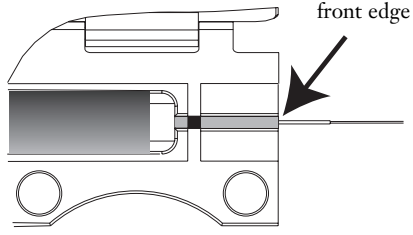


Figure 5-36

5.7-4 Gently close the door on the handler. Ensure that at least 1 mm of coated fiber protrudes from the handler.

If there is not at least 1 mm of coated fiber protruding from the handler, open the handler door, remove the fiber, and reload the fiber in the handler

5.7-5 Position the handler in the cleaver so that the edge of the fiber coating aligns with the edge of the left-hand elastomeric pad (Figure 5-37). The coating should lightly contact the pad's edge. No pressure is required.

IMPORTANT: *The fiber must be visually aligned with the edge of the elastomeric pad during this step. Do not simply slide the handler against the stop. Poor cleave quality and incorrect cleave length will result.*

Critical Steps — *The fiber should lay flat across the fiber pad.*

When cleaving fan-out, align the edge of the 250 µm coating with the fiber pad. The fiber coating should not extend onto the pad. Clamping coated fiber in the pad may result in poor cleave quality and incorrect cleave lengths.

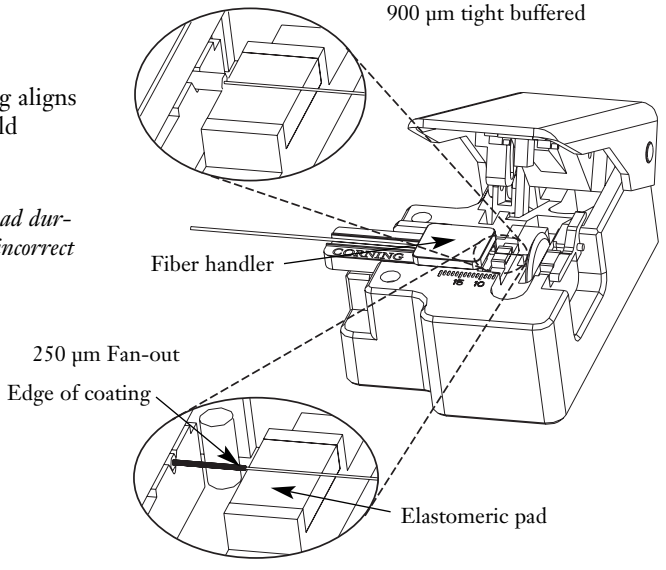


Figure 5-37

5.7-6 While carefully holding the handler in position, with the coating butted against the elastomeric pad, slowly press the cleaver's handle as far as it will go (Figure 5-38).

Gently release the handle and remove the handler from the cleaver.

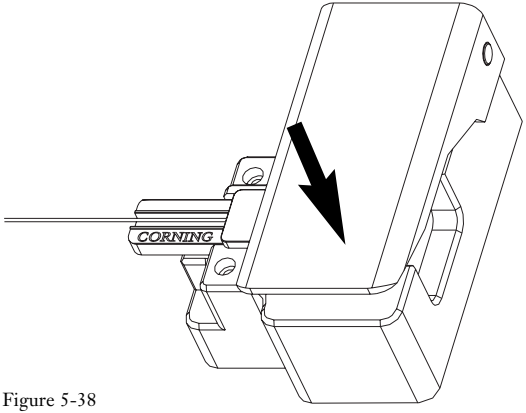


Figure 5-38

5.7-7 Use tweezers to remove the scrap fiber end from the cleaver and place it on a loop of tape kept for that purpose alone.

5.7-8 Open the door on the handler and remove the cleaved fiber.

5.8 Connector Installation

5.8-1 Press in the release button on the UniCam tool's fiber index, and place the fiber between the rollers. Make sure the fiber is fully seated between the rollers (Figures 5-39 and 5-40) before removing your finger from the button.

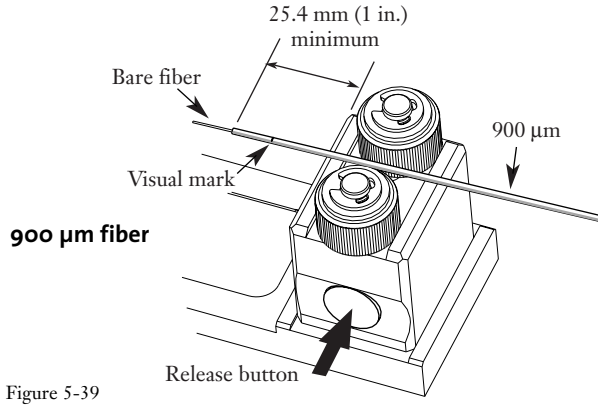


Figure 5-39

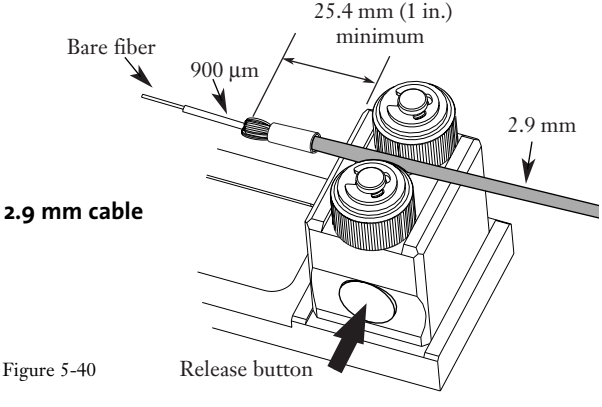


Figure 5-40

5.8-2 While pulling the fiber through the rollers, insert the fiber into the connector's crimp tube until you feel it firmly stop against the connector's fiber stub. The index rollers will rotate, allowing the fiber to pull through.

- Guide the fiber in straight. Do not bend or angle it.
- If you feel resistance at the entry funnel, pull the fiber back out a short distance and re-insert it.

Notes: If you have stripped and cleaved the fiber to the correct length, the end of the cable jacket or the visual mark should stop within 2 mm (0.08 in) of the lead-in tube (Figures 5-41 and 5-42).

If this mark is not visible, the fibers may have been broken. Remove the connector, re-strip and recleave the fiber, and begin with a new connector.

For jacketed fibers, the buffer mark must be visible between the lead-in tube and the aramid yarn to assure that the fibers butt together. If you don't see the mark, pull the fiber out of the connector, and start over again with new cable preparation.

900 µm fiber

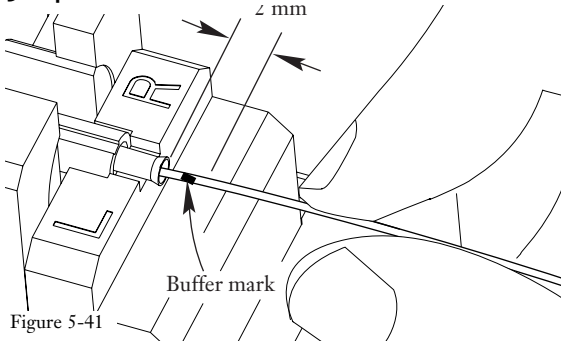


Figure 5-41

2.9 mm cable

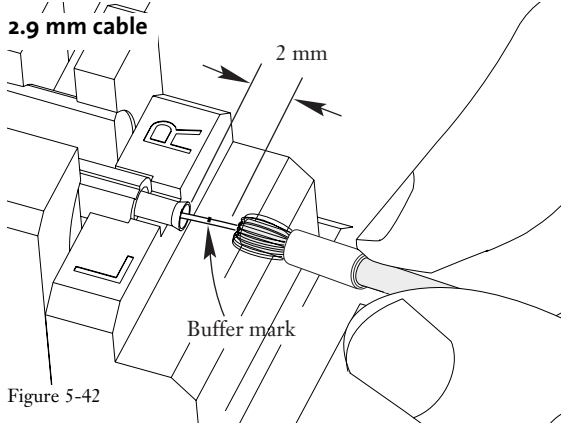


Figure 5-42

Critical Step: *The bow created in step 5.8-3 is critical. It will ensure the fiber maintains contact with the connector's stub fiber during the next step.*

5.8-3 For installations on 900um fiber –lightly pinch the index rollers on the fiber, and slowly rotate the rollers until a 12 mm (0.5 in.) bow forms in the fiber between the connector and the index rollers (Figure 5-43).

Note that you may chose to maintain inward pressure by hand instead of using the fiber index rollers.

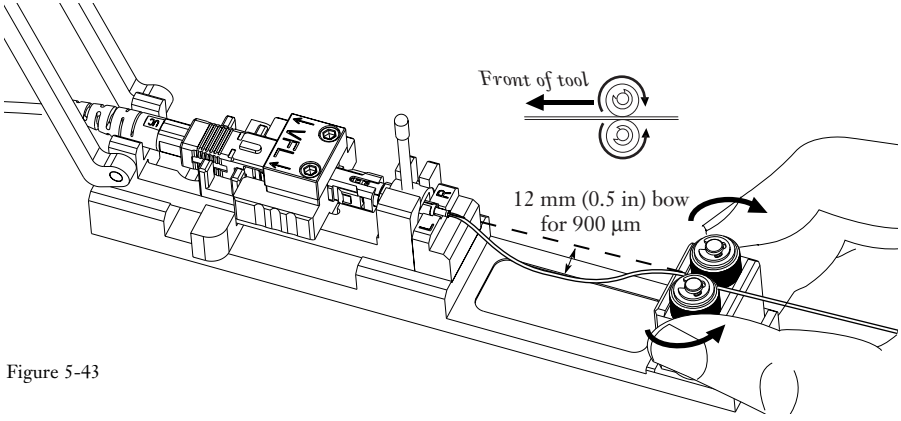


Figure 5-43

For installation on 2.9mm cable or FTB cables - lightly pinch the index rollers on the fiber, and slowly rotate the rollers until the cable jacket just begins to bow between the connector and the index rollers (Figure 5-44).

Note that you may chose to maintain inward pressure by hand instead of using the fiber index rollers.

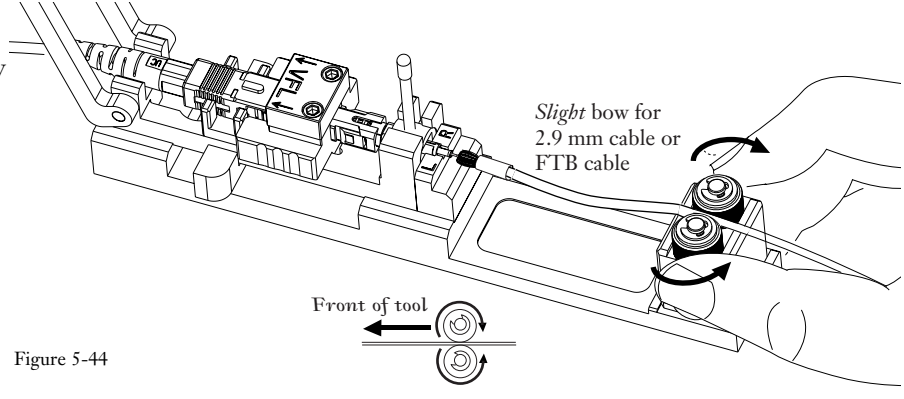


Figure 5-44

5.8-4 Rotate the wrench down until it stops. It is normal for the wrench to rotate beyond 90° (Figure 5-45).

DO NOT ROTATE THE WRENCH BACK UP.

CTS If you are using the CTS system, the glow from the connector's cam should noticeably dim **after** the wrench is rotated fully down.

If the glow is not significantly dimmed, rotate the wrench up, remove the fiber from the connector, and repeat the installation.

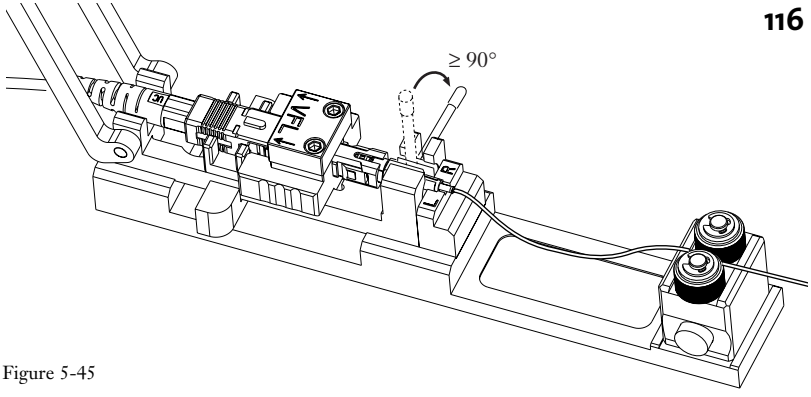


Figure 5-45

5.8-5 Carefully flip the crimp handle 180° until it contacts the crimp tube. Push down firmly to crimp (Figure 5-46). The tool cannot over-crimp the connector.

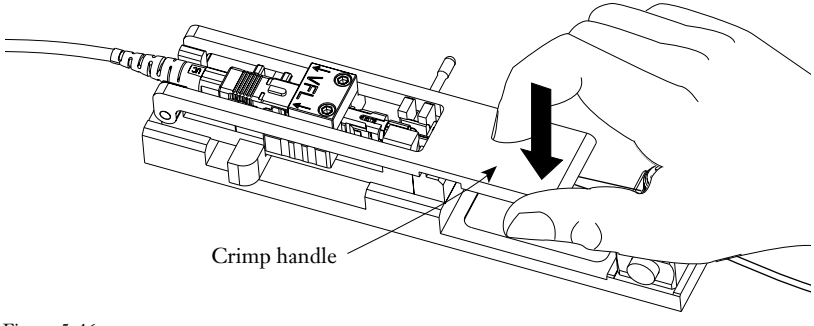


Figure 5-46

5.8-6 Flip the crimp handle back. You should see a flat impression in the crimp tube, indicating a proper crimp (Figure 5-47).

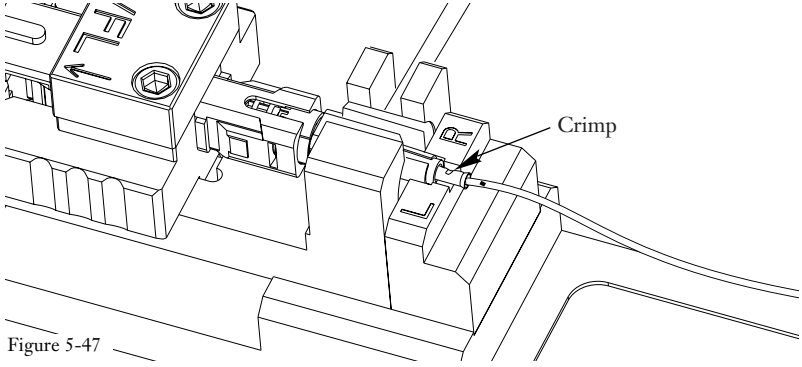


Figure 5-47

5.8-7 Remove the fiber from the index rollers by pressing the release button and lifting it out (Figure 5-48).

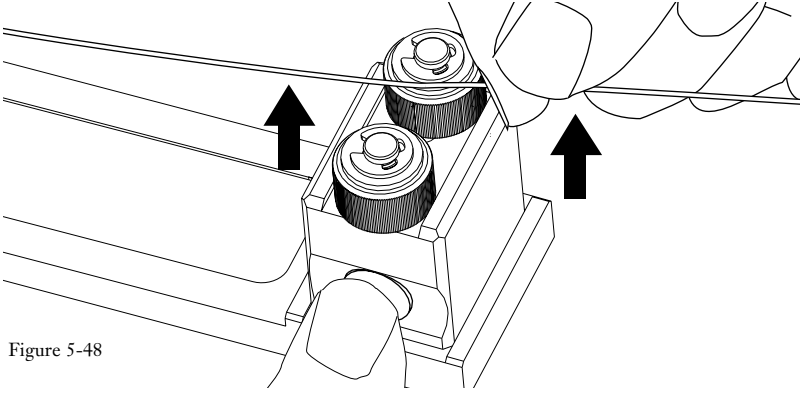


Figure 5-48

5.8-8 Leave the wrench handle down.

Pull the slide handle back and remove the connector by lifting it and its fibers (900 µm) or 2.9 mm cable straight up and out of the tool (Figure 5-49).

Do not pull the fibers or cable away from the crimped tube. Handle the connector only.

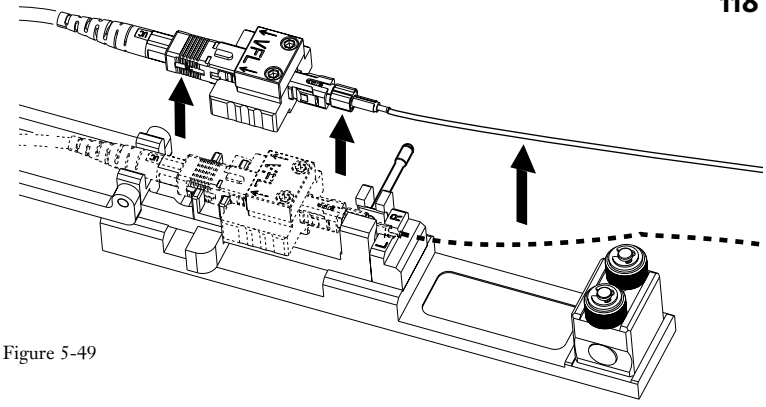


Figure 5-49

CTS

5.8-9 If you are using the CTS system, remove the connector from the CTS coupler and replace the front dust cap (Figure 5-50).

To complete a 900 µm installation skip to step 5.8-14 on page 121.

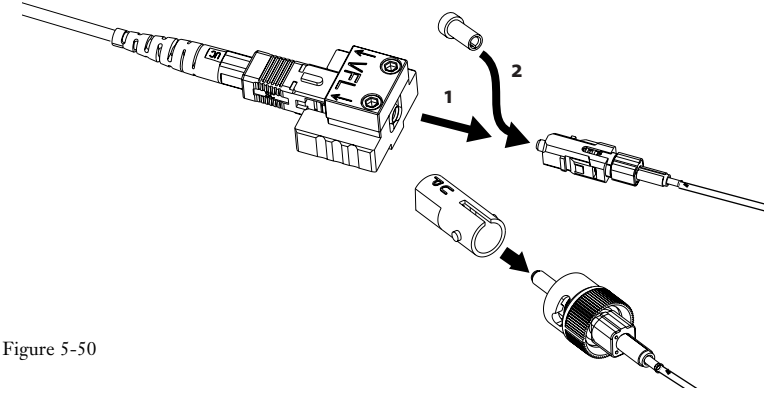


Figure 5-50

2.9 mm Cable and FTB Fan-out Cables Only:

5.8-10 Hold the cable and slide the crimp ring back along the cable jacket to free the aramid yarn. Flare the yarn around the buffered fiber (Figure 5-51).

The ends of the yarn should just touch the back of the square cam. If the yarn is too long, trim it now.

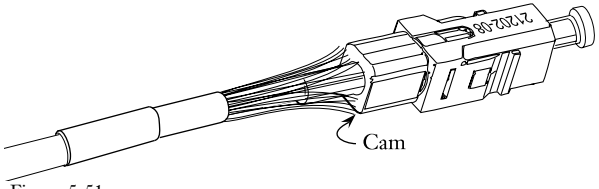


Figure 5-51

5.8-11 Hold the connector and push the crimp ring over the aramid yarn and against the back of the connector's cam (Figure 5-52).

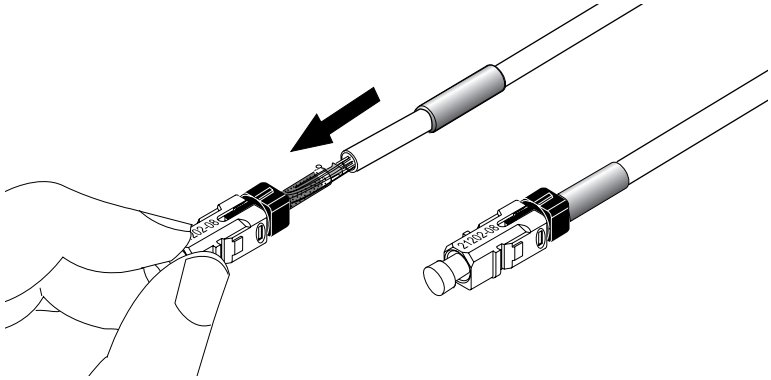


Figure 5-52

CAUTION: *Use only the crimp tool supplied with the UNICAM tool kit (part number 3201007-01). Other similar-appearing crimp tools, e.g., tools with part numbers 3201001-01 and 3201002-01, will over-crimp causing increased attenuation.*

5.8-12 Place the connector crimp ring into the opening of the crimp tool jaws (Figure 5-53).

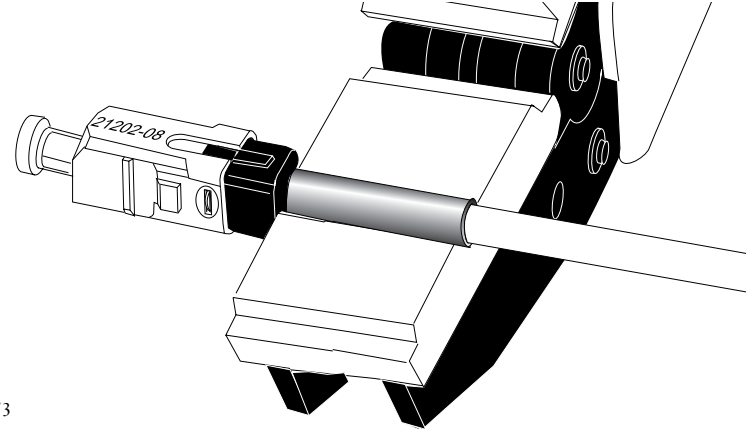


Figure 5-53

5.8-13 Squeeze the handles shut until they automatically release to crimp the crimp ring onto the connector. Remove the connector and cable from the tool.

5.8-14 Complete the connector assembly according the appropriate step below:

For ST-compatible and FC-compatible Connectors:

a) Slide the boot up the back of the connector until it reaches the cam (Figure 5-54).

b) The connector is now ready to use. Leave the front dust cap on until you are ready to insert the UniCam connector into an adapter sleeve.

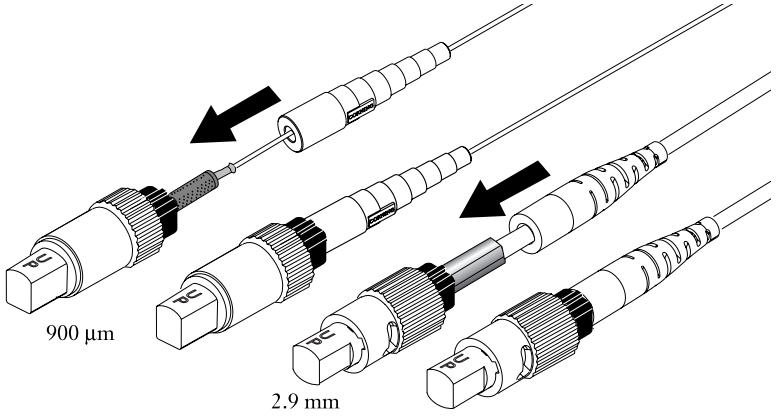


Figure 5-54

For SC Connectors:

a) Slide the boot up the back of the connector until it reaches the cam (Figure 5-55).

b) To install the outer shroud onto the UniCam SC connector, line up the date code on the inner shroud with the key-side of the outer shroud. Using the boot, push the UniCam assembly into the rear of the outer shroud until it snaps into place (Figure 5-56).

Wiggling the parts while applying pressure will make them snap together easily.

c) The connector is now ready to use. Leave the front dust cap on until you are ready to insert the UniCam SC connector into an adapter sleeve.

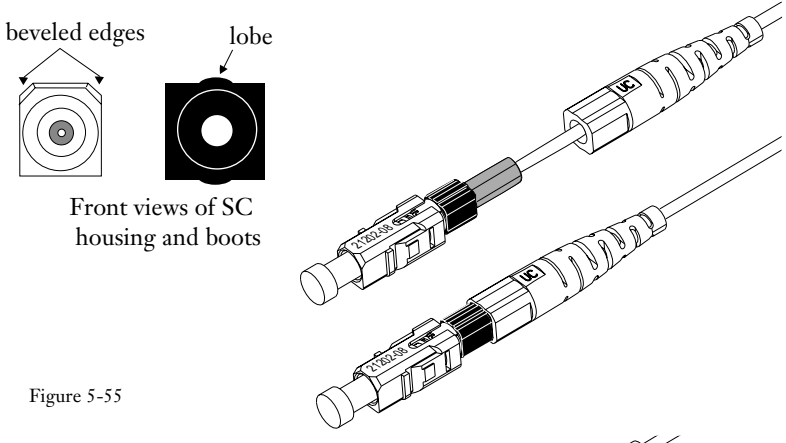


Figure 5-55

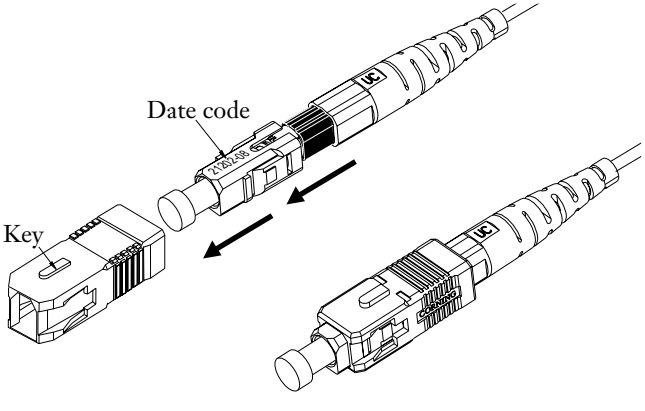


Figure 5-56

Maintenance & Testing

6. UniCam Connector Maintenance and Testing

6.1 General

6.1-1 This section provides information on how to maintain and test the UniCam connectors described in this manual. In addition, this section includes performance data, a guide to fiber preparation and cleave lengths for one and two-fiber UniCam connectors, and a chapter on maintaining system polarity with MT-RJ connectors.

6.2 Connector Cleaning

6.2-1 This procedure describes how to use a Corning Cable Systems Universal Connector Cleaning Cassette (p/n 2104359-01) to clean UniCam fiber optic connectors (Figure 6-1).

Corning Cable Systems recommends using this cleaning procedure every time a connector is unmated.

In addition to cassette operating instructions, Section 6.2-9 of this procedure describes how to use the TKT-CCK kit for any rare "worst case" connectors which the cassette can not effectively clean.

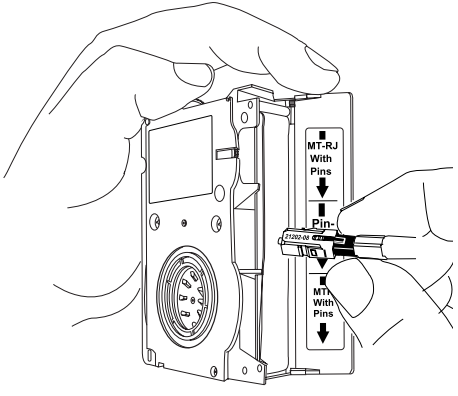


Figure 6-1

6.2-2 The Universal Connector Cleaning Cassette uses a special cloth tape over two pin-clearance runners to clean the connector end face of MT-RJ connectors which have guide pins (Figure 6-2).

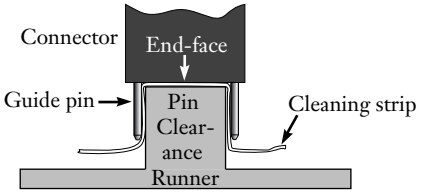


Figure 6-2

The center section of the cleaning area between the two runners may be used to clean any pin-less connector, including single fiber connectors (ST-compatible, SC, FC, or LC).

6.2-3 In addition to the cleaning cassette, the following tools and materials are required for this procedure:

- Universal connector cleaning cassette (Corning Cable Systems p/n 2104359-01)
- Lint free tissues (3615001-01)
- Pump bottle (1603003-01) and reagent grade isopropyl alcohol
- Aerosol duster (2101005-01)
- Foam-tipped swabs (3617002-01)
- Inspection microscope (L-Scope 9 shown)

6.2-4 Open the flap on the connector cleaning cassette. Note the two pin-clearance runners under the cleaning strip, and the corresponding connector designations on the flap label (Figure 6-3). The center portion of the strip is used for both single fiber and pin-less multifiber connectors.

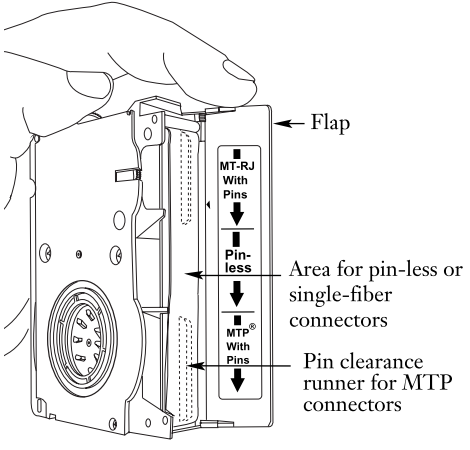


Figure 6-3

6.2-5 Turn the toothed-wheel one stroke to access a fresh area of the cleaning strip (Figure 6-4).

Note: *If dirt or contamination is visible on the desired area of the strip upon opening the flap, 9-10 strokes of the wheel will access a full 76 mm (3 in.) length of fresh cleaning strip.*

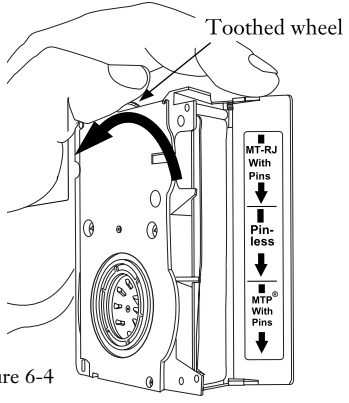


Figure 6-4

6.2-6 To clean a connector:

a) Remove the connector dust cap.

b) Place the connector end-face on the appropriate area of the cleaning strip.

c) Using light pressure,make two passes on the strip in the direction of the arrows on the label (Figure 6-5).

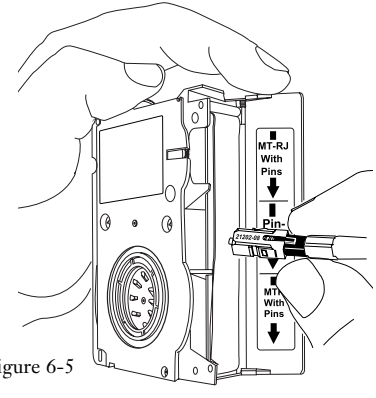


Figure 6-5

6.2-7 After preparing the inspection microscope according to its manufacturer's instructions, insert the connector into the microscope adapter (Figure 6-6).

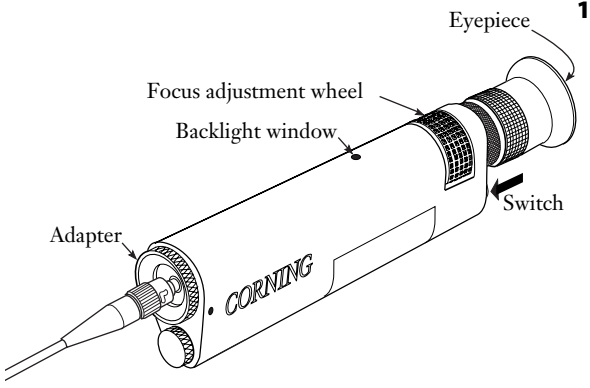


Figure 6-6

6.2-8 Make a visual check of the connector end face and pins / pinholes.

- If the connector is satisfactory, immediately mate it in the appropriate adapter or sleeve, or replace the dust cap.
- Repeat steps 6.2-6 a) through c) if additional cleaning is necessary.

Cleaning Excessively Dirty Connectors

6.2-9 Connectors which have been subjected to harsh environments (dust, etc.) without dust cap protection, may require cleaning beyond that provided by the cleaning cassette. To clean such connectors with the Corning Cable Systems TKT-CCK Connector Cleaning Kit:

Pin-less Connectors

a) Use a lint-free tissue soaked with isopropyl alcohol to wipe the connector end faces (Figure 6-7).

b) Continue the cleaning by wiping the end face with a clean, dry tissue.

c) Complete the cleaning by blowing the end face with filtered compressed air or an aerosol duster. *If you are using an aerosol duster, keep the nozzle at least two inches (5 cm) away from the connector* (Figure 6-8).

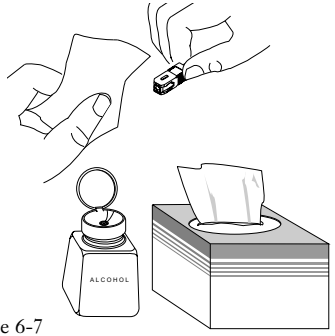


Figure 6-7

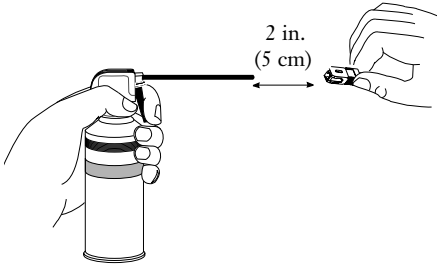


Figure 6-8

d) Make a visual check of the connector end face with the microscope. Repeat Pin-less Connector steps a) through c) if necessary.

e) If the connector is satisfactory, immediately mate it in the appropriate adapter or sleeve, or replace the dust cap.

Pinned Connectors

a) Use a lint-free swab soaked with isopropyl alcohol to wipe the connector end face and guide pins. Take special care to thoroughly clean around the base of both guide pins (Figure 6-9).

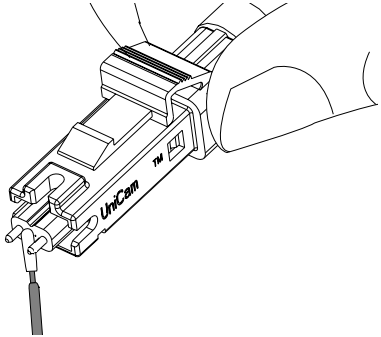


Figure 6-9

b) Continue the cleaning by wiping the end face and guide pins with a clean, dry tissue.

c) Complete the cleaning by blowing the end face and guide pins with filtered compressed air or an aerosol duster. *If you are using an aerosol duster, keep the nozzle at least two inches (5 cm) away from the connector* (Figure 6-10).

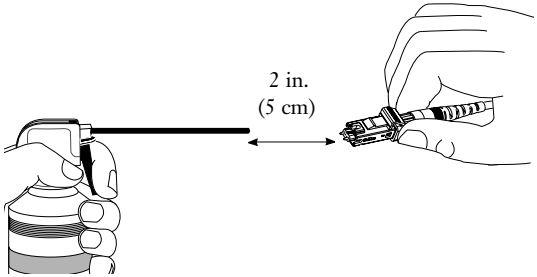


Figure 6-10

d) Make a visual check of the connector end face and guide pins with the microscope. Repeat Pinned Connector steps a) through c) if necessary.

e) If the connector is satisfactory, immediately mate it in the appropriate adapter or sleeve, or replace the dust cap.

6.3 Testing UniCam Connectors

6.3-1 Corning Cable Systems recommends that you test fiber optic connectors according to *EIA FOTP-171.*

6.3-2 If you have questions about proper testing and required equipment, etc., call Corning Cable Systems Engineering Services at 1-800-743-2673.

6.4 Performance of Corning Cable Systems UniCam Connectors

Polish

6.4-1 UniCam connectors are factory polished to precise quality standards. This polish provides single-mode end-face geometry meeting industry standards. Figure 6-11 shows typical single-mode, ceramic ferrule end-face geometry results.

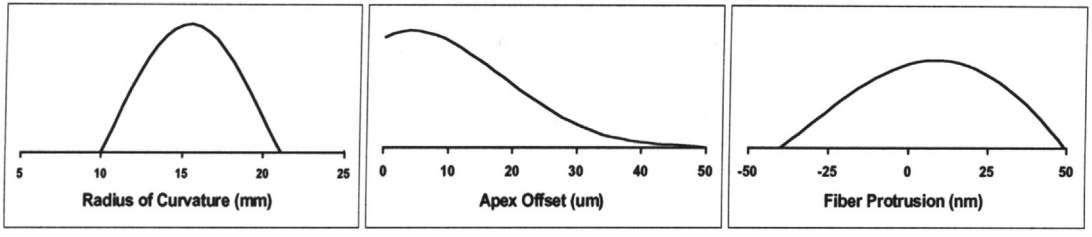


Figure 6-11

6.4-2 UniCam connectors are 100% factory tested for performance. Properly installed, UniCam connectors will consistently exceed TIA/EIA requirements for insertion loss of less than 0.75dB. Figure 6-12 shows typical insertion losses for common UniCam connectors installed with an FBC-012 cleaver, and following this procedure.

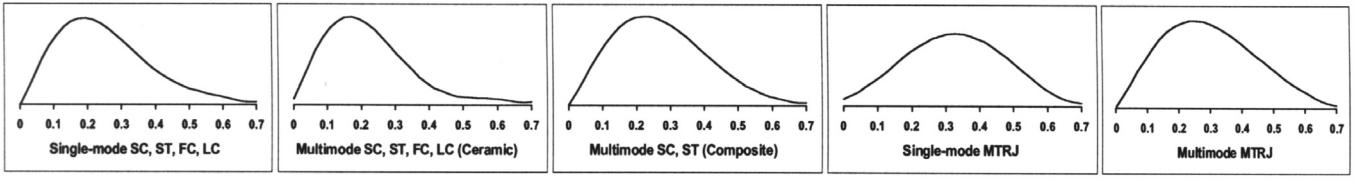


Figure 6-12

6.5 Maintaining System Polarity with MT-RJ Connectors

1. Introduction

1.1 The dual fiber, single ferrule MT-RJ connector provides benefits in connector costs and density. However, system polarity becomes more confusing in fiber wiring administration. The current duplex SC connector, specified in ANSI/TIA/EIA-568A, has the flexibility to change polarity by repositioning the connectors in the clip. This repositioning is not possible with the new MT-RJ and other connectors having two fibers in one ferrule. Depending on the connector technology, once the fibers are secured into the ferrule they cannot be repositioned without the risk of permanent damage.

1.2 Figure 1 shows the difference in fiber configurations for single fiber, single ferrule connectors and for dual fiber, single ferrule connectors. In the MT-RJ ferrule, note that the "B "position is referencing the left fiber, relative to the key, and the "A"position is referencing the right fiber.

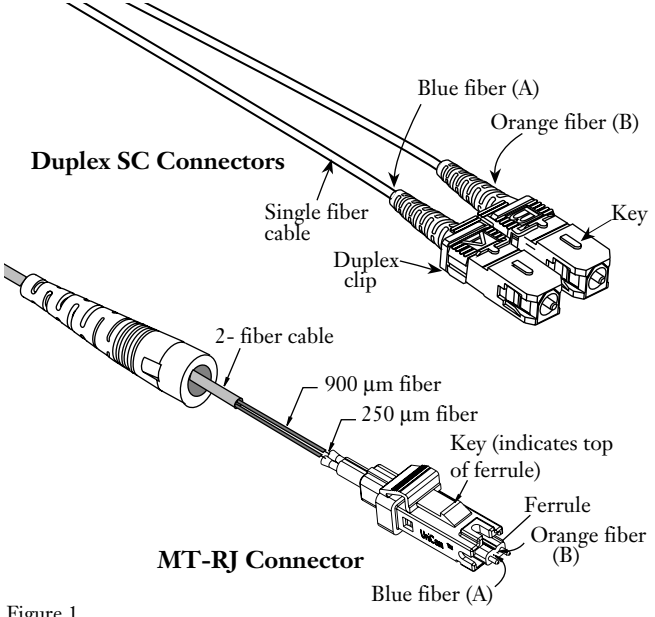


Figure 1

1.3 In a duplex system, the optical fibers are installed in pairs in the patch panels. The system provides a continuous passive pathway between transmitters and receivers on both ends. This transmit and receive configuration requires the fibers to be installed in a manner that will allow the system to transmit from one location and receive at another. With this in mind, maintaining system polarity is essential for an optical fiber system to work properly. This chapter explains how to maintain polarity for MT-RJ connectors and illustrates how to ensure system compliance.

2. What is system polarity and how do you achieve it?

2.1 System polarity ensures that the transmitter on one end of a link will communicate with the receiver on the other end. In the optical fiber industry, all transceivers have a common relationship between the transmitter and receiver relative to the keyway. Figure 2 illustrates the transmitter and receiver relationship.

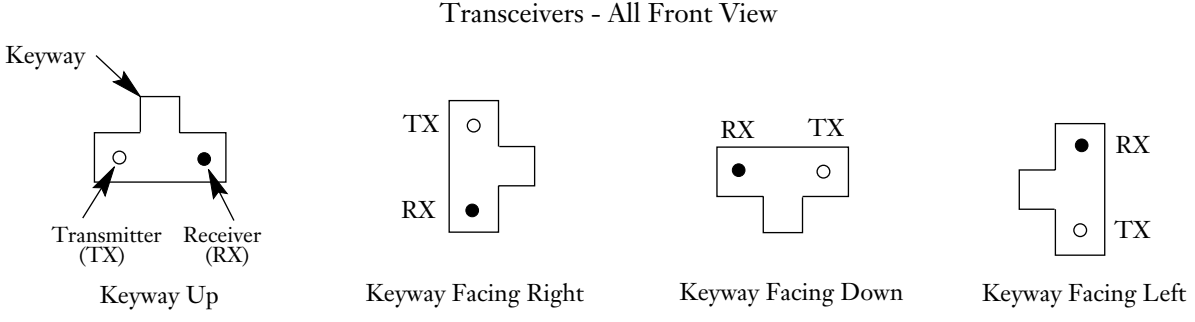


Figure 2

Note: *The orientation of the transmitter and receiver relative to the key are always the same, regardless of the view.*

2.2 If a system is wired with fiber pairs, then the TX (transmitter) must route to the RX (receiver) on the distant end. Figure 3 illustrates proper TX and RX routing.

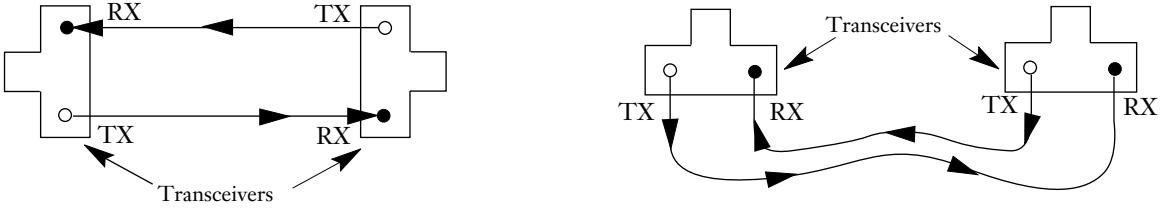


Figure 3

Reverse Fiber Positioning

2.3 The technique of maintaining polarity by taking this straight through path is called "Reverse Fiber Positioning" (RFP). The RFP method is achieved by repositioning the fibers in the micro holes, relative to the connector key, for the ferrule at the opposite end of the system. Figure 4 illustrates Reverse Fiber Positioning.

Note: Two fibers are shown. One has a dashed line to distinguish it in these drawings.

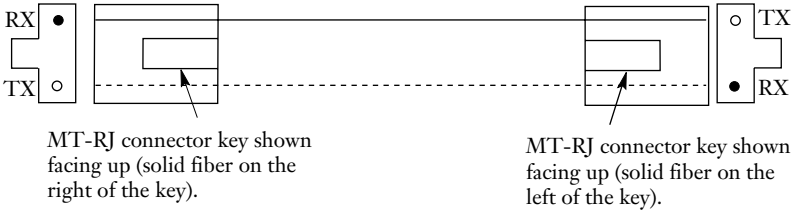


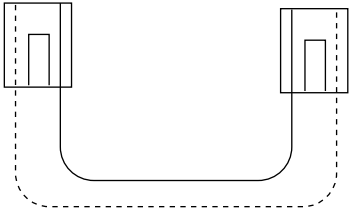
Figure 4

Patch Cords

2.4 Some applications allow a patch cord to establish a link between the electronics. Due to the key on the connector and the matching keyway in the transceiver, the MT-RJ connectors can only be inserted into the transceivers one way. Therefore, it is necessary to construct a patch cord with the Reverse Fiber Positioning method. Figure 5 illustrates an RFP patch cord. Corning Cable Systems recommends that all patch cords be constructed this way.

Note: *Every Corning Cable Systems MT-RJ patch cord is constructed with "RFP" as shown in Figures 4 and 5.*

Reverse Fiber Position (RFP) Patch Cord



Note: *Relative to the connector key, the connector on the right has the dashed fiber on the right and the connector on the left has the dashed fiber on the reverse side, the left.*

Figure 5

Cable Segments

2.5 This RFP method also works in a system where MT-RJ patch cords are installed in patch panels between two transceivers. Figure 6 illustrates a system wired with the RFP technique.

2.6 In Figure 6 the transmitter routes to the receiver with the connectors mated together with keys oriented in the same direction on the front and back of the patch panels. RFP maintains this system polarity. Note that the connector in patch panel #1 has the dashed fiber on the right side of the key, and in patch panel #2 it is on the left side of the key.

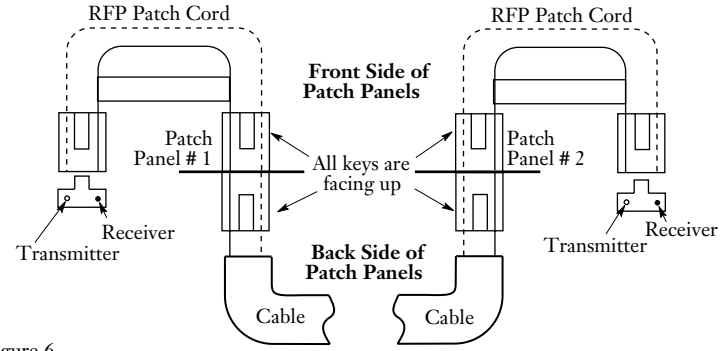


Figure 6

This is plain to see when only looking at the patch panels. Figure 7 illustrates RFP for patch panels.

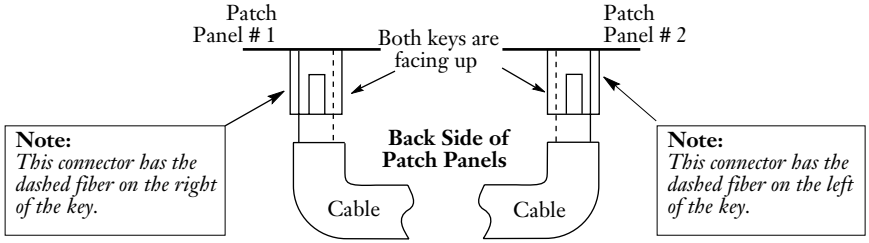


Figure 7

2.7 The RFP technique maintains polarity regardless of how many patch panels are used in the system. For this reason Corning Cable Systems recommends the RFP technique for dual fiber, single ferrule connectors.

When using the RFP wiring method, keep these rules in mind:

- The keys must be oriented in the same direction.
- Fibers must be installed on opposite sides of the connector relative to the key for any continuous cable run, including jumpers.

The nature of RFP is that connectors on opposite ends of any cable run have fibers that are oriented in reverse positions relative to their keys.

3. Consecutive Fiber Positioning

3.1 An alternate technique that will also maintain transmitter to receiver polarity is called "Consecutive Fiber Positioning" (CFP). This technique uses the same RFP jumpers in the front of each patch panel as previously discussed. Figure 8 illustrates the RFP jumper again.

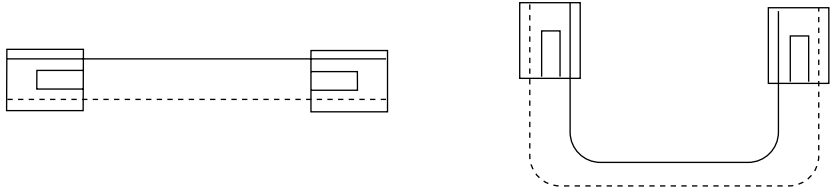


Figure 8

3.2 Using the CFP technique, the connectors that are installed in the backside of the patch panel have the fibers oriented on the same side of the ferrule relative to the key. Figure 9 illustrates the CFP wiring method.

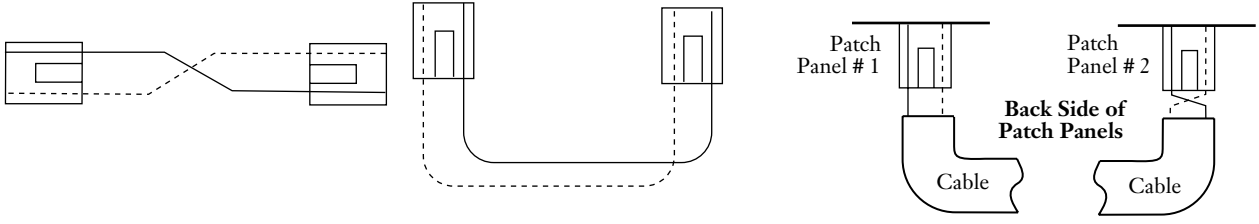


Figure 9

3.3 When you look at this wiring convention in a system, polarity is not maintained when standard RFP patch cords are used. Note that the transmitter on one end routes to the transmitter on the other end. Figure 10 illustrates a system that uses the CFP wiring technique.

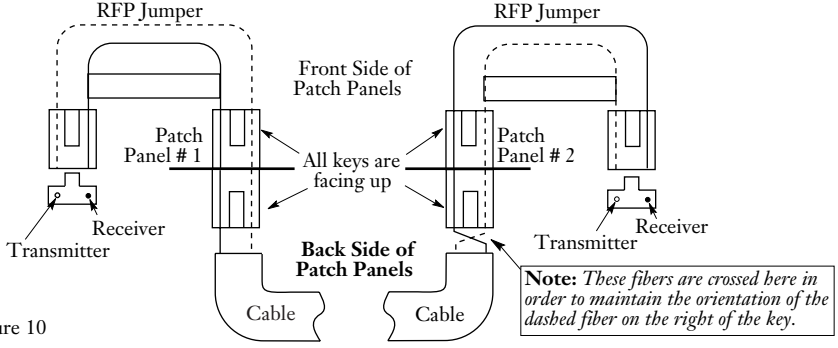


Figure 10

3.4 To correct this, a connector in one patch panel must be rotated180°. Thus, one mated pair of MT-RJ connectors will have the keys oriented in opposite directions. This rotating of the cable run in the backside of one, and only one, patch panel will return polarity back to the system. Figure 11 illustrates this rotation and the restoration of polarity. Note that the dashed fiber is still on the right of the key but the key is rotated out of view. *A Corning Cable Systems dual keyway adapter is needed to do this.*

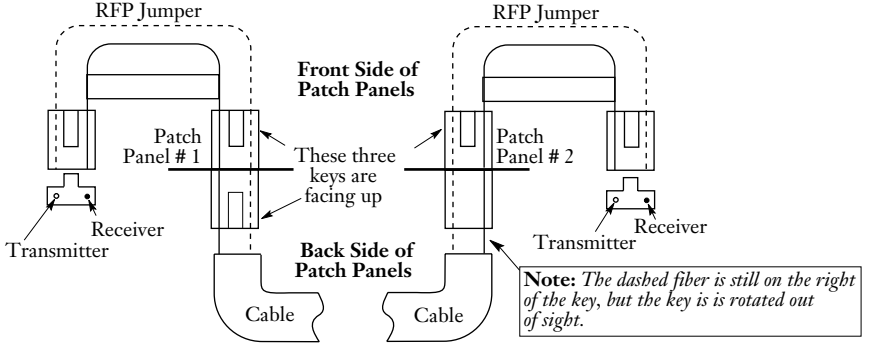


Figure 11

3.5 This CFP technique will work with an even number of patch panels and an odd number of cable segments as long as these rules are followed:

1) RFP jumpers are used in the front of the patch panel.

2) The backside of every cable segment has the keys oriented in the opposite directions in one, and only one, patch panel.

3) Adapters with a dual keyway in the back plane must be used.

Two things should be noted about this technique:

1) Not all vendors offer MT-RJ adapters that allow the keys to be rotated in the backside of a patch panel. Corning Cable System adapters have this dual keyway feature.
2) Corning Cable Systems mounts its MT-RJ adapters in the patch panel with the keys oriented sideways instead of up and down. This is done to increase packing density and allow easier finger access to the key.

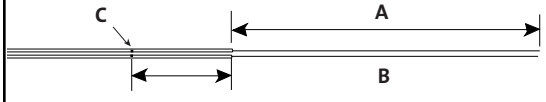
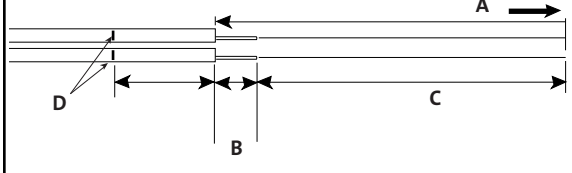
Checking that the keys in the back of patch panel #1 are oriented to the left and in the back of patch panel #2 are oriented to the right easily verifies that CFP was properly installed.

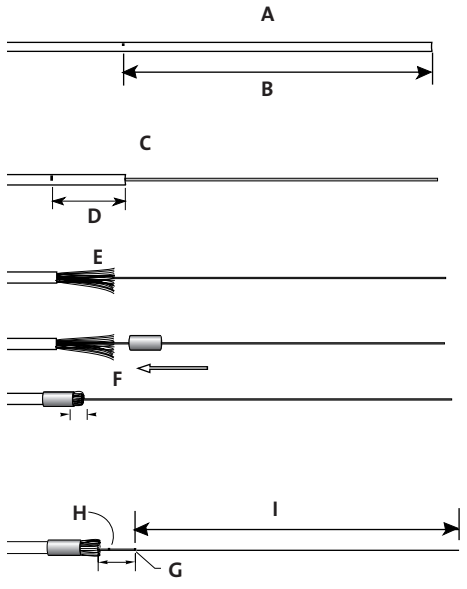
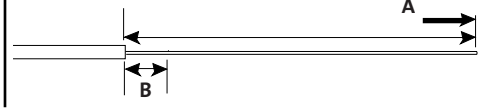
Conclusion

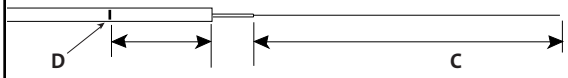
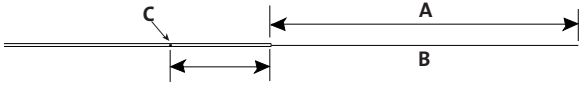
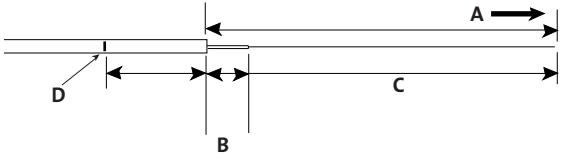
Due to the fact that not all vendors offer a dual key adapter on the backside, Corning Cable Systems recommends the Reverse Fiber Positioning, (RFP), technique to maintain system polarity for MT-RJ connectors. If dual key adapters are used, such as Corning Cable Systems', the "Consecutive Fiber Positioning" (CFP) technique can be used. This system is more craft friendly as it allows fiber orientation relative to the key on field-installable connectors to be uniform throughout the system. Dual key adapters also allow for easy recovery if either RFP or CFP was installed incorrectly.

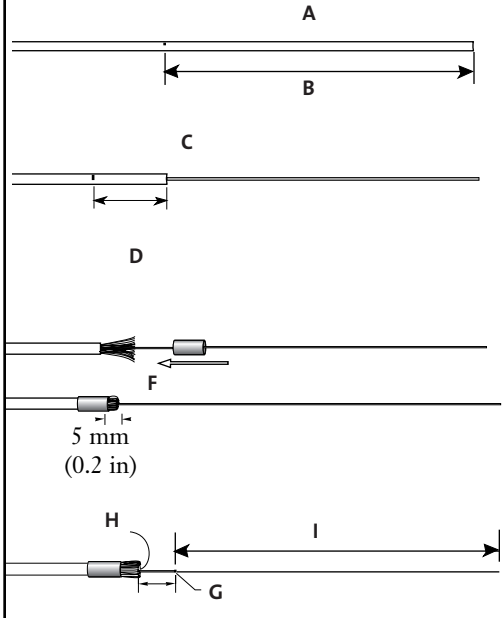
6.6 Fiber Preparation Guide

6.6-1 This section provides a guide to fiber preparation for one and two-fiber UniCam connectors. ***Note that the illustrations are not to scale.***

Connector type	Cable or Fiber Type	Preparation after sliding on appropriate boot and hardware
MT-RJ	900 µm tight-buffered	 **A** Measure and mark 40 mm (1.5 in.) on buffered fibers **B** Strip buffer with No-Nik tool **C** Apply Visual marks at 11 mm
	900 µm OD Fan-out Tubing	 **A** Feed 44 mm (1.7 in.) of 250 µm coated fibers from end of tubing **B** Measure and mark 4 mm (0.16 in.) from Fan-out on 250 µm **C** Strip 40 mm of bare fiber with stripping tool **D** Apply visual marks at 11 mm

Connector type	Cable or Fiber Type	Preparation after sliding on appropriate boot and hardware
LC	**1.6 mm, 2.0 mm, and 2.9 mm Single-fiber Cables**	 **A** Measure and mark 40 mm (1.5 in.) on cable **B** Strip off 40 mm (1.5 in.) of cable jacket with buffer stripping tool. **C** Trim aramid yarn flush with end of cable jacket with scissors. **D** Measure and mark 11 mm (0.43 in.) from end of cable jacket. **E** Remove 11 mm from end of cable jacket. **F** Fold yarn and secure with crimp ring approx. 5 mm (0.02 in) from jacket end. **G** Measure and mark 9 mm (0.354 in.) from end of cable jacket. **H** Apply second mark on 900 µm buffer 2 mm from the edge of cable jacket. **I** Remove 40 mm of buffer with No-Nik tool.
	900 µm OD Fan-out Tubing	 **A** Feed 44 mm (1.7 in.) of 250 µm coated fiber from end of tubing **B** Measure and mark 4 mm (0.16 in.) from Fan-out on 250 µm

Connector type	Cable or Fiber Type	Preparation after sliding on appropriate boot and hardware	
LC *continued*	**900 µm OD Fan-out Tubing** *continued*		**C** Strip 40 mm (1.5 in.) of bare fiber with stripping tool **D** Apply visual mark at 7 mm (0.275 in.) on Fan-out
	900 µm tight-buffered		**A** Measure and mark 40 mm (1.5 in.) on buffered fiber **B** Strip buffer with No-Nik tool **C** Apply Visual mark at 7 mm (0.275 in)
SC, FC, and ST-Compatible	**900 µm OD Fan-out Tubing**		**A** Feed 44 mm (1.7) in of 250 µm coated fiber from end of tubing **B** Measure and mark 4 mm (0.16 in.) from Fan-out on 250 µm **C** Strip 40 mm of bare fiber with stripping tool **D** Apply visual mark at 10 mm (0.39 in.)

Connector type	Cable or Fiber Type	
SC, FC, and ST-Compatible *continued*	**2.9 mm Single-fiber Cable**	

A Measure and mark 40 mm (1.5 in.) on cable

B Strip off 40 mm (1.5 in.) of cable jacket with buffer stripping tool.

C Trim aramid yarn flush with end of cable jacket with scissors.

D Measure and mark 11 mm (0.43 in.) from end of cable jacket

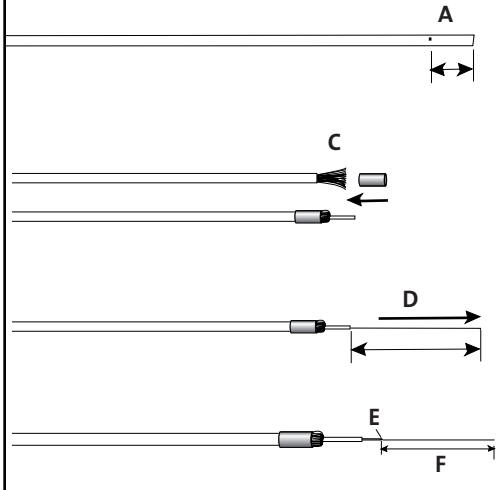
E Remove 11 mm from end of cable jacket

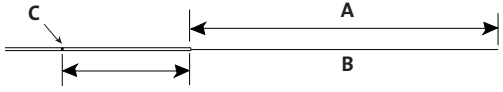
F Fold yarn and secure with crimp ring approx. 5 mm (0.02 in) from jacket end

G Measure and mark 10 mm (0.39 in.) from end of cable jacket

H Apply second mark at edge of cable jacket

I Remove 41 mm of buffer with No-Nik tool

Connector type	Cable or Fiber Type	Preparation after sliding on appropriate boot and hardware
SC, FC, and ST-Compatible *continued*	**FTB 250 µm Fan-out Tubing**	 **A** Measure and mark 11 mm (0.43 in.) from end of jacket **B** Remove jacket with buffer stripping tool **C** Secure armaid yarn with crimp ring to expose 900 µm tube **D** Feed 250 µm coated fiber throgh tube until 44 mm (1.7 in.) is exposed **E** Measure and mark 4 mm from end of coated fiber **F** Strip 40 mm of fiber coating with the fiber stripping tool

Connector type	Cable or Fiber Type	
SC, FC, and ST-Compatible *continued*	**900 µm tight-buffered**	 **A** Measure and mark 40 mm (1.5 in.) on buffered fiber **B** Strip buffer with No-Nik tool **C** Apply visual mark at 10 mm (0.39 in.)