

PSDS Application Note No. 03-A

Bare Fiber Adapters and the Precision Spherical Dipole System (PSDS)

Introduction

The Precision Spherical Dipole System (PSDS) system normally uses SC-style fiber optic connectors. Two SC connectors are used in a duplex fiber system. One contains a single mode fiber (for the RF uplink) and the second a multimode fiber (for the gap voltage downlink). The duplex SC connector can be easily separated, when necessary, so that each SC connector can be inserted through small holes. However, when a smaller than SC connector opening is used, a bare fiber adapter must be used. This application note describes the bare fiber adapter use.

The Bare Fiber Adapter Kit

The bare fiber adapter kit consists of the following:

1. A fiber Cleave tool
2. A fiber cable stripping tool
3. Two bare fiber adapter connectors
4. Two single mode SC-to-bare fiber cables
5. Two multimode SC-to-bare fiber cables
6. A duplex SC-to-SC connector

Using the Bare Fiber Adapter Kit

To use the Bare Fiber Adapter kit, the following steps should be followed:

1. One each single-mode and multi-mode fiber is required to be properly prepared.
2. To prepare the fiber(s), the outer jacket must be stripped about 3 inches.
 - a. The outer buffer should be stripped leaving about 2 inches of fiber exposed
 - b. Score and Cleave the fiber, leaving 0.5 inches of fiber exposed.
3. Once the fiber is cleaved, clean the fiber with Isopropyl alcohol and Kim wipes
4. press the clamp button on the bare fiber adapter. Insert the cleaved fiber in the rear of the housing of the adapter until the glass is flush with the end of the ferrule. Release the clamp button, securing the fiber in place.
5. Repeat for both the single mode and multimode fibers. (Note: an extra set of each fiber is provided.)

Discussion

Figure 1 shows how to connect the fiber cables together when using the bare fiber adapter kit. The bare fiber adapter kit is placed in series with the normal fiber cables.

Important

Please see Appendix A, B and C for additional manufacture information.

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--- **CAUTION** ---

Fiber optic cable is more fragile than normal copper cables. Care should always be used with fiber optic cable. However, normal fiber optic cables have sufficient outer coating, covers and strain relief so extreme care is not needed.

When a bare fiber adapter is used, the bare fiber is exposed, and special care is required. Fiber is very thin glass, and can break easily. Broken fibers are GLASS, and must be handled carefully and properly disposed. If treated carelessly, broken or exposed fibers can cause injury!

The fiber cables are especially fragile next to the bare fiber adapter connectors and can easily be broken if care is not taken. Broken fibers can cause injury and should be disposed of carefully. If a fiber breaks when using the bare fiber adapters, simply repeat the fiber stripping process described above.

Fiber Cable Cross Section

A cross section of a typical fiber is shown in Figure 2. The center glass core diameter depends on the type of fiber (single vs. multimode). A single mode fiber is much smaller and supports only a single transmission mode of light in the fiber core. A glass primary coating is applied for strength and to provide a constant change in index of refraction for the core fiber. A glass buffer is then added for additional strength. An outer jacket of plastic (and kevlar strength members) are added for handling strength.

Summary

The bare fiber adapters are extremely useful when using the PSDS system for shielding applications where only a very small hole is available for bringing the fibers through the metal shield. While the bare fiber adapters can be used over many times, they must be treated with care and caution. The bare fiber adapters usually must be replaced after 40 - 50 fiber insertions.

References:

Appendix A -- Operation Manual for S315 Optical Fiber Cleaver
Appendix B -- CFS-2 Fiber Optic Stripper
Appendix C -- Bare Fiber Adapters

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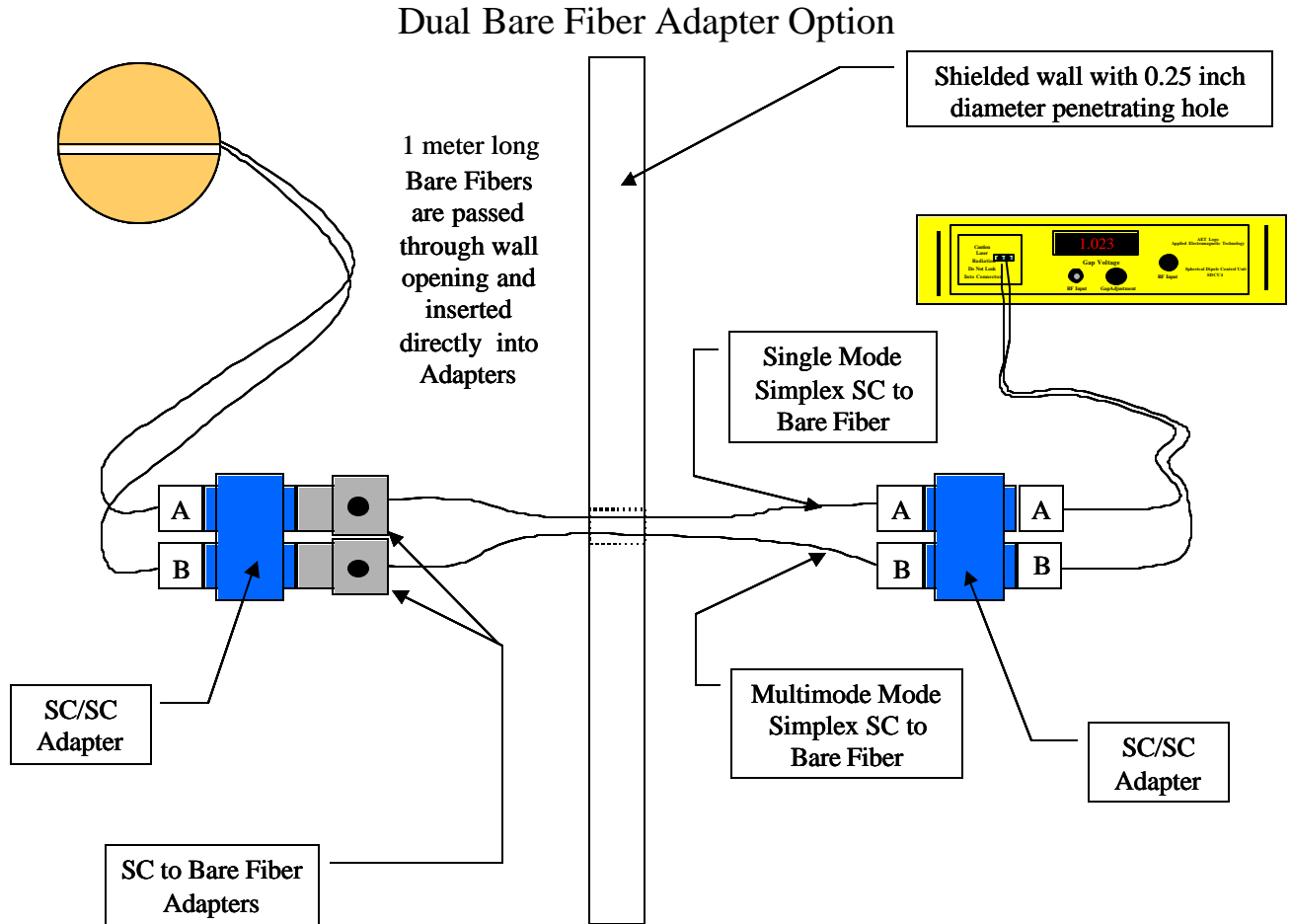


Figure 1 - Bare Fiber Adapter to SC Connector Installation Diagram



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Applied Electromagnetic Technology

Applied Electromagnetic Technology, LLC.

P.O. Box 1437 Solomons, Maryland, USA 20688-1437

• Tel.: (410) 326-6728 • Fax: (410) 326-6728 • E-mail: info@appliedemtech.com

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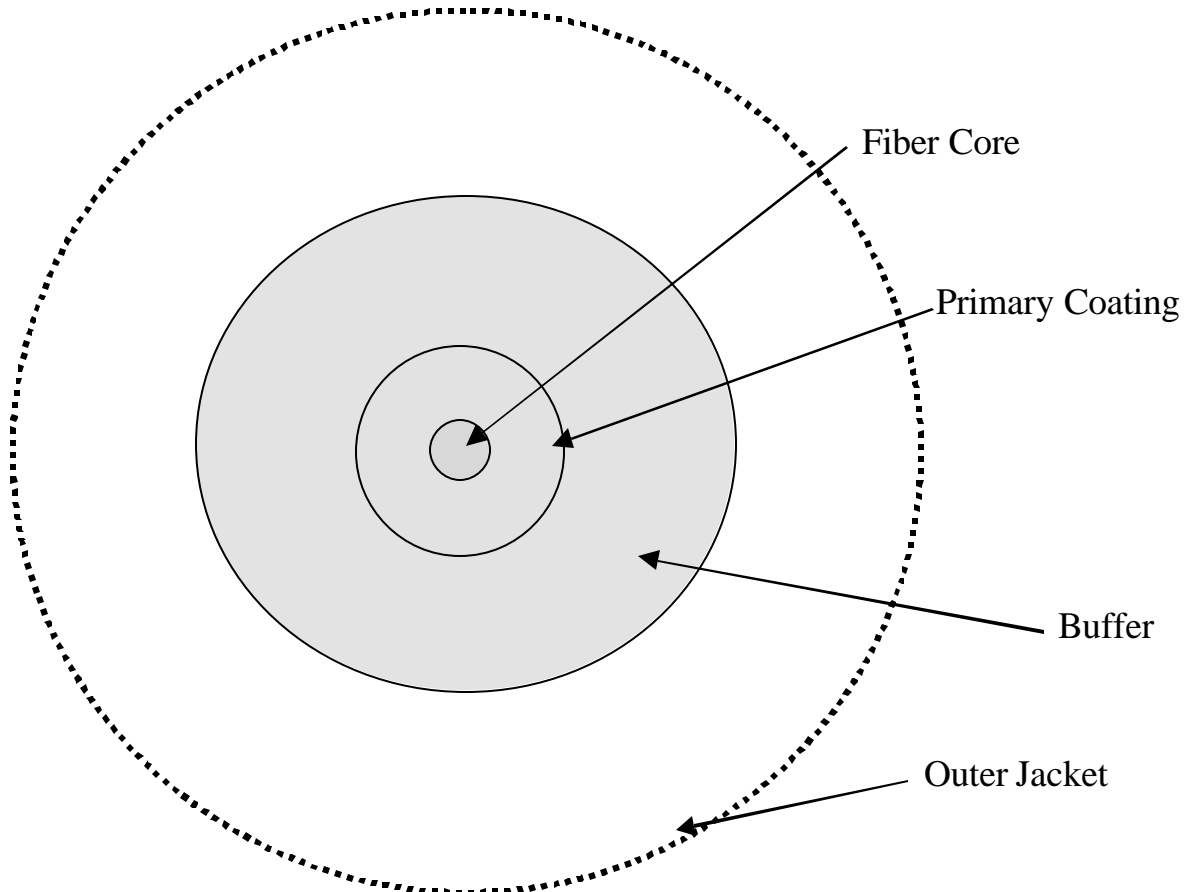


Figure 2 - Fiber Cable Cross section Diagram

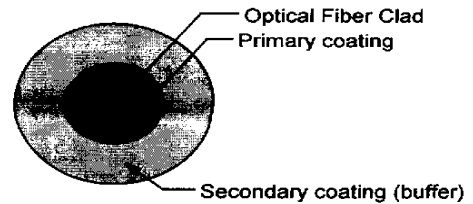
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Appendix A

Operation Manual S315 Optical Fiber Cleaver

1. Introduction

The cleaver cleaves end of optical fibers, whose primary and secondary coating have been removed, to specific length approx. 2.0-20.0mm. The cleaver assures mirror-like end face quality. Completely remove the primary coating from the optical fiber by using a fiber stripper and clean using a solution (alcohol) before using the cleaver.



2. Names of Individual Sections

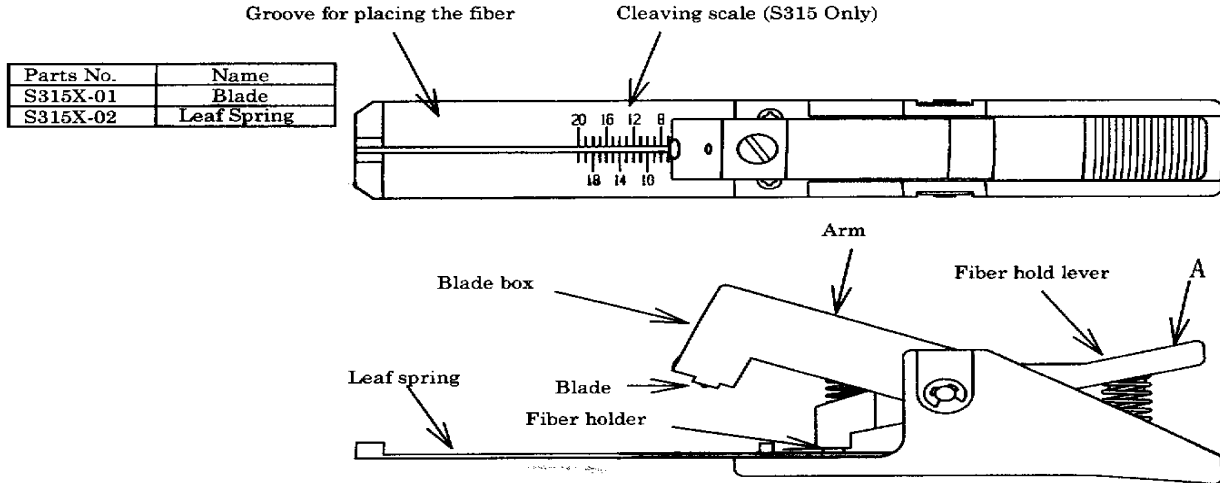


Fig. 1 Part Name

3. Cleaving Sequence

CAUTION: IF LEAF SPRING IS DAMAGED OR BENT IT SHOULD BE REPLACED BEFORE USING.

3.1 Optical fiber setting

Push Section A that holds the optical fiber to lift the Fiber holding section as shown in Figure 2. Set the optical fiber whose coatings have been removed along the groove for placing the fiber section, and position the end of the buffer coating just onto the scale marked on the leaf spring, corresponding to your intended cleaving length.

CAUTION: DO NOT TOUCH BLADE TO THE LEAF SPRING WITHOUT FIBER IN PLACE.

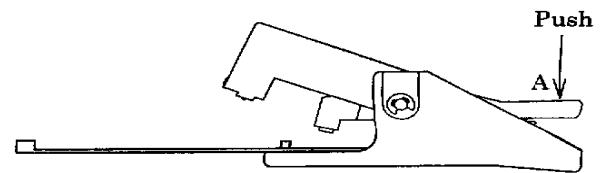


Fig. 2

3.2 Optical Fiber Fixing

Release section A to fix the fiber on the leaf spring. The leaf spring shall remain horizontal at this time. After clamping the fiber, place your fingers at the end of the leaf spring and hold the buffered fiber firmly against the leaf spring. While keeping fiber tight, Press section A to release torsion that may be on the fiber. Release section A to resecure fiber.

CAUTION: FOR THE BEST POSSIBLE CLEAVE, KEEP BUFFERED FIBER IN CONTACT WITH THE LEAF SPRING AT ALL TIMES.

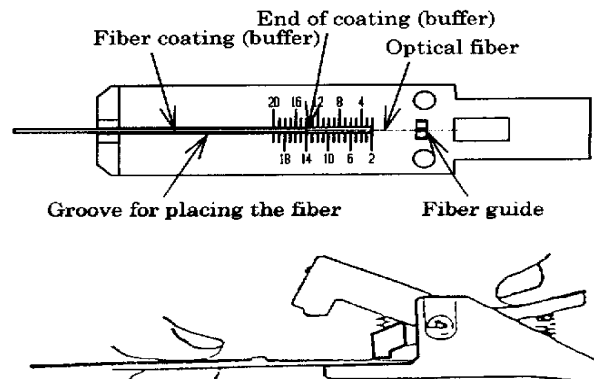


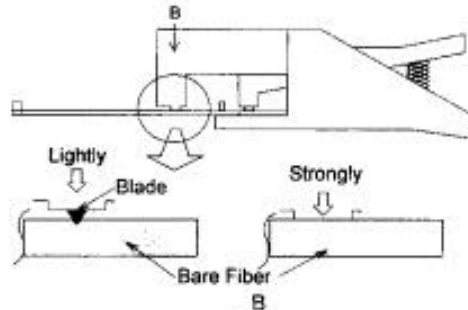
Fig. 3

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3.3 Optical fiber Scoring

With fiber in position, press section B to lightly score the fiber. Remember to lower the blade slowly. This will allow you to control the force of the blade more accurately.

CAUTION: DO NOT PRESS BLADE HOUSING INTO THE FIBER. THE TIP OF THE BLADE SHOULD ONLY TOUCH THE FIBER.



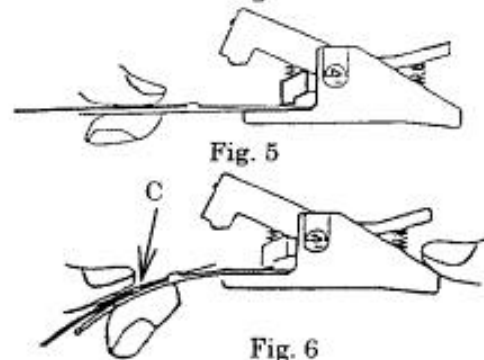
3.4 Arm release

Release section B and allow the arm to return to its normal position before proceeding to section 3.5.

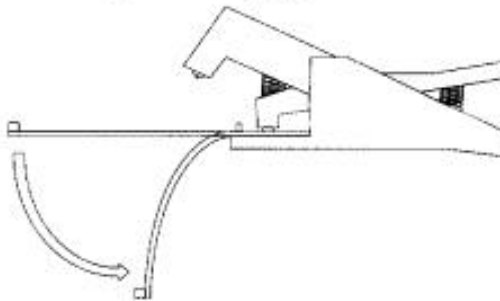
3.5 Optical fiber cleaving

The optical fiber will be cleaved at the point where the blade scored the optical fiber. To complete the cleave, bend the leaf spring while keeping tension on the fiber.

CAUTION: DO NOT TWIST LEAF SPRING WHILE CLEAVING FIBER.



CAUTION: DO NOT OVER BEND THE LEAF SPRING. IT MAY CAUSE DAMAGE TO THE LEAF SPRING.



3.6 Maintenance

Keeping the Cleaver clean is essential to good cleave performance. Make sure that the leaf spring is in good condition and is kept clean of any debris that may cause improper cleaving. Also make sure that the blade is clean and there is no indentation in the leaf spring from excessive pressure on the blade during cleaving.

4. Specification

Item :	Specification :
Applicable Fiber (mm)	Single fiber 0.125 O.D
Fiber Coating Material	Acrylate
Coating Diameter (mm)	0.25 to 0.90 O.D
Dimension (mm)	124 (L) × 20 (W) × 40 (H)
Weight (g)	60
Environmental	
Operating temperature	± 0 to 40 C
Storage temperature	-20 to 60 C
Cutting length (mm)	2.0 - 20.0mm

Agent

THE FURUKAWA ELECTRIC CO., LTD.

Head Office: 6-1 Marunouchi 2-chome, Chiyoda-ku, Tokyo, 100-8322 Japan
Engineering Department, FITEL Products Division

Tel: 81-3-3286-3443

Fax: 81-3-3286-3708

Sales and Marketing Department, Overseas Telecommunications Division

Tel: 81-3-3286-3223

Fax: 81-3-3286-3710

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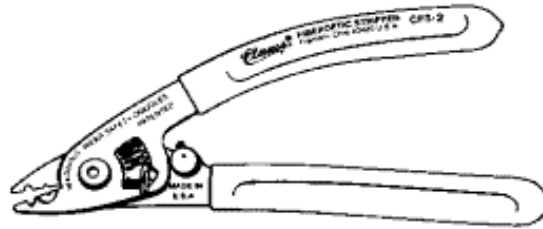
• Tel.: (410) 326-6728 • Fax: (410) 326-6728 • E-mail: info@appliedemtech.com

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Clauss®

CFS-2 • FIBEROPTIC STRIPPER

Operating Instructions



Thank you for purchasing the "NEW" CLAUSS FIBEROPTIC STRIPPER Model No. CFS-2. Here are a few suggestions to help you use it safely and efficiently.

1. Always wear safety glasses when working with optical fiber.
2. The larger stripping notch at the tip of the tool with a 1.0 mm dia. can be used to strip many fiber jackets. Close the tool around the jacket, hold firmly and strip off jacket material.
3. If there is a KEVLAR® central strength member, this must be trimmed with a KEVLAR® cutter like the Clauss Model No. 86 1/2SF KEVLAR® Shears.
4. The smaller stripping notch close to the pivot point is designed to remove 250µm buffer from 125µm fiber.
 - a) Insert fiber into smaller notch of tool
 - b) Close tool squarely with fiber, hold firmly
 - c) Draw the tool towards the end of the fiber exerting steady pressure. We recommend several short strips be made to acquire the desired finished length.
5. Always make sure the fiber stripping notch is clean and clear of any debris. If not clean, the tool will break fiber rather than strip it.
6. Tool may be cleaned with the Clauss FS400 Bifurcated Foam Tip Swipe or a soft bristle brush.

If you have any questions about this or any of the other fine tools available from Clauss, our customer service department will be happy to assist you.

We thank you for your business.

CLAUSS FIBEROPTIC/TELECOM DIVISION
223 N. Prospect Street, Fremont, OH 43420 USA

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Appendix C



BARE FIBER ADAPTERS

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Part #: F1-8194, F1-8294, F1-8394, F1-6194
(* for F1-8394 SC adapter)

INSTRUCTIONS:

- 1.] On jacketed fiber, cut back the jacket and strength member about 3 inches. (**3.5 in.)
- 2.] Strip off the 900um buffer to allow a sufficient amount for cleaving approximately 2 inches. (**2.5 in.)
- 3.] Cleave the fiber leaving one half inch of glass exposed.
- 4.] Use Isopropyl Alcohol and Kim Wipes to clean the fiber.
- 5.] Now press the clamp button on the adapter. Insert the cleaved fiber into the rear housing of the adapter until the glass is flush with the end of the ferrule. Release the clamp button, securing the fiber in place.

For more information call 1-800-5000-FIS