F-CLX Series

Manual Fiber Cleaver User's Manual

Newport®
Experience | Solutions

Warranty

Newport Corporation warrants that this product will be free from defects in material and workmanship and will comply with Newport's published specifications at the time of sale for a period of one year from date of shipment. If found to be defective during the warranty period, the product will either be repaired or replaced at Newport's option.

To exercise this warranty, write or call your local Newport office or representative, or contact Newport headquarters in Irvine, California. You will be given prompt assistance and return instructions. Send the product, freight prepaid, to the indicated service facility. Repairs will be made and the instrument returned freight prepaid. Repaired products are warranted for the remainder of the original warranty period or 90 days, whichever first occurs.

Limitation of Warranty

The above warranties do not apply to products which have been repaired or modified without Newport's written approval, or products subjected to unusual physical, thermal or electrical stress, improper installation, misuse, abuse, accident or negligence in use, storage, transportation or handling. This warranty also does not apply to Diamond blades, fuses, batteries, or damage from battery leakage.

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First printing 2007

This manual has been provided for information only and product specifications are subject to change without notice. Any change will be reflected in future printings.

Newport Corporation
1791 Deere Avenue
Irvine, CA, 92606
USA

Part No. 90001006 Rev. A

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Service Information

This section contains information regarding factory service for the source. The user should not attempt any maintenance or service of the system or optional equipment beyond the procedures outlined in this manual. Any problem that cannot be resolved should be referred to Newport Corporation.

Technical Support Contacts

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Newport Corporation Service Dept.

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Newport Corporation Calling Procedure

If there are any defects in material or workmanship or a failure to meet specifications, promptly notify Newport's Returns Department by calling 1-800-222-6440 or by visiting our website at www.newport.com/returns within the warranty period to obtain a **Return Material Authorization Number (RMA#)**. Return the product to Newport Corporation, freight prepaid, clearly marked with the RMA# and we will either repair or replace it at our discretion. Newport is not responsible for damage occurring in transit and is not obligated to accept products returned without an RMA#. E-mail: rma.service@newport.com

When calling Newport Corporation, please provide the customer care representative with the following information:

- Your Contact Information
- Serial number or original order number
- Description of problem (i.e., hardware or software)

To help our Technical Support Representatives diagnose your problem, please note the following conditions:

- Is the system used for manufacturing or research and development?
- What was the state of the system right before the problem?
- Have you seen this problem before? If so, how often?
- Can the system continue to operate with this problem? Or is the system non-operational?
- Can you identify anything that was different before this problem occurred?

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1.2 Introduction

- This user manual covers operation of the **F-CLX-0-3** perpendicular and **F-CLX-8-3** angled precision optical fiber cleaving tools.
- Special variants of these cleavers may be supplied with additional user instructions for operation & maintenance.

1.2.1 Unpacking Instructions

- Open packing box
- Take cleaver out of box
- Remove plastic packing protecting upper and lower sections of cleaver
- Check all fiber channels are free from fiber in both clamps and off-cut side
- Remove rubber tube protecting diamond blade
- Wipe diamond blade clean with alcohol wipe
- The cleaver is now ready to start cleaving.

1.2.2 Perpendicular Cleaver

- The **F-CLX-0-3 High Strength Fiber Cleaver** is designed to cleave an optical fiber with an end face perpendicular to within 0.5°. The cleaver avoids direct contact when clamping the fiber and so the resultant cleaved fiber is strong enough to be used in a high-strength fusion splice.

1.2.3 Angled Cleaver

Cleaving a singlemode fiber at 8º from the perpendicular ensures the back-reflection will not be guided down the fiber, and hence the return loss will be around 60 dB (reflectance of -60 dB).

- The **F-CLX-8-3 High Strength Angled Fiber Cleaver** is designed to cleave a single mode 125μm diameter optical fiber with the core angled at 8º(±0.3º) from the perpendicular, for reduced back-reflection, where the working end of the

optical fiber is clamped through its coating by an external clip. Cleave lengths as short as 2mm are possible.

- The **F-CLX-8-3** cleaver avoids direct contact when clamping the fiber and so the resultant cleaved fiber has enough strength to be used in a high-strength fusion splice
- Variants of these cleavers are able to angle cleave fiber of different diameters (50,80, 200μm, etc)

High strength angle cleaved fibers are typically used to pigtail optical fiber to opto-electronic components such as lasers and detectors.

1.3 Specifications

F-CLX-0-3

Fiber diameter:	125 μm
Coating diameter:	250 μm – 900 μm
Cleave length:	> 2mm for 250μm coating, > 12mm for 900μm coating
Blade Life:	> 10,000 cleaves
Dimensions:	74mm x 72mm x 90mm (3” x 3” x 3.5”)
Weight:	500 g (1.1 lbs)
Typical end angle:	<0.5°
Standard deviation:	0.3°

F-CLX-8-3

Fiber diameter:	125 μm
Coating diameter:	250 μm – 900 μm
Ferrule dimensions:	please ask
Cleave length:	> 2mm for 250μm coating, > 12mm for 900μm coating
Blade life:	> 10,000 cleaves
Dimensions:	74mm x 72mm x 90mm (3” x 3” x 3.5”)
Weight:	500 g (1.1 lbs)
Typical end angle:	8.0°
Standard deviation:	0.3°

1.4 F-CLX Series Contents

1.4.1 Contents of Cleaving Kits

The cleaver is supplied along with the following items:

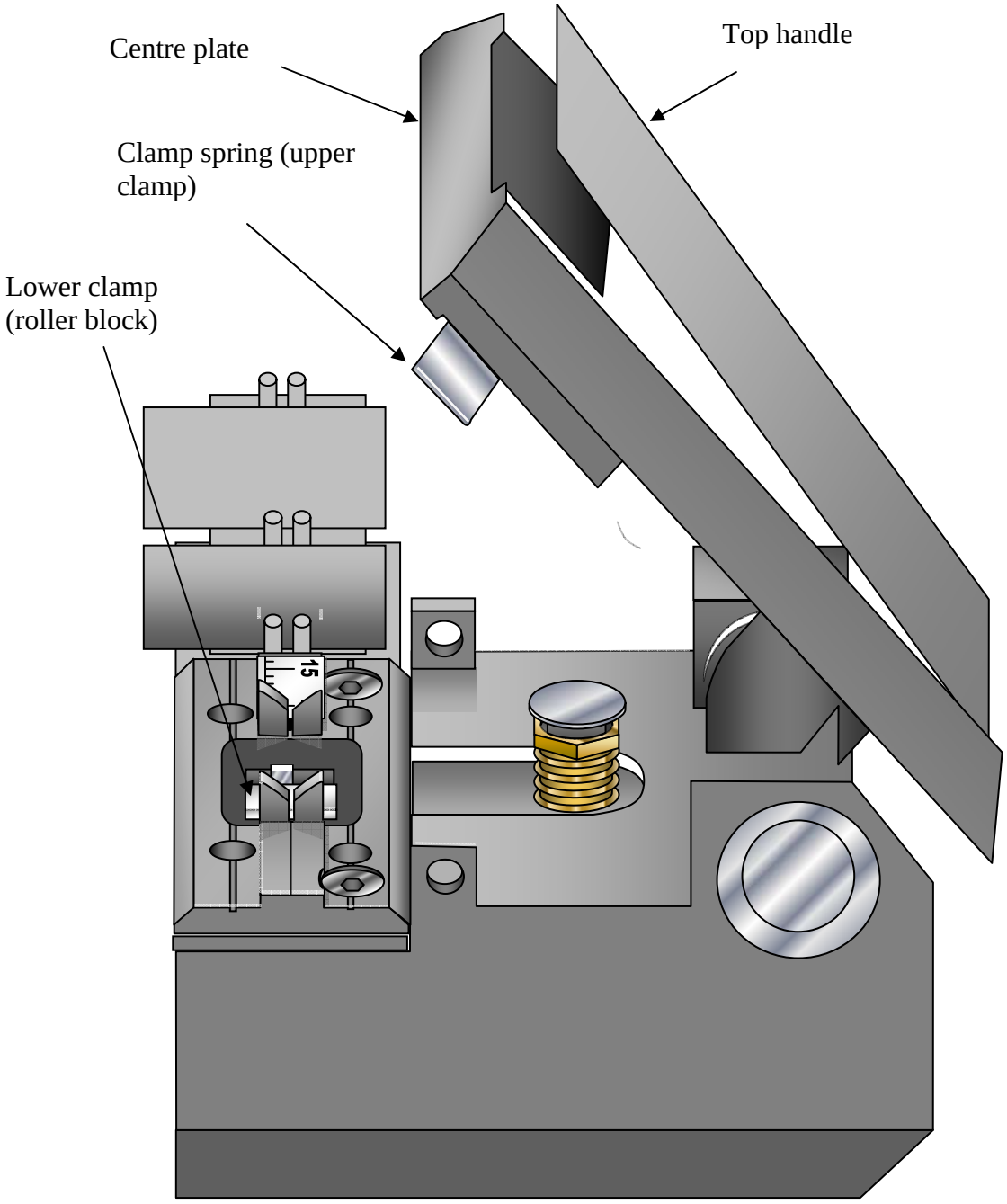
1. The F-CLX-0-3 and F-CLX-8-3 have a fiber clip screwed to the cleaver to hold the coated fiber; it is possible to use coating diameters in range of 250-900μm.
2. User's Manual

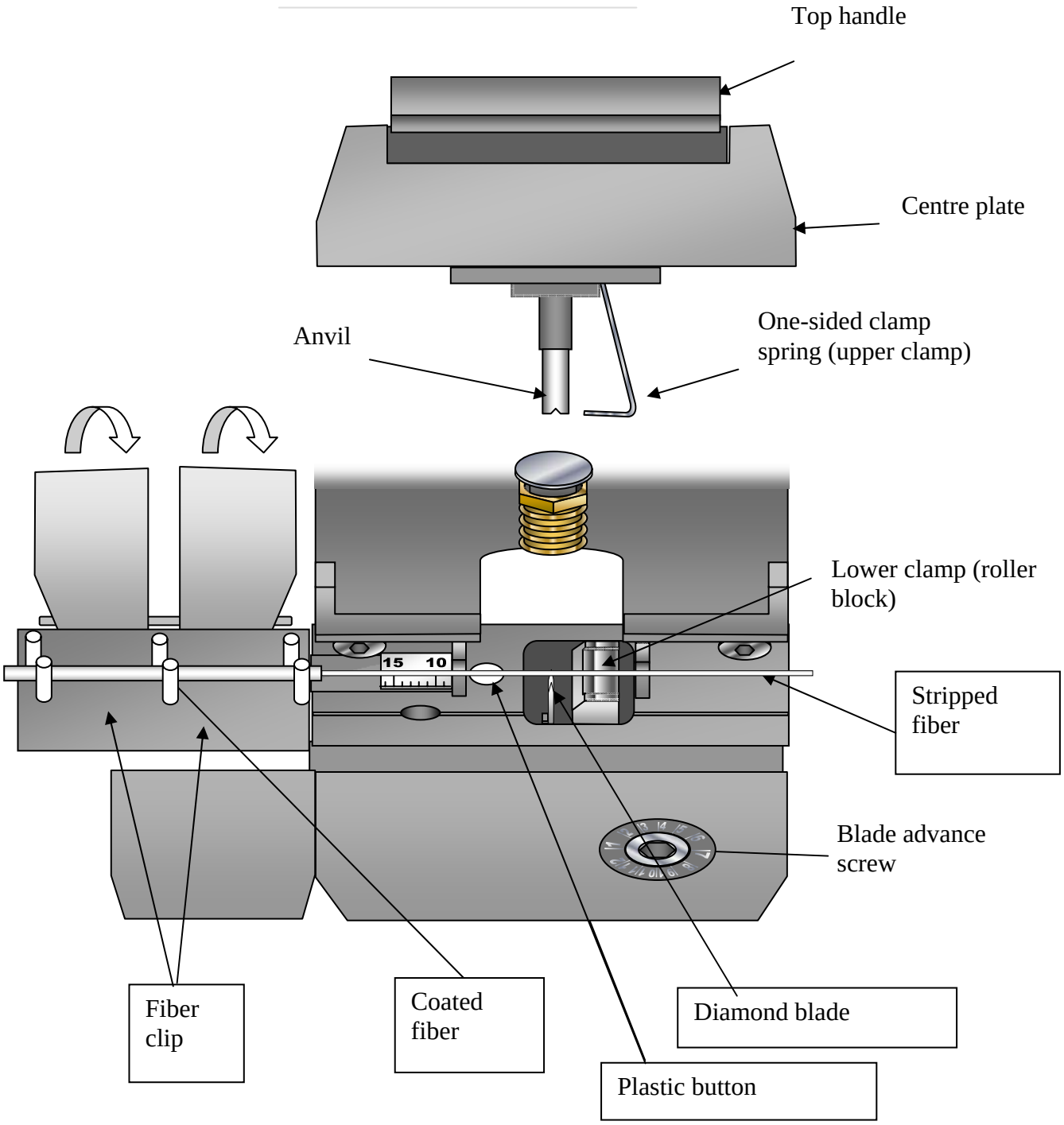
1.4.2 Optional Extras

The following items are also available for the cleaver:

- Travel case for cleaver (remove before use)
- Performance certificate for your cleaver (end angle measured for 10 consecutive cleaves from this cleaver)

1.4.3 Description of F-CLX-0-3 and F-CLX-8-3



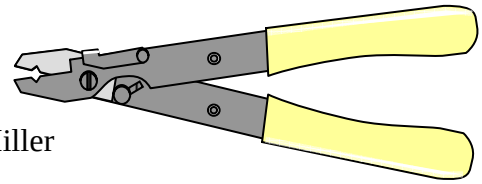

Top handle
Centre plate
Anvil
One-sided clamp spring (upper clamp)
Lower clamp (roller block)
Stripped fiber
Blade advance screw
Fiber clip
Coated fiber
Diamond blade
Plastic button

1.5 Operation

1.5.1 1. Fiber Preparation

- Strip primary coating (and secondary coating if applicable).
- The stripped fiber should be at least 25 mm long to ensure that the glass cladding passes over both the left and right fiber clamps, through left and right fiber guides.

- *Commonly used stripping tools:*



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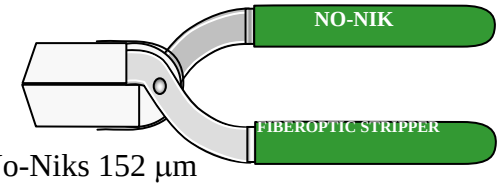
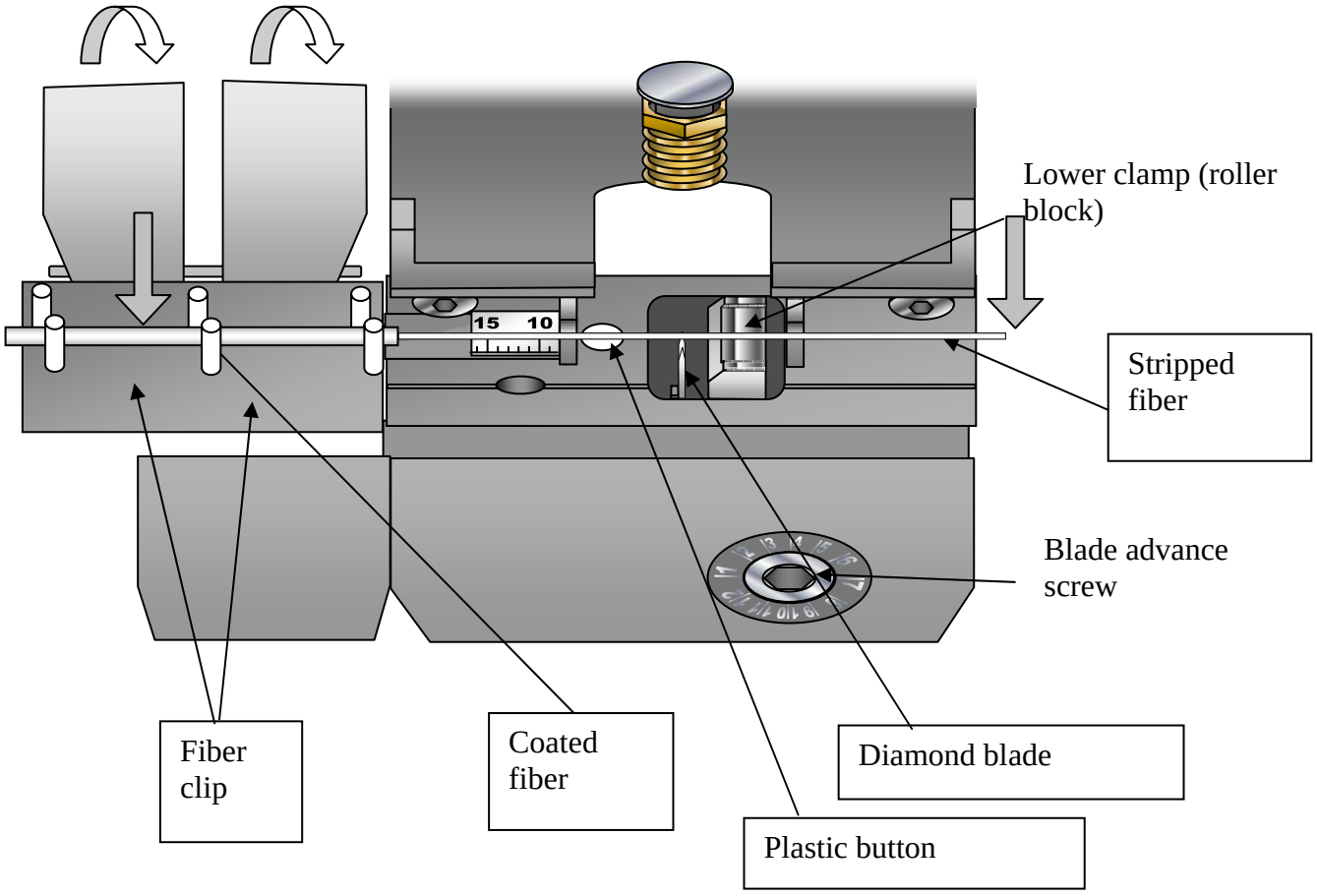


No-Niks 152 μm
(gold handles)

- Clean fiber thoroughly using a lint-free wipe wetted with alcohol (IPA)

1.5.2 Fiber Insertion

- Lower the stripped fiber into the fiber clip, as shown, and close 2 clamp lids.
- The fiber clip (nominally for 250μm coated fiber) is able to clamp coating diameters in the range of 250-900μm.
- The clip is made up of two metal clamps holding the coated fiber in to a common groove. The coated fiber should lie in the groove so that it can be clamped on its coating by both clamps.
- The fiber is tensioned by pulling the stripped fiber using the one-sided clamping spring while the fiber clip anchors the coating of the fiber, so stopping any movement and so tensioning the fiber.

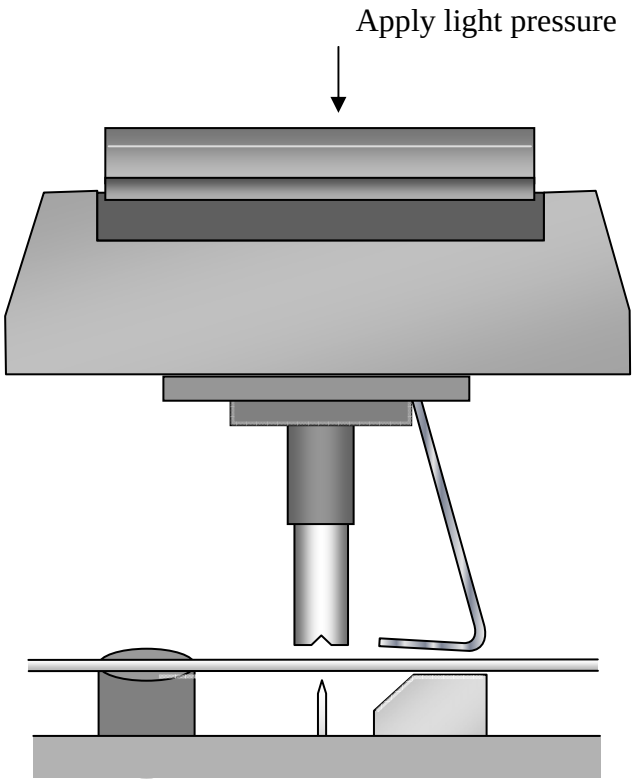


1.5.3 Setting the Cleave Length

- The cleave length is set by adjusting the position of the coated fiber in the fiber clip.
- The maximum recommended cleave length is 25mm so that the coated fiber can be held by both lids of the fiber clip.
- The minimum value is set because bare fiber must be in contact with the plastic button for low end angles to be achieved. (If very short cleave lengths are required for 250μm coated fiber, 250μm coated fiber may be passed through the slot in the fiber guide and over the button to give a cleave length as short as 2mm. Even shorter cleave lengths are not recommended because the coating would interfere with the anvil. 900μm coated fiber has a minimum cleave length of about 12mm because the coating will not go through the 300μm-wide slot in the fiber guide.
- Please contact the factory or your local agent if other cleave lengths are required.

1.5.4 Cleaving the Fiber

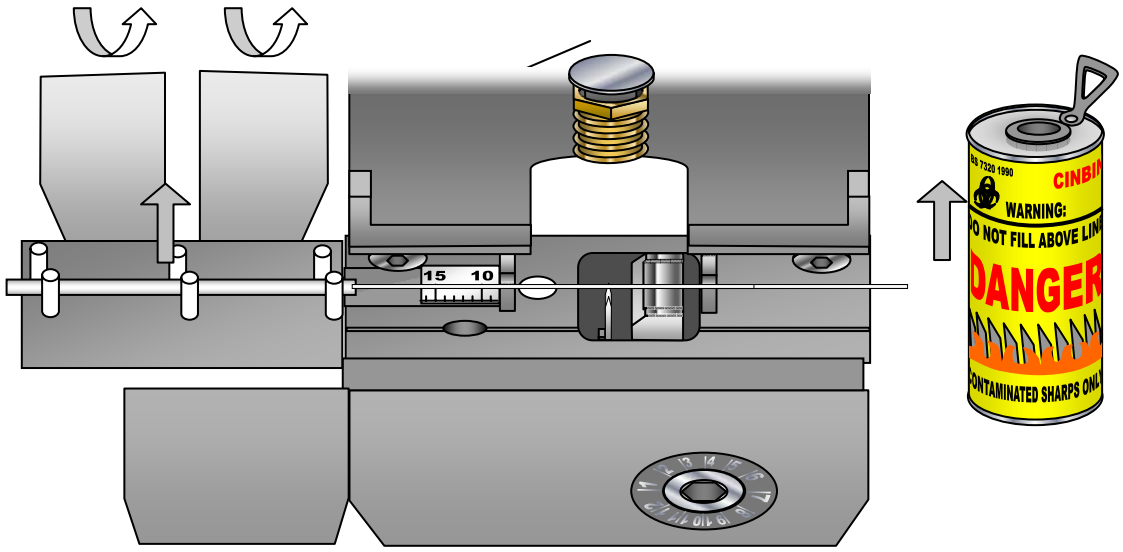
- Apply light pressure to the top handle of the cleaver to close the fiber clamps. Slightly increased pressure will cleave the fiber. When the fiber cleaves, there is a slight click heard as the tensioned roller block(s) relax against their stops as the two parts of the fiber separate.



- Release the pressure on the cleaver top handle as soon as the fiber cleaves.
- **Caution:** Applying too much pressure to the cleaver top handle may cause twisting of the clamps of the cleaver and this may break the fibers under the clamps. A stop is fitted to the cleaver to minimize this occurrence. The fiber will normally cleave before the top handle is fully depressed.

1.5.5 Remove the Cleaved Fiber

- Open the two fiber clamp lids and carefully lift the cleaved fiber from the fiber guide (as shown), so that the fiber does not touch any surfaces that could scratch or contaminate the fiber cladding.



1.5.6 Remove the Fiber Off-Cut

- The fiber off-cut is a sharp hazard which should be removed by pulling through the slot on the right-hand side of the cleaver using the rubber tool provided or by hand and placed in a container or ‘cin-bin’.
- Any fiber off-cuts left in the cleaver may cause problems for subsequent cleaves because the fiber will not be clamped.

1.6 Troubleshooting

1.6.1 (i) Will not cleave:

- Handle not pushed down far enough. Close the handle until the fiber is heard to cleave. Do not use excess force; finger pressure is sufficient. Do not push the handle after it has reached its stop.

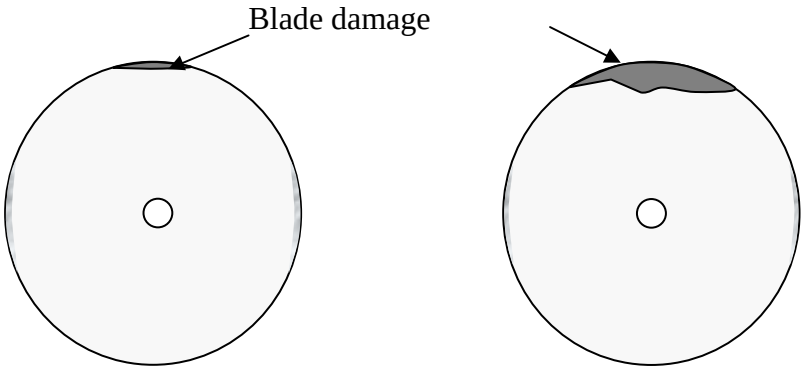
- Off-cut fiber still in tool. Remove.

1.6.2 (ii)Crushed fiber on lower clamp:

- Clean the fiber and clamping surfaces using an alcohol wipe by wiping away the dirt or glass fragment.

- Always clean stripped fiber before inserting into cleaver.

1.6.3 (iii) Excess blade damage:



Good cleave *Excess blade damage*

- Blade dirty: Clean blade with alcohol wetted cotton bud or lint-free tissue.

- Blade chipped: Advance blade by turning screw 30^{o} clockwise, to line up with the next position on the front dial. (With proper use each blade position should achieve around 2,000 cleaves before needing to be advanced.)

1.6.4 (iv) Incorrect fiber end angles:

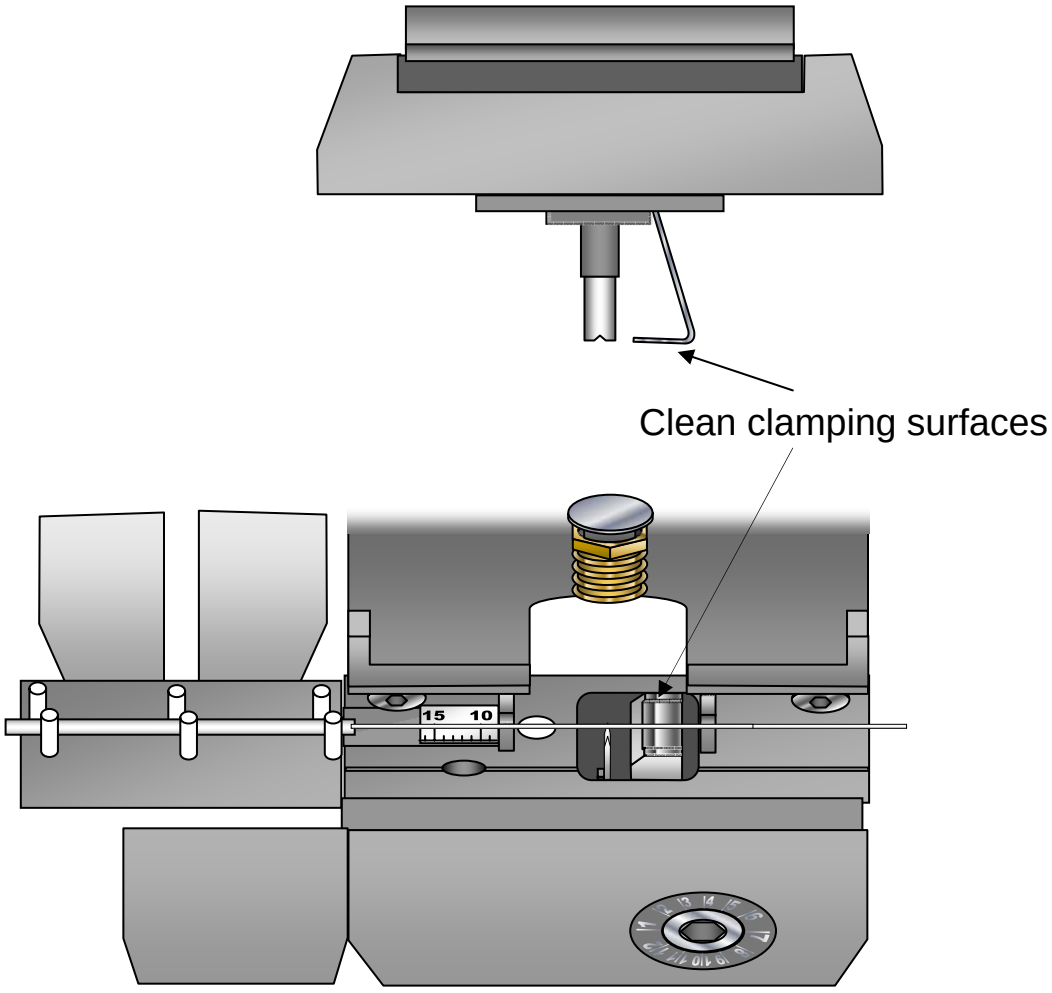
- Not enough tension: Clean top of lower clamp & bottom of top clamp spring. If the problem persists the cleaver will need servicing.

1.7 Cleaver Maintenance

- The cleavers should be kept clean and free of dust and fiber off-cuts at all times. The cleaver should be transported in its carrying case (where supplied)
- All stripped fibers should be cleaned with an alcohol wipe prior to insertion into the cleaver to prevent dirt accumulating under the clamping surfaces which may break fibers.
- The diamond blade wears with time. A maintenance schedule should be agreed with the operators in advance and the diamond blade should be advanced after a certain number of cleaves have been carried out or a certain amount of time has elapsed. (See Blade Advance Adjustment below.)

1.7.1 Cleaning the clamping surfaces

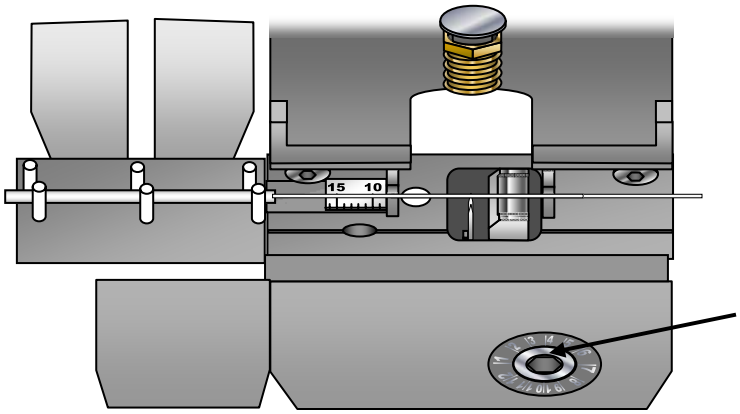
- The top faces of the lower clamp (roller block) and the bottom of the top clamping spring should be wiped regularly with an alcohol-wetted tissue. This will remove dust particles and fiber debris, which might otherwise prevent proper clamping of the fiber and so give poor cleaving.



- The lower clamp should be cleaned with an alcohol wipe, rubber, or other non-hard material. Do not touch the diamond blade.
- The blade should be kept clean and free from dust or grease. This is best achieved by gently wiping the blade with an alcohol soaked tissue or cotton bud. The blade can also be cleaned by gently running the rubber tool (located in the bottom of the carrying case – if supplied) along the edge of the blade.
- **Caution:** Any hard or contaminated cleaning implement may damage the sharp edge of the diamond blade.

1.7.2 Blade Advance Adjustment

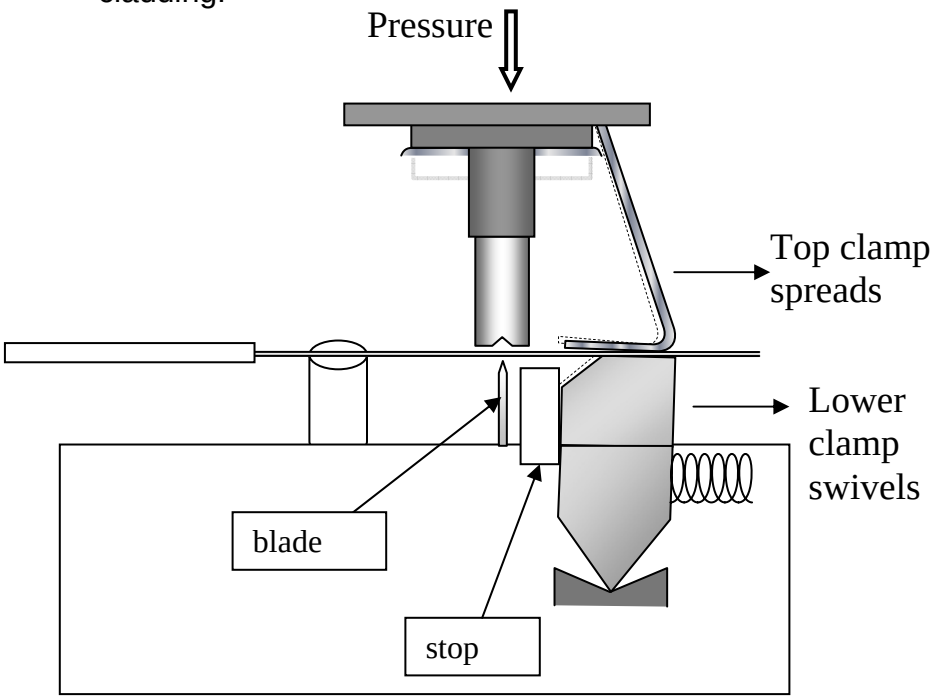
- The part of the diamond blade which cuts into the fiber may become worn or chipped, giving poor cleaves. The blade can be advanced so a new portion scratches the fiber



- Using the hexagonal screwdriver supplied, turn the blade adjustment screw clockwise by 30^{o} so the indicator mark is aligned opposite the next mark on the circular scale
- The blade has 12 marked positions. When the blade has reached its final position, the cleaver should be returned to the factory, or agent, for replacement of the blade.
- The blade adjust screw should only be turned clockwise, advancing the blade to an unused portion. If the screw is turned anti-clockwise, this will expose an used part of the blade which is probably damaged. The blade adjustment screw is deliberately set tight to eliminate any backlash.
- **CAUTION:** Poor cleaving may be caused by dirt. Clean the blade and the fiber thoroughly and re-cleave the fiber. Only advance the blade if cleaving does not improve.

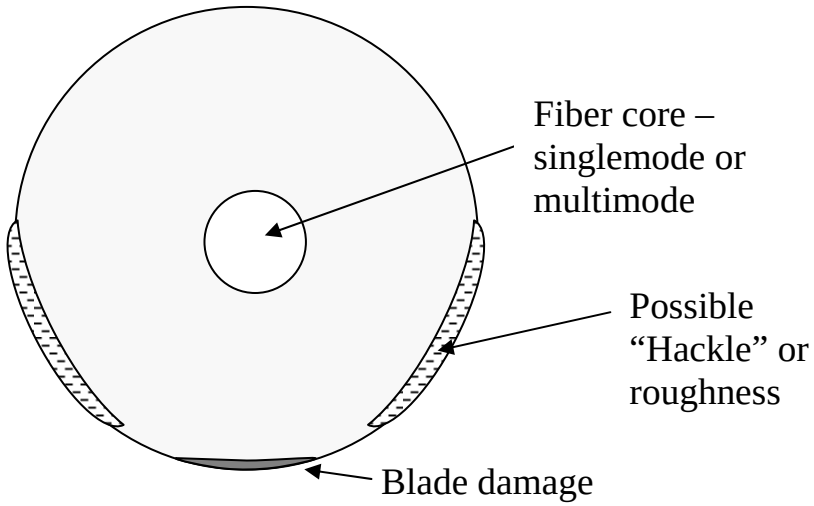
1.7.3 Cleaving Principles

- Optical fiber cleavers operate by a combination of scoring and tensioning the cladding surface of the fiber. The quality of a cleaved fiber end will depend on the degree of control provided by the scoring and tensioning mechanisms. The precision fiber cleavers here described have been designed to minimize the damage to the cleaved fiber end-face.
- As the cleaver top handle is lowered the fiber cladding is clamped under polished clamp pad to the right of the desired cleave point.
- Pressing down on the top plate transfers a tension into the fiber. However, the fiber remains stationary because it has been clamped on its coating.
- Further pressure on the top handle causes the anvil to be lowered into contact with the fiber while the diamond blade swings up and towards the anvil such that it strikes the fiber at a glancing angle.
- The small score provides a stress concentration point which starts a crack propagating across the fiber. The resultant cleaved fiber end is mirror-smooth over the core region, with any blade damage penetrating less than 5 µm into the fiber cladding.



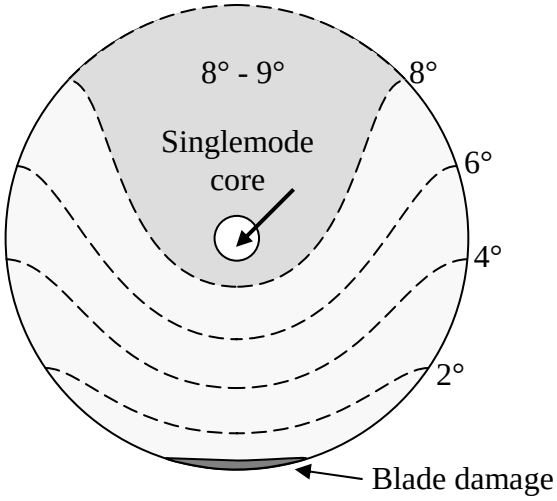
1.7.3.1 F-CLX-0-3: Shape of perpendicular cleaved end

- The cleaved fiber end is perpendicular with an average end angle of < 0.5° with a standard deviation of < 0.3°
- The end face is mirror smooth with any surface roughness limited to the extreme circumference of the cleaved fiber end



1.7.3.2 F-CLX-8-3: Shape of angle cleaved end

- The cleaved fiber end has an average end angle of 8.0^{o} with a standard deviation of less than 0.3^{o} over the region of the core of the optical fiber. The cleaved end is at an angle which is approximately constant over the region of the core of the single mode fiber. However, the region of the cleaved end close to the diamond blade score has a lower end angle.



2 Factory Service Information

2.1 Service Form

Newport Corporation
U.S.A. Office: 800-222-6440
FAX: 949/253-1479

Name _____ Return Authorization #_____
(Please obtain RA# prior to return of item)

Company _____

Address _____ Date_____

Country_____ Phone Number _____

P.O. Number _____ FAX Number _____

Item(s) Being Returned:

Model # _____ Serial # _____

Description _____
_____
_____
_____
_____
_____

Reason for return of goods (please list any specific problems):
_____
_____
_____
_____
_____
_____
_____

Notes:

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