Maintenance Manual

ULTRA SONIC CLEAVER

(DC-125)

ILSINTECH
PRECISION TECHNOLOGY

1. Application

This product specification describes general specifications of Ultrasonic CLEAVER which is used for assembling of optical communication equipment connector and optical fiber splicing as well as optical fiber high precision cleaving. This document is also applied to general matters in using it.

2. Rating

2.1 ADAPTER rating

1) Battery Charger (JBL910A1602K01)

2) Output voltage : DC 16.8V

2.2 Battery

1) Specification : Polymer Lithium Ion Battery 16.8V, 1050mAh

2) Life span : about more than 100 hours

3. Applicable optical fiber

- Coating diameter : 250㎛~900㎛
- Clad diameter : Single-core silica optical fiber of 80㎛~200㎛

※ Exclusive V-GROOVE application that fits coating and clad diameter is necessary.

4. Usage

- Precise right angled cleaving of silica optical fiber

5. Specification

1) Cleaving length : 1.0 ㎜ ~ 50.0 ㎜
(It can be set in accordance with the customer's demand.)

2) Cleaving angle : 90°±0.3° (Normal)

3) Cleaving method : ultrasonic cleaving

4) Blade life span : more than 20,000 times of cleaving

5) Tension control range : 100g ~ 300g

6) Ultrasonic work : BLADE FEED HANDLE linkage

7) DISPLAY : LED

8) Distance of Blade position adjustment : 2㎜

9) Blade Feed Rate : about 5㎜

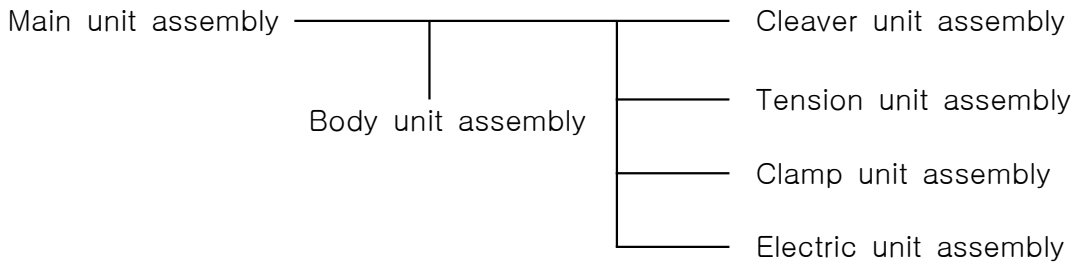
10) Weight : 800g

11) Outer size : W 120 × D 90 × H 65 (㎜)

6. Assembly and structure

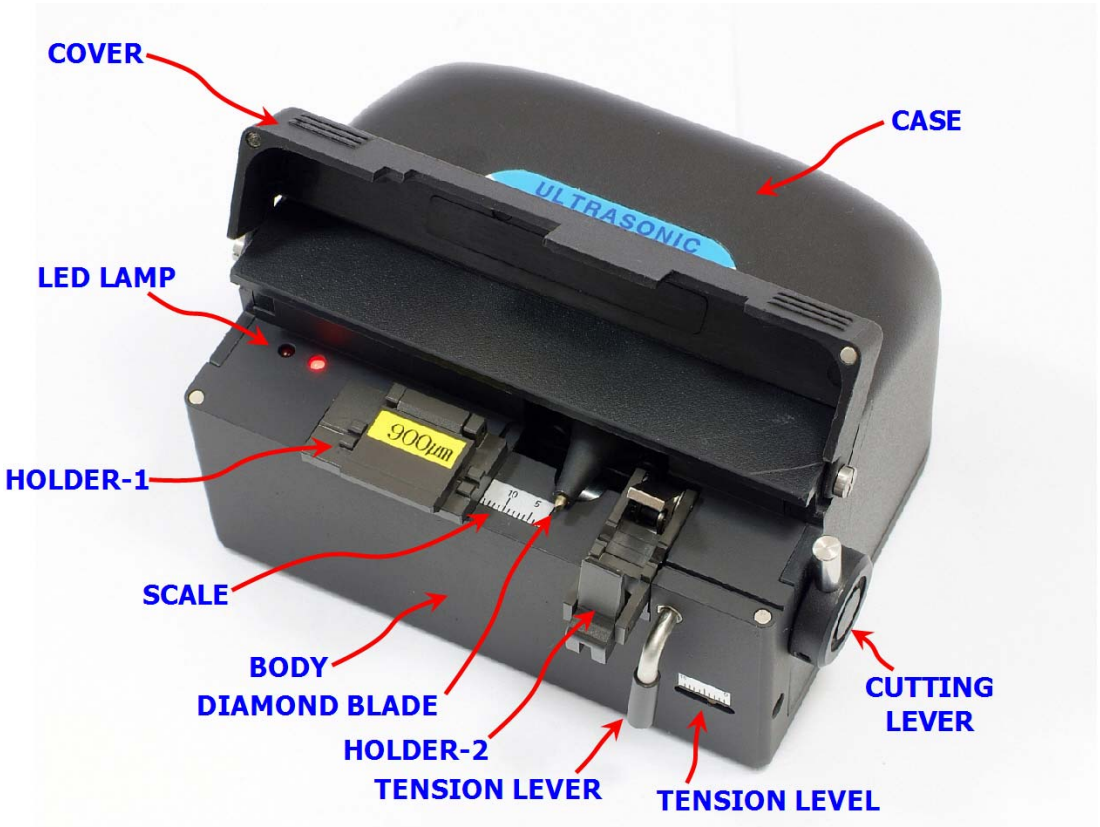
6-1 Assembly

- Assembly structure is as follows.



6-2 Structure and the title of each component

- Figure 1 presents the names of product components and a schematic diagram of the main parts.



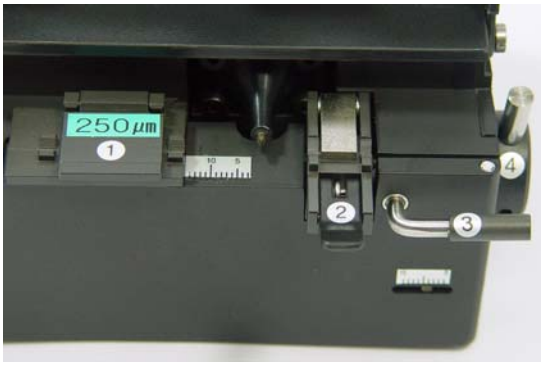
<Figure 1. Name and Structure of Ultrasonic Cleaver>

7. Operation procedure

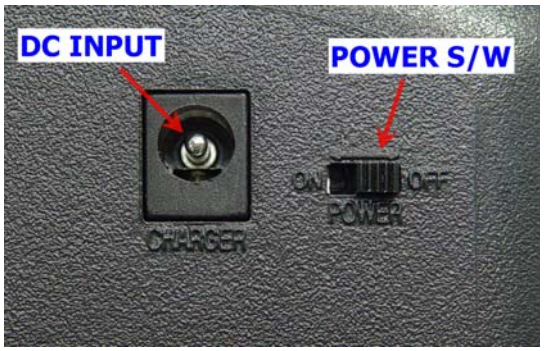
7-1 Operating procedure

1) Put POWER S/W at the back shown in Figure 3 at POWER ON position.
2) Completely open the front cover.
3) Remove the protection tube of Blade.
4) Get the blade back by turning ④ CUTTING LEVER upward and rotate ③ TENSION LEVER counterclockwise by 90°. Check the initial condition.
5) Strip optical fiber about 25mm and wash it clean.
6) Place the fiber coating part on ① HOLDER-1 and set the cleave length, and then close the cover.
7) Confirm that the stripped fiber part is located properly in V-GROOVE of ② HOLDER-2 and then clamp.
8) Lower ③ TENSION LEVER.
9) If ④ CUTTING LEVER is lowered, Blade begins to move slowly forward and LED indication part on the left becomes yellow from red. Cleaving begins.
10) If cleaving is done, remove the fiber for the next operation and ensure the initial condition.

※Caution! - Ultrasonic oscillation for a long period of time can impair the product. Thus, if the cleaving is completed, first raise ④ CUTTING LEVER to stop ultrasonic oscillation.



<Figure 2. Cleaving order display>



<Figure 3. Power supply at the back>

7-2 Caution

1) Since the tip of the cleaving part of Blade is composed of diamond, it is very sharp and brittle. Thus, be careful that it is not touched by a tool or person.
2) Please make sure that the tip is kept protected by a protection tube after using.

3) A high-tension circuit for ultrasonic generation exists in the product and it can cause an electric shock. Thus, when disassembling, power supply should be necessarily removed.

4) This product is a very precise and sensitive device. Thus, pay much attention to handling it. It should not be exposed to external shock.

5) Careful attention and accurate setting are necessary in each operating procedure in order to get the cleave angle you want.

8. Adjustment, replacement and charging

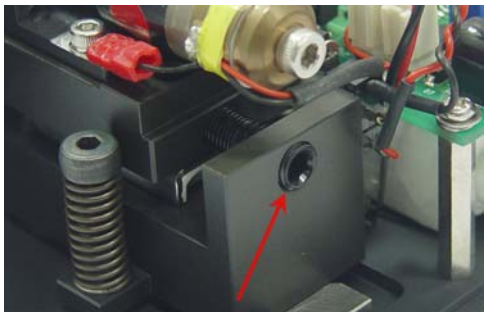
8-1 Adjustment

1) Blade Feed Rate

- Loosen four wrench bolts at the bottom of Body in Figure 4 and remove the case by pushing it to the back of Body.
- Turn the set screw part of Blade Feed Rate Control Part in Figure 5 in order to control spring tension and finally to control the feed rate. At this time, Blade Feed Rate should be set to 1.5±0.5 seconds.

※Caution! - Blade Feed Rate should not be adjusted as possible as you can because it was set to the optimal condition in the factory.

<Figure 4. Bottom of the body>

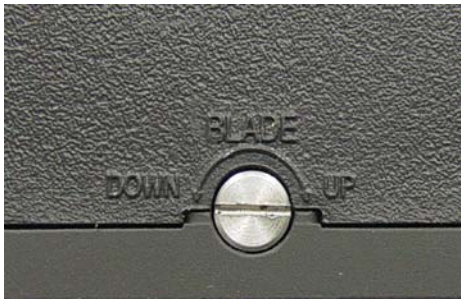


<Figure 5. Blade Feed Rate control part>

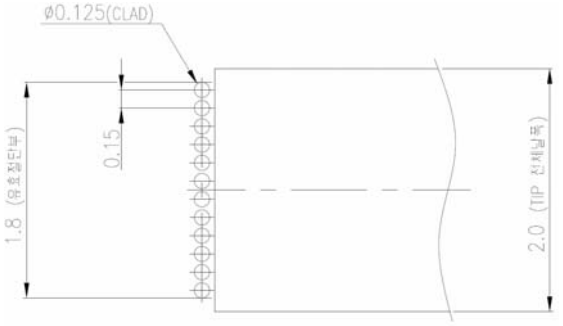
2) Adjustment of blade height

- Adjust the cleave position of Blade by setting Blade Height Adjustment Part at the rear of Body in Figure 6 to UP or DOWN using a regular screwdriver.
- When setting to UP or DOWN to adjust the location, adjust it by a half(1/2 rotation). If so, a maximum of 12 parts can be used. The cleaving life span of one part is about 1,800 times of cleaving, but it depends on the cleaving condition.

※Caution! - Adjust if fiber is not cleaved. An arbitrary adjustment can influence the whole life span.



<Figure 6. Blade Height Adjustment Part>

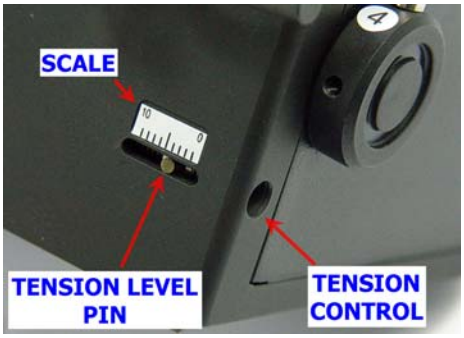


<Figure 7. TENSION Control Part>

3) Tension Control

- As shown in TENSION control part in Figure 8, check the scale indicated by TENSION LEVEL PIN. You can adjust using TENSION CONTROL on the right.
- Setting value is different depending on clad thickness. It was optimally set in the factory, and so an arbitrary operation can influence the quality of cleaving.

※Caution! - TENSION CONTROL should not be used as possible as you can.



<Figure 8. TENSION Control part>

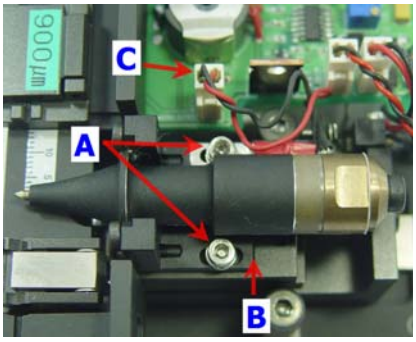
8-2 Replacement

1) Replacement of Blade assembly

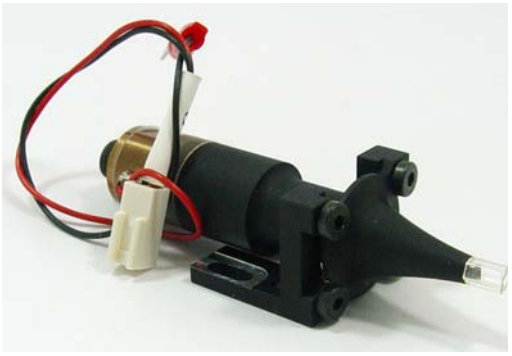
- Loosen four wrench bolts at the bottom of Body in Figure 4 described in clause 8-1 and remove the case by pushing it to the back of Body.
- As shown in Blade Assembly Part Detail of Figure 9, loosen two wrench bolts marked by A and remove the connector marked by C.
- Replace Blade Assembly in Figure 10. At this time, B part in Figure 9 becomes an assembly base level and assembly work should be conducted in a parallel and close condition.

- In the case of assembling, take the reverse steps of disassembling. Conduct a cleaving test in order to check the cleaving quality and the cleaved part of Blade.

※Caution! - When replacing blade assembly, be careful not to damage the tip.



<Figure 9. Blade Assembly Part Detail>



<Figure 10. Blade assembly>

8-3 Charging

1) If POWER S/W at the back is turned ON, Power LED is turned on as shown in Figure 11.
2) If the battery is consumed below the specified voltage, LOW BATTERY LED is turned on as shown in LED display part detail of Figure 11. Then, charge the battery using the adapter.
3) If you keep using the battery without charging, it may cause a failure of normal cleaving. The fully charged battery can be used for about more than 100 hours.
4) Cleaving or charging is possible even during using it.

<Figure 11. LED display part detail>

9. Inspection and testing

9-1 Inspection

1) Material warehousing inspection

- Purchased products : check the standards and item name of standard product. (Sampling inspection)
- Subcontracted products : check dimensions according to the drawing and conduct a visual inspection.
- Casting material : conduct a material warehousing inspection on a lot basis.
  a) Conduct a mechanical test and a chemical test according to KSD6017.
  b) Mechanical test specimen : manufacture Specimen No. 4 of KSB 0801 and conduct a tension test.
- After a material warehousing inspection, decide if the product is acceptable or not and take the following step according to the result.

2) Visual and structure inspection

- The exterior of the product should be in a good condition without harmful crack or defect.
- There should be no damage to the tip of Blade.
- The standards for the applied parts should be good in accordance with the drawing.

3) Dimension inspection

- Dimensions should be okay based on the drawing.

9-2 Testing

1) Working test

- The operation should be normal after Power-Up.
- There should be no problem in opening and closing the cover and controlling Blade and tension. Also clamps and levers should be working properly.

2) Electrical property test

- During ultrasonic operation, the input current should be within 0.05±0.02A.
- During ultrasonic operation, the output frequency should be within 65±5㎑. (between the both ends of PCB's TEST POINT in a blade-combined condition)

3) Mechanical property test

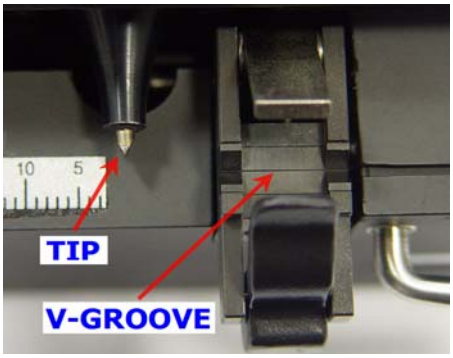
- Clad Φ0.125㎛-based clamp tension should be within 210±10g.
- BLADE Feed Rate should be within 1.5±0.5 seconds from start to cleaving.

4) Cleaving property test

- Measurement of cleaving angle by interferometer
- Average cleaving angle : it should be within 90±0.3°.
- Cleaved face crack and hackle should be in a good condition.
- More than 90% of the fiber angle inspection results should be within the

cleaving inspection range(90°±0.3°).

※Caution! - TIP and V-GROOVE in Figure 12 can have an enormous impact on the cleaving quality. Thus, clean it regularly to keep it clean.



<Figure 12. TIP & V-GROOVE Detail>

10. Maintenance check-up items

10-1 When it comes to A/S products, please check the following points in order to maintain optimal mechanical performance.

1) Ultrasonic operation should be performed normally.
2) There should be no damage to BLADE and the Setting dimension should be correct.
3) COVER should be working smoothly.
4) Check that BLADE is firmly assembled without vibration.
5) Check that, for each element, bolts are tightened well without loosening.
6) Check that attached stickers or labels are firmly attached in the right position.

10-2 When all the check-up is done for the items in clause 10-1 above, conduct an inspection for the fiber cleaving-angle using Interferometer etc.

11. Maintenance tools and their application

- Maintenance tools of CLEAVER CI-08 and their application are as follows.

No.	Maintenance tools	Application	
1	Hex wrench	For 1.5㎜	M3 SET SCREW
		For 2.0㎜	M2.6 HEX. SOCKET BOLT
		For 2.5㎜	M2.6 HEX. SOCKET BOLT M5 SET SCREW
		For 4.0㎜	M8 SET SCREW
2	Regular screwdriver(-)	Blade length adjustment, COVER HINGE PIN	
3	Vernier Calipers	General use	
4	Screw LOCTITE	Bolt and set screw assembly	
5	Solidifying agent	MAGNET adhesion	
6	Cotton swab	TIP cleaning etc.	
7	Tweezers	CHIP removal	
8	Alcohol and alcohol cotton	General product cleaning	
9	Lubricant, grease	Main operating parts	

Table 1. Maintenance tools and their application

12. Packaging

12-1 The product which has gone through all the tests should be subject to washing and foreign-substance removing work. Then, it should be packaged in a good physical condition in accordance with clause 12-3.

12-2 When packaging, do not omit any of the components in clause 12-4.

12-3 Packaging

1) A shock-resistant HARD CASE(small size) should be used.
2) Put a desiccant in the HARD CASE.
3) HARD CASE should be packed again in a paper box.

12-4 Components

- Product body
- One Standard ADAPTOR
- A pair of tweezers
- Two wrenches (For 1.5㎜ and 2.5㎜)
- Brush
- Instruction Manual