

# User Manual

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C10/C9/C8/C6/C5



[www.COMWAYTEK.com](http://www.COMWAYTEK.com)

**COMWAY**  
TECHNOLOGY



# CATALOG

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## 1. PREFACE

### MAIN CONTENT

Thanks for choosing COMWAY Single Fiber Fusion Splicer product.

To help users master this machine quickly, this manual particularly introduces the function feature, operation skills, maintenance notes and precautions of COMWAY C10 Fusion Splicer.

Description:

In this manual, the C10 pictures are used for description (including the cover) by default, and C9/C8/C6/C5 series products are used in the same way.



Important !!

Be sure to read all this manual carefully before use.

For more information, please contact local distributor or visit website:

[www.comwaytek.com](http://www.comwaytek.com)

### SAFETY PRECAUTIONS

This machine is only used for splicing the silica optical fiber. It

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can not be used for other purpose.

As the splicer is the high precision machine, please be cautious to carry and operate, conforming to the following safety regulations:

- Do not use the machine in an explosive hazardous situation.
- Do not touch the electrodes when the machine is power-on!
- Never disassemble the machine by yourself. Any problem, please contact the authorized maintenance center to repair it.
- Do not expose the machine in fire, thunder, rain, and humid environment.
- Do not stack the battery and adapter up each other when charging, otherwise it will cause the fire.

## **MAINTENACE NOTES**

- Do not use hard and sharp objects to clean V-groove and electrodes.
- Do not use acetone, gas or other chemistry agent to clean any parts.
- Please conform to more maintenance instructions in the subsequent chapters of this manual.

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## TRANSPORTATION AND STORAGE

- To avoid the emergence of condensation, the machine should be kept at least 1 hour to accommodate environment from coldness to warmth.
- If long time no use, the machine should be cleaned and kept dry.
- The machine should be put in the carrying case to avoid damage and dirty when carried.
- Keep the splicer away from the direct sunlight, extremely high temperature or relative humidity over than 95%.

## SPECIFICATIONS

Size & Weight	D156 x W135 x H149 (mm)
Weight	2.0kgs (2.4kgs with battery)
Fiber Alignment	C10/C9: 6 motors core alignment C8/C6/C5:high precision PAS core alignment
Fiber type	SM(ITU-T G.652/G.654), MM(ITU-T G.651), DS(ITU-T G.653), NZ/NZDS(ITU-T G.655), BI(ITU-T G.657)
Splice mode	Single fiber
Fiber diameter	Cladding diameter 80~150μm, coating 100~3000μm

Cleave length	250μm cladding diameter 8~16mm, over 250μm cladding diameter 16mm
Minimum splicing length	16mm
Splicing programs	Max. 200
Splicing time	6 sec.[SM FAST] program,10 sec.[SM G652] program
Heating programs	Max. 30
Heating time	Adjustable,Typical 12sec.
Splice protector	10~60mm
Splice image capture	Max.800
Splice data storage	Max. 20000
Splice loss	SM:0.02dB, MM:0.01dB, DS:0.04dB, NZ/NZ DS:0.04dB, BI:0.02dB
Return loss	>>60dB
Loss estimation	Provided
Operation condition	Altitude 0~5000m, Humidity 0~95%, Temperature -10~+50℃, Wind velocity up to15m/s
Storage condition	Humidity 0~95%, Temperature - 40~+80℃ (battery -10~+40℃)
Tension	1.96~2.25N
Fiber view	Two 300x cameras observation, 4.1inch high-light color screen,Super screen 750x cameras observation

Fiber magnification	300x for X or Y single axis view, 200x for both X & Y dual axis view
Port	High speed USB
Electrodes life	5000 splices
Power supply	AC 100-240V, 50/60Hz
Battery parameters	C10/C9:8400mAh High capacity battery, more than 320 times splicing and heating  C8/C6/C5:5600mAh High capacity battery, more than 250 times splicing and heating



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## STRUCTURE



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## POWER SUPPLY AND CHARGING

- Install/Remove the battery:



Insert the [Battery Pack](#) into the machine in the direction as indicated by the red arrow.



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Press the [Battery Release Button](#) to remove the battery as indicated by the red circle.

- Power supply with AC Adapter:



1. Remove the [Battery](#) from the machine;
2. Insert the [AC Adapter/Battery Charger](#) into the machine (same place as the battery);
3. Insert [AC Power Cable](#) into the AC Adapter/Battery Charger and start getting energized.

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- Battery charging:



1. Connect the AC Adapter with the Battery by [DC Power Cable](#);
2. Insert [AC Power Cable](#) into the AC Adapter, and then start getting energized.




**Important !!**

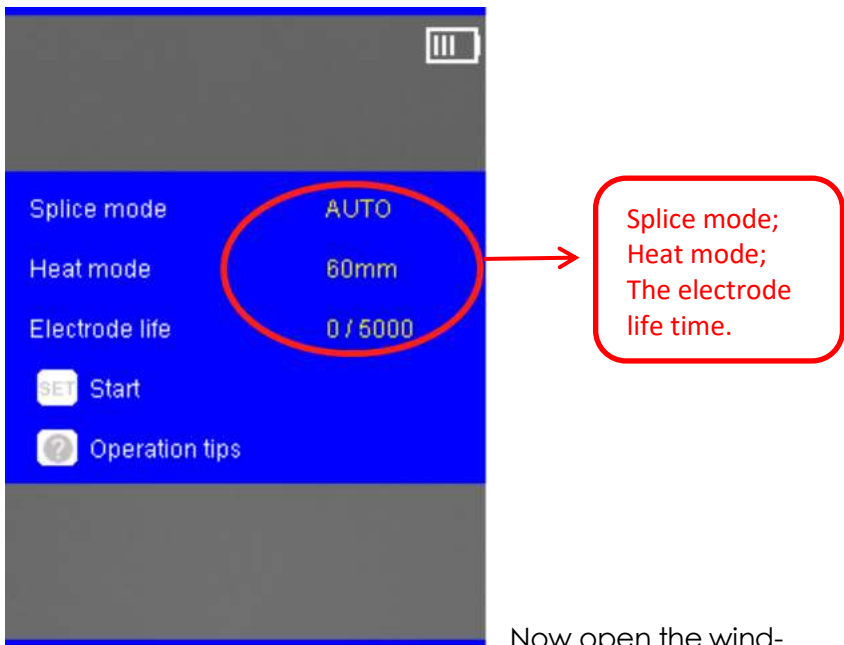
Do not put the Battery and Adapter overlapped when charging.

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## MAIN SCREEN

Insert the Battery Pack or AC Adapter/Battery Charger and

press the power key  until it turns green, then the splicer starts work and check itself. After finished, the splicer enters into the [Main screen](#) and shows “Ready” .










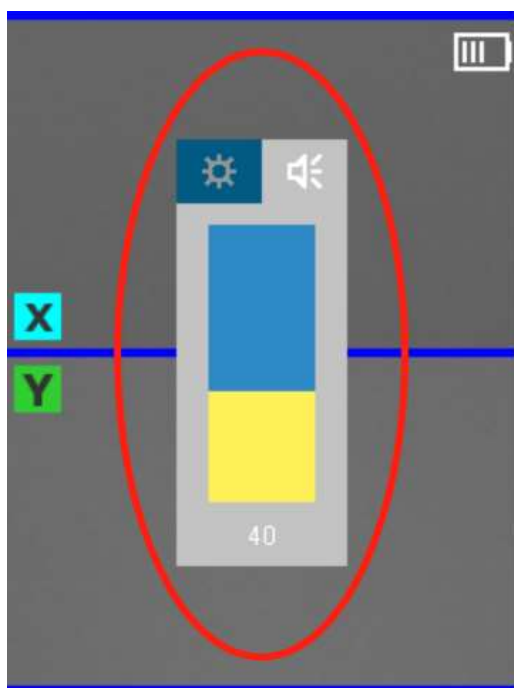
Now open the wind-protector and start the fusion work.

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## BRIGHTNESS AND VOLUME SETTING

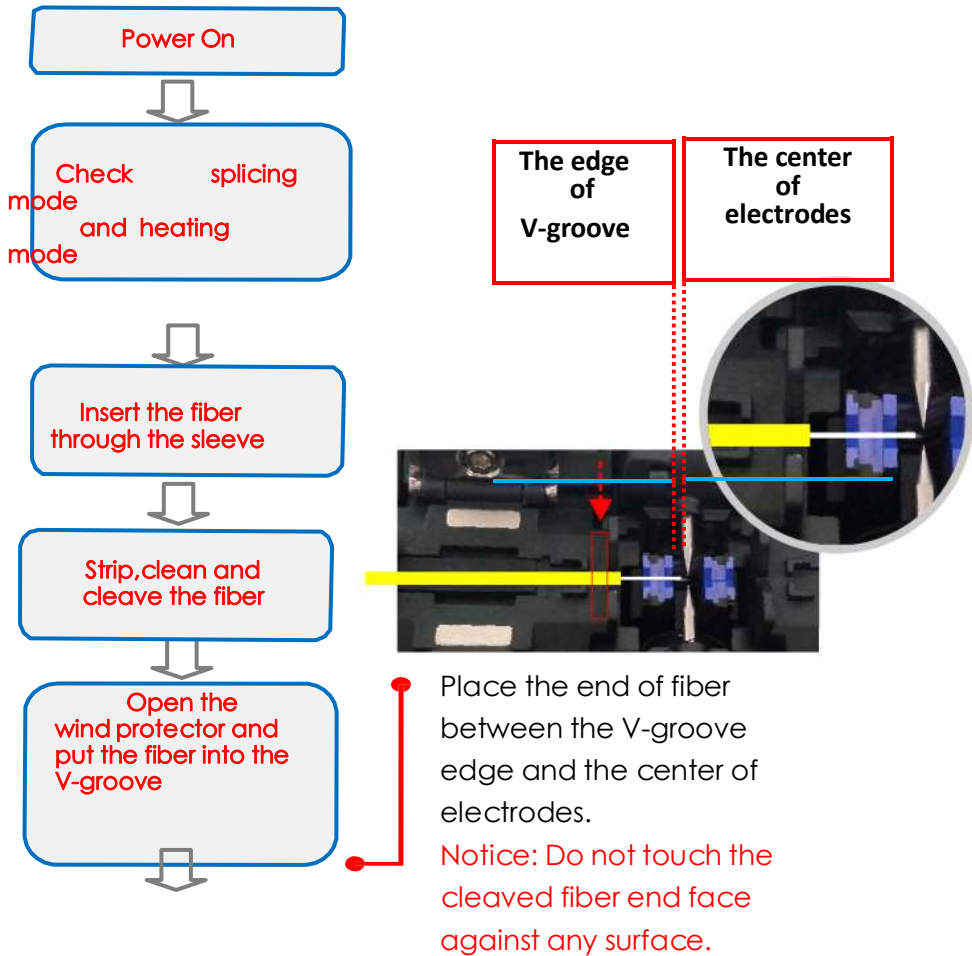
Follow these steps:

- On the [Work interface](#), press UP key  or DOWN key , then the brightness and volume menu come out;
- Press the menu key  to change between brightness Tab and volume Tab;
- Press UP key  and DOWN key  to adjust the brightness or volume. After selecting the suitable brightness or volume, press the  to store (or press back key  to give up).

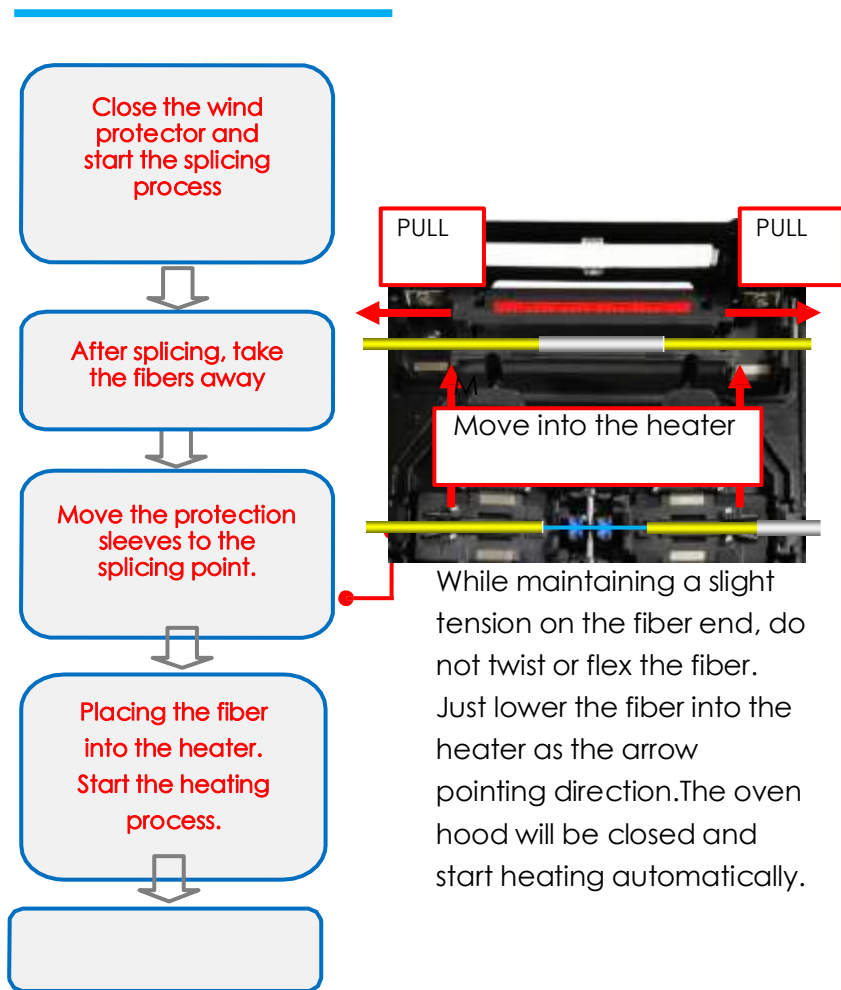


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## 2. QUICK REFERENCE GUIDE








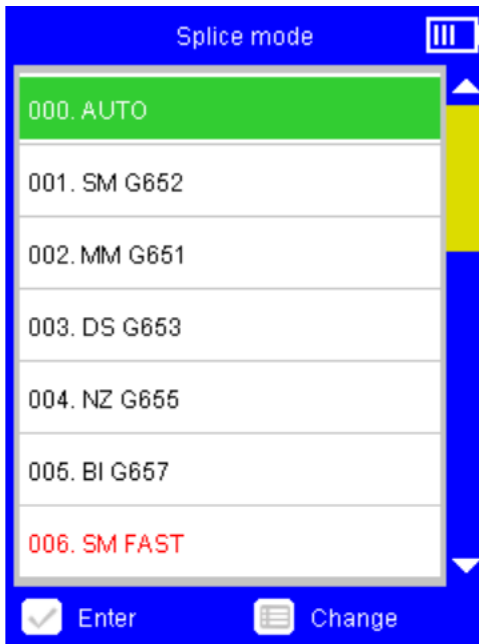
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### 3. SPLICE

#### SPLICE MODE

When the splice mode is not matched with the fiber type,

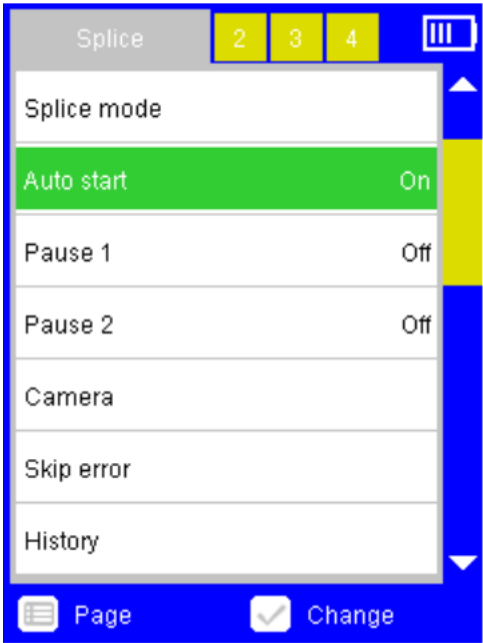
click the [Menu](#)  key, then enter into the [Splice / Splice mode](#), select and enable the splice mode matched with the fiber type.



When the fiber type is uncertain, [AUTO](#) mode is suggested, but the speed of splicing will be slower.

(Notes: AUTO splicing mode C10 is available, C9/C8/C6/C5 is not available.)

# AUTO START



Auto start includes two options:

ON	Close the wind-protector under <a href="#">operation interface</a> , start to splice automatically.
OFF	Close the wind-protector under <a href="#">operation interface</a> , no response.

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## PAUSE 1, PAUSE 2

Pause 1 includes the following options:

ON	When starts to splice under the <a href="#">operation interface</a> , the splicer will be paused for confirmation after finishing cleaning & discharging operation
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OFF	When start to splice under the <a href="#">operation interface</a> , the splicer will keep operating after finishing cleaning & discharging operation.
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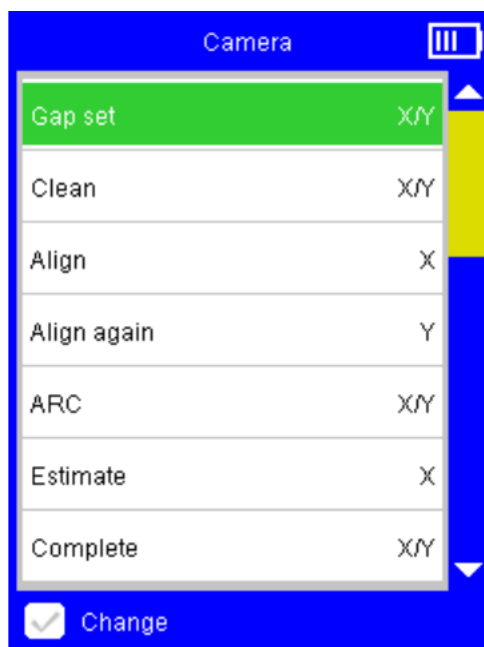
Pause 2 includes the following options:

ON	When starts to splice under the <a href="#">operation interface</a> , the splicer will be paused for confirmation after finishing the second time alignment.
OFF	When start to splice under the <a href="#">operation interface</a> , the splicer will keep operating after finishing the second time alignment.

## CAMERA

This option is for setting up the display mode of the X/Y view in the fiber splicing process.

[COMWAY Fusion Splicer](#) has two cameras, the display images from these two cameras called [X-view](#) and [Y-view](#).



Camera interface shows every steps of a fiber splicing process:

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Gap set	Push the fibers into view.
Clean	ARC to clean the fiber.
Align	Adjust fibers to align approximately.
Align again	Adjust fibers to align accurately.
ARC	ARC to splice the fibers.
Estimate	Estimate the splicing loss.
Complete	Splicing finished, wait for tension test.

For each step, [Camera](#) options are available as below:

X	Show the <a href="#">X-view</a> only
Y	Show the <a href="#">Y-view</a> only.
X   Y	Show both <a href="#">X-view</a> and <a href="#">Y-view</a> .

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## SKIP ERROR

The screenshot shows a software interface titled "Skip error" with a blue header bar. On the right side of the header is a battery icon. Below the header is a scrollable list of error types. The first item, "Fiber Cleaving error", is highlighted in green and has a status of "Off". The other items are "Large cleave angle" (Off), "Large fiber angle" (Off), "Dust burn" (On), and "Big loss" (Off). Below the list is a grey rectangular area. At the bottom left of the interface is a checkbox with a checkmark and the text "Change". On the right side of the list, there are yellow and blue vertical bars, and a small white triangle pointing up.

Error Type	Status
Fiber Cleaving error	Off
Large cleave angle	Off
Large fiber angle	Off
Dust burn	On
Big loss	Off

☒ Change

[Skip error](#) interface lists various errors that may be detected in a fiber splicing process:

Fiber end-face error	Fiber end is not found, face uneven or dust
End face angle too large	cleaving angle is too large.
Fiber angle too large	The fibers of V-grooves are not in the same level (There may be dust on the V-grooves or fiber surface.)
Dust burn	It finds dust burning when discharging and splicing (There is dust on the fiber surface or the fiber end face.)
Loss too large	The estimated loss is large after spliced (This splicing may be not eligible.)

For each error, the [Skip error](#) options are available:

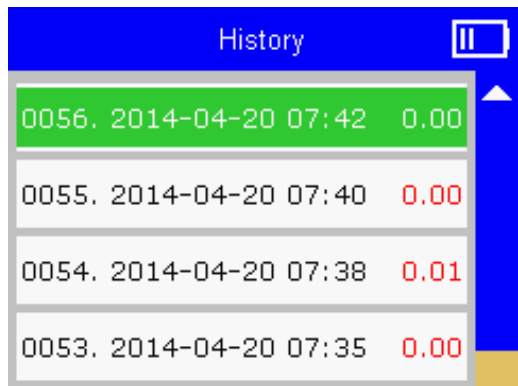
ON	Warn and pause to confirm when detects corresponding error.
OFF	Skip and keep operating when detects corresponding error.



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## SPLICE HISTORY

**History** interface will automatically record the specification data of each splicing operation and the estimate loss in order to take reference inquires about the statistics.



The screenshot shows a software interface titled "History" with a blue header bar. Below the header is a table with four rows of data. The first row is highlighted in green. The table has three columns: an ID number, a timestamp, and a numerical value. To the right of the table is a vertical blue bar with a white upward-pointing arrow and a pause icon at the top.

History		
0056.	2014-04-20 07:42	0.00
0055.	2014-04-20 07:40	0.00
0054.	2014-04-20 07:38	0.01
0053.	2014-04-20 07:35	0.00

The data of each splicing operation will be recorded according to the time order. The latest record will be arranged on top.

## SCREENSHOT


**Screenshot** interface is used for saving the images of X-view and Y-view for project record or error analysis.

This function is to automatically save the error image when the splicer reports an error, and adopt rolling overlay storage. The sub-item function has the functions of viewing image records and clearing image records.

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## 4. HEAT

### HEAT MODE

Press the  key in the [Operation interface](#) when the heating mode is not matched with the protection sleeve which is currently being used. Then enter into the [Heat / Heat mode](#) interface, choose a heating mode that is matched with the protection sleeve.




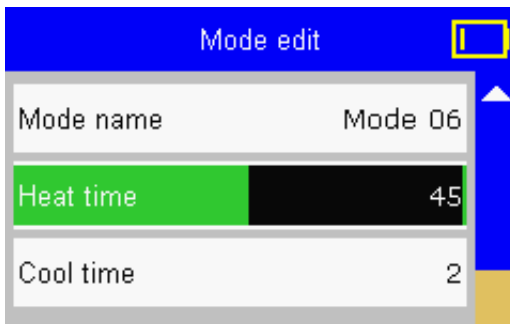
The [\[40mm std.\]](#) and [\[60mm std.\]](#) mode are designed for working above 0°C which are respectively used for heating the common 0~40mm and 40~60mm protection sleeve. When the heating is not sufficient due to the fairly thick protection sleeve or the low temperature, please follow

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these steps until improved:

1. Switch from [XXmm std.] mode to the corresponding [XXmm plus] mode.
2. Heat the 40mm protection sleeve under the [60mm std.] or [60mm plus] mode;
3. When the heating is not sufficient even under the

[60mm plus] mode, select [New =>] item, press  key to create a new heating mode, set up the heating time to 45s, return and select this option to start this mode;



4. When the heating is still not sufficient even finished the above steps, select the new heating mode created


above, press  key to enter into the Mode edit interface, add 5 to Heat time and test whether successful;

5. Repeat the step 4 until getting the most suitable heating time that can heat sufficiently under the current environment.

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# AUTO START

Auto start includes the follow options:

ON	Put the fiber in the heater. The splicer will start heating automatically once the heater cover is closed.
OFF	Put the fiber in the heater. The splicer will start heating only when press the  key.

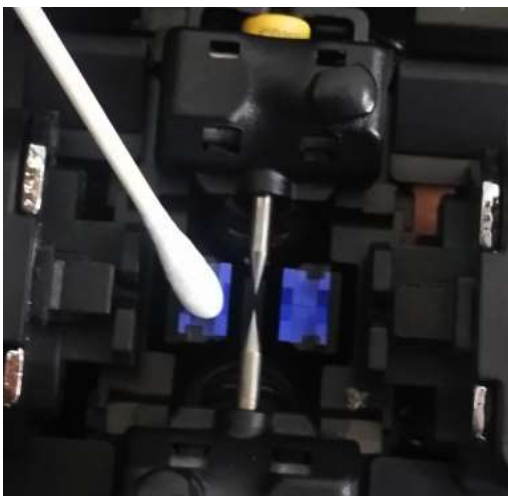
## 5. MAINTENANCE

Since the splicer is the high precision machine, it should be cleaned and maintained regularly while being used in order to guarantee the optimum performance.

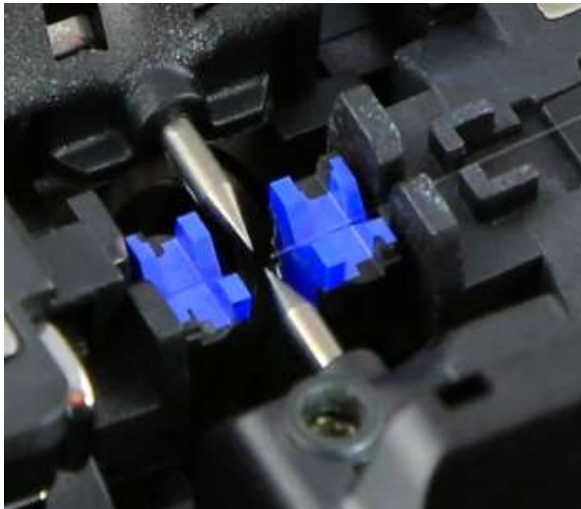
### DAILY CLEANING

There are mainly two parts need daily cleaning: V-groove and Microscope Lens:

1. When clean the V-groove, follow these steps:
  - Wipe the bottom of the V-groove with a small cotton swab dipped by alcohol;



- Suck the remaining alcohol in the V-groove with a dry cotton swab;
- Jab out the dirt in the V-groove with the end part of a cleaved fiber.



2. When clean the [microscope lens](#), follow these steps:
    - Wipe the surface of the microscope lens with a small
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cotton swab dipped by alcohol;



- Suck the remaining alcohol on the surface of the microscope lens with a dry cotton swab.

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## ELECTRODES REPLACEMENT

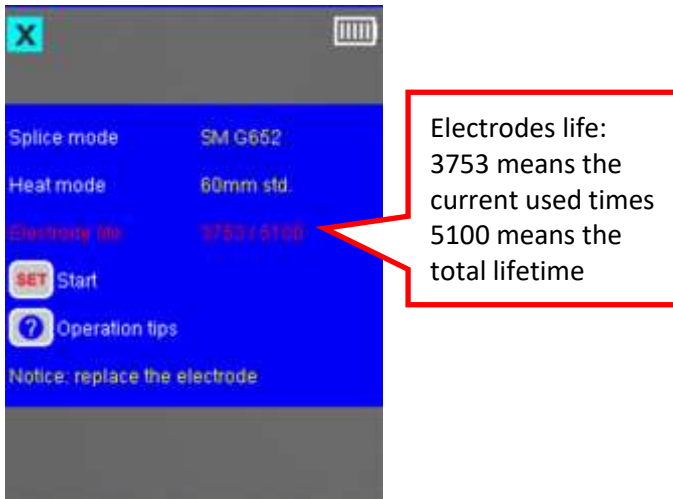
When ARC times surpass the electrodes' lifetime, the discharging will be unstable, and splicing loss goes larger. So, suggest users to clean the electrodes after every 500 times splicing.

When the splicer warns users of replacing electrodes, please change the electrodes as required to guarantee the splicer's performance.

### Electrode life notification :

COMWAY Fusion Splicer has the upgraded functions of electrode life notification and ID electrode replacement, as described below:

1. The electrode life will be shown in the main operation interface, as shown below:



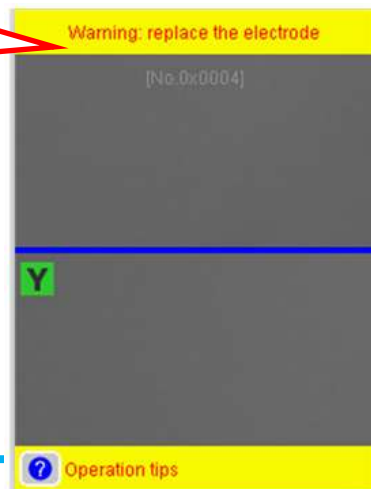
2. When the electrodes' used times are close to the total lifetime, the words "electrode life" will turn red with a notice, as shown below: replace the electrode



3. When the electrodes' used times reach to or over the total lifetime, there will be scrolling notices, as shown above.

4. At the same time, the electrode replacement warning will display every time when the splicer is boot up, as shown below:

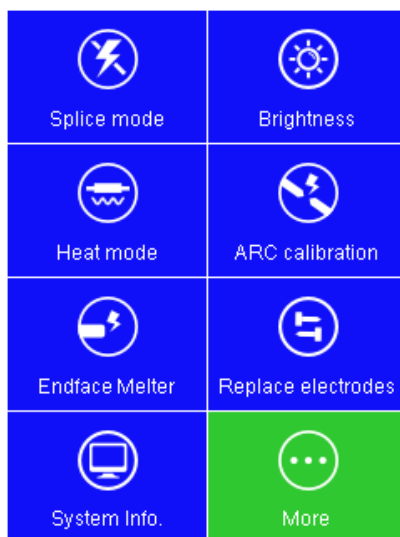
Warning on booth-up when the electrode is used over its lifetime.





## ID electrode replacement :

1. Enter into the “ Replace electrodes ” interface, do as the operation tips. Two ways to enter into “ Replace electrodes ” interface: one is via the main menu interface, the other one is via the maintenance menu interface.



**Main menu interface**



**Maintenance menu interface**

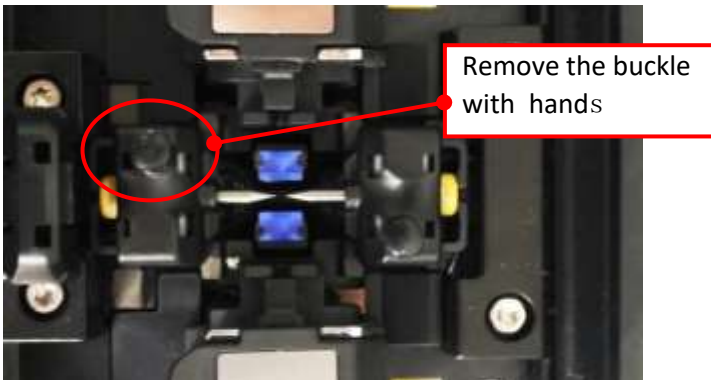
2. Follow the [ Step 1 ] as the interface prompts : Shut down the splicer and replace by new and original COMWAY

electrodes (ID electrode).

“Replace electrodes” interface

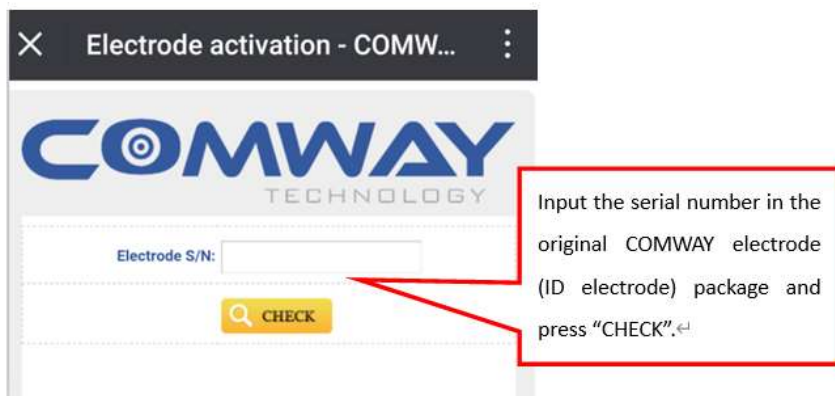


- Shut down the splicer, unfasten the screws to remove the electrodes, replace the old electrodes with the new ones, then install electrodes holder on the splicer and fasten the screws.



3. Boot up and re-enter into the “Replace electrodes ” interface, as the [Step 2 ] notice, scan the QR Code by to the “Electrode activation” interface, and input the serial number

in the original COMWAY electrode package.



4. Press the Enter button in the “Replace electrodes ” interface to the “Input activation code” interface to identify.





5. After finishing all of the above steps: Electrode counter had reset to zero automatically.



6. After finishing all steps of electrode replacement , please

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enter into the “Maintenance menu” to implement  
“Electrode stabilize” and “ARC adjust” .

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Power on the splicer, press the key, and then enter into the [Maintenance](#) menu.

- Operate under [Electrode Stabilize](#);



- Operate under [ARC Adjust](#);

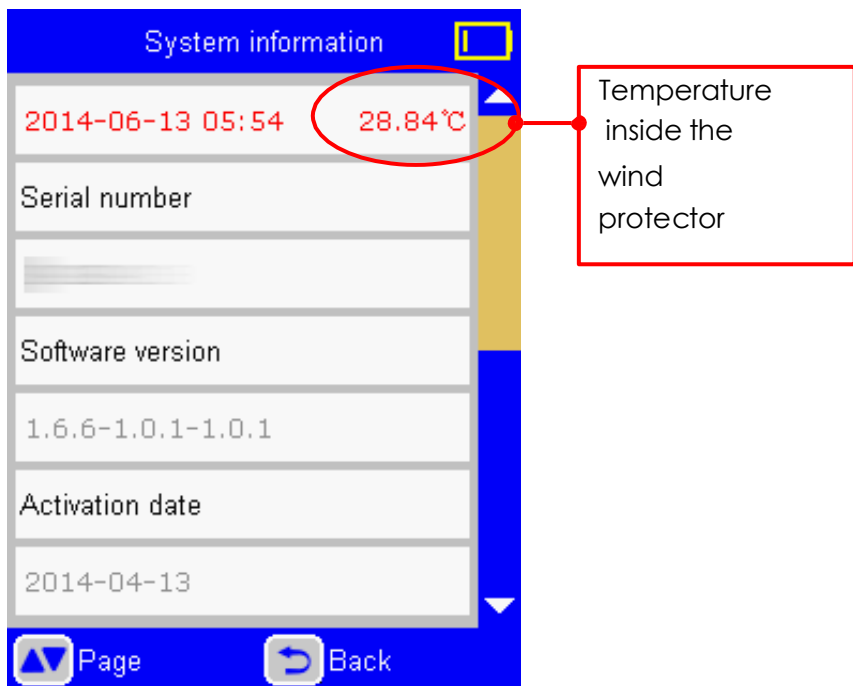


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## 6. SYSTEM

### SYSTEM INFORMATION

[System information](#) interface presents all the basic information of the current system of the splicer, including the temperature inside the wind-protector detected by temperature sensor.



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## RESOURCE DOWNLOAD

In the [Resource download](#) interface, the QR code and download link of COMWAY tools , COMWAY datasheet and COMWAY user menu is provided. They can be downloaded as needed.



## LANGUAGE

[Language](#) interface is available for the specific area. All the languages under this menu can be selected.

## DATETIME

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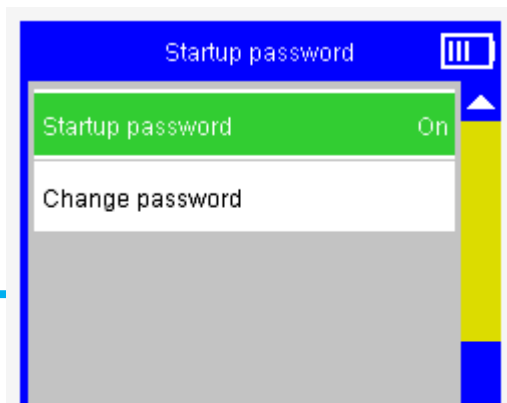
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**Datetime** interface is for setting date and time. The exact date and time would be shown on functions like splice history and image storage, etc. Correct date and time can make your information more accurate.

The power supply on the mainboard makes sure time run precisely when the machine is off. Normally, the power supply can work several years. If the system time stops working when the machine is off, please contact the authorized COMWAY service center to change a new power supply.

## **STARTUP PASSWORD**

Startup password function is used to set power-on password .



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Startup password switch settings:

OFF	Turn off startup password function, it can be used directly after boot up.
ON	Turn on startup password function, it can't be used till enter password. Initial password:0000 , do remember the password after turn on startup password function.

Select the password setting to set up password:

## LOW POWER MODE

The splicer can run at [Low power mode](#) when idling time.  
These options are available:

OFF	When the <a href="#">Low power mode</a> is OFF, the splicer will not run at low power mode anytime.
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(Number)	The splicer will run at <b>Low power mode</b> when there is no operation during the setting times. Unit: second.
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## AUTO SHUTDOWN

The splicer can shutdown automatically when idling time.  
These options are available:

OFF	When this function is off, the machine won' t shut down automatically anytime.
(Number)	The machine will shut down automatically when there is no operation during the setting times. Unit: second.

## LCD DIRECTION

When the LCD screen direction is up or down,the image on the display will change accordingly at the same time.




These operations are available:

Auto	The image on the display will turn up or down automatically.
Front	The image on the display always shows forward.
Back	The display image always shows backward.


## 7. ERRORS AND SOLUTIONS

### ” FIBER PLACED ERROR”

ERROR	REASON	SOLUTION
“Fiber placed error”	<ul style="list-style-type: none"><li>● The fiber is placed in the incorrect position.</li><li>● There is some dust in the V-groove.</li></ul>	<ul style="list-style-type: none"><li>● Press the , replace the fiber, and make sure that the end-face of the fiber is between the edge of the V-groove and the middle of the two electrodes.</li><li>● Clean the V-groove.</li></ul>

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## " MOTOR OUT OF LIMIT"

ERROR	REASON	SOLUTION
"Motor out of limit"	<ul style="list-style-type: none"><li>● The fiber is placed in the incorrect position.</li><li>● There is some dust in the V-groove.</li></ul>	<ul style="list-style-type: none"><li>● Press the , replace the fiber, and make sure that the end-face of the fiber is between the edge of the V-groove and the middle of the two electrodes.</li><li>● Clean the V-groove.</li></ul>

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## **" FIBER DIRTY"**

ERROR	REASON	SOLUTION
"Fiber dirty"	<ul style="list-style-type: none"><li>● There is some dust on the surface of the fibers.</li></ul>	<ul style="list-style-type: none"><li>● Strip the fibers again, clean up them with dustless cloth dipped by alcohol, then cleave the fiber again.</li></ul>

## **" FACE ANGLE TOO LARGE"**

ERROR	REASON	SOLUTION
"Face angle too large"	<ul style="list-style-type: none"><li>● The fiber is not well-cleaved.</li></ul>	<ul style="list-style-type: none"><li>● Strip the fibers again, clean up them with dustless cloth dipped by alcohol, then cleave the fiber again.</li></ul>

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## **” END FACE ERROR”**

ERROR	REASON	SOLUTION
“End face error”	<ul style="list-style-type: none"><li>● The fiber end-face is fragmentized and uneven.</li></ul>	<ul style="list-style-type: none"><li>● Strip the fibers again, clean up them with dustless cloth dipped by alcohol, then cleave the fiber again.</li></ul>

## **” FIBER ANGLE TOO LARGE”**

ERROR	REASON	SOLUTION
“Fiber angle too large”	<ul style="list-style-type: none"><li>● There is some dust on the surface of the fibers.</li><li>● There is some dust in the V-groove.</li></ul>	<ul style="list-style-type: none"><li>● Strip the fibers again, clean up them with dustless cloth dipped by alcohol, then cleave the fiber again.</li><li>● Clean the V-groove.</li></ul>



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## "DUST BURN"

ERROR	REASON	SOLUTION
"Dust burn"	<ul style="list-style-type: none"><li>● There is some dust on the surface of the fibers.</li><li>● There is some dust on the V-groove</li></ul>	<ul style="list-style-type: none"><li>● Strip the fibers again, clean up them with dustless cloth dipped by alcohol, then cleave the fiber again.</li><li>● Clean the V-groove.</li></ul>

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## 8. CONNECT THE PC SOFTWARE




### INSTALLATION AND CONNECTION

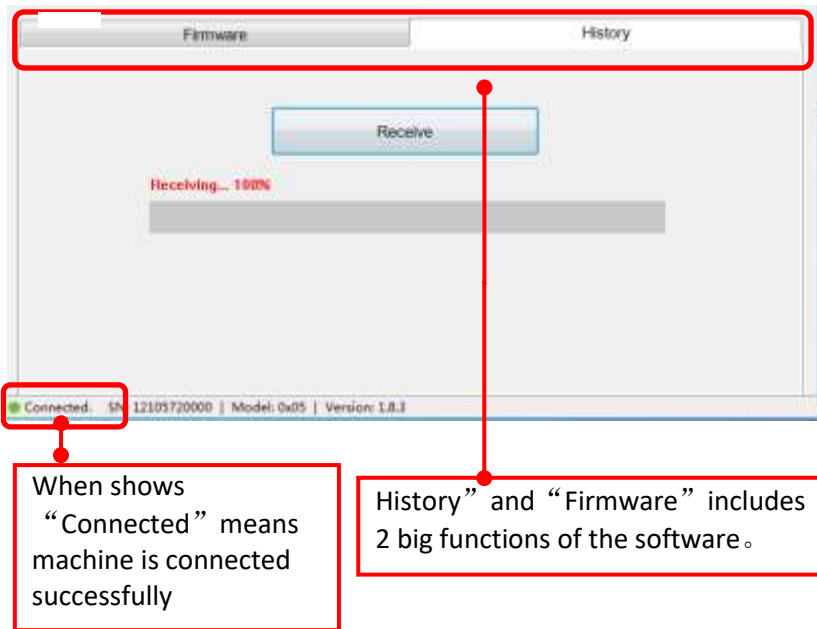
Follow these steps:

(Notes: Following steps are suitable to the machine with red label, For the machines with yellow label please refer to the previous user manual.

- Install the software [Fusion Splicer](#) for windows system on PC.
- Connect the fusion splicer and PC with USB cable.



-  the [Fusion Splicer](#) software, press the [power on](#) button  + [heat](#) button  at the same time under [power off](#) situation, then the machine enters into the USB enable mode.

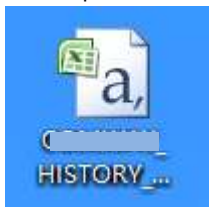


## EXPORT STORED FUSIN SPLICE RECORDS

- With the assistance of **Fusion Splicer** software, it is much easier to export the fusion splicer records under the menu "**History**"
- Power on the machine, press menu button, enter into "**More**", under "**Splice**" menu then choose "**History**" and "**Export History**". Follow the steps shown on the display: **Create export files** till it shows "**Complete**"
- Start Fusion splicer software, choose "**History**", click "**Receive**" button;
- Click the "save" button on the **Fusion Splicer** software to save the fusion splice records on the PC.
- This file can be opened with Microsoft Excel and other

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compatible softwares.



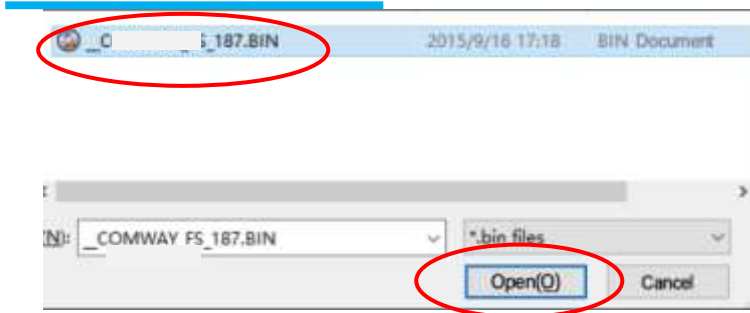
## UPGRADING THE FIRMWARE OF THE FUSION SPLICER

Enter into the “[System /System information](#)” interface to check the firmware version of the splicer. Users can get the newest update file from COMWAY distributor, and then upgrade the firmware of the splicer as the below steps:

Please refer to the previous chapter how to connect the machine and PC with USB cable. Start [Fusion Splicer](#) software, click” [Firmware](#)” button;



- Click [Select Files...](#)” button, you can find the upgrade file, then “[Open](#)”



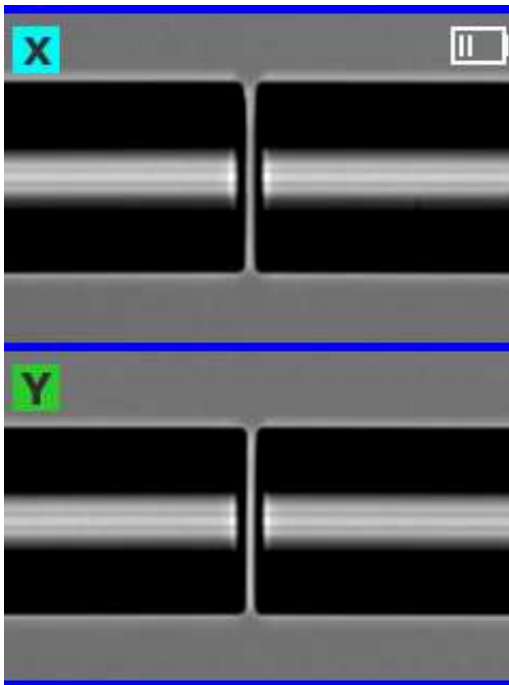
- When it shows “Complete” , power off the machine and restart.
- Press menu button, enter into “System Info” to check whether the system is upgraded to the newest version.

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## 9. TIPS

### HOW TO IMPROVE THE SPLICING QUALITY

- If the users follow the tips when use the splicer,good splicing quality can be achieved,even zero splicing loss.  
Here list some important tips:
- Preparatory work before splicing:Daily Maintenance  
Press the menu key,enter into the daily maintenance interface,finish the maintenance operation according to the tips;
- Try your utmost to cut the fiber end face smooth, and clean the fiber well with alcohol pad. Please refer to the below image:



- Choosing the corresponding [Splice mode](#) according to

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the fiber type (instead of Fast splice mode).E.g.,if the fiber type is SM,then choose **SM G652** splice mode (instead of SM Fast splice mode);

Tips: When don't know the fiber type, choose Auto to splice the first time. Once learn the exact fiber type, then switch to the right splice mode. (Auto only can be used on C10, not C8/C6/C5)

- Cleaning the V-groove every 500 times discharging and splicing.

## **WHEN TO USE AUTO SPLICE MODE (C10)**

- The biggest difference between **AUTO** splice mode another splice mode is that the splicer will identify the fiber type under the **AUTO** splice mode and then automatically choose the standard splice mode to splice.

e.g. The splicer will select **SMG652** splice mode when it identify out the fibers are both SM type. So the splicing time under the **AUTO** splice mode will be longer than the standard splice mode.

Tips: Choose Auto splice mode when the fiber type is unknown , and the fusion splicer will identify the fiber type automatically .After confirming the fiber type, then switch to the corresponding splice mode in order to improve the efficiency of the following splicing work.

# COMWAY C10 User Manual

Version: 2.5

The models and specifications could be amended at any  
time without prior notice.