# User Manual

# FFS-10000


www.star-technologies.co.in

STAR The Fiber Expert

# CATALOG

# 1. PREFACE

## MAINCONTENT

Thanks for choosing Star FFS-10000 Fast Fusion Splicer.
This manual particularly introduces the function features,operation skills, maintenance notes and precautions of Star FFS-10000 Fast Fusion Splicer

Two models are introduced in this manual:
FFS-10000 full functional optic fiber fusion splicer (hereafter called FFS-10000) FFS Series high-performance optic fiber fusion splicer

Notes:
In this manual,the FFS-10000 pictures are used for description (including the cover) by default.

**Important !!**
**Be sure to read all this manual carefully before use.**

For more information,please contact local distributor or visit website:
www.star-technologies.co.in

## SECURITY WARING

This machine is only used for splicing the silica glass fiber. It cannot be used for other purpose.As the splicer is the high precision machine, please be cautious to carry and operate, and follow the below safety regulations:

- Do not use the machine in an explosive hazardous situation.
- Do not touch the electrodes when the machines 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.

## MAINTENANCE NOTES

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

## TANSPORTATION AND STORAGE

- To avoid the emergence of condensation,the machine should be kept at least 1hour to accommodate environment from coldness to warmness.
- If it is not used for a long time,the machine should be cleaned, packed well and kept in a dry place.
- If it is not used for a long time,the machine should be charged every three months.
- 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%.

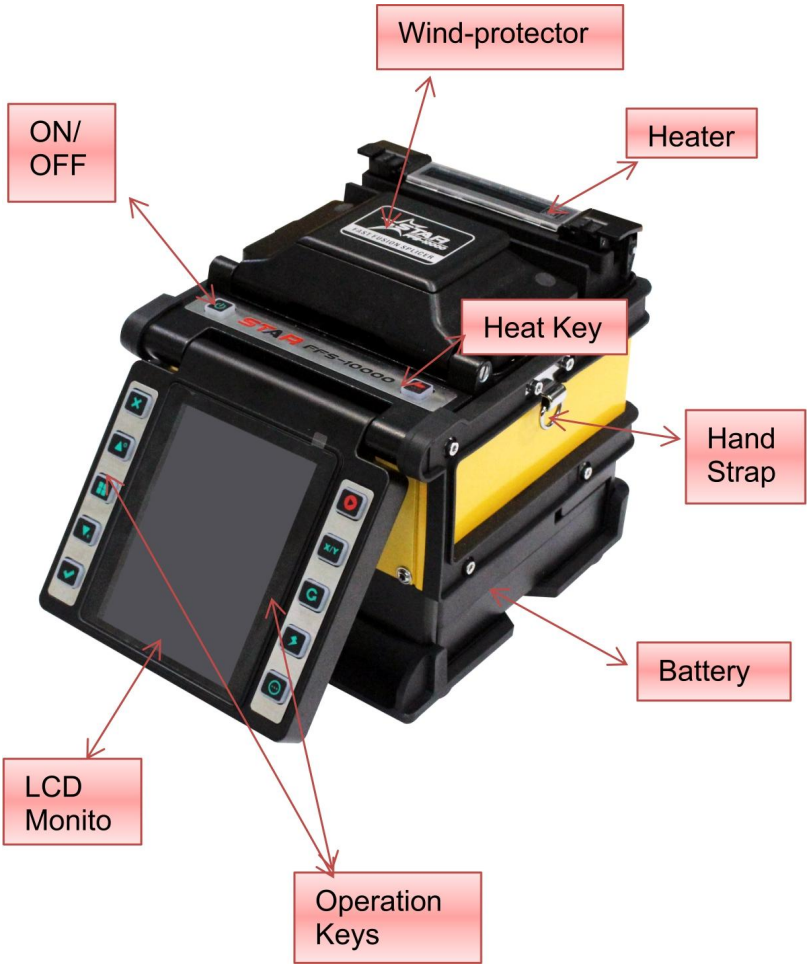
## SPECIFICATION

| | |
|---|---|
| Size & Weight | D190×W140×H150(MM);<br>**FFS-10000**:1.8kg(2.2kg with battery) |
| Fiber alignment | **FFS-10000**:6 motors core alignment |
| Fiber type | SM(ITU-T G.652), 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 ~ 150um, coating 100 ~ 1000um |
| Cleave length | 250um cladding diameter 8 ~ 16mm, over 250um cladding diameter 16mm |
| Minimum splice length | 20mm |
| Splicing programs | Max.100 |
| Splicing cycle time secs.[Auto] | **FFS-10000**:6 secs.[SM Fast] program, 10 program |
| Heating programs | Max.30 |
| Heating cycle time | Adjustable, 12 secs. typical |
| Splice protector | 10 ~ 60mm |
| Splice image capture | Max.300 |
| Splice data storage | Max.20000 |
| Splice loss | SM:0.02dB, MM:0.01dB, DS:0.04dB, NZ/NZDS:0.04dB, BI:0.02dB |
| Return loss | >>60dB |
| Loss estimation | Provided |
| Operation condition | Altitude 0～5000m, Humidity 0～95%, Temperature -20～+50℃, Wind velocity up to 15m/s |
| Storage condition | Humidity 0 ~ 95%, Temperature -40 ~ +80℃ (Battery -20 ~ +40℃) |
| Tension | 1.96 ~ 2.25N |
| Fiber view | Two cameras observation, 4.1 inch high-light color screen |
| Fiber magnification | 560x for X or Y single axis view,180x for both X&Y dual axis view |
| Port | High speed USB |
| Electrode life | 5000 arc discharges |
| Power supply | AC100-240V, 50/60Hz |

| | |
|---|---|
| Battery module | **FFS-10000**:8400mAh High capacity battery, more than 350 times splicing and heating |

## STRUCTURE



## POWER SUPPLY AND CHARGING

- Install/Remove the battery:

Insert the Battery Pack into the machine in the direction as indicated by the red arrow.

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.

- Battery charging:

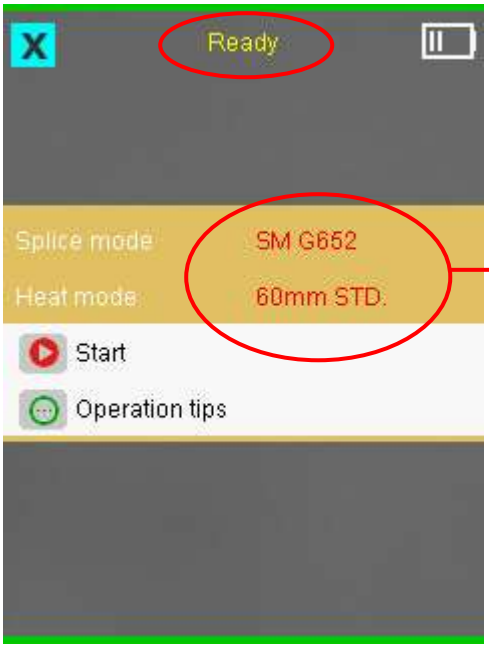

1. Connect the AC Adapter with the Battery by DC Power Cable;
2. Insert AC Power Cable into the AC adapter, and then start getting energized.

Important!!
Do not stack the battery and adapter up each other when charging.

## MAINSCREEN

Insert the Battery Pack or AC Adapter/Battery Charger and

Press the power key until it turns green,then the splicer starts work and self-checking. After finish,the splicer enters into the Main screen and shows “Ready”.




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

## BRIGHTNESS SETTING

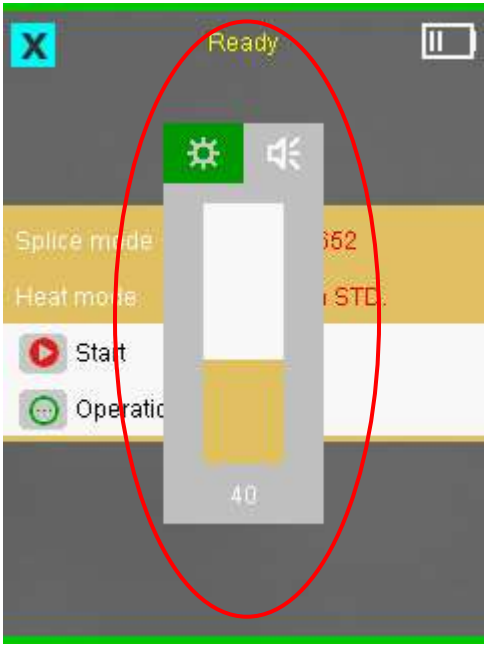
Follow these steps:

- On the work interface,press UP key  ,the brightness menu come out;
- Press UP key  and DOWN key  to adjust the brightness. After finish,press the  to save(or press back key  to give up).

## VOLUME SETTING

Follow these steps:

- On the work interface,press DOWN key  ,the VOLUME menu come out;
- Press UP key  and DOWN key  to adjust the volume. After finish,press the  to save(or press back key  to give up).



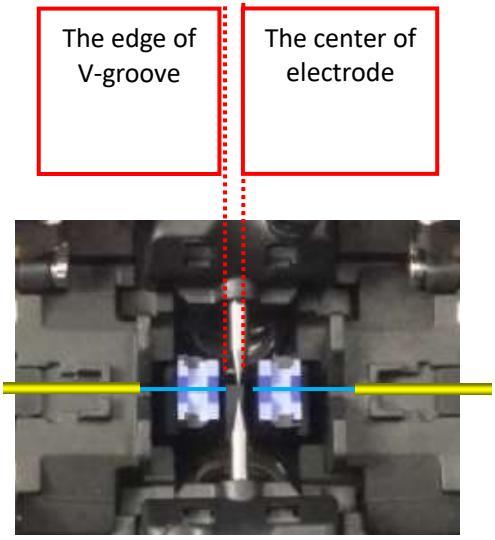

## 2. QUICK REFERENCE GUIDE

**Power On**

**Check SPLICE MODE and HEAT MODE**

**Insert the fiber through the sleeve**

**Strip, clean and cleave the fiber**



**Open the wind-protector and put the fiber into the V-groove**

Place the end of fiber between the V-groove edge and the center of electrodes. Notice: Do not touch the cleaved fiber end face against any surface.

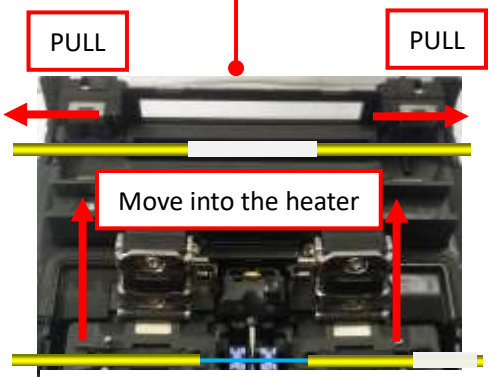
Close the wind-protector and start the splicing process

**Having finished Splicing, take the fibers away.**

**Move the protection sleeves to cover the splicing point.**

**Place the fiber into the heater. Start the heat process.**

**Completed.**

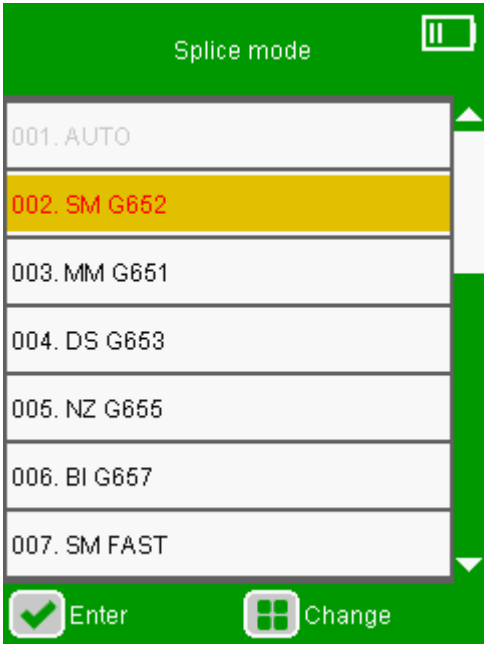



While maintaining a slight tension on the fiber end, do not twist or flex the fiber. Just lower the fiber into the heater as the arrow pointing direction. The oven hood will be closed and start heating automatically.

# 3. SPLICE

## SPLICE MODE

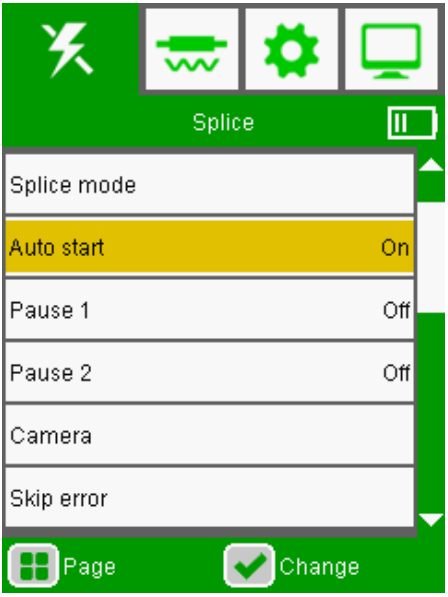
When the splice mode is not matched with the fiber type, click the Menu key on the work interface,then enter to the Splice mode,select and enable the splice mode which matched with the fiber type.




When the fiber type is uncertain, AUTO mode is suggested, but the splicing speed will be slower.

(Pay attention: AUTO mode is only available for FFS-10000)

## AUTO START




Auto start includes two options:

| | |
|---|---|
| ON | Close the wind-protect under work interface, start to splice automatically. |
| OFF | Close the wind-protect under work interface, no response. |

## PAUSE 1,PAUSE 2,

Pause1includes the following options:

| | |
|---|---|
| ON | When starts to splice under the work interface, the splicer will be paused for confirmation after finishing cleaning & discharging operation. |
| OFF | When start to splice under the work interface, the splicer will keep operating after finishing cleaning & discharging operation. |

Pause2 includes the following options:

| | |
|---|---|
| ON | When starts to splice under the work interface,<br>The splicer will be paused for confirmation after finishing the second time alignment. |
| OFF | When start to splice under the work interface,<br>The splicer will keep operating after finishing the second time alignment. |

## CAMERA

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

FFS-10000 Fast Fusion Splicer has two cameras,the display images from these two cameras called X-view and Y-view.

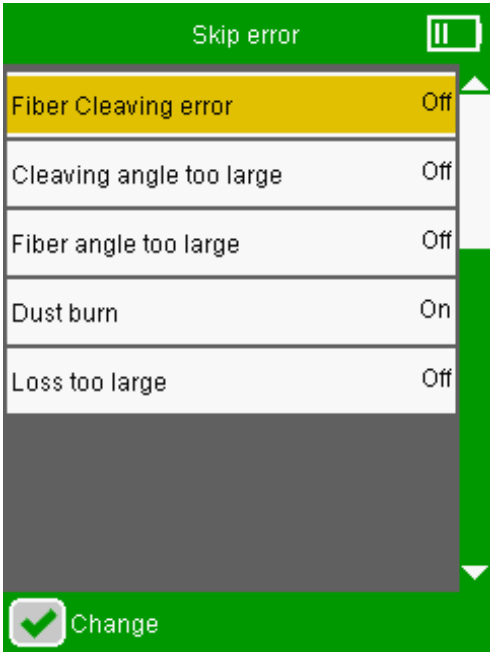
Camera interface shows several steps while a fiber splicing process:

| | |
|---|---|
| Gapset | 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 X-view only |
| *Y* | Show the Y-view only. |
| *X*/*Y* | Show both X-view and Y-view. |

## SKIP ERROR



Skip error interface lists various errors that may be detected in a fiber splicing process:

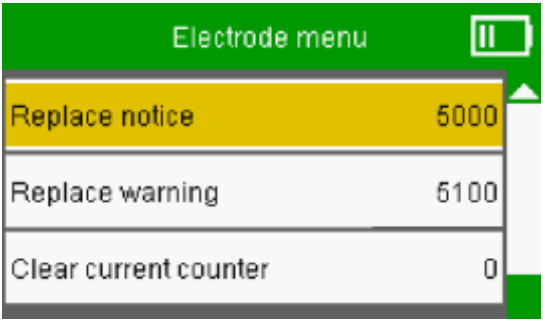
| | |
|---|---|
| Fiber end face error | Fiber is not found,face uneven or dust |
| End face Angle too large | Cutting angle is too large. |
| Fiber angle Too large | The fibers of V-grooves are not in the same level (There may be dust on the V-grooves or fiber surface.) |
| Dust burn | It finds dust 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 splice (This Splicing may be not eligible.) |

For each error,these Skip error options are available:

| | |
|---|---|
| ON | Warn and pause to confirm when detects Corresponding error. |
| OFF | Skip and keep operating when detects Corresponding error. |

## ELECTRODE MENU

Electrodes are the consumable parts. According to different materials and manufacturing processes,each new electrode has its life time(discharge times). Electrode menu is used for automatically recording the lifetime of new electrodes.




| | |
|---|---|
| Replace notice | When the electrodes' discharging time reach to the setting point of this option, it will remind you to replace new electrodes on the work interface. |
| Replace warning | When the electrodes' discharging time reach to the setting point of this option, it will remind you to replace new electrodes on the work interface in a obvious way. |
| Clear current counter | It records the current ARC counter. After changing new electrodes,select this option,push to clear the record to restart recording the ARC times of new electrodes. |

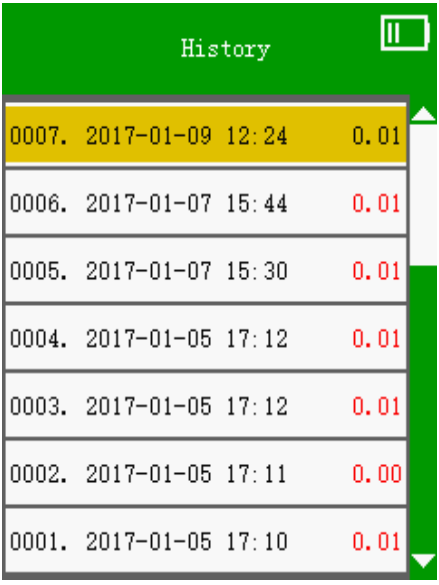
**Important !!**
**Using inferior electrodes will lead to the splicer's abnormal working or even breakdown. Please contact with the Jetfiber agent to purchase original electrodes.**

## 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.

History includes View history and Clear history


Press  under the View History, you can check all the splice data records. All there records are placed according to the splice date. The latest record was arranged on top.



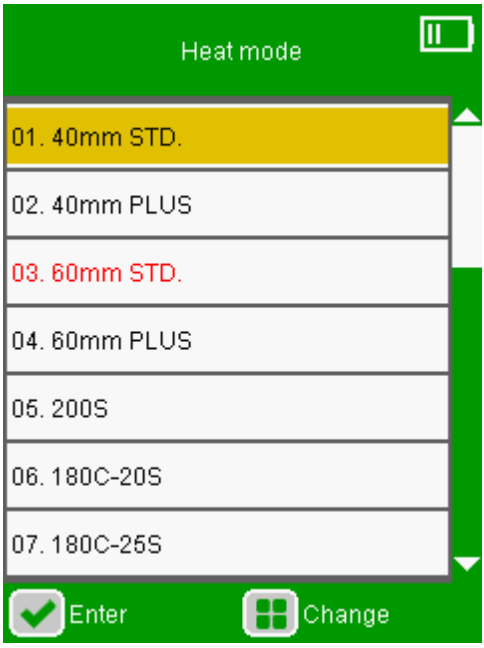

Press  under the Clear History.

All splice data can be cleared.

# 4. HEAT

## HEATMODE

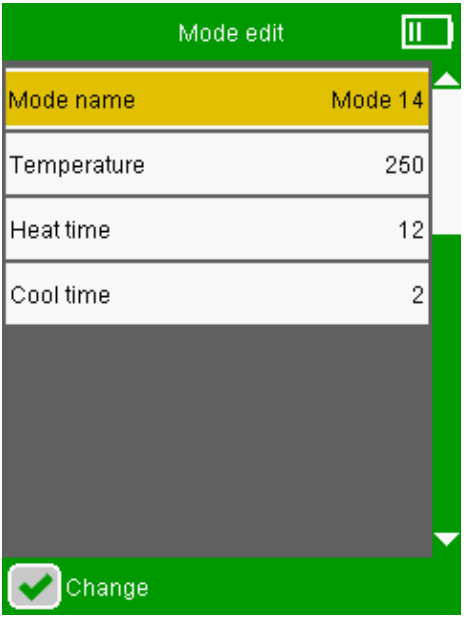
Press the key in the work interface when the heating mode is not matched with the protection sleeve which is currently being used.Then enter into the Heat mode interface,choose a heat mode that is matched with the protection sleeve.




The[40mmstd.]and[60mmstd.]mode are designed for working above 0℃ which are respectively used for heating the common 0~40mm and 40~60mm protection sleeves. When the heat is not sufficient due to the fairly thick protection sleeve or the low temperature,please follow these steps until improved:

1. Switch from[XXmm STD.]mode to the corresponding [XXmm PLUS]mode;

2. Heat the40mm protection sleeve under the[60mmstd.] or[60mmplus]mode;




3. When the heat is not sufficient even under the [60mmplus]mode,select[New=>]item,press key to create a new heat mode,set up the heating Time to 25s,return and select this option to start this mode;
4. When the heat is still not sufficient even finish the above steps,select the new heat mode created above,press key to enter into the Mode edit interface,prolong the Heat time an extra 5s and test whether successful;
5. Repeat the step 4 until getting the most suitable heating time that can heat sufficiently under the current environment.

## AUTOSTART

Auto start includes the follow options:

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

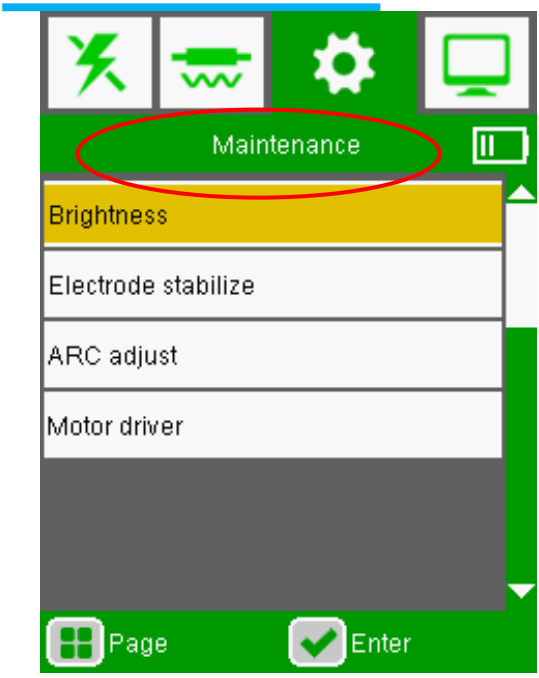
# 5. MAINTENANCE

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.

## BRIGHTNESS ADJUSTMENT

Be affected by the external environment, the image brightness of optical imaging system is unqualified because of dirty camera interface. The system of fusion splicer will be brightness adjusted automatically, this caused the splicing time slower. Please adjust the brightness of fusion splicer.

- Power on the fusion splicer, Pres  go to Maintenance
- Press Brightness

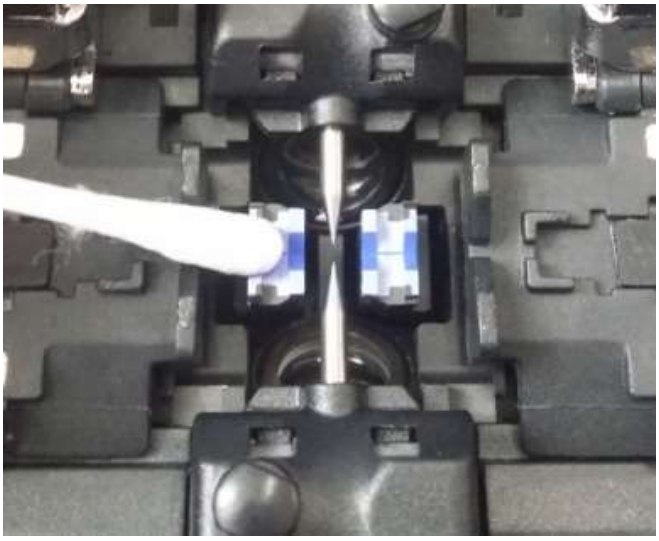

Maintenance
Brightness
Electrode stabilize
ARC adjust
Motor driver
Page
Enter

## DAILY CLEANING WORK

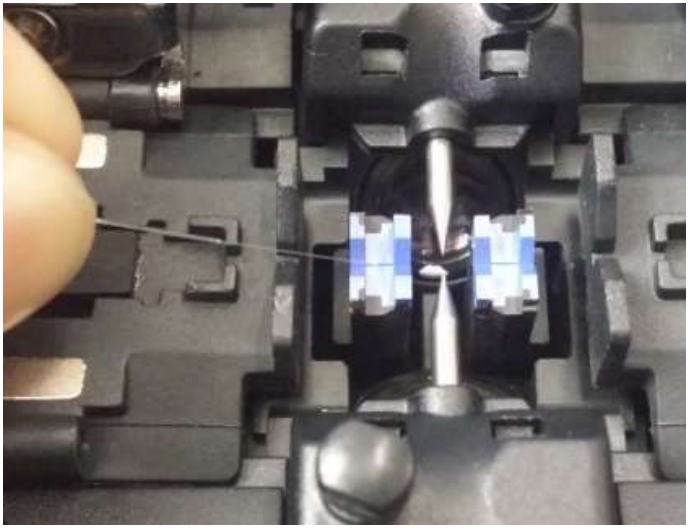
There are mainly two parts need daily cleaning:V-groove and Microscope Lens:

1. When clean the V-groove,follow these steps:

- Wipe the bottom of the V-groove with a small cotton swab dipped by alcohol;

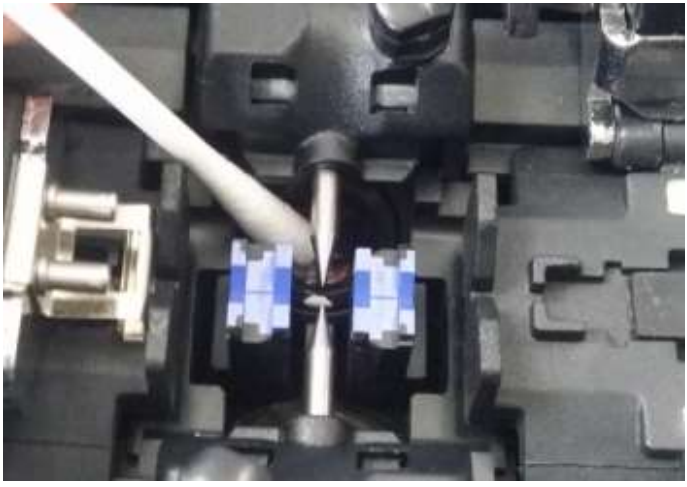


- Suck the remaining alcohol in the V-groove with a dry cotton swab;
- Jab out the dirt in the V-groove with the end part of a cleaved fiber.



2. When clean the microscope lens,follow these steps:

- Wipe the surface of the microscope lens with a small cotton swab dipped by alcohol



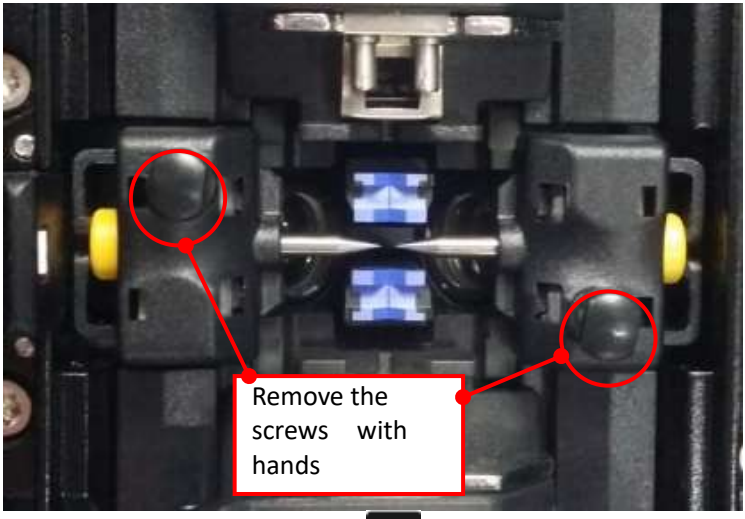
- Suck the remaining alcohol on the surface of the Microscope lens with a dry cotton swab.

## 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.

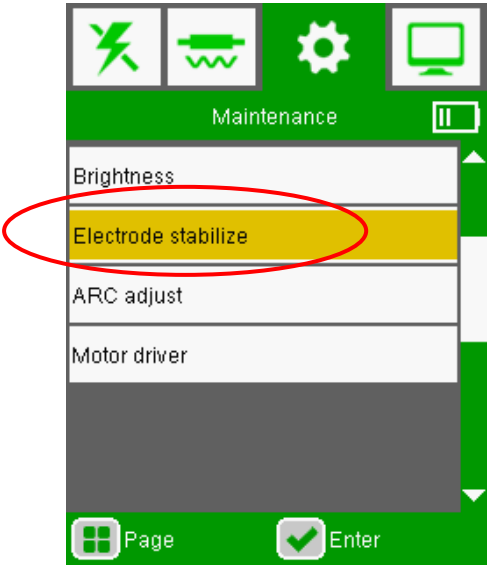
Please operate as the following steps:

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

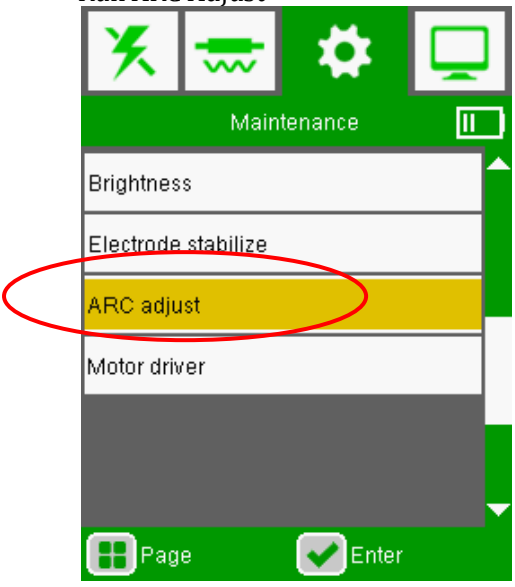



- Power on the splicer, press the  key, and then enter into the Maintenance menu;

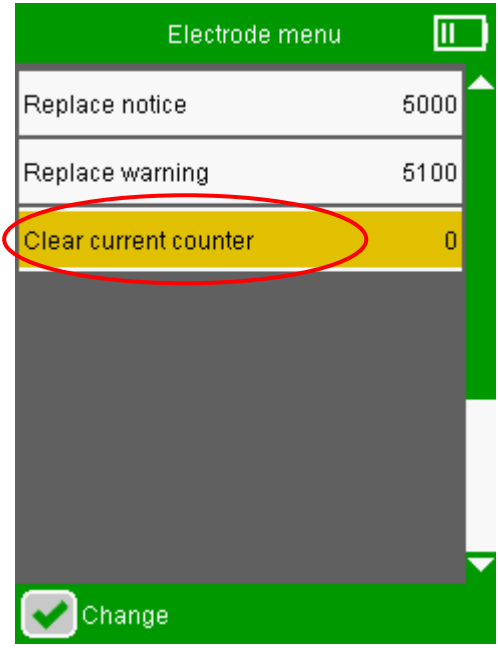
- Run Electrode Stabilize;




- Run ARC Adjust



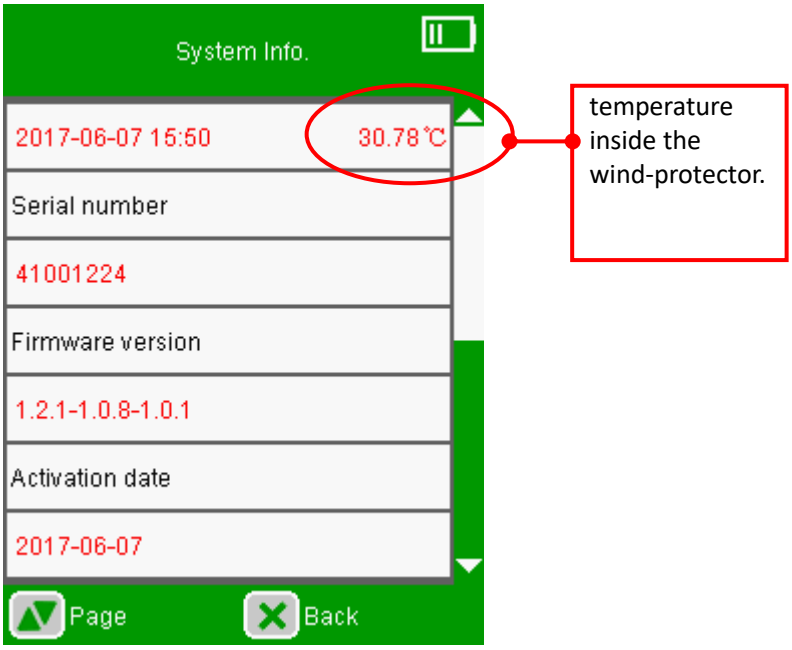
- Enter into the Splice / Electrode menu interface, select Clear current counter item, push key to zero the ARC counter in order to restart recording the ARC times of the new electrodes.



# 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.




## RESOURCE DOWNLOAD

Resource download interface provides FFS-10000 fast fusion splicer upgrade tools, PC software and other resources to download the link two-dimensional code. If you want to upgrade the fusion splicer, welding data export, remote control assistance and other operations, please enter the interface scan QR code, download the corresponding resources.

## LANGUAGE

Language interface are available for the specific sales area. All the

languages under this menu can be selected.

## DATE TIME

Date time 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 Jetfiber service center to change a new power supply.

## STARUP PASSWORD

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


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 Settings to set up password:


## POWER SAVING MODE

The splicer can run at power saving mode when idling time. These options are available:

| | |
|---|---|
| OFF | When this function is off, the machine won't go into power saving mode automatically anytime. |
| (Number) | The machine will go into power saving mode automatically when there is no operation during the setting times. Unit: second. |

## AUTO SHUT DOWN

The splicer can shut down automatically while idling.
These options are available:

| | |
|---|---|
| OFF | When this function is off,the machine won't shut down automatically at anytime. |
| (Number) | The machine wills hut 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 options are available:

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

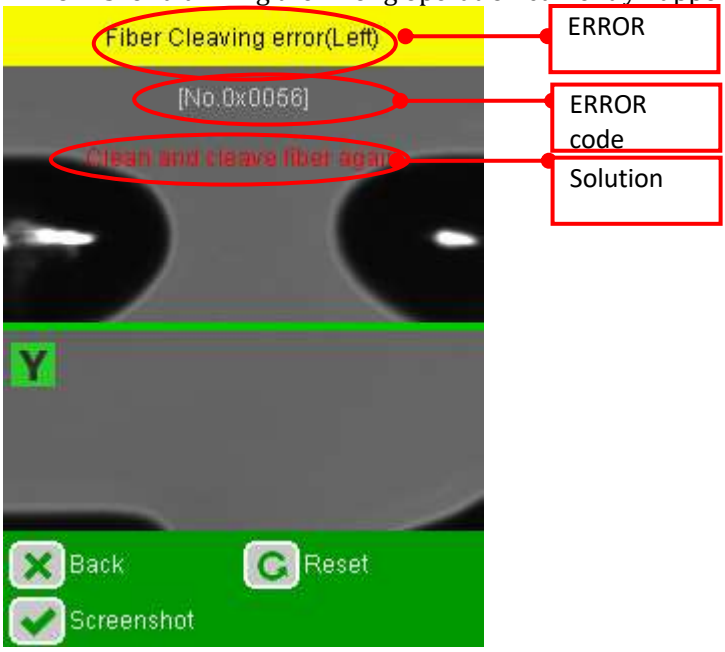
| | |
|---|---|
| Back | The display image always shows backward. |

### FACTORY RESET

**Factory Reset** is used for recovering factory parameters while splicer can not work, which caused by splicing parameter, heating parameter or system information in disorder.
After this action, all the manual models which been added would be cleared away.

## 7. ERROR and SOLUTION

ERROR is for alarming the wrong operation currently happened.




This part would show some common errors and the corresponding solutions

## “ERRORS AND SOLUTIONS”

| ERROR | REASON | SOLUTION |
|---|---|---|
| “FIBER PLACED ERROR ” | ● The fiber is placed in the incorrect position.<br>● There is some dust in the V-groove. | ● Press the  and reposition 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.<br>● Clean the V-groove. |

## ”MOTOROUTOFLIMIT”

| ERROR | REASON | SOLUTION |
|---|---|---|
| “Motor out of limit” | ● The fiber is placed in the incorrect position.<br>● There is some dust in the V-groove. | ● Press the  and reposition 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.<br>● Clean the V-groove. |

## ”FIBERDIRTY”

| ERROR | REASON | SOLUTION |
|---|---|---|
| “Fiber dirty” | ● There is some dust on the surface of the fibers. | ● Strip the fibers again, clean up them with dustless cloth dipped by alcohol,then cleave the fiber again. |

## ”FACEANGLE TOO LARGE”

| ERROR | REASON | SOLUTION |
|---|---|---|
| “Face angle too large” | ● The fiber is not well- cleaved. | ● Strip the fibers again, clean up them with dustless cloth dipped by alcohol,then cleave the fiber again. |

## ”END FACE ERROR”

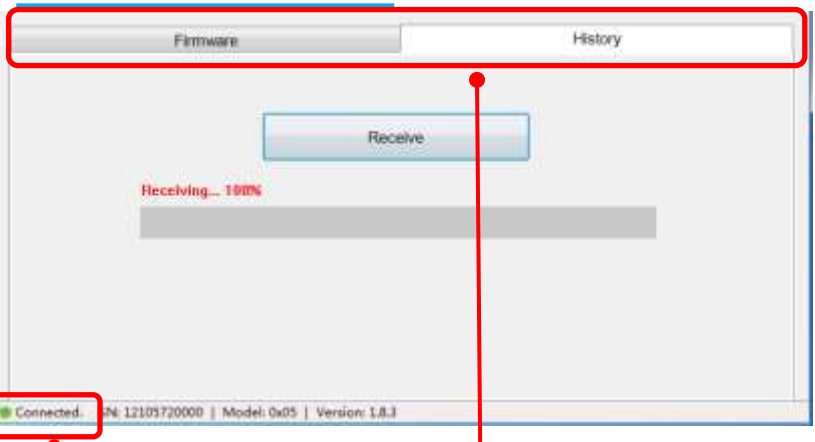
| ERROR | REASON | SOLUTION |
|---|---|---|
| ““End face error” ” | ● The fiber end-face is fragmentized and uneven. | ● Strip the fibers again, clean up them with dustless cloth dipped by alcohol, then cleave the fiber again. |

## ”FIBER ANGLE TOO LARGE”

| ERROR | REASON | SOLUTION |
|---|---|---|
| “Fiber angle too large” | ● There is some dust on the surface of the fibers.<br>● There is some dust in the V-groove. | ● Strip the fibers again, clean up them with dustless cloth dipped by alcohol,then cleave the fiber again.<br>● Clean the V-groove. |

## ”DUST BURN”

| ERROR | REASON | SOLUTION |
|---|---|---|
| “Dust burn” | ● There is some dust on the surface of the fibers.<br>● There is some dust in the V-groove | ● Strip the fibers again, clean up them with dustless cloth dipped by alcohol,then cleave the fiber again.<br>● Clean the V-groove.Clean the V-groove. |




When shows "Connected" means machine is connected successfully

"History" and "Firmware" includes 2 big functions of the software。

## EXPORT STORED FUSIN SPLICE RECORDS

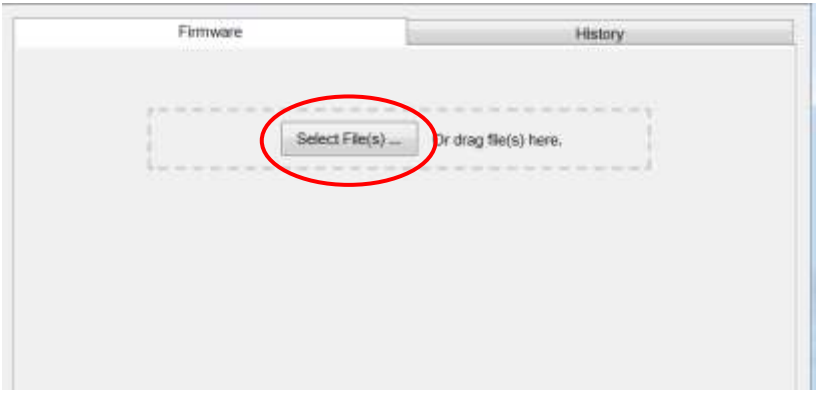
With the assistance of Fusion Splicer software, it is much easier to export the fusion splicer records under the menu "History". Follow these steps:

- 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 compatible softwares.

## UPGRADING THEFIRMWAREOFTHESPLICER

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:
Follow these steps:

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



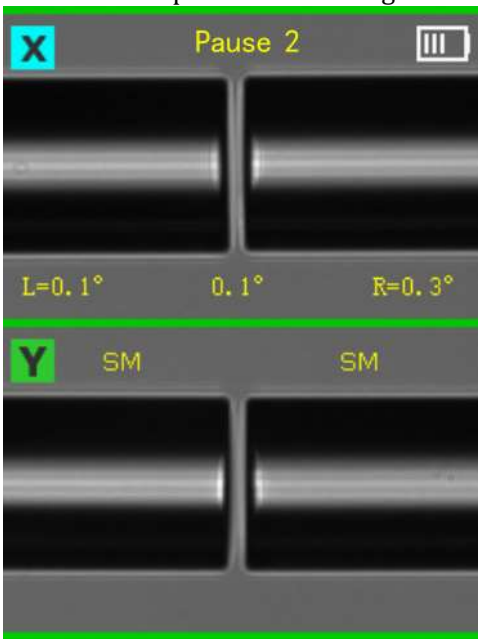

- Click “Select Files…” button, you can find the upgrade file, then “Open”
- When it shows “Complete”, power off the machine and restart.
- Press menu button, enter into “System Info” to check whether the system is upgraded to the newest version.

# 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;




- Choosing the corresponding Splice mode according to 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 FFS-10000)

- Cleaning the V-groove every500 times discharging and splicing.

## WHEN TO USE AUTO SPLICE MODE（FFS-10000 ）

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 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.

# STAR FFS-10000 MANUAL

## VERSION: 1.0

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