PROLITE-40B

OPTICAL FIBER FUSION SPLICER

PROMAX

SAFETY NOTES

Read the user's manual before using the equipment, mainly " SAFETY RULES " paragraph.

The symbol  ***on the equipment means "SEE USER'S MANUAL". In this manual may also appear as a Caution or Warning symbol.***

Warning and Caution statements may appear in this manual to avoid injury hazard or damage to this product or other property.

TABLE OF CONTENTS

OPTICAL FIBER FUSION SPLICER

PROLITE-40B

1 INTRODUCTION

The Optical Fiber Fusion Splicer (OFFS) is applied to fiber fusion splice, it can splice various types of optical fiber (core diameter: 80-150 μm) including single mode fiber, multi-mode fiber, dispersion shifted fiber. OFFS which is a fine product based on optical-mechanical-electrical integration should be keep clear, and the impact and vibration should be avoided.

1.1 List of Features and specifications

Applicable fibers	Single mode (ITU-T G.652) and G.657. Multimode (ITU-T G.651). DS (ITU-T G.651) NZDS (ITU-T G.655)
Fiber cleaved length	10 ~ 16 mm. 16 mm (Coating diameter: 250 ~ 1000 μm).
Fiber diameter	
Cladding diameter:	80 μm ~ 150 μm.
Coating diameter:	100 μm ~ 1000 μm.
Fiber aligning method	Core aligning.
Blending mode	Automatic 3-axis (X, Y, Z).
Actual average splice loss:	0,02 dB (Optical fiber SM). 0,01 dB (Optical fiber MM). 0,04 dB (Optical fiber DS). 0,04 dB (Optical fiber NZDS).
Average melting time:	8 seconds.
Fibre Heater	Built-in into the splicer.
Average heat time:	30 s (can be set from 10 to 90 s).
Effective heating length	< 60 mm.
Display	5.7" inches colour LCD Monitor.
Image Processing mode	Digital.
Language	Spanish, English and Portuguese.
Inner Light	Built-in high light LED (suitable for work at night).
Tension test	2N.
Electrode life	2500 times.
USB interface:	To export data and update software.
VGA Port	To transmit images to a monitor.

ALIMENTATION

Battery	Li Ion Battery.
Battery level	Real-time screen indicator.
Battery Charger	By built-in charger.
Operating time	3h 30 min.
Voltage	13.5 V DC; 4,5 A.
Mains Adapter	From 100 to 240V 50Hz / 60 Hz (Included).

ENVIRONMENTAL CONDITIONS

Temperature range	From -10 °C to +50 °C.
Max. relative humidity	< 95 % RH (No condensation).
Wind speed	< 15 m/s.
Storage temperature	– 20 °C to + 60 °C.
Storage humidity	Without condensation.

MECHANICAL FEATURES

Dimensions	W. 140 x H. 160 x D. 150 mm.
Weight	2.8 kg.

INCLUDED ACCESORIES

AF-001	Optical fiber cutter.
AF-002	Spare electrodes.
AF-003	Optical fiber Stripper.
AF-013	Melting Protectors 60 mm.
	Carrying case.
	Power Adapter **PROLITE 40**.
	AC Power Cord.
	SMD Tweezers.
	Suction bulb.
	Alcohol dispenser.

1.2 Terms about Fusion splicer

During operating the fusion splicer by menu, you will find some terms, the meanings are as follows:

SM	Single Mode Fiber.
MM	Multimode Fiber.
DS	Dispersion Shifted Fiber.
NZDS	Non-zero Dispersion Shifted.
Cleave Length	Cleave length after cut. Typical value is between 10 and 16 mm.
Bare Fiber	Optical fibre whose cladding has been removed.
Reset	The operation makes the internal execution parts and circuit parameters return to their initial status. Once reset, the Splicer is capable of splicing again.
Alignement	The operation is to adjust the two fibers, so that they are in the same direction. If they are not properly aligned, there will be deviations in the horizontal (x-axis) and vertical (y-axis) directions, which are called radial offset. The alignment operation controls the radial offset within the allowable range.
Estimated Splice Loss	The splicer calculates the loss at the splicing point according to the fiber images. The results are reliable when the splicing is done correctly.
Fiber Protection Sleeve	Used to protect the splicing point, as shown in the following figure.

Table 1.-

2 SAFETY RULES

2.1 General

* **The safety could not be assured if the instructions for use are not closely followed.**

* The external charger is **Class I** equipment. For safety reasons plug it to a supply **line with the corresponding ground terminal**.

* Use the mains adapter in **Over-Voltage Category II** installations and **Pollution Degree 1** environments. It is for **INDOOR USE**.

* When using some of the following accessories use only **the specified ones** to ensure safety:

  Power adapter.
  Mains cord.
  Electrodes.

* Observe all **specified ratings** both of supply and measurement.

* Remember that voltages higher than **70 V DC** or **33 V AC rms** are dangerous.

* Use this instrument under the **specified environmental conditions**.

* **The user is not authorised to manipulate** inside the instrument:

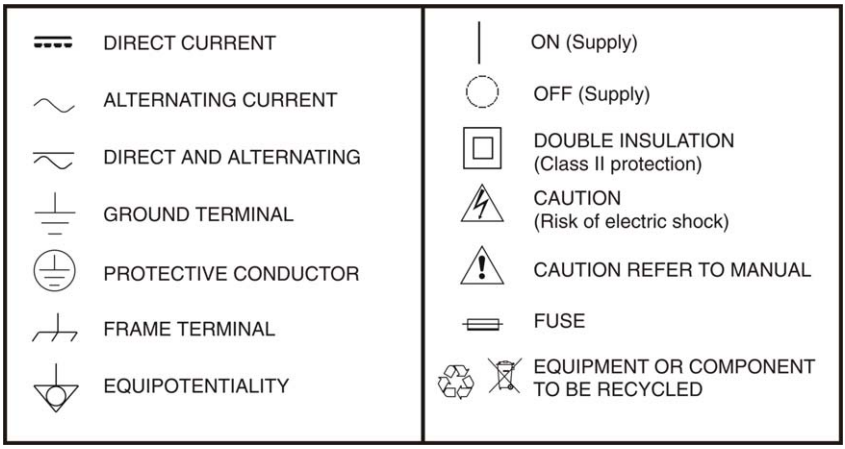
  Replacing electrodes.

* In the Maintenance section provides instructions specific to this intervention.

* Any change on the equipment should be carried out by qualified personnel.

* Follow the **cleaning instructions** described in the Maintenance paragraph.

* Symbols related with safety:



2.2 Specific Precautions

* When you activate the light-producing arc and the electrode under a voltage of 6000 V. Do not open the lid and touch the electrode as it might damage.
* The fusion splicer can only quartz glass fiber.
* In case of any malfunction, breakdown or team entry into any type of material and equipment immediately disconnect the external power supply and call service.
* Do not use in presence of flammable substances.
* Avoid dusty conditions and temperature or humidity.
* When changing from cold to hot wait until thoroughly dry the condensation.
* Do not disassemble the power module.
* Maintenance are recommended once a year.

2.3 Descriptive Examples of Over-Voltage Categories

Cat I Low voltage installations isolated from the mains.

Cat II Portable domestic installations.

Cat III Fixed domestic installations.

Cat IV Industrial installations.

3 STRUCTURE AND PANEL

3.1 Brief introduction of Structure

The portable fusion splicer which was specially designed is suitable for field, lab and other situations. The Jig and Fixture is as Figure 1.-.

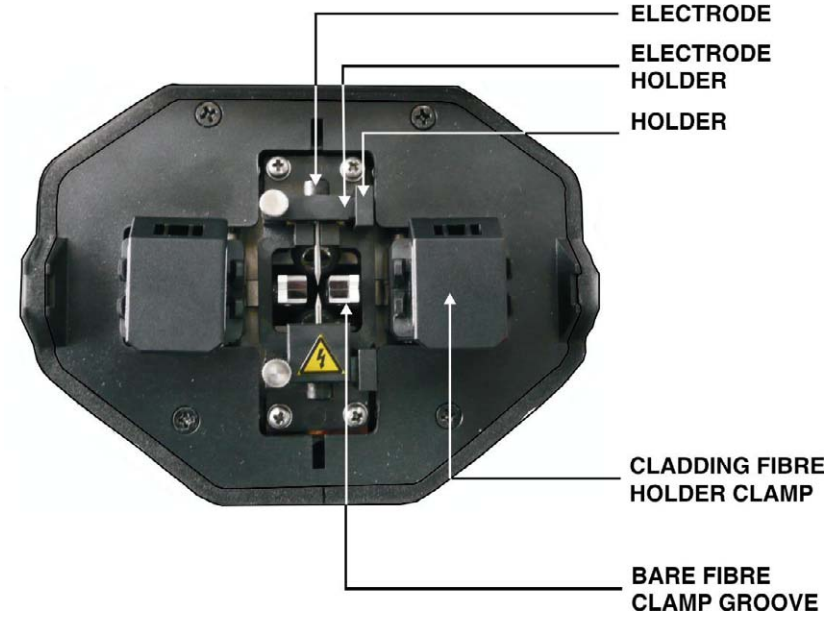


Figure 1.-

3.2 Introduction to Panel

3.2.1 Shield

The shield is closed unless fibers are going to be put in. Close it before any keyboard operation. With a viewfinder mirror and a holding clamp for bare fiber in the V-groove, it can prevent dust and wind and provide vertical light for the microscope.

3.2.2 Screen

The viewing angle of the 5.7-inch TFT-LCD can be adjusted. But please protect its screen from hard sharp things!

3.2.3 Power Supply

To provide convenience for user, the inner Li-Ion battery. The direct current was supplied by the adapter, and the battery was charged when the adapter was used.

3.2.4 Charging Indicator Light

When the adapter was plugged in, the red indicator LED "**CHARGE**" was turned on. The green led will shine after charging was accomplished.

3.3 Introduction to Keyboard

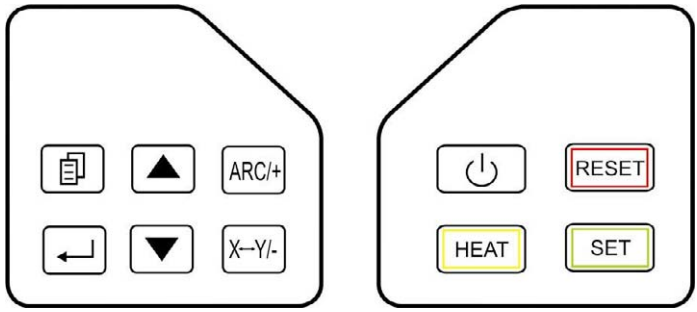


Figure 2.-

Key	Function Description
POWER	This is the power key. The instrument would turn on or off.
HEAT **HEAT**	Press to operate the reinforcement heater. The red lamp is lit during operation. And if the cover is covered, the heater will work also. The heating time can be set in the menu, the operation refer to APPENDIX B. If the key is pressed in the heating procedure, the heater will stop heating.
RESET **RESET**	All operations except heating would be cancelled, if this key was pressed, and all the motional parts will be move to default position, and the instrument is ready for next fusion.
SET **SET**	Press this key; the splicer accomplishes cleaning, gap adjustment, alignment, fusion splicing and loss estimating functions. The results will be displayed automatically on the screen.
MENU	Press this key to enter the main menu. Exit the current menu and return to the upper level or to the splicing interface (if in the main menu currently). Pressing this key the user accesses the configuration menu or allows the user to return to a high level.
ENTER	Press to enter the next sub-level menu; used to switch between the right and left fibers when adjusting motor, In the test menu, it confirms the start of a test. Press this key and the splicer will discharge for a short time between the two electrodes. This operation can get rid of the dust on the fiber but not of the stabs on the fiber NZDS.
UP	In the Menu mode, it allows you to move up on the submenu list. In the Manual Fusion mode, it allows you approaching to the fibres.
DOWN	In the Menu mode, it allows you to move down on the submenu list. In the Manual Fusion mode, it allows you to align the fibres.
X↔Y/- **X↔Y/-**	It allows you to switch between the X and Y axe view. vertical X and Y Horizontal X and Y only X only Y In Menu mode allows you to scroll through the options to choose from.
ARC/+ **ARC/+**	It allows you to shoot an arc fusion. In the Menu mode allows you to move between several options to choose from.

Table 2.-

3.4 Introduction to Port board

Input / **Output** port is on the right side of the main body, as **Figure 3.-**, the function are introduced in Table 3.

Figure 3.-

Name	Function Description
POWER IN	DC power input terminal, 13.5V, 4.5A.
CHARGE	When the Led is red, the battery is charging. When the Led is green, the battery is full.
USB	USB connection to save records on your PC.
VGA	Video signal output.

Table 3.-

3.5 Interface and View Modes

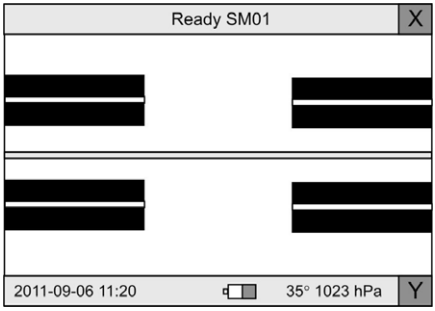


Figure 4.-

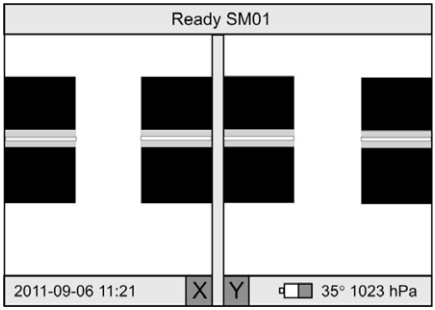


Figure 5.-

In the Standby Mode, the user can switch between view modes pressing **X↔Y/-** [X↔Y/-].

Available modes are:

- X and Y vertical axes. Figure 4.-
- X and Y horizontal axes. Figure 5.-
- Only X axe.
- Only Y axe.

At the top part of the screen, status messages about the splicer process are shown. At the lower part there is the date and time, the battery life, the temperature and the air pressure.

4 INSTALLATION AND ADJUSTMENT

a) Open the shield and check whether are there dusty or the other eye winker (such as short fiber) in the fixture.

b) Brush clean the V-grooves in one direction with an alcohol-soaked cotton swab.

c) Power on the OFFS, and fix the fibers following figure 6. The cleave length of bare fiber should be 10 mm ~ 16 mm, and the bare fiber should be put in the V type groove, Cladding Fiber Holder Clamp hold down the fiber. The fiber will be seen in the middle of the screen, don't overlap.

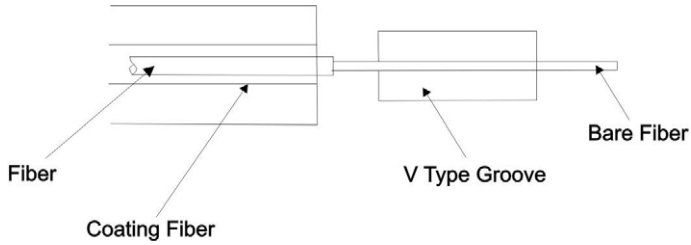


Figure 6.-

d) Check all the key, if there were any exception, please contact us.

e) In splice mode, use **ARC/+** [ARC/+] (**GAP**), **DOWN** [▼] (**ALIGN**) keys to adjust the fibers to proper positions. If on the screen appears "**OK**", then the user can start the fusion by pressing on **ENTER** [↵] to clean and on **ARC/+** [ARC/+] to splice. Otherwise notice the following;

Whether the fiber is clean or not? If not, clean it.

Whether the V-groove is clean or not? If not, clean it.

Whether the fiber end profile is good or unqualified? If unqualified, cleave the fiber again.

Whether the fiber is a standard fiber or not? If not, replace it with a standard one.

If the trouble is not included in the above lists. Please ask the manufacturer for help.

f) In Auto fusion Mode or Half-auto fusion Mode, press **SET** SET key, the splicer accomplishes cleaning, gap adjustment, alignment, fusion splicing and loss estimating functions. The results will be displayed automatically on the screen.

5 BASIC OPERATION

5.1 Splicing Parameter Setting

Turn on the power and then the instrument begin self-checking. If everything was ready, splice mode would be entered, the display on the screen is as figure 4.

5.1.1 Main Menu

Enter The Main Menu

In the **SPLICE** mode, press the key **MENU** and the instrument will enter the menu mode. The screen displays the main menu as Figure 7.

Functions in the Main Menu

The symbol is a highlight rectangle which can be moved up or down by or key. Functions in the main menu are as follows:

"**Fiber Type**": To select fiber type.

"**Para. Group**": Select the discharge condition group, adjust the discharge parameters.

"**Heat Time**": Adjust heating time.

"**Splice mode**": Auto, semiauto, manual.

"**Setup**": Include CMOS setting, language selection, time setup, tension test setting, and power save, restore factory settings.

"**Test**": Arc Power, Overlap Test, Bright Setup, Motor Adjust.

"**Maintenance**": Display the splice results or number of discharges in the memory and clear the pole.

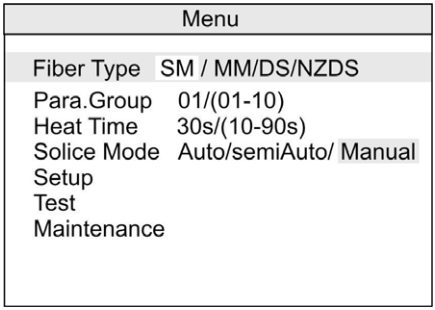


Figure 7.-

Return

In the main menu, if the **MENU** key was pressed, the **Splice** mode would be returned to fusion mode.

5.1.2 Selección del tipo de fibra

After the main menu was entered, the "**Fiber Type"** option could be get by **ARC/+** ARC/+ or **X↔Y/-** X↔Y/-. A blue cursor will move between options.

The menu as following:

SM: To save single-mode fiber splicing parameter groups. 10 groups in total: 01~ 10 which can be changed.

MM: To save multi-mode fiber splicing parameter groups. 10 groups in total: 01~ 10 which can be changed.

DS: To save dispersion shift fiber splicing parameter groups. 10 groups in total: 01~ 10 which can be changed.

NZDS: To save nonzero dispersion shift fiber splicing parameter groups. 10 groups in total: 01~ 10 which can be changed.

5.1.3 Fusion Parameters

There are 10 groups or memories with several parameters to edit for each type of fibre.

We give an example on how to select the **SM1** splice parameter group.

a) As the screen in figure 7, move the cursor to ***Fiber type*** option with **UP** ▲ key or **DOWN** ▼ key, and select "**SM**" with **ARC/+** ARC/+ or **X↔Y/-** X↔Y/-.

b) Move the cursor to "**Para. Group**" with **UP** ▲ key or **DOWN** ▼ key, and select "**01**" by press **ARC/+** ARC/+ or **X↔Y/-** X↔Y/-.

c) Press the **MENU** 🗐 key to finish the operation.

5.1.4 Adjustment of Splice Parameters

Entering modification menu

If the parameters in **SM1** group need to be adjusted, please select the "**Fiber Type**" option or "**Para. Group**", and press **ENTER** ↵ to enter menu of adjustment of splice parameters.

Specification of Splice Parameters

All items in the parameters group as table 4.

Parameter Modification:

a) Use the **UP** ▲ or **DOWN** ▼ key to move the cursor to the item that needs to be adjusted, and then it means this parameter could be modified.

b) Then adjust the parameter to the ideal value with **ARC/+** ARC/+ or **X↔Y/-** X↔Y/-.

c) The other parameters can be modified in the same way.

Item	Range	Unit	Default Value
Prefuse Time	00~99	10 ms	05
Fuse Time	00~99	100 ms	14
Prefuse Power	00~99	0.1 mA	30
Fuse Power	00~99	0.1 mA	30
Overlap	00~40	2 µm	07
End Angle	0.5~2.0	1.0 °	2.0
GAP	00~09	2µm	04

Table 4.-

5.2 Adjustment of Splice Power

This part gives instructions on how to achieve low splice loss in different environment conditions.

a) The recommended parameter group is decided according to the fiber gap of **Arc Test**. The gap length: 015~025.

b) Parameter modification in different circumstances.

Modify the pre-fusion current and the fusion current in the discharge parameter group, and make the value of ***Arc Test*** meet the requirements in step b, thus gaining a low loss. The parameters will reduce at a high temperature and increase at a low temperature.

5.3 Fiber Operation

Step 1: Before splicing, thread the fiber through the optical fiber protection sleeve.

Step 2: Remove fiber coating, and then brush the bare fiber with alcohol-soaked cotton swab. The typical bare fiber length is 20 mm. The concentration of the alcohol should heavier than 90 %.

Step 3: Cut the bare fiber using the cleaver. The typical value of the cleaver length is 10 mm~16 mm.

Step 4: Open the shield and fiber holder clamp carefully. Set the fiber in the V-groove and the fiber holder on the holder mount. At the same time, note that the tip of the bare fiber does not touch anything. Make sure fiber is at the bottom of the V-groove. If not, reset the fiber.

Step 5: Set the other fiber in the same way. Put the shield down carefully.

NOTE:

a) Open the fibre holder separately. Load the cleaved fibre into the V-groove. The end surface couldn't touch the bottom of V-groove. Consult figure 8 (a)~(b).

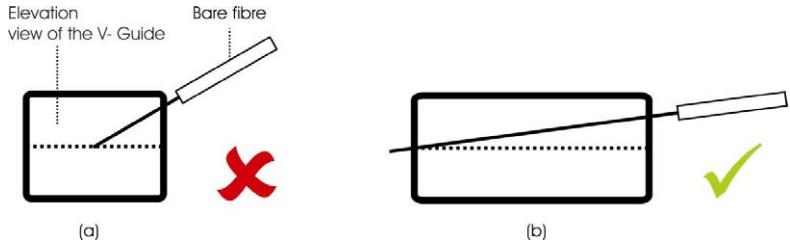


Figure 8.- Wrong way to install.

b) The tip of the coating fiber should keep a distance from the bare fiber mount.

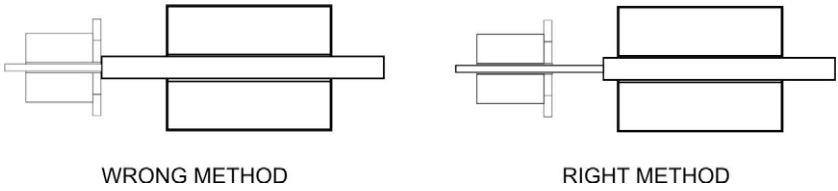


Figure 9.-

c) To be sure the coating fiber was pressed tightly by the hold clamp. The shield was closed, the fiber should be pressed on the V-groove by the shield.

5.4 Arc Test

Arc Test is very important for obtaining low splice loss. So before splicing, the test should be done. See the details in the appendix A.

5.5 Fusion splicing Operation

There are three splicing modes for selection: **Manual**, **Semi-auto** and **Auto** splicing mode.

5.5.1 Manual mode

1.- Strip, clean and cleave the optical fibers.

2.- Open the shield.

3.- Lift the fiber clamps.

4.- Place the optical fibers in the V-grooves.

5.- Carefully close the V-groove clamps. Ensure the bare fibers are seated at the position between the V-groove and the electrodes.

6.- Carefully close the fiber clamps and then the shield.

7.- Decide if the end face of fibers is good or bad.

8.- Press the **UP** ▲ key. The fibers move forward to their initial gap. Do gap adjustment. If either of the two end face angles is more than the preset value, an error occurs. Press the **RESET** RESET key and prepare the fiber again.

9.- Press **DOWN** ▼ key and "**ALIGNIN**" will be displayed on the screen and the splicer will align the fibers automatically. The buzzer will beep and the screen will display "**OK**" after the operation is done.

10.- Press **ARC/+** ARC/+ key to end this splicing operation. The result of estimated loss is displayed on the screen.

5.5.2 Semi-auto Mode

The difference between semi-auto and manual splicing mode is whether the splicer automatically puts the two fibers end profiles to the screen center or not. We advise the user to take the **Auto** and **Semi-Auto** splicing mode except for special-type fiber.

5.5.3 Auto splicing mode

"**READY**" is displayed on the screen.

1.- Do the same steps as in section 5.6.1: (1), (2), (3), (4), (5), (6), (7).

2.- Close the shield and the splicer will exercise Clean, Gap, Align, Fusion and Tension Test functions automatically. The result will be displayed on the screen as Figure 10 and Figure 11.

Figure 10.-

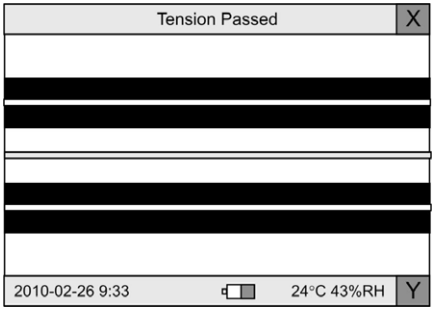


Figure 11.-

Notes:

1. **Auto** splicing mode is convenient, so we advise the user to take the auto splicing mode.

2. The splicer has the checking function of fiber cutting angle and fiber end face, when it works in **Semi-auto** or **Auto** splicing mode. The quality of fiber end and face has enormous impact on the loss of the contacting point; so efforts should be mad as possible to make the end face plane, and the angle of the place with the fiber cross-sectional plane should be less than 1°.

5.6 Estimated Splice Loss

Splice loss could be estimated by observing the splicing operation and the video of the spliced part. If spliced part is abnormal (the diameter is bigger or smaller or etc.), the fiber should be re-spliced.

NOTE: When splicing different fibers or multi fiber, a black line sometimes appears on the spliced part. But it does not affect the splice result.

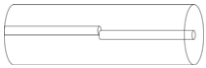
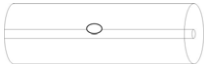
PHENOMENON	REASON	RESOLVE METHOD
Fiber Not Aligned 	Dust in the V-groove.	Clean V-groove.
Fiber Diameter Too Small 	Discharge power is inappropriate.	Do Arc Power test and adjust the current.
	Splice parameter is inappropriate.	Increase discharge time or stuff length.
Black Line 	Splice parameter is inappropriate.	Adjust the current and the discharge time.
Gas 	The fiber end is unqualified.	Check cleaver.
	The current too small or discharge time too short.	Adjust the current and the discharge time.
Fiber Asunder 	The stuff length is too small.	Do an overlap test.
	The current is too strong.	Reduce the current value and the discharge time.
Fiber Diameter too big 	The stuff length is too big.	Do a overlap test.
	The current is too strong or the discharge time too long.	Adjust the current value and the discharge time.

Table 5.-

5.7 Heater Operation

1.- Open the heater cover and the left and right fiber clamps of heater.

2.- Move the protection sleeve to cover the bare fibre and part of the cladding.

3.- Hold the fiber, tighten it lightly and then set the splice point in the center of the heater.

(Do not let the fiber sag)

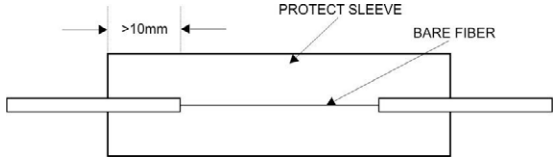


Figure 12.-

4.- Close the lid. The heater will be automatically **ON** and the **HEAT** HEAT button in red.

The user can stop the process at any moment by pressing on the **HEAT** HEAT button.

5.- Once the process is finished, take out the fibre without touching the protector lid and put it on the refrigerated tray.

Figure 13.-

6 SETUP

The "**Setup**" menu allows you to configure several general parameters of the fusion splicer such as the COMS sensor, language, date and time, activate or not the tension test after splicing and the power save. It also allows to restore the factory settings. Select "**Setup**" item in main menu and press the key to confirm. The screen displays as shown in Figure 14.

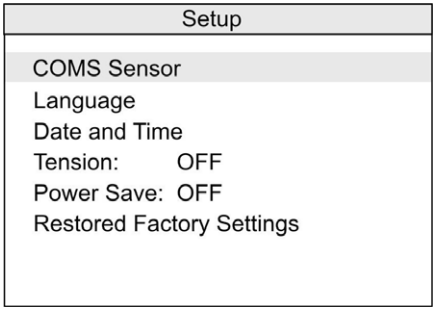


Figure 14.-

6.1 CMOS sensor

This option allows the user to adjust the sensitivity or the gain of the view system.

Press **ENTER** ↵ to start process. With button **ARC/+** ARC/+ and **X↔Y/-** X↔Y/- the user can change the gain value that appears at the top of the screen. Press **MENU** to exit.

6.2 Language

Use the **UP** ▲ or **DOWN** ▼ key to move the cursor to "**Language**", and press the key to **ENTER** ↵. Use the **UP** ▲ or **DOWN** ▼ key to move the cursor to the item which you want, and press the **MENU** key to return to the former.

6.3 Date and Time

Use the or key to move the cursor to "**Time Setting**", and press the key to enter, the screen displays as shown in Figure 16.

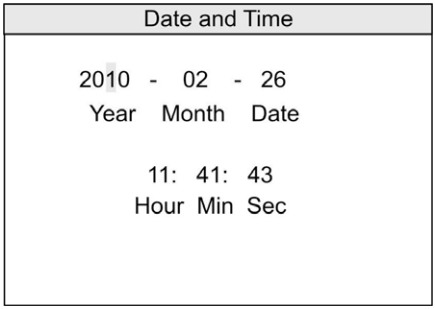


Figure 15.-

Set time in the following steps:

1. Use the **UP** ▲ or **DOWN** ▼ key to move the cursor to the item which you want to change.
2. Use the **X↔Y/-** X↔Y/- or **ARC/+** ARC/+ key to modify the number.
3. After the date and time are calibrated, new time will be remembered. Press the **MENU** key to return. or press the **RESET** RESET key to return to the "**READY**" status.

6.4 Tension

If the function of "**Tension**" is set to "**ON**", a proof-test (about 2N) of the Splice point is performed automatically upon completion of fusion splicing. Set the function of "**Tension**" in the following steps:

1. Use the **UP** ▲ or **DOWN** ▼ key to move the cursor to "**Tension**".
2. Use the **X↔Y/-** X↔Y/- or **ARC/+** ARC/+ key to switch between different mode.

6.5 Power Save

The splicer will be shut down certain duration of time (about 5 minutes) to save unnecessary loss of battery capacity, when it is set to power saving mode. Use the **UP** ▲ or **DOWN** ▼ key to move the cursor to "**Power Save**", and then use the **X↔Y/-** X↔Y/- or **ARC/+** ARC/+ key to switch between different mode.

6.6 Restore Factory Settings

When the instrument is produced, there are some parameters(such as Fiber Type, Para. Group, Heat Time and Fusion Mode) installed.

Restoring factory settings is set by pressing the **ENTER** ↵ key twice, when the cursor is moved to "**Restore Factory Settings**". When the instrument is restored factory settings, the parameters of Fiber Type is SM, Para. Group is 01, the Heat Time is 50 s, the Fusion Mode is Manual, the Tension is set to "**OFF**", the Power Saving is **ON**. The table 8 below shows other default parameters.

Fiber Type Value Parameter	SM	MM	DS	NZDS
Prefuse Time	08	22	08	08
Fuse Time	14	18	14	14
Prefuse Power	30	30	30	30
Fuse Power	30	30	30	30
Overlap	07	08	09	10
End Angle	2.0	2.0	2.0	2.0
Gap	04	04	04	04

Table 6.-

7 TEST AND ADJUSTMENT

The **TEST** menu allows the user to make calibration and electric arc test, the overlapping test and the motor adjusting.

Select "**Test**" item in main menu and press the **ENTER** key to display the test menu on the screen.

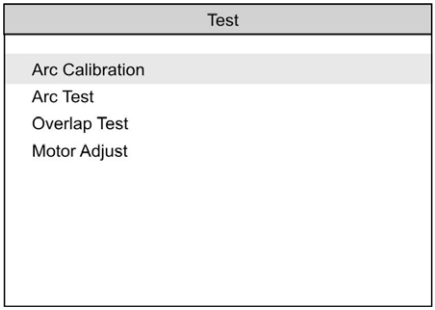


Figure 16.-

7.1 Arc Calibration

It makes an arc calibration test and an automatic adjustment of parameters to achieve a suitable value.

7.2 Arc Test

Test the position relationship between the electrodes and fiber to decide if the fiber ends are at the center of the arc. And test whether the arc power is suitable for fiber splicing or not.

Select "**Arc Test**" item in the menu and press the **ENTER** key to confirm.

Now the screen displays as Figure 18.

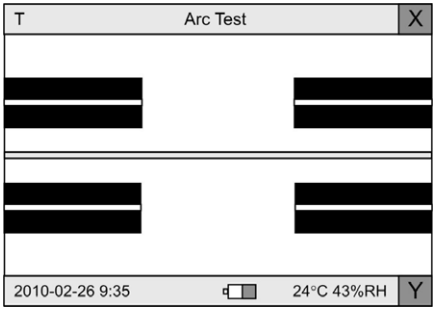


Figure 17.-

Then start the **Arc Test** by pressing the **ENTER** key. The process is as follows:

a. The splicer puts the two fibers end profiles to the screen center automatically and accomplishes gap setting and aligning.

b. An electrical arc is produced by electrodes. Two fiber end profiles are fused into ball shape.

c. The location of electrodes can be calculated according to the change of fiber's shape, and displays the following information.

If the electrode's position is on the left, the screen displays "**Gap XXX To R XXX**".

If the electrode's position is to the right, the screen displays "**Gap XXX To L XXX**".

If the electrode's deviation is within 10, no adjustment is needed. The electrodes location adjustment requires high skill. It should be done by a technician. If the value of "**GAP**" is between 15 and 25, the arc power is suitable for fiber splicing. If the value of "**GAP**" is less than this range, please increase "**Prefuse Power**" and "**Fuse Power**", contrarily, decrease "**Prefuse Power**" and "**Fuse Power**". Press the key to return to the former operation after the test is done. Before the **Arc Power test**, the electrodes should be cleaned. The test is effective only after the arc becomes stable.

7.3 Overlap Test

Test the stuff length of the fiber during fusion splicing.

Choose the "**Overlap Test**" item in test menu and press **ENTER** key to confirm. Now the screen displays as Figure 19.

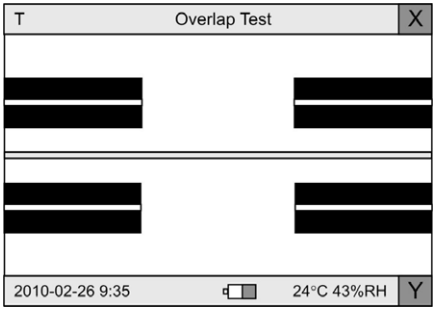


Figure 18.-

a. Send the two end profiles of fibers to the center of the screen automatically, and accomplish gap setting.

b. The left fiber exits from the screen, but the right fiber goes forward by "**Stuff**" value.

c. The amount of stuff is calculated and displayed. The stuff length of the fiber is set by the customer according to the arc power, fiber type and material. When it needs to be changed, follow the adjustment method of discharge parameters. Press the key to return after the test is done.

7.4 Adjustment of Motor

Adjust the original location of motor with the bare fiber clamped on the stage.

Fiber Fusion Splicer has a function to check the initial positions of the left and right motor automatically. If the location is wrong during self-test, the splicer will switch to motor adjustment mode automatically. Only after the location of motor is adjusted can the splicer do fusion splicing.

Otherwise, when the position of coated fiber clamp is found straying from the center obviously, i.e. it is shorter or longer when the fiber stripping length should be 16 mm. We can enter into the motor adjustment through the menu to adjust the original location of the left and right motor. The operation processes under these two conditions are as follows:

Use the Menu to Adjust

a. Locate the 16 mm stripping length fiber properly and close the shield.

b. Enter the test sub-menu, choose the "**Motor Adjust**" item and press the **ENTER** key. The splicer will enter motor adjustment status. The screen displays as shown in Fig 20.

c. Use the **ENTER**, **UP** and **DOWN** key to adjust motor's location until the fiber is displayed on the screen.

d. Press **ENTER** key so that the buzzer beeps to indicate the new location of the motor is accepted automatically by the splicer. This way the adjustment is done.

e. Press **MENU** key to return.

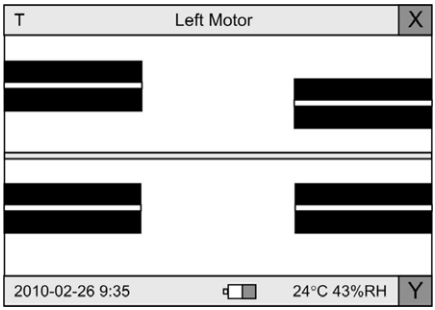


Figure 19.-

Note:

If the left and right motors are close to the V-grooves, the two 16 mm stripping-lengths fibers may collide or one of them occupies the whole screen. In this case, the fibers could be located after the splicer enters the motor-adjustment status. The motors can be adjusted one after another.

If the grounding condition is good and the **RESET** key is pressed before the instrument is turned off, the position of motors will need no adjustment for quite a long time.

8 HEAT TIME ADJUSTMENT

The oven heater time of the splicer can be adjusted between 10 s and 90 s in 10 s steps.

The set time is the time the oven is on during the heat-shrinkable process of the protection sleeve tube.

The oven is on automatically every time you open and close.

To power on or off manually, the user should press on **HEAT** HEAT button. When the oven is on, the button is lighted in red colour.

WARNING: The oven can reach high temperatures. Do not touch the area to avoid burns. Do not insert anything other than a fibre covered by a suitable protective.

Select the "**Heat Time**" in the main menu. Use the **X↔Y/-** X↔Y/- button / - or **ARC/+** ARC/+ to select the heating time. Press the **MENU** key to exit. The selected time will not be lost even if the user turn off the fusion splicer.

9 MAINTENANCE

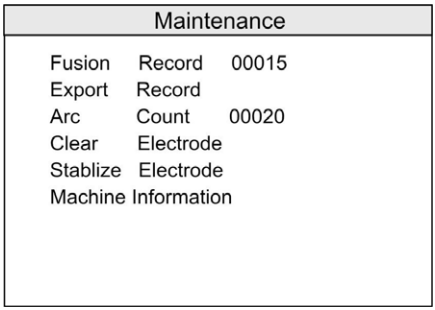


Figure 20.-

9.1 Fusion Record

The splicer memory can store up to 5000 groups of fusion splice results and discharge times. The failed and bad fusion splice results are abandoned automatically. When the 5000 groups are full, the new data will cover the old ones in turn. The displayed sequence number is convenient for customers to inquire after any information.

Select the "**Fusion Record** " item in the sub-menu and press the ↵ key to confirm. The splicer displays as Figure 21.-.

You can change the sequence number in turn by pressing the **UP** ▲ or **DOWN** ▼ to check all the data. Press the **MENU** 🗐 key to return to the former menu.

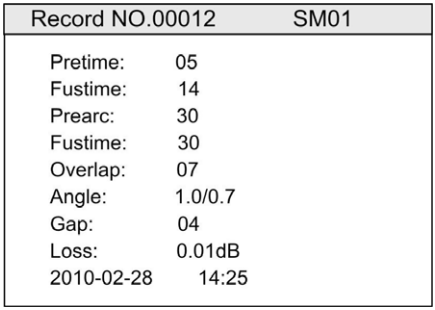


Figure 21.-

9.2 Export Record

Select the "**Export Record**" item in the sub-menu and press the **ENTER** key to confirm, the "**Please Insert USB**" message is displayed on the screen. Press the **ENTER** key to confirm again, the data will be exported to U disk. When the data is exported, the "**Please pull out USB**" message is displayed on the screen. **Pull out USB**, and press the **MENU** key to return to the former menu, or press the **RESET** key to return to the "**READY**" status.

Notes: The format of USB must be FAT!

9.3 Arc Count

The counter can count up to 999999. Every fusion will be taken into account, no matter the fusion splice is successful or not.

9.4 Clear and Stabilize Electrodes

Electrodes wear with use and also must be cleaned periodically due to silica oxide build-up. It is recommended that the electrodes should be replace 2500 arc discharges. When the electrodes are replaced, it is necessary to stabilize it. Use the **UP** or **DOWN** key to move the cursor to "**Clear Electrodes**", and press the key **ENTER** to confirm, the Electrodes will be cleaned later. In the same way, Use the **UP** or **DOWN** key to move the cursor to "**Stabilize Electrodes**", and press the **ENTER** key to confirm, the electrodes will be stabilized.

10 FUSION SPLICER MAINTENANCE

10.1 Cleaning

Keep clean the V-groove, electrodes and view system. Close the lid when not using the fusion splicer.

10.1.1 Cleaning V-groove

If there is dust on the V-groove, the bare fiber alignment operation may produce a big splice loss. Clean the V-groove in the following steps.

1.- Open the shield.

2.- Cleave a bare fiber and push the tip of this fiber from the V-groove's one end to the other end.

3.- If the above method cannot clean the V-groove, you can use an alcohol-soaked cotton swab to brush the groove to get rid of the dust.

10.1.2 Cleaning Electrodes

1.- If the electrodes are polluted because of long-term use, wipe the tip of electrodes lightly with a cotton stick dipped in acetone or a 3 mm wide and 50 mm long grinding paper. Pay attention to protecting the electrodes' tip and its position during cleaning. Finally stabilize electrodes, see Clear and Stabilize Electrodes (Section D.4) for detail.

2.- Change the electrodes for new ones if necessary. See Chap. 10.2 "**Change of electrodes**".

10.1.3 Cleaning the Objective Lens

The surface of the objective lens must be kept clean. Dust on lens can cause trouble in the image process and a big splice loss.

1.- Turn off the power.

2.- Use a cotton swap soaked with pure alcohol to clean the lens's surface from center toward rim.

3.- Turn on power. Make sure dust cannot be seen on the LCD screen.

10.2 Exchange of electrodes

1. Turn power off and unplug power cord.
2. Open the shield. The Figure 22 shows the structure of the electrodes.
3. Removed electrode by loosing screw of the electrode holder. Insert new pair of electrodes and tighten screw alternately while pushing insulated part of the electrode.
4. Plug in the power cord, turn on the power switch, and then stabilize electrodes.

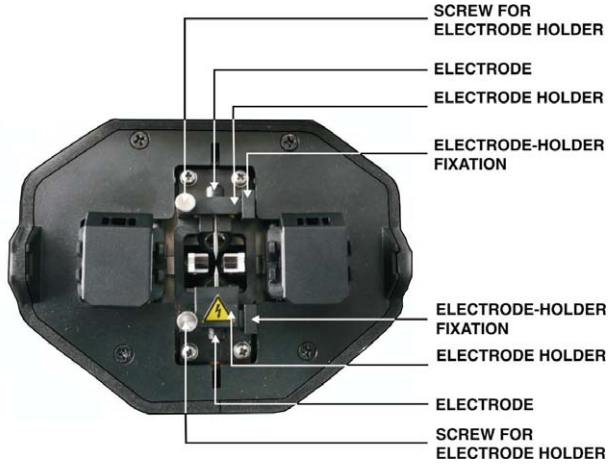


Figure 22.-

10.3 Transportation and Storage

1.- Always use the carrying case of the fusion splicer to prevent moisture, vibration and impact when storing and transporting the splicer.

2.- Never store the splicer in a place where the humidity or temperature cannot meet requirements.

10.4 Alarm indication and abnormal remedy

Message	Reason and Remedy
OVER RUN	There is dust on the V-groove... A fiber is detached from its V-groove. A fiber is dirty.
NO FIBER	The bare fiber is too short... Incorrect position.
L/R MOTOR OVER	A motor exceeding the limit position, causing auto reset.
FAILURE	Arc power is too strong or Arc is unstable. The gap is too big. Stuff length too small or no stuff at all.
BAD	Splice parameters are inappropriate or arc power is unstable. Dust on fiber end profiles. The angle of fiber end profile is too big.
UNSTABLE ARC	The interval between two fusion is too short . Electrodes need cleaning.
NO ARC	Electrodes are dirty. Worn-out electrodes. Clean or replace electrodes.
L/R -END BAD	Left or right fiber end profile is too bad; cleave fiber again.

Table 7.-

ANNEX A: TIPS FOR A PROPER FUSION.

1. On a well-lit table prepare all components and tools that you are going to use.

- Scissors and fiber stripper.
- Cutter.
- Fiber Cleaning Wipes.
- Fiber disposal container to place fiber stubs.
- Fusion protection sleeves.
- Headlamp.

2. If the fiber is in the form of cable, first strip the outer jacket and the Kevlar jacket with the scissors until you have a wire of 0.9 mm.

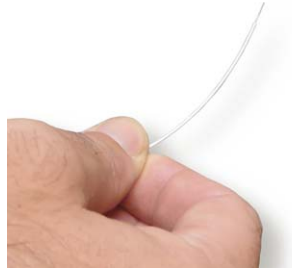


Figure 23.-

3. Cross an end of the Optical fiber (OF) through and inside a splice protector and keep it away from the end. (> 1m).

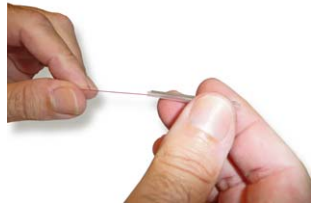


Figure 24.-

4. First use the stripper to remove the 9 mm plastic coating, leaving the fiber only with a cladding of 250 μm. Prepare the stripper again in order to remove the plastic layer of 250 μm and then leave the optical fiber "naked" (125 μm in diameter and about 4 cm in length). To avoid damaging this glass fiber is better to make a first pass loosely with your stripper. After that make a second pass tighter to remove plastic remains.

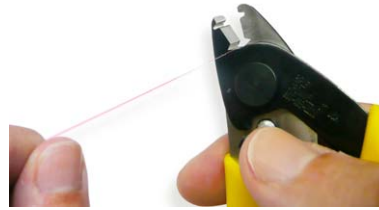


Figure 25.-

5. Take a wipe forming a "**V**" with your fingers and pass the naked part of the fiber through the middle of the folded wipe. Close the "V" to remove properly the waste that may remain after stripping the fiber. Perform this operation at least five times. Keep in mind that only the last few millimetres of fiber optics will be involved during the splice process.

Figure 26.-

6. Place the bare fiber in the fiber cutter. Place the cross section, with the coverage at 17 mm from the blade. The fiber has to be as perpendicular as possible to the blade. If the fiber has tensions that make it bend then you should move the blade forward. Try to rotate the fiber to adopt a perpendicular position and then move down the fixing lever to its top without sudden shocks. Then move the blade back and the piece that secures the "naked" optical fiber down.

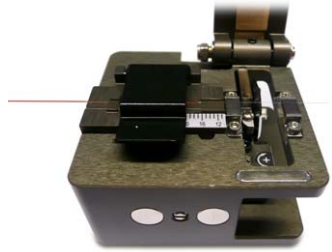


Figure 27.-

7. Place the end of the fiber, which should already be peeled and cut, into the splicer. Turn on the splicer using the lateral switch, lift the centre lid and the left side cover to fix the Optical fiber. The end of the fiber must be just in the line that connects both terminals. By lowering the cap of the splicer you can check the cut and cleanliness of the fiber. If you see cuts at angles, gaps or dirt is better to repeat the whole process again, from peeling.

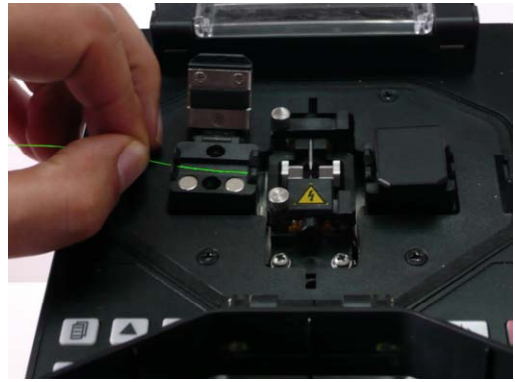


Figure 28.-

8. Repeat this procedure for the other end of the Optical fiber that you want to splice. Finally, both ends of the Optical fiber should be near the centre line that connects both terminals. Moving down the lid of the splicer, you could see the level of cleanliness and the cut made on the optical fiber.

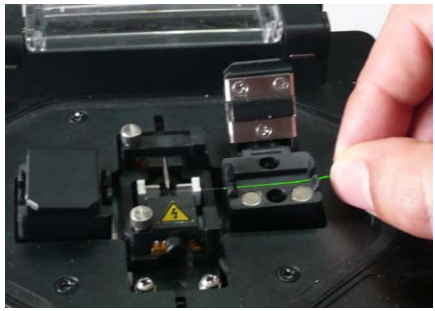


Figure 29.-

Figure 30.-

9. If both cuts are correct and the fiber is not dirty you can start to splice by pressing RUN. The first stage is a small discharge to clean the optical fiber. After that, an electric arc melts both ends and splices them.

Figure 31.-

10. If the splice is successful you will not observe any discontinuity on the Optical fiber when monitoring on the display. Then lift the lid and the two levers that hold the fiber on each side of the made splice.

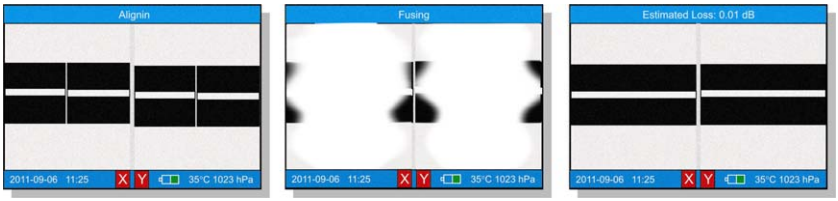


Figure 32.-

11. Lift the fiber up by holding it horizontally on each side about 10 cm from the central point where the Optical fiber has been spliced and place the protective tube centred on the area where the splice was made.

Figure 33.-

12. Place this part of the fiber inside the oven and press HEAT. After 30 s the indicator **HEAT** turns off and then you should proceed to cool the splice by placing it on the cooling rack located behind the oven.

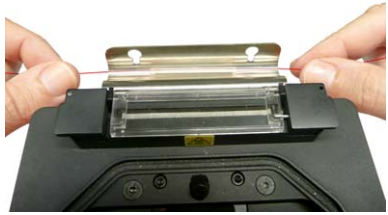


Figure 34 .-

ANNEX B: THE PARAMETERS OF MMF ADJUST

Enter the parameter adjust menu, select multi-mode fiber parameter. The screen displays as shown in Table. The parameters in the Table can be as the reference.

Parameters	Values
Prefuse Time	25
Fuse Time	18
Prefuse Power	22
Fuse Power	22
Overlap	07
End Angle	2.0
Gap	06

1.- When splicing multi-mode fiber, gas sometimes appears on the spliced part. Increase the "Prefuse Time" and reduce "Prefuse Power", "Fuse Power".

2.- If the line on the spliced part break off, increase the "Fuse Time", "Prefuse Power", "Fuse Power".

3.- If the spliced part fiber diameter too small, reduce "Prefuse Power", "Fuse Power".

4.- The "Fuse Power" and "Prefuse Power" must keep the same.

NOTE: When splicing multi fiber, a white or black line sometimes appears on the spliced part. But it does not affect the splice result.