



USER MANUAL

MULTI-FUNCTION
FUSION SPLICER 5.0
AR-FUSPLICE-5.0



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1. Notice before using

1.1 Safety instruction

Please read the following information before first using.

1. Using the specified battery and adaptor, otherwise it may cause an explosion or permanent damage to the machine.
2. Don't use the machine in high temperature, flammable or explosive environment (such as a gas station nearby).
3. Don't attempt to disassemble the machine or its accessories, only authorized agencies can repair it.
4. Please don't touch electrodes during working time, or it may cause personal injury.
5. When liquid or foreign body into the machine, or smoke, odor, noise, etc., or a strong impact, please immediately shut down the machine, and pull out the AC power.

1.2. Note

When using the machine, improper operation may cause damage for the machine or even danger to human health. It is suggested to operate in the following way.

1. This model the machine only applies to quartz glass fiber splicing, not to any other things.
2. Don't use or store the machine in a high temperature or humidity environment (otherwise it may damage the equipment or reduce the performance of the machine).
3. While using the machine in dust environment, try to avoid a dust as far as possible.
4. When moving the machine from low temperature to high temperature, there should be any heating process to eliminate condensation.
5. Please use high-purity anhydrous alcohol (purity>99%) to clean magnifying lens, reflector and fiber v-groove surface.
6. The splicing the machine must be handled gently to avoid strong vibration or impact, and with a carrying case for transportation or storage.
7. Maintain the whole the machine once a year.

1.3. Legal statement

Without the written consent of our company, any unit or individual will not be allowed to extract or copy part of the contents of this manual, or transmitted in any form. Products described in this manual, including our company software, unless approved by the related oblige, otherwise no one can be in any form for the software to copy, distribute, modify, excerpts, decompiling, disassembling, decryption, reverse engineering, lease, transfer, sublicense and other ACTS of infringing the software copyright.

Attention: The manual describes some features and functions of the product and its accessories, related to the production batch, therefore, the description in this manual may not exactly match the product you purchased, as well as its accessories.

Our Company reserves the right to modify any information in this manual at any time, without any prior notice and does not undertake any responsibility.

Limitation of liability: Within the scope of applicable law, our company, in any case, don't compensate for any special, incidental, indirect, secondary damage due to using this manual or the product, and also don't compensate for any loss of profits, data, goodwill or anticipated savings. Within the scope of applicable law, in any case, our company will undertake the greatest responsibility for the losses suffered the use of the product described in this manual in the limit of the price you paid for the product. (Except in cases involving personal injury according to applicable law for damages).

2. Start to comprehend splicer

2.1. Overview of splice



FIGURE 2.1

2.2. Keyboard

2.2.1. Keyboard appearance

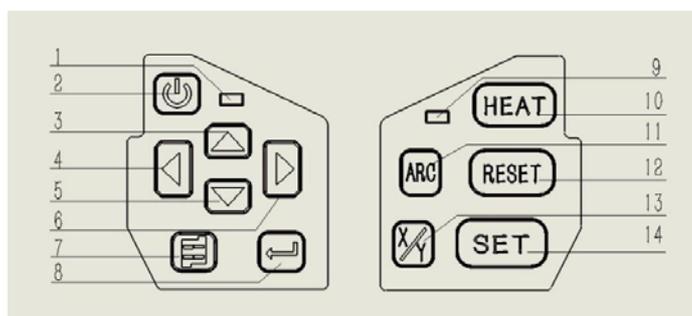


FIGURE 2.2

Table 2.1

1 Power Light	2 Power	3 Up
4 Left	5 DownExpansion anchor bolt	6 Right
7 Menu / Exit	8 Enter	9 Heating light
10 Heat	11 Arc	12 Reset
13 Image switch	4 Auto splice	

2.2.2. Keyboard functions

Table 2.2

	<ul style="list-style-type: none"> • While Power On, press this key to shut down. • While Power OFF, press this key to Power On.
	<ul style="list-style-type: none"> • Under the standby interface, press this key to discharge a weak arc. • In the menu, press this key to enter the next submenu. • If permitted, press this key to run. • If permitted, press this key to switch between the left and right sides of CMOS Sensor, Motors and so on.
	<p>Under the standby interface, press this key to enter the main menu.</p> <p>Under the main menu interface, press this key to return the upper menu.</p>
	<ul style="list-style-type: none"> • Under the standby interface, press this key to increase the LCD backlight. • In the CMOS sensor step, press this key to increase the CMOS sensor backlight. • In motor adjustment, press this key to drive up the fiber. • If permitted, press this key to move up the cursor.



- Under the standby interface, press this key to gap the fiber.



- Under the main menu, press this key to select the left icon.
- In motor adjustment, press this key to drive the corresponding motor to move to left.



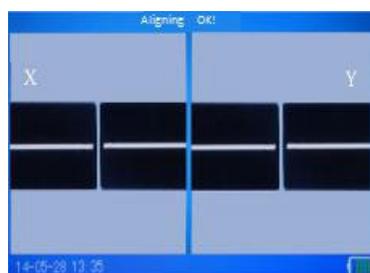
- Under standby interface, press this key to enter main menu.
- Under the main menu interface, press this key to return the upper menu.



- Under the standby interface, press this key to decrease the LCD backlight.
- In the setup of CMOS sensor, press this key to decrease the CMOS sensor backlight.
- In function of a motor test, press this key to move down the corresponding motor.
- If permitted, press this key to move down the cursor.



- Under the standby interface, press this key to align the fiber.



- Under the main menu, press this key to select the right icon.
- In motor adjustment, press this key to drive the corresponding motor to move to the right.

	<ul style="list-style-type: none"> • Under the standby interface, press this key to align the fiber.
	
	<ul style="list-style-type: none"> • Under the main menu, press this key to select the right icon. • In motor adjustment, press this key to drive the corresponding motor to move to the right.
	<ul style="list-style-type: none"> • Under the standby interface, press this key to fuse.
	<ul style="list-style-type: none"> • In the Power On state, press this key to reset the motor position.
	<ul style="list-style-type: none"> • Under the standby interface, press this key to switch the video mode.
	<ul style="list-style-type: none"> • Under the standby interface, press this key to run auto splice.

2.3. Technical parameters

Applicable fiber	SM, MM, DS, NZDS, others
Cladding diameter	80 -150um
Coating diameter	100 - 1000um
Typical loss	SM:<=0.02dB; MM:<=0.01 dB; DS:<=0.04dB; NZDS:<= 0.04dB
Return loss	> 60dB
Cutting length	10-16mm(Coating layer Diameter: <250μm) 16mm(Coating layer Diameter: 250~1000μm)
Program	40 groups
Operation mode	Auto mode and Manual mode
Auto to heat	Supported
Splice time	6 seconds
Heating time	18 seconds (heat-shrinking tube width is 40mm or 60mm)
Magnification	125 times/double show, 250 times/single show
Observation mode	High sensitivity CMOS sensor, Color LCD of 5.0 inch
Fusion Records	Support to store 4000 groups of Fusion Records
Estimate loss	Supported
Tension	Supported, 1.8~2.2N
Operation Interface	GUI
Battery capacity	5200mAh;Typical 250 times fusion; Show remaining real-time
Power supply	Adapter : AC100-240V(50/60HZ); Output : DC11~13.5V
Electrodes times	4000 times Interface
Interface	12V DC power input,USB2.0
Operation Environment	Altitude: 0-5000m; Humidity: 0-95%; Temp: -10°C - +50°C; Air speed: <=15m/s
Volume/weight	156mm (L) × 141mm (W) × 156mm (H) /2.45kg (Battery Included)

3. A complete splice

A full fiber splice procedure including: the fiber end face preparation, fiber splicing, tension test, heating and cooling of shrink tube. This chapter will introduce details of the specific process of the fiber splice.

3.1. Power on



FIGURE 3.1

Press and hold the power button until the power indicator light, then, LCD also enters the self-test screen.

3.2. Preparation of fiber end face

Prepare two optical fibers, as shown in Figure 3.2, in which an optical fiber is set into the heat shrink tube.

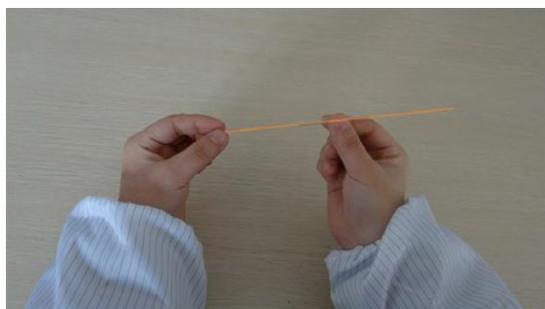


FIGURE 3.2

As shown in Figure 3.3, clenched fiber cleaver, place the fiber into the tooth of the clamp by the left hand, reserve bare fiber 30 to 40 mm stripped fiber coating. Use a cotton ball dipped in anhydrous alcohol (purity>99%) wipe optical fiber coating layer that residual debris, Figure 3.4 shows.



FIGURE 3.3

Put the cleaned fiber into the cutter positioned groove, the edge alignment of the fiber coating cutter ruler "13" scale outside (the scale is greater than 13, shown in Figure 3.4). Close small platen, requiring that the bare fiber straight on the left and right rubber on the chopping block. Together with close the large plate, and push the cutter blade slider to the other end to cut off the fiber.

After Cutting, open the large platen to take away cutting broken fiber into the waste fiber storage box. (Broken fiber has a great harm to human health, so, please be sure to collect and chop broken fiber). Open the small platen, and carefully take out the cut end face fiber. Don't make the fiber cross section touching any other objects, to order to avoid damage or contamination end face.



FIGURE 3.4

3.3. Fiber clamping

Open the windproof cover and the two side fiber platens, then, put the prepared fiber into V-groove through the locating slot. Make sure that the fiber end face should be located between V-groove edge and two electrodes. As shown in Figure 3.5



FIGURE 3.5

Please operate carefully and don't let the fiber end face touch any other object. Then close the large platen to fix optical fiber, which should be placed horizontally in the V-groove, without upturned phenomenon. If clamping failed, you can lift fiber carefully and repeat the operation above until the fiber clamping is qualified. Similarly, prepare and clamp the other optical fiber.

Then, close the windproof and continue to observe the amplified fiber from the display. If the fiber end face is uneven, tilt or damaged, you need to remove the fiber to cut again.

3.4. Optical fiber fusion

After clamping, the machine is in ready state, as shown below. If in "Automatic" splice mode, auto splice begins as soon as the windproof closed. If in "Manual" splice mode, user must press the "SET" button to run the splice routine.



FIGURE 3.6

First, select fusion parameter group according to the optical fiber type. Press "MENU" to enter the main menu, and then select the "parameters" icon and press the "confirm" key to enter the menu. We need to select fusion parameter group matched with splice fiber type. It is suggested to choose SM8.

Press "SET" to start the splice procedure. The machine drives the motor, which will promote both sides of fibers to the middle of the screen, judging the fiber end face whether meet the requirements. If qualified, turn to the next process, otherwise show a tip of bad end face and stop.

After judgment, alignment motor will adjust fiber Position to make both sides of fibers align in three-dimensional. At last, the electrode discharge arc to fuse fiber. When fusion completed, the machine will give the loss estimates, and have a tension test if needed.

3.5. Heat-shrinkable

Optical fiber fusion point is really fragile and easily broken, so, you need protection by using heat shrinkable. Open the windproof cover, large platen and heater cover. Gently remove fiber, and don't bend fiber greatly to avoid the fusion point broken.

Move heat shrinkable tubing to the fusion point, which must be in the middle. Then, place heat shrinkable tubing in the middle of the heating furnace. The heater begins heating as soon as heating furnace closed. About 34 seconds later, heating shrinking has completed. The figure below is the heat shrink tubing before thermal shrinkage and after thermal shrinkage.

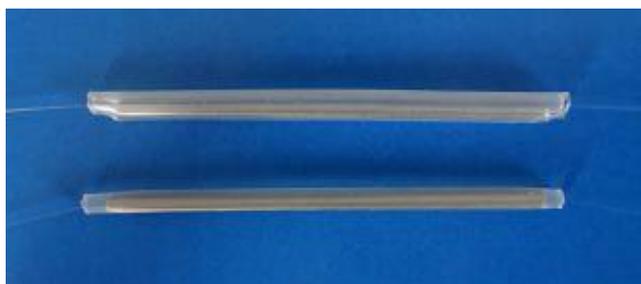


FIGURE 3.7

3.6. Cooling

The heat shrinkable tubing after heating is in high temperature, and need cooling. Hang the cooling tray on the carrying handle. So, after heating, pull out the fiber from the heating furnace to the cooling tray by hands. About 1 minute later, it cools to the ordinary temperature.

4. Menu instruction

The machine adopts METRO-style menu, whose interface is simple, beautiful and convenience for operation. The operation interface has 8 icons, and each icon corresponds to different functional menu.



FIGURE 4.1

For the main menu interface:

In the standby state, press the key  to enter interface of main menu.

In the main menu, press the key  to exit the main menu to the standby interface.

In the main menu, press the direction keys, and the corresponding direction on the next icon is selected.

Press the key  to enter the submenu.

In submenu:

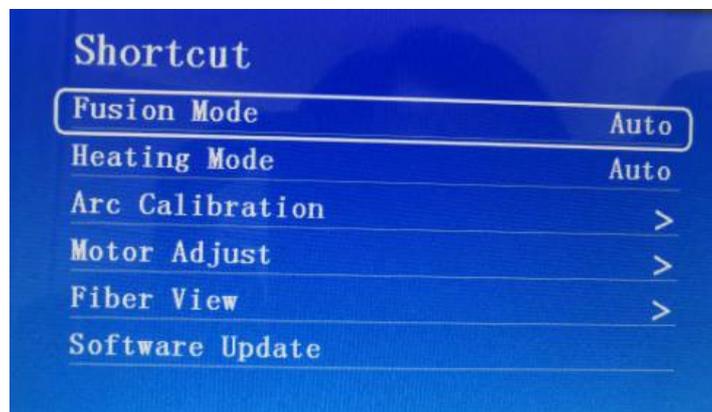
Press the key  or  to select the up down cursor.

Press the key  or  to modify the current data.

Press the key  to enter the next submenu.

Press the key to  enter the upper menu.

4.1. Shortcut



4.1.1. Fusion Mode

Users can press  or  to switch the fusion mode between Auto or Manual.

4.1.2. Heating Mode

Users can press  or  to switch the heating mode between Auto or Manual.

4.1.3. Arc Calibration

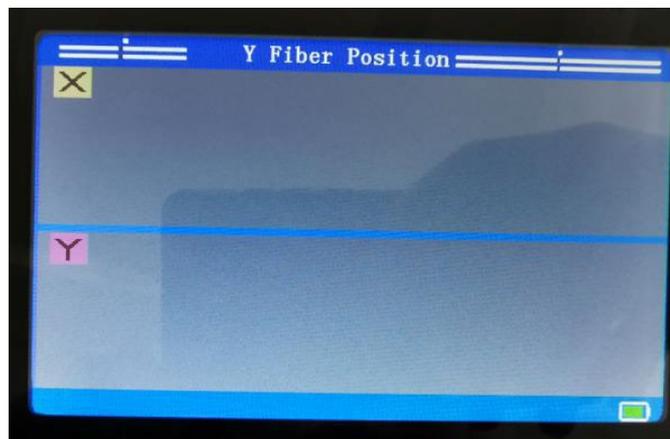
See details in 4.5.1

4.1.4. Motor Adjust

See details in 4.4.1.

4.1.5. Fiber View

Fiber position is used to move the fiber image positions up/down/left/right. Press the key \leftarrow to enter the video interface. Press the key \leftarrow to switch the X and Y fibers. The fibers will drive up/down/left/right by pressing the key \blacktriangle \blacktriangledown \blacktriangleleft \blacktriangleright



4.1.6. Software upgrade

This function is used to upgrade software in the machine. After the U disk with upgrade file inserted into USB port, choose this option and press the key \leftarrow to upgrade.

4.2. Parameter setting menu



"Parameters" menu is used to select and set the fiber splicing parameters. Menu forms by different splicing parameters submenu, as shown in Figure 4.2. Each sub-menu is a group of splicing parameters, and the menu is composed by the part of the number, file name, pattern and state. Number from 0 to 39, a total of 40 groups of parameters can be used. Mode Auto, Calibrate, Normal three kinds, of which the Auto class of parameters derived experimental optimization for the factory and cannot be modified and recommended for new users. The data of the Calibrate parameters can be modified except the pre-discharge and post-discharge time. All the Normal parameters can be modified.



Set Paras	
Prefuse Time:	016ms
Fusion Time:	2.0sec
Arc Data:	060
Fiber Gap:	008um
Overlap:	012um
Endface:	1.6°
State:	○

FIGURE 4.3

The "type" represent which the fiber is fused by the parameter. Abbreviations are explained in the following.

SM: Single mode fiber
MM: Multi mode fiber

DS: Dispersion shifted fiber
NZDS: Non-zero dispersion-shifted fiber

The state ON/OFF says the group is currently used or not. Press the key ▲ or ▼ to change the current splicing parameter group.

Press the key ↵ to enter the para group, as shown above.

The parameter consists of the following parameters:

Prefuse time Prefuse time in total fusion process, a short time about 30ms in SM 16ms in MM, . It is not recommended for the new user to modify.

Fuse time Fuse time in total fusion process, a long time 2.0 seconds in SM, 1.2 seconds in MM. It is not recommended for the new user to modify.

Arc Data Discharge current means that the discharge arc current intensity. The high value of the current corresponds to a greater arc, resulting in a higher temperature. The fiber is ablated more seriously. Press the key ▲ or ▼ to increase or decrease the parameter value.

Fiber Gap The distance of fiber gap before fusing. Press the key ▲ or ▼ to change it.

Overlap The pushing forward distance in fusion process. Press the key ▲ or ▼ to add or sub the value of overlap.

Endface The angle between the fiber end and vertical direction is the end face. In the process of judging the fiber end face, the fiber end face should not more than the Max end face.

State It shows the using state of the current viewing parameter group. You can press the key ▲ or ▼ to change the parameter.

4.3. Setup

The "setup" menu is used to set the data including the Brightness, Auto power off, Tension, Language etc., as shown below.

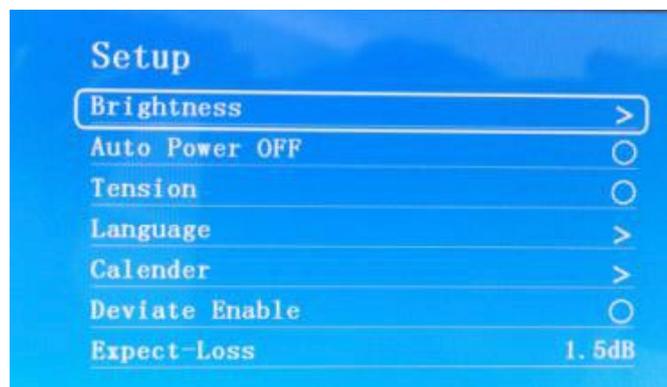


FIGURE 4.4

4.3.1. Brightness

Press the key to enter the interface of camera brightness, as shown below. Press the key ▲ or ▼ to modify the gain of CMOS camera resulting in the change of camera brightness. Press the key ← to switch the CMOS camera sensor between X and Y.

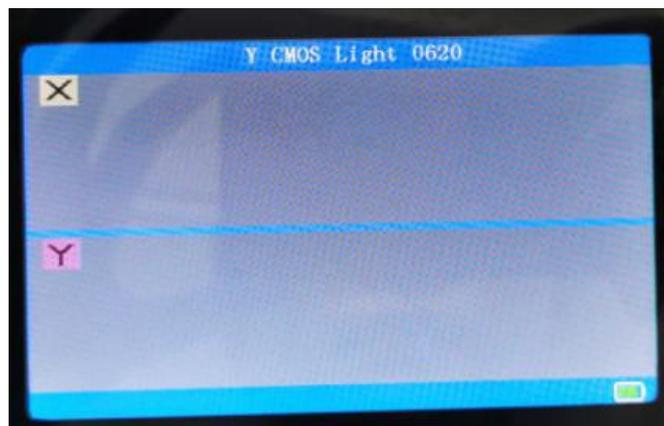


FIGURE 4.5

4.3.2. Auto Power Off

Auto power off is a power saving function. When the machine is no any operation, it will power off automatically after 10 minutes if this function is ON.

4.3.3. Tension

Open the option, splice completed, the machine would impose 2 Newton's pulling on the fiber to test the quality of splicing. If the fiber broken, it means the fusion failed. Press the key \leftarrow to switch the tension state between ON and OFF.

4.3.4. Language

Language shows the display language current software used. If there are more than one languages available, users can change the language via this menu

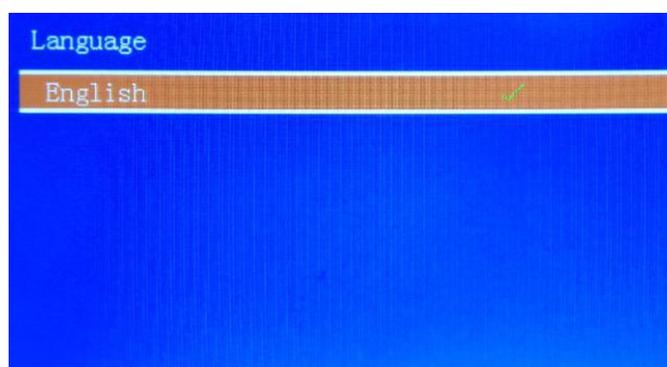


FIGURE 4.6

4.3.5. Calender

Press the key **↵** to enter the interface of Date and Time as shown in figure 4.7. Press the key **◀** or **▶** to move the selection cursor, and then press the key **▲** or **▼** to modify the selection value

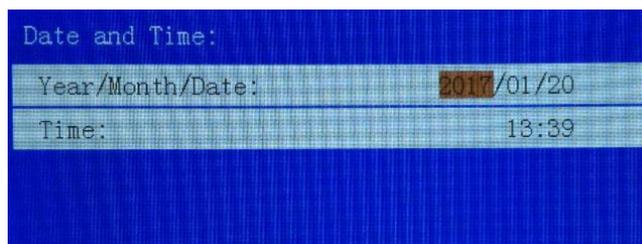


FIGURE 4.7

4.3.6. Deviate Enable

If users need to set the splicing loss at fixed value, users can turn on this function and setup the expected loss they need.

4.4. Maintenance

The function menu consists of motor adjust, push test, fusion records, export records, factory setting, as shown in Figure 4.8.



FIGURE 4.8

4.4.1. Motor adjust

Motor adjust is used to check the motor performance and change the motor position. Total of 4 motors are available for operation.

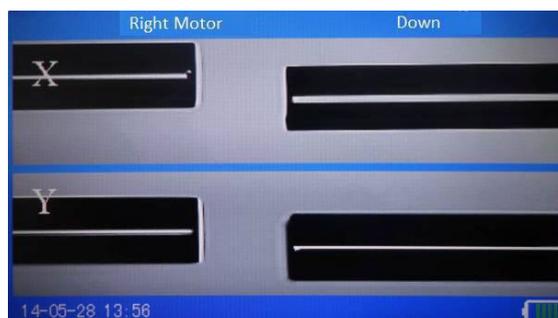


FIGURE 4.9

Press the key \leftarrow to enter the video interface. Press the key \leftarrow to switch the left and right motors. The align motor will move up or down by pressing the key \blacktriangle or \blacktriangledown . The push motor will drive left or right by pressing the key \blacktriangleleft or \blacktriangleright



FIGURE 4.10

4.4.2. Push Test

Push test imitates the distance of the push motor moving forward in the fusion process. Press the key \leftarrow to enter the interface. After the prepared fiber clamped into the machine, you must press the key \leftarrow to run the test. The test results will be given at the end of the test, as shown in Figure 4.11, which shows the distance of each push motor moving forward. The standard value is between 8 and 12.

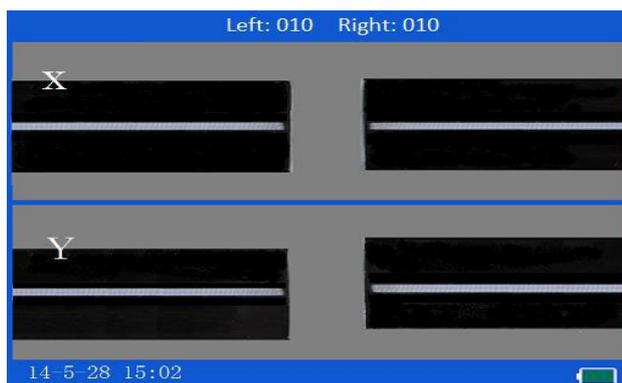


FIGURE 4.11

4.4.3. Fusion Records

Fusion Records				
0021	AUTO	SM/MM.	2019-08-12	0.00dB
0020	AUTO	SM/MM.	2019-08-12	0.00dB
0019	AUTO	SM/MM.	2019-08-12	0.00dB
0018	AUTO	SM/MM.	2019-08-12	0.00dB
0017	AUTO	SM/MM.	2019-08-12	0.00dB
0016	AUTO	SM/MM.	2019-08-12	0.00dB
0015	AUTO	SM/MM.	2019-08-12	0.00dB
0014	AUTO	SM/MM.	2019-08-12	0.00dB

FIGURE 4.12

This option stores working parameters, fiber end face, the environment and date in each splicing. The machine can store 4000 groups of fusion records. The key \leftarrow can be pressed to enter the page of fusion record, and the page displays ten groups of fusion records, sequence from top to bottom by the latest fusion time as shown above. Press the key \blacktriangle or \blacktriangledown to the contiguous page. Press the key \leftarrow enter the page of fusion records.

Fusion Records:		No. 00021
Date Time:	2019-08-12	19:57
Estimate Loss:	0.00dB	SM/MM
Outer Temp:		31°C
Inner Temp:		34°C
Prefuse Time:		015ms
Fusion Time:		2.0sec
Arc Data:		171
Overlap:		008um
L/R Gap:		012um
L/R Endface:		0.5°/0.6°

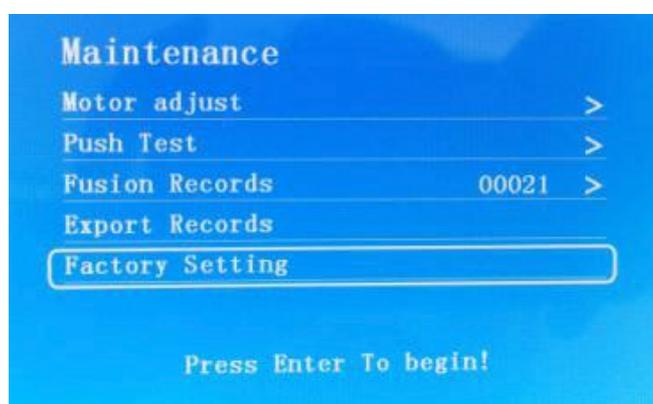
FIGURE 4.13

4.4.4. Export Records

The option is used to export the fusion records memories in the machine. After the U disk inserted into the USB port, choose this option and press the key to ↵ confirm fusion records export. Program begins to test USB port and then find the records. If there's no record, program will prompt error.

4.4.5. Factory Setting

This function could make all parameters back to factory setting.



4.5. ARC

The menu consists of Arc calibration, Arc adjust, electrodes Aging and Arc Numbers, as shown in Figure 4.14.

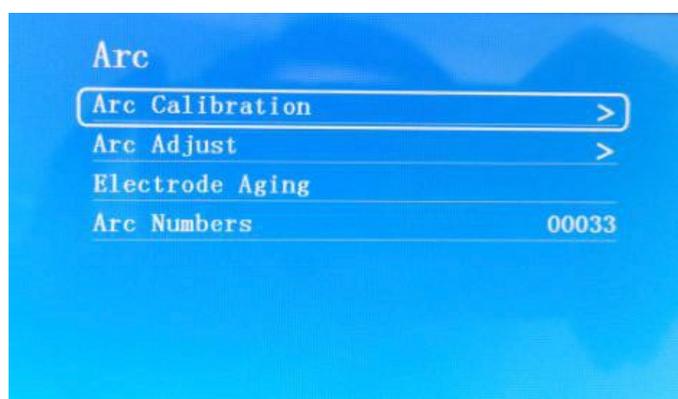


FIGURE 4.14

4.5.1. Arc Calibration

Automatic calibration can automatically change the fusion parameters in the discharge current until the test results meet the requirements on the basis of test results. The test interface is shown in Figure 4.15. When calibration completed, we need to press the button “SET” once in the standby interface.



FIGURE 4.15

4.5.2. Arc Test

Cut and clamp fiber according to splice procedure, and then press the key \rightarrow . The calibration program starts to run and test results are given. According to the test results, manually set the splicing parameters of discharge current, and repeat the above steps until the test results meet the requirements.

Parameter modification requirements: the default value is between 8-12, every 5 to modify 1 Arc parameter value. When the calibration result is larger than 12, we should reduce discharge parameter value.

4.5.3. Electrodes aging

New electrode discharge instability and the need for the discharge of a certain number of times to stabilize the arc which called electrode aging. When electrode replaced, enter this menu and then press the key \leftarrow to start aging the electrode, as shown in Figure 4.16. Don't open windproof cover in aging process.

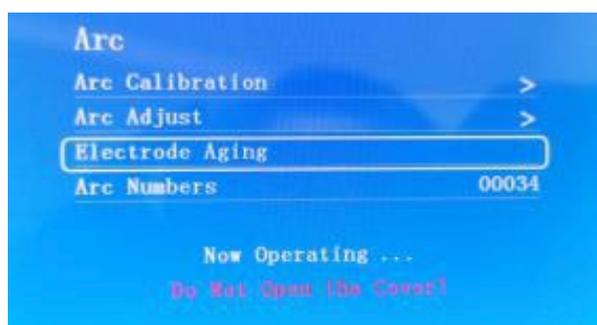


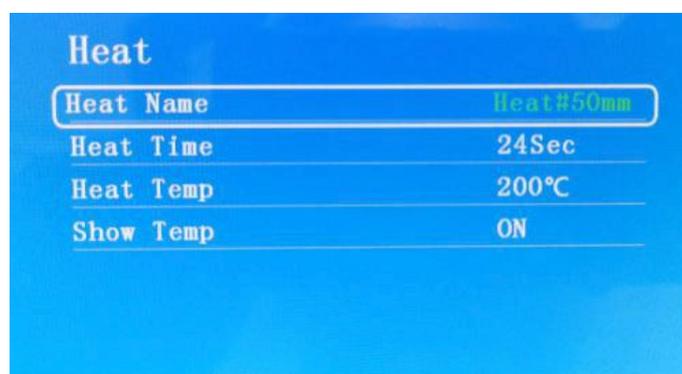
FIGURE 4.16

4.5.4. Arc numbers

This option shows the total number of Arc discharge.

4.6. Heater

The Heater menu is used to set heating time and heating temperature, as shown in Figure 4.17. Heat time needs to set by users according to specific heat shrinkable. Select this option "Heat Time", and press the key ◀ or ▶ to change the time. Same as the heat temperature. Users can also turn on or off the Show Temp function, if it is on, users can see the real-time temperature on display screen when heating.

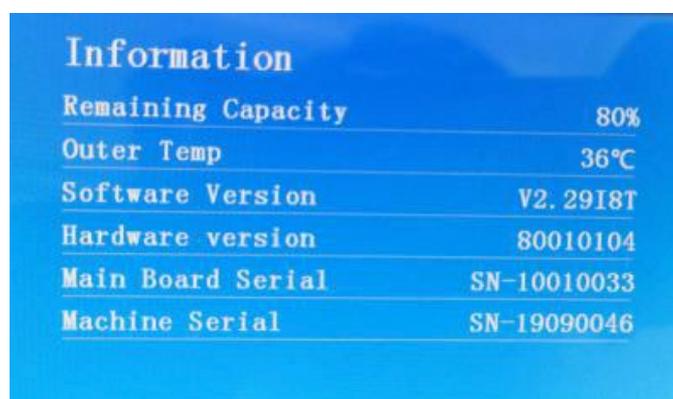


Heat	
Heat Name	Heat#50mm
Heat Time	24Sec
Heat Temp	200°C
Show Temp	ON

FIGURE 4.17

4.7. Help

In Help menu, users can inquiry the basic information of the fusion splicer, including software version, hardwareversion, main board serial etc., as shown in Figure 4.18 below.



Information	
Remaining Capacity	80%
Outer Temp	36°C
Software Version	V2.2918T
Hardware version	80010104
Main Board Serial	SN-10010033
Machine Serial	SN-19090046

FIGURE 4.18

5. Routine maintenance

5.1. Cleaning

5.1.1. Cleaning V groove

V-groove is a V slot on the ceramic substrate of narrow width, easily to accumulate dust which will make the fiber move instability and cause a bad fusion, therefore, the V groove should be cleaned regularly.

The following is the way of cleaning the V groove:

1. Place the fiber with good endface into the V groove to remove the pollution, shown in figure 5.1.

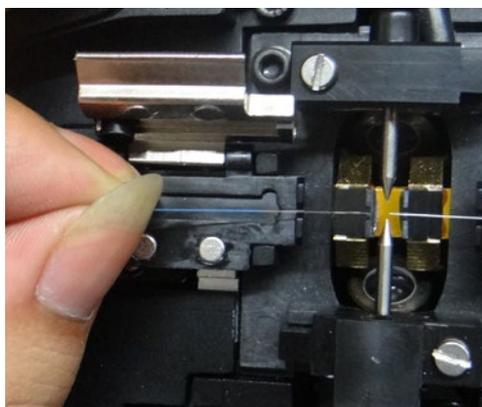


FIGURE 5.1

2. Use a cotton swab soaked with alcohol to clean the surface and bottom of the V groove. At last, the alcohol should be the natural air-dry or wiped dry by the dry cotton swab. Shown in figure 5.2.

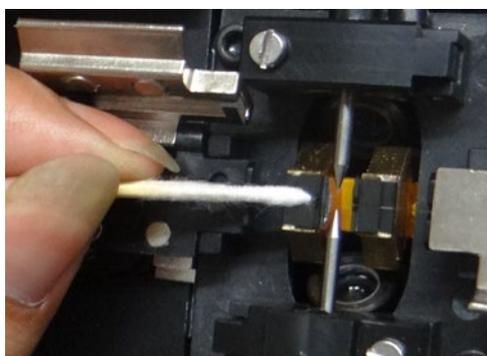


FIGURE 5.2

5.1.2. Cleaning fiber presser foot

The dust accumulated on the fiber press foot will cause the pressure instability and affect the quality of fusion. So, it should be wiped off from the fiber pressure foot regularly.

Open the windproof cover, and then use the cotton dipped in alcohol to clean the surface of the presser foot. When cleaning, don't repeat back and forth with cotton, but to wipe the foot in one direction. Besides, users need to spin the cotton swabs, keeping the unused cotton facing the presser foot, waiting for the alcohol volatile.

5.1.3. Cleaning objective lens

Microscope is the core component of the machine optical system. So its surface must be kept clean, and users should regularly clean. The microscope is cleaned by the swab which dipped in a little alcohol, with a spiral movement from the center to the edge of the lens and the rotation around the swab until to spin out the edge of the lens.

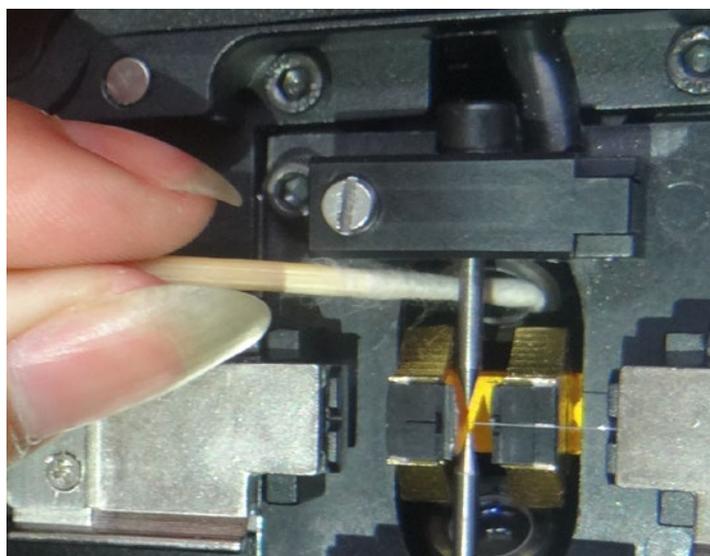


FIGURE 5.4

5.2. Replacing electrode

Arc produces by high temperature, melting the fiber, which will produce silicon oxide vapour and some deposited on the electrodes, causing the arc instability. Therefore, users are recommended to replace electrodes when discharge reached 3000 times.

Please replace the electrodes according to the following steps:

1. Shut down the power.
2. Loosen setscrews of electrodes cover and remove the electrodes cover, as shown in Figure 5.5
3. Take out the electrode from the electrode holder. (Electrode is fixed on the electrode holder, figure 5.6).

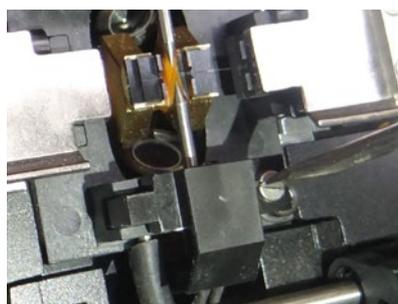


FIGURE 5.5

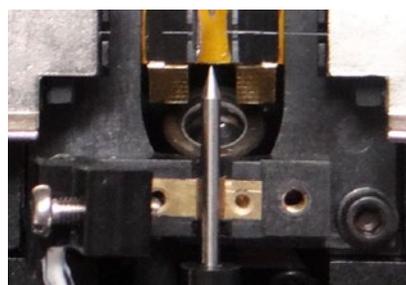


FIGURE 5.6

With tissue paper dipped in alcohol to clean the new electrodes, then, install the electrodes into the original electrodes seat position.

4. Close the electrodes cover and tighten the screws.
5. Close the windproof cover and power on the machine.
6. Take an electrode aging.
7. Run 3 times fiber fusion if current fusion parameter is Auto mode otherwise run Arc Test or Arc.

Calibrate if current fusion parameter is normal or calibrate. Note: The replacement of the electrodes should be gentle, so as not to damage the machine or stabbed himself.

5.3. Electrode aging

The electrodes arc begins unstably when the external environment such as the temperature and pressure changed greatly especially moving the machine from low altitude to high altitude. When happened, users should take an electrode aging to stabilize the electrodes arc. The machine runs 5 times of huge electrodes arc when the user selects the electrodes aging and executes it. Note: Please according prompts to operate, do not open the cover while electrodes aging.

5.4. Software upgrade

The user should insert the USB disk with upgrade file into USB interface before software upgrade. When the software upgrade menu is selected and pressed, the machine will automatically complete the upgrading. After upgrading, the user should restart the machine.

1. Copy the upgrade document named "boot.dat" to the U-Disk, whose capacity must be more than 2GB.
2. Insert U-Disk into the USB interface of the machine.
3. Power on the machine. Press the menu button "☰", entering the main menu.
4. Select the option "Function", and press button "↵".
5. Select the option "Software upgrade" in the interface of Function, and press the button "↵", upgrade beginning.
6. After upgraded, pull out U-Disk, and restart machine.

6. Common fault and solution

Phenomenon	Reason	Handle
Tip of "Please check fiber!"	1The fiber is broken. 2 No fiber is loaded. 3 The fiber is far away from the Electrodes more than 2mm	Making the fiber image into the screen after loading the fiber.
Tip of "Please reload fiber"	The fiber is not completely loaded into the V groove.	Press the Reset key and reload the fiber in correct position.
Tip of "Fusion failed"	Fusion loss is very big or Fusion broken.	Clean the V groove and fiber press foot; Check the fusion parameter and the motor overlap to modify
Electrodes do not discharge	The electrodes are of dirty or damaged; Or the high-voltage board is fault.	Clean or replace the electrodes
Tip of "Please check L(R) end face"	The end face of fiber is bad, or the fiber is polluted, or the image is unclear.	Recut fiber or clean the V groove, or increase the max endface value of fusion para.

Phenomenon	Reason	Handle
Tip of "Resetting push motors"	The motor exceeds the range of operation reset to the original Position	Reload the fiber in correct position when resetting completed.
Tip of "Please close cover"	The cover is opened	Operate when cover closed.
Tip of "X(Y) Image Light Error"	Display lamp does not light or some other reasons	Check the mirror ,lens or the image light
Tip of "(L,R)Fiber On Error position!"	The fiber is not completely loaded into the V groove or fiber is dirty	Reload fiber or recut fiber.
Tip of "Please Gap Again!"	The gap of fiber is un-fittable.	Take a gap process first.

Note: If the above-mentioned problems still exist after handling, please contact technical support.

7. Appendix A

Warranty terms and conditions

If the machine fault occurs on the date of delivery in a year, it will get a free repair. But if the following occurs, it is not in the warranty scope:

- ★ Failure or damage caused by natural disasters.
- ★ Failure or damage caused by abnormal voltage power supply.
- ★ Failure or damage caused by wrong operation.
- ★ Failure or damage caused by the operation not according to the user's manual.
- ★ Loss unit (such as electrodes). Before sending the machine, please contact with the manufacturer or agent.

Required information of repair (Please contain the following information in machine)

<1> Your full name, your company, address, telephone number, fax number and e-mail address

<2> Type of machine and the serial number.

<3> The problems encountered.

When and under what conditions the problem happened.

Now how the condition of the machine.

Information of screen display and the error tips etc.