GS-901

Ribbon Fiber Fusion Splicer

User Manual

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CONTENTS

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 causes an explosion or permanent damage to 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 in working time, or it may causes 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 for human health. It is suggested to operate as the following way.

1. This model machine only applies to quartz glass fiber splicing, not to any other things.
2. Don't use or store the machine in high temperature or humidity environment (otherwise it may damage the equipment or reduce performance of the machine).
3. While using the machine in dust environment, try to avoid 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 machine must be handled gently to avoid strong vibration or impact, and with carrying case for transportation or storage.
7. Maintain the whole machine once a year.

1.3 Legal statement

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according to applicable law for damages)

2 Start to comprehend splicer

2.1 Overview of splicer

Figure 2.1

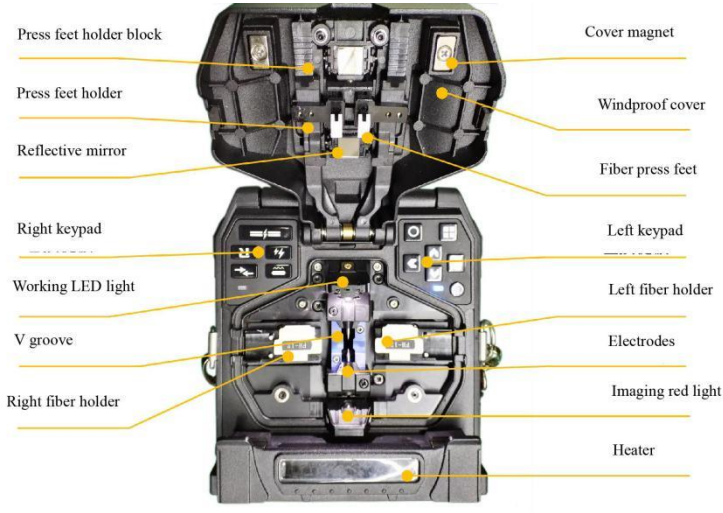

Figure 2.2 Main Structure Parts

2.1.1 Keyboard appearance

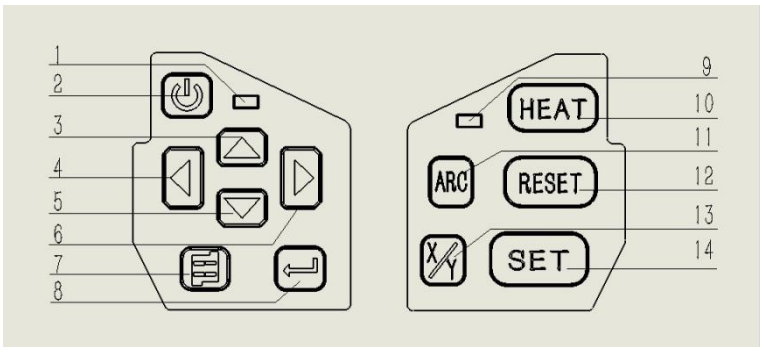

Table 1 Keyboard

1	Power light	2	Power	3	Up
4	Left	5	Down	6	Right
7	Menu/Exit	8	Enter	9	Heating light
10	Heating	11	ARC	12	Reset
13	Image switch	14	Auto splice		

Table 2 Keyboard functions

	● While Power On, press this key to shut down. ● While Power OFF, press this key to Power On.
	● Under standby interface, press this key to discharge weak arc. ● In 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.

	● Under standby interface, press this key to enter main menu. ● Under the main menu interface, press this key to return the upper menu.
	● Under standby interface, press this key to increase the LCD backlight. ● In 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 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 move to left.
	● Under standby interface, press this key to decrease the LCD backlight. ● In setup of CMOS sensor, press this key to decrease the CMOS sensor backlight. ● In function of motor test, press this key to move down the corresponding motor. ● If permitted, press this key to move down the cursor.

	• Under 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 move to right.
	• Under standby interface, press this key to fuse.
	• In Power On state, press this key to reset motor position.
	• Under standby interface, press this key to switch video mode.
	• Under standby interface, press this key to run auto splice.

2.2 Technical parameters

Table 3 Technical Parameters

Applicable fiber	SM(G.652)，MM(G.651)，DS(G.653)，NZDS(G.656)
Fiber count	1，2，4，6，8，10，12
Cladding diameter	125um
Typical loss	SM:0.05dB，MM:0.02dB，DS:0.08dB,NZDS: 0.08dB,
Return loss	＞60dB
Splicing time	18 seconds（12 cores ribbon fiber）
Heating time	Typical heating time 30 seconds
Magnification	Dual high sensitivity camera, real time XY observation, 22X fiber image magnification
Splicing program	40 groups of preset programs and 100 groups of user-defined programs
Heating	Inductive automatic heating, 40 seconds
Tension	＞2.2N
Fusion Records	4000 groups of fusion records

Estimate loss	Supported
Electrodes times	More than 1500 times, easy to replace
Interface	12V DC power input,USB2.0
Operation	GUI menu design, easy to operate
Battery	5200mAh pluggable Li-battery, real-time remaining power monitoring
Power supply	Adapter : AC100-240V(50/60HZ); Output : DC11~13.5V
Volume/weight	156mm（L）×141mm（W）×156mm（H）/2.45kg (Battery Included)
Operation Enviroment	Altitude: 0-5000m; Humidity: 0-95%; Temp: -25℃- +50℃; Air speed: <=15m/s

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

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

3.2 Preparation of fiber end face

Prepare two ribbon optical fibers, clean the fibers with alcohol cotton, cleaning length is about 100mm, then put the fiber into the heat shrink tube, as shown in Figure 3.1.

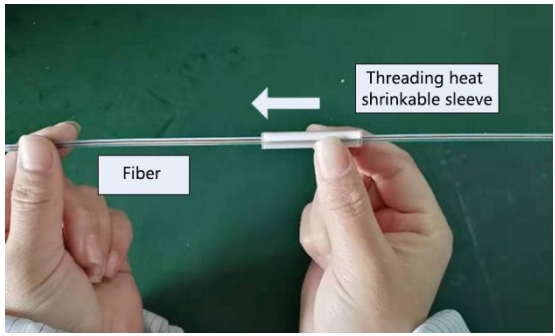

Figure 3.1 put fibers into heat shrink tube

Place the fiber into the tooth of clamp, reserve the fiber 30 to 40 mm outside the fiber clamp, then close the clamp. The fibers must be put into the right and left clamps correspondingly.

Now we will start to stripper the fiber coating, open the Heat stripper cover, put the fiber clamp into the groove of the heat stripper, closely to the locating surface, shown as figure 3.2. Close the heat stripper cover and grip it, heat stripper will start to heat automatically, when it indicate the heating completed, hold the cover on both sides with both hands, pull outwards

slowly to remove the coating layer. Use the alcohol cotton (alcohol purity>99%) clean the optical fiber coating layer that residual debris. After cleaning, the optical ribbon fiber will stick together because of the residual alcohol. Scrape the end face of the optical fiber with your fingers and straighten the optical fiber.

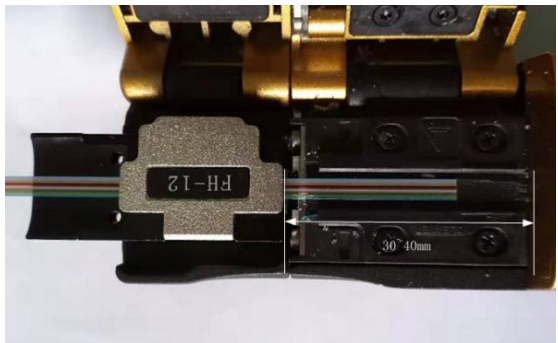

Figure 3.2 Heat stripper for ribbon fiber coating layer

Put the cleaned optical fiber into the positioning groove of the fiber cleaver, and hold it against the front positioning surface. Make sure the fiber is placed on the rubber anvils without overlapping, as shown in Figure 3.3. Close the fiber

cleaver, push the slider of the fiber cleaver to the other end, and cut off the optical fiber. After cutting off, open the fiber cleaver to remove the chopped fiber, and put it into the waste fiber storage box (the broken fiber has great harm to human health, please be sure to collect and dispose the broken fiber in a unified way). Carefully take out the fiber with the end face cut, and do not make the fiber section touch any other objects, so as to avoid damage or pollution of the end face.

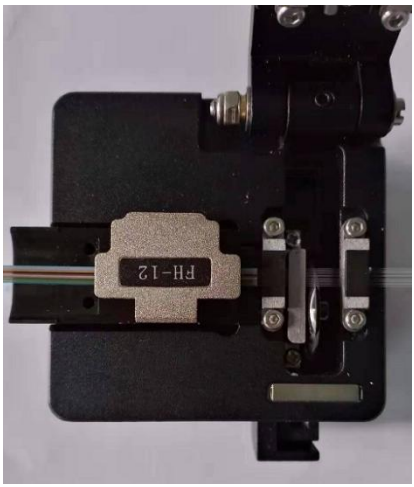

Figure 3.3 Cutting ribbon fiber

3.3 Fiber clamp loading

Open the windproof cover, put the prepared fiber clamp with prepared ribbon fiber into fusion splicer, make sure that the fiber end face should be located between V-groove edge and two electrodes. Shown in Figure 3.4. Please operate carefully and don’t let the fiber end face touch any other object. All optical fibers shall be placed horizontally in the V-groove without upwarping. If clamping fails, please carefully lift the optical fiber and repeat the above operations until the optical fiber is qualified.

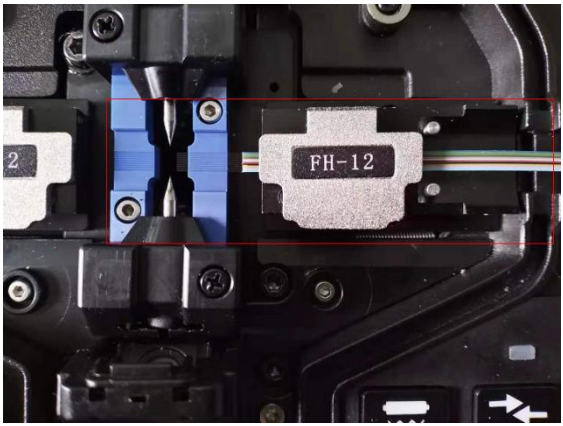

Figure 3.4 Fiber clamp loading

Repeat above operation to prepare the other fiber clamp with ribbon fibeer. Then close the windproof cover, watch the magnified fiber image on the display screen. If the fiber end face is obviously 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 in

figure 3.5. 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 3.5 Fusion ready state

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 “ENTER” key to enter the menu. We need to select fusion parameter group matched with splice fiber type.

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, such as calculating the fiber end angle, end quality and fiber quantity, and display the fiber end parameters, as shown in Figure 3.6. If qualified, turn to the next process, otherwise show a tip of bad end face and stop.

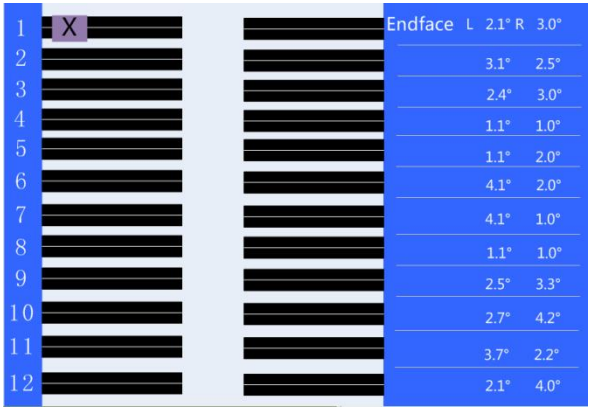

Figure 3.6 Fiber parameter

After judging the end face, the motors will further push the optical fiber to the position to be welded, and the fusion

splicer will further calculate the spacing and offset between the optical fiber pairs and display it, as shown in Figure 3.7. If the spacing and offset of the fibers are within the maximum range allowed by the program, the splicer will start to splice the fibers. Otherwise, if the gap and offset of some fiber pairs exceed the allowable range, the program will prompt to prepare the fiber again. In this case, it is strongly recommended that customers do not force fusion, otherwise it will lead to a fusion failure.

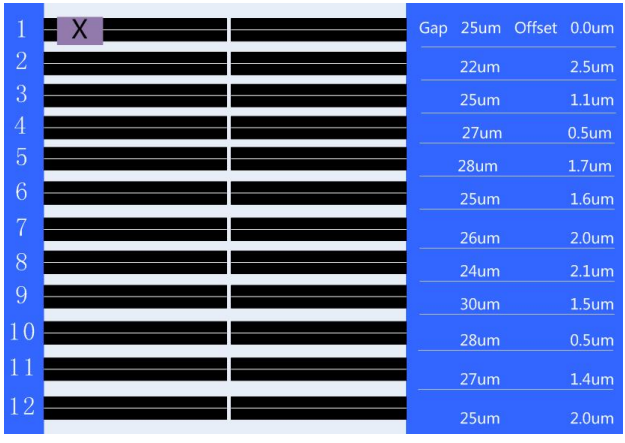

Figure 3.7 Spacing and offset information

Finally the fusion splicer will discharge to complete the fusion of the optical fiber. After the fusion, the program calculates the estimated fusion loss value through the analysis of the optical fiber image, and displays it, as shown in Figure 3.8. In some cases, the estimated loss calculated by the program is within the allowable range, but the fusion defect is found when observing through the display, if so, it is recommended to do a fusion again.

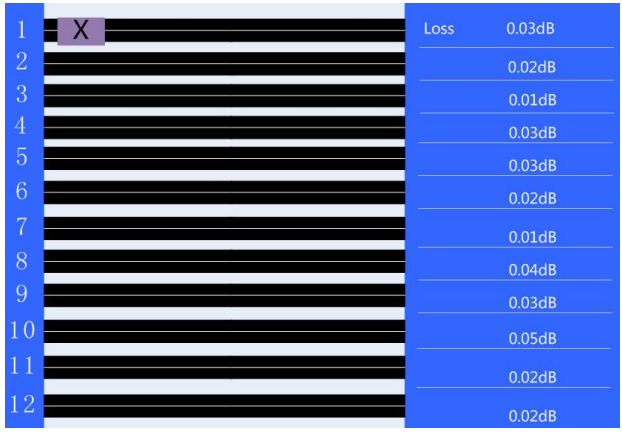

Figure 3.8 Estimated fusion loss

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, shown in Figure 3.9. Then, the heater begins heating as soon as heating furnace closed. If it is found that the heat shrinkable effect is not ideal and the optical fiber is not tightly fixed, it is recommended to heat again.

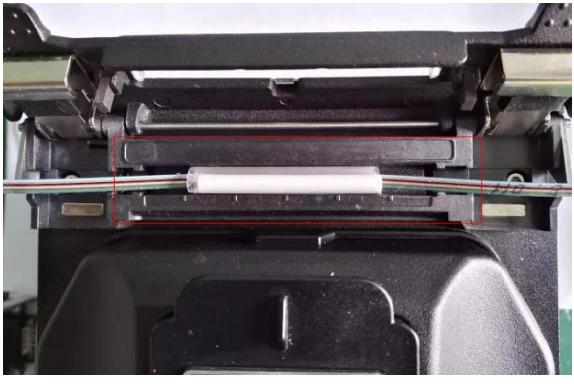

Figure 3.9 Heat shrink tube heating

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 7 icons, and each icon corresponds to different functional menu, shown in figure 4.1.

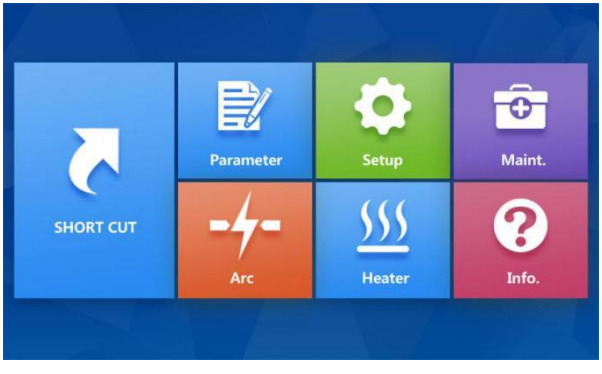

Figure 4.1 Menu information

For the main menu interface：

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

In the main menu, press the key  to exit the main menu to 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

Figure 4.1 Shortcut menu

The shortcut menu includes some common functions to facilitate the quick operation for users, as shown in Figure 4.1.

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 Drive

See details in 4.4.1.

4.1.5 Fiber position

Fiber position is used to move the fiber image positions up/down/left/right. Press the key ↵ to enter the video interface. Press the key ↵ to switch the X and Y fibers. The fibers will drive up /down/left/right by pressing the key ▲, ▼ , ◀ , ▶.

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 ↵ to upgrade.

4.2 Parameter setting menu

Parameter setting menu is used to select and edit fusion parameters, set fusion process, reset and other control functions, as shown in Figure 4.2.

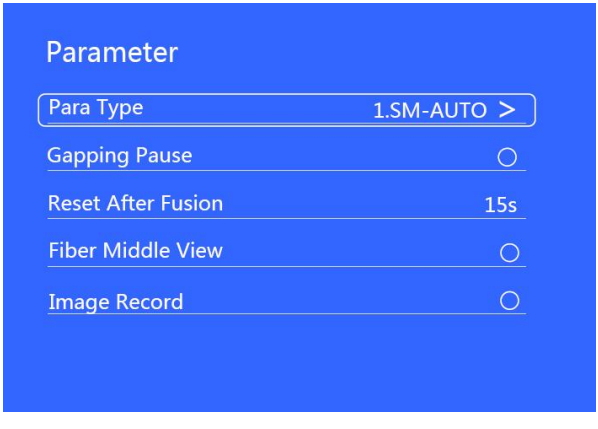

Figure 4.2 Fusion parameter menu

4.2.1 Parameters menu

The "parameters" menu is used to select and set the fiber splicing parameters. The menu is composed of different splicing parameters submenus, as shown in Figure 4.3. Each submenu is a group of welding parameters, and the menu consists of three parts: number, file name and status. The number ranges from 0 to 39, totally 40 groups of parameters are available. The file name contains fiber mode, fiber quantity and other information, such as SM-10, indicating that the group of parameters is for single-mode fiber. The number of fibers is 10. In addition, there are auto parameters, such as“SM-AUTO”, indicates that the shuffle parameters are for single-mode fiber, and the fusion parameters are automatically configured and cannot be modified. The status indicates whether the parameters in this group are currently in use, and the origin indicates that they are in use.

Figure4.3 Fusion parameter groups

To change the current fusion parameter group, press ▲ or ▼ and move to the parameter group option to be set. Press the key ↵ to enter the parameter setting menu, as shown in Figure 4.4. The parameters consist of the following:

Prefuse time After the fiber is pushed to the fusion position and aligned, the fiber is preheated by short-time discharge. The single-mode time length is 800ms, and the multi-mode time length is 1000ms. This parameter value is not recommended to be modified by new users.

Figure 4.4 Fusion parameters edit menu

Fuse time After the pre discharge, the fusion splicer starts to splice and discharge. The discharge lasts for a long time, and the current intensity is large, resulting in high temperature to melt the optical fiber. The time length of single mode is 10 seconds, and that of multi-mode is 10 seconds. The parameter value is not

recommended to be modified by new users.

Arc power Arc power 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.

Max offset It refers to the upper limit of the lateral offset distance between the fibers to be spliced. If it exceeds this limit, an error message will be prompted.

Gap Before the fusion splicer discharges, the two optical fibers need to run to a relatively close position. The distance between the end faces of the two optical fibers is the gap between the left and right optical fibers. Press ◀ or ▶ to change the parameter value;

Max gap Refers to the upper limit of the gap between the fibers to be spliced. If the limit is exceeded, an error message will be prompted.

Max angle The end face angle is the angle between the end face of the X, Y fiber images and the vertical direction. The maximum end angle refers to the maximum end angle allowed when judging the fiber end. If the judgment of the end face angle is always failed, the parameter value can be increased properly, but the splicing loss may be increased.

Loss limit It refers to the upper limit value of estimated loss , it the estimated loss is exceeded this value, fusion failure will be indicated.

Overlap In the process of optical fiber fusion, with the high temperature melting of optical fiber produced by the arc, it is necessary to push the optical fiber forward to make the optical fiber contact and fuse. The fiber forward distance is the motor forward distance here. Press ◀ or ▶ to change the parameter value.

MFD The mode field distribution diameter of laser in optical fiber is 9.3um for single mode and 62.5um for

multi-mode.

Group status That is, whether this current parameter group is ON/OFF. Press the ↵can change the status.

4.2.2 Others

Gap pause It refers to that during fiber splicing process, when the optical fiber is pushed to meet the gap conditions, the program stops running and waits for the user's further operation. If it is necessary to continue the splicing, press the "SET" key. If interrupt the splicing, and press the "RESET" key.

Reset time After finish one fiber fusion, in order to prepare for the next fusion, the motors need to be reset to the reference position. Open the windproof cover, after a period of time, the motors start to reset. The waiting time is the automatic reset time. After selecting this menu, press ◀ or ▶ to change the parameter value.

Fiber middle view The program always takes the position

of an arc as the middle position of the fusion splicer, and always takes this position as the center of the field of vie.

Fiber image record When this option is turned on, the program will automatically save the fiber images after fusion completed.

4.3 Setup

Figure 4.5 Setup menu

The Setup menu is used to set the operation parameters of the fusion splicer, including brightness, power saving setting, tension test, anguage, date and time and other submenus, as

shown in Figure 4.5.

4.3.1 Brightness

Press the key ↵ to enter the interface of camera brightness. Press the key ▲ or ▼ to modify the power of the light source. Press the key ↵ to switch the X and Y cameras.

4.3.2 Auto Power Off

Auto power off is a power saving function. When the machine is no any operation, the display brightness will decrease after 5 minutes, and it will power off automatically after 10 minutes if this function is ON.

4.3.3 Tension

Turn on this option, when 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 ↵ 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. Press ↵ to enter the language options menu.

4.3.5 Date and time

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.

4.4 Maintenance

The function menu consists of motor adjust, push test, fusion

records, export records, factory setting, as shown in Figure 4.6.

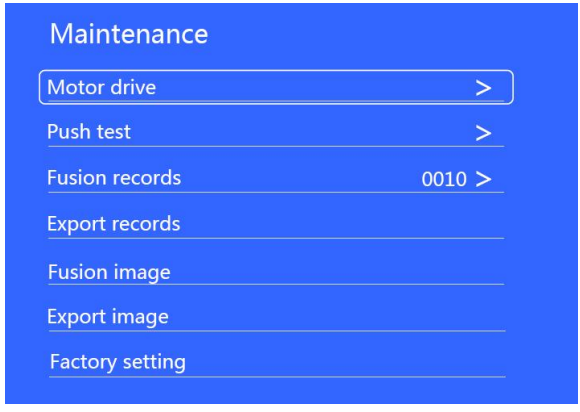

Figure 4.6 Maintenance menu

4.4.1 Motor drive

Motor drive is used to check the motor function or adjust the motor position manually. The motors includes left propel motor and right propel motor.

Press ↵ enter this menu， shown in Figure 4.7. Press the key ↵ to switch the left and right motors. The motors will drive

left or right by pressing the key ◀ or ▶ .

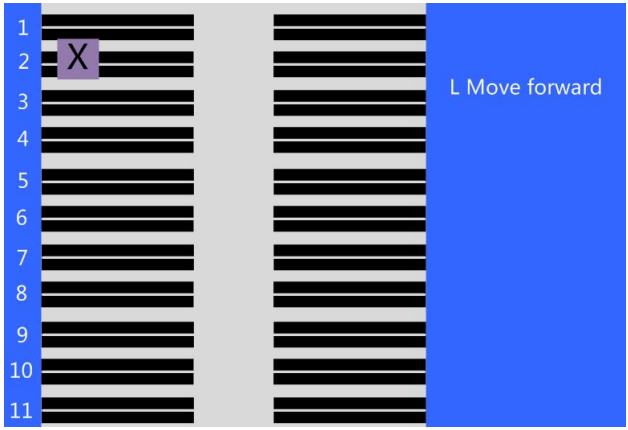

Figure 4.7 Moto drive

4.4.2 Push test

Push test imitates the distance of the push motor moving forward in the fusion process. Press the key ↵ to enter the interface. After the prepared fiber clamped into the machine, you must press the key ↵ to run the test. The test results will be given at the end of the test, as shown in Figure 4.18,

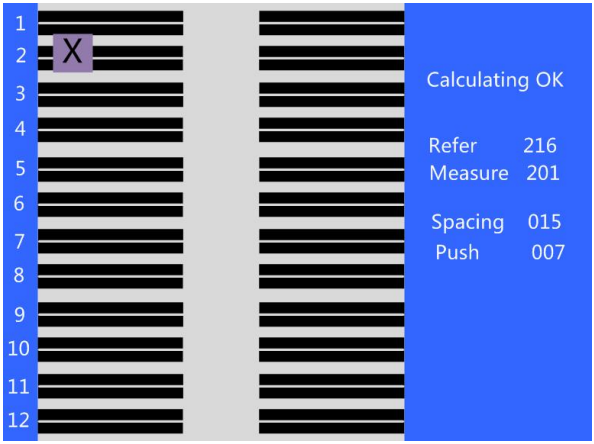

Figure4.8 Push test

4.4.3 Fusion Records

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 ↵ can be pressed to enter the page of fusion record, and the page displays 8 groups of fusion records. Press the key ▲ or ▼ to the contiguous page. Press the key ↵ to enter the page of fusion records, as shown in Figure 4.9.

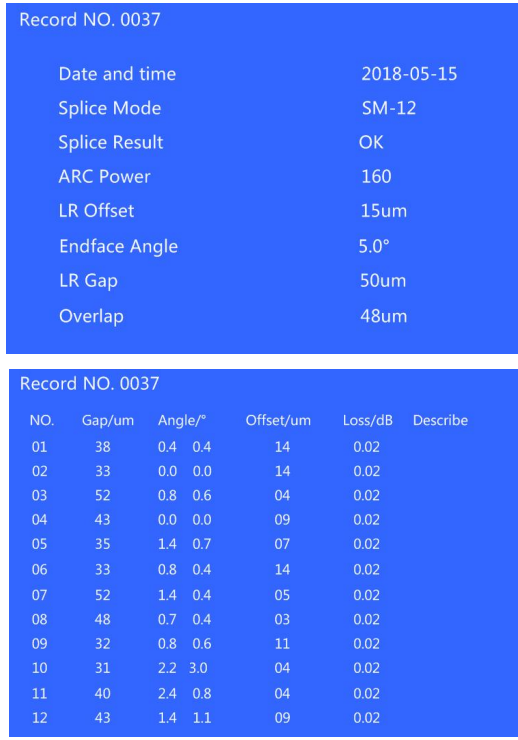

Figure4.9 Fusion records

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 Fusion image records

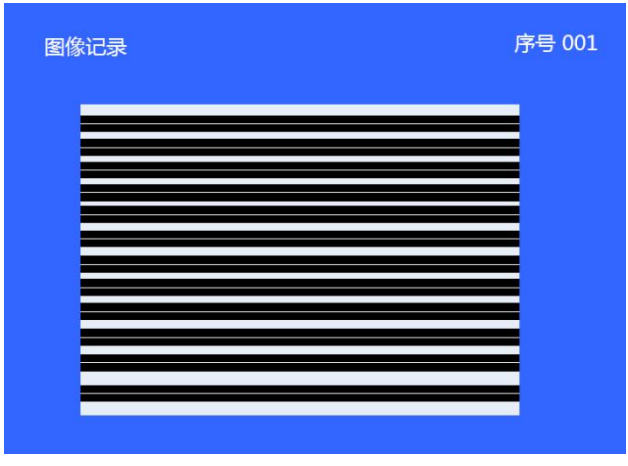

Figure 4.10 Fusion image records

It stores the fusion image records after the completion of historical fusion. After entering, the fusion images can be displayed in sequence, as shown in Figure 4.10.

4.4.6 Factory Setting

This function could make all parameters back to factory setting, press the key ↵ to factory setting.

4.4.7 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 ↵ to upgrade. After upgrading completed, please re-start the machine.

4.5 ARC

The menu consists of Arc calibration, Stablization, count of discharge, as shown in Figure 4.19.

Figure4.19 ARC

4.5.1 Arc Calibration

This function can automatically change the discharge current value 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 standby interface. In general, when the results of arc test results are between 160~200, the splicing loss will be low.

Figure4.20 Arc calibration

Press ↵ enter the arc calibration menu，prepare the fibers same as the fiber splicing process, after loading fiber, press the key ↵, it will start ARC calibration automatically and the program will adjust the ARC value automatically according to test result, repeat above steps, until Calibration OK!

4.5.2 Stablization

When fusion splicer replaces a new electrodes or fusion splicer changes to a fiber optic project with great difference

in geographical environment, the electrodes may discharge instability. In this case, the electrodes need for the discharge of a certain number of times to stabilize the arc which called electrode stablization.

Enter this menu and then press the key ↵ to start stablization of the electrodes. Don't open windproof cover during this process.

4.5.3 Count of discharge

This option shows the total number of Arc discharge.

4.6 Heater

The Heater menu is used to set heating time and heating temperature etc., as shown in Figure 4.21.

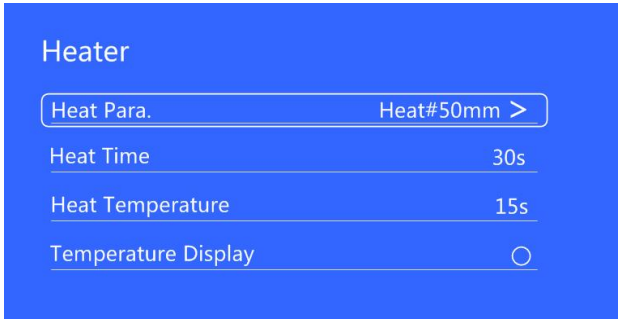

Figure4.21 Heater menu

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.

4.7 Info.

In this menu, users can inquiry the basic information of the fusion splicer, including battery remaining capacity, software version, hardware version etc., as shown in Figure 4.22.

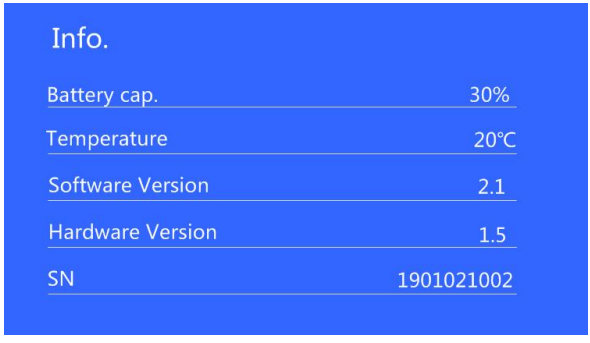

Figure4.22 Info. menu

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:

Figure 5.1 V groove cleaning I

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

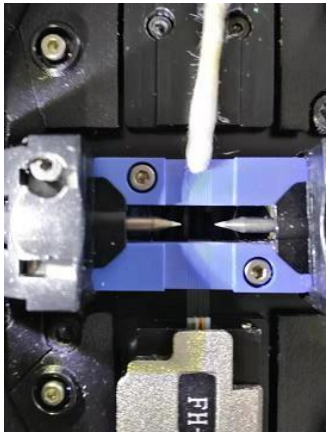

Figure 5.2 V groove cleaning II

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.

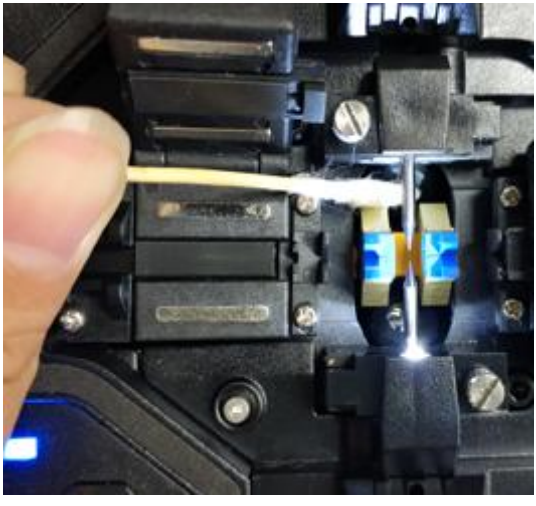

Figure 5.3 Lens cleaning

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 1000 times.

Please replace the electrodes according to the following

steps:

1. Turn off the fusion splicer.
2. Loosen setscrews of electrodes cover and remove the electrodes cover, as shown in Figure 5.5-1.
3. Take out the electrode from the electrode holder. (Electrode is fixed on the electrode holder, as shown in figure 5.5-2).

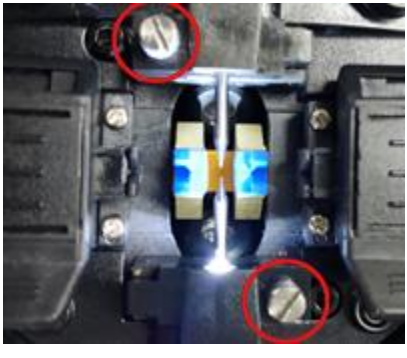

Figure5.5-1 Remove the electrodes cover

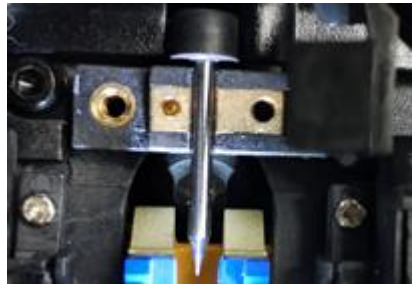

Figure5.6-2 take out the electrodes

4. With tissue paper dipped in alcohol to clean the new electrodes, then, install the electrodes into the original electrodes seat position.
5. Close the electrodes cover and tighten the screws.
6. Close the windproof cover and power on the machine.
7. Take an electrode aging.
8. 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

Table 6.1

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.
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 tip