SKYSHL

SS413F Series
Optical Fiber Fusion Splicer

Quick Guide Manual

OTDR/Fusion Splicer/OLS/OPM
Professional Manufacturer

Shenzhen SKYSHL Technology Co.,Ltd.

www.skyshl.net

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SKYSHL

CATALOGUE

1. Overview

Thank you for choosing our products. This operation outline mainly introduces the product performance, basic operation steps and maintenance of optical fiber fusion machine, which is newly produced by our company.

The machine adopts a high-speed image processing technology and special precision positioning technology. The whole processes of fiber fusion splicing can be automatically completed within 9 seconds. Provided with TFT color LCD display, the screen is protected by high strength protective panel. User-friendly graphical interface is convenient for efficient and quick operation by the user. High performance battery can realize online charging continuously in the work, to get a longer battery life. No manual arc calibration operation is needed.

The machine has real time splice arc control and correction functions. In extreme environment, the machine can also effectively ensure the splice quality of optical fiber. The machine is featured with fast splice speed, less splice loss, light weight, portable, applicable to backbone network, metropolitan network and FTTH project. In order to complete accurately the splice operation, please read carefully this user's manual.

(**SS413F Video:youtu.be/llfhWtie48c**)

2. Product specifications

Applicable optical fibers	SM (G.652 & G.657), MM (G.651), DS (G.653), NZDS (G.655) and user-defined optical fibers
Splice loss	0.02dB (SM),0.01dB (MM),0.04dB(DS/NZDS)
Return loss	Better than 60dB
Control technology	Real time splice arc control and correction; Self adaptive in working environment scope; Electrode oxidation self adaptive.
Splicing time	≤9 seconds (standard SM).
Heat time★	≤25 seconds (The Heat time can be set and the heater temperature can be adjusted.); Fast heat function, functions of automatic or manual heating selection.
Splicing function	Step-by-step splicing or automatic splicing optional
Fiber alignment	Fine alignment, fiber core alignment, clad alignment, manual alignment
Fiber diameter	Cladding diameter 80 ~ 150μm, Coating diameter 100 ~ 1000μm
Cleave length	Coating less than 250μm: 5 ~ 16 mm; Coating 250 ~ 1000μm: 16 mm.
Tension test	Standard 2N (optional)
Magnification times★	320 times (X-axis or Y-axis); 160 times (X-axis and Y-axis).

Fiber clamp	Multifunctional clamp is applicable to bare fiber, tail fiber, jumper, covered fiber and stealth fiber. The clamp meets the requirement of industry standard FTTH fusion quick splicer.
Heat-shrink sleeve	60mm/40mm/20mm and a series of micro- shrink sleeves (some features are optional)
Display ★	Provided with TFT color 4.3 LCD display. The screen is protected by high strength protective panel. Contents (image) can be flipped, easy for two-way operation.
External Interface	USB2.0 Interface: convenient data download, USB flash disk upgrade software.
Splicing mode	100 groups user mode, 53 groups factory mode.
Heater mode	40 groups user mode, 11 groups factory mode.
Connection storage	Built-in memory is capable to save latest 10000 splices. Store 100 groups of splice images (X, Y fiber splicing images).
Electrode life	> 5500 times (times of arc).
Lithium battery ★	Continuous splicing, heating more than 350 times (typical environment).
Power saving function	In “Power Save Mode" Under typical circumstances can save 15% battery power
Power supply ★	Lithium battery provides 12.5V power (charging in 10.8V) and can be charged continuously when the splicer works. When the charging time 3.5, the battery charging times are not less than 300 times. (Charging) Power adapter: Input AC100-240V 50/60HZ, Output DC13.5V/4.8A. The present power mode can be identified, real-time monitoring the present battery capacity.
Work environment	Operating environment: -10～+50℃; Storage temperature:- 40 ~ + 60℃;Humidity: <95% RH (non-condensing); Operating altitude: 0 ~5000m Maximum wind speed: 15m / s.
External dimension★	133(Length)*163(Width)*140(Height)
Weight ★	1.6 kg (Batteries not included)

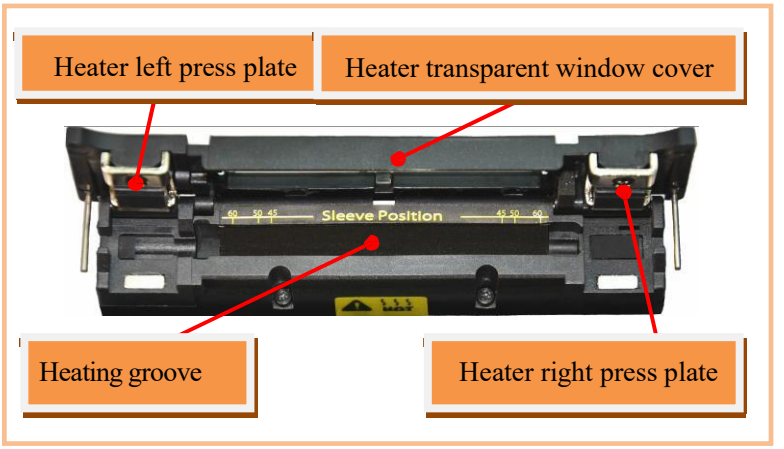
Remarks:

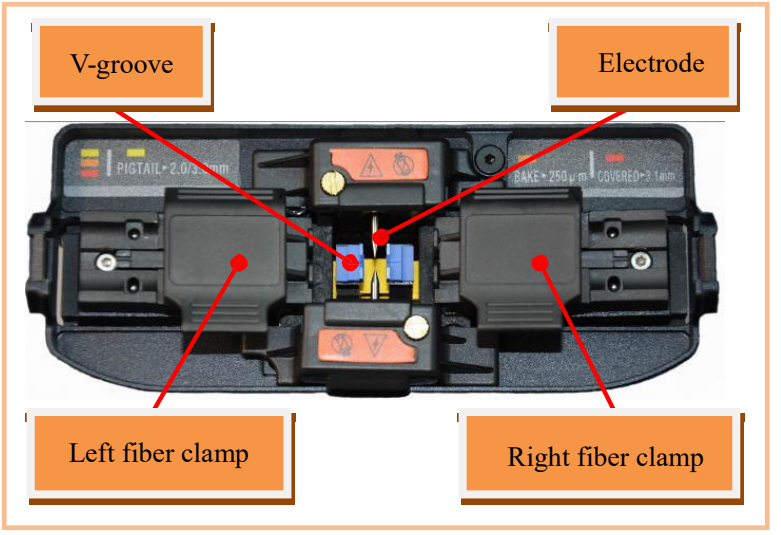
①The technical data in the above table “★” are different for different types of products.

②Detailed technical indicators of the product should be consulted and obtained with the sales staff of the company.

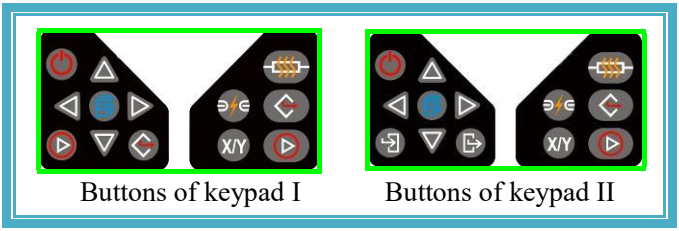
3. Main components of fusion splicer

3.1 Name of main components of fusion splicer





3.2 Descriptions of the keypad of fusion splicer



Buttons of keypad I Buttons of keypad II

Boutton	Readiness	Manual mode	Automatic mode	Parameters menu
	Power switch	Power switch	Power switch	Power switch
	Moving cursor	Upward movement of fiber	Invalid	Increasing the amount of parameters/moving cursor
		Downward movement of fiber	Invalid	Reducing the amount of parameters/moving cursor
		Leftward movement of fiber	Invalid	Reducing the amount of parameters/moving cursor
		Rightward movement of fiber	Invalid	Increasing the amount of parameters/moving cursor
	Invalid	Return to readiness screen	Return to readiness screen	Return to higher level menu screen
	Invalid	Invalid	Invalid	Confirming option function/Parameter modification
	Enter splice mode menu	Open the function to move motor by buttons at pause	Invalid	Enter lower level menu /operation screen
	Start splicing	Continue forward /Start splicing	Start splicing	Invalid
	Start splicing	Continue forward /Start splicinge	Start splicing	Confirming option function/Parameter modification
	Invalid	Motor reset	Motor reset	Invalid
	Invalid	Motor reset/Return to higher level menu	Motor reset/Return to higher level menu	Return to standby screen/Higher level menu
	Heater Switch	Heater Switch	Heater Switch	Heater Switch
	Invalid	Next step / arc	Invalid	Invalid

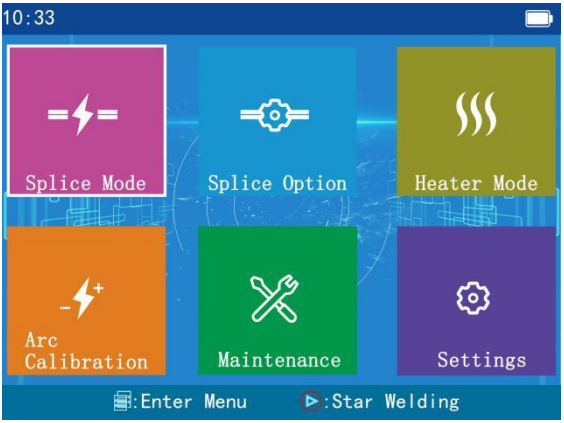
Remarks:

①Keypad layout is different for different model fusion splicer of this series, each button mark and their functions are listed in the table above.

②The "**blue**" text on the table above is the button functional description of **keyboard** Ⅱ.

4. Common Operating Interface Description

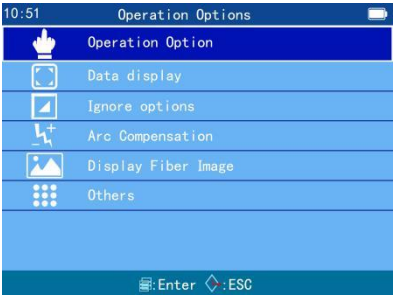
4.1 Standby Interface of fusion splicer (Level 1 Menu)



- Top right corner of the screen  :Indicating the present power supply mode of "power adapter".
- Top right corner of the screen  :Indicating "Heater" is "warming up" at current.
- Bottom of screen  :Indicating "Keypad operation" on current screen.

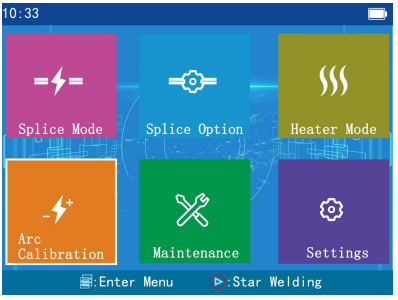
4. 2【Splice options】

4. 2. 1【Operation Options】

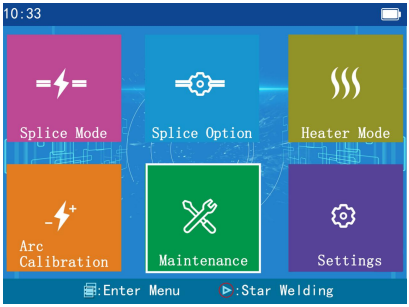


4. 3【Heater mode】

4. 4【Arc Calibration】



4. 5【Maintenance】



4. 6【Settings】

5. Power supply

5.1 Starting up:

Hold down button;

When the LED indicator on the keypad is changed to green,release button.

5.2 Shutdown:

Hold down button. After the LED indicator on the keypad is changed from green to red, release button.

5.3. Power supply

5.3.1 Power adapter power supply(no need to install lithium batteries)

Adapter AC input

- Only AC power cord attached to the adapter is used, and the input voltage is AC100-240V 50-60HZ.
- The grounding terminal of AC power line input must be grounded effectively。

Adapter DC output

- Use only the DC power cord attached to the adapter.
- Output voltage: DC13.5V 4.8A
- Insert DC power cord into the "POWER INPUT" port at the bottom of splicer. The splicer supplies power to the adapter.

5.3.2 Lithium battery power supply

①The random lithium batteries are correctly connected to the bottom of the splicer (power module), that is to realize the power supply of lithium batteries in the splicer.

②Different battery configurations correspond to different charging modes.

- Use only AC power cord attached to the adapter, input voltage:AC100-240V 50/60HZ.
- The grounding terminal of AC power line input must be grounded effectively.
- Insert DC power cord attached to adapter "POWER INPUT" at the bottom of splicer Input port, the splicer will start one charging process of secondary lithium batteries.

Charging of batteries

- Charging indicator lamp is red; after charging, Charging indicator Lamp Turn green.
- When the power is off, the charging time is up to 3hours, 30minutes, 40minutes and the battery is surplus. The amount of capacity determines the length of charging time.

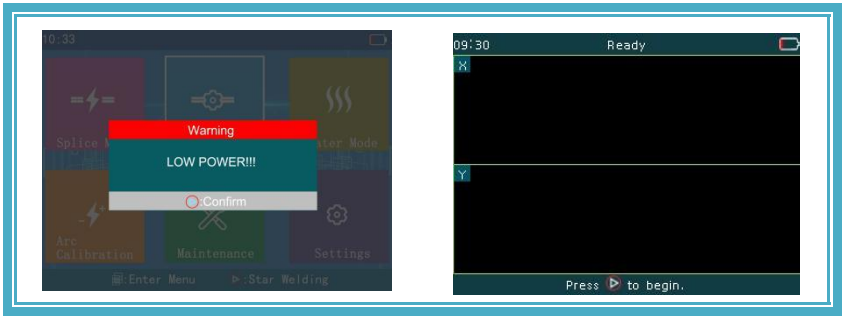
Battery maintenance

- Please store lithium batteries in a cool, dry and safe environment.
- Do not place the lithium battery near high temperature, flammable and explosive gases or liquids.
- If the lithium battery needs to be stored for a long time (more than one month), it is recommended to charge it to 40%-60%, and the storage time should be charged 1 to 2 times a month.

- Please use the special charger provided by our company for the lithium battery.
- Do not short circuit the positive and negative electrodes of the lithium battery, otherwise it will cause burns and explosion.
- Please use the standard lithium battery supplied by SKYSHL for the fusion splicer, please do not use other lithium batteries not supplied by our company.
- Do not disassemble the lithium battery privately.
- Do not hit the lithium battery strongly.

5.3.3 Low voltage alarm (battery-powered)

This model fusion splicer has "low voltage alarm" function.When the lithium battery (group) power is below a certain value,the fusion splicer screen will show "low battery!!!" warning window as shown below. At this point, the user should promptly use the power adapter or charge the lithium battery, or hold down button to turn off the fusion splicer. Otherwise, it will shut down automatically after about 30 seconds.



6. Cleaning operation before fusion

Cleaning V-groove（Youtube Video:youtu.be/P6qsIM3S-D4）

Clean the bottom of the V-groove with a wet cotton swab dipped in absolute ethanol. Use a dry cotton swab to absorb the residual anhydrous ethanol in the V-shaped tank. Use a clean, cut, fiber-optic end to remove dirt.

● When cleaning, be careful not to bump into or touch the electrode rod.

7. Regular maintenance

Cleaning objective lens(SS413F has no mirror, only camera)

In routine maintenance, the ear syringe may be used for blowing off the dust from the surface of the mirror and the objective lens of the fusion splicer.

The mirror and objective lens are dusty after a long time without routine maintenance, resulting in whitening and fuzzy black-clad of fiber image.

<1> Before cleaning the lens, first turn off the power of the fusion splicer.

<2> Roll specific lens paper into a stick, fold and tear out, then clean the mirror, objective lens surface with the rough edge of the stick.

<3> When the lens paper cleaning is invalid and the objective lens surface is free of visible dust particles, try to use a thin cotton swab dipped in a little pure alcohol (99% and above) and wipe gently the lens surface. It is recommended in principle not to use alcohol to clean the mirror surface.

<4> Wipe the lens with a cotton swab from the middle of the lens and make a circular motion up to the edges of the lens. Then wipe with a clean dry swab the remaining alcohol. The objective lens surface should be clean and free of dirt.

- Incorrect use methods or undesirable chemical substances cleaning objective lens can cause optical fiber imaging fuzzy damage the equipment.

Replacement of electrode

Electrodes will be worn-out after long-term use, plus silicic oxide accumulates on the tip, it also requires regular cleaning. It is recommend to replace the electrode when the electrode rod exceeds its service life. If the machine continues in service without changing the electrode, it will increase splice loss and reduce the strength after fusion splicing.

Use of lithium batteries

Lithium batteries must be charged in the ambient temperature range of 0～+40℃. The storage environment of lithium batteries for a long time is: temperature -5 ～ +35℃. humidity 65+20% RH, clean, dry and ventilated.

8. Basic Fusion Procedures

(Video: youtu.be/A6uZtgps8Ok)

1.Turn on the power of the SS413F

2.Confrimation of splice and heater mode

"Auto SM" fusion mode is Recommended for SM(G.652& G.657)." Standard 60mm " heater mode is recommended for the length of protective casing is 60mm.

3.Cleaning coating or tight sleeve of optical fibers

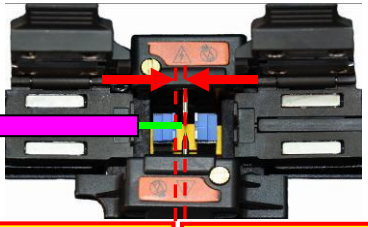
4.Putting Optical Fiber into thermal shrinkage protection casing

5.Remove the fiber sheath and coating and use alcohol to clean the fiber

6.Use a fiber cleaver to cut the fiber (make sure the end face after the cut is flat)

Because the fiber is very fragile, do not touch other objects with the end face of the cut fiber.

7.Place optical fibers in V-groove of the SS413F



The end of the optical fiber is placed between the V-groove edge and the center of the electrode.

8.Close the windproof cover and begin to fuse the optical fibers

9.LCD screen observation of optical fiber welding

10.Take out optical fiber

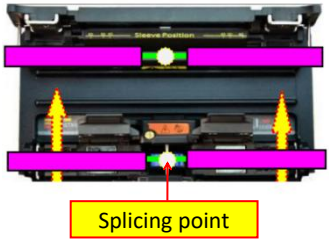
11.Place the heat shrinkable sleeve in the middle of the heater

12.Place the weld point of the fiber in the center of the heat shrink tube.

13.Move the fiber to place the weld point in the middle of the heat shrink tube.

14.Close the heater cover and start heating

15.Complete

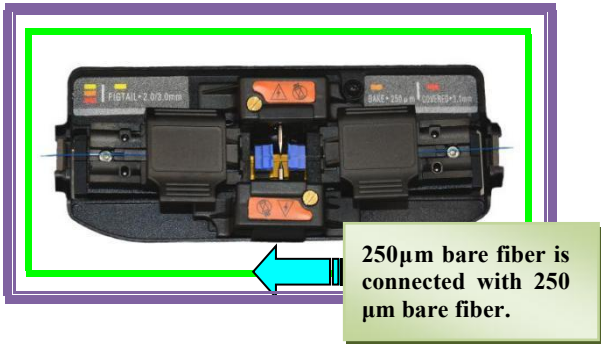


●The application of different types of fibers in FTTH projects:

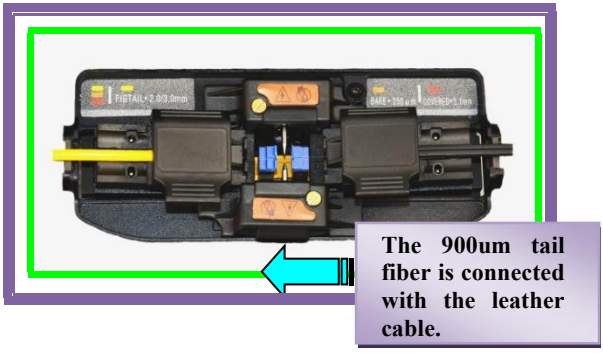
①Open the wind cover and wait for the automatic reset of the fusion splicer until the machine is at readiness status.

②Put respectively the prepared fibers into The bottom of left and right V grooves of the fusion splicer.

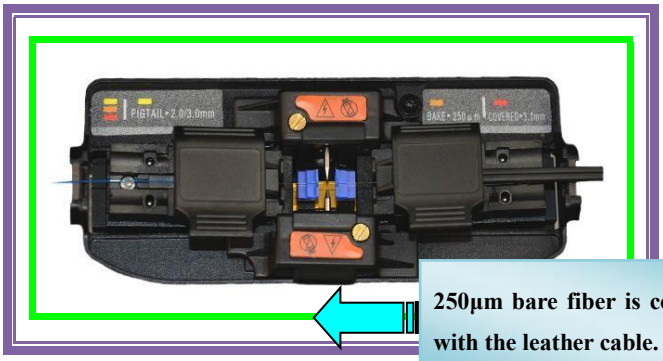
③When the windproof cover is closed, the splicer will automatically complete fusion between the following different kinds of optical fibers.



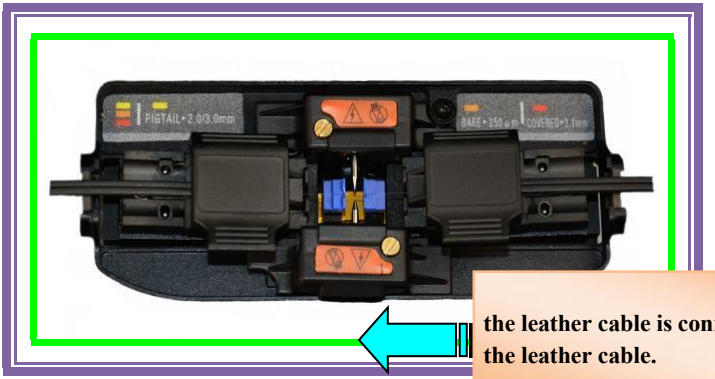
250μm bare fiber is connected with 250 μm bare fiber.



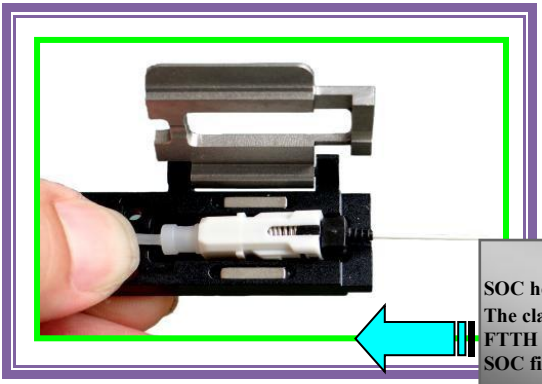
The 900um tail fiber is connected with the leather cable.



250μm bare fiber is connected with the leather cable.



the leather cable is connected with the leather cable.



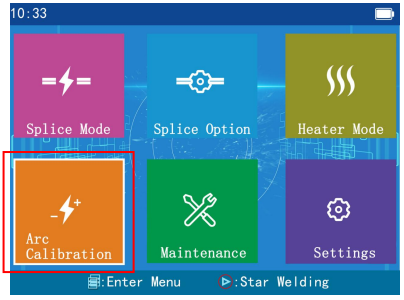
SOC hot splicing:
The clamp must meet the industry standard FTTH hot melt quick connector.【Need a SOC fiber fixing clip (optional)】

9. ARC Calibration (Video:youtu.be/lBO6tsaLN5k)

Why do we need to do Arc Calibration?

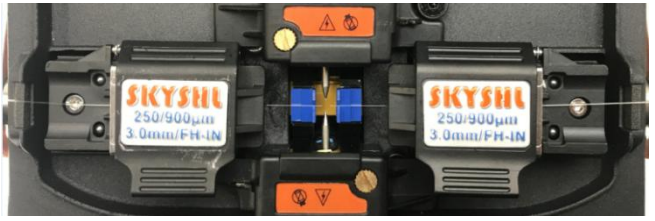
When the fiber optic material, altitude, climate, temperature, humidity, electrode condition and other factors change greatly, it may lead to increased splicing loss of the l splicer; Arc calibration can effectively reduce the splicing loss.It is recommended to do an ARC calibration before the first use after getting the machine.

<1>Select “Arc Calibration” from the main menu page



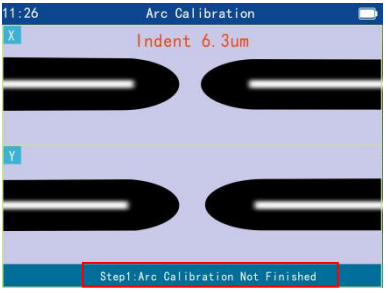
<2>Place two optical fibers in the fusion splicer.

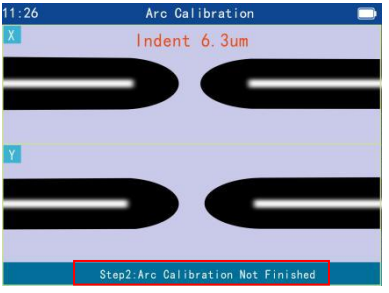
Both Arc Calibration Fibers and Splicing Fibers are made in exactly the same way.



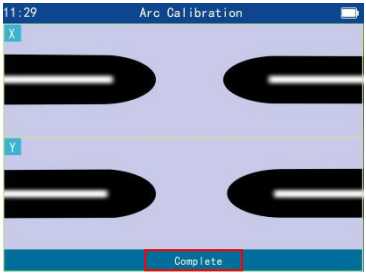
<3>Closing the cover will automatically start the arc calibration.

<4>If “Step1: Arc Calibration Not Finished” or “Step2: Arc Calibration Not Finished” is displayed at the bottom of the screen, it indicates that the calibration has failed. Please make two fibers again, then start Arc Calibration again.





<5>If it displays “Complete”, it means the calibration was successful.



10. Manually adjust the fiber position / Motor Calibration

(Video:youtu.be/u0oUbqNg77A)

Why do we need to adjust the position of the fiber?

Due to the dust on the construction site, the initial position of the motor changed. When the fiber is welded, the motor stroke cannot reach the alignment position, which leads to the wrong position of the fiber and welding cannot be performed. After cleaning the dust in the V-groove, the fusion splicer still can not be welded, so we need to manually adjust the position of the fiber to restore the original position of the motor.

<1>Select 【Maintenance】-> 【Manufacture adjust 1】 -> Enter the password "1" (The X/Y button selects the characters and the button confirms

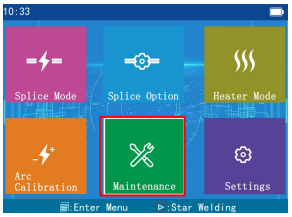


Figure 10.1.1

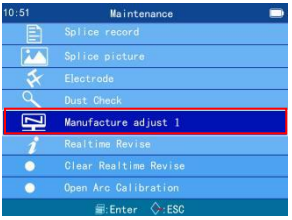


Figure 10.1.2

Figure 10.1.3

<2>Select 【Left Fiber】(Press and hold key to display positioning grid, hold key to display menu, press and hold key to confirm selection); Press and hold the button to move the fiber to the left position of the screen(As shown in figure 10.2.2).

Figure 10.2.1

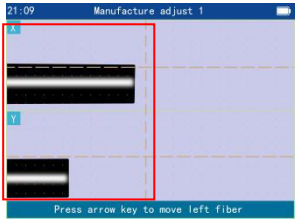


Figure 10.2.2

<3>Select 【Right Fiber】, Press and hold the button to move the fiber to the right screen position(As shown in Figure10.3.2).

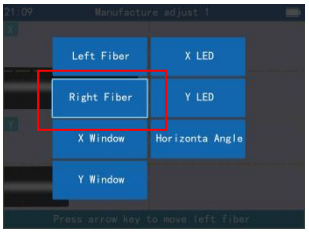


Figure 10.3.1

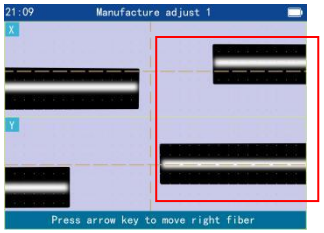


Figure 10.3.2

<4>Select 【Left fiber】 and press and hold the or to align the left and right fibers displayed in the X window horizontally(As shown in Figure10.4.2).

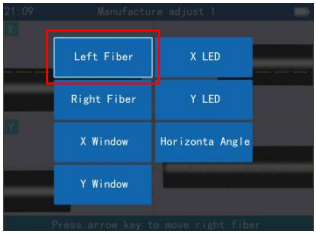


Figure 10.4.1

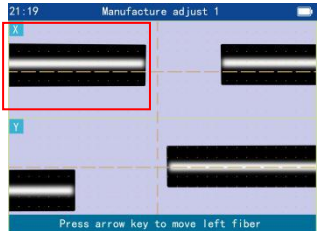


Figure 10.4.2

<5>Select 【Right fiber】 and press and hold the or to align the left and right fibers displayed in the Y window horizontally(As shown in Figure10.5.2).

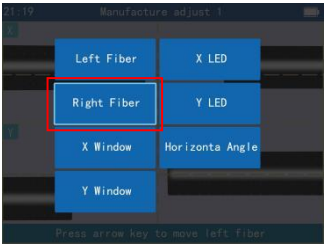


Figure 10.5.1

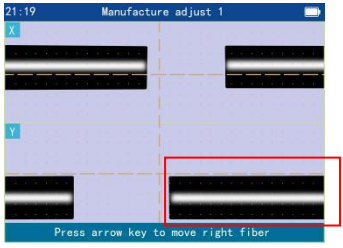


Figure 10.5.2

<6>Select【X Window】,and then press and hold the or to make the center line of the fiber in the X window overlap the horizontal auxiliary line in the X window(As shown in Figure10.6.2).

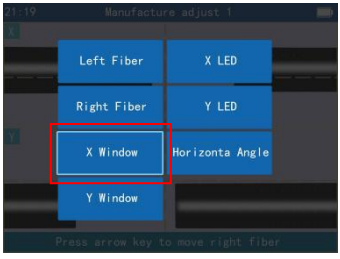


Figure 10.6.1

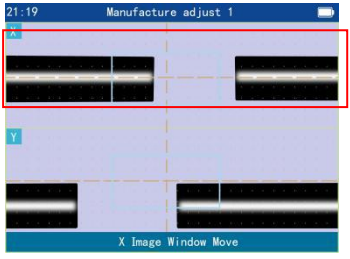


Figure 10.6.2

<7>Select【Y Window】,and then press and hold the or to make the center line of the fiber in the Y window overlap the horizontal auxiliary line in the Y window(As shown in Figure10.7.2).

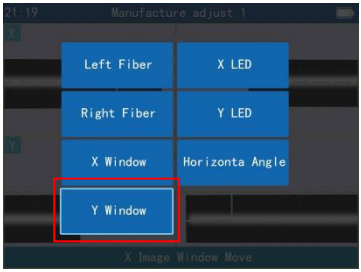


Figure 10.7.1

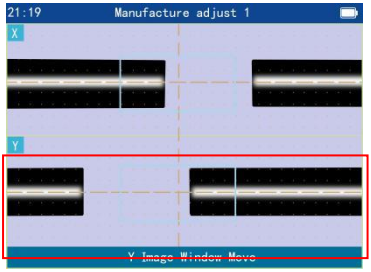


Figure 10.7.2

<8>Select【X Window】, and then press the or key to overlap the center of the gap between the left fiber and the right fiber in X Window with the vertical auxiliary line(As shown in Figure10.8.2).

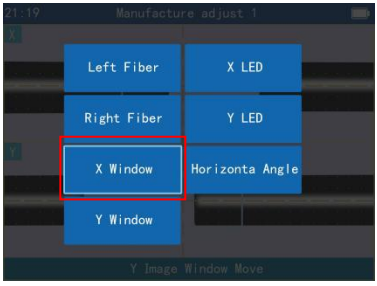


Figure 10.8.1

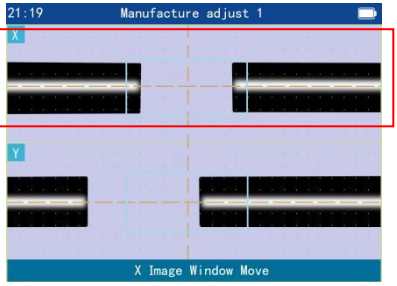


Figure 10.8.2

<9>Select【Y Window】, and then press the or key to overlap the center of the gap between the left fiber and the right fiber in Y Window with the vertical auxiliary line(As shown in Figure10.9.2).

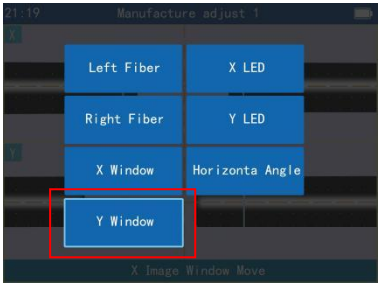


Figure 10.9.1

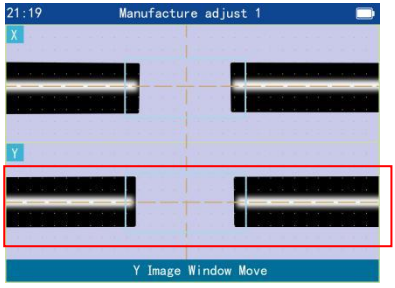
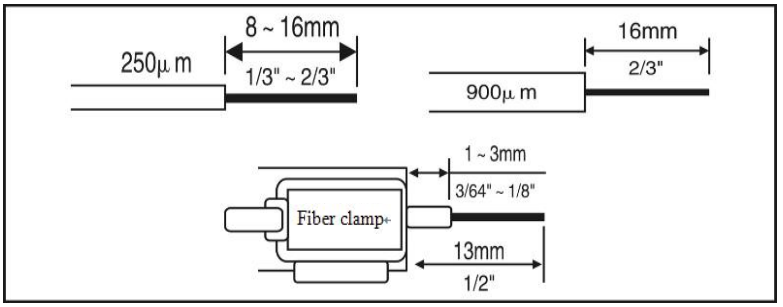


Figure 10.9.2

<10>Press the button twice to exit calibration after calibration is complete.

11. Cutting Length of Optical Fiber



12. Common troubleshooting

Phenomenon	Defect	Reason	Measures
 	Bubble	1.Dust on the end of optical fibe. 2. Condensation. 3.Poor end face ofoptical fiber. 4.Arc intensity is too low.	1.Clean the fiber. 2.Cut the end face of the fiber again and make sure the end face of the fiber is flat. 3.Replace with new electrodes. 4.Stable electrode. (【Maintenance】-> 【Electrode】-> 【Stabilize Electrode】)
	Unfused	1.Too high pre-arc intensity 2.Propulsion speed is too slow 3.Advance blocked	1.Do"arc calibration". 2. Stable electrode. (【Maintenance】-> 【Electrode】-> 【Stabilize Electrode】) 3. Clean V-groove.
	Variable diameter		

Phenomenon	Defect	Reason	Measures
	Misalignment of fibers	1. V-groove is dirty 2. Motor stroke is out of range	1.Use Cotton Swab and Cleaved Fiber to clean the V-groove. 2.Manually adjust fiber position.
	Fiber end bevel angle is too large	1.Poor fiber cut	1.Adjust the height of the fiber cleaver blade. (Video: youtu.be/eoDzTGHLg6w) 2. The fiber cleaver blade is worn out, please rotate it to a new position or replace with a new fiber cleaver. (Video: youtu.be/r8v-vGfuuGk)
	The end of the fiber has burrs		
	Fiber end face protrusion		
	Blurred fiber image	1.Camera is dirty	1.Clean the camera.

Defect	Reason	Measures
Cannot start the machine	1. The battery is too low 2. No battery installed 3.The adapter has no power	1. Replace the battery or charge the machine 2. Install the batteries in the machine 3. Connect the power supply to the adapter
Fiber is not automatically spliced after closing the cover	"Auto start" is closed	【Splice Option】-> 【Operation Option】->Set "Auto start" to "ON"
Does not heat up automatically after closing the heating oven cover	"Heat Control" is "Manual"	【Heater Mode】->Choose the type of heat-shrinkable tube->Set "Heat Control" to "Auto"

Appendix A. Warranty period and conditions

(If the following occurs,it is not within the scope of free warranty)

- ★ The failure or damage caused by the careless use of the operator (Including product physical damage, moisture short-circuit etc.);
- ★ Product damage caused by the disasters (earthquake, fire, flood, lightning, typhoons, etc.) or force majeure;
- ★ The product failure or damage due to improper use, or improper installation, or caused by non- original battery and accessories or other external factors, such as voltage instability;
- ★ The user tears up "warranty void after tearing up the label" label on the enclosure of the fusion splicer, and disassemble and repair the machine without authorization;
- ★ The user tears up "warranty void after tearing up the label" label on the enclosure of the lithium battery;
- ★ Consumable parts (such as arc electrode, cutter blade, fusion splicer carrying case, etc.).

● Exemption clauses

For the use of non-original battery, battery charger, power adapter and so on not provided by our company, the Company will not accept any liability on all losses caused thereby.

If you have any questions about the product, please contact SKYSHL.

Maintenance and repair Information required

(the following information shall be included in the machine)

<1> Full name, Company, Address, Phone number, Fax number and e-mail.

<2> Fusion splicer model and serial number.

<3> Problems and fault symptom encountered.

①.What time and under what circumstances the problems occur?

②.How is the current situation?

③.The character and image information of optical fiber on the display when the machine fails.

<4> List of parts in the machine.

★**Symbols and Sign**

High voltage warning sign: there is high voltage, please do not touch it..

High temperature warning sign: high temperature exists, please do not touch it.

★The company's product performance and properties are improving and subject to change without notice.

★If the pictures in this manual are inconsistent, the product is final.

Scan the QR code to download
the product documents

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If there are any issues with the product, please contact the above email directly so we can take care of any issues inmmediately.