SUN-FS550 Fiber Fusion Splicer User's Manual

Optical Fiber Fusion **Splicer**

Before operating this series fusion splicers,

please read carefully this manual.

Please observe all safety warnings and cautions in this manual.

Version 2.10

⚠ WARNING !

1. The input voltage range of this model fusion splicer is fixed. Do not usethe voltage outside the range specified. Please use the correct AC and DC power supply.
2. Avoid the operation which may cause electrical shock, equipment damage, or even fire disaster, personal injury or death. Please use a dedicated three-wire grounded AC power line, AC / DC power adapter. When the adapter input cable is connected to AC220V, 50 / 60HZ power supply, the user must use an effectively grounded three-holes socket.
3. Strictly prohibit handling AC power cable, adapter and fusion splicerwith wet hand, in case an electrical shockoccurs.
4. When the fusion splicer encounters following faults, please unplug immediately the power output cable of the adapter from the fusion splicer power supply input port and shut down the fusion splicer, otherwise, it will cause the fusion splicer unable to be repaired even causing bodily injury, death and fire.
   * Smoke, smell, sound or abnormal heating up
   * Liquid, foreign matter go into the machine
   * Machine damage or falling down
5. Do not use gas cleaning agent to clean the fusion splicer, otherwise, the arc of the machine electrode during discharge will ignite combustibles and cause fires.
6. Do not operate the fusion splicer in flammable liquid or flammable gas environment; otherwise, it will lead to serious consequences of fire, explosion and so on.
7. Never touch the electrode of this model fusion splicer at work, otherwise, the people will suffer a serious arc electric shock and burn. Shut down the fusion splicer and disconnect the power supply before replacing electrode.
8. Meet proper personal protection requirements in operation, in case the fiber debris get into the eyes, mouth, skin or mouth, causing personal injury.

 WARNING !

9. There are no parts required for maintenance in this model of fusion splicer, prohibit dismantling the fusion splicer and power module (lithium batteries). Repair in any errors will cause the machine unable repair even causing personal injury.

10. The operation method of power module (lithium battery) is strictly limited in this manual. Wrong use will result in battery explosion, fires and personal injury. Please strictly implement "Battery Precautions" in the manual, "Battery Danger Warning" and other related requirements.

11. If the battery charging cannot be completed or charge indicator cannot be converted within five hours, stop charging immediately and contact with our customer service center.

12. The fusion splicer battery is a consumable item and has a safe period of service life. Extended use is strictly prohibited. (Safe service life means: the charge-discharge in normal operation areless than 300 times and the storage period does not exceed 12 months).

⚠ CAUTION !

1. Do not touch the fusion splicer heater and heat-shrink sleeve with splicing process just completed, otherwise burn hazard will occur.
2. 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 operator can also use special lens paper to clean. It is recommended in principle that alcohol is not used for cleaning the mirror surface. Please strictly implement the relevant requirement of the manual.
3. Do not store the fusion splicer in a high temperature or high humidity environment.
4. In a dusty environment, the fusion splicer shall be tried to avoid dust.
5. When the fusion splicer is moved from a cold environment to a high temperature environment, try to have a heating up process to eliminate condensation.
6. In order to maintain fusion splicer performance and stability, the machine maintenance in factory is recommended once a year.
7. The fusion splicers are accurately calibrated in factory. Please try to avoid intense shock and collision, and use a dedicated carrying case for transportation and storage.
8. The repair and commissioning of the fusion splicer must be performed by professional and technical personnel. Incorrect use methods or undesirable devices can cause bad damage to the equipment. If a problem occurs, please contact in time the manufacturer.

⚠️ CAUTION !

★**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 for all the losses caused.

★ **Symbols and logo**

The safety warning signs used on this model fusion splicer shall be observed fully.

High voltage warning sign: **High voltage; No touch.**

High temperature warning sign: **High temperature; No touch.**

1. General

Thank you for buying the product. This user manual describes mainly the detailed operation steps of fully automatic, high-performance this series optical fiber fusion splicers as the latest products made 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. User-friendly graphical interface is convenient for efficient and quick operation by the user. The high-end fiber optic fusion splicer can collect at real-time "thermal image" in auto calibration mode. The real time fusion splicing process compensation in low temperature and low pressure environment can guarantee effectively the quality of the fiber splicein extreme environments. High fusion splicing speed, small splice loss, light in weight and portable features are applicable to backbone network, metropolitan area network and FTTx project.

In order to complete accurately the fusion splicing operation, please read carefully this user's manual.

1. 1 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

Splicing time	9 seconds (typical environment)
Heating time	35 seconds (typical environment)
Fiber Align	Fine align, core align, clad align, Manual align
Fiber diameter	Clad diameter 80 ~ 150μm, coating diameter 100 ~ 1000μm
Cutting ength	Coating less than 250μm: 8 ~ 16 mm; Coating 250 ~ 1000μm : 16 mm
Tension test	Standard 2N (optional)
Fiber clamp	Multifunctional clamp, applicable to bare fiber, tail optical fiber, wire jumper, rubber-insulated fiber. Optional clamp meets industry standard FTTx splice quick connector.
Magnification times	300 times (X-axis or Y-axis); 150 times (X-axis and Y-axis)
Heat-shrink sleeve	60mm, 40mm and a series of miniature shrink sleeves (some features are optional)
Display	TFT color LCD display. Thecontent can be flipped, easy for two-way operation.
External port	USB2.0 port: Convenient data download, U-disk upgrade software
Splice mode	53 factory modes, 40 user modes
Heating mode	11factory modes, 40 user modes

splices stored	Built-in memory to save the latest 4000 splices.
Built-in battery	Continuous splicing andheating times more than 200 times (typical environments)
Power saving function	Selecting "Power Save Mode" under typical circumstances can save 15% battery power.
Power supply	Built-in 12.5V lithium battery power supply, the charging time ≤3.5 hours; External adapter, input AC100-240V 50 / 60HZ, Output DC13.5V / 4.8A; The power supply mode can be identified, real-time monitoring of current battery power.
Working environment	Temperature: -10 ~ + 50 ℃ , humidity: <95% RH (non-condensing), Operating altitude: 0 ~ 5000m, Maximum wind speed: 15m / s
Lighting	Convenient placement of optical fiber at night
External dimensions	See "1.2 standard configuration of fusion splicer"
Weight	See "1.2 standard configuration of fusion splicer"

Remarks:

★ The technical data in the table above may be different due to the different types of products.

1.2　Standard configuration of fusion splicer

The following is the summary of　this series fusion splicers.

Product Model	Thumbnail	External dimensions	Weight (without battery)
A		168mm (length) ×150mm (width) ×165mm (height)	2.10Kg
B		125mm (length) ×105mm (width) ×113mm (height)	1.11Kg
C		193mm (length) ×125mm (width) ×85mm (height)	1.05Kg
D		122mm (length) ×148mm (width) ×130mm (height)	1.37Kg
E		168mm (length) ×150mm (width) ×165mm (height)	2.10Kg
F		160mm (length) ×133mm (width) ×145mm (height)	1.60Kg
G		168mm (length) ×150mm (width) ×165mm (height)	2.10Kg

The following is the standard configuration of optical fiber fusion splicer:

No.	Name	Thumbnail	Quantity	Remarks
1	Fusion splicer	—	1 set	Main machine
2	Carrying case (bag)		1 piece	Spare parts
3	Splicing clamp		1 piece	Optional
4	Heater clamp		1 piece	Optional
5	Spare electrode		1 pair	Spare parts
6	Power adapter		1 piece	Spare parts
7	AC power cable		1 piece	Spare parts
8	Hot fiber clamp		1 piece	Optional
9	Plastic tweezers		1 piece	Spare parts
10	Cleaning brush		1 piece	Spare parts
11	Cooling tray		1 piece	Spare parts
12	Operation manual		1 disk	Accessories

13	Certificate of quality		1 copy	Accessories
14	Test Report		1 copy	Accessories

Remarks:
1.The fusion splicer carrying case (bag) has many styles prepared for the users.
2.The standard configuration above is the configuration recommended by our company, the configuration of the machine in packing box is based on the packing documents, i.e. "packing list" in the packing box, will not be described in detail hereby.
3. The "optional parts" are not the basic parts of the fusion splicer in packing box and shall be ordered by the user separately.

1.3 Name of main components of fusion splicer

Heater clamp (left press plate)

Heater right press plate

Heating groove

Heater transparent window cover

V-groove

Electrode

Left fiber clamp

Right fiber clamp
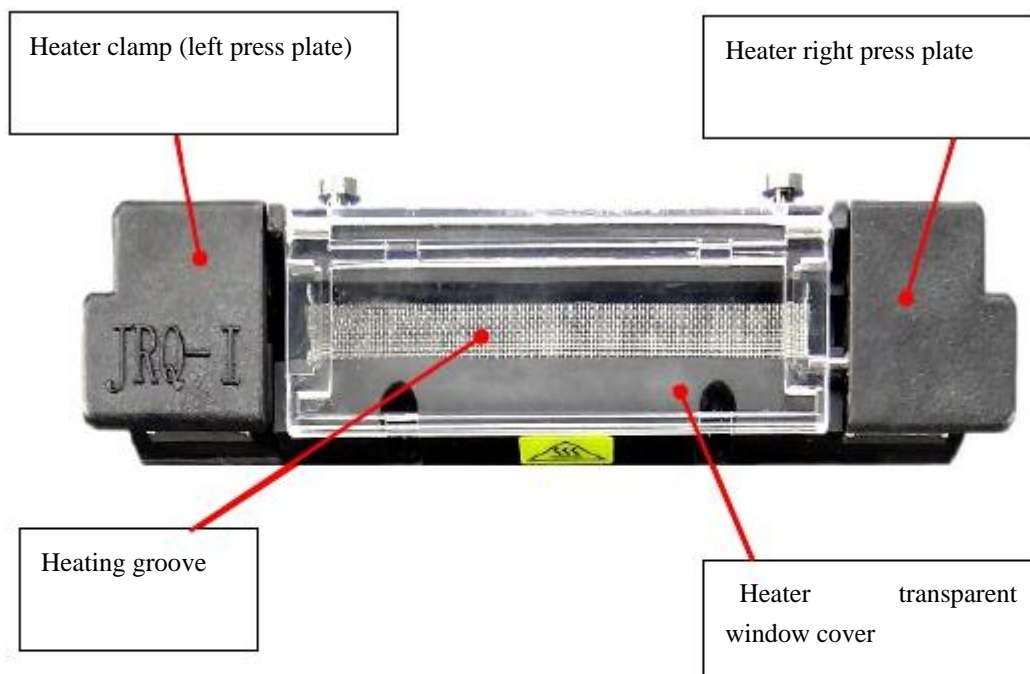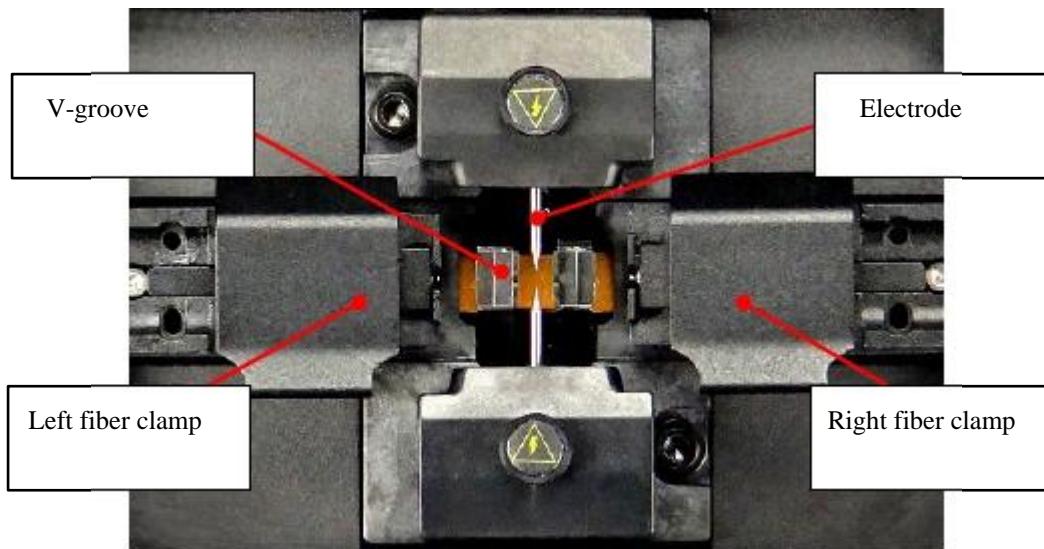
1.4 Descriptions of the keypad of fusion splicer

Buttons of keypad I

Buttons of keypad II

Button	Readiness	Manual mode	Automatic mode	Parameters menu
	Power switch	Power switch	Power switch	Power switch
	Moving cursor	Upward movement of fiber	In valid	Increasing the amount of parameters / moving cursor
	Moving cursor	Downward movement of fiber	In valid	Reducing the amount of parameters / moving cursor

	Moving cursor	Leftward movement of fiber	In valid	Reducing the amount of parameters / moving cursor
	Moving cursor	Rightward movement of fiber	In valid	Increasing the amount of parameters / moving cursor
	In valid	**Return to readiness screen**	**Return to readiness screen**	**Back to higher level menu screen**
	In valid	**In valid**	**In valid**	**Confirming option function / Parameter modification**
	Enter splice mode menu	Open the function to move motor by buttons at pause	In valid	Enter lower level menu /operation screen
	Start splicing	**Continue forward / Start splicing**	**Start splicing**	**In valid**
	Start splicing	Continue forward / Start splicing	Start splicing	Confirming option function / Parameter modification
	In valid	**Motor reset**	**Motor reset**	**In valid**
	In valid	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
	In valid	Next step / arc	In valid	In valid
	In valid	Switching over X / Y display screen	Switching over X / Y display screen	In valid

Remarks:
①.Keypad layout is different for different model fusion splicer of this series, each button mark and their functions are listed in the table above.
②.The "blue" text on the table above is the button functional description of keyboard Ⅱ.
③.For the detailed operation of [Manual mode], please read "4.7 Manual drive motor " in this manual.

1. 5 Description of readiness screen of fusion splicer

● Top right corner of screen: Indicating the power supply mode as"power adapter" at present.

● Top right corner of screen: Indicating "Heater" "is warming up" at present.

● Bottom of screen: Indicating "Keypad operation" on current screen.

LCD display

This series of fusion splicers are equipped with a liquid crystal display. It is a precision part manufactured in factory environment with quality controlled strictly. Nevertheless,there may be also some individual black, red, blue, green dots on the screen. The brightness of the display will be different at different viewing angle to the screen. **These symptoms are not the defects of LCD display, but natural phenomenon.**

2. Basic operation

2.1 Power supply of fusion splicer

The power supply of this series fusion splicers adopts two-in-one power supply design. The power supply modes are divided into external power adapter or lithium battery, wherein the lithium battery power supply is divided into built-in battery and independent removable battery. For the correct and safe use of this series fusion splicers, the operator must use the parts (power adapter, charger and lithium battery) provided by the company and read carefully following operation manual.

2.1.1 Power supply of power adapter

①.The basic parameters of the exclusive AC/DC power supply adapter of the fusion splicer produced by our company are as follows:

INPUT: AC100-240V ~ 1.8A 50 / 60HZ

OUTPUT: DC13.5V / 4.8A

● **Use only AC adapter power cable supplied with the machine.**

●**The ground terminal of AC input power cable must be effectively grounded.**

●**When using AC generator, the operator shall check regularly whether it conforms to AC input requirements of the output voltage.**

●**Use only DC output power cable supplied with the adapter.**

●**Prohibit strictlyhandling AC power cable, adapter and fusion splicer with wet hand,otherwise, an electrical shock may occur.**

The power adapter is connected with this series fusion splicers in two ways

as follows.

②.One connecting way is shown in the figure below. After the power adapter is connected to AC mains power, DC output power cable is connected to the "POWER INPUT" of the power supply module of the fusion splicer, then the fusion splicer is powered by the external power adapter.

power supply module
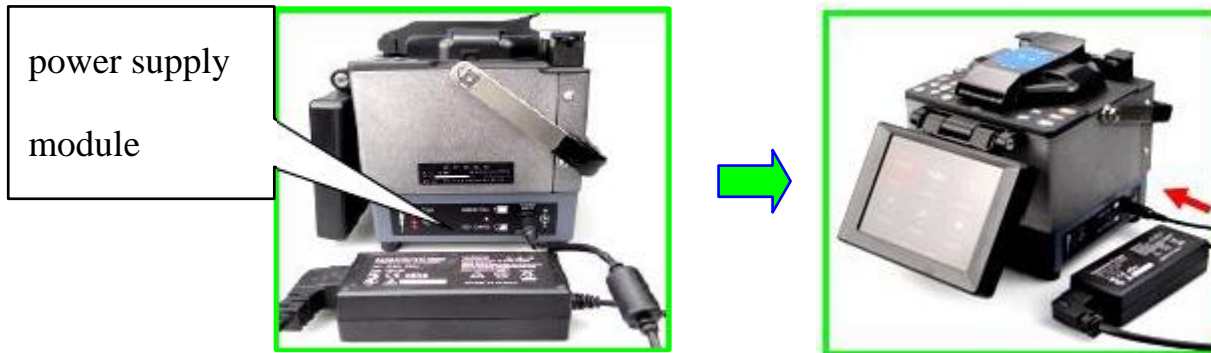
③.Another connecting method is shown in the figure below. The fusion splicer bottom, i.e. battery base, is installed with the power supply adapter. The power supply adapter is connected to AC mains power. Finally, DC output power cable is connected to "DC IN" power input port of the power supply adapter. The fusion splicer is powered by the external adapter.

power supply adapter.
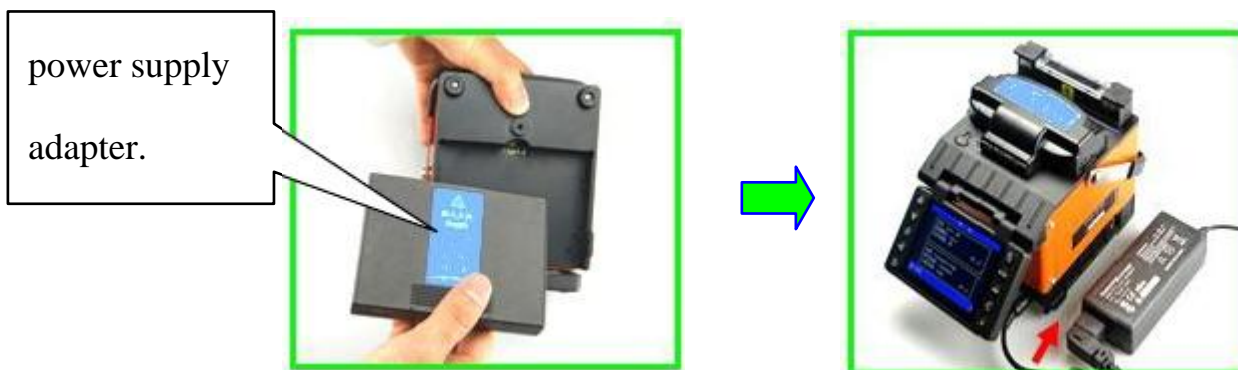
● If AC voltage of the mains power (or generator) is lower than 100V or higher than 240V or unstable, AC / DC power adapter will not provide normal DC output. The adapter DC output cable cannot be connected to "POWER INPUT" of the fusion splicer power module ("DC IN" of power adapter) in such a case.

> ⚠ **Do not use external power supply which does not meet the requirements of our company, otherwise, it will burnout fusion splicer or cause personal injury. When the AC/DC power supply adapter input cable is connected to AC220V, 50 / 60HZ power supply, theoperator must use an effectively grounded three-hole socket.**

2.1.2 Power supply of Lithium battery

The lithium battery power supply is divided into built-in battery and independent removable battery.

①.**Built-in lithium battery**

A. Lithium battery installation

Tilt the fusion splicer and open the power module cover at the bottom of the fusion splicer as shown in figure:

See the figure below. The lithium battery cable is connected with the power cable inside the battery case. Confirm reliable connection.Put the cable first into the side hole of the battery case andthen install the Lithium battery. Close the battery case cover on the bottom of the fusion splicer. If replacing the lithium battery, follow the procedure above.

B. Lithium battery capacity check

After installing the built-in lithium battery according to the steps above, press "PUSH" button on the power module at the side of the fusion splicer as shown in the figure below. Four battery capacity indicators (red) arranged vertically on the left side of the battery are ON. When more indicators are ON, the   battery capacity is higher. The battery capacity description is shown in the table below.

Battery capacity ≥80%	Battery capacity ≥60%	Battery capacity ≥40%	Battery capacity ≥15%	Battery capacity ≤10%
Battery voltage ≥12.2V	Battery voltage about 11.8V	Battery voltage about 11.4V	Battery voltage about 11V	Battery voltage <11V
● The indicators are On. ○ The indicators are Off.				

Remarks:

①**. When the fusion splicer is not connected with the external power supply adapter, the current battery capacity indication on the table above is valid.**

②**. When the fusion splicer is connected to the power adapter, the built-in battery is at the charging state, and four battery capacity indicators (red) arranged vertically on the left side of the power module are ON, it represents only the charging voltage of the battery at current time, does not mean the battery capacity.**

C. Starting up by Lithium battery power

Upon completion of the operations above, make sure the internal lithium

battery is installed correctly and the lithium battery capacity is enough, the fusion splicer can be started.

D. Charging lithium battery

When only one of the lithium battery indicators (red) is ON, or"under voltage" alarm is ON during the operation of the fusion splicer, the lithium battery shall be charged in time.

The power adapter's DC power cable is connected with "POWER INPUT" of the power module of fusion splicer. The built-in lithium battery of the fusion splicer can be charged then.

● **Always use the designated AC / DC power adapter for battery charging.**

● **Long-term power shortage of the lithium battery will damage the lithium battery.**

<1>. No matter what capacity of the battery is at present, whenever DC output cable of AC/DC adapter is connected to "POWER INPUT" of the fusion splicer power module, the power module (Lithium battery) will start charging process.

<2>. Indication of charging status: In charging, the charging indicator (RED CHARGE) is red. When charging is completed, the charging indicator (GREEN FULL) is green;

<3>. At OFF state, the charging time is maximum 3 hours and 30 minutes and minimum 40 minutes, as the capacity of the lithium battery at present determines the charging time.

<4>.When charging at ON state, the charging time is longer. Suggestion: The operator shall try to charge the Lithium battery at the OFF state as this would shorten the charging time.

②.**Powered by independent dismountable Lithium battery**

A. Installation and power supply of Lithium battery

As shown in the figure below, take out the power supply adapter at the bottom of the fusion splicer and install the independent removable lithium battery into the battery base of the fusion splicer. The fusion splicer is powered by the independent removable lithium battery then.
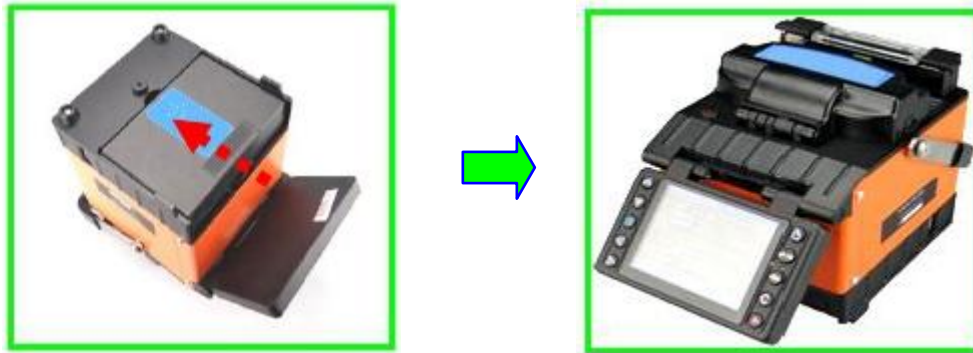
B. Lithium battery capacity check (A Model has no such function)

   After the independent removable lithium battery is installed in accordance

with the steps above, the check operation is as follows.

<1>Move the cursor to [Maintenance] window on the readiness screen and

press to enter the window.

<2> In [Maintenance] screen, press to select "Status".
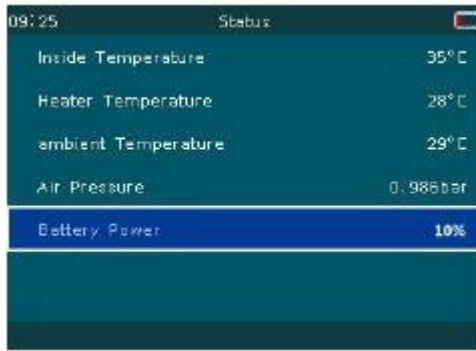
<3>Press , [status] screen appears. "Battery capacity is 90％" is the

capacity of the battery at present.

C.   Charging lithium battery

   When "battery capacity < 10%" on [status] screen, top right corner of the

screen shows "battery under voltage", or "under voltage" alarm is on during

the operation of the fusion splicer, the lithium battery shall be charged in

time.

09:25 Status	09:22
Inside Temperature 35°C	
Heater Temperature 28°C	Warning
ambient Temperature 29°C	LOW POWER!!!
Air Pressure 0.986bar	Confirm
Battery Power 10%	

<1>. Insert the power adapter's DC output cable into "DC IN" port of the

special charger, the charger power indicator (POWER) is red;

<2>.Insert the lithium battery into the charger slot, the lithium battery starts

charging process.

● Always use the designated AC / DC power adapter and charger

for battery charging.

● Long-term power shortage of the lithium battery will damage

the lithium battery.

<3>. In charging, the charge indicator (CHARGE) is red. When charging is

completed, the indicator (CHARGE) is green;

<4>. The longest charging time is 4 hours and 30 minutes; the remaining battery capacity determines the length of charging time.

2.2 ⚠ Battery operation precautions:

<1> Please use the battery in a normal environment. Battery charge and arc and storage need strict environmental conditions:

Battery charging temperature: 0℃ ~ 40℃; Operating ambient temperature: -20℃ ~ 60℃;

Storage ambient temperature: -5℃~ + 35℃; Relative humidity: 65 ±20% RH.

<2>The battery shall keep away from heat, moisture, high pressure and high electrostatic environment and so on during use, as well as collision and knocking.

<3> Battery charging is a complex chemical reaction process and the matching charger shall be used only for safety. The attendant must be at site during battery charging. More than five hours charging is prohibited.

<4>When the battery will not be used for a long time, keep the battery with half of full capacity. In the storage state, the battery shall be charged once every 2-3 months.

<5>The voltage and appearance of the battery should be checked once every 2 to 3 months and the battery shall have a thorough charge and arc once in every six months.

<6>For the battery delivered from the factory within one year, in case the charging and discharging time is significantly shorter (only half the time of normal use and shorter) or when there is obvious bulging, do not use the battery immediately and return it to the factory for inspection and maintenance.

<7>The fusion splicer battery is a consumable item and has a safe service life. Extended use after safe service life is strictly prohibited. Safe service life means: The charge-arctimes in normal use are less than 300 times and the storage period does not exceed one year (12 months).

2.3 ⚠ Battery hazard warning:
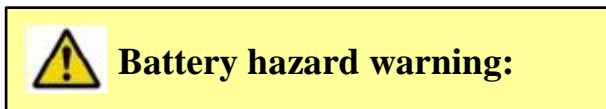
<1>It is strictly prohibited to dismantle the battery:

The battery inside is fitted with protective circuit, which can guarantee the battery safety when used under normal environment. Improper disassembly will damage the protective function of the battery, could cause short circuit in the battery core and cause the instantaneous heat, combustion, and other dangerous of the battery.

<2>Battery short circuit is strictly prohibited.

In any case, do not short-circuit the positive and negative terminals of the battery, otherwise, once the battery core protection circuit fails, there will be a large current, causing the battery heating up, smoking, firing and other hazards.

<3>Never heat up or incinerate battery.

Heating or incinerating battery will cause melting of the core spacer, burning of electrolyte, and the risk of fire or explosion.

<4>Avoid sunlight exposure or rain water

Sunlight exposure may cause the battery to generate high temperature and rain water may cause battery short circuit and other fault, and cause easily the fail of the protection functions.

<5>No battery shall be submerged.

Battery pack is not waterproof. The battery submerged in water will make the battery cells have abnormal chemical reaction, smoke, fire and other hazards.

<6>The dedicated charger shall be used and the battery shall be properly charged.

Battery charging process is a special process of electric ions reactions. The performance requirements of battery cell in charging are fully taken into account in the design of the dedicated battery charger. The multiple protecting functions can prevent the risk of heating up, burning and so on of the battery in charging process. The battery shall be charged in accordance with the correct way and charging for too long could pose a safety risk.

<7>Do not contact directly with battery leak electrolyte.

The leaking electrolyte has certain corrosion. Once leakage occurs, do not touch it directly with hand. If the battery fluid gets into the eyes, rinse immediately the eyes with clear water. Do not rub the eyes. Go quickly to the hospital for treatment. When the electrolyte leakage is found, take out the battery quickly from the machine, so as to eliminate safety risks and avoid

also the machine corrosion.

<8> The battery should be placed away from children.

The identification and control ability of the child is poor. The battery should be placed outside the child's reach to avoid accidents.

2.4 Power-saving mode operation (A model has no such function)

To save battery power and based on the work site conditions, the fusion splicer can be set to enter the power saving mode or shutdown mode when the fusion splicer is not operated within a certain period of time. See [Settings] power save menu (Section 3.7).

2.5 Under voltage alarm (battery-powered)

This series fusion splicers have "low voltage alarm" function. When the lithium battery (group) power is below a certain value (this value is set at the factory and is about 10.3V), the fusion splicer screen will have "low battery !!" warning window as shown below. Top right corner of the screen has battery under voltage icon and buzzer alarms automatically. At this point, the operator should promptly adopt adapter power supply or charge the lithium battery, hold down for a long time to turn off the fusion splicer. Otherwise, it will shut down automatically after about 30 seconds.
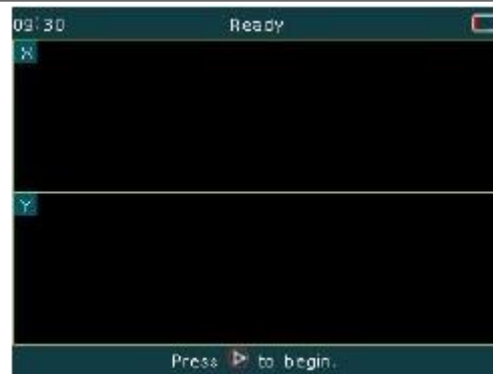
Note: Top right corner of the screen : display the battery under

voltagealarm(simultaneously) .

2.6 Start up and shut down

Start up:

Press for a long time. When the LED indicator on the keypad is

changed to green, release . All motors are back to the initial position, the

fusion splicer shows "readiness" screen. The starting up operation is complete.

Shut down:

Press . After the LED indicator on the keypad is changed from green

to red, release . The machine completes the normal soft shutdown.

2.7 LCD brightness adjustment

On the one hand, the LCD brightness determines power consumption; on

the other hand, when the external lighting of the work environment is not the

same, in order to facilitate the operation of the fusion splicer, the operator can

adjust the LCD brightness. Set-up procedure is as follows:

<1>Move the cursor to [Settings] window of the fusion splicer, press

 button to enter the window.

<2>In the "Settings" screen, press button to select "display brightness".

<3> Press button.The brightness amplitude percentage value window

appears. Select or button to select the appropriate brightness value.

The modified value is recognized as valid by the machine in default.

<4> Press continuously button or button, return to the readiness

operation screen.
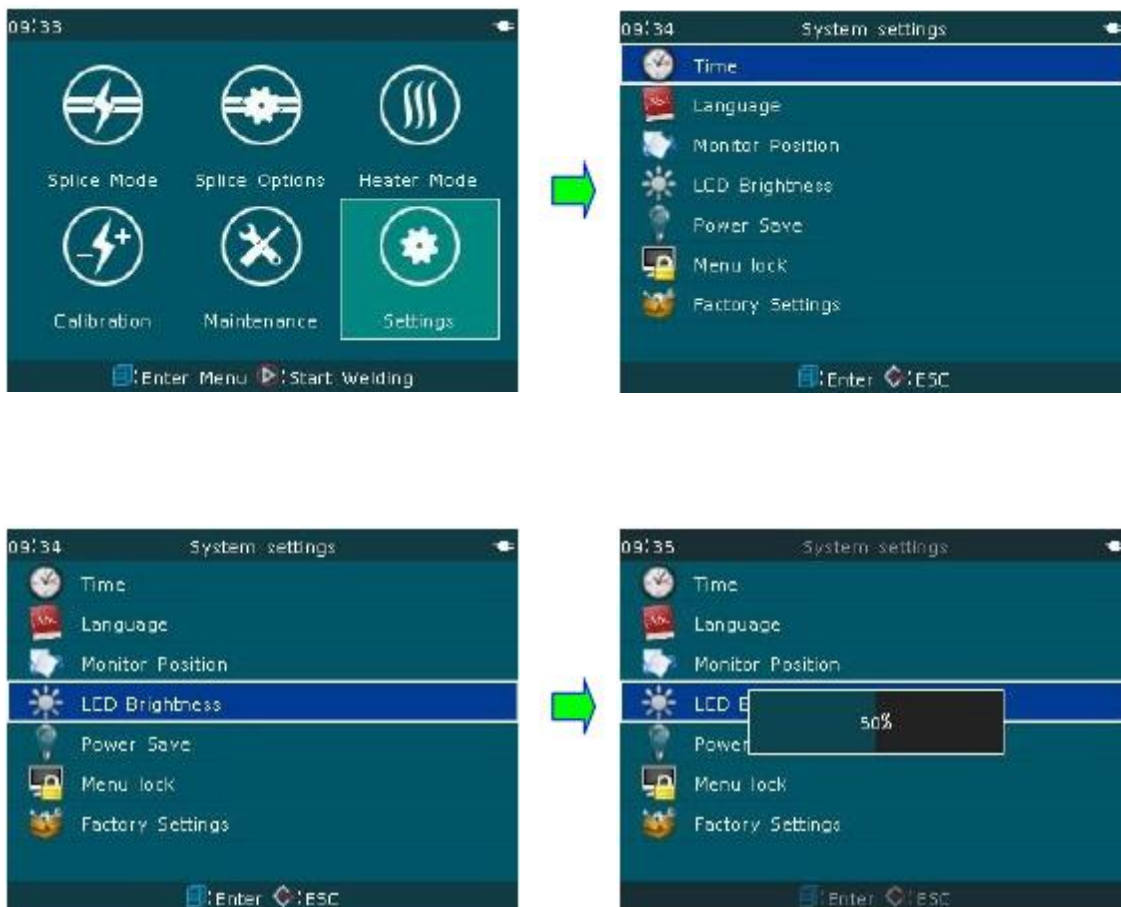
● **When the display brightness is set to be moderate and not too high, power consumption can be reduced and the duration of lithium battery is extended.**

2.8 Preparation of optical fiber end face

2.8.1 Installing optical fiber shrink sleeve

Before the fiber is spliced, put a fiber heat shrink sleeve in advance on the fiber as shown in the figure below.


2.8.2 Production of single-mode and multimode fiber splicing end face

A. Open the big press plate of the cleaver and push the sliding block of the blade from the rear end to the front end.

● Strip off the fiber coating with fiber stripper. The bare fiber length dipped

in alcohol and then clean the bare fiber. Clean the fiber with absorbent

cotton or cotton paper only once. Do not use the absorbent cotton or

cotton paper used before to wipe the fiber again.

(Note: Please use alcohol with purity higher than 99%).
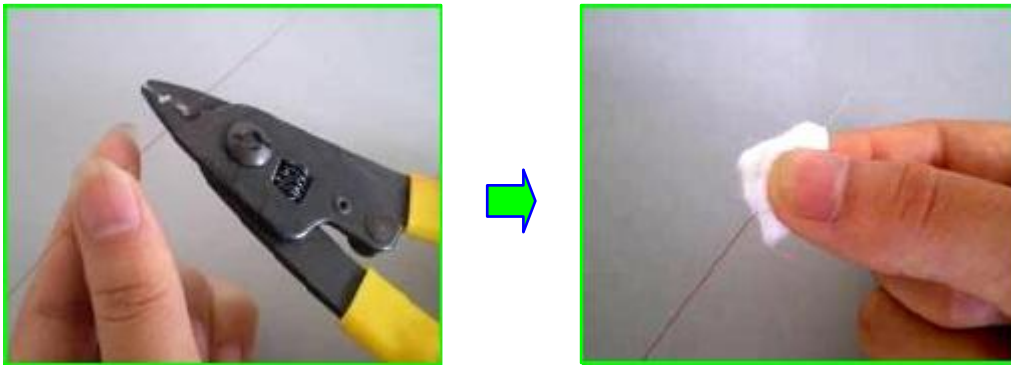
C. Open the smaller steel plate at the left side of the cleaver and put

horizontally the stripped and cleaned fiber in the guide groove of the

cleaver. Hold down the smaller steel plate with left hand and close the

bigger press plate of the cleaver with right hand. It is required that the

bare fiber is put straightly on the left and right fiber rubber pressing seats.

Note the position of 0.25mm
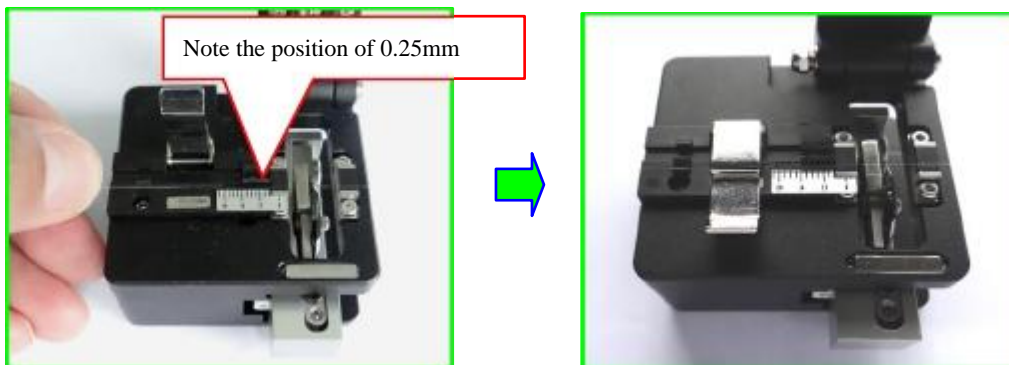
D. Hold the cleaver with left hand and then push the sliding block of the

cleaver blade to the other end with the right hand to cut the fiber.
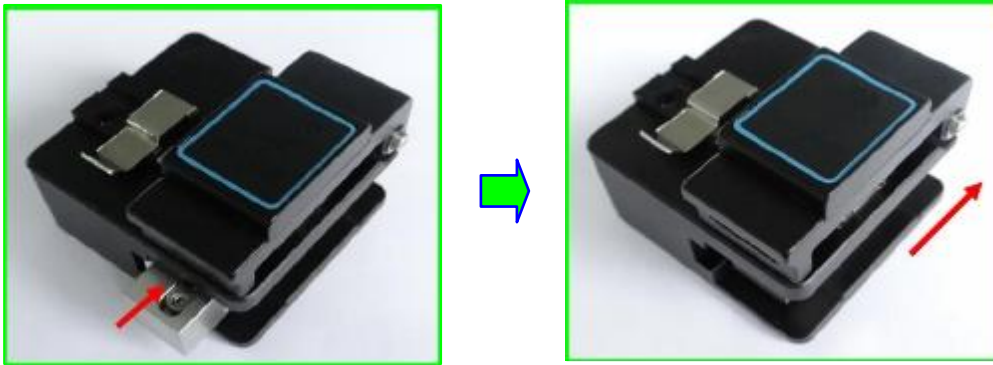
E. Hold the cleaver with the left hand. Open the bigger press plate of the

cleaver with the right hand and remove the waste fiber. Put the waste fiber

into a fixed container.

F. Open the smaller steel plate of the cleaver with the right hand and hold the

fiber with the left hand at same time. Remove carefully the fiber with

preparedneat end face. Note: Neat end face of the fiber shall not touch any

item. Put the fiber on the left or right clamp of the fusion splicer.

2.8.3 Production of the end face of covered optical cable

A. Put in advance a heat-shrink sleeve on the covered fiber cable before

peeling the clad. Put about 50mm of the covered fiber cable into the stripper
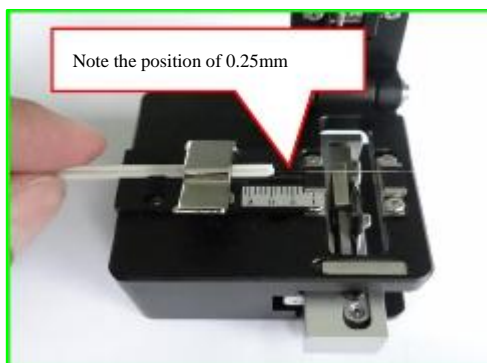
for peeling the clad.

Put the heat shrink sleeve on the fiber as indicated by the arrow
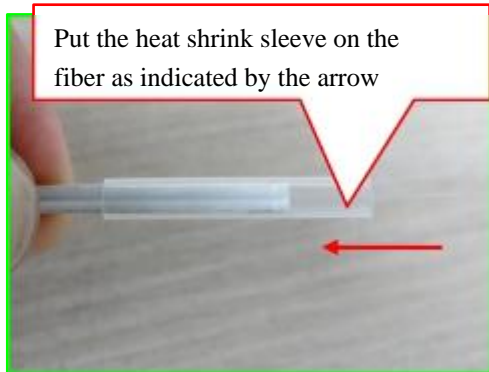
B. Reserve 3-4mm coating and peel fiber coating. Wipe clean the peeled fiber

cable with alcoholic dust-free paper.

C. Open the smaller steel plate and larger press plate at the left side of the

cleaver. Put the stripped and clean fiber cable into the guide groove of the

cleaver and cut the fiber cable. Put the fiber on the left or right clamp of the

fusion splicer.

Note the position of 0.25mm

> ● **When the covered fiber cable is connected with a covered fiber cable, one of the covered fiber cable shall be installed with a heat shrink sleeve before peeling the clad.**

2.8.4 Production of end face of tail optical fiber

Follow the procedures above. Remove the outerclad, tight clad and coating layer of the tail fiber and wipe clean the fiber with alcoholic dust-free paper. Note: Reserve 3 ~ 4mm of 0.9mm clad and3 ~ 4 mm of 0.25 mm clad. Put the tail fiber into the cleaver and cut it.

Note the position of 0.25mm
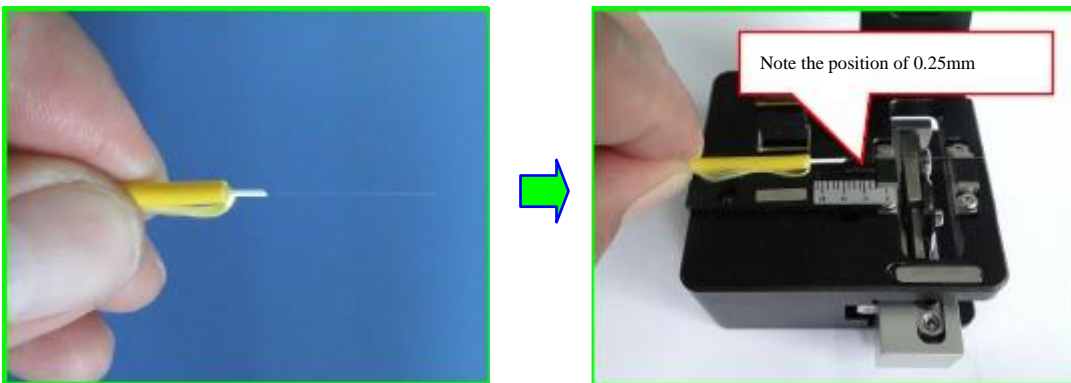
2.9 Placement of optical fiber

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

B.Put respectively the prepared fibers into the left and right clamps of the fusion splicer.

C.Make sure the optical fiber is placed at the bottom of the left and right V grooves.

D.The end face of each fiber shall be placed between the V-groove edge and
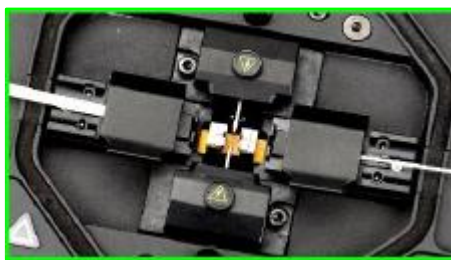
the electrode centerline.

V-groove edge   **Electrode centerline**
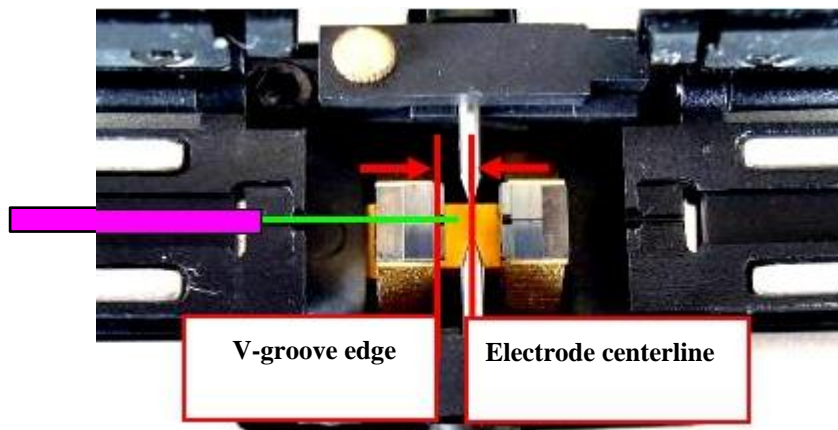
● **The following is the application of different types of fibers in FTTx**

projects:

250 um bare fiber is connected with 250 um bare fiber.

250 um bare fiber is connected with 900 um tail optical fiber.

Covered fiber is connected with 900um tail optical cable.

> ● **Optional clamp for the industry standard FTTx quick fusion splicing.**

3. Management menu

This chapter details the management of the operation menu of this series fusion splicers.

3.1 Overview of first-level menu

3.1.1 There is one first-level main menu in the operation screen of the fusion splicer and six operation windows (second level menu) under the first-level main menu.

3.1.2 On the first level main menu window, press ![button] button to execute the default splicing parameter files (factory setting, user mode) for fiber splicing. Press ![button] button to execute the default splicing parameter files (factory setting, user mode) for heater operation.

3.1.3 On the first level main menu window, press ![button] button or ![button] button, press ![button] or ![button] button for switching over six operating windows in the first-level main menu window. Press ![button] button to enter the current
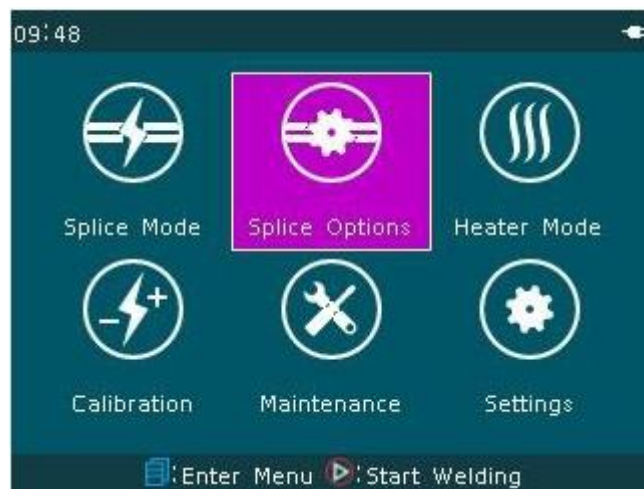
operation window for operation. The options included in each operating

window and the next level menu will be described in section 3.2-3.7 of this

manual.

The first-level main menu and six operating windows (second-level menu) are respectively as follows:
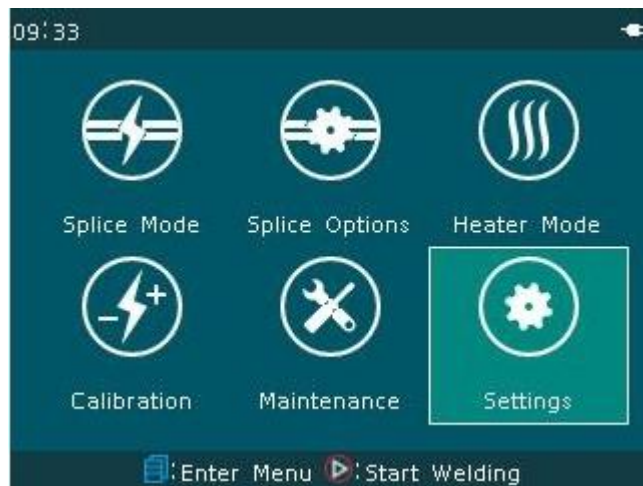
A. "**Splice Mode"**

B.**"Splice Options"**

C. **"Heating Mode"**

D. **"Calibration"**

E. **"Maintenance"**

F.**"Settings"**

3.2 [Splice mode] operations

3.2.1 Overview

A. [Splice mode] has 40 built-in users splice modes (splicing parameter files) for different types of fibers to be selected by the users. Three kinds of the default modes included in the machine are: Auto, Calibrate, Normal. Each set of fiber splicing parameter files include the options, important parameters and so on for fiber splicing.

B. [Splice mode] has also 53 built-in factory modes (library) or 53 sets of welding parameter files for the special operation by the users (The splice parameter files in the factory mode "Library" shall be introduced into 40 user splice modes).

C. Description of menu "select splice parameters file" In different "Mode" settings (including: Auto, Calibrate, Normal), the users can open the splice

parameter files with two level permissions. Press ▷ button or ◁ button for switching over different windows. ⟲ button or ⮞ button in turn to return back to the original operation window.

Description of "Auto, Calibrate" splicemode files

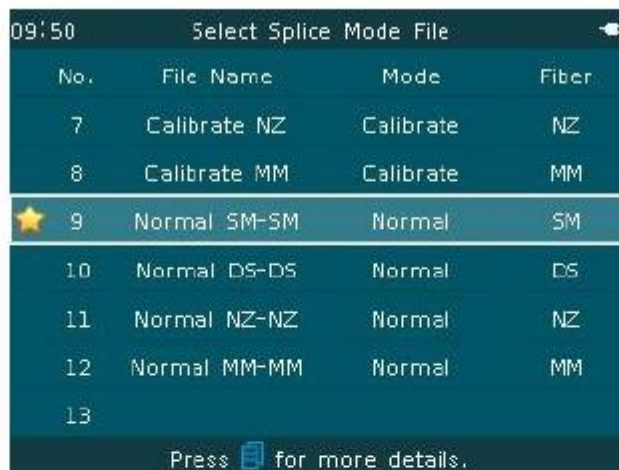| Parameter	Description
File (name)	Splice parameter file name is up to seven characters for users.
Splice Mode	The splice mode offers four options: Auto (automatic), Calibrate (calibration). Normal (General), Special (Special). The last is a special operation option.
Fiber Type	Splice modes corresponding to different fibers have been stored in the database. The operator can choose the appropriate splice mode in the database according to different fiber types and copy them to the user splice modes.
Alignment	Setting fiber alignment modes. "Precise": The fiber is aligned according to thefiber core position and the clad position at the same time. "Fiber core": The fiber is aligned according the fiber core position.

	"Clad": The fiber is aligned according the clad position.
Tension test	If "tension test" is set to "ON", after the welding is completed, the tensile test is performed automatically.
Cutting angle limit	Setting cutting angle limit. When the cutting angle of any of the fibers exceeds the limit, a limit alarm message appears on the screen.
Loss limit	When the estimated splice loss exceeds the setting splice loss limit, a limit alarm message appears on the screen.
Cleaning arc time	Cleaning arc is a short duration arc and used to remove tiny dust on the surface of the fiber. Changing this parameter can change the length of the cleaning arc time.
Manually replenishing arctime	Under certain conditions, the splice loss can be improved by more arcs. Changing this parameter can change the length of the arc time.

Description of "Normal" splice parameter files

Parameter	Description
File (name)	Name of splice parameter file is up to seven characters for users.

Splice mode	The splice mode offers four options: Auto (automatic), Calibrate (calibration). Normal (General), Special (Special). The last is a special operation option.
Type of fibers	Splice modes corresponding to different fibers have been stored in the database. The operator can choose the appropriate splice mode in the database according to different fiber types and copy them to the user splice modes.
Alignment	Setting fiber alignment method. "Precise": The fiber is aligned according to the the fiber core position and the clad position at the same time. "Fiber core": The fiber is aligned according the fiber core position. "Clad": The fiber is aligned according the clad position.
Tension test	If "tension test" is set to "ON", after the welding is completed, the tensile test is performed automatically.
Cutting angle limit setting	Setting cutting angle limit. When the cutting angle of any of the fibers exceeds the limit, a limit alarm message appears on the screen.
Loss limit setting	When the estimated splice loss exceeds the setting splice loss limit, a limit alarm message appears on the screen.
Cleaning arc time	Cleaning arc is a short duration arc and used to remove tiny dust on the surface of the fiber. Changing this parameter can change the length of the cleaning arc time.
Manually replenishing arc time	Under certain conditions, the splice loss can be improved by more arcs. Changing this parameter can change the length of the arc time.
Fiber gap setting	Setting the gap between right and left fiber end faces in the alignment and pre-arcsetting.
splicing position setting	The relative position of the splicing place is set to the center of the electrodes. Different types of fiber have different value of MFD. The operator can reduce the splice loss by moving the position of the gap toward the fiber with larger value of MFD.
Fiber pre-melting strength	Setting the pre-arc intensity in the process from the arc start to the fiber moving forward. If [pre-arc intensity] is too large, the end face of the fiber will be excessively melted. This will result in undesirable splice loss.
Fiber pre-melting time	Setting the pre-arc time in the process from the arc start time to the start time of fiber moving. Long [pre-arc time] and big [pre-arc intensity] will lead to the same result.
Overlap	Setting the amount of overlap of fiber. When [pre-arc intensity] is set to be lower, it is suggested [overlap] is set to a small value, on the contrary, it should be set to a large value.
Intensity of arc 1	Arc can be divided into two stages and arc1 is the first stage of arc. Setting the arc intensity of arc 1 here.

Time of arc 1	Setting the time of arc 1.
Intensity of arc 2 (Factory setting)	Arc 2 is the second stage of arc. Setting the intensity of arc 2 here.
Time of arc 2 (Factory setting)	Setting the time of arc 2.

### 3.2.2 Edit / Select

<1>Editing splice parameter files

On the readiness window as shown in the figure below, move the cursor to [Splice Mode]and click and enter the window of [select splice parameter files], where "☆" No. 1 is the "splice parameter files" of current default splice.

If the operator wants to add "tension test" function in the current fiber splicing point, the operator shall modify the default splice parameters. The steps of "Edit" splice parameter file are as follows:

A. On the window of [select splice parameters file] and "☆" No. 1, click

 button. "Edit, Export" option window appears. Move the cursor to

"Edit" and click button or button, "edit splice parameter files" window of current default splice appears.
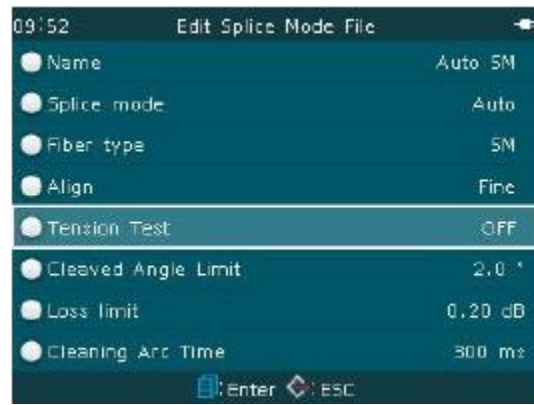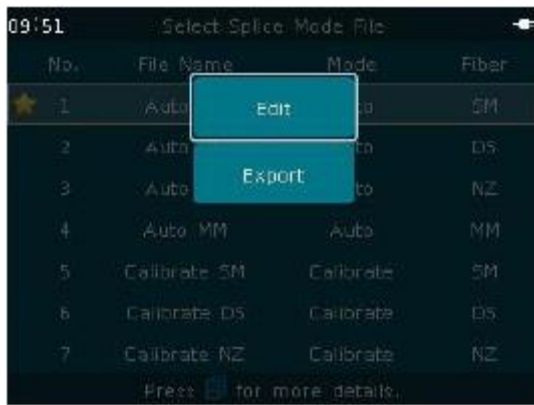
B. Move the cursor to "tension test" item and click button. "Close,

open" options window appears. Move the cursor to "ON" and click

button or button, No. 1 splice parameter "tensile test is ON".
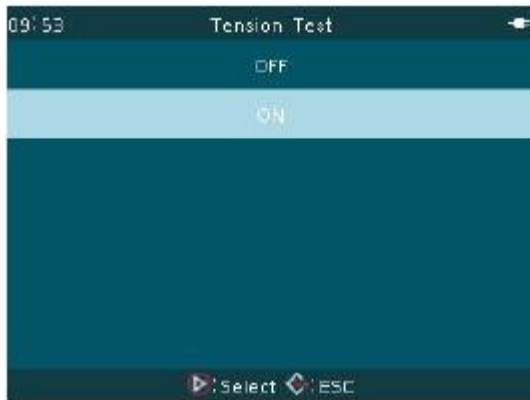
C. Press continuously button or button to return to the readiness

window. "Tension test" on the fiber splice point is performed once the fiber

splicing is completed.

<2> Select splice parameters file

If the user's current splicing environment, including atmospheric pressure,

temperature, etc., has been greatly changed with the last splicing environment,

in order to ensure the fusion splicing parameters under current harsh

environment remain stable, the splice mode shall be changed. The steps of

"select" splice parameter are as follows:

A.Move the cursor to No.5 in the window of [select splicing parameter files]

and click ![button] button. "Edit, Select, Delete, Export" option window appears.

Move the cursor to "select" and press ![button] button or ![button] button, "☆" No.

5 is the "splice parameter files" of current default splice.

B.Press ![button] button or ![button] button to return to the readiness window. The

real-time automatic calibration can be realized in fusion splicing procedure,

realizing finally the target to stabilize the fusion splicing parameters in harsh

environment.

3.3 [Heating mode] operation

3.3.1 Overview

A.[heating mode] has 40 built-in users heating modes (heating parameter files) for different types of fiber heat-shrink sleevesto be used by the users. There are nine default heating modes according to the length, diameter, material and other specifications of the fiber heat shrink sleeves, including: Standard, Micro250, Micro400 and Micro900 and so on. Each set of heating parameter files include the options, important parameters and so on for fiber heat-shrink sleeve heating.

B.[Heating mode] has also 11 built-in factory modes (library), i.e. 11 sets of heating parameter files for the special use by the users (The heating parameter files in the factory modes "Library" shall be introduced into 40 users heating modes).

C.Description of menu of "select heating parameters file"

In different "mode" settings (including: Standard, Micro250, Micro400, Micro900 and so on), the users can open same splice parameter files. Press

or to switch over different windows.Press or in turn to return back to the original operation window.

Description of heating parameter files

Parameter	Description
File (name)	Heating parameter file name is up to 13 characters for users.
Materials category	Setting material of heat shrink sleeves: Standard, Micro250, Micro400, Micro900 and Connector and so on.
Length category	Setting the length of heat shrink sleeves: 60mm, 40mm, 20mm, etc. (Some functions are optional)
Heating control	Heating control "Automatic" or "Manual" is optional. A, E models do not have automatic heating function.
Heating time	Setting the holding and delaying time of "heating temperature".
Heating temperature	Setting the thermostat heating temperature.
Heating end temperature	Setting the heating end temperature. When the heater is near this temperature, the buzzer alarms. At this moment, the heater has been cooled and can be removed from the furnace.

3.3.2 Edit / Select

<1>Editing heating parameter files

In the readiness window as shown in following figure, move the cursor to

[heating mode] window and click button and enter the window of

[select heating parameters files]. "☆" No. 1 is the current default "heating

parameter files".

The operator can adjust the heating parameters and options according to the demand. If the operator wants to add "heating time" function due to the special needs of heat shrink sleeve, the operator shall modify the machine default heating parameter value. The steps of "edit" heating parameter document are as follows:

A. In the window of [select heating parameter files] and "☆" no. 1, press

 button. "Edit, Export" option window appears. When the cursor moves to

"edit" and click buttonor button, the current default "editing heating parameter files" appears.

B.When the cursor moves to "heating time", click button, "heating time"

window appears.Click or button to increase the value to "25".Press

again the button or button to confirm that the modified value is

valid. No.1 heating parameter is "heating time 25S".

C.Press continuously ⬅️button or ➡️ button, the machine is returned to

the readiness window. "Heating time" of the heater of the machine is 25S in

each time.

<2>Selecting heating parameter files

If the operator adopts "Micro- 900" heat shrink sleeve, in order to meet the

quality requirements of the work, the operator shall select corresponding

heating mode of "material category". The steps of "select" heating parameter

are as follows:

A.In the window of [select heating parameter files], move the cursor to No.7

and press 📘button. "Edit, select, delete, export" option window appears.

When the cursor moves to "select" and click button or button, "☆"

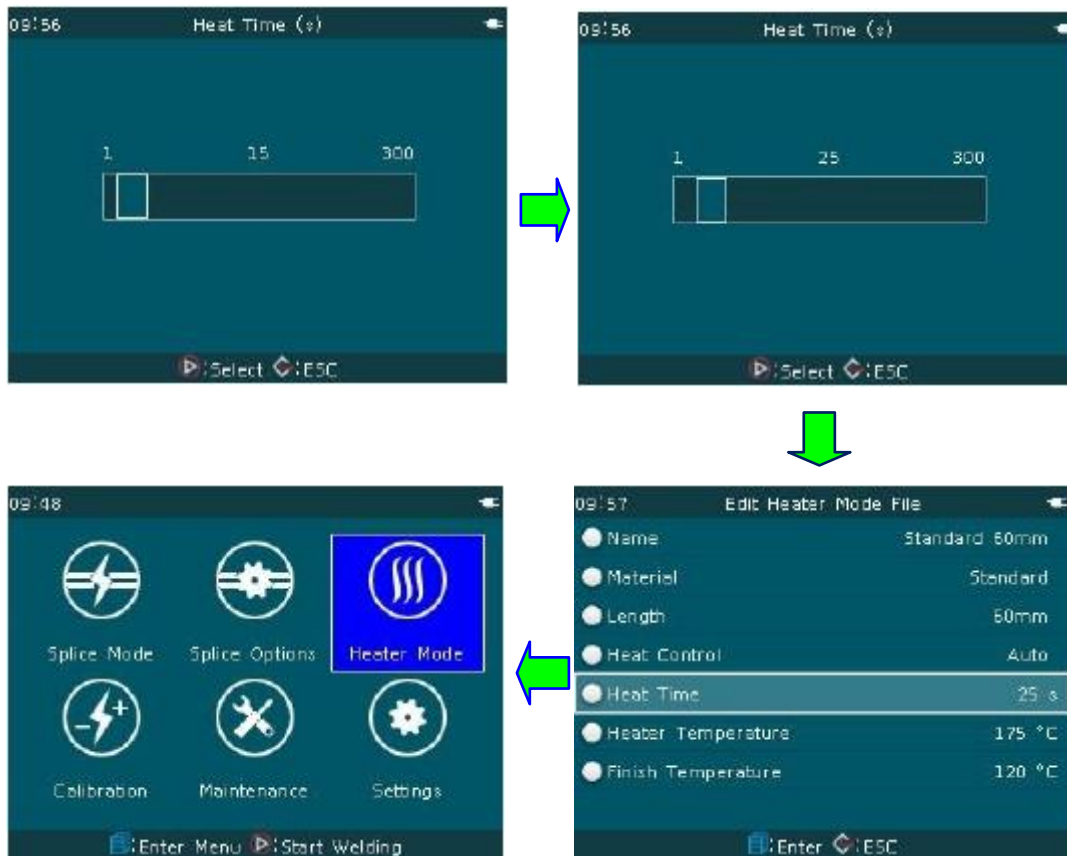No. 7 is the current default "heating parameter files" of the machine,

B.Press button or button, the machine is returned to the readiness

window. The machine implements "Micro-900-60mm" heating mode in

heating operation each time.

● **The "export, delete, import" and other operating options are the special features and shall be used with caution as recommended.**

> ★ **This series fusion splicer heater temperature range is 100 ~ 200 ℃ .In case the heater is damaged due to improper operation, it is recommended to be careful in high temperature heating above 190℃. Strictly prohibit non-stop heating for more than 100 seconds at high temperature above 190℃, as such action will burnout the heater.**

3.4 [arc calibration] operation

<1>The temperature, barometric pressure and humidity in the operating environment are always changed. This series of fusion splicers are equipped with temperature and barometric sensor. The amount of change in the external environment can be transmitted in real time to the control system, thus ensuring the arc intensity of the machine is always in a state of balance. However, electrode wear and fiber debris bonding which may cause the change of arc intensity, left or right offset of the arc centerand other abnormal circumstances cannot be corrected by the fusion splicer sensor only, so the operator shall adjust the arc to compensate the arc intensity, the offset of the fiber splicing position relative to the arc center. The [arc calibration] function can check the current arc intensity and correct the valut to the standard arc intensity.

● **A, B, C, D and E model fusion splicers have no "Real time arc calibration" function. If the above model fusion splicer has been stored for a long period or the operating environment is changed greatly, in order to ensure the effectiveness of fusion splicing, it is proposed "arc calibration" shall be checked before the 1st fusion splicing.**

<2>Steps of arc calibration

A. Arc calibration is divided into two steps: "Arc correction step 1" and "Arc correction step 2".

B.In the readiness window as shown in following figure, move the cursor to [arc calibration] window and click button to enter "arc calibration" operation window.
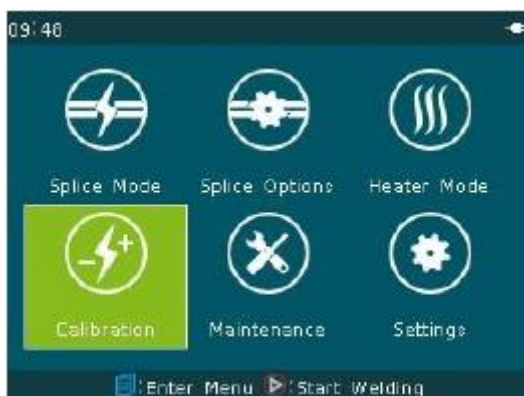
C.Prepare qualified G652 single-mode fiber and put it into the splicer V groove.

D.In "arc calibration" window, press button.The arc calibration will start automatically. The arc calibration starts from "arc calibration step 1".If "arc

calibration step 1" is "not finished", the machine will not enter "arc calibration step 2". The operator is required to follow the prompts and continue to prepare and put the fiber into the machine. The operation above shall be repeated.
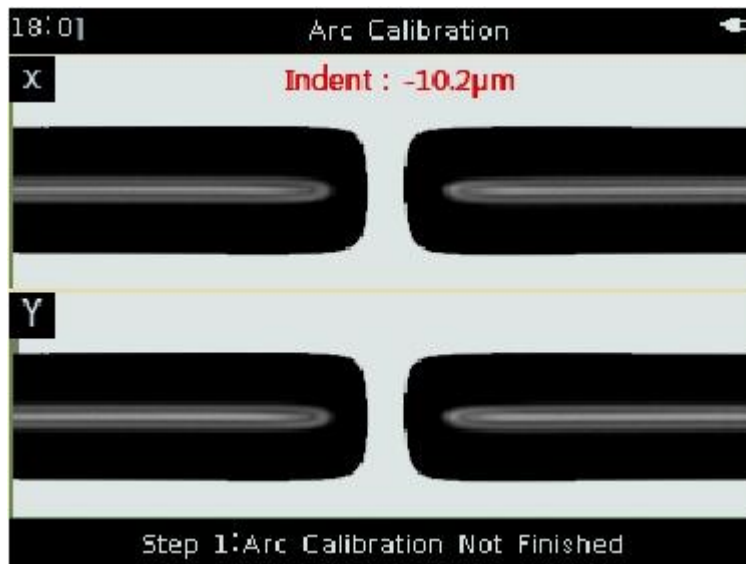
E.When "arc calibration step 1" is finished, "arc calibration step 2" is started automatically. The operator shall prepare repeatedly the fiber and let the splicer go into automatic arc calibration until the machine shows "arc calibration step 2 is finished"as shown in following figure.
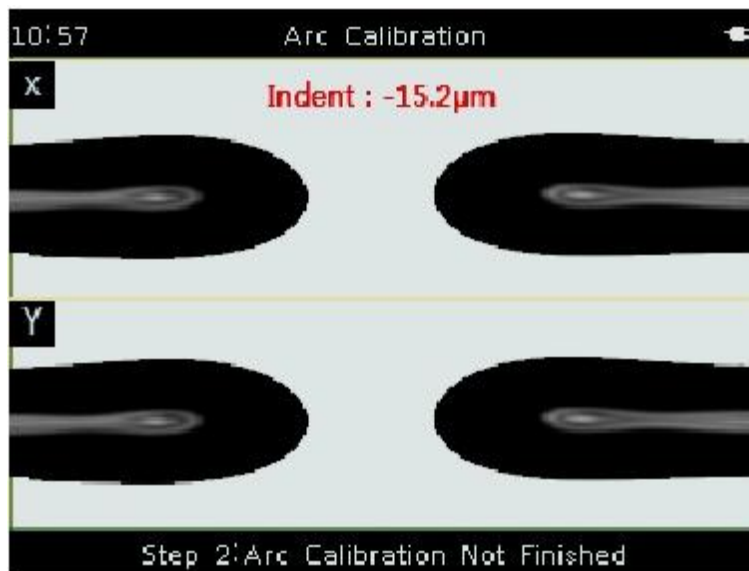
F. When "arc calibration step 2" is finished,it indicates one time of arc calibration (Step 1, Step 2) is passed. When "arc calibration step 2 is finished" has appeared for three times, the splicer exits automatically the arc calibration window and returns to the readiness window.

● **To ensure best splicing quality, we recommend strongly the user repeats arc calibration until there are three times of arc calibration are passed, i.e. the message of "arc calibration step 2 is finished" has been appeared for three times. The calibration of arc intensity and splicing position at this moment has the best results.**

3.5 [splice options] operation

[Splice options] window provides a number of important splicing options.

In the readiness window as shown in following figure, move the cursor to

[splice options] window and click button and enter "edit splicing

operation option"window. The important splicing options can be set then.
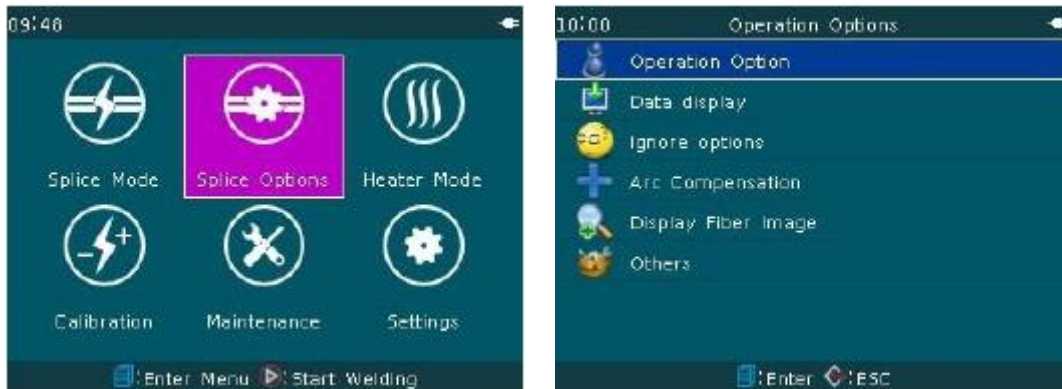
3.5.1 Fusion splicing operation:

Parameter Description Table:

Parameter	Description
Automatic start	Setting "On": The fiber will be welded automatically when the wind cover is closed. This requires the operator to prepare the fiber in advance and put it into the machine. Setting "Off": The fiber will be pushed into the screen automatically when the wind cover is closed. The window shows "click button for start".

Pause 1	If "Pause 1" is set to "On", the fiber splicing process will stop when the fiber is pushed to the gap setting value. The operator can see the value of cutting angle at the same time
Pause 2	If "Pause 2" is set to "On", the fiber splicing process will stop when the fiber alignment is finished. The operator can see the offset of the fiber core and the offset of the clad at the same time.

3.5.2 Data display:

Parameter Description Table:

Parameter	Description
Cutting angle	If at "On" status, the cutting angle of the right and left fibers after measurement by the machine is displayed automatically on the screen.
Offset data	If at "On" status, the offset of the right and left fiber core and the offset of the clad will be displayedautomatically.
Arc calibration value	Factory default setting

Remarks: A model has no such function.

3. 5. 3 Ignore options:

Parameter Description Table:

Parameter	Description
Cutting	
Loss	If it is set to "On", the error messages will be ignored in the
Fiber core angle	
Bubbles	process of slicing, the machine continues the fusion
Thick	splicing process.
Thin	

Remarks: A model has no such function.

3.5.4 Arc compensation:

Parameter Description Table:

Parameter	Description
Atmospheric pressure	If it is set to "On", arc intensity will be adjusted so as to compensate the changes of pressure and temperature.
Temperature	

Remarks: A model has no such function.

3.5.5 Fiber image display :

Parameter Description Table:

Parameter	Description
Gap setting	Setting the display method of the fiber in the welding process, having following options:
Pause 1	
Alignment	X: X-field image is magnified. Y: Y-field image is magnified.
Pause 2	X / Y: Vertical display of fiber image in X and Y fields.
Arc	X | Y: Horizontal display of fiber image in X and Y fields.
Loss estimate	X: The image of X-field is magnified. Y: The image of Y-field is magnified.

Remarks: A model has no such function.

3.5.6 Others :

Parameter Description Table:

Parameter	Description
Auto fiber forward	If [splice operation] "automatic start" is set to "On": "Auto fiber forward" setting is invalid. The fiber will be welded automatically when the wind cover is closed. If "automatic start" is set to "Off": A."Auto fiber forward" is set to "On" status. Whenclosing the wind cover, the fiber is pushed into the screen, press button again, the fiber is welded automatically. B."Auto fiber forward" is set to "Off" status. When closing the wind cover, the fiber does not go into the screen. Press button, the fiber is welded automatically.
Bad cleaved end face	Set to "On": If the cleaved end face exceeds the limit value, the screen shows respectively "red unfilled corner" overrun alarm message for the left and right fiber end faces.
Max. number of re-arc	Re-arc sometimes improves splice loss, but sometimes becomes worse. Multiple re-arcs may reduce the splice strength. This function can limit the number of re-arcs.

Reset after splice	"Off": After the fiber is welded and the loss estimate is displayed, the machine is not reset when opening the wind cover. Press button to complete reset. "On": After the fiber is welded and the loss estimate is displayed, when opening the wind cover, the machine is reset automatically.
Secondary cleaning discharge	This function is mainly applied to "red light online fiber splice", to ensure more clean on the fiber end processed.
Real-time revise	Only F、G Model have this function, and the calibration is finished at the factory.

3.6 [Maintenance] operations

[Maintenance] function provides a number of important product maintenance options. In the readiness window as shown in following figure, move the cursor to [maintenance] window and click button to enter "maintenance" window. The important product maintenance options can be set then.
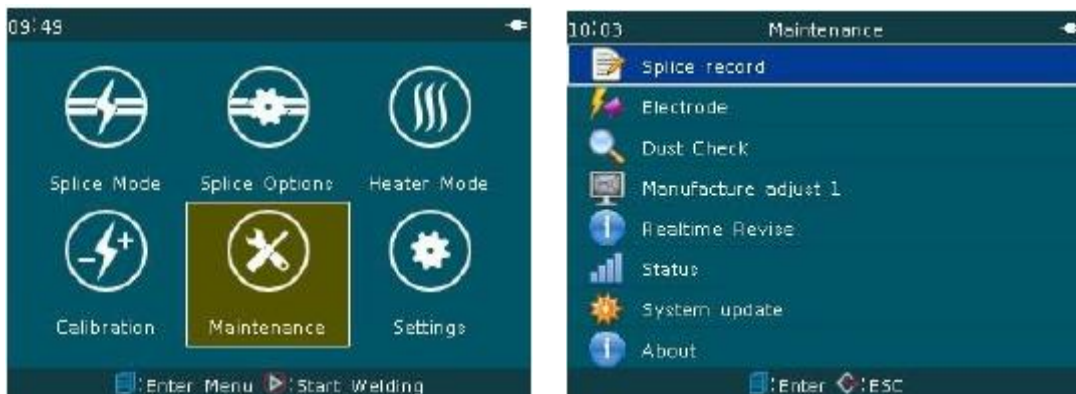
3.6.1 Splice record

"Splice record" function provides the historic records of fiber splices

completed before. The machine can store maximum 4000 splice records.

<1>Inspecting splice records

In "splice record" menu, press button."view, empty, export" option window appears.When the cursor moves to "view" and click button or button, the window displays the detailed information of current splice record number, as shown in following figure.
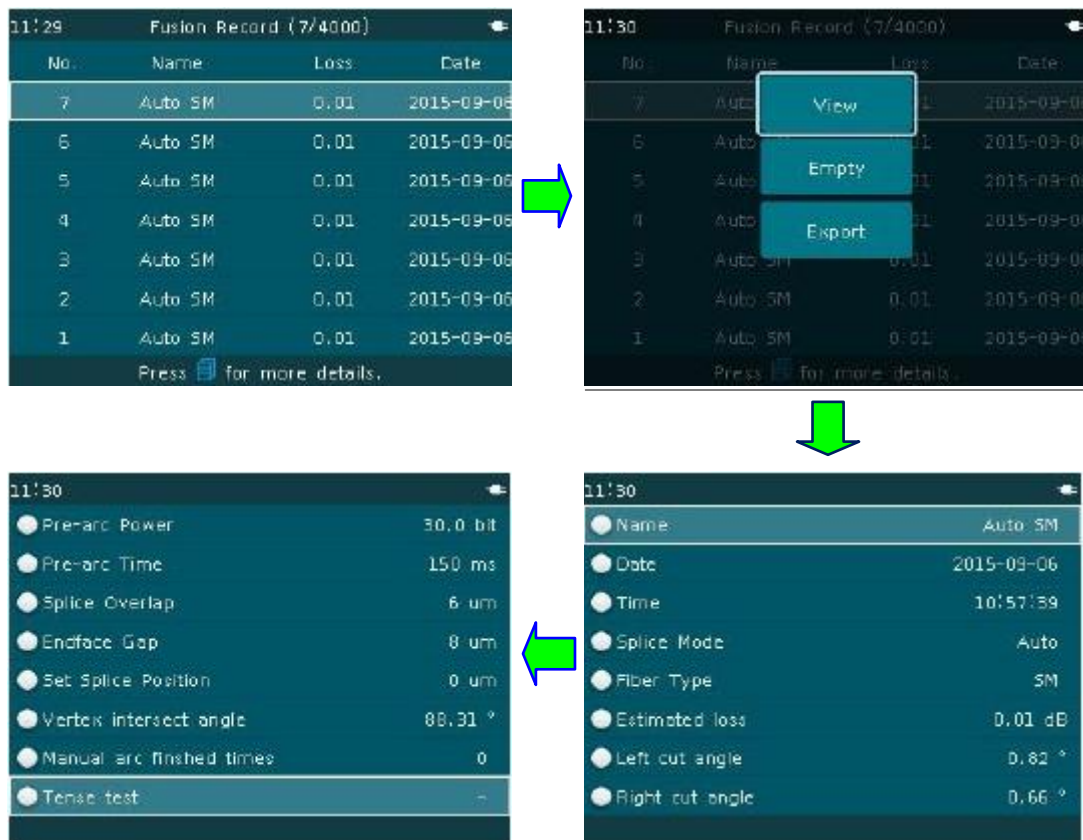
<2>Clearing up splice records

A. In "splice record" menu, press button, "view, empty, export" option window appears.

B.When the cursor moves to "empty" and click button [▷] or [⏏] button, "Delete all records?" dialog box appears. If the operator confirms to clear the current splice record, press [▷] button or [⏏] button to delete all splice records.

<3>Export splice record

A. In "splice record" menu, press [▤] button, "view, empty, export" option window appears.When the cursor moves to "export" and click [▷] button or [⏏] button, "save splice record to USB storage?" dialog box appears.

B. Insert external U disk correctly into the USB2.0 port on the back cover of

the fusion splicer, then press buttonor button, soon all splice

record information is saved to the user's U disk.
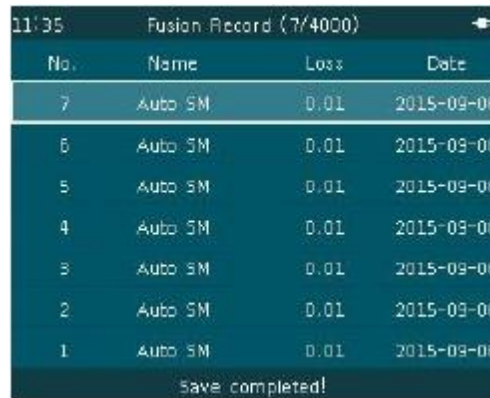
3.6.2 Electrode

For the operations and requirements of the electrode, please refer to "5.

Inspection and maintenance" of this manual.

3.6.3 Dust Check (A Model has no such function)

For the operations and requirements of the dust checking, please refer to "5.

Inspection and maintenance" of this manual.

3.6.4 Manufacturer adjust 1

Manufacturer adjust 1 belongs to the operation with permission under

certain conditions. A.The user cannot weld the fiber at site and the fusion splicer is unable to be sent back to the factory.B. The user does not understand the daily maintenance of the machine and the operation is not correct, but did not cause a fault of the parts. "Manufacturer adjust 1" can be done under the guidance of the serviceman from the customer service center.

● The operator shall master the routine maintenance knowledge and proper maintenance method of the fusion splicer.

3.6.5 Real-time revise

Real-time revise is the factory real time and automatic calibration setting of the arc intensity and arc time of the fusion splicer, to realize optimized fiber splicing operation. Only A ,B model have this function.
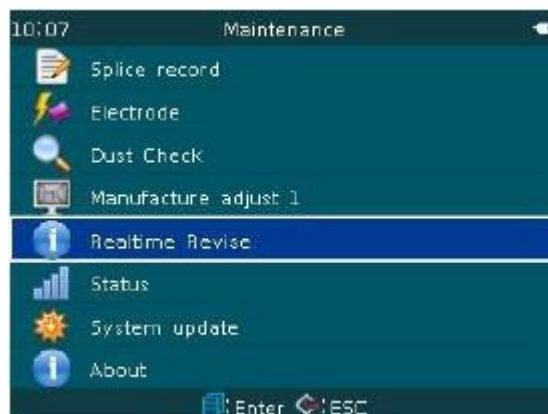
3.6.6 Status

Parameter Description Table:

Parameter	Description
Inside temperature	Monitoring the ambient temperature of the circuit board inside the machine.
Heater temperature	"Heater temperature" can be used by the tomonitor the temperature change process of the heater.
Ambient temperature	Monitoring the environment temperature in present fiber splicing process and offering self-calibration compensation amount. Satisfied temperature of this series fusion splicers: **-10 ~ + 50**℃ operating environment.
Air pressure	Monitoring the air pressure in present fiber splicing process. Only F,、 G model: altitude: **0 ~ 5000m** operating environment. Other models: altitude: **0 ~ 3000m** working environment.
Battery power	Battery feed mode: Dynamically displaying the power(percentage) of current lithium battery. Power adapter feed mode: Not displaying the power (percentage) of current power supply.

Remarks:A model has no such function.

● **When the lithium battery power <10% , the machine emits**

automatically "low power" alarm.

3.6.7 System update

Based on the design concept meeting the requirement of users, the software update of this series fusion splicers adopts 2.0 U disk (hereinafter referred to as U disk), fast and simple. The operation steps are as follows:

A. When the cursor to "system update", click button, "insert U disk" dialogue box appears.
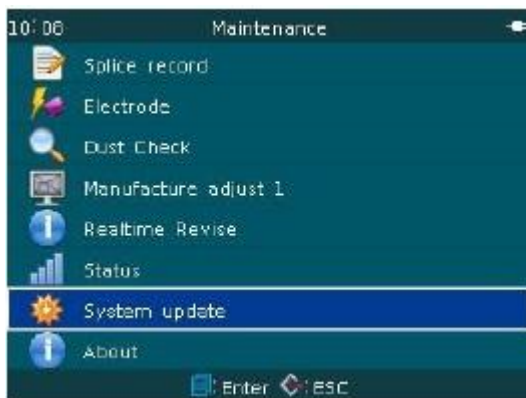
B. The user shall insert U disk with uprate package correctly into the USB2.0 port on the back cover of the fusion splicer, then press or button.The screen displays "updating ___" and timekeeping. After about 120S, the screen displays "reboot___ update successfully". The fusion splicer restarts automatically and returns to the readiness screen.
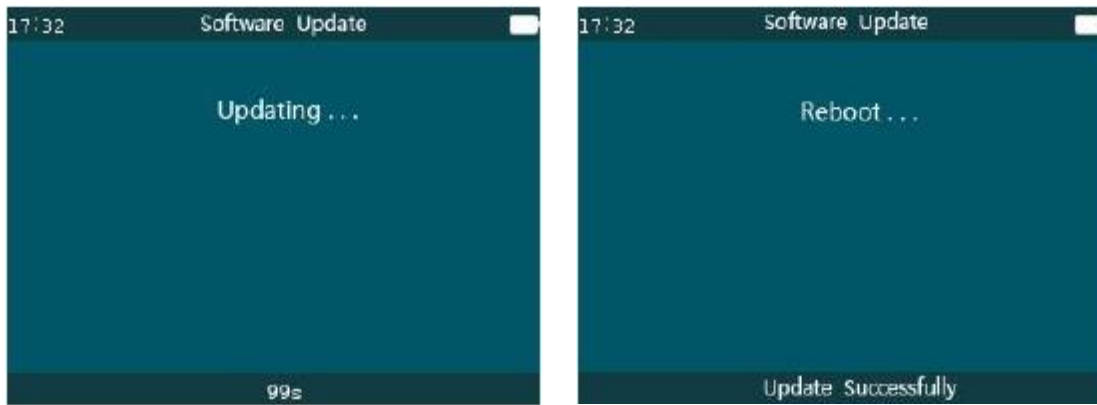
C. Precautions on U disk application

- ● "Software update compression package" in the user U disk must be extracted to the root directory of U disk used at present.
- ● Before using U disk, the operator must confirm the file system is "FAT32", otherwise, U disk shall be "formatted".

U disk "format" steps are as follows

<1>Insert U disk into the computer's USB port and move the cursor to "My Computer". Double-click the cursor mouse and open "My Computer" desktop. Find "KINGSTON (H)" folder.

<2>Move the cursor to "KINGSTON (H)" and right-click the cursor mouse. The following dialog box appears. Move again the cursor to "format (A)" item.

<3>Left click the cursor mouse. The following "Format" dialog box appears.

<4>Move the cursor to "Start (S)"dialogue box and left click the mouse.

Format warning dialog box appears.
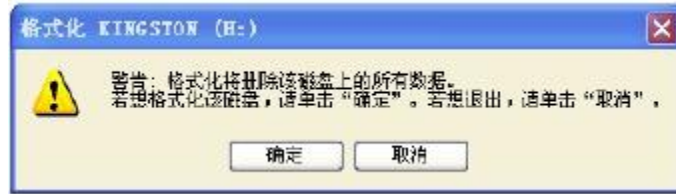
<5>Move the cursor to "confirm" dialogue box and left click the mouse.

Format progress dialog box appears.

<6>Formatting operation will be done quickly. "Format finished" dialog box

appears.

<7>Move the cursor to "confirm" dialogue box and left click the mouse.

"Format" dialog box appears once again. Move the cursor to "close"

dialogue box and left click the mouse. 2.0 U disk formatting operation is

finished. Finally, take out U disk safely from the computer.

3.6.8 About

"About" provides the model, serial number, software version and related

hardware information of the fusion splicer.
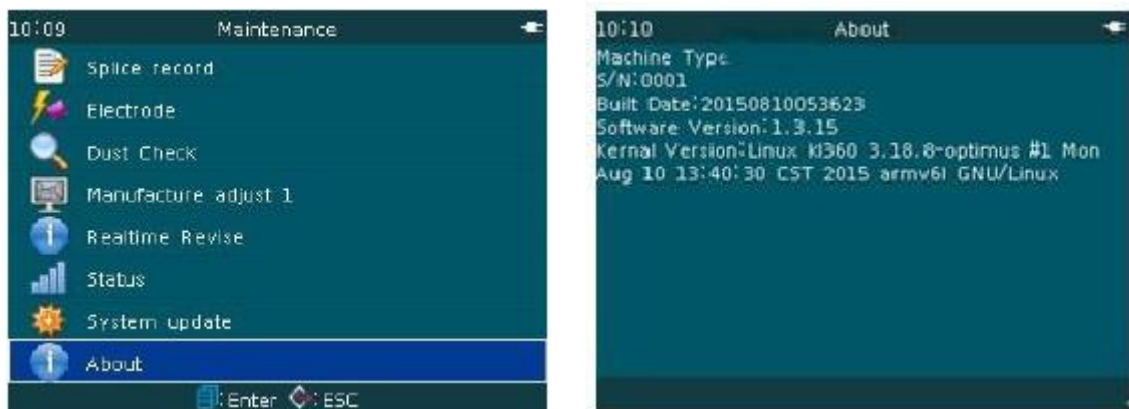
3.7 [Settings] Operation

For the convenience of users, [Settings] application menu is provided. In the readiness window as shown in following figure, move the cursor to [settings] window and click button to enter the "Settings"window. The corresponding options can be set.

3.7.1 Time

The fusion splicer is set in Chinese "Time". The setting steps are as follows:

<1>In the "Settings" menu, move the cursor to "Time" item, press button."Time" setting window appears, continue to press button."Set Date and Time" and other detailed time information appear.
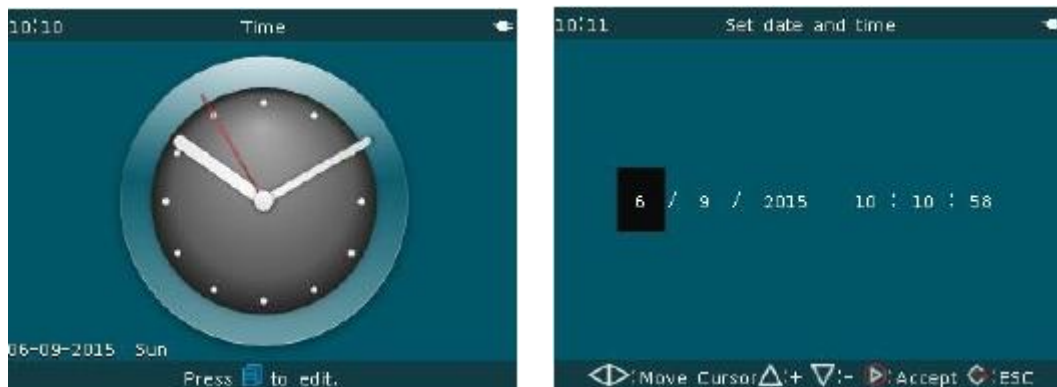
<2>In "Set date andtime" window, review and adjust year, month, day, and Chinese time according to the "keypad prompt bar" at the lower portion of the window.

3.7.2 Language

This series fusion splicers are provided with built-in language packs, including Chinese, English, French and other languages, total dozen of choices, to meet the domestic and overseas users' customized demands. The factory is also adding continuouslynew language (language pack)according to market demand.
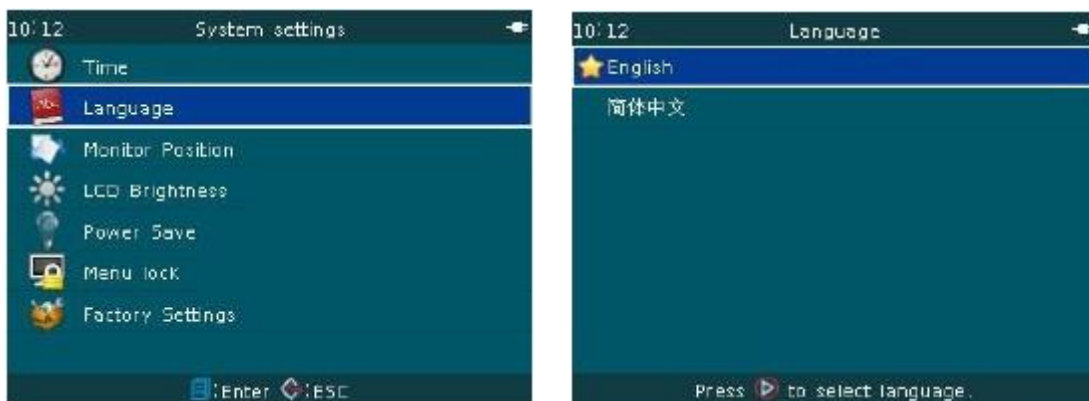
3.7.3 Monitor position

In order to meet users' demand in a special environment, this series of fusion splicers are equipped with monitor window rollover function, providing upside and underside options. Rollover setting steps are as follows (where A model has no such function):

<1>In the "Settings" menu, move the cursor to "monitor position" item, Press button."Upside, underside" option window appears.
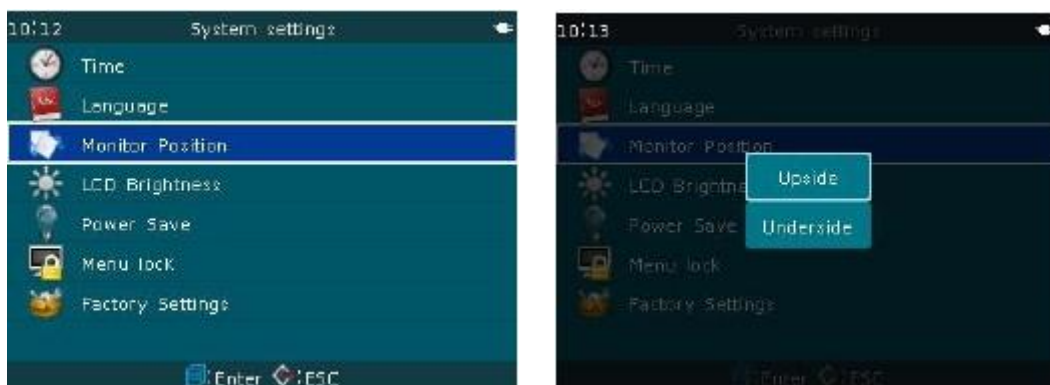
<2>Move the cursor to "down" Continue to press [image: play button] button or [image: exit button]

button.All the currently displayed menu of the fusion splicer, fiber splicing

windows arerollover, meeting users' operation demand.
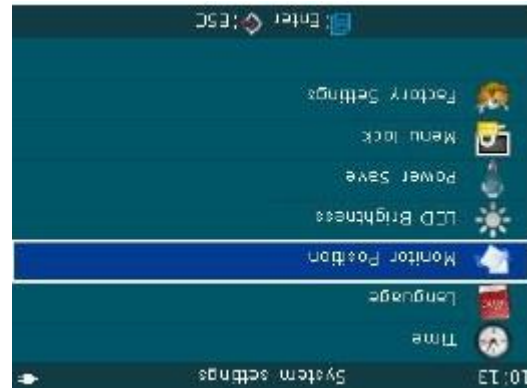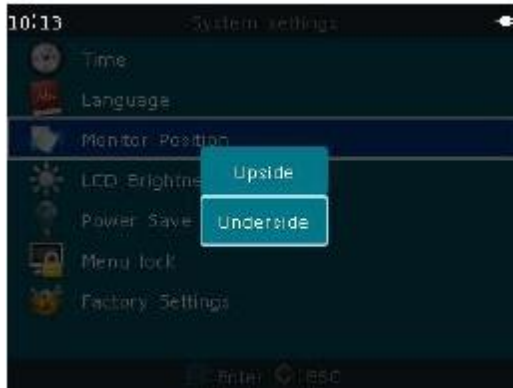
3.7.4 LCD brightness

For LCD brightness operation and requirements, refer to "2.7 LCD

brightness adjustment" of the manual.

3.7.5 Power save menu

This function is very important to improve lithium battery duration and

battery life. When this function is turned ON, the fusion splicer will not

operate in the setting time and will enter automatically the sleep state or

power off.

<1>Sleep settings

"Sleep" feature of This series fusion splicers is disabled by default.
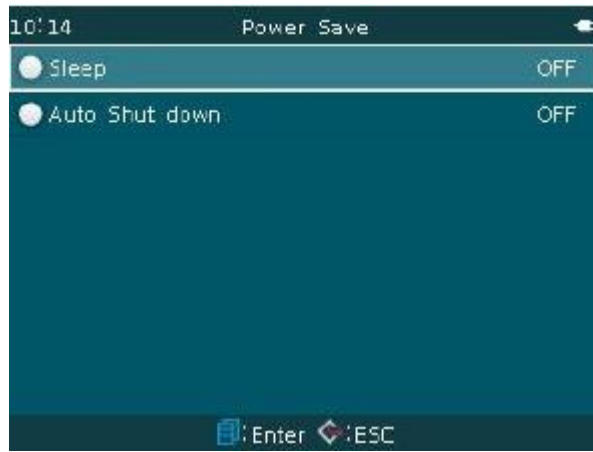
A. In "Power save menu" screen, move the cursor to "sleep" item, press button and enter "sleep" time option setting window. Sleep time setting range is "1 ~ 60min" or "OFF". Move the cursor to "15min", press button or button, the current sleep time 15min setting of the fusion splicer is effective.

B. Press button or button to return back to the readiness window. The normal splicing operation can be done. When the operator does not operate the keypad of the fusion splicer within 15 minutes, the machine will enter automatically sleep (LCD and electric circuit etc.are closed). If the operator operates any keys on the keypad, the fusion splicer can wake up at any time to work.

<2>Automatic shut down setting

"Auto shut down" feature of this series fusion splicers is disabled by default at the factory.
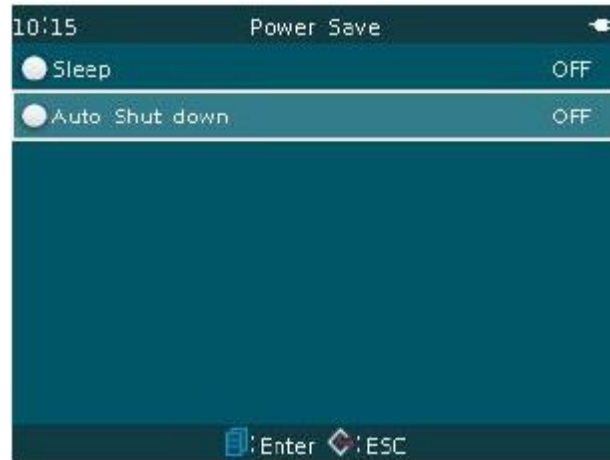
A. In "Power save menu" screen, move the cursor to "auto shut down" item, press ![button] button and enter "Auto shut down" time option setting window. Automatic shut down time setting range is "1 ~ 120min" or "OFF". Move the cursor to "×× min",press ![button] button or ![button] button.The current automatic shut down time ×× min setting of the fusion splicer is effective.
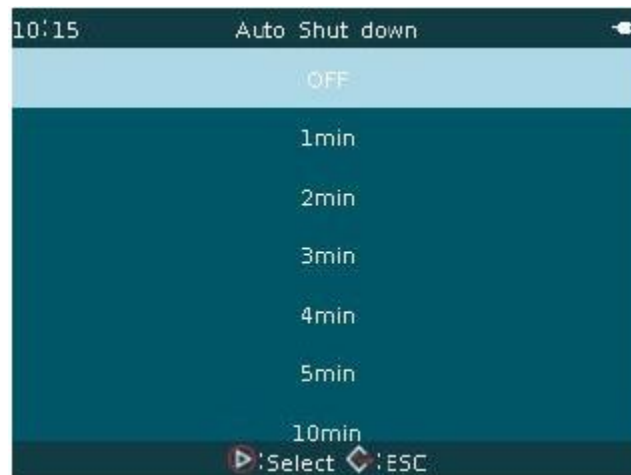
B. Press ![button] button or ![button] button to return back to the readiness window.The normal splicing operation can be done. When the operator does

not operate the keypad of the fusion splicer after ×× minutes, the machine will enter automatically automatic shut down status.

Parameter Description Table

Parameter	Description
Sleep	When the user sets the sleep waiting time, if the fusion splicer does not operate within the set time, the fusion splicer will turn automaticallyoff the LCD. The power consumption of the fusion splicer will be greatly reduced, to prevent the big loss of the battery power. When the LCD is off, LED indicator next to is still green. The operator can press any key to wake up the machine and resume the operation.
Automatic shut down	After this feature is turned on and set automatic shut down waiting time, if the fusion splicer does not operate in the setting time, the fusion splicer will cutautomatically off the power supply.

Remarks: A model has no such function.

3.7.6 Menu lock

For preventing incorrect operation of the machine, not causing the changes of the parameters of the machine, notaffectingthe welding quality, preserving the historic records such as machine splices, the administrator can lock the functions of relevant menu of the fusion splicer according to the need.

<1>In [Settings] menu, move the cursor to "Menu lock", press button and enter the "Password" screen.Input a valid password to enter the "Menu lock" screen.
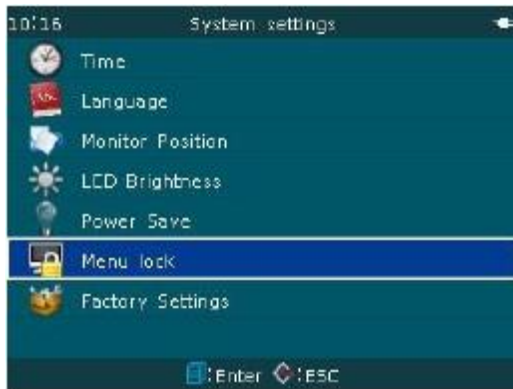
<2>The administrator can set "ON" or "OFF" permission on the operating
function based on the work. Lockable operating functions are listed in the
table below.

Functions	Description
Splicing record editing	On: First 12 of 40 user mode records are locked and cannot be edited. Off: First 12 of 40 user mode records can be edited.
Heating record editing	On: First 9 of 40 groups of user mode records are locked and cannot be edited. Off: First 9 of 40 user mode records can be edited.
Splice mode library	On: 53 factory splicemodescannot be imported into the user splice modes. Off: 53 factory splice modes can be imported into the user splice modes.
Heating mode library	On: 11 factory heatingmodescannot be imported into the user heating modes. Off: 11 factory heating mode can be imported into the user heating modes.
Remove splice records	On: The historic records of splice modes are locked and cannot be deleted. Off: The historic records of splice modes can be deleted.

Arc calibration	On: Arc calibration records are lockedand cannot be operated. Off: Arc calibration records can be operated.
Calendar	On: The calendar settings are locked and cannot be operated. Off: Calendar setting can be operated.
Clear-up arc numbers	On: "Clear-up arc numbers" cannot be operated. Off: "Clear-up arc numbers" can be operated.
Password	Password set by the fusion splicer administrator to access "menu lock" window.

3.7.7 Factory settings

"Factory settings" is used in the factory for machine software and hardware configuration and commissioning. The user cannot access it. Otherwise, the operation in error will lead to the result that fusion splicer cannot be repaired due to protection by password.

4. High level operation

Wherein F, G models of this series fusion splicers have the following automatic optimization functions based on optical fiber condition,   and the

automatic compensatory function in low temperature and low pressure environment.

● Before the fiber is spliced, get by image measurementthe end face shape, cutting angle, fiber eccentricity and other parameters of the fiber; and modify accordinglythe forward speed and amount of overlap and other splice parameters.

●"AUTO" automatic splice mode: Built-in automatic control splice modes suitable for SM, MM, DS, NZ four fibers. In "AUTO" mode splicing process, by real-time analysis on fiber "thermal image", the machine adjust and control inreal-time the arc time and correct automatically the arc intensity of next splicing, meeting the user'sdemand that the splice parameters are always stable when the operation environment changes during the splice .

●"CALIBRATE" self-calibrationsplice mode: The built-in self-calibrationsplice mode is suitable for SM, MM, DS, NZ four fibers. In "CALIBRATE" mode: the fusion splicer gets and analyzes the characteristics of the fiber "thermal image" before welding. After finishing the analysis, themachine correctsautomaticallynext splice arc intensity according to "estimate splice loss". This splice mode is used by the factory for the configuration of different types of fiber optics. **If the users are not familiar with the performance of This series fusion splicers, it is not recommended to use this function.**

4.1 Select splice mode according to the type of optical fibers

<1>Different fibers have different splice parameters. In the fiber splice

operation, the user shall choose a suitable fiber splice mode according to the type of fibers to be welded.

<2>In "Select splice parameter files" screen, there are a total of 12 sets of different kinds of fibers. Different modes can be selected and edited by the user as shown in following drawing.
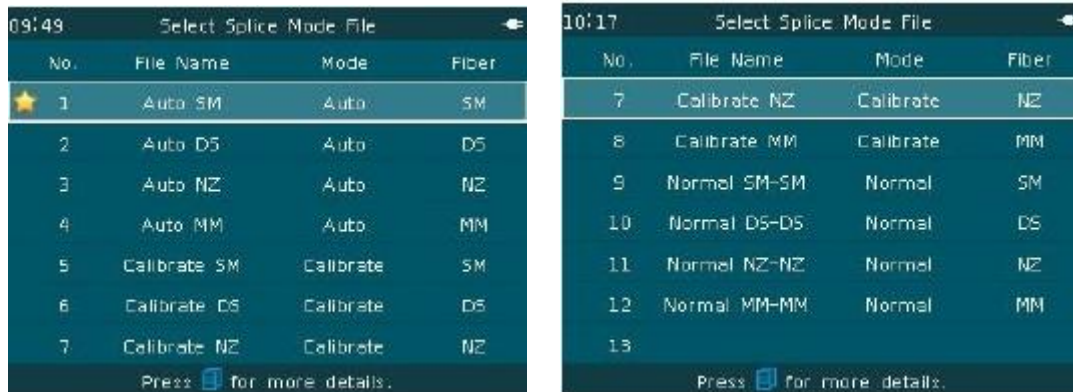
Description of some types of fibers:

Type of fibers	Description
SM	Splice standard single-mode fiber. MFD: 9-10um wavelength: 1310nm
NZ	For splicing non-zero dispersion shifted fiber. MFD: 9-10um wavelength: 1550nm WDM fiber can be spliced in this mode.
DS	For splicing dispersion-shifted fiber. MFD: 9-10um wavelength: 1550nm
MM	For splicing multimode fiber. MFD: 50.0-62.5um

Description of some modes:

Splice Mode	Description
Auto	"Real time arc calibration" function: Compensate and adjust in real time "arc time" and other parameters.
Calibrate	"Real time arc calibration" function: Compensate and adjust in real time"splice arc intensity".
Normal	Implement in default the factory optimized parameters.
Other modes	In the splicer database, there are other splice modes different to the modes listed above. The new splice modes are constantly increasing. The users can contact their sales dealer and ask for the latest splice modes.

4.2 Selecting / Editing splice mode

<1>Factory default fiber, splice mode (splice mode file) of This series fusion splicer: No. 1, Auto SM. If the user has no choice on other "splice mode files",No. 1 is used by default as "splice mode files" in the current operation of the fiber splice.

<2>When the machine is delivered, in No. 1 to 8 splice modes of "Select splice mode files" menu, there are 9 operating parameters and options for the user to edit and select. In No.9 to 12 splice modes, there are 15 operating parameters and options for the user to edit and select.

<3>The user can select and edit the current"splice mode files" according to fusion splicing demand. For the specific steps and requirements, please refer to "3.2.2edit/ select" of the manual.

4.3 Splicing operation

This series of fusion splicers are installed with an image processing system to observe and inspect the optical fiber. However, the image processing system may not discover fusion splicing errorsin some cases. In

order to achieve good welding results, the operator needs the LCD to monitor

visually the entire welding process of the optical fiber.The following

describes the standard welding steps.

4.3.1 Inspection on cutting angle and end face of the optical fiber

<1>Two optical fibers are loaded into the fusion splicer and are moved

forward each other. After cleaningarc, two optical fibers are stopped

respectively at a set position. The operator shall then check the cutting angle

and the quality of the endface of each fiber. If the measured fiber cutting

angle is bigger than the set limit (factory default value), or the operator

checks out the end face of the optical fiber has a burr, the machine buzzer

alarms. At the same time, the LCD will show an overrun alarm message.

Fiber splicing process is paused automatically. To ensure the quality of

welding, the user is recommended to make again a good fiber end face and

place the fibers into the machine once again.

Left cutting angle   Right cutting angle
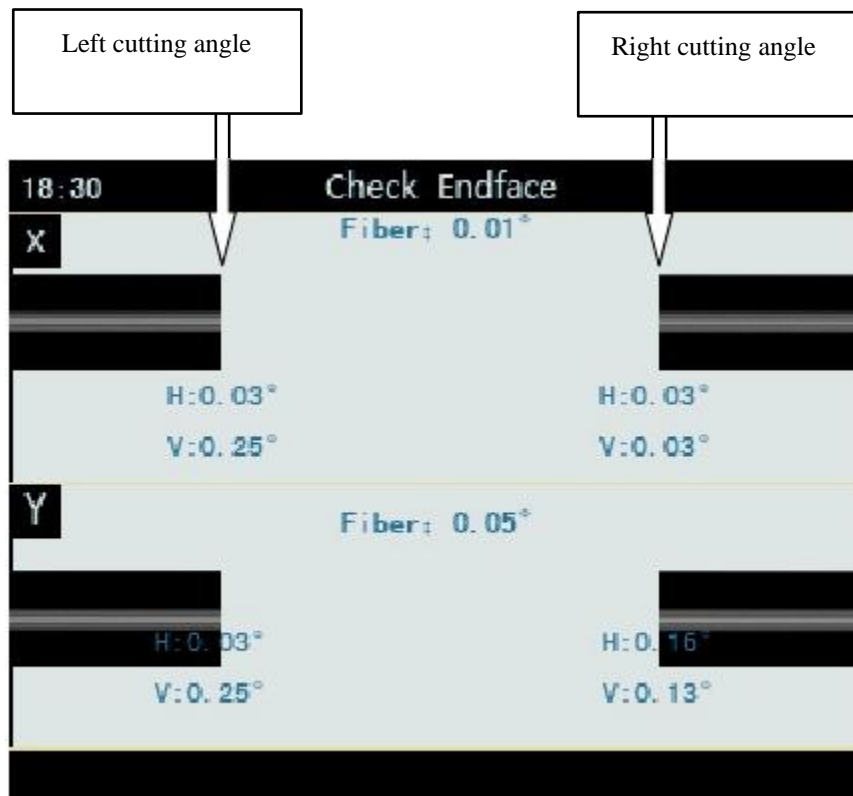
Screen Data Description:

Fiber: Angle between the left fiber (extension line) and the right optical fiber (extension line) on X (Y) screen. **H:** Angle between the left (right) fiber and the horizontal line. **V:** Angle between the left (right) fiber end face and the vertical line.

<2>When there is no overrun alarm message displayed on the fusion splicer LCD, the operator should also check manually the fiber end face. If the operator finds a situation similar to the following, take the fiber away from the fusion splicer and prepare again the fiber end face, because the fiber surface defects may lead to a failure of the splicing.

<3>Quality of the fiber end face has a big influence on the splice loss.Try to make a plane on the fiber end face when cutting the fiber. The angle of the

plane with the cross section of the fiber is less than 1 °. The end face in the

following figure (a) is good and can be welded; (b) ~ (f) are ineligible end

faces and should be made again.

4.3.2 Automatic aligning and splicing

After optical fiber inspection is finished, the fibers will be aligned according

to the manner of "core to core" or "clad to clad", and then is spliced witharc.

4.3.3 Estimation of splice loss

After fusion splicing is finished, the estimated value of the splice loss will

be displayed.
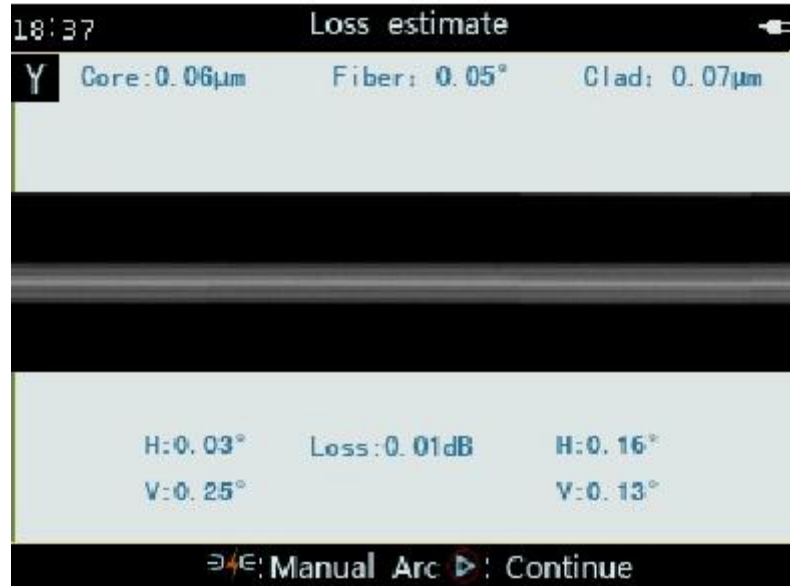
Screen Data Description:

Core:The left fiber core is offset to the right fiber core. **Clad:** The left

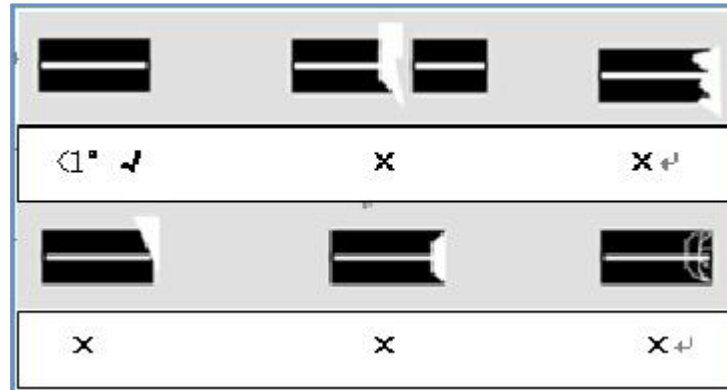fiber clad is offset to the right fiber clad. **Fiber:** angle between the left fiber

(extension line) and the right optical fiber (extension line) on X (Y) screen.**H:**

Angle between the left (right) fiber and the horizontal line. **V:** Angle between the left (right) fiber end face and the vertical line.

<div style="border: 2px solid blue; background-color: cyan;">

● **A model has no "screen data" display function.**

</div>

If the fiber after splicing is checked out to have following abnormal circumstance, for example: too thick, too small or bubbles, the fusion splicer shows "fusion splicing failure" messageor "too large splice loss estimate" message. When there is no error message displayed, but the splice result is found on the LCD display to be very poor, it is proposed to make splice again.

● **The splice point sometimes looks "thicker" than the rest of the fiber. This is normal fusion splicing and does not affect splice loss.**

● **When the splice loss exceeds the set alarm value, the machine shows red message to warn the operator. If this information is set not be displayed, the user can edit "Ignore Options" (Section 3.5) menu in [Splice Options].**

● **In some circumstances, additional arcs can improve splice loss. Press ⚡ button to carry out additional arcs. In some circumstances, additional arcs may increase splice loss. It is recommended to limit the number of arcs. The user can edit it in "Others" (Section 3.5) menu in [Splice options].**

● **When different fibers (different diameters) or multimode fiber are**

spliced,sometimes a vertical line is produced at the splicing point, this does not affect splice loss and point strength.

Causes and solutions of increased splice loss are listed in the table below:

Phenomenon	Causes	Solution
axial misalignment of fiber core	V-groove or fiber clamp feet have dust.	Cleaning V-groove and fiber clamp.
angle error of fiber core	V-groove or fiber clamp feet have dust.	Cleaning V-groove and fiber clamp.
	Poor quality of fiber end face	Check whether the fiber cleaver works well.
Steps on fiber core	V-groove or fiber clamp feet have dust	Cleaning V-groove and fiber clamp.
Fiber core bending	Poor quality of fiber end face	Check whether the fiber cleaver works well.
	Low pre-arc intensity or short pre-arc time.	▲ Increase "fiber pre-melting intensity". ▲ Increase "fiber pre-melting time".
Mode field diameter mismatch	Arc intensity is too low.	▲ Increase "arc 1 intensity". ▲ or "arc 1 time".
Dust	Poor quality of fiber end face	Check the cleaver working situation.
	Dust remains after cleaning fiber or cleaning arc.	Clean thoroughly the fiber or increase "clean arc time".
Bubbles	Poor quality of fiber end face.	Check whether the cleaver works well.
	Low pre-arc intensity or short pre-arc time.	▲ Increase "fiber pre-melting intensity" ▲ Or Increase "fiber pre-melting time".
Fiber separation	Fiber feed is too small.	▲Increase "overlap".
	Too high pre-arc intensity or too long pre-arc time.	▲Reduce "fiber pre-melting intensity" ▲Or reducing "fiber pre-melting time".
Too thick	Too low pre-arc intensity or too much feed of fiber.	▲Increase "fiber pre-melting intensity" ▲Or reduce "overlap"
Too thin	Inappropriate arc intensity.	Doing "arc calibration".
	Some arc parameters inappropriate	▲Adjust "fiber pre-melting intensity", "Fiber pre-melting time". ▲or adjust "overlap".
Fine Line	Some arc parameters inappropriate	▲Adjust "fiber pre-melting intensity", "Fiber pre-melting time". ▲or adjust "overlap".

Remarks: ▲ This item can be edited only in "Normal Splice Mode".

4.4 Tension test

4.4.1 If testing the strength of the splice point, enter the window of [select

splice mode files" in splice mode and enter "edit splice mode files"window,

click the cursor mouse to select "tension test" "On". Press ⊳ button or

button to confirm that the setting and then exit to the readiness window.

4.4.2 After the machine finishes splicing and the splice loss estimate value is

displayed, press "continue" button at the lower portion of the display screen

and press ⊳ button. The fusion splicer will perform automatically the

tension test of the fiber.
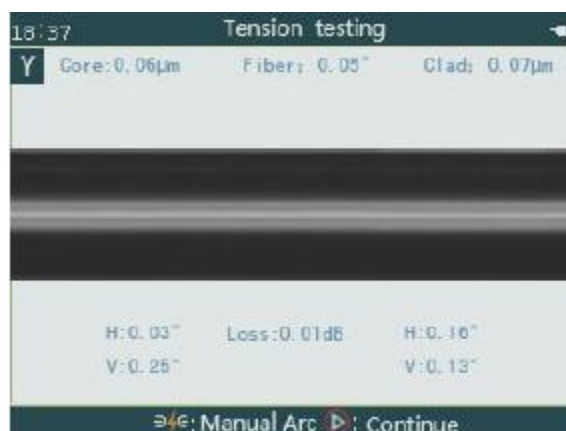
4.4.3 When the fiber splice point is not broken during the tension test, the

screen shows "tension test is complete".

● Forthe specific steps of the tension test"On", refer to "3.2.2 edit/ select" of

the manual.

> ● **Splice "tension test" function is OFF as factory default setting.**

> ● **If "splicing fails" appears in the fiber splicing, the tension test is not possible.**

4.5 Saving splice records

4.5.1 Upon the fiber splicing is completed and the loss estimate is displayed,

the splice loss value, splice parameters, splicing time and other relevant

information will be storedautomatically in the machine's memory.

4.5.2 When 4000 splice results have been stored, 4001th result will overwrite

the first result.

4.6 Reinforcement of fiber splice point

4.6.1 Selecting the heating mode according to heat-shrink sleeve material

<1>Different heat shrink sleeves have different specifications and sizes. When

the user reinforces the fiber splice point, matching heat shrink sleeve shall be

used. The heat shrink sleeve shall be operated according to the material type of the heat shrink sleeve used at present. The user shall choose a suitable heating mode.

<2>In "Select heater mode files" screen, total 9 sets of heat shrink sleeve modescan be selected, used and edited by the user, as shown in following drawing
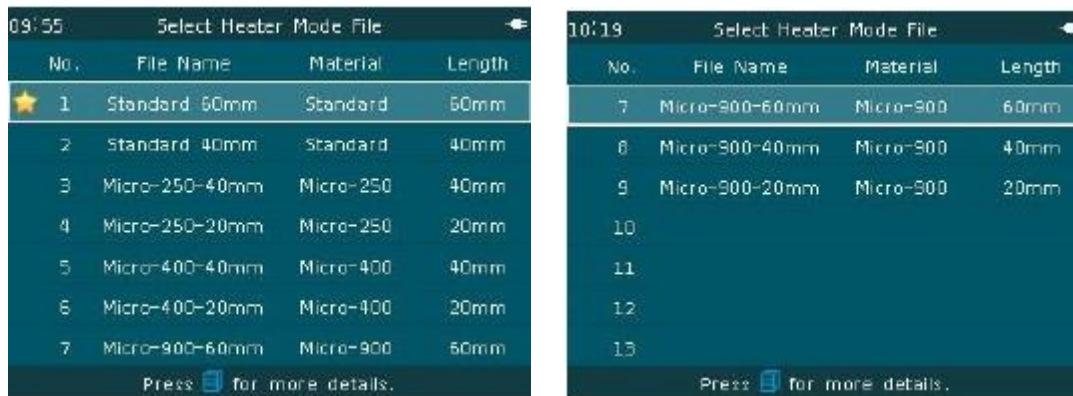
Heating mode description:

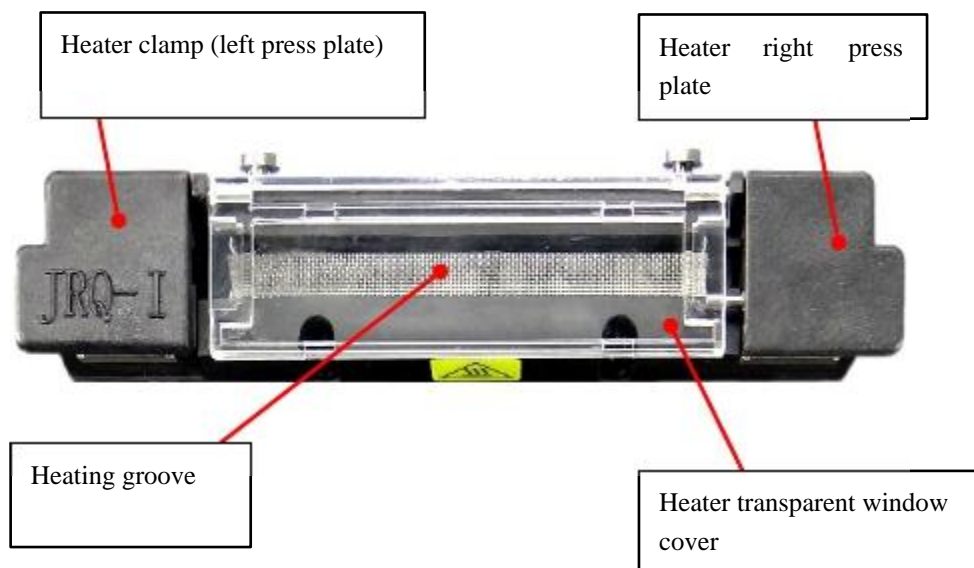| Parameter	Description
File (name)	Heating mode file name is up to 13 characters which can be selected by the users.
Material type	Setting the material of heat shrink sleeves: Standard, Micro250, Micro400, Micro900 and Connector and so on.
Length type	Setting thelength types of heat shrink sleeves: 60mm, 40mm, 20mm etc. Some length types are optional.
Heating control	Setting the heating control as "Automatic" or "Manual" in optional. A, E models do not have automatic heating function.
Heating time	Setting the holding and delaying time of "heating temperature".
Heating temperature	Setting the thermostat heating temperature.
Heating end temperature	Setting the heating end temperature. When the heater is near this temperature, the heating indicator is off, the buzzer alarms. At this moment, the heater has been cooled and can be removed from the furnace.

4.6.2 Selecting / Editing heating mode

<1>This series fusion splicers' factory default heating mode (heater mode file): No. 1, Standard 60mm. If the user does not select other "heating mode files",No. 1 "heating mode files" is used by default in the current heat shrink sleeve operation.

<2>When the machine is delivered from the factory, in No.1 to 9 heating mode files of "Select heater mode files" menu, there are 7 operating parameters and options for the user to edit and select;

<3>According to fusion splicing demand, the user can select and edit the current"splice mode files".For the specific steps and requirements, please refer to "3.3.2edit/ select" of the manual.

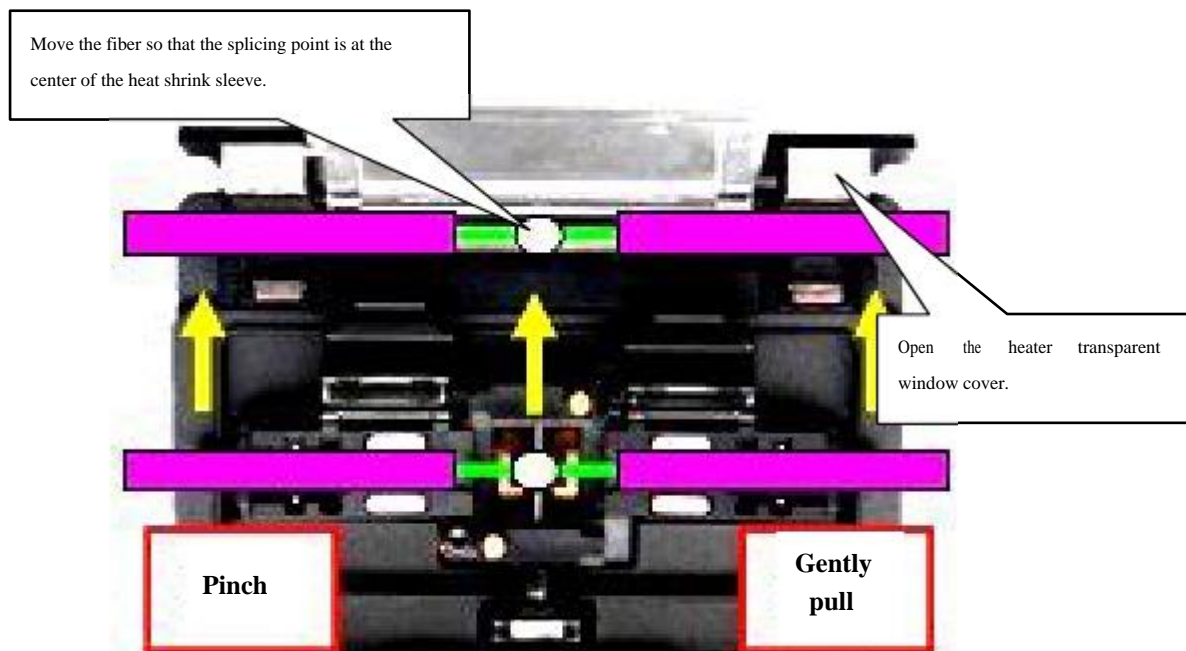## 4.6.3 Heating operation

| Heater clamp (left press plate) | Heater right press plate |

| Heating groove | Heater transparent window cover |

A.Manual heating control

<1>After opening respectively the heater clamp (left press plate) and the

transparent window cover, hold the left end of the optical fiber installed with

heat shrink sleeve with the left hand. Straighten gently the other end of the

optical fiber with the right hand. The optical fiber is moved from the

V-groove to the heater groove as shown in the figure below.

Move the fiber so that the splicing point is at the center of the heat shrink sleeve.

Open the heater transparent window cover.

Pinch

Gently pull

<2>Confirm that the fiber splice point is placed at the middle position of

heat-shrink sleeve.Put the heat shrink sleeve at the center position of the

heating groove and straighten gently the fiber. Close the heater transparent

window cover (right press plate) and the heater clamp (left press plate).

● **The reinforcing core of the heat shrink sleeve is placed on the bottom and the optical fiber is not distorted.**

<3>Press ⬚ to start heating. Heating processes include: Start heating-up

(LED red indicator), constant temperature stage (LED green indicator),

cooling stage (LED red indicator). When heating is complete, the buzzer

sounds. The heating indicator LED (red) is turned off automatically. If pressing button during heating, heating process will be terminated.

<4>After opening the heater transparent window, the fiber has been protected by the heat shrink sleeve and can be removed.

> ● **Heat shrink sleeve may be stained on the heating bottom plate of the heating groove.In this case, remove the heat-shrink sleeve by a cotton swab.**
> ● **Heater temperature in heating process is high. Do not touch the heating groove and heat-shrink sleeve .**

<5>Observe heat shrink sleeve after heating. The qualified fiber inside is free of bubble and dust.

B.Automatic heating control

For user-friendly heating operation, This series of fusion splicer is provided with automatic heating control mode.

<1>Refer to "3.3.2 edit/ select" of the manual,in "Select heating mode files" window, "Manual" option of "heating control" is set to "Auto" mode, realizing automatic heating mode.
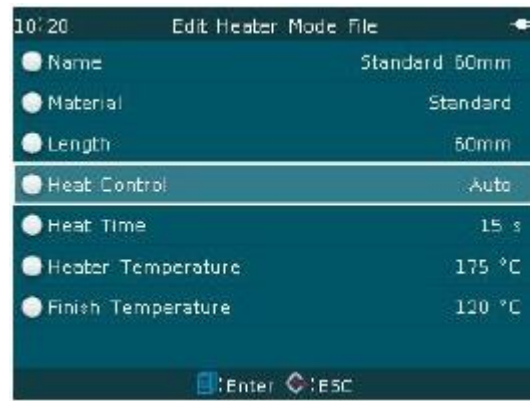
<2>When the operator puts the fiber heat shrink sleeve with fiber at the center of the heater groove, after the transparent window is closed and the heater's right press plate holds down effectively the fiber, the heater will work automatically. After finishing heating-up,thermostat stage and cooling three-steps, the buzzer sounds and the heating indicator LED (red) is turned off automatically.

<3>When the operator needs to stop the heating operation of the heater in process of heating, the operator just presses button.

● **A,E model have no "automatic heating" function.**

● **The right press plate of the heater cannot hold down effectively the optical fiber (or fiber-optic breaks by pressing). Automatic heating is invalid.**

4.7 Manual drive motor

4 motors (driving, aligning)in the fusion splicer can be operated separately and manually.

4.7.1 Selecting manual (step by step) splicing

In the "Splice operation options" menu of "Edit splice operation" window, set "Pause 1", "Pause 2" to "On". When the fusion splicer performs the splicing process to "Pause 1" or "Pause 2" status, the motor will stop automatically and the motors can be operated manually by pressing buttons.
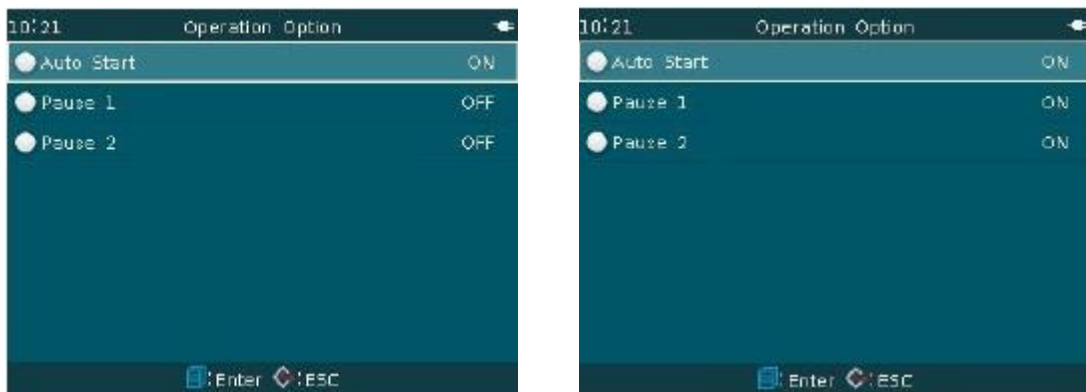
4.7.2 Manual (step by step) splice operation steps

<1>The machine goes from the automatic "forward" and other actions to complete the fiber "gap setting", and is suspended in "Pause 1" screen.Press

 button, "left fiber", "right fiber", "grid" dialog boxes appear. Move the cursor and select "Left fiber (right fiber)", then press button or button to confirm "Left fiber (right fiber)" operation. The fdriving and aligning motors of the left fiber (right fiber) can be set as follows.

```
17:30            Pause1              ⎼
X           Fiber: 0.01°

        H:0.03°              H:0.03°
        V:0.25°              V:0.03°

Y           Fiber: 0.05°

        H:0.03°              H:0.16°
        V:0.25°              V:0.13°

    ▤: Adjust Fiber  ▷: Align ∋↯⊑: Next
```

<2>In the "left fiber" operation window, press ▷ or ◁ to move X (Y) field left driving motor forward or backward; Press ▲ or ▽ to move X -field alignment motor upward or downward.

<3>In the "right fiber" operation window, press ▷ or ◁ to move X (Y) field right driving motor forward or backward;press ▲ or ▽ to move Y -field alignment motor upward or downward.

Operation comparison table of X (Y) field driving motor

and alignment motor

X (Y) field driving motor		
Left driving motor	Forward	Backward
Right driving motor	Backward	Forward
X (Y) field alignment motor		
X field alignment	Upward	Downward

motor		
Y field alignment motor	Upward	Downward

<4>Press ![button] button at "Pause 1" status in the splicing process. 4 motors (driving, aligning) can be adjusted manually (step by step) by pressing buttons, so that the gap between the left fiber and right fiber is (aligned) best.

Press ![button] button, the machine goes from "Pause 1" to "Pause 2" and suspended.
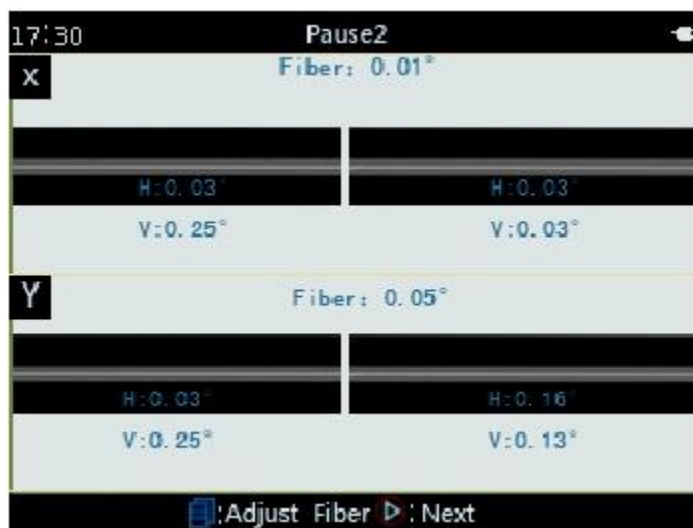
<5>Press ![button] button as same at"Pause 2" status in the splicing process. 4 motors (driving, aligning) can be adjusted manually (step by step) by pressing buttons. The left fiber and right fiber are aligned best (gap). Press ![button] button,the fibers are spliced by the arc of the fusion splicer.

<6>After splicing, the machine will calculate automatically "splice loss" and shows it on the screen.

> ● **When the left (right) motor is advanced forward by pressing buttons to the limit position, the motor will stop running and go back by pressing the buttons in the opposite direction.**

5. Inspection and maintenance

The following describes the key points for cleaning and maintenance inspection.

> ● **For the operation in section 5.1 ~ 5.4, turn off the fusion splicer power.**

5.1 Cleaning V-groove

If the V-groove is contaminated, it cannot grip properly the optical fiber. This will cause the splice loss too large. So in daily work, the V-groove should be checked and cleaned periodically or regularly.V-groove cleaning steps are as follows:

<1>Open the wind cover.

<2>Clean with a thin cotton swabs moistened with alcohol the bottom of V-groove, and wipe with a dry cotton swab the alcohol left in the V-groove.
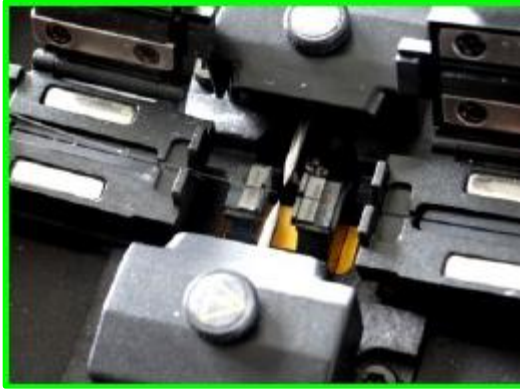
<3>If the thin cotton swabs moistened with alcohol cannot remove the contaminant in the V-groove, the operator can use the tip of the optical fiber with the coating layer being stripped to remove the contaminants from the V-groove. Then repeat steps <2> .

> ● **Be careful not to touch the electrode tip.**
>
> ● **Do not use excessive force when cleaning the V-groove, in case damaging V-groove wall.**

5.2 Cleaning fiber clamp

<1>If the fiber clamp is contaminated by dust, the fiber gripping may be a problem. This will likely result in poor quality of the splice point. In routine working process, the fiber clamp should be checked regularly and cleaned regularly.

<2>Cleaning fiber clamp according to following steps: Open the wind cover. Clean with a thin cotton swab moistened with alcohol the surface of fiber clamp.Then wipe with a dry cotton swab the clamp.

5.3 Cleaning mirror and objective lens

5.3.1 Routine maintenance

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.

5.3.2 Cleaning with anhydrous alcohol

The mirror and objective lens are dusty after a long time without routine maintenance, resulting in whitening and fuzzy black-clad of fiber image.Steps to clean the objective lens with anhydrous alcohol are as follows:

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

<2>Roll specific lens paper into a stick and then fold it and tear it apart. Then clean the mirror and 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 using alcohol to clean the mirror surface.**

<4>Wipe the lens with a cotton swab from the middle of the lens andmake 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.
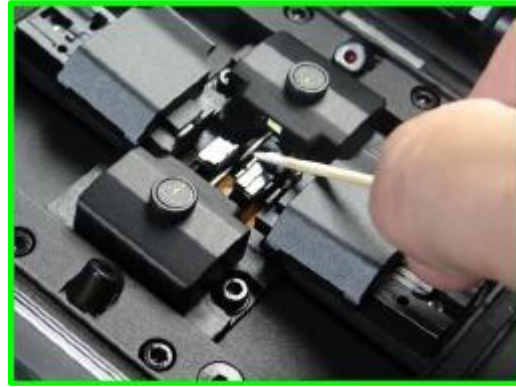
> ★ **Incorrect use methods or undesirable chemical substances cleaning objective lens can cause optical fiber imaging fuzzy and damage the equipment.**

<5>Turn on the power supply of the fusion splicer and make sure the dust and streaks are not visible on the LCD display. X / Y fields shall be switched over to check the condition of the surface of both objective lens and do dust check.

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

5.4 Replace the electrodes

Electrodes will be worn outafter long-term use and silicic oxide will be accumulated on the tip, so regular cleaningis required.It is recommended to replace the electrode after 2500 times of arcs. If the electrode continues in service without changing, the machine will increase splice loss and reduce the strength after fusion splicing. The steps replacing the electrode are as follows:

<1>Before replacing the electrode, turn off first the power of the fusion splicer.

<2>Remove the old electrode. The removal method is as follows:

a. Loosen the fixing screws on the electrode cover and remove the electrode

    cover.

b.Take out the electrode from the electrode holder (Electrodes are fixed inside

    the electrode cover).

<3>Clean the new electrode with tissue paper dipped in alcohol, then install

    the electrode to the original holder position.

<4>Install the electrode cover and tighten screws.

> ●**When replacing the electrode, do not pull out the wiring.**
>
> ● **Do not tighten the screws with the force larger than finger's max. force.**

5.5 Stabilizing electrodes

When replacing a new electrode or the external environment is changed, the electrode (tip) surface is covered by dirt. The direct result is that the arc intensity is unstablesometimes and more splice loss. Especially when the fusion splicer moves from low altitudes to high altitudes, it takes some time to stabilize the electrode. In this case, stabilizing electrode will accelerate the process of stabilizing arc intensity. The steps are as follows.
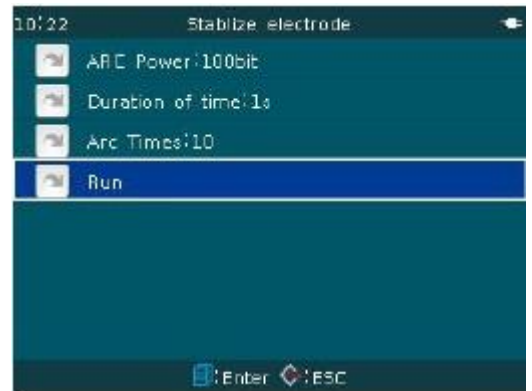
<1>In the "Maintenance" menu, move the cursor to "electrode" item, press
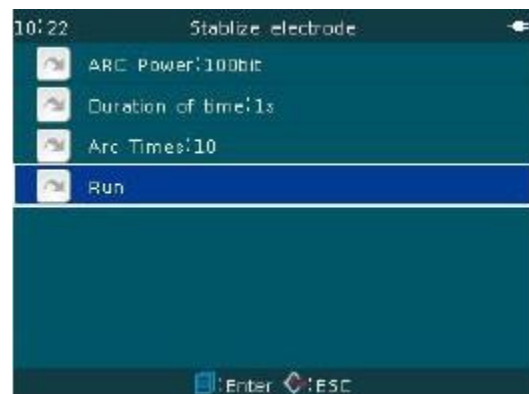
and enter the lower level menu of "Operation electrode".Move the
cursor to "stabilizing electrodes" item.

<2>Continue to press and enter "stabilizing electrodes" operation
window.Move down the cursor to "run" item.

<3>Press or .The fusion splicer starts 10 times of "stabilizing
electrodes" arcs.

<4>Certainly, the operator can check visually arc stability in fiber splicing to confirm if "stabilizing electrode" operations shall be repeated.

5.6 Clear arc times

This function can reset the times of arcs.

<1>In"operation electrode" menu, move the cursor down to "clear arc times" item.
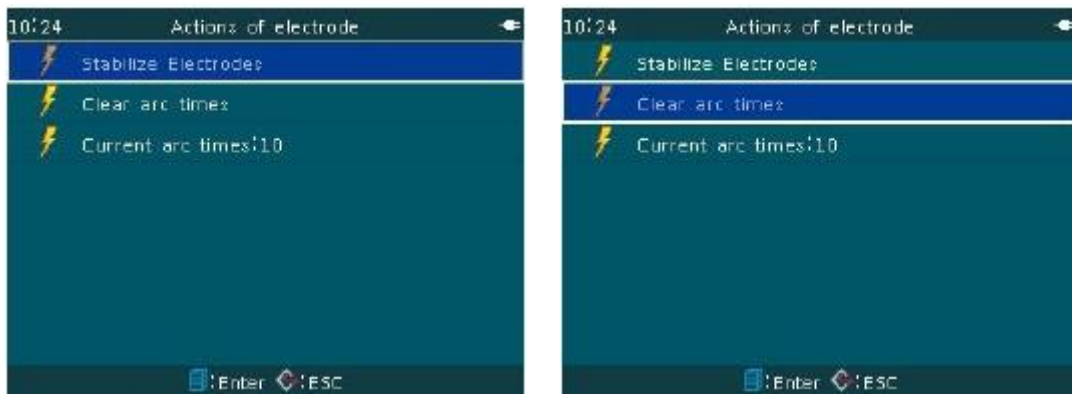
<2>Press [icon] button, "continue to clear the arc times data?" dialog box appears.Press [icon] or [icon] button."Current arc record 10" is cleared and "current arc times" is 0.
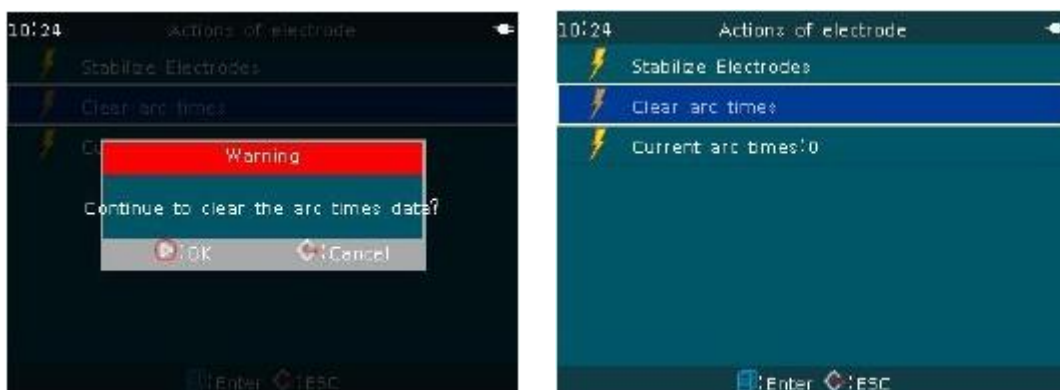
5.7 Dust check (A model has no such function)

The operator can observe the optical fiber through the imaging system of

the fusion splicer. The dust or dirt on the camera, the lens and mirror of the imaging system may affect the observation and cause bad splice result.With the dust check function, the operator can check the dust and dirt on the optical fiber path and indicate their location.

5.7.1 This feature allows the user to check the dust or dirt on the optical path and determine whether they affect the detection on the optical fiber.

5.7.2 Operation steps

<1>Before starting the test, take out the optical fiber from the fusion splicer.

<2>Check visually if lens, mirror surface are free of foreign material.

<3>In the "Maintenance" menu, move the cursor to "dust check" item and press ![icon] button to enter "X dust check" operation window.

<4>Press ![icon] or ![icon] button.The fusion splicer completes soon "X image check".If there are any dust points, the position is shown on the screen.

<5>Upon completion of X image dust check, press ⬤X/Y button. The screen

switches to Y image. Continue to press ⬤▷ or ⬤↪ button. The fusion

splicer completes soon "Y image check". If there are any dust points, the

position is shown on the screen.
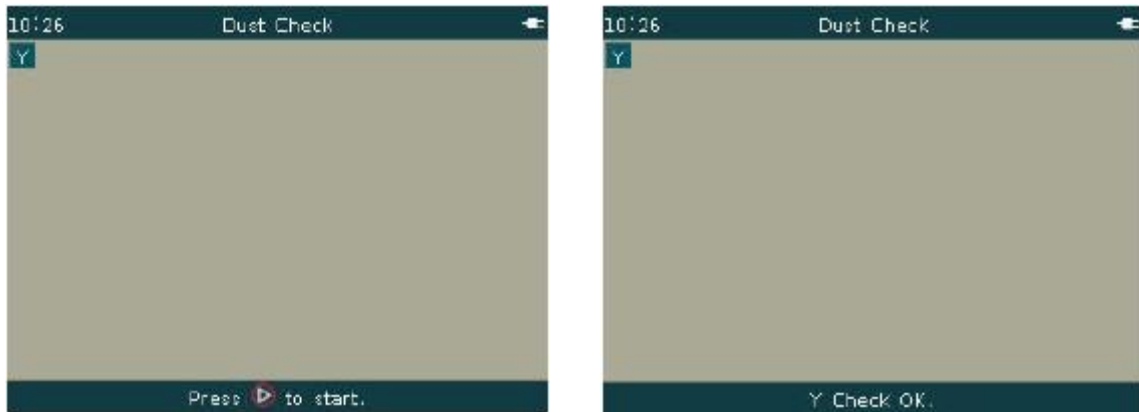
<6>Upon completion of respective 2 image dust checks, press ⬤↩ or ⬤↪

in turn to return back to the fusion splicing window. The normal optical

fiber splicing work can be done.

● **If the screen displays "image dirty" after the dust check, the**

operator shall clean the objective lens and mirror inside the wind

cover. If after cleaning, the dirt remainsafter "Dust check" again, it

indicates that the dirt may go into the optical path. Please contact

the manufacturer or dealer.

5.8 Cleaver maintenance

5.8.1 Cleaning fiber cleaver

<1>Keep clean the fiber clamp surface of the cleaver. Do not touch oily liquid.

<2>Clean with a thin cotton swab dipped with alcohol the blade and pressing pad.

<3>Afterwork each time, it shall be noted that the rubber press pad shall be free of any residual broken fiber or other debris. The cleaver after cleaning shall be put into a special packing box (bag).

5.8.2 Adjustment of blade height

<1>Adjusting upwards the blade: If the cleaver cannot cut the fiber for a few successive times, or the fiber end face has very irregular cutting mark or obvious cutting edge. It may be caused by insufficient height of the blade. Blade height adjusting sequence is as follows: Use a wrench to loosen the height locking screws on the cleaver holder and rotate the height adjusting screw in clockwise a little as required, then tighten gently the height locking screw.

<2>Adjusting downwards the blade: The fiber end face after cutting has always concave face, black spots, or angled etc. It may be caused by too

much height of the blade. Blade height adjustingsequence is as follows:
Use a wrench to loosen the height locking screw on the cleaver holder;rotate
the height adjusting screw in counter clockwise a little as required;then
tighten gently the height locking screws.

5.8.3 Changing blade position

After height adjustment, the cleaver cannot cut off the fiber still for a
few successive times, or the fiber end face after cutting has very irregular
cutting mark. It may be caused by unsharp blade at simple point. It is
necessary to change the cutting position of the cleaver blade. Hold the
cleaver blade with left hand;loosen the blade locking screw with a hex
wrench (1.5mm) with right hand; rotate the blade to a new cutting point;
then tighten the blade locking screw.

5.8.4 Replacement of blade

The average life of the blade is about 48,000 times of cutting. To ensure the
cutting effect, it is recommendedchanging the blade in time.

<1>Loosen the blade locking screw with a hex wrench and remove the screw
and washer on the blade.

<2>Put the cleaver at 90 °position, blade upward.Open big press plate. Clamp
carefully with tweezers both sides of the blade. Lift gently the blade and put
it on a proper place. Clean with cotton swab dipped in alcohol the blade
axis.

<3>Clamp with tweezers a new blade. Hold the blade flat and put the blade
into the machine from a position slightly above the blade axis. The blade hole
is aligned with the axle. Rotate the blade with a cotton swab gently touching

against the surface of the blade, so that the blade is rotated to point 1.

<4>Put the blade pad on a corresponding position of the blade, and screw up

and tighten the blade locking screw.

5.8.5

 Precautions in cleaver operation:

<1>Dismantling and oiling the machine may cause malfunction, so it is

absolutely not permitted.

<2>The cleaver is a precision part. Beating and falling to the ground (impact)

may damage the cleaver and cause the personnel injured, so be care in

operation.

<3>The blade mounted on the machine is very sharp. Do not touch it with

hand (or other parts of the body), in case injury.

<4>Fiber and fiber debris are tiny. The sharp tippiercing into the finger and

getting into the eyes can cause injury, so to be careful in operation. Fiber

debris shall be put into a dedicated waste site separated from general waste.

<5>If the cleaver will not be used, put it into a box and keep the box in a dry,

dust-free place.

<6>If the machine fails or is abnormal, stop using it. Do not disassemble or

modify it. Contact the customer service center of the factory.

5.9 Calendar settings

This function is used to set the calendar and time inside the fusion splicer.

For the operation steps: refer to "3. 7. 1 time" of the manual.
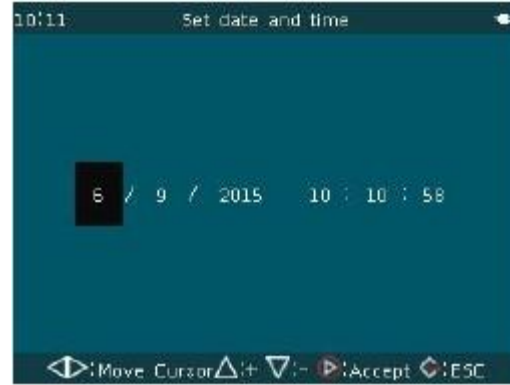
5.10 Heater / battery / environment

(Remarks: A model has no such function)

This feature not only provides users with information about the current operating environment, and also improves fusion splicing properties, provides software correction values. Operation steps: please refer to "3.6.6 status" of the manual.
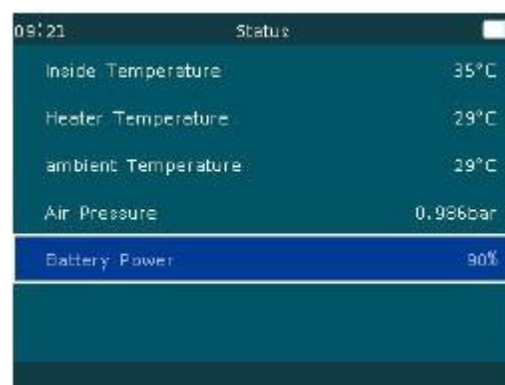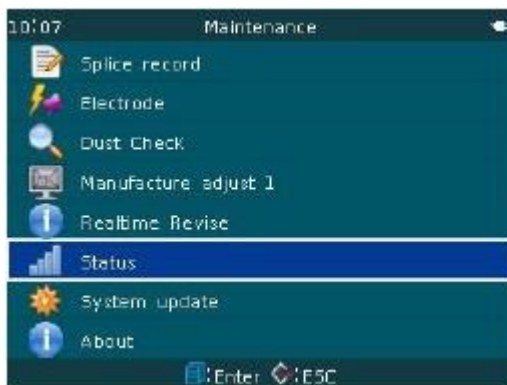
5.11 Replacement of spare lithium batteries

Refer to "2.1.2 lithium power supply" of the manual. Replace the backup battery.

6. Problems and troubleshoot

6.1 Power supply

The machine does not shut down after pressing .

Press button until the keypad indicator light is turned from red to green. Release button, the fusion splicer shuts down.

Full charged battery is even not enough for several splices.

● If the fusion splicer power-saving function is turned off, the power consumption will increase.

● As the battery provides power through chemical reaction, the temperature too low will lead to reduced capacity,particular below zero.

● At high altitudes, arc current will increase. In this environment, the battery capacity will decrease rapidly.

● AC / DC adapter is not provided by our company, or the charging time is not enough.

LED (power module indicator) blinks during charging

● Temperature is too high (above 50 degrees) or the battery is exposed in direct sunlight.

● Battery is faulty or has exceeded the service life. Insert a new battery, if LED is still blinking, contact the manufacturer or distributor.

● AC / DC adapter is not the model provided by our company.

6.2 Fusion splicing operation

Splice loss value is unstable / high.

● Clean V-groove, optical fiber clamp, mirrorand objective lens inside the wind cover. See [inspection and maintenance] (Chapter 5).

● Replace the electrode. See [Replacing electrode] (Section 5.4).

● If the fiber is bent, the bent portion of the optical fiber is placed upward.

- Splice loss is decided by the cutting angle, arc conditions and fiber cleaning.

- If finishing the operations above, splice loss is still too high or unstable, contact the manufacturer or dealer. Recommend regular maintenance (once a year) to ensure good welding quality.

Confirm splicing program

- See [splice mode] operation (Section 3.2).

Display is suddenly closed.

- When the fusion splicer is powered by the battery,the operator shall turn on the power-saving function.If the fusion splicer does not operate after a little time, the display will shut down automatically. Press any key to return to a normal state.Changing the time setting, refer to [Power Save] (Section 3.7.5).

Changing the limit of cutting angle, splice loss, offset angle

- See [splice mode] operation (Section 3.2)

Error messages can be ignored.

- Enter [ignore display] in [splice options] menu (Section 3.5). Refer to the error messages allowed to be ignored.

Arc intensity and time cannot be changed.

- In Auto mode or Calibrate mode, these parameters cannot be changed.

- In the mode above, after executing the arc calibration, the arc intensityis sufficient.

- In Normal mode, arc intensity and time can be changed except the operator locks them.

Showing cutting angle, fiber angle, fiber core/ clad offset

● For cutting angle, fiber angle, core / clad offset settings,see [data display] in

  [splice options] menu [Ignore display] (Section 3.5).

● KL280G fusion splicer has no such display.

In the automatic mode, unsuitable splice mode is selected.

● Automatic mode can only apply to standard SM, DS, NZ, MM optical

  fibers.See [splice mode] operation (Section 3.2)

Splice loss estimation and actual value are inconsistent.

● Splice loss estimate is an internal calculated value of the fusion splicer and

  is only a reference.

● Splicer optical components may need to be cleaned.

6.3 Heating operation

Heat shrink sleeve is not completely shrunk.

● Prolong heating time or increase temperature. See [heating mode] (Section

  3.3)

● The reinforcing core of the heat shrink sleeve is not placed on the bottom.

  Optical fiber is not distorted. See [heater operation] (Section 4.6.3).

The heat-shrink sleeve after shrinking is stuck to the heating groove.

● Eliminate it with a cotton swab or other soft material.

Automatic heating function does not work.

● After the transparent window of the heater is closed, the right press plate of

  the heater cannot effectively hold down the optical fiber (or fiber-optic

  breaks by pressing). See [heater operation] (Section 4.6.3).

Cancel heating operation

● Press ⬢ button one time.

6.4 High lever setting

Lock "Select" and "Edit" in splice andheating mode.

● See [Menu lock] (Section 3.7.6).

Appendix A: Warranty period and conditions

● **If the following occurs, they are 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;

★ Other product failure or damage causedby improper use, improper installation, the use of non-original batteries and parts, or other external factors (Such as unsteady voltage);

★ The user tears offthe label"warranty void after tearing up the label" on the enclosure of the fusion splicer, and disassemble and repair the machine without authorization;

★ The user tears offlabel"warranty void after tearing up the label" on the enclosure of the lithium battery;

★ Consumable parts (such as arc electrode, cleaver blade, fusion splicer carrying case, etc.).

● **Exemption clauses**

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

★ **Warning**

> The fusion splicer battery is a consumable item and the battery life has safety service life requiredstrictly: The times of charge-discharge in normal use are less than 300 times and the storage life not exceeding one year (12 months). Extended use is strictly prohibited.

●Before delivering failed fusion splicer, contact the manufacturer or dealer.

Maintenance and repair information required (the following information shall be included in the machine)

<1> Full name, the company, address, phone number, fax number and e-mail.

<2> Fusion splicer model and serial number.

<3> Problems and fault symptom encountered.

  a) What time and under what circumstances the problems occur?

  b) How is the current situation?

  c) The character and image information of optical fiber are appearedon the display when the machine fails.

<4> List of parts in the machine.

Appendix B: Contact information

The fusion splicer must be returned to dealers or factory for repair. Please

provide a description of the exact fault when applying for repair. Please

contact the dealer for repair address or the address below.

★ **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 at site**

is final.

Table: SUN-UM-TL-FS002   Version: A/0