Instruction Manual

SAT-17T

OPTICAL FUSION SPLICER

Before operating the equipment,
please carefully read this instruction manual
Do follow all safety instructions and warnings covered in this manual.
Take the manual for safe keeping

Thanks for choose Aitelong!

The information contained in this document is subject to change without notice.

Please visit www.aitelong.com for more information.

Contents

■ ***Warnings & Cautions***

This machine is specially designed for splicing optical fibers. Any misuse of this equipment for other applications, like splicing anything not optical fiber, will seriously damage the machine. Manufacturer take much consideration to user's personal safety and injury, and provided a lot of Safety & Cautions instructions. Misuse of this machine may result in electric shock, fire and/or serious personal injury.

Follow all safety instruction

Read and understand all safety instruction

Stop using when it malfunction

Contact with our service for repair as soon as possible

Instruction Manual

Read this instruction manual carefully before operating this machine. Store this instruction manual in a safe place

Warnings
➢ If any following condition happens, please disconnect the AC power cord from the AC adapter inlet or the wall socket and hold power button to force power off immediately to ensure the equipment safety, and contact with maintenance center. ● Fuming, un-normal smell, unusual noise, or over-heat. ● Liquid or foreign matter falls inside splicer; ● Damage or drop occurs. If this occurs, ask your service center for repair or suggestions.
➢ Please use the original AC/DC adaptor or battery charger which is supplied by original box. Using any improper and non-authorized power source may cause fuming, electric shock or equipment damage, also may result in fire, personal injury or death.
➢ Please use the original supplied AC power cord and do not place heavy objects on the AC power cord. Fuming, electric shock or equipment damage may be caused by improper use or non-authorized power cord, or personal injury or other fatal consequences.
➢ Never operate the splicer in the environment where existence of flammable liquids or vapors, the electrical arc may lead to splicer at risk of fire or explosion if operated under such occasion.
➢ Do not use compressed gas or canned air to clean the splicer. They may contain flammable materials and could be igniting the splicer during the electrical splicing operation.
➢ Do not touch the electrodes when the splicer is in operation. The electrodes generate high voltage and high temperatures that may cause a seriously shock or burn for operator. Please turn the

splicer off and disconnect the AC power cord before replacing the electrodes.

- Safety goggle should always be worn during optical fiber preparation and splicing operation. Optical fiber fragments can be extremely dangerous if it comes into contact with the eye, skin, or has been ingested.
- Check the AC power source before use. Proper AC power source is in range of AC100-240V, 50/60Hz. Improper power source may be resulted in fuming, electric shock or equipment damage, and may results fire, personal injury or death.
- Do not short-circuit the terminals of AC adapter and battery. Excessive electrical current may cause personal injury, burning, electric shock and other damages for equipment.
- Do not touch the splicer AC power cord and AC plugs with wet hands. These may result electric shock.
- Do not operate splicer nearby hot objects, or in hot temperature environments; don't store splicer in dusty/humid atmospheres environment. These may result electric shock, splicer malfunction or poor splicing performance.
- When using optional battery, follow the instruction below. Failure using may result in explosion or personal injury.
  - Don't charge battery with other methods than instructed in this manual.
  - Do not discard battery into an incinerator or fire.
  - Do not charge or discharge battery near a flame or under direct sunlight.
  - Do not excessively shake or jar the battery.
  - If battery leaks of liquid residue, be careful handling the

battery and make sure the liquid does not contact with in skin or eyes. If liquid contact with skin or eyes, please wash skin or eyes thoroughly and ask for nearest hospital service immediately. Call our service center for battery replacement information. ● Do not place battery on top of AC adapter during the charging.
➢ Before using the shoulder belt of carrying case, please check the belt and hooks condition. Carrying the case with a damaged or non-functional shoulder belt may break the belt or come off and result personal injury or equipment damage.
Cautions
➢ Do not store splicer in any area where temperature and humidity are extremely high, otherwise it may result equipment failure.
➢ Do not touch sleeve directly or heater during heating or immediately after completion of heating. Their surfaces are very hot, and any touching may result skin burn.
➢ Do not place the splicer in an unstable or unbalanced position. The splicer may shift or dropped down, a personal injury or equipment damage may be resulted.
➢ The splicer is precision adjusted and aligned. Do not let splicer to receive a strong shock or impact. Unexpected equipment failure may result. Use supplied carrying case for transportation and storage. The carrying case protects the splicer from damage, moisture, vibration and shock during storage and transportation.
➢ In order to extend life cycle of rechargeable battery, please charge it at least every three months

➢ V-groove, objective lens should be regular cleaned every month, but in harsh environment conditions, the cleaning should be done immediately to ensure the correct alignment.
➢ Stabilizing electrodes if follow situation occurs: replace new electrodes, electrodes squeak, electrode oxidation, carbon deposition, high/low temperature, high altitude etc. Doing this will improve splicing accuracy.
➢ Please follow the instructions for electrodes replacement. ● Use only specified electrodes. ● Set the new electrodes in the correct position. ● Replace the electrodes must in a pair. Ignore or misunderstanding to follow the above instructions may cause unusual arc discharge. It can result equipment damage or degradation in splicing performance.
➢ Do not use any chemical other than pure alcohol (99% or greater) to clean the objective lens, V-groove, LCD monitor and other parts of the splicer. Otherwise blurring, discoloration, damage or deterioration may result.
➢ The splicer requires no lubrication. Oil or grease may degrade the splicing performance and damage the splicer
➢ The equipment must be repaired or adjusted by an authorized technician or engineer. Incorrect repair may cause fire or electric shock. If any problems occurred, please contact your nearest service or your sales representative directly.

■ ***Product Introduction***

1. Introduction

SAT-17T Optical Fusion Splicer was designed and made by the latest technologies, it comes with high precision positioning technology, fast and efficient image processing and accurate alignment technology, ensure the typical splicing time is within 9S (Fast mode 7S). It also offers high capacity replaceable battery to operate in long time for field work.

Its featured in simple operation, small size, light weight, fast splicing speed, small splicing loss, and many unique functions, especially suitable for optical fiber cable works and maintenance in telecommunications, broadcasting, railways, petrochemical, power, military, public security and other communication fields, as well as teaching and scientific studies in research institutes.

In order to properly use the equipment to complete splicing operation, please read this manual carefully before using.

2. Features

- Small, durable, and easy to carry
- Large-screen LCD color display
- Operation menu is simple and beautiful
- Automatic screen power off to extend battery life
- Automatically power-off in low power
- Auto-heating after cover-close function
- LCD manual reversing function
- Support more splicing application scenarios:
    - ✧ Bare fiber to bare fiber

- ✧ Indoor cable and Indoor cable
- ✧ Indoor cable and SOC (Splice-On Connector)
- ✧ Pigtail cable and SOC (Splice-On Connector)
- ✧ Indoor cable and pigtail cable

3. Technical Specifications

3.1 Key Specification

Applicable Fibers	SM (single mode), MM (multi-mode), DS(dispersion), NZDS (non-zero dispersion), EDF(Erbium-doped fiber)
Average Loss	0.02dB(SM), 0.01dB(MM), 0.04dB(DS), 0.04dB(NZDS), 0.02dB (BIF/UBIF)
Return Loss	Better than 60dB
Typical Splicing Time	9s / 7s (fast mode)
Fiber Aligning	Core alignment and cladding alignment
Fiber Diameter	Cladding diameter:80～150μm
	Coating diameter:100～1000μm
Magnification	X or Y, magnify 360X
	X + Y, magnify 180X
Image display	High-performance 4.3 inch LCD
Tensile test	Standard 2N
Splicing Mode	100 (10 factory pre-defined)
Heating Mode	100 (4 factory pre-defined)
Battery capacity	7800mAH, 86.58WH
	300 times (splicing and heating)

	Charging time: about 3h (can be used while charging)
Battery life	1000 charging cycles
Electrode life	Typical 3,000 times, and replaceable
External interface	Mini USB
Result record	Maxmium10000 results
Heater Function	Automatic, support user defined heating mode, 0°C ~ 300°C adjustable
Power supply	Built-in lithium battery: 11.1V
	AC/DC adapter input: AC 100-240V
	Output: DC 13.5V / 5.0A
Working environment	Temperature: -20°C ~ +55°C (-4°F~131°F)
	Humidity: 95% RH (40°C non-condensing)
	Altitude: 0~5000m
Dimensions	L×W×H＝166×146×159 (mm)
Weight	1.6kg (without battery), 2.0kg (with battery)

3.2 Heating Stove Specification

Compatible Cable	250μm, 600μm, 900μm，2~3mm and 3.5mm
Heat-shrinkable tubing	60mm, 45mm, 20mm or other types
Heat Time	Auto-heating , 19 sec fast heating
Heat Temperature	0~280°C
Heat process	30 groups

3.3 Packing List

No.	Item	Quantity
1	SAT-17T Fusion Splicer	1 pc
2	Chargeable Battery	1 pc
3	AC/DC Adaptor	1 pc
4	AC Power Cable	1 pc
5	Tweezers	1 pc
6	Cooling Tray	1 pc
7	Carrying case	1 pc
8	Fiber Strippers	1 pc
9	Indoor Fiber Stripper	1 pc
10	Alcohol Bottle	1 pc
11	Fiber Cleaver	1 pc
12	Warranty Card	1 pc
13	User Manual	1 pc
14	Packing List	1 pc
15	QC Pass/Warranty	1 pc

4. Description and Function of Splicer

4.1 Components of Splicer

Fig.4.1.1 Main host

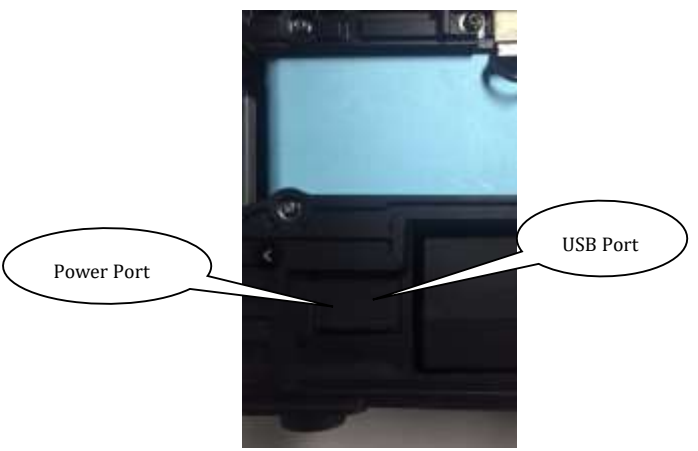


Fig.4.1.2 Power port

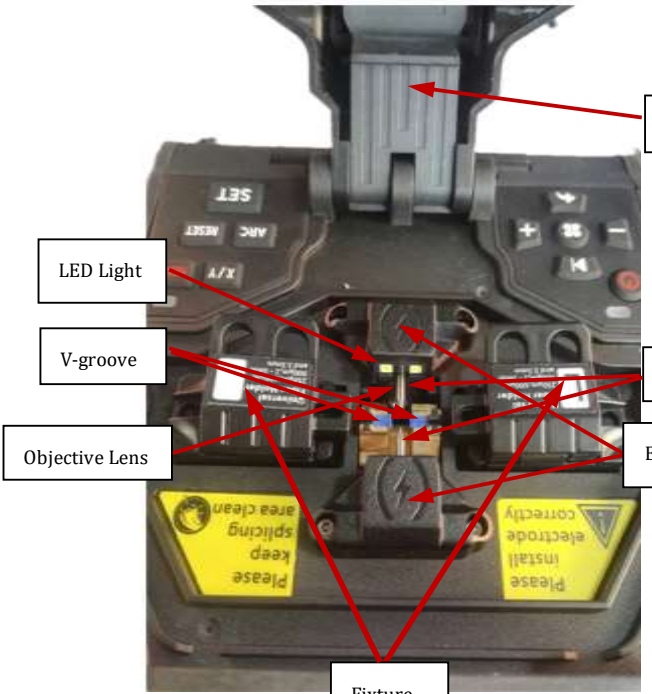
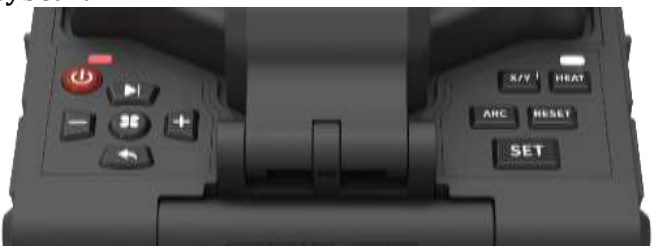


Fig.4.1.3 Splicing components

Fig.4.1.4 Heating stove

4.2 Keyboard and Function

4.2.1 Keyboard



4.2.2 Key Definitions

Keyboard Icon	Name	Function
	Start/stop	Power on/off
HEAT	Heating key	Start heating
X/Y	Switch X/Y view field	Switch the X/Y views after fiber alignment
	Menu/Confirm	Enter menu, and confirm the operation
RESET	Reset	Motor Reset
SET	Start	Start align/ARC/fusion etc.
	Next Menu	Move the menu icon
	Minus	Minus the value
	Add	Add the value
	Return	Return to previous menu

■ *Panel and Interface Instructions*

1. Power Supply

The fusion splicer supports two types of power supply:

a. Internal battery supply power (no external adaptor is used)

b. External adaptor supply power (A power adaptor is used)

Note: Please use the standard adaptor which is packed along with fusion splicer, if use other model of adaptor, may result in abnormal running.

1.1 External Adaptor Supply Power and Charge

This fusion splicer adaptor input index: wide-range 100-240V, 1A, 50/60Hz. Output index:13.5V, 5A, please must use the dedicated adaptor. Connect fusion splicer and power source with adaptor, if battery is installed in the fusion splicer, then the adaptor is supplying power for fusion splicer and charging for battery. And an icon as Fig. 1.1.1 will show in the screen upper right corner. The ⚡ means the battery is charging, and the power indictor light will continuously twinkle until the battery is fully charged.

Fig.1.1.1 Battery electricity

1.2 Internal Li-ion Battery Supply Power

a. Battery electricity indicator

Upper right of the screen shows the battery electricity, green stand for surplus battery electricity. as Fig.1.1.2 shows.

Fig.1.1.2 Battery electricity

b. Battery charge

When the adaptor is connected, it will charge to the battery, user can check the battery icon to judge whether the fusion splicer is charging, the charge time will change along with battery electricity, max. 3 hours. After fully charging, the battery icon will show as Fig.1.1.3.

Fig.1.1.3 Battery is fully charged

c. Low-battery warning

When the electricity is too low to run normally, a warning will show as Fig.1.1.4, user must charge for the battery or connect adaptor to supply power.

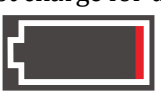


Fig.1.1.4 Low Battery Capacity

d. Battery usage precaution

1). Before first time use, please fully charge the battery.

2). Please check the battery electricity before using, if the electricity is over low, charging for it asap.

3). Do not use or place the battery at a high temperature or a direct sunlight places.

4). Please charge the battery electricity to 40%-60%, before the battery is stored in a long-term.

5). The battery is consumables. After charge and discharge for many times, the battery capacity will decline, so use need change it to a specific model of battery.

2. Power On/Off

2.1 Power On

Press in short time, the power indicator on operation panel turns red, the buzzer beeps, all motor back to initial position, and the LCD screen shows the optical fiber checking interface, as fig 2.2.1 shows. The power model will be auto judged, while the battery is used to supply power, the surplus electricity will be Showed.

2.2 Power Off

Press in long time, the LCD screen will shut down, power indicator flicker, and then extinguish when hand release. The fusion splicer is powered of normally.

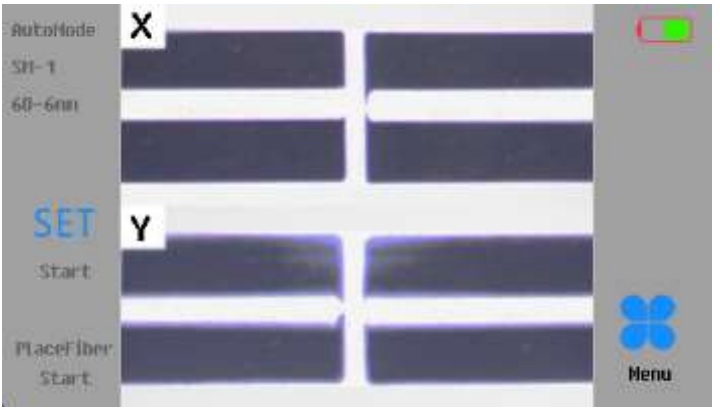


Fig.2.2.1 Optical fiber checking interface

3. Main Menu

The fusion splicer is adopted friendly operation menu, user can learn the main menu content and operation steps with this

chapter. Press MENU enter into main menu interface, as Fig.3.1

Fig.3.1 Main Menu

Function Menu	Specification
Function Setting	Setting parameters of fast ARC, tensile testing etc.
Splice Mode	Setting parameters under splicing mode
Heating Mode	Setting parameters of heating process, time, temperature, heating shrink etc.
History Records	Record total ARC/splice/ARC reset times, and splicing results checking etc.
Maintenance	ARC calibration, motor maintain, and setting system parameters etc.
System Setting	Screen brightness, language, date, factory defaults, energy saving, about device etc.

4. System Setting and Function Setting Menu

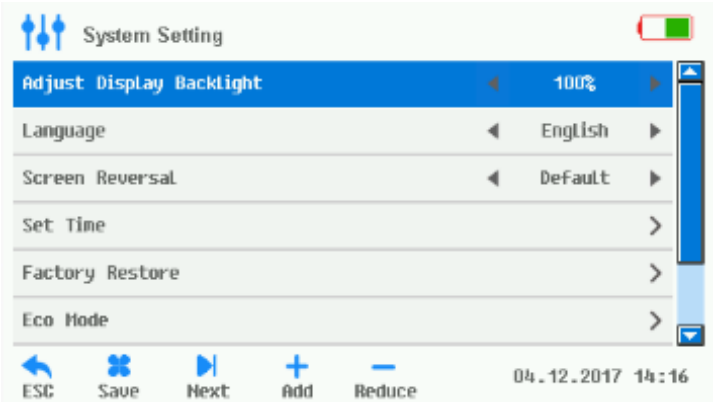


Fig.4.1 System Setting Menu

Setting	Description
Adjust Display Backlight	Adjust the screen's brightness
Language	Adjust the language, such as Chinese, English etc.
Screen Reversal	Screen can rotate in 180° to suit different direction working
Set Time	Set the system's time, year, month, date, etc.
Factory Restore	Recover all the system parameters to factory default
Eco Mode	Set auto-dormant, auto-power off etc. to save energy
Silent Mode	Open/close the buzzer
About	Check the machine basic information, such as version, S.N, and company contact info. etc.

Function	Description
Quick ARC Calibration Mode	If this function is turned on, before splicing, the fusion splicer will run a quick ARC calibration
Tension Set	If Tension test is turned on, after splicing, Tension test will be executed automatically
Reset Waiting Time	If Tension test is turned off, after opening cover, the fusion splicer auto to reset waiting time(Turn on tension test, this can't run)
Auto Start	If close cover set turn on, after closing the cover, auto-align and splice
Auto Heating	If close cover set turn on, after closing the heating stove, fusion splicer auto-heating

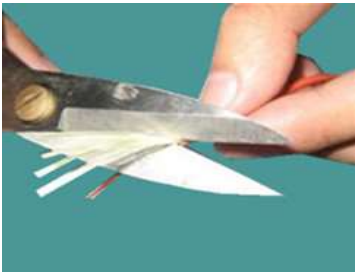
5. Preparation Before Splicing

5.1 Strip The Optical Fiber Coating

Use gauze (dipped in alcohol) cotton ball to clean the about 100mm optical fiber. If the fiber is indoor fiber, an indoor fiber stripper need to used peel it about 40mm. As fig.5.1.1. For other types fiber, please use the stripper to shear the coating.

Fig 5.1.1 Strip indoor fiber

① Strip outer plastic with stripper



② Shear the string with a scissor

④ Strip coating with stripper

④ Stripped coating with stripper

Fig 5.1.2 Strip other type of optical fiber

5.2 Install Heating Sleeve

After the optical fiber splicing, a heating sleeve is needed to protect the splicing spot. Confirm the heating stove is clean and make the sleeve is parallel with the optical fiber, as Fig.5.2.1.

Fig 5.2.1 Install heating sleeve

5.3 Strip and Clean the Optical Fiber Coating

a. Strip the coating

Strip the fiber's coating with a stripper, the length is about 30mm, as Fig.5.3.1&5.3.2 shows. Place the coating stripped fiber into the fixture groove, the length is about 30mm.

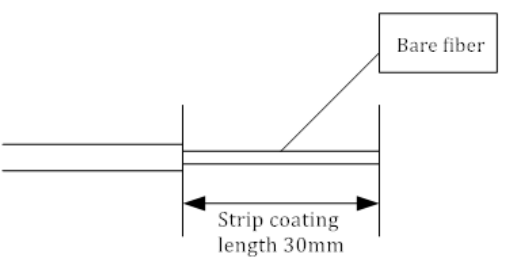


Fig 5.3.1 Strip coating length

Fig 5.3.2 Strip the coating manually

b. Clean the optical fiber

After stripping the coating, use gauze (dipped in alcohol) cotton ball to clean the bare fiber, toward to bare fiber and rotate the ball to clean the chips. As fig. 5.3.3.

Fig 5.3.3 Cleaning the fiber

5.4 Cleave the Optical Fiber

a. Ensure that the sliding panel with blade has slid to the user's side before cleaving fiber, then open the top clamp cover and holder clamps cover.

b. Align the optical fiber coating layer edge to appropriate scale mark, place optical fiber into oriented rolling groove of holder, and confirm that bare optical fiber is straightly placed on the clamp pad.

c. Close clamps cover of holder first then close the top clamp cover slowly, quickly push the sliding plate with blade to another side, and finish optical fiber cleaving.

d. Open the top clamp cover first, then open holder clamp cover while holding optical fiber by another hand, flick off fragmentary optical fiber, and carefully remove the optical fiber from cleaver.

e. Take out and place the fiber chips into chips collector box.

f. Indoor fiber cleave process is similar.

Note: Optical fiber sections after cutting must keep off any other objects, in order to guarantee splicing quality**.**

The cleaver of bare fiber is different from indoor fiber, so please use the corresponding cleaver for different fiber.

5.5 Loading Optical Fiber to Splicer

a. Open wind protector cover and fiber platen on left and right sides of splicer. Check the V-groove, clean it if there is some dust.

b. Place prepared optical fibers onto v-groove and ensure the

end of each fiber is located between the v-groove edge and tip of electrode. If fiber coating has any curl, place optical fiber and make its curve is turned upwards. Be careful to avoid the prepared optical fiber ends touched any objects, so that optical fibers end -surface quality can be guaranteed.

c. Hold fiber with fingers and close fiber clamp tip cover to let optical fiber in a fixed position of v-groove. Make sure fibers are placed in the bottom of the v-grooves. If fiber is not placed properly, please reload fiber.

d. Compliance with step b/c, load the another side optical fiber.

e. Close the wind protector, start splicing.

Note: Before splicing, the protection sleeve should be placed on a random optical fiber.

6. Splicing Operation

6.1 Choose Splice Mode, Edit Splice Parameters

a. Splice mode description

Splice Mode	Description
Fiber Type	SM (single mode), MM (multi-mode), DS (dispersion), NZDS (non-zero dispersion), BIF/UBIF EDF etc., Factory defined multi default groups, user can choose different splicing program with fiber type.
Splice method	Automatic, semi-automatic and manual.
Splice Mode No.	Current splice mode and
Edit splice Program	Edit the current item's splice parameters, as Fig6.1.1.
Cleaning ARC Time	Clear ARC is cleaning the dust on optical fiber surface by ARC. The clean time range: 0-200ms
End-face Angle Limit	Set the end face angle limit value, while the right/left fiber exceed the set value, an error prompt will show. Set range 0~8°.
Cleave angle limit	Inclined angle limit after fiber align, if exceed limitation, the error prompt will show, range 0~4°.
Fiber Align Limit	After fiber align, if central deviation exceed limitation, an error prompt will show, set range: 0.0~1.5μm.
Loss Limit	Estimated splice loss exceed limitation, an error prompt will show, set range:0~0.2dB.

Manual ReARC Time	Set the ReARC time. With some situation, splice loss can be reduced by ReARC.
Align Type	Set Refined, clad and Core alignment, default core alignment.
Quick Splice Mode	Can be set On/off, if open, splice time will at min. 7 sec.
Forced Splice Mode	When aligning the fiber, if the fiber can't calibrate normally, such as cleave end face isn't meet the align need, user can choose this mode to splice forcedly. Note: this operation will increase the splice loss, so it is just suit for some special circumstances.

b. Under "Splice Mode" Menu, choose "Edit Splice Program" to edit the splice parameters. As Fig 6.1.1.

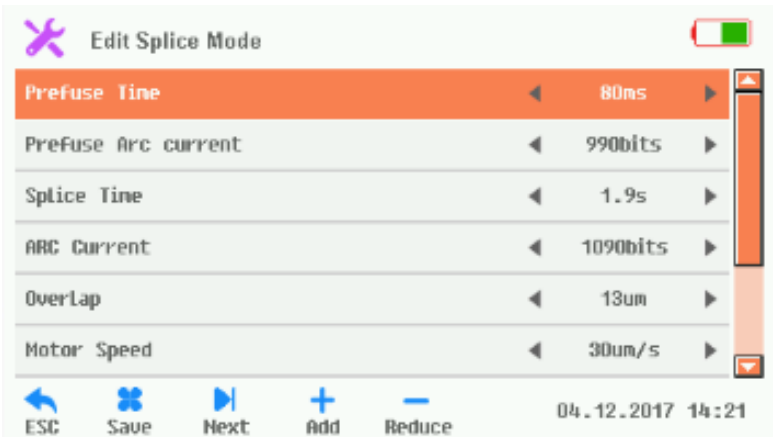


Fig 6.1.1 Edit Splice Mode Menu

Splicer Parameters	Description
Prefuse Time	Set the Prefuse time between time of ARC and fiber pushing.
Prefuse ARC Current	Set the Prefuse ARC current between time of ARC and fiber pushing.
Splice Time	Set splice ARC time.
ARC Current	Set splicer ARC current
Overlap	Set the fiber pushing overlap within splicing
Motor Speed	Set motor speed within splicing
ARC2	Set whether on/off additional ARC
ARC2 Time	Set additioanl ARC time
ARC2 Current	Set additioanl ARC current

6.2 Auto-align and End-face Check

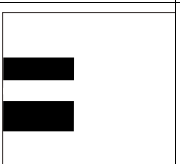
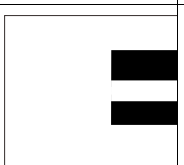
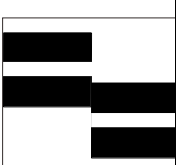
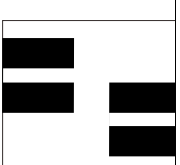
To ensure excellent splicing, this fusion splicer is adopted Image processing System to check the optical fiber. But with some situation, the system may not find the splicing fault. Thus, in order to get a better splice result, user need to visually check the fiber via displayer.

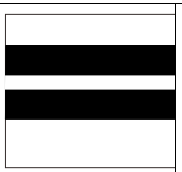
Press SET, enter into auto align mode, left and right fiber forward motion to each other side. The system automatically checks the optical fiber end face after cleaning ARC, if the end face is too bad to splice, then an error message will show on screen, otherwise the fiber will go on aligning. After well

aligning, the screen shows left and right fiber angle. If the detected end face cleave angle exceed limitation value, an error message also shows, user need to re-cleave fiber again.

Note: Set the "End-face Angle Limit" "Fiber Align Limit" in "Splice Mode" menu.

If the below prompt info. while aligning, the system will auto-reset motors, user can also press to reset motor, and re-cleave or re-load fiber.

Image (X/Y axis)	Prompt Info.	Probable Reason	Measurement
	Incorrectly placed right fiber	Right fiber is not load into V-groove, or cleave too short	Reload fiber, re-cleave fiber
	Incorrectly placed left fiber	Left fiber is not load into V-groove, or cleave too short	Reload fiber, re-cleave fiber
	Abnormal alignment	Left/right fiber is not loaded into V-groove	Reload fiber, re-cleave fiber
	Re-load fiber	Left and right fiber is cleaved too short.	Reload fiber, re-cleave fiber

	Re-load fiber	Left and right fiber is cleaved too long.	Reload fiber, re-cleave fiber
	Unqualified fiber end face	Problem occur while cleaving fiber (concave core, bulge tip, bevel, burr etc.)	Re-cleave fiber
			
			
	Unqualified fiber	Dust on the surface of fiber	Re-clean fiber, and reload fiber

6.3 Splicing

After fiber aligning, a message “Finish Align”, press “ SET” to start splicing, or press RESET. If the setup is Auto splice, then the system will auto-splice without any press handle.

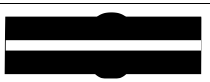
6.4 Splice Loss and Quality Evaluate

After splicing, the splice loss evaluation value will show on the right screen, if the fiber is spliced abnormally, such as fiber thick, thin, separation, bubbles, line etc. an error message will appear, user have to re-splice or re-ARC. And if no error prompt, but screen shows bad splice result, user should also re-splice.

Note that the splice spot may look thicker, it's a normal splicing without influence of splice loss.

Splice result normal, but the splice loss exceed limitation, after splicing, user should press SET to re-ARC, after ARC, system will re-check the fiber, evaluate splice loss and show whether it's qualified. Splice abnormal or higher evaluation value Cause and Solution as follow:

Symptom	Cause	Solution
 Core axial offset	1. Dust on V-groove or fiber presser foot 2. Problem with image check system	1. Clean V-groove or fiber clamp chip 2. Continuously appear, user need to do "Detect system parameter"
 Core angle	1. Dust on V-groove or fiber presser foot 2. Bad angle of fiber end-face 3. Incorrect fiber load position	1. Clean fiber presser foot 2. Re-cleave fiber 3. Re-load fiber

 Bubbles	1. Bad angle of fiber end-face 2. Dust on fiber end face 3. Prefuse in lower current or shorter time 4. Splicing in lower current or shorter time	1. Re-load or re-clean fiber 2. Increase Perfuse current or time. 3. Increase splice current or time.
 Fiber Separation	1. Low fiber push value 2. Low speed of fiber push 3. Higher splice current or longer splice time	1. Execute “Detect system parameter” 2. Decrease Prefuse current or time
 Thicker	Higher fiber push value	Decrease overlap value, advise “ARC Calibration”
 Thinner	1. Low fiber push value 2. Higher splice current	1. Increase overlap value, advise “ARC Calibration” 2. Decrease splice current
 Line	Lower splice current	Increase splice current

7. Tension Test

If “Tension Test” is turn on, after finishing splicing, Tension Test will be executed automatically, Tension=2N, the menu as below:

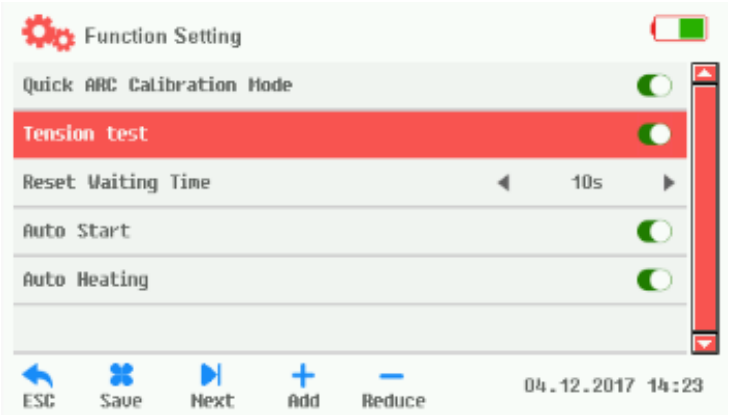


Fig 7.1 Tension Test Menu

8. History Records

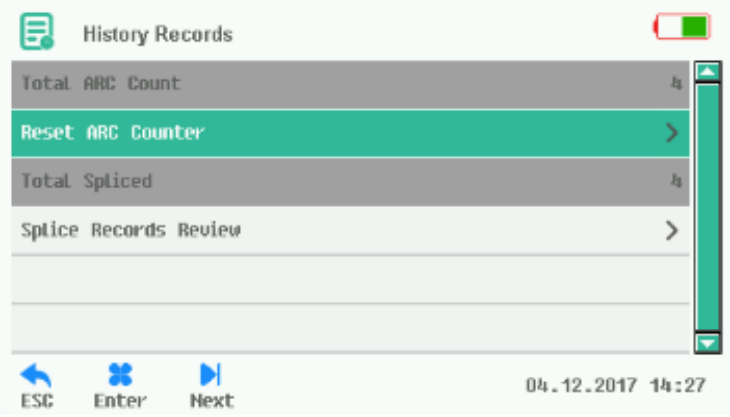


Fig 8.1 History Records Menu

History Records	Description
Total ARC Count	Count the ARC total times from last Reset
Reset ARC Counter	Change the electrodes, execute this operation
Total Spliced	The statistic of stored splice records
Splice Records Review	Provide max. 10000 groups new splice records. Review the splice parameters and results.
Splice Image Review	Review the splice image records.

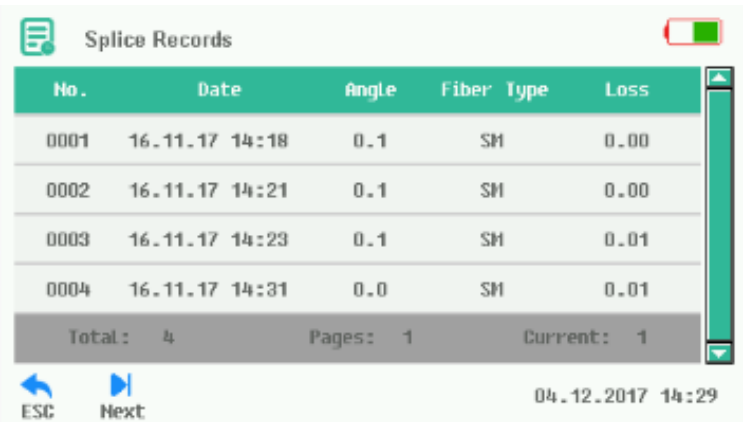


Fig 8.2 Tension Test Menu

9. Heating Mode

Enter “Heating Mode”, as Fig 9.1 shows:

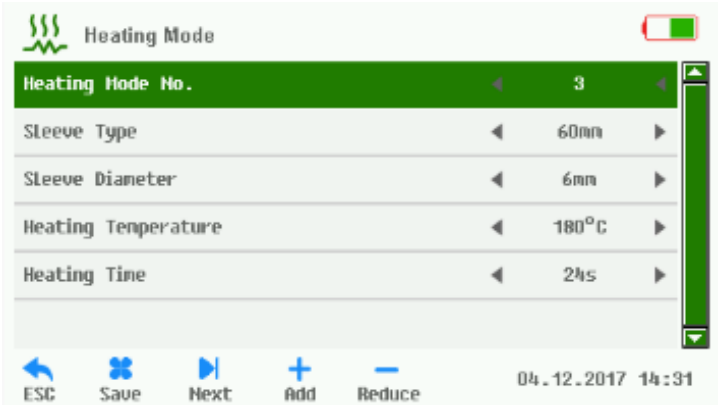


Fig 9.1 Heating Mode Menu

Heating Mode	Description
Heating Mode No.	Different heating mode is set for different sleeve, 30 group user define program
Sleeve Type	10mm-60mm sleeve, FC、SC
Sleeve Diameter	1-8mm
Heating Temperature	Max temperature in heating
Heating Time	Heating and shrinking the sleeve time

Note: Use the pre-set heat parameters, if the sleeve type is "Blank", system will auto-set the heating No. to "1".
After changing electrodes, updated program, user must do shrink calibration to avoid influencing shrink result.

a. Open up the cover of heater.

b. Open the wind protector cover, take out spliced fiber and more the sleeve to the center of spliced spot.

c. Placed the fiber into heating stove, slightly pull the fiber to be straight and keep the sleeve in the center of heating stove, then close the heater cover.

d. Choose heating mode, and confirm heating parameters (If same with previous heating, ignore this step).

e. Press HEAT to start heat, the indicator light will turn on in red, if press HEAT during heating, then heating will cancel.

f. After heating, the indicator light will extinguish. Open the heater cover and take out the heated sleeve. (Note: do not touch the heated sleeve to avoid scald)

g. Check the shrink result, if it is qualitied, place the sleeve into cool tray to wait for natural cooling, otherwise, such as dust or bubbles inner sleeve, do heating operation again until its qualified.

■ Maintenance

1. Maintenance Menu

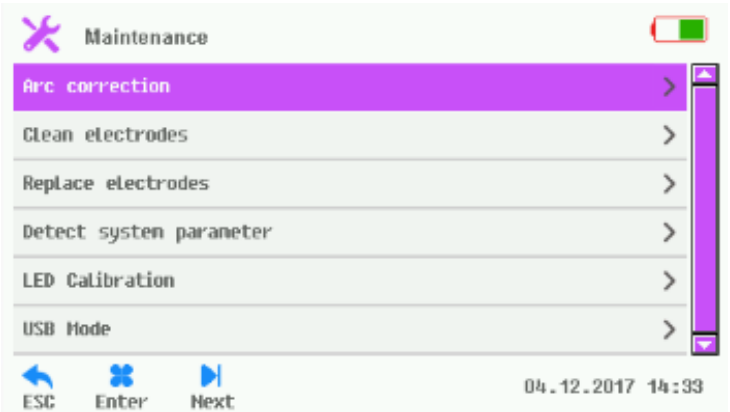


Fig 1.1 Maintenance Menu

Maintenance	Description
ARC Calibration	Operate ARC, and auto-calibrate ARC current
Clean Electrodes	Run repeatedly high current ARC to clean electrodes
Replace Electrodes	After replace electrodes, auto-detect ARC location and ARC repeatedly to stabilize electrodes.
Detect System Parameter	Auto-detect electrodes position and parameters etc.
LED Calibration	Accord to prompt to Calibrate optical source
USB Mode	Accord to prompt to enter USB mode

2. ARC Calibration

When splicing the fiber, environmental factors, such as temperature, humidity, atmospheric pressure etc. may lead to the change of ARC strength. This fusion splicer is equipped with a temperature and atmospheric pressure sensor to detect the above factors and ensure a stable working environment.

Burn-in and dirty of electrodes may also result in ARC strength and skew of fiber splice spot.

Regarding with above problem, user can execute ARC Calibration to solve the problems. This function is accorded to splice spot axis skewing before/after ARC to judge the ARC strength, and auto-calibrate it to standard strength, thus to realize a fiber splice in low loss and high stabilization.

Strongly suggest: Run ARC Calibration Under the below circumstance, otherwise the splice result will be influenced.

- The splice fiber type is changed.
- Program upgraded
- Operation environment has great change, such as temperature, humidity, air pressure etc.
- Continuously splicing failure or splice loss higher.
- No using of fusion splicer in long-term, or the electrodes is used in too many times.
- Cleaned or replaced the electrodes.

ARC calibration step as follow:

a. In Maintenance Menu, choose “ARC Calibration”

b. Place the cleaved fiber into fusion splicer and close the wind protector cover.

c. Press SET to calibrate ARC.

(1). System set the fiber gap to ARC central spot which can be detected.

(2). After ARC, system will detect the right and left fiber's splice value, and calibrate ARC current.

d. If the message: High ARC Current or Low ARC Current show on screen, repeat step b and step c until successful.

e. If prompt ARC Failure, please repeat step a.

f. After finish ARC Calibration successfully, press to exit ARC calibration mode.

3. Electrodes Maintenance

3.1 Clean Electrodes

ARC may be effected by the impurity on the electrodes surface, so user have to clean electrodes periodically.

Operation step as below:

a. Press to power off, and the power indicator light will extinguish.

b. Clean the new electrodes tip with dipped alcohol gauze.

c. Press to power on

d. In "Maintenance" menu, choose "Clean Electrodes".

e. Press SET to start ARC, the fusion splicer will discharge with 5 times to gasify the impurity for the purpose of stabilizing ARC and cleaning electrodes.

Note: During this process, do not touch the electrodes tip to avoid the damage of electrodes and influence of splicing results.

3.2 Replace Electrodes

Electrode will be abraded in long term using, for used about 5000 times, it is recommended that replace the electrodes to avoid increase splice loss and decrease the splice strength. There will be a replacing prompt after over 5000 times, after replacing, user need to operate "Clean Electrodes"

a. Press to power off, and the power indicator light will extinguish.

b. Loosen the fixed screw on electrodes cover, take out electrodes.

c. Install the new electrodes and its cover, tighten the screw.

d. Check whether two electrodes are on a horizontal plane, if not, install the electrodes once again.

e. Power on, and load the fiber into splicer, in "Maintenance" menu to operate "ARC Calibration".

f. After replacing electrodes, in "History Records" menu execute "Reset ARC Counter".

g. After finishing above step, do "Detect System Parameters".

4. Detect System Parameters

This function can detect relevant main parameters of the fusion Splicer.

Strongly suggest: Run Detect System Parameters Under the below circumstance, otherwise the splice result will be influenced.

- Program upgraded
- Replace or move the electrodes
- Fusion splice is transported in long distance or shake

violently

- Continuously splicing failure or splice loss higher
- Failure in fiber aligning process.

Operation step as below:

a. Clean V-groove and cleaved fiber with a dipped alcohol gauze. This is an important step, user must operate.

b. In "Maintenance" menu, choose "Detect System Parameters"

c. Load the cleaved fiber into fusion splicer and close the wind protector cover, press SET to start.

d. In general, this procedure will last for 2 minutes, please check the prompt info. on screen, if failed, accord to prompt to re-start system detect. (Step b)

e. After finish successfully, press to exit Detect System Parameters mode.

5. Clean Fusion Splicer

5.1 Clean V-groove

In most time, abnormally fiber aligning is caused existed contaminants in V-groove. So user have to regularly check and clean the V-groove, the step as below:

a. Open the wind protector.

b. Use dust blower clean the contaminants.

c. Use the fine cotton swabs dipped with alcohol to clean the bottom of V-groove and use the dry cotton swabs to wipe excessive alcohol off the V-groove.

Note: Do not touch the electrode tip, do not use a hard object to clean V-groove to avoid V-groove damage.

5.2 Clean Objective Lens

Splicer adopts high precision image application technique to locate and align optical fiber, while the dust adhering to lens shall interfere with processor in terms of image processing; accordingly, dirty lens shall adversely influence the splicer in terms of location of optical fiber core and lead to higher splicing loss or splicing failure; therefore, user should regularly clean the two lens to prevent dust from accumulation and ensure proper splicing effect.

a. Power off and open the wind protector cover.

b. Use fine cotton swabs dipped with alcohol to slightly clean reflector glass.

c. Use a dry cotton to wipe out the residual alcohol, check the objective lens glass and confirm it is cleaning totally.

d. Power on and check the screen to confirm whether there is still dust, if yes, repeat the above operation once again.

Note: Do not touch the electrodes and lens with a hard object.

5.3 Clean the Holder Platen

Dust on holder platen may cause fiber hold problem, and influence the splice results. User should regularly check and clean the holder plate.

a. Open the wind protector cover.

b. Use fine cotton swabs dipped with alcohol to slightly clean the holder plate, and use a dry cotton to wipe out the residual alcohol.

5.4 Clean Heating Stove

Dust and contaminants can easily attach on heating stove, user should regularly check and clean the heating stove.

6. Program Upgrade

Program upgrade is an additional function of this fusion splicer,

user can upgrade the system to newest program via this operation. Operation step as following:

a. In "System Setting" menu, find "About" and enter the info. review page, user can find the current version info. (such as: V5.01/V2.28/ROM: V0.80)

b. Get the newest updated software from manufacturer, and compare whether it is the same with the current version, if yes, then user can ignore this operation.

c. Power on the fusion splicer, use USB wire to connect the fusion splicer and PC, after the computer pop up the U disk prompt, copy the updated software to the U disk. After the software is totally copied, shutdown the fusion splicer and restart it.

d. When restart the fusion splicer, user should follow the prompt message. In general, the progress bar will change 0%--100%, if abnormally terminate, please repeat step b, c, d. And if there is some problems user can't solve, contact with manufacturer directly.

■ *Appendix 1 Warning Info. List*

Warning	Cause	Solution
Left fiber placed incorrectly (LFPC)	1. Left fiber is cleaved too short 2. Left fiber loaded in V-groove is break 3. Left fiber isn't loaded in V-groove center. 4. Left motor wire fault.	1. For cause 1&2, re-cleave left fiber for correct length. 2. For cause 3, re-load left fiber. 3. Exclude cause 1,2,3, run "Detect System Parameter" or contact with factory
Right fiber placed incorrectly (RFPC)	1. Right fiber is cleaved too short 2.Right fiber loaded in V-groove is break 3.Right fiber isn't loaded in V-groove center. 4. Right motor wire fault	Same with LFPC method
Left and right fiber load incorrectly (LRFPC)	Same with above	Same with above method
Left fiber unqualified (LFNQ)	1. Dust on left fiber 2. Bad quality for left fiber, such as damage of fiber core or cladding, incomplete fiber etc.	1. For cause 1, wipe the left fiber with alcohol dipped cotton. 2. For cause 2, re-cleave and re-splice left fiber.

Right fiber unqualified (RFNQ)	1. Dust on right fiber 2. Bad quality for right fiber, such as damage of fiber core or cladding, incomplete fiber etc.	As the same with LFNQ solution
Left and right fiber unqualified (LRFNQ)	Same with above	Same with above method
Left fiber end-face unqualified (LFEANQ)	Left fiber end-face exceed limited value	Re-cleave left fiber, if the quality still poor, replace cleaver.(Note: Menu-Splice Mode-End face Angle Limit to set the upper limit value)
Right fiber end-face unqualified (RFEANQ)	Right fiber end-face exceed limited value	As the same with LFEANQ solution
Left and right fiber end-face unqualified (LRFEANQ)	Left and right fiber end-face exceed limited value	Same with above method
Fiber angle unqualified (FANQ)	Two side fiber's angle on horizontal or vertical plane exceed limited value	Re-load fiber for both two side.
Higher loss	1. Splice loss exceed	1. For cause 1, clean V-

	limited value 2. Mismatching fiber splice mode is chosen	groove, re-operate “ARC Calibration” and re-splice 2. For cause 2, replace to proper splice mode
Low power	Current battery Electricity is low than 2%	Connect power adaptor to charge
Replace electrodes	ARC times is exceed the limited value	Operate “Replace Electrodes”, then do “Detect System Parameter”
Records exceed limitation	Splice records quantity is exceed limited value	Download the original splice records by USB, then contact with Authorized company to operate Reset Counter
Abnormal aligning	1. Dust on end-face or bad quality end-face. 2. Fiber is pressed tightly by wind protector cover	Re-cleave and clean fiber, then try to re-align, if the fault still exist, run “Detect System Parameters”
Abnormal overtime	Run in too long time during fiber aligning process	Re-splice, if the fault continuous occur, re-start fusion splicer
Abnormal view field	1. Incorrectly install the electrodes 2. Fusion splicer inner	Execute “Detect System Parameter”, if still prompt fault, re-install

	mechanical structure is damaged.	electrodes. After above step, the problem isn't solved, contact with factory directly
Abnormal data	Fusion splicer works in an abnormal status	Keep splicing, no effect on splice result. If problem is appear continuously, re-start fusion splicer
Abnormal optical source	1. Improperly set the LED light brightness 2. Improperly installed the wind protector cover	Execute "Detect System Parameter", if the problem isn't solved, contact with factory
Abnormal detecting	Malfunction during run "Detect System Parameter"	Check whether the fiber is loaded correctly, or the wire is connected properly. If problem isn't solved, contact with factory
Abnormal power supply	Battery supply power abnormally	Connect adaptor to supply power
Abnormal heating	Heating can't run normally	After re-starting the fusion splicer, check whether the problem still exist, if yes, contact with factory directly.
Abnormal	The data can't be saved	Contact with factory

storage	normally	directly.
Abnormal COMM.	COMM. exist packet loss	Re-start the fusion splicer, if the prompt still show, contact with factory directly
Abnormal image	Camera lens may be damaged or the relevant connector loosen	Re-start the fusion splicer, if the prompt still show, contact with factory directly
Abnormal sensor	The inner senor works abnormally	The abnormalities do not affect splicer using. The solution please consult factory
Abnormal electrodes	Electrodes on two sides are installed abnormally	Confirm two sides electrodes tips are aligned, and confirm the electrodes are located in the central of V-groove

■ *Appendix 2 Error Message List*

Error Message	Reason	Solution
Abnormal sound when run ARC	Incorrectly install the electrodes	Re-install electrodes strictly comply with request
ARC delay or can't ARC	1. Incorrectly install the electrodes 2. Electrodes tips are surrounded by monox	1. Re-install electrodes strictly comply with request 2. Clean electrodes tip or replace electrodes.
When do ARC, fusion splicer crash	Incorrectly install the electrodes	Re-install electrodes strictly comply with request
ARC Calibration failed	Current environment affect ARC process	If high current is prompted continuously, decrease splice current and do ARC calibration. After above step, the problem isn't solved, contact with factory
Fiber align abnormally	1. Dust on objective lens, LED light and V-groove 2. Malfunction on fusion dynamical system	After cleaning objective lens, LED light, V-groove, if the problem is not solved, contact with factory directly

Bad quality of splicing spot	1. Dust on fiber 2. Choose the wrong fiber type or splice mode	1. Re-prepare optical fiber and re-splice 2. Choose the right fiber type or splice mode 3. Do ARC Calibration, adjust to proper ARC strength. 4. Do "Detect System Parameter"
No-response of keyboard	Abnormal system running	Power off then re-start fusion splicer
No light or color confusion for screen	1. Abnormal system running 2. Screen ribbon cable loosen or damage	Power off then re-start fusion splicer, if the problem is not solved, contact with factory directly
The fibers aren't spliced after running splicing	ARC strength Abnormal or malfunction of system running	Do ARC Calibration and re-splice, if the problem is not solved, contact with factory directly
The fiber exceed the view field in the alignment process	1. Fiber is load out of V-groove 2. Abnormal system running	1. Re-load the fiber and make sure it in the center of V-groove 2. Main menu Splice Mode-Splice Mode-Manual Enter, user move left &right fiber to the view field center, and then do "Detect System Parameter"

■ *Appendix 3 Guaranty*

Guarantee period and condition

If the splicer shows a quality issue within warranty period after the date of delivery, the free maintenance service will acceptable by manufactory; however, free maintenance service will be refused if following conditions happens:

- Failure or damage as a result of natural disaster.
- Failure or damage as a result of over range and unstable input voltage.
- Failure or damage as a result of faulty operation.
- Failure or damage as a result of failure to follow operation steps defined in operation manual or operation instruction.
- Wearing part (such as electrode etc.)

Note: In order to ensure service quality, before sending back the splicer, user is required to contact sales agency or manufactory directly to avoid unnecessary loss.

In order to save time necessary for maintenance, when user sends back the product, please attached following information alone with returned instrument:

(1). Name of company, Industry or organization; address; contact phone number; fax number and e-mail address,

(2). Relevant product model and series number.

(3). Description of problem, including the environment (such as altitude, temperature, humidity etc.) in which the failure occurred, and the date or time and frequency of the failure, current. condition of the instrument, etc.

(4). Packing list, warranty card etc.