# DINTEK DTF-02

## Optical Fiber Fusion Splicer

## Instruction Manual

DINTEK
LAN CABLING SYSTEMS

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# Warnings and Safety Precautions

This product is designed for splicing glass optical fibers used for communication and it is strictly forbidden to splice other substances. Mis-operations can cause electric shock, fire or personal injury. Please carefully read and observe the following rules for your own safety.

## Warnings:

(1) Use the power supply unit provided by this product mix.

DO NOT use other power adapter, battery or power line.

DO NOT use this product under other voltages so as not to cause fire or electric shock.

(2) Don't let liquid such as water or metal material drop into the equipment, otherwise it may cause fire, electric shock or equipment breakdown. Stop using the equipment, unplug the battery socket and contact our maintenance staff once any of the above situation happens.

(3) DO NOT use the fusion splicer in a combustible or explosive environment, otherwise it may cause fire or explosion.

(4) DO NOT touch the electrodes when the fusion splicer is operating as it may cause injury by high voltage generated by arc of electrodes. Ensure that the power is off, and the power line has been unplugged when replacing the electrodes.

(5) If smoke, bad smell or abnormal noise occurs, stop using the fusion splicer immediately, unplug the power plug and contact our maintenance staff. Continued use

may cause fire, electric shock or equipment breakdown.

(6) Disassembling or reassembling the fusion splicer and reassembling the battery or power adapter is prohibited to avoid over-heating, rupture or fire.

(7) Please strictly follow the operation manual on how to use the battery. Incorrect operation can cause battery over-heating, rupture or explosion, leading to fire or personal injury.

* DO NOT use other methods beyond this manual to charge the battery;

* DO NOT throw the battery into fire;

* DO NOT connect positive and negative electrodes with reverse interfaces;

* DO NOT charge or discharge under high temperature, fire or direct sunlight;

* DO NOT throw or strike the battery;

*If the battery electrolyte leaks out, handle it carefully. If the spill contacts skin or eyes inadvertently, you must thoroughly clean and immediately take medical treatment, at the same time, inform the repair department to process the battery.

(8) Optical fiber fusion splicer must be repaired and debugged by a professional. Incorrect repair may cause fire or electrical shock. If a failure occurs, please contact our repair department.

## Attention:

(1) DO NOT use or store an Optical fiber fusion splicer in high temperature or a highly humid environment, otherwise it may cause damage to the equipment.

(2) DO NOT touch the heat shrinkable sleeve in the process of heating or just after heating, for the high temperature may cause combustion.

(3) DO NOT touch the equipment with wet hands or an AC power line or AC plug, otherwise it may cause an electric shock.

(4) DO NOT use any other chemical except alcohol to clean the microscope lens, V-groove, or monitor, as this may lead to blurred images or stains, and can even cause corrosion and damage of equipment.

(5) Please take appropriate dustproof measures when the equipment is operated in a dusty environment, to avoid dust from entering the interior of the equipment and cause breakdown.

(6) Avoid the equipment from strong vibration and impact, it may cause equipment damage. Please transport or store the equipment in specified carrying case.

# Chapter 1
# Brief Introduction of the Product

This chapter introduces the performance of the equipment in detail. Reading through this section can help you understand this product and familiarize the product features, technical parameters, and the operating environment.

## 1.1 Product Introduction

The optical fiber fusion splicer is a mini fiber splicing equipment which is compactly designed, easy to carry and operate. It has a vivid and exquisite image-forming system and high precision image processing technology for fiber alignment, which leads to its high proficiency in splicing and low loss. Its beautiful operation interface and body design, which conforms to the operating principle of ergonomics, greatly improves user experience. It is equipped with a large capacity lithium battery, which provides reliable guarantee for longevity in field work. This is a compact and fully automatic Optical fiber fusion splicer with high performance, high safety, low power consumption, and can be operated with ease.

## 1.2 Product Features and Technical Index

### 1.2.1 Features

(1) Based on the principle of PAS (Lateral Projection System), adopts advanced image detection algorithm.

(2) Double core align structure, higher success rate of fusion and lower loss;

(3) Adopt 4.3 inches 16:9 TFT colorized LCD screen.

(4) 6 Motor Core Alignment.

(5) Typical fusion time: 6sec.

(6) Typical heating time: Automatic v-shaped heat shrinkable: 9 seconds automatic intelligent heating when cover is closed.

(7) Reliable design, strengthen shockproof, dustproof and other functions.

(8) Low power consumption design makes it possible for the product to work for a long time, with many functions operating at the same time.

(9) Multi-functional, compact and portable, which can greatly improve working efficiency.

(10) Detects the air pressure, temperature and humidity and other environmental factors and automatically calibrates arc.

(11） Removable plug with a convenient and quick charge battery.

(12） Cornering, the straps can be used for aerial work.

## 1.2.2 Technology Indexes

Table 1-1 Main technical indexes

| | |
|---|---|
| Applicable Optical Fiber Types | SM (Single Mode), MM (Multi-Mode), DS (Dispersion Shift), NZDS (Non-Zero Dispersion Shift) |
| Applicable Optical Fiber Core No. | Single core |
| Applicable Optical Fiber Diameter | Cladding diameter: 80-150μm<br>Coating diameter: 100～1000μm |
| Fusion Splice Model | Pre-store: 40 groups, user define: 80 groups |
| Average using Splice Loss | 0.02dB (SM)，0.01dB (MM)，0.04dB (DS)，0.04dB (NZDS)，0.04db (BIF/UBIF) |
| Echo Loss | Better than 60dB |
| Fusion Splice Duration Time | 6sec (Fast Mode) |
| Loss Estimation of Fusion Splice | Exist |
| Tension Test | 2N |
| Monitor | 4.3 inches colorized LCD, supported in Chinese and English, Spanish, Russian, French, Portuguese and other displays |
| Optical Fiber Magnification Times | X/Y: 180 times, X or Y: 400 times |
| Power Supply | 6800mAh Lithium battery, 13.5V/5A power adapter |

| | |
|---|---|
| Battery | Typically work 260 times (Fusion splicing/heating/hot stripping), Single battery charge: 3 hours / can be recycled up to 500 times |
| Splice Results Storage | 10000 groups of the latest records |
| Data Interface | USB2.0 |
| Operating Environment | Elevation: 0~5000M, Relative humidity: 0~95%, Temperature: -20°C~55°C, Maximum wind speed: 15m/s |
| Storage Environment | Relative humidity: 0~95%, Temperature: -40°C~80°C (except battery), Temperature: -10°C~40°C (battery) |
| Weight of the Equipment | 1.93kg (include battery) |
| High Altitude Operation | Cornering, machines can be directly hung on the operators neck during normal operation |

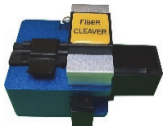
Table 1-2 Tube Heater

| | |
|---|---|
| Applicable Optical Fiber Cable Diameter | 250μm, 900μm, 2~3mm |
| Applicable Sleeve Length | 60mm, 45mm, 40mm (FP-03) |
| Heating Time | Cover and automatic heating, v-shaped 9s rapid thermal shrinkage (customizable) |
| Heating Temperature | Below 180 ~ 300°C |
| The Heating Process | Cover automatic and manual button heating (optional) |

## 1.3 Standard Assembly of Fusion Splicer

Table 1-3 Standard Package

| Serial Number | Description | Diagrammatic Sketch | Quantity |
|---|---|---|---|
| 1 | Optical Fiber Fusion Splicer | | 1 |
| 2 | Plug-in battery | | 1 |
| 3 | Power Adapter | | 1 |
| 4 | AC Power Line | | 1 |
| 5 | Plastic tweezers |  | 1 |
| 6 | Backup Electrode Bar | | 1 |
| 7 | Cooling Tray | | 1 |
| 8 | Carrying Bag | | 1 |

| | | | |
|---|---|---|---|
| 9 | Miller Pincers | | 1 |
| 10 | Stripper | | 1 |
| 11 | Multi-Function Jig | | 1 |
| 12 | Dust-Blowing Ball with Brush | | 1 |
| 13 | Instruction Manual | | ——— |
| 14 | Mini Pump Bottle of Alcohol | | 1 |
| 15 | Cleaver |   | 1 |
| 16 | Replacement Electrode Bar | | 1 |

# 1.4 Introduction of Fusion Splicer

## 1.4.1 Host of Fusion Splicer

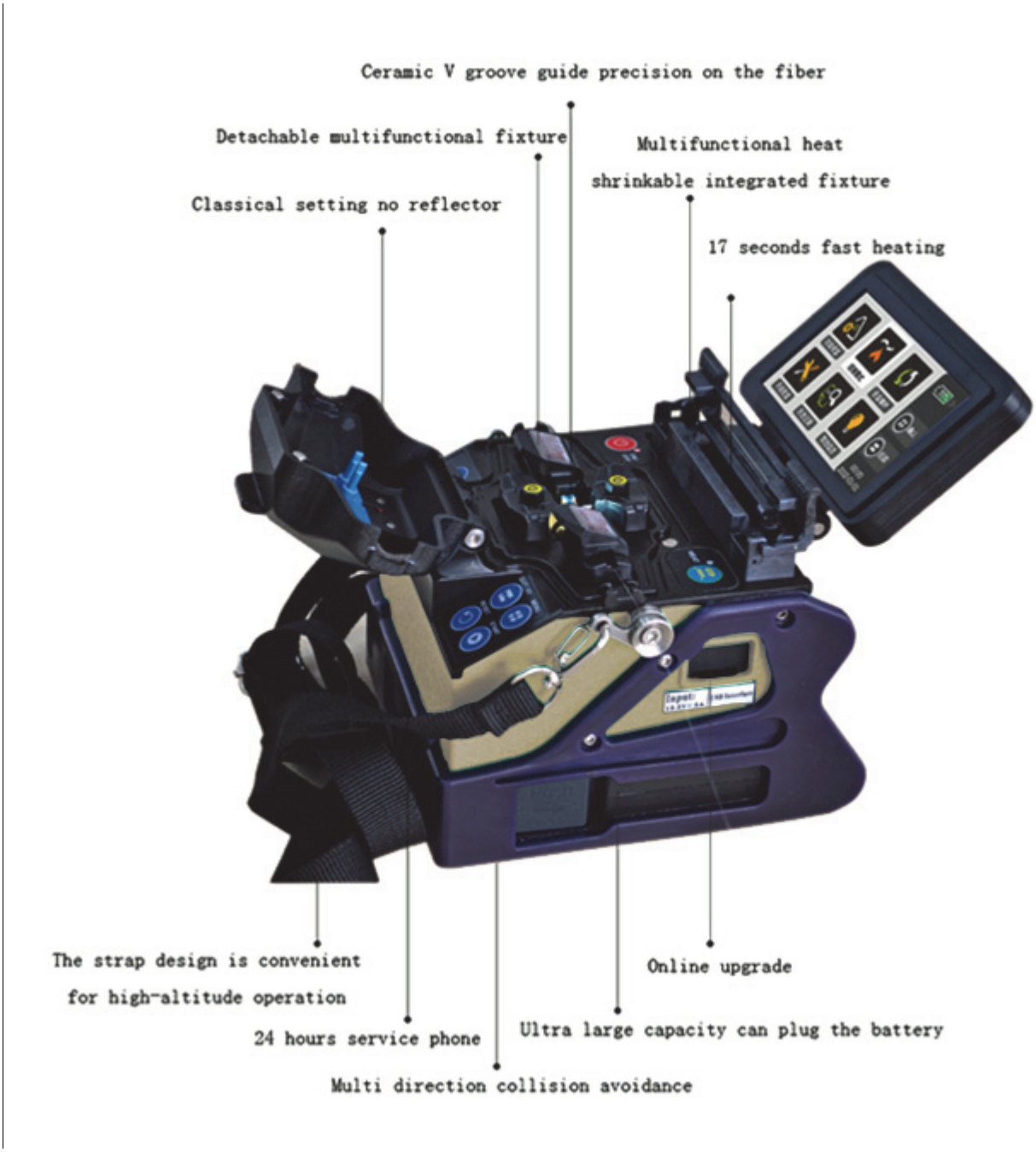



Figure 1-1 Host Machine View

## 1.4.2 Keyboard

Figure 1-2 Keyboard View

Table 1-4 - Keyboard Function Descriptions

| Keyboard Icon | Name | Function |
|---|---|---|
| | Power key | Power on / off |
| | Sleeve heating key | Start sleeve heating |
| | Exit Key /switch key of XY field of view | Return to previous menu field X, Y switch in Optical Fiber Mode |
| | Menu/Confirm | Enter menu, Press enter key on the menu |
| | Reset key | Equipment reset |

| | | |
|---|---|---|
| | Start Key | Start alignment<br>Fusion Splicing |
| | Up key | Menu cursor moves upward |
| | Down key | Menu cursor moves downward |
| | Left key | Menu cursor moves to the left.<br>Reset the current option |
| | Right key | Menu cursor moves to the right.<br>Reset the current option |

### 1.4.3 Optical Fiber Fusion Splicer Device

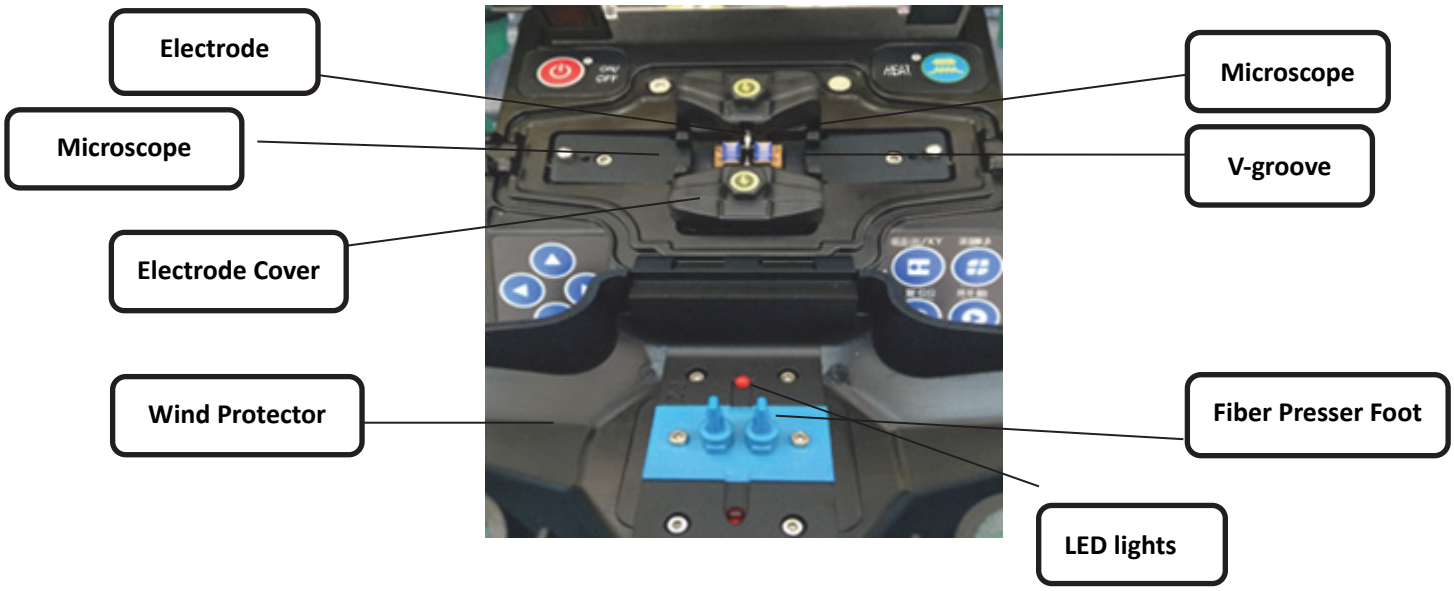



Figure 1-3 Optical Fiber Fusion Splicer Structure

## 1.4.4 Tube Heater

Figure 1-4 Tube Heater Structure

## 1.4.5 External Interface

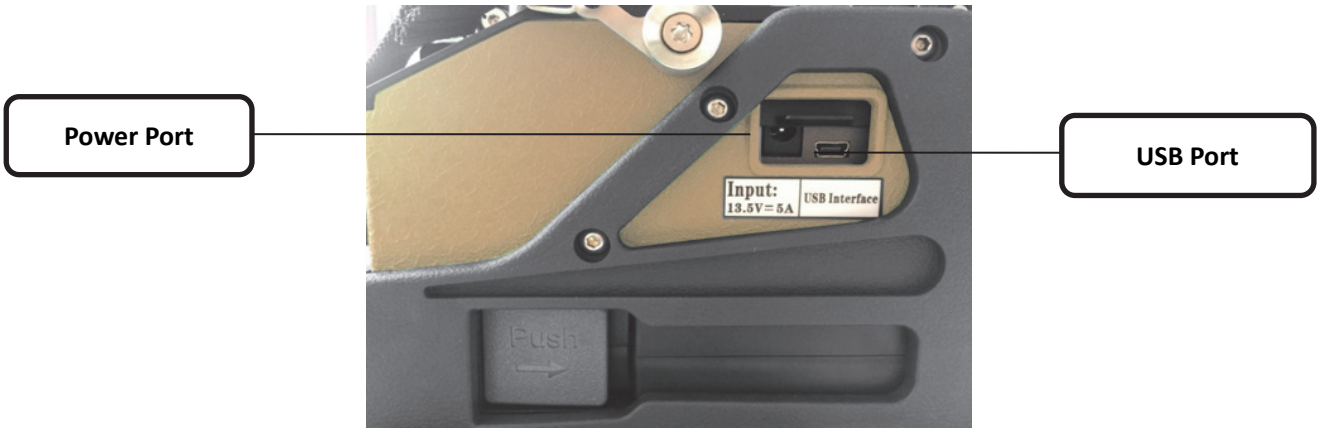



Figure 1-5 External Interface

# Chapter 2 Basic Operation

This chapter describes the Fusion Splicer's basic operation methods. Please read this chapter in detail. It can help you use the splicer correctly, avoiding damage and causing abnormal problems.

## 2.1 Power Supply

This product can be charged by the following two power supply modes:

(1) Internal lithium battery (with no external power adapter inserted).

(2) External power adapter (with external power adapter inserted).

Attention: Please use the supporting power adapter of this product. Using other adapters can cause anomaly of the equipment.

### 2.1.1 Power Supply by External Power Adapter

The input of adapter: 100-240V, 1.4A, 50/60HZ. The output of adapter: 13.5V, 5A. Please use this product's supporting power adapter. Insert the adapter's DC output line into the Fusion Splicer's external power interface. The indicating icon at the top right corner of the monitor will show . If the battery pack has already been installed in the Fusion Splicer, the adapter will charge the battery pack while supplying power for the splicer.

## 2.1.2 Power Supply

### (1) Battery electric capacity indication

The remaining capacity percentage will be shown at the top right corner of the monitor, as shown in Figure 2-1.

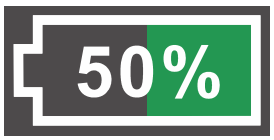



Figure 2-1 Show the Remaining Battery Capacity

### (2) Battery Charge

When connected with exterior adapter, the battery pack will be charged. The charging time varies with the remaining capacity. The longest charging time is 3 hours.

### (3) Battery alarm

When the remaining capacity of the battery pack is lower than 10% or it is unable to guarantee the normal work of the Fusion Splicer, it will show an alarm on the monitor. Users shall immediately charge it or use the adapter to supply power.

### (4) Warnings

When using the battery pack, follow the instructions below.

a. Please charge fully for the first use.

b. Please check the battery capacity before use. If the battery capacity is low or it has shown under-voltage alarm, please charge immediately.

c. Please do not charge or store battery pack under high temperature or direct sunlight, to avoid aging.

d. Please charge the battery fully for long time storage.

e. The battery pack is easily depleted. Repeated charge and discharge will make the charging ability of it decrease. When the battery is full of electricity but can only be used for a short time, it is time to replace with a new designated battery.

## 2.2 Startup and Shutdown

To start the equipment, press the power button " ". The power LED on the operation panel will turn red and the buzzer will buzz. The monitor showcases the fiber observation interface after all motors are reset to their initial positions, as shown in Figure 2-2. Then the power supply mode will be automatically recognized. If you use the battery pack for power supply, the interface will showcase its remaining power. The monitor will indicate an abnormality if it detects that the system is abnormal when the equipment is first started.

To shut down, press the power button " " for a few seconds until the power LED and screen turn off.

Figure 2-2 Fiber Observation Interface

## 2.3 Menu Introduction

Press the Menu button " " to enter the main menu, as shown in Figure 2-3 below.

Figure 2-3 Function Menu

| Function Menu | Descriptions |
|---|---|
| Function | Set the parameters of heat stripping, sleeve heating and arc calibration modes |
| Splice | Set the parameters of splice mode |
| Maintenance | Electrode maintenance etc. |
| System | Set the display parameter, system language & time, restore to initial settings etc. |
| History | Record arc times, splice results etc. |
| Help | Provide key operation manual |

Table 2-1 Function Menu Descriptions

## 2.4 System and Function Settings

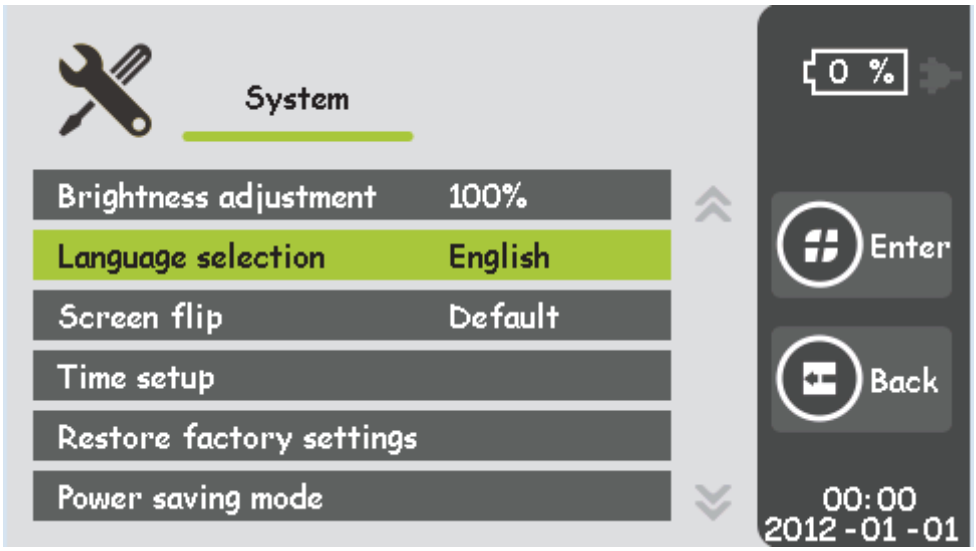



Figure 2-4 System Setting Menu

| System Settings | Descriptions |
|---|---|
| Brightness Adjustment | Adjust the brightness of monitor |
| Language Selection | English and Chinese<br>Others are upon request |
| Screen Flip | Monitor interface can be rotated 180° to showcase in the reverse direction |
| Time Setup | Set system time, year, month, hour and minute |
| Restore Factory Settings | Restore all parameters to initial settings |
| Power Saving Mode | Set automatic dormancy or shutdown |
| Silence Mode | Turn up or down the buzzer |

Table 2-2 System Settings Menu Descriptions

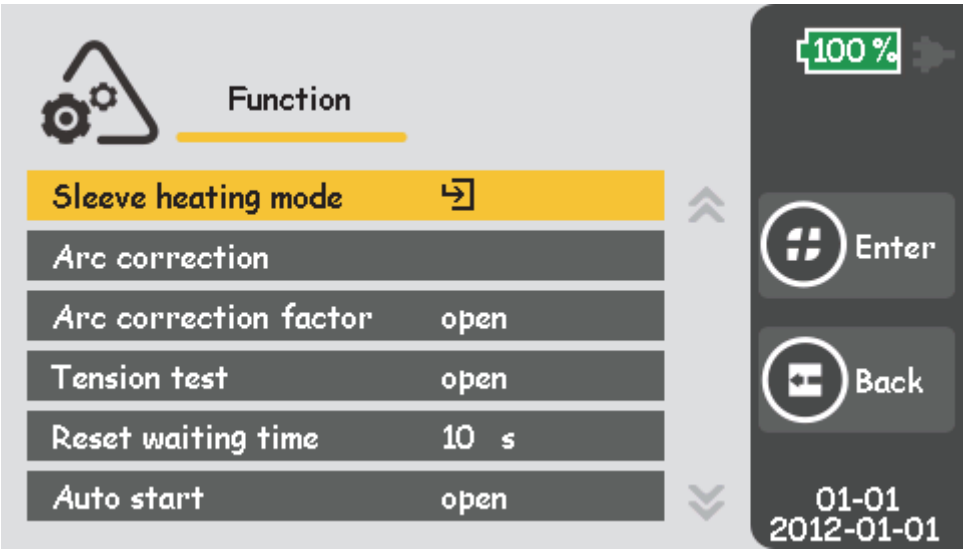



Figure 2-5 Function Settings Menu

| Function Settings | Descriptions |
|---|---|
| Sleeve heating mode | Set the sleeve heating time, typical heating time: 9 seconds |
| Arc Calibration | Automatically adjust the arc current |
| Arc Calibration Factor | If this factor is set "Open", the latter current will be used to fusion splice |
| Tension Test | If this is set "Open" after splice is completed, the equipment will restore, and the tension test will perform itself |
| Reset Waiting Time | If the Tension test is set to “Close”, the system will restore the equipment after the waiting time is over |
| Auto Start | If the Cover is set “Open”, it will perform slice itself when the cover is lidded. |

Table 2-3 Function Descriptions

# 2.5 Preparations Before Splice

## 2.5.1 Stripping Fiber's Other Protective Layers Outside the Coating Layer

Clean the fiber (100mm from the tail) cotton dipped with alcohol. If it is butterflied fiber, it needs butterflied fiber pincers to strip the outer coating 40mm from its tip, as shown in Figure 2-6. Protective layers of other kinds of fiber can be stripped by miller pincers and scissors, as shown in Figure 2-7.

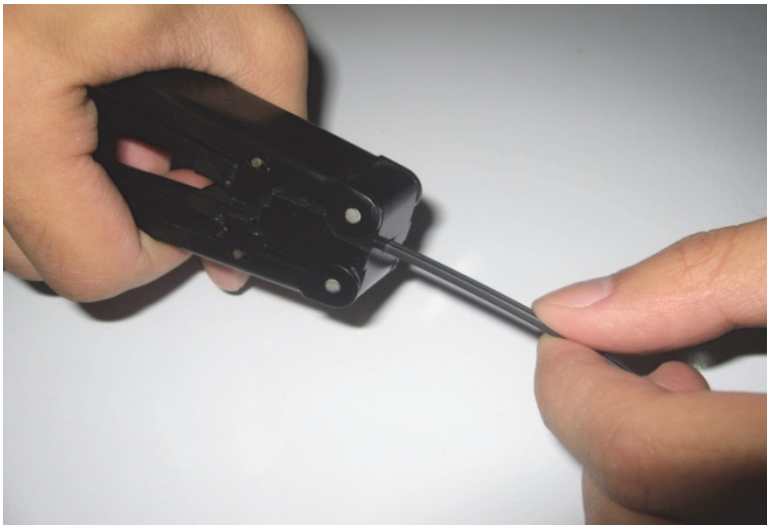
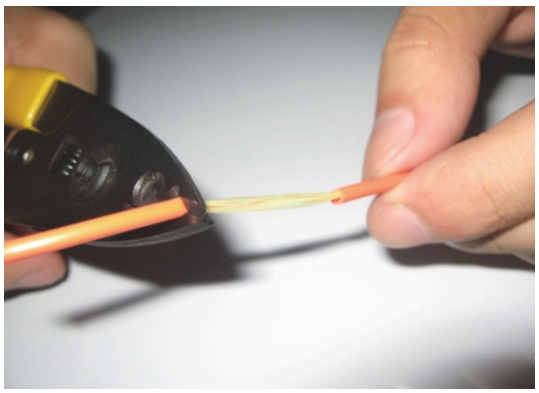
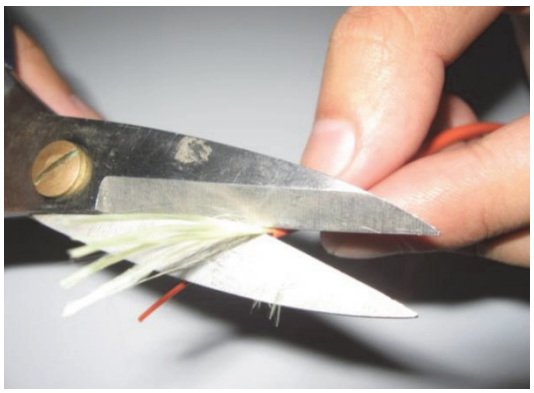


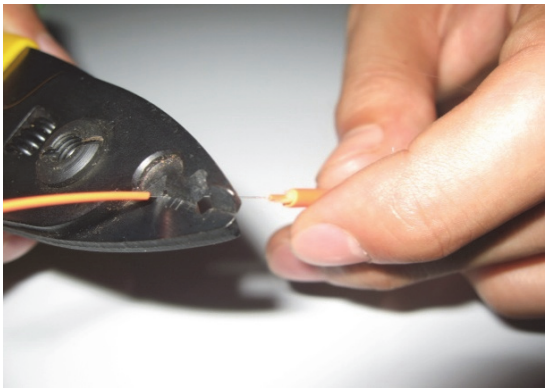
Figure 2-6 Butterflied Fiber Strip



(a) Strip external plastic layer with miller pincers



(b) Cut off the wool with scissors



(c) Strip Internal plastic layer with miller pincers

(d) Strip the only one plastic layer with miller pincers

Figure 2-7 Single Core Fiber Strip

## 2.5.2 Placing Protection Sleeve Over Fiber

The sleeve is used to protect the junction after splice. Before installation, make sure there is no dirt inside the sleeve and keep the sleeve straight with optical fiber, as shown in Figure 2-8.

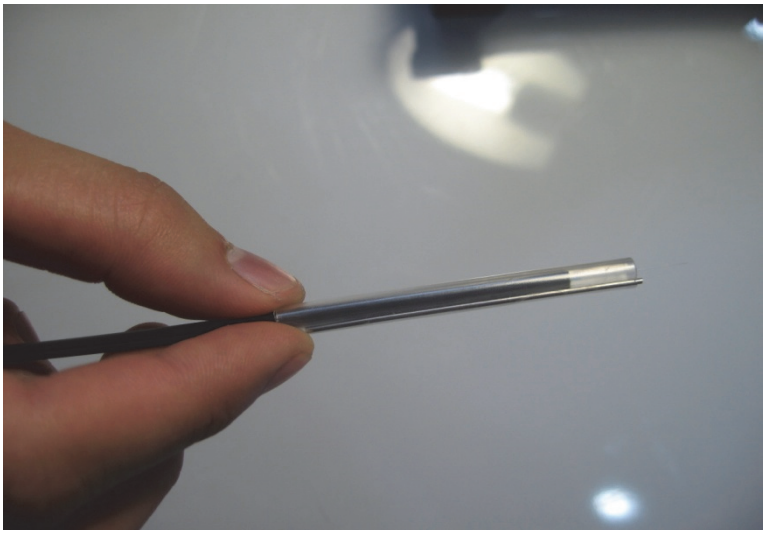


Figure 2-8 Placing Protection Sleeve

## 2.5.3 Strip and Clean Outer Coating of Fiber

(1) Strip the outer coating 30mm from its tip with a stripping pincer, as shown in Figure 2-9 and 2-10. After stripping, place fiber into the clamp slot and keep 30mm of the fiber outside the clamp.

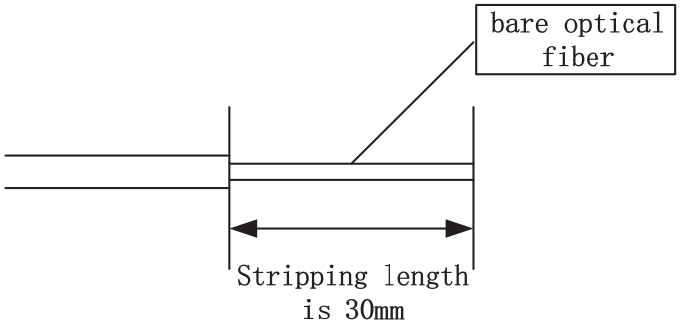



Figure 2-9 Stripping Length of Coating Layer

Figure 2-10 Manual Stripping

(2) After manual stripping, clean the scrap off the coating layer by circulating the fiber using cotton dipped with high purity alcohol, starting from the interface of the coating layer and bare fiber as shown in figure 2-11.

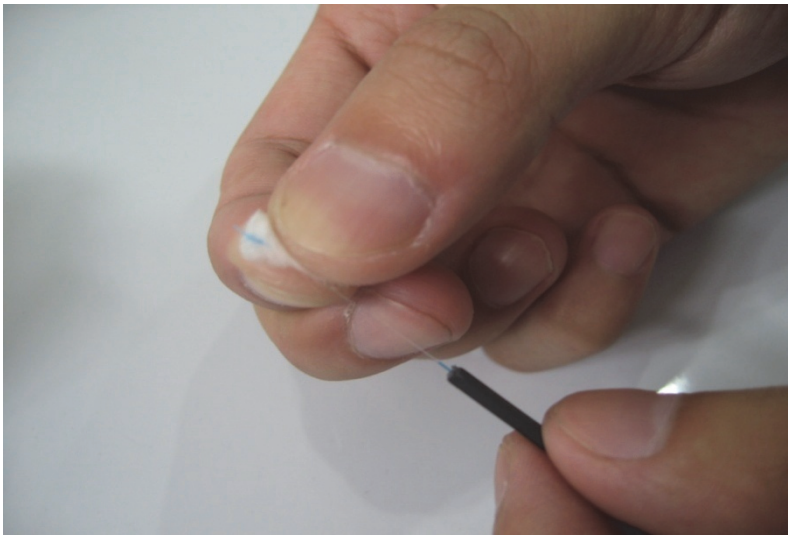


Figure 2-11 Clean Fiber

## 2.5.4 Fiber Cleaving

(1) Open the cleaver cover and place the fiber with clamp into the cleaving slot, keeping the optical fiber vertical with the cleaver surface.

(2) Press forward the fiber clamp and ensure the forefront of the clamp lies closely with the cleaving slot. If not, the fiber can be longer than expected.

(3) Press down the fiber cover to cleave.

(4) Open the cover and take away the cleaved fiber.

(5) Take out the scrap and put into scrap box.

**Attention:** If fiber cleave is not accurate or the cleaving blade cannot cut, please adjust the blade of cleaver.

### 2.5.5 Place Optical Fiber

(1) Open windproof cover to check whether the v-groove is clean or not. If not, cleaning should be done. Refer to chapter 3.4.1.

(2) Place cleaved fiber (with clamp) into both-sided clamp slot and ensure it is in the v-groove, as shown in Figure 2-12.

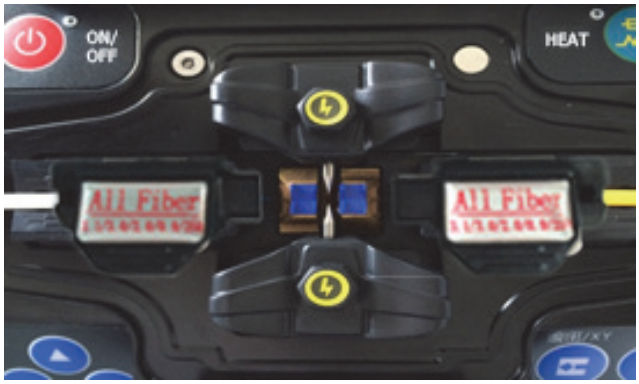



Figure 2-12 Fiber-Place

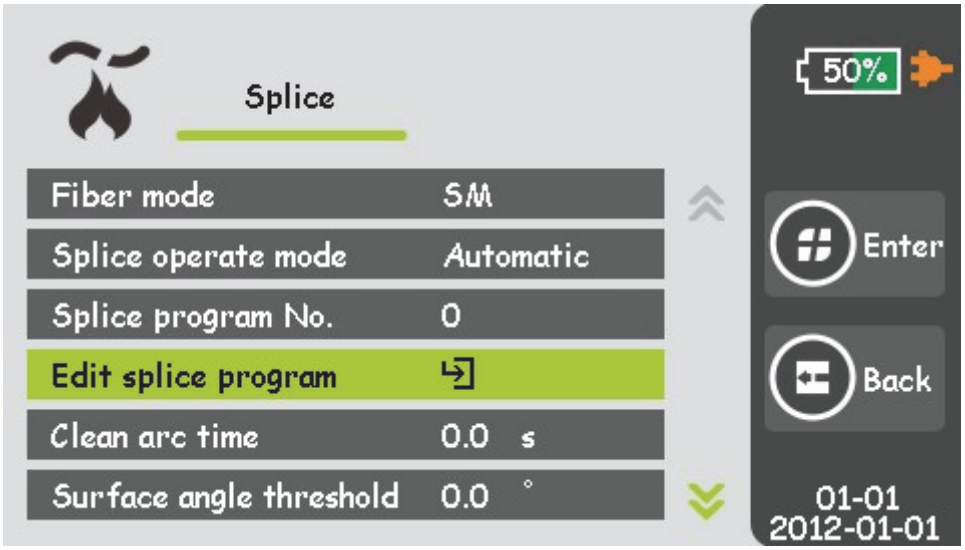
(3) Observe and check whether the fiber head face is between the electrode tip and the v-groove and near the electrodes; if not, remake the fiber.

(4) Press the windproof cover lightly.

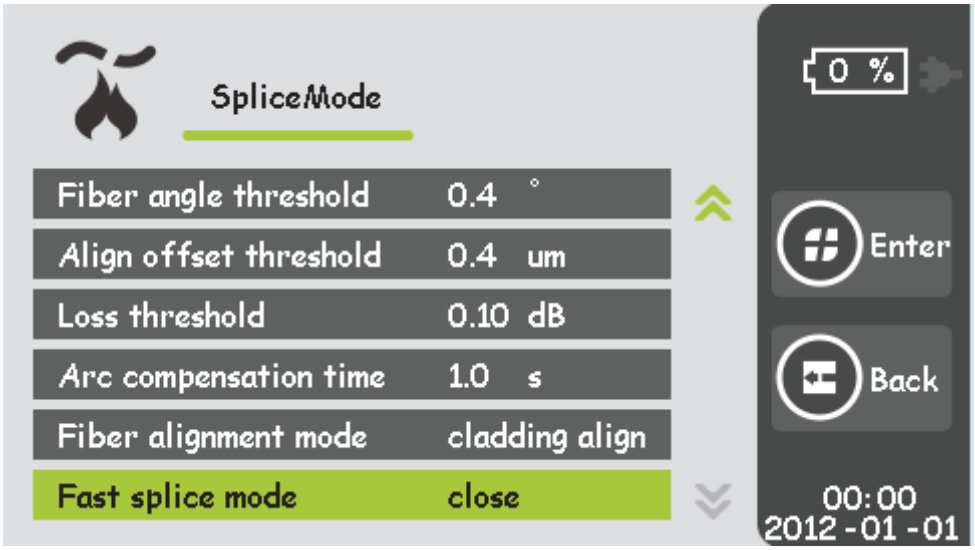
## 2.6 Fusion Splicing

### 2.6.1 Select Splice Program and Set Splice Parameters

(1) The splice program selection menu is shown in Figure 2-13 (a) and (b). Users can choose from the 40 factory preset groups of splice program and set up and store their own 80 splice program groups.




(a)




(b)

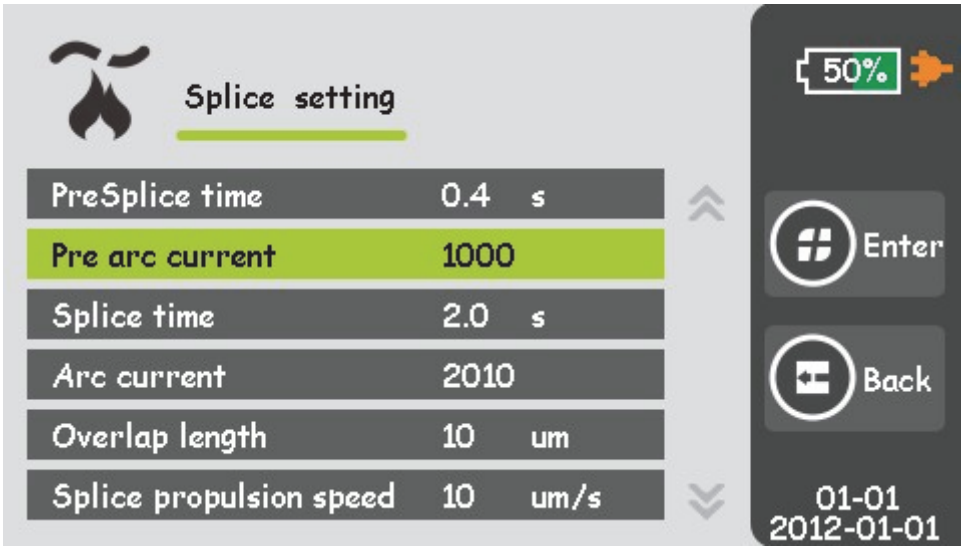
Figure 2-13 (a), (b) Splice mode menu

Table 2-4 Splice Mode Descriptions

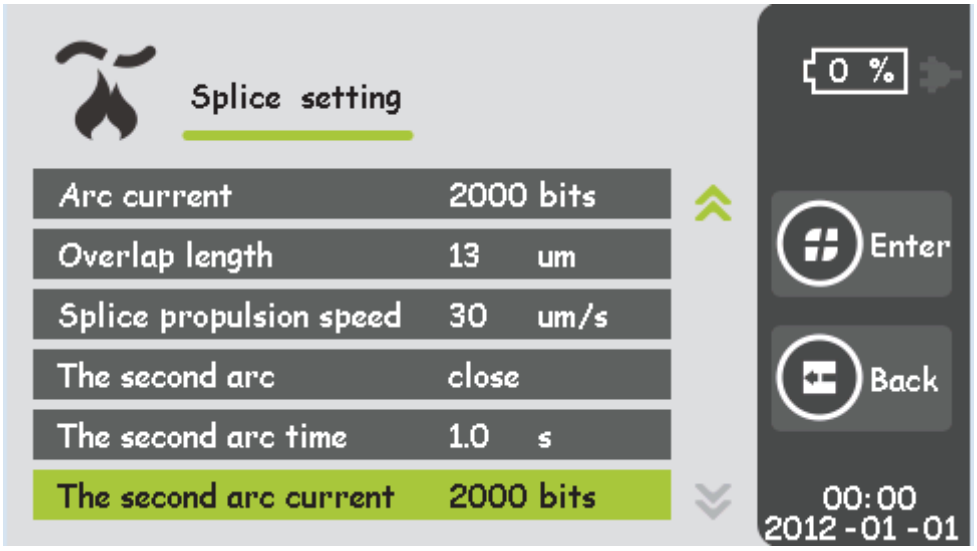
| Splice mode | Description |
|---|---|
| Fiber Mode | Set according to the type of fiber used such as SM (Single Mode), MM (Multi Mode), DS (Dispersion Shifted) and NZDS (Non-Zero Dispersion Shifted).<br>Each fiber has 10 preset groups of splice program. Users can choose the corresponding program based on fiber type |
| Splice Operate Mode | Automatic or Manual |
| Splice Program | 20 preset groups of splice program,<br>80 groups of users-set splice program |
| Edit Splice Program | Edit splice parameters under the current number of programs, as shown in figure 2-16 |
| Cleaning Arc Time | Cleaning Arc means cleaning exquisite dust on the fiber surface by short-time arc. The duration ranges from 0 to 1 second. |
| Surface Angle Threshold | An error message is displayed if the head face angle of either left or right side of fiber exceeds the limit. The setting range is 0-5°. |

| | |
|---|---|
| Fiber Angle Threshold | An error message is displayed if the clamp angle of the two fibers spliced exceeds the angel limit. The setting range is 0-4°. |
| Align Offset Threshold | An error message is displayed if the misalignment of the two fibers spliced exceeds the misalignment limit. The setting range is 0.0-1.5 μm. |
| Loss Threshold | An error message is displayed if the estimated splice loss exceeds the loss limit. The setting range is 0-0.2db. |
| Arc Compensation Time | Splice loss may be improved by compensative arc in some cases. |
| Fiber Alignment Mode | Cladding align or core align can be set. |
| Fast Splice Mode | It can be set "Open" or "Close" which can accelerate alignment. |

(2) Select【Edit Splice Program】in the menu of【Splice】, splice parameters are shown in Figure 2-14.




(a)




(b)

Figure2-14 Splice Parameters Menu

Table 2-5 Splice Parameters Description

| Splice Parameters | Descriptions |
|---|---|
| Pre-splice Time | Set pre-splice time |
| Pre-splice Current | Set pre-splice current |
| Splice Time | Set splice time |
| Arc Current | Set splice current |
| Overlap Length | Set the overlaps of fiber when splice is operated |
| Splice Propulsion Speed | Set propulsion speed when fibers are spliced |
| The Second Arc | Close or open the second arc |
| The Second Arc Time | Set the second arc time |
| The Second Arc Current | Set the second arc current |

## 2.6.2 Automatic Alignment and Head-Face Inspection

This product uses an image processing system to observe the optical fiber to ensure good splicing. However, in some cases, the image processing system may not detect the splice error. Therefore, a visual inspection of the fiber through a monitor needs to be conducted to obtain good splice results.

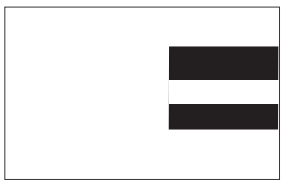
Click the Start button ” ”, the fiber enters automatic alignment process and the left and right optical fiber start to do opposite movement. After cleaning arc, the system will automatically check the fiber head face. If the fiber head face is too bad to splice, the monitor displays an error message. If the fiber head face is good, alignment

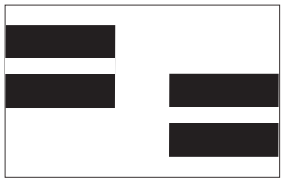
continues. After fiber alignment, the monitor shows angles of the left and right head face. An error message is displayed if the cleave angle of either left or right fiber ends exceeds the angle limit. Then users need to re-cleave the optical fiber.

**Attention:** Cleave Limit and Misalignment Limit could be set in the【Splice Mode】menu.

When it shows images and messages as shown in Table 2-6 in the process of automatic alignment, the equipment will be reset automatically. Users can also press reset button " " to reset the equipment and re-cleave or re-place the optical fiber.

Table 2-6 Abnormal Alignment Note

| Images (X/Y axis) | Message | Possible Reason | Measure |
|---|---|---|---|
| | The right fiber placement is incorrect | Right optical fiber is not placed in the V-groove, or too short | Replace or re-cleave optical fiber |
|  | The left fiber placement is incorrect | Left optical fiber is not placed in the V-groove, or too short | Replace or re-cleave optical fiber |
| | Abnormal alignment | Left or right fiber is not placed in the V-groove | Replace or re-cleave optical fiber |

| | | | |
|---|---|---|---|
|  | Replace fiber | Left or right fiber is cleaved too short | Place or re-cleave optical fiber |
| | Replace fiber | Left or right fiber is cleaved too long | Replace or re-cleave optical fiber |
| | Optical fiber head face angle is not proper | Problems occur in the process of cutting (spurs, burrs, beveled, concave core) | Re-cleave optical fiber |
| | | | |
| | | | |
| | | | |
| | Optical fiber is not available | Dust on fiber surface | Re-clean and replace optical fiber |

## 2.6.3 Arc Splice

After fiber alignment, the monitor will display the message "alignment is OK". At this time, you can press the start key " " to splice fiber or press the reset button to reset equipment. If it is set to automatically splice, no press is needed.

## 2.6.4 Splice Loss Estimation and Quality Assessment

When fiber splice is completed, the loss estimated amount will be displayed on the right side of the monitor. If fiber splice is abnormal, such as: too thick, too thin, separated, bubbles-containing, with thin line, etc., an error message will be displayed on the monitor and users need to re-splice or re-arc. If there is no error, but the splice effect observed through the monitor is not good, it is recommended that users re-splice. Note that sometimes the splice point looks thicker than the rest, but it is normal which does not affect splice loss.

If effect of fiber splice is normal, but fiber splice loss exceeds the limit amount, an error message will be displayed on the monitor. The limit amount of loss can be set in 【Splice Mode】.

In some cases, compensative arc may improve splice loss. When splice is completed, press the start key " " to re-arc. After re-arc, the system will re-detect optical fiber to estimate splice loss and determine whether it is reasonable.

Abnormal splice or high loss estimate phenomena and solutions are shown in table 2-7.

Table 2-7 Abnormal Splice Descriptions

| Phenomena | Reason | Solutions |
|---|---|---|
| Fiber core axis mismatch | (1) Dust on V-groove or fiber presser foot<br>(2) Image detection problem | (1) Clean V-groove and fiber presser foot<br>(2) If it appears repeatedly, users need to【Calibrate System】<br>(3) Clean the lens and light source |
| fiber core angle error | (1) Dust on V-groove or fiber presser foot<br>(2) Poor fiber head face angle<br>(3) Fiber is placed incorrectly | (1) Clean V-groove and fiber presser foot<br>(2) Re-cleave fiber<br>(3) Replace fiber |
| Bubbles | (1) Poor fiber head face angle<br>(2) Dust on fiber head face<br>(3) Low pre-splice current or short-time pre-splice<br>(4) Low splice current or short-time arc | (1) Re-cleave fiber<br>(2) Re-clean fiber<br>(3) Increase【Pre-splice Current】or【Pre-splice Time】<br>(4) Increase【Splice Current】or【Splice Time】 |
| Fiber Separation | (1) Splice propulsion force is not enough<br>(2) Splice propulsion is too slow.<br>(3) Spice current is too high, or arc time is too long | (1) Do【Calibrate System】<br>(2) Decrease【Pre-splice Current】or【Pre-splice Time】 |

| | | |
|---|---|---|
| thick | The splice propulsion force is excessive | Decrease【Overlap Length, then do【Arc Calibration】test |
| thin | (1) The splice propulsion force is not enough<br>(2) Splice current is excessive | (1) Increase【Overlap Length, then do【Arc Calibration】test<br>(2) Decrease【Splice Current】 |
| line | Splice current is too small | Increase【Splice Current】 |

## 2.7 Tension Test

If【tension test】is set "ON", after splicing, tension test will automatically be performed, and the pulling force is 2N after splice. Menu operation is shown in Figure 2-17.

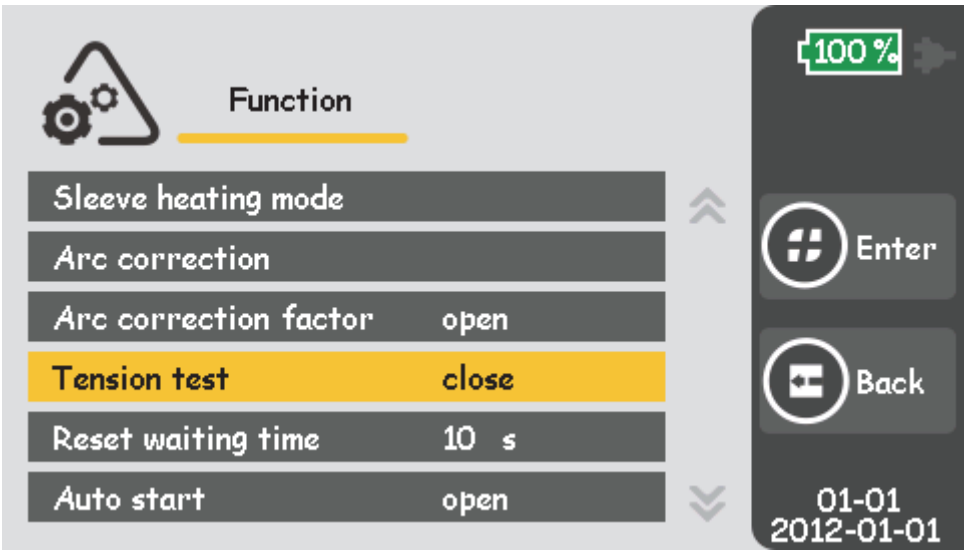



Figure 2-17 Tension Test

## 2.8 Splice Results Storage and Query

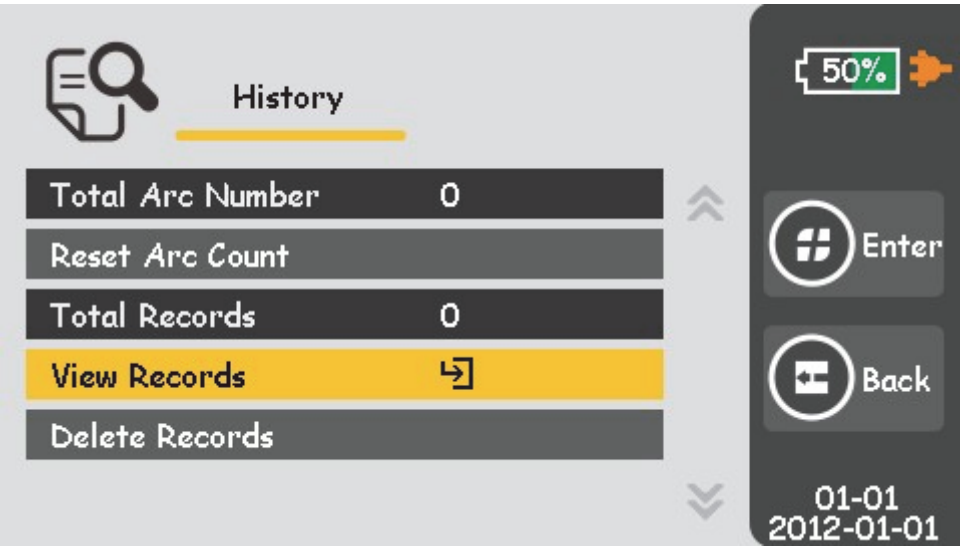



Figure 2-18 History Records Menu

Table 2-8 History Records Descriptions

| History Records | Descriptions |
|---|---|
| Total Arc Number | Electrodes arc times since the last record is eliminated |
| Reset Arc Count | Eliminate arc times after electrodes are replaced |
| Total Records | The splice records having been stored by system |
| View Records | 3000 groups of the latest splice records can be viewed. Users could query the splice parameters and results |

| Delete Records | Delete all splice records |
|---|---|
| Exception information records | Query the current welding machine running status and warning, fault information |
| Delete the exception information records | Delete the current storage anomaly information records |
| Online data records | Current running status parameters real-time recording equipment |

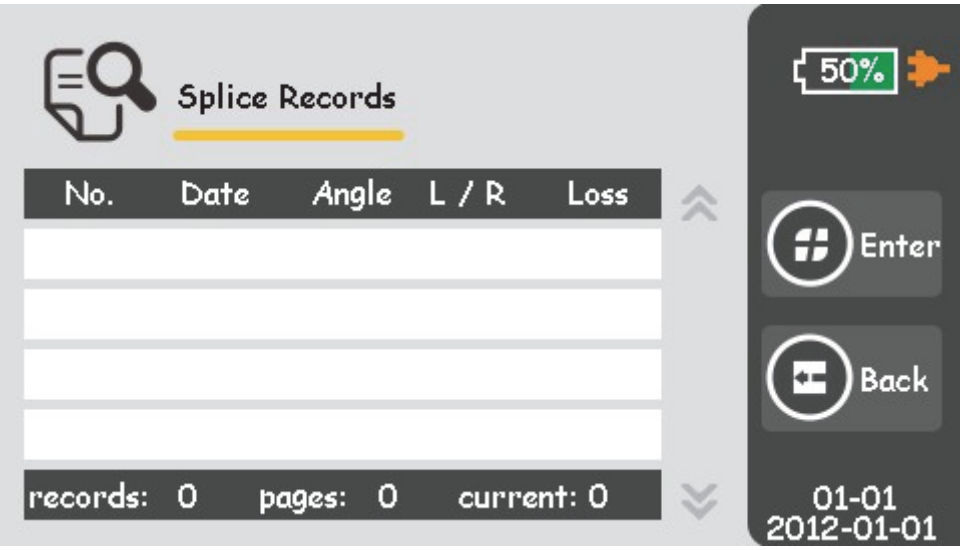



Figure 2-19 Splice Records

## 2.9 Heating Protection Sleeve

(1) When replacing the lithium batteries to update the program, it is necessary to carry out thermal shrinkage correction, otherwise it will seriously affect the effect of thermal shrinkage.

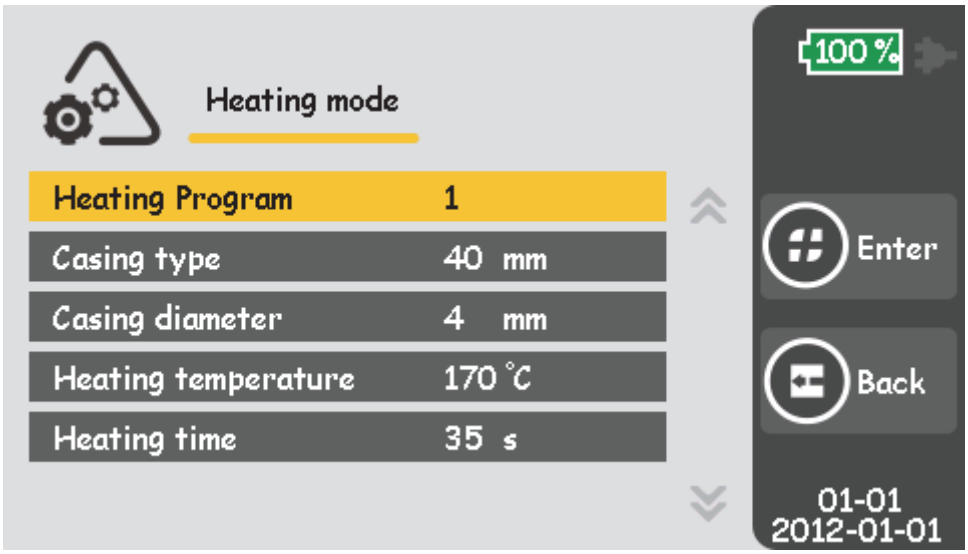



Figure 2-20 Heating Mode Menu

Table 2-9 Heating Mode Descriptions

| Heating Mode | Descriptions |
|---|---|
| Heating Program | Users can choose the preset heating program based on different protection sleeve or set the program themselves |
| Sleeve Diameter | 1-8mm |
| Sleeve Type | 10-60mm ordinary sleeve, FC, SC |
| Heating temperature | Heating temperature upper limit |
| Heating time | Sleeve heating time |

**Attention:** It is better to use preset heating parameters.

(2) Open the heater cover.

(3) Open the Wind proof cover, carefully remove the spliced fiber (without clamp) and move protection sleeve to splice point while ensure splice point is at the center of

protection sleeve.

(4) Place fiber with protection sleeve in sleeve heater, straighten the optic fiber lightly and make sure protection sleeve ‘s left end is aligned with the heater’s left end, as shown in figure 2-21. Then close heater cover.

(5) Select【Sleeve Heating Mode】and the heating parameters. If it is the same with last time, you may skip this step.

(6) Enter the heating key ”” to start heating. The heat indication light is on. Press heat shrinkage key ”” in the process of heating, the heating will be canceled.

(7) When heating is completed, the heat indication light is off. Users need to immediately turn on the heater cover and remove the optical fiber, as shown in Figure 2-21. (Note: Do not use your hand to touch the heated protection sleeve to prevent being burned.)

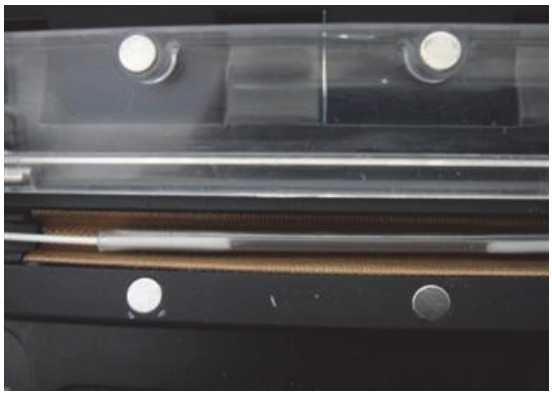


Figure 2-21 The Effect of Heating

(8) Check the finished sleeve, if it is qualified, place the sleeve in the cooling pans to let it cool down; if the finished sleeve has bubbles or dust inside, it is suggested to repeat the operation.

# Chapter 3 Maintenance

## 3.1 Maintenance Menu

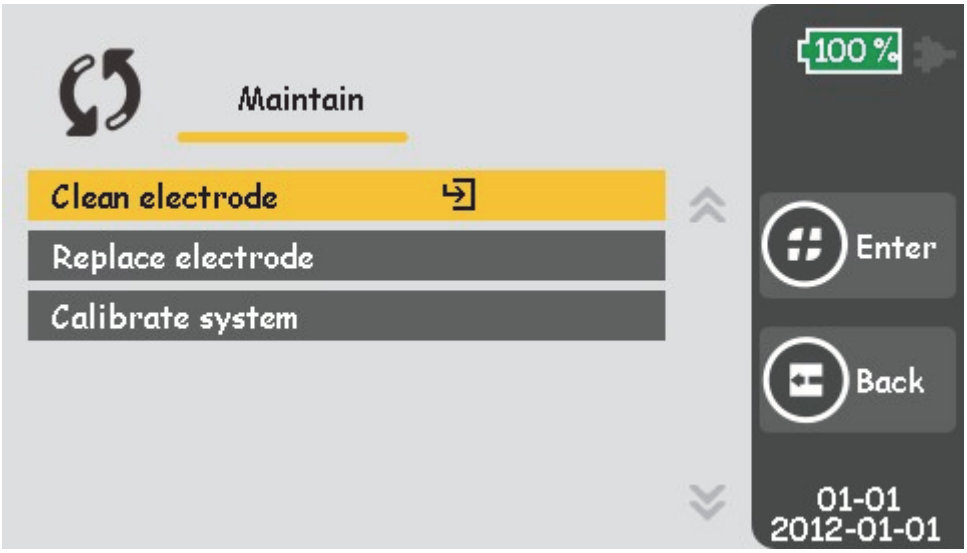



Figure 3-1 Maintenance Menu

Table 3-1 Maintenance Descriptions

| Equipment Maintenance | Descriptions |
|---|---|
| Discharge correction | Perform discharge correction operation, automatic correction of discharge current |
| Clean electrodes | Repeats short arc several times to clean the electrodes |
| Replace Electrodes | After Replace Electrodes, repeats short arc several times to stabilize the electrodes and to measure the electrodes position |
| Calibrate System | Measures the electrodes position, motor and other parameters automatically |

## 3.2 Discharge Correction

Atmospheric conditions such as temperature, humidity and pressure are constantly changing, which arises variability during the arc. This splicer is equipped with temperature, pressure and humidity sensors to monitor the operation environment to stabilize the arc power. Electrodes wear and dirtiness also affect arc power, and the center position of the arc sometimes shifts to the left or right. This splicer provides Arc calibration function to eliminate these effects. Based on the axis deviation of the splice joint before and after the arc to judge the arc force to realize low loss and stable splice.

When one of the following circumstances exists, Arc calibration must be executed before splice operation.

Table 3-2 Operations to Different Conditions

| **Conditions** | **Operations** |
|---|---|
| Fiber type changes | Perform【Arc calibration】 |
| Temperature, humidity or pressure changes | Perform【Arc calibration】 |
| Splice loss increases | Perform【Arc calibration】 |
| Electrodes have been used for long time or stained | Perform【Arc calibration】 |
| After cleaning or replacing electrodes | Perform【Arc calibration】 |

**Operation Procedure:**

(1) Select【Arc calibration】in the【Function Setting】Menu.

(2) Place cleaved fibers into the splicer.

(3) Press " " to start.

a) The system adjusts the center of fibers gap to arc center.

b) After arc, the system will measure the melt-back amounts of left and right fiber axis's and calibrate the arc current.

(4) After arc, the result will be displayed on the screen. If the screen displays "Arc current too weak", or "Arc current too powerful", repeat step (2) and (3) again until the screen displays "Arc calibration successful".

(5) If the screen displays "Arc calibration failed", repeat step (1).

(6) After Arc calibration and splice position calibration is complete, press " " to exit Arc calibration mode.

**Attention:**

a) Cleave Angle Limit is solely set under the Arc calibration mode, which is irrelevant with the one under splice mode.

b) Arc calibration often needs to be operated a couple of times. Users should follow the steps patiently.

# 3.3 Electrodes Maintenance

Discharge Correction

The atmospheric environment such as temperature, humidity and air pressure, will cause the change of the intensity of discharge in Optical fiber fusion. This welding machine with built-in temperature, pressure and humidity sensors to monitor and control the system working environment, works to keeps the intensity of discharge stable. Electrodes in aging or dirty conditions can cause the change of discharge intensity, at the same time, the electrode discharge center, relative to the location of the optical fiber fusion, can cause deviation. The machine provides discharge correction function to solve the above problems.

## 3.3.1 Clean Electrodes

The surface of the electrodes will attach impurities during daily use and affect the arc effect, hence users need to periodically clean the electrodes.

**Cleaning Procedure:**

(1) Press the power button “ ” to turn off the device.

(2) Wipe the electrode tip with the cotton swab carefully.

Figure 3-2 Clean the Electrodes

(3) Press " " to turn on the device and the power indication light will be on.

(4) Select【Clean Electrodes in【Maintenance】Menu.

(5) Press Startup key " ", the device will arc five times automatically, using powerful arc current to vaporize the impurity on the electrodes surface to arc steadily and clean the electrodes.

**Attention:** Don't touch the electrode tips with hard object in the process of cleaning to avoid damage to the electrodes.

## 3.3.2 Replace Electrodes

Electrodes deplete during their usage. Replace electrodes after they have been arced 2000 times, otherwise it will affect the splice result of fiber, which leads to more loss and decrease of fiber strength. When the number of arcs reaches 2,000, a message reminding you to replace the electrodes is displayed when the device is turned on. The arc times should be cleared after replacing the electrodes. The electrode's tip is sharp,

so please take care during operation.

**Replacement Procedure:**

(1) Press “ ” to turn off device before replacing.

(2) Loosen the screw located on electrode cover, then take electrode out of electrode slot as shown in figure 3-3.

Figure 3-3 Electrodes - replace

(3) Put the new electrode into the electrode slot and install the electrode cover, then tighten the screw.

(4) Check whether the two electrodes are in the same horizontal plane and the vertical plane, if not reinstall.

(5) Prepare and put fiber into the splicer, execute【Arc calibration】in the【Functions Setting】Menu.

(6) Electrode change is completed, need to perform in【historical records】【zero discharge times.

(7) Replacement completed.

## 3.4 Self-Checking System Parameter Test

System parameters of the welding machine provide a self-check function so users can carry out the self-diagnostic test on the system, to detect the performance of several key parameters of the welding machine.

**It is strongly recommended to discharge correction on the welding machine in the following situations, otherwise it will influence the sealing effect:**

- ✧ For welding optical fiber type change.
- ✧ System upgrade.
- ✧ A big change in the environment temperature, humidity or air pressure.
- ✧ Continuous welding failure or loss on the high side.
- ✧ The captain of the welding time is not used, or electrode used too many times.
- ✧ Clean or replace the electrodes.

Discharge correction operation steps are as follows.

（1）In the feature【set menu 】【 discharge correction 】.

（2）Will cut fiber on the welding machine closed wind cover.

（3）Press the start key “ ” to perform.

a) The optical fiber clearance center system set to measured discharge center position.

b) After discharge, the system will measure about optical fiber axial melting, correction of discharge current.

（4）If the prompt on the screen reads "discharge current is too large," or "discharge current is too small, please continue to repeat the above

mentioned in (2) and (3) until success tip discharge correction operation.

（5）If prompt correction "discharge" failure shows, please start step (1) described until success tip discharge correction operation。

（6）Discharge intensity and welding position after the successful completion of calibration, press exit “ ” Exit discharge correction mode。

***Note:***

a) Discharge correction mode of cutting Angle limit is set by itself, has nothing to do with the cutting Angle limit welding mode。

b) Discharge correction generally need to be executed multiple times in a row, please be patient to operate according to clew。

## 3.5 Cleaning of Fiber Fusion Splicer

### 3.5.1 Clean the V-groove

The presence of impurities in V-groove will make the fiber image deviate from the normal position, resulting in dis-alignment, causing more splice loss. Users should regularly check and clean V-groove, the specific process is as follows:

(1) Open the windproof cover of Fiber Fusion Splicer.

(2) Use the specific brush to clean the impurities in V groove bottom as shown in figure 3-4 (a).

(3) Please use the fine cotton swab dipped in alcohol to clean the bottom of the V-groove, as shown in Figure 3-4 (b).

(a) (b)

Figure 3-4 Clean the V-Groove

**Attention**: Do not touch the electrode tip. When cleaning the V-groove, do not overexert or use hard object (such as blades) to avoid damage, which can cause breakdown.

### 3.5.2 Clean the Microscope

The Fiber Fusion Splicer image processing system is used to observe the optical fiber. If the microscope lens gets dirty, it will affect observations, leading to poor fusion splicer results. The microscope lens should be cleaned regularly to maintain the cleanliness of the lens. The specific process is as follows:

(1) Turn off the splicer power, and open windproof cover.

(2) Use cotton swab dipped in alcohol to gently wipe the lens, as shown in Figure 3-5.

(3) Then wipe the residual alcohol with clean, dry cotton swab, after that, check the microscope lens is clean.

(4) Turn on the power to observe whether there is dust on the image, if there is, re-clean the lens.

Figure 3-5 Clean the Microscope

**Attention**: When cleaning, do not touch the electrodes, and do not use hard objects to touch the lens.

### 3.5.3 Clean the Fiber Presser Foot

Dirt on the optical fiber presser foot may cause fiber clamp problems and affect splice results. The presser foot should be checked and cleaned regularly. The steps are as follows:

(1) Open windproof cover.

(2) Use cotton swab dipped in alcohol to wipe the surface of the presser foot as shown in Figure 3-6. Then use dry cotton swab to dry the presser foot.

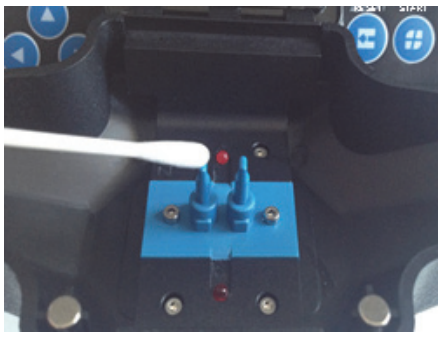


Figure3-6 Clean the Fiber Presser Foot

### 3.5.4 Clean the Heater

The heater easily collects dust and dirt, so please clean the heating plate with a dry cotton swab regularly as shown in Figure 3-7.

Figure 3-7 Clean the Heating Plate

# Appendix 1 Warning Information

| **Warning information (English information is contained within the brackets)** | **Reason** | **Counter Measures** |
|---|---|---|
| Incorrect placement of left fiber (LFPC) | (1) Left fiber is cleaved too short.<br>(2) The part of left fiber put into V-groove is broken.<br>(3) Left fiber is not put into the center of V-groove.<br>(4) Left propulsion equipment is incorrectly connected. | ● In the case of 1 or 2, re-cleave left fiber and make sure the cleaved length is appropriate<br>● In the case of 3, replace left fiber<br>● If the breakdown does not match 1、2、3, do【Calibrate System】, If the problem remains, please contact the after-sales service department. |

| | | |
|---|---|---|
| Right fiber placement is incorrect (RFPC) | (1) Right fiber is cleaved too short.<br>(2) The part of right fiber put into V-groove is broken.<br>(3) Right fiber is not put into the center of V-groove.<br>(4) Right propulsion equipment is incorrectly connected. | Solutions refer to the above |
| Left and Right fiber placement are incorrect (LRFPC) | The same as above | Solutions refer to the above |
| Left fiber is unqualified (LFNQ) | (1) Left fiber surface is dusty.<br>(2) Left fiber is cleaved poorly, such as core defect, cladding defect or fiber incompleteness | ● In the case of 1, use alcohol to clean the left fiber<br>● In the case of 2, remake fiber |
| Right fiber is unqualified (RFNQ) | (1) Right fiber surface is dusty.<br>(2) Right fiber is cleaved poorly, such as core defect, cladding, defect, fiber incompleteness. | Solutions refer to the above |
| Right fiber is unqualified (LRFNQ) | The same as above | Solutions refer to the above |

| | | |
|---|---|---|
| Left fiber head face is unqualified (LFEANQ) | Left fiber head face angle exceeds limit | Re-cleave left fiber. If cutting quality is still poor after multiple trial, replace the blade (attention: in 【Menu】->【Splicing Mode】->【Surface Angle Threshold, head face angle limit can be set). |
| Right fiber head face is unqualified (LRFEANQ) | Right fiber head face angle exceeds limit | Solutions refer to the above |
| Left and Right fiber head face are unqualified (FANQ) | Left and Right fiber head face angle exceeds limit | Solutions refer to the above |
| Estimated loss amount is too much | (1) splice loss exceeds limit.<br>(2) The selected program does not match the fiber type | Clean v-groove, re-operate 【Arc calibration】then splice again |
| Power is insufficient | Current remaining battery less than 2% | Use power adapter to charge |
| Replace electrodes | Electrodes arc records exceed the limit | Replace electrodes (operate 【Replace Electrodes】, 【Calibrate system】) |

| | | |
|---|---|---|
| Records exceed limit | Splice records exceed the limit | Use USB data cable to transmit the original splice records, then operate 【Delete Arc Records】 |
| Alignment abnormity | (1) Fiber head face is dusty, or head face is poor.<br>(2) Windproof cover is pressed too tightly.<br>(3) LED lamp brightness is inappropriate | Re-cleave and clean fiber, then try alignment. If problem remains, operate 【Calibrate System】 or restart the equipment. |
| Timeout abnormity | Alignment during splice process takes longer time | Restart alignment and fusion. Restart the equipment if the problem remains |
| Field of view abnormity | (1) Electrodes placement is incorrect.<br>(2) Equipment structure is damaged | Operate 【Calibrate System】 if the error still exists, reinstall electrode bars. If the problem remains, contact the aftersales service department. |

| | | |
|---|---|---|
| Data abnormity | The equipment is running in abnormal state | If it does not affect the operation, continue alignment and splicing. Restart the equipment if the error still exists. |
| Light source abnormity | (1) LED lamp brightness is inappropriate.<br>(2) Windproof cover is inappropriately placed | Operate 【Calibrate System】firstly. If the problem remains, contact the aftersales service department. |
| Detect abnormity | Abnormity in the process of 【Calibrate System】 | Check the placement of fiber and wire connection. If the problem remains, contact the aftersales service department. |
| Power abnormity | Battery is abnormally charged | Insert power adapter |
| Heating shrinkage abnormity | Sleeve heater cannot operate normally | Restart equipment. If the problem remains, contact the aftersales service department. |
| Store abnormity | Data could not be saved | Contact the aftersales service department. |

| | | |
|---|---|---|
| Communicate abnormity | Data communication exists loss and loss | Restart equipment. If the problem remains, contact the aftersales service department. |
| Image abnormity | The camera may be broken, or connector interface is loose | Restart equipment. If the problem remains, contact the aftersales service department. |
| Sensor abnormity | Inner sensor is broken | This abnormity does not affect normal operation. Contact the aftersales service department for solution |

# Appendix 2 Problems and Troubleshooting

| Abnormal phenomena | Reason | Countermeasures |
|---|---|---|
| Arc sounds abnormally | Electrodes are incorrectly placed | Reinstall electrode properly |
| Arc delay or system could not arc | (1) Electrodes are incorrectly placed.<br>(2) The electrode tip is wrapped by monoxide | (1) Reinstall electrode properly.<br>(2) Clean electrode tip or replace electrode |
| System crashes when arc | Electrodes are incorrectly placed | Reinstall electrodes properly |
| Arc calibration failure | Environment<br>Affects arc greatly | If the system warns that arc current is too big, decrease splice current, then do【Arc calibration】and vice versa.<br>If the problem remains, contact the aftersales service department. |

| | | |
|---|---|---|
| Optical fiber alignment error | (1) Microscope lens, LED lamp or V–groove is dusty.<br>(2) Equipment power system is faulty | Clean the microscope lens, LED lamp and V –groove, if the problem remains, contact the after-sales service department. |
| Fiber spliced joint's quality is poor | (1) Fiber is dusty.<br>(2) The fiber type or fusion splice program selected is wrong.<br>(3) Fusion splice environment changes greatly.<br>(4) Control equipment is broken | (1) Re-make optical fiber, splice again.<br>(2) Choose the right type of fiber and fusion splice program.<br>(3) Operate【Arc calibration】to obtain the appropriate intensity of arc.<br>(4) Operate【Calibrate System】 |
| The keyboard has no response | System crashes | Turn off the power and restart |
| The screen has no light or blurry colors | (1) System crashes.<br>(2) Wire of LCD monitor is loose or is broken | Turn off the power and restart. If the problem remains, contact the aftersales service department |

| | | |
|---|---|---|
| On both sides of weld after discharge, fiber has not succeeded | Abnormal discharge intensity or system error | Please do continue to weld again after discharge correction. If you still cannot solve the problem, then shutdown and restart |
| Optical fiber in the process of alignment is beyond the view outside | (1) Optical fiber placed outside the V-groove.<br>(2) System is running abnormal | 1、Please reposition the optical fiber and guarantee in the center of the V groove<br>2、The selected welding mode - > 】 【 welding operation mode 】 menu, enter the "manual" mode, select operation about optical fiber, the operator can be through four direction key. Move the corresponding side of the optical fiber, motor back to the center of the field, and then do self-checking system parameters. |

# Appendix 3 Contact Us

## Fault repair:

Please describe the current state of the faulty equipment.

Multifunctional optical fiber fusion splicer repair shall be returned to agents or manufacturers. Please contact agents or click the following link.