Instruction Manual

Fusion Splicers with Linux OS.

Safety Precautions

Please strictly follow the safety guidance of the manual in application of the optical Fibre fusion splicer (Hereinafter referred to as Splicer). The ignorance or violence of the rules or notice stressed in the manual may cause electric shock, fire disaster and injuries to users. The manufacturer shall take no responsibilities of accidents caused by improper use.

For your safety, please carefully read and follow the following instructions.

Safety Precautions

Working Environment

Cautions for use/storage of the splicer:

◆ Working Temperature：-10℃ ~ + 45℃

◆ Temperature Limitation： - 20℃ ~ + 55℃

◆ Working Humidity：≤95％RH （No condensation）

◆ Maximum Wind Speed：15m / s

◆Storage Conditions： - 10℃ ~ + 45℃ （With Battery, No Condensation）-20℃ + 60℃（No Battery, No Condensation）

◆Don't use the splicer in environment vulnerable to fire, explosion in case any fire disaster or explosion caused.

◆Don't use or store the splicer in environment of high temperature or high humidity in case any damages to the machine caused. When the splicer is moved from low temperature environment to environment of higher temperature, please take possible warming up measures to eliminate condensation.

◆Please take suitable dust-resistance measures when using the machine in dusty environment to prevent lots of dust getting into the machines and causing device malfunction.

Power Supply

Please use the matching accessories of the splicer and don't use any power adapter, battery or power cord that are not specified in the instruction.

Please don't use the splicer under the mains voltages that are not specified for the model this may cause fire disasters or electric shock. A customized car charger power cord is only available for 12V power supply from cars and vans.

Battery

Please strictly follow the instructions when using the battery. Improper use of battery may cause battery heating up, burst, explosion, fire disaster or injuries to users.

- Please do not charge the battery with methods that are not specified in the manual.
- Do not dispose the battery in fire.
- Do not reverse the positive and negative poles.
- Do not expose the discharging battery under sunshine or in environment with high temperature or in fire.
- Do not throw or strike on the battery.
- If the battery electrolyte leaks out, please handle it carefully. If user's skin or eyes are contaminated by electrolyte accidentally, please wash it thoroughly and look for medical help immediately. At the same time please inform the after-sales department to handle the battery.

Other Cautions

◆ Please prevent any liquid or metal materials getting into the internal structure of the product, or possible fire, electric shock or product malfunction may be caused. Once water or any metal materials get into the product please stop using, cut the power supply, turn off the equipment and contact the maintenance service department.

◆ Please do not touch the electrodes when the equipment is working in case getting hurt by the high voltage. Please do cut the power supply and turn off the equipment before changing electrodes.

◆ Do not disassemble the splicer, its battery or its adapter in case overheating, burst or fire disaster caused.

◆ Except the components that are allowed to be changed in this manual please do not try to demolish any parts of the splicer. The maintenance or repair of the equipment must be operated by professional technicians from our company, improper operations may cause fire or electric shock. Please contact the maintenance center through 24-hour-on service line when necessary. Product warranty will be invalid for personally disassembled products.

Other Cautions

◆ Do not touch the shrinkable tube in heating process or when it's just finished, as the shrinkable tube is very hot and may cause scald.

◆ Do not touch the splicer, power cord or power plug with wet hands in case electric shock caused.

◆ Do not clean the microscope lens, V groove, screen etc with any chemical materials except alcohol otherwise it may cause image blur or spots on screen or may even cause corrosion or damage of the equipment.

◆ Please prevent the equipment from strong shaking or crash, or the equipment may be damaged. Please transport or store the splicer by dedicated carrying box.

◆ Please do entire machine maintenance once a year to maintain the performance of the splicer.

Legal Notices

◆ Without literal authorization from our company, any organizations or individuals shall not extract, copy part or all the contents of the manual and shall not be disseminated in any form .

◆ This manual describes the product, and the features or functions of its accessories are determined by production batches. Thus, the product or its accessories described in the manual may not be the same with the ones you purchased. The manufacturer keeps the right of amending the manual whenever it's necessary without formal notice and shall take no responsibility for such actions.

◆ Notice: Please thoroughly read the instruction manual to operate the splicer more accurately and professionally.

Production Introduction

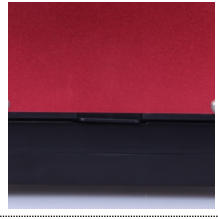
Optical Fibre Fusion Splicer is mainly used for optical Fibre cable maintenance and relative operations. Thus, it is also called Fibre cable splicer. It is a device that uses high precision propulsion structure to push two Fibres to get closer to each other and uses an electric arc to melt two optical Fibres together at their end faces, to form a single long Fibre.

Optical Fibre fusion splicers are mainly applied by : Telecom carriers, ISP, network project contractors, laboratories. And they're applied in : Fibre cable network maintenance, telecom projects, emergent repairing, optical experiments, manufacture and testing of optical devices, academic researches in colleges.

Introduction of Function Buttons

Appearance	Name	Function
	Menu / Confirm	Enter menu page/Confirm or save
	Power On / Off	Turn on/off the power
	Next	Switch to next option/Switch X/Y views
	Return / Reset	Return/Reset the motor
	Start / +	Run to start splicing/Adjust parameters(Increase/Switch)
	Heating	Start heating

Description of Product Structure

Appearance	Name	Function
	Heater	For heating process of shrinkable tubes after splicing.
	Battery Fixing Button	Put on/take off the battery

Fundamental Parameters

Applicable Optical Fibres

- SM，MM，DS，NZDS，UI ,BUI，EDF, etc.
- Applicable Core Type：Single Core
- Applicable Fibre Diameter: Cladding diameter 80-150μm, Coating diameter 100 - 1000μm.

Fundamental Parameters

Splicing Mode

- Pre-store: 15 groups. Customize: 785 groups
- Splicing Results Recording: 100,00-group splicing records & 10,000 image storage
- Splicing Speed：9SEC(Standard Mode）7S（Fast Mode）
- Alignment：Core to core alignment, clad to clad alignment

Product Introduction

Fundamental Parameters

Splicing Loss

- Average Splicing Loss：0.02dB(SM)，0.01dB(MM)，0.04dB(DS)，0.04dB(NZDS)
- Return Loss：≧60dB
- Splicing Loss Estimation：Exist
- WIFI Function: Support

Power Supply

- Power Supply：Input 220V±10%, 1.4A, 50/60Hz output 13.5V/5A
- Battery：11.1V Lithium battery，typically splicing and heating 260 times，charging time 3 h，500 times rechargeable, 5200mAh lithium battery

Fundamental Parameters

Operation Conditions

- Operation Environment: Altitudes 0 ~ 5000m, relative humidity 0 ~ 95%(No condensation), temperature -20℃ ~ 55℃, maximum wind speed 15m/s
- Storage Conditions: Relative humidity 0 ~ 95% (No condensation), temperature -40℃ ~ 80℃
- Corrosiveness Resistance:The main device, components and constituent materials meet the requirements of GB/T 2423.54-2005 corrosion and are not vulnerable to the corrosiveness of fluid pollution.

Weight and Dimension

- Weight：1.19kg（Without battery），1.53kg(With battery)
- Dimension：146D×131W×152H(mm)

Product Introduction

Fundamental Parameters

Heating Shrinkable Tube

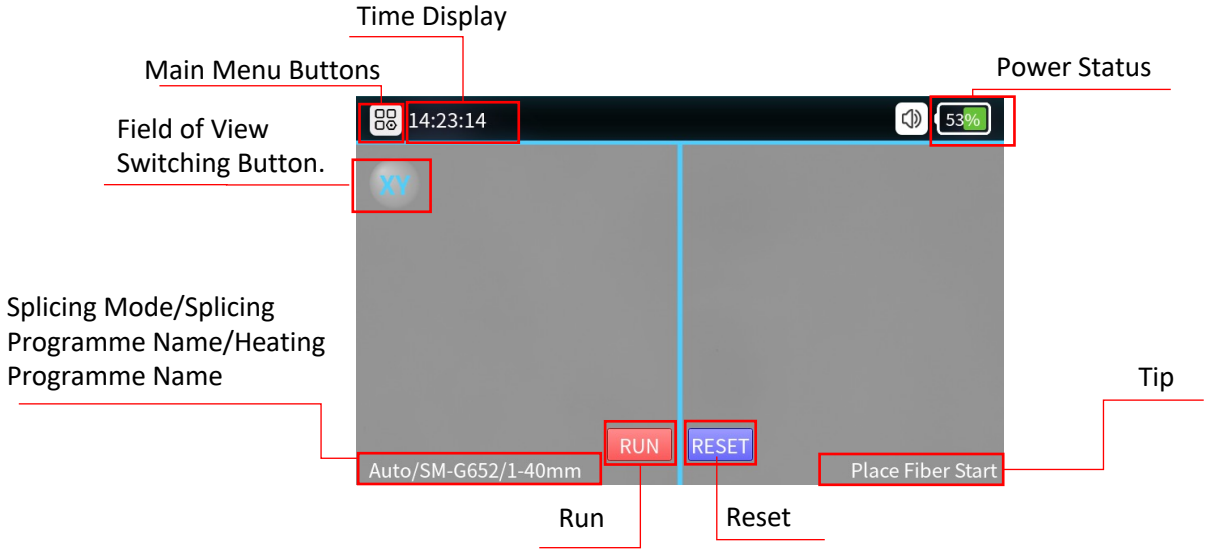
- Applicable Diameter： 1mm,2mm,3mm,4mm,6mm
- Applicable Length： 60mm， 50mm， 45mm， 40mm， 25mm， 20mm
- Heating Time： 2mm tube(10-15S adjustable)， 4mm tube （14-19S adjustable)，6mm tube(17-23S adjustable)
- Heating Temperature: 10-260℃(Customizable)
- Automatic Heating : Auto Fibre recognition and heating after covered

Fundamental Parameters

Other Parameters

- Tension Test: ≧2N （Optional）
- Display：5 inches TFT true color HD LCD screen，support multi-language selection
- Magnification：X/Y:210 times，X/Y:320 times
- The result can be double-clicked to magnify 1100 times after the fusion is complete.
- USB Port：USB2.0
- Illumination：LED double white light
- IOT function: optional
- Password management function:optional

Description of UI



Description of IoT Function

- Billing management: you can query the billing information of the specified equipment, query the optional billing packages, and recharge the corresponding tariffs for the specified equipment.
- Device location function: real-time uploading of device location information after power-on
- Data statistics: real-time uploading of splicing record information, maintenance information and abnormal alarm information of the equipment.
- Remote Upgrade: Remotely upgrade the device online.
- Remote control: remote monitoring and management of equipment, remote control of equipment (can be locked or unlocked the use of equipment).

Function Introduction of the Splicer

Shortcut Function

SplicePROG

HeatPROG

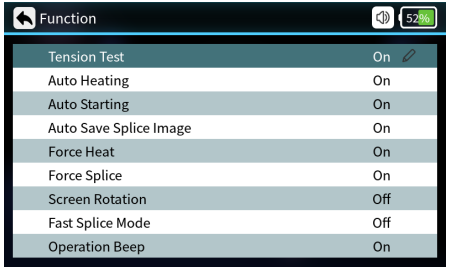
SpliceSet

Maintain

System

Function Introduction

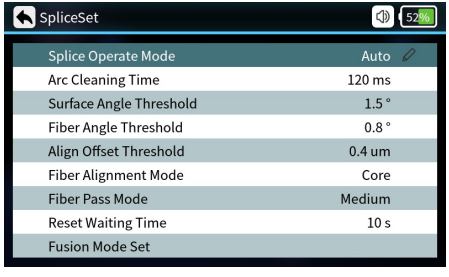
Shortcut Function



Parameters	Instructions
Tension Test	When it's on, the tension test will be executed automatically after splicing.
Auto Heating	Put in the optical Fibre, cover after automatic heating
Auto Starting	When it's on, automatically splicing once cover closed.
Auto Save Splice Image	When it's on, automatically heating once cover closed.
Force Heat	When it's on, no Fibre optic detected, pressing the heat button also heats it up.
Force splice	When it's on, the user can press the start button to force the fusion splicing to continue, when the fusion splicing process detects an angle failure or Fibre mismatch.
Screen Rotation	Screen interface rotated 180°
Fast splice Mode	Can be set on or off, fusion time is reduced when fast mode is on.
Operation Beep	Beeps can be set to be on or of
Screen Brightness	Adjusting the brightness of the display.
Auto off	Timer auto turn off function switch.
Auto-off time	Setting the timer auto turn off time.

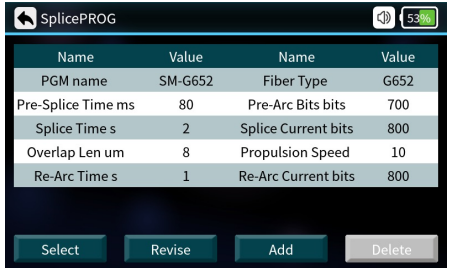
Function Introduction

SpliceSet



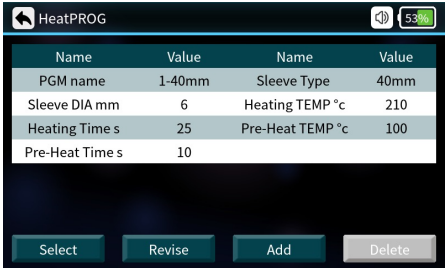
Parameters	Description
Splicer operate Mode	Automatic mode, semiautomatic mode, manual mode optional.
Arc Cleaning Time	Clean discharge refers to the cleaning of fine dust adhering to the surface of an optical Fibre by discharging the Fibre prior to fusion splicing.
Surface Angle Threshold	Limit value of Fibre end face angle.
Fibre Angle Threshold	Angle limit after alignment of left and right Fibres.
Align offset Threshold	Limit of center deviation after alignment of left and right fibres.
Fibre Alignment Mode	Core alignment, cladding alignment, and fine alignment can be set.
Fibre Pass Mode	Low, medium and high standards can be set.
Reset Waiting Time	When the tensile test is turned on, waiting time for motor reset after opening the windproof cover

Edit Splice Program



Edit Splice Program	
Splice PGM	Name of splicer program
Pre-Splice Time	Pre-Splice time can be set from: 0-500 (ms)
Splice Time	Splice time can be set from:0-5 （s）
Overlap Len	Overlap Len can be set from:0-50 （um）
Re-Arc Time	Re-Arc Time can be set from:0-5 （s）
Fibre Type	Types of Fibre
Pre-Arc Bits	Pre-Arc Bits can be set from:0-4000 （bits）
Splice Current	Splice Current can be set from:0-4000 （bits）
Propulsion Speed	Propulsion Speed can be set from:0-50 （um/s）
Re-Arc Current	Re-Arc Current can be set from:0-4000 （bits）

SleeveSet



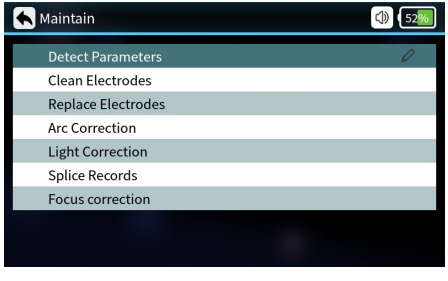
Parameters	Description
Heating PN	There are many heating programs for different shrinkable tubes pre-stored in the system, also many self-set programs are offered to users.
Sleeve DIA	1-20mm
Heating Time	Heat shrink heating time
Pre-Heat Time	Pre-heating time
Sleeve Type	10mm-60mm normal tube, FC, SC
Heating Temp	The temperature limit of heating process
Pre-Heat Temp	The temperature limit of preheating process

Splice Records

Parameters	Description
No.	Sorting by Splice Time
Loss	Loss after splicing
Type	Types of Fibre for splicing
Time	Splice time
Image	Viewable image of the finished splice

Export. This function is used when you want to export the splice data to a computer. When you press the ”Export” the unit will create a “HTML” file of your splices within the unit.
Then connect your computer to the USB port, you should then see the Fusion Splicer internal memory displayed in your computers File Manager “NO NAME”. Open the “Export Directory”
Copy the Export.html file and the Image Directory to your hard drive. If you then open the HTML file you will see all the splice data, now click image.jpg a photo of the splice will be displayed.

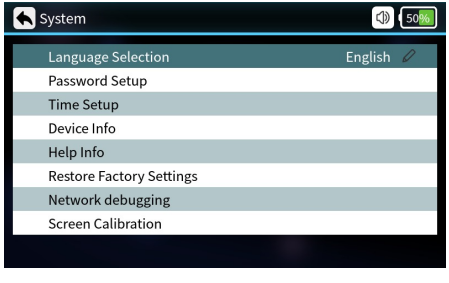
Maintain



Parameters	Description
Detect Parameter	Automatic self-test of electrode position, motor and other system parameters.
Clean Electrodes	Multiple high-current discharges to clean the electrodes.
Replace Electrodes	After replacing the electrode, the discharge position is automatically determined and the electrode is stabilized by multiple discharges.
Arc Correction	Performs Arc Correction operation and automatically corrects the discharge current.
Light Correction	Automatic correction of red light source.
Splice Records	Query splice time, evaluate loss, image, etc.

Function Introduction

System



Parameters	Description
Language Selection	Domestic Default Simplified Chinese
Time Setup	Setting the time setup
Device Info	Current device related information
Help Info	instruction manual
Restore Factory Setting	Settings are restored to factory settings
Network debugging	Display network related information
Screen Calibration	Calibration touch screen

Basic Operations

1.Turn on the power

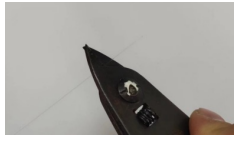
Optical Fibre observation interface: Short push the power switch then the indicator on the operation panel will turn to red and the buzzer will be sounds like “Di Di”. All motors will return to their initial positions and the Fibre observation interface shows.

2. Preparation before splicing

① Put the shrinkable splicing tube on

Put the Fibre through the splicing tube so to protect fusion point after splicing. Make sure there is no impurity inside the tube and keep the tube parallel with the Fibre.

②Strip down the protective layers except the class coating layer.



Strip the coating layer by 40mm with strippers.

After stripping the optical Fibre, use dust-free paper dipping with 99% purity alcohol to clean the coating layer in a circular direction. Starting from the interface between the coating and the bare Fibre, rotate the paper in the direction of the bare Fibre in a circular direction and get rid of the debris of coating layers.

3.Fibre Cutting

① Positioning the tip of the Fibre at 13 - 13.5 mm above the top of the slot.

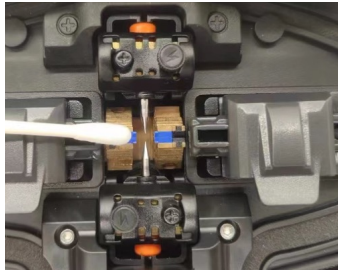
② Keep the slider at outer side. Then cover the pressure pad.

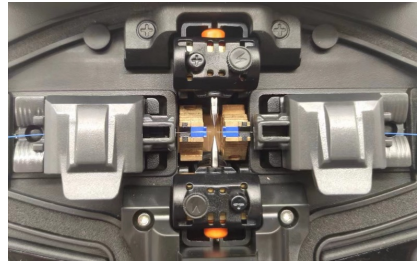
③ Push the slider and finish the cutting.

④ Open the Fibre holder and open the pressure pad, take the Fibre and keep it away from other items in case it may get polluted.

Notice: When there is a poor cutting surface please adjust the blade surface of Fibre cleaver. What's more, we'd like to suggest you use specified Fibre cleavers equipped with our machines.

4.Fibre Placement





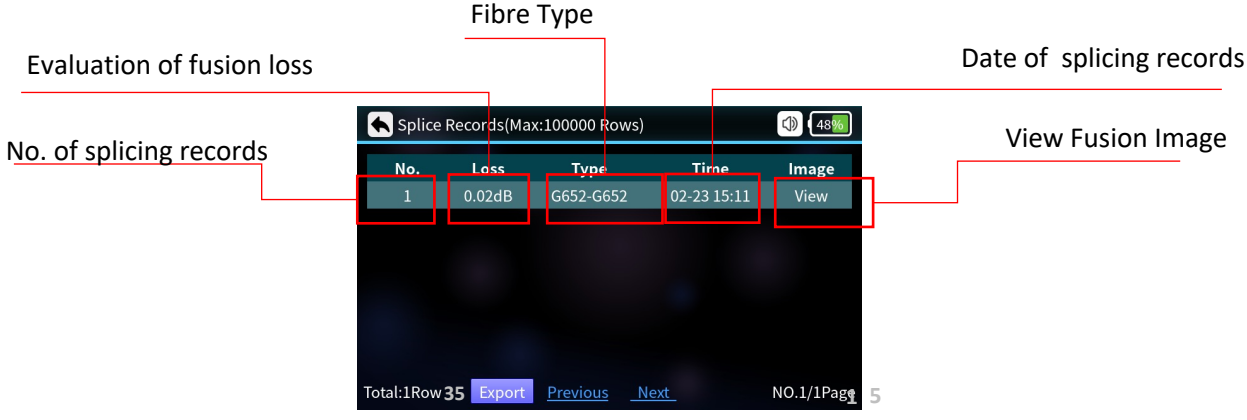
① Open the wind-proof cover and check if the V-groove is clean. If not, please use air blow or blade to clean the V-groove.

② Put the cut Fibres in the V-groove of the splicing modules and make sure the Fibres are right in the V-groove.

③ Check if the end-faces of the Fibres are in the position between the electrode tips and the V-grooves. And make sure they're close to the electrode's tips. Or the Fibres shall be re-placed.

④ Close the wind-proof cover gently and start splicing.

5.Check Splicing Result



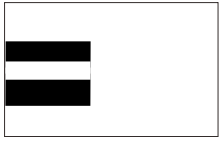
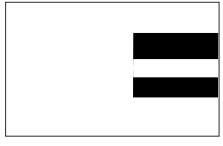
6. Auto-alignment and End Face Correction

To assure splicing quality, the product uses image processing system to observe Fibres. But in some conditions the system may not be able to detect the splicing errors. So, we still need to inspect the splicing process with our eyes through display screen to get better splicing quality.

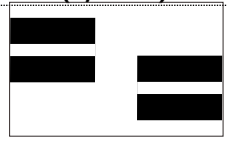
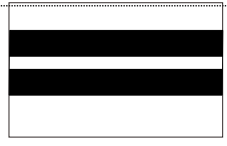
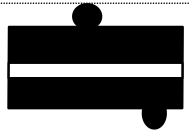
Close the wind-proof or press the start button, the optical Fibre enters the automatic alignment state, and the left and right optical Fibres begin to do phase movement. The system will check the cut faces after cleaning discharge, if the end faces are not qualified the splicing will not be started and there will be error notice on the screen. If the cut faces are qualified the aligning process will continue. After alignment the end-face angles of Fibres on both sides will be showed on the screen. If the detected angles exceed the limited angle there will be error notice on the screen. The Fibres will need to be re-cut.

If it shows following images or notice info in aligning process the system will reset the motors. Users can also push reset button to reset motors and retry to cut or put Fibres.

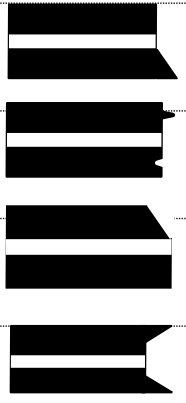
6. Solutions of Abnormal Alignment Issues

Displayed Images (X/Y Axis)	Notice	Possible Reasons	Solutions
	Fibre on the right side is improperly placed	Fibre on the right side is not placed into the V-groove or it's too short	Reposition the Fibre, Recut the Fibre
	Fibre on the left side is improperly placed	Fibre on the left side is not placed into the V-groove or it's too short	Reposition the Fibre, Recut the Fibre
	Alignment Error	Fibre on the right/left side is not placed in the V-groove	Reposition the Fibre, Recut the Fibre

5. Solutions of Abnormal Alignment Issues

Displayed Images (X/Y Axis)	Notice	Possible Reasons	Solutions
	Please reposition the Fibre	Left/right side cuts too short	Reposition the Fibre, recut the Fibre
	Please reposition the Fibre	Fibres on left/right side are too long	Reposition the Fibre, recut the Fibre
	Fibres are not qualified	Dust or dirt on Fibres	Clean and reposition the Fibres

8. Solutions of Abnormal Alignment Issues

Displayed Images (X/Y Axis)	Notice	Possible Reasons	Solutions
	Angles of Fibre end-faces are not qualified	Problems with the Fibre cutting process (Tips,Glitches,Bevels, Notches)	Recut the Fibre

After Fibre alignment the system will automatically discharge and splice. If the setting is set to semiautomatic splice, the message “Alignment complete” is displayed on the screen. Then the user can push start button to splice, or push reset button to reset motors.

ARC Correction

When the outer environment suddenly change or for following situations the ARC correction will be needed to adjust current intensity so to ensure low loss, high stability splicing.

① Temperature, humidity or air pressure changes

② Aging or pollution of electrodes

③ Continuous splice fails or high splicing loss

④ Machine is idle for a long time

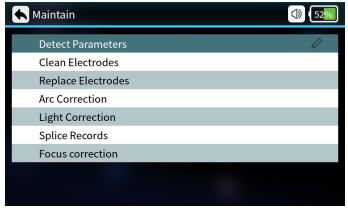
⑤ Electrodes over used

⑥ Electrodes are newly cleaned or replaced

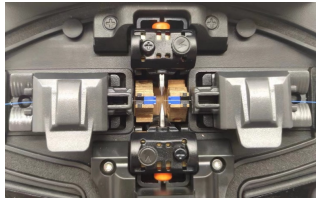
Maintenance

ARC Correction

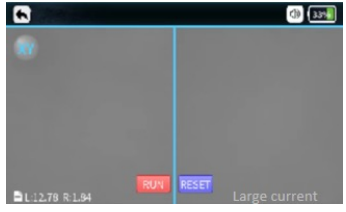
Discharge Correcting Method：



① Choose “Arc Correction” Under



②Put cut Fibres on Fibre holders and close the wind-proof cover.



③If there is “Large Current”or “Small current”please repeat the operation of ②③ until it shows the correction is successful.

Notice：

The cutting angles under discharge correcting mode are separately set, it's not relative with that under splicing modes. Discharge correction usually need to be repeated for a couple of times. Please operate with patience.

Maintenance

Detect System Parameters

The self-test function offered is available to test and inspect the system based on several important parameters.

We insist to suggest users to do parameters self-test in case splicing quality may be affected：

① After system updating

② After replacing/move electrodes

③ After enduring long-distance transportation or strong shock

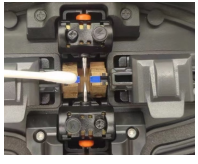
④ After continuous splicing failures or splicing loss is abnormally high

⑤ When there is continuous over-adjusting in alignment process

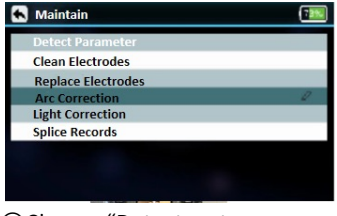
Maintenance

Detect System Parameters

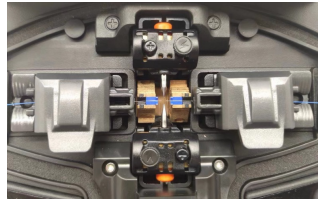
Operations are as following：



①Clean V-groove and pressers with cotton swab dipped with alcohol.



②Choose “Detect system parameters”under “Maintain”



③Put Fibres and close the cover the self-test will be on. Normally the test will continue for 2 minutes. Please observe the notice on on the LCD screen, if the test fails, please operate according to instructions on screen and re-enable system detection(Step ①).

Notice：

Cleaning is the most important step. Please do clean specified parts before further operations.

Maintenance

Electrodes Replacement

The electrodes will be attired due to long time use. Please replace the electrodes after 5000-time discharges or when the splicing quality is affected with higher loss. The system will automatically remind you that the electrodes need to be replaced when the discharging count reaches 5000. After electrodes replacement the discharging record shall be reset. Be careful of sharp tips of electrodes when replacing them. The operations are as following:

① Users shall cut the power and turn off the machine before replacing electrodes， press the power button to switch off the power, the red LED goes out.

② Unscrew the screws on electrode cover, take off electrode cover, take off the electrodes.

③ Put new electrodes into the electrode groove then put the cover back and tight the screws gently.

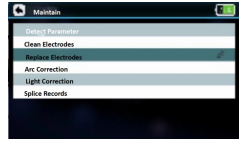
④ Check if the two electrodes are at the same horizontal line and the same vertical line, If not, please replace the electrodes.

⑤ Turn on the machine and put well cut Fibre into the machine, choose “Replace Electrodes” under “Maintain”.

⑥ Please “Detect system parameters” and do “Arc Correction”







V-groove Cleaning

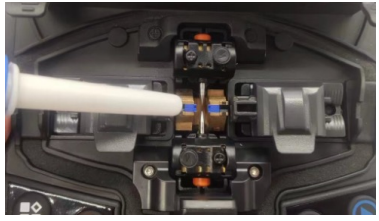
If there is contaminant in V-groove the Fibres will deviate from normal position and thus the alignment will be affected so that the splicing loss may be abnormally higher. Users must check and clean V-groove regularly. The operations are as below:

① Open the wind-proof cover.

② Clean the contaminant on V-groove with equipped dust blower.

③ Clean the bottom of the V-groove with cotton swab dipped with alcohol.

④ Notice: Do not touch the tips of electrodes. Clean the V-groove gently and do not use any hard stuff (Blade etc.) to clean the groove in case any damages affecting normal functions caused.



Maintenance

Microscope lens Cleaning

The splicer is loaded with image processing system to observe Fibres, if the microscope lens are polluted the normal observation will be affected, thus may result in bad splicing result. Users shall clean the 2 lens regularly to ensure they are clean.

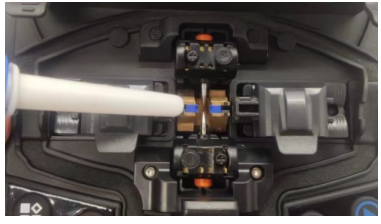
① Turn off the machine and open the wind-proof cover.

② Clean the lens gently with cotton swab dipped with alcohol.

③ Notice: Do not touch the electrodes. Do not touch the lens with hard stuff.

④ Clean the residual alcohol with clean, dry cotton swab and make sure it's clean and there is no contaminant left.

⑤ Turn on the machine, observe the image on screen and check if there is dust, if so, please clean the lens again.



Maintenance

Fibre Pressers Cleaning

Dust on Fibre pressers may cause Fibre fixing or Fibre holding issues and it will directly affect splicing quality. Users shall check and clean the Fibre pressers regularly.

① Open the wind-proof cover.

② Clean the surface of the pressers with a fine cotton swab dipped with alcohol, dry the presser with a dry cotton swab after cleaning.

Troubleshooting

Abnormal Phenomenons	Reasons	Solutions
Abnormal sounds such as snorting when discharging	Improper installation position of electrodes	Please strictly following the instruction when installing electrodes
Delayed discharge or no discharge	1. Improper installation position of electrodes 2. The tips of electrodes are wrapped by silicon oxide	1. Please strictly following the instruction when installing electrodes 2. Clean the tips of electrodes or replace the electrodes
The machine crash when discharging	Improper installation position of electrodes	Please strictly following the instruction when installing electrodes
Discharge Correction Failure	Current environment is interfering the discharging process	If it keeps warning overcurrent, please lower the current before discharge correction. Otherwise please increase the current. If it still fails, please contact after-sales department.
Fibres alignment failures	1.There is dust on lens, LED light, V-groove. 2.Power system malfunction.	Try to clean lens, LED lights and V-groove. If the problem still exists, please contact after-sales department.。
Low quality of splicing point	1.Dust on Fibres 2.Wrong Fibre type settings or wrong splicing program 3.Splicing environment changes 4.Controlling motor malfunction	1.Re-prepare the Fibres and splice again. 2.Choose right Fibre type and right splicing program 3.Do discharge correction to adjust current to normal intensity 4.Retry parameters self-test

Never stop going forward