

Tentative version

Instruction manual

Core Alignment Fusion Splicer 90S



Please read this instruction manual carefully before operating the equipment. Adhere to all safety instructions and warnings contained in this manual.

Keep this manual in a safe place. There is a change without a previous notice.

We are not responsible for the products which are not purchased from our authorized distributors.

- Please don't ship the 90S to an end customer until October 25 due to IP issue.
- From October 26, it is possible to ship the 90S for an end customer with NDA between distributor and customer.
- Please don't publicize the information of 90S/R until a press release date on December 6.

Please consent beforehand.

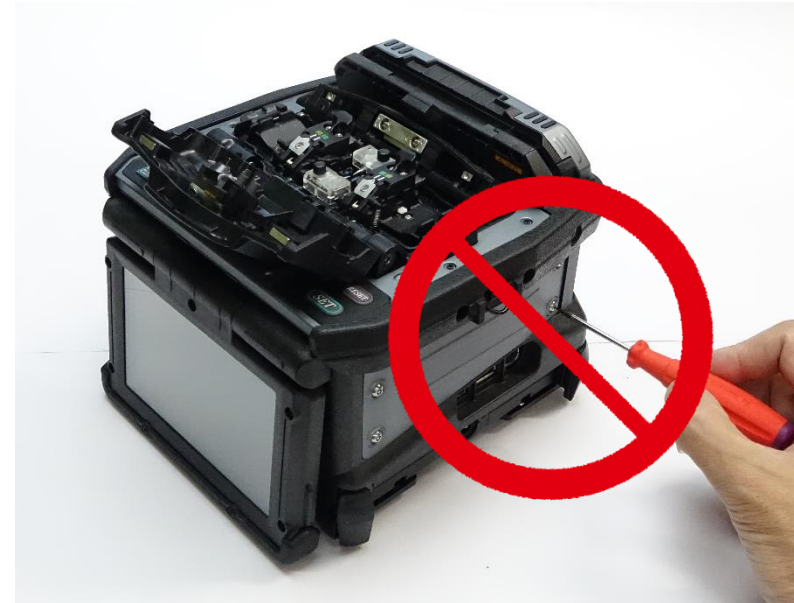
The software equipped in splicer and its related documents are protected by copyright laws and international treaty provisions as well as other intellectual property laws.

Copying some or all of instruction manual without notice is forbidden without explicit permission from our company.
It cannot use on the Copyright Act except that it uses as an individual.

---Caution for Air Transport---

This product contains Lithium Ion Battery.

Before shipping this product, inform the transport company that this product contains the lithium ion battery, and follow their instructions.



Do not remove the protector from the splicer, without first consulting an authorized distributor for instruction. Tightening the original screw without the protector present may damage mechanism inside.

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Safety Information

The splicer has been designed for splicing Silica-based optical fibers for telecommunications. Do not attempt to use this machine for other applications. Fujikura Ltd. gives much consideration and regard to personal injury and any damages. Misuse of the machine may result in electric shock, fire and/or serious personal injury and any damages.

Follow all safety instructions

Read and understand all safety instructions.

Stop using it when it malfunctions

Ask our service centers 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.

The following alert symbols are used in this instruction manual and machine to indicate warnings and caution for safe use. Understand the meanings of these symbols.



WARNING!

There is a possibility of death or serious injury resulting from improper use by ignoring this indication.



CAUTION!

There is a possibility of personal injury or physical loss resulting from improper use by ignoring this indication.

Symbol means "Pay attention"



Pay attention to hot surface!

Symbol means "Must not do"



You must not disassemble!

Symbol means "Must do"



You must disconnect a plug!



WARNINGS!



Disconnect the AC power cord from the AC adapter inlet or the wall socket (outlet) immediately if user observes the following or if the splicer receives the following faults:

- Fumes, bad smell, noise, or over-heat occurs.
- Liquid or foreign matter falls into cabinet.
- Splicer is damaged or dropped.

If this occurs, ask our service center for repair. Leaving the splicer in a damaged state may cause equipment failure, electric shock or fire and may result in personal injury, death or fire.



AC adapter which be used for a splicer is only an adapter for exclusive use.

Using an improper AC power source may cause fuming, electric shock or equipment damage and may result in personal injury, death or fire.



Use the supplied AC power cord. Do not place heavy objects on the AC power cord. Use of an improper cord or a damaged cord may cause fuming, electric shock or equipment damage and may result in personal injury, death or fire.



Do not disassemble or modify the splicer, AC adapter or battery. In particular, do not remove or bypass any electrical or mechanical device (e.g. a fuse or safety switch) incorporated into the design and manufacturing of this equipment. Modification could cause damage that may result in personal injury, death, electric shock or fire.



Never operate the splicer in an environment where flammable liquids or vapors exist. Risk of dangerous fire or explosion could result from the splicer's electrical arc in such an environment.



Do not use compressed gas or canned air to clean the splicer. They may contain flammable materials that could ignite during the electrical discharge.



Do not touch the electrodes when the splicer is on and power is supplied to the unit. The electrodes generate high voltage and high temperatures that may cause a severe shock or burn.

Note Arc discharge stops when wind-protector is opened. Turn the splicer off and disconnect the AC power cord before replacing electrodes.



Safety glasses should always be worn during fiber preparation and splicing operation. Fiber fragments can be extremely dangerous if it comes into contact with the eye, skin, or is ingested.

**WARNINGS!**

Use only proper power source.

- Proper AC power source is AC100-240V, 50-60Hz. Check the AC power source before use. Proper DC power source is DC10-12V. Improper AC or DC power source may cause fuming, electric shock or equipment damage and may result in personal injury, death or fire.
- AC generators commonly produce abnormally high AC output voltage or irregular frequencies. Measure the output AC voltage with a circuit tester before connecting the AC power cord. Such abnormally high voltage or frequency from a generator may cause fuming, electric shock or equipment damage and may result in personal injury, death or fire. Make sure the generator is regularly checked and serviced.
- An AC adapter Protection Circuit is included in the AC adapter. If the "High AC Input" lamp of the AC adapter is lit or the protection circuit in the AC adapter is tripped, this indicates that the incoming voltage is dangerously high and may cause injury or damage to the equipment, as mentioned above. When using an AC generator with AC output voltage of AC220-240V especially, Fujikura Ltd. recommends the following measures to correct the condition.
 1. Connect a step-down transformer between the generator and the AC adapter in order to lower the AC voltage from AC220-240V to AC100-120V.
 2. Or, use an AC generator with AC output voltage of AC100V.
 3. Or, use an AC generator that has an inverter circuit to stabilize the output.



Do not modify, abuse, heat or excessively pull on the supplied AC cord. The use of a damaged cord may cause fuming, electric shock or equipment damage and may result in personal injury, death or fire.



The splicer uses a three-prong (core) AC cord that contains an earthed ground safety mechanism. The splicer **MUST** be Grounded. Use only the supplied three-prong (core) AC power cord. **NEVER** use a two-prong (core) power cord, extension cable or plug.



Connect AC power cord properly to the splicer (inlet) and wall socket (outlet). When inserting the AC plug, make sure there is no dust or dirt on the terminals. Engage by pressing the female plug into the splicer (inlet) and the male plug into the wall socket (outlet) until both plugs are fully seated. Incomplete engagement may cause fuming, electric shock or equipment damage and may result in personal injury, death or fire.



Do not short-circuit the terminals of AC adapter and optional battery. Excessive electrical current may cause personal injury due to fumes, electric shock and equipment damage.

**WARNINGS!**

Do not touch the splicer, AC power cord and AC plugs with wet hands. This may result in electric shock.



Do not operate splicer near hot objects, in hot temperature environments, in dusty / humid atmospheres or when water-condensation is present on the splicer. This may result in electric shock, splicer malfunction or poor splicing performance.



When using optional battery, follow the instructions below. Failure to follow these may result in explosion or personal injury.

- Do not charge battery with other methods than instructed.
- 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 so the liquid does not get in skin or eye contact. If it reaches contact, immediately wash skin or eyes thoroughly and see the doctor. Dispose of the battery and call the service center for replacement.
- Do not stack battery on top of AC adapter while charging.
- If charge did not complete in five hours or the "CHARGE" LED does not turn ON, immediately stop charging and call the service center for repair.



When transporting the carrying case using the shoulder belt, check the belt and hooks for damage before use. Carrying the case with a damaged shoulder belt may cause the belt to break or come off and result in personal injury or equipment damage.



CAUTIONS!

	Do not store splicer in any area where temperature and humidity are extremely high. Possible equipment failure may result.
	Do not touch protection sleeve or tube-heater during heating or immediately after completion of heating. Their surfaces are very hot and touching these may result in skin burn.
	Do not place the splicer in an unstable or unbalanced position. The splicer may shift or lose balance, causing the unit to fall. Possible personal injury or equipment damage may result.
	The splicer is precision adjusted and aligned. Do not allow the unit to receive a strong shock or impact. Possible 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.



CAUTIONS!

	<p>Follow the below listed instructions for handling electrodes.</p> <ul style="list-style-type: none"> • Use only specified electrodes. • Set the new electrodes in the correct position. • Replace the electrodes as a pair. <p>Failure to follow the above instructions may cause abnormal arc discharge. It can result in equipment damage or degradation in splicing performance.</p>
	Do not use any chemical other than pure alcohol (99% or greater) to clean the objective lens, V-groove, LCD monitor, etc., 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 a qualified technician or engineer. Incorrect repair may cause fire or electric shock. Should any problems arise, please contact the authorized distributors.

RECYCLING and DISPOSAL

In European Union



In accordance with the European Parliament Directive 2002/96/EC, electrical parts and materials that can be re-used and/or recycled have been identified in order that the use of new resources and the amount of waste going for landfill can be minimised.

In the European Union, do not discard this product as unsorted municipal waste. Contact your local authorities.

In other countries

[Recycling]

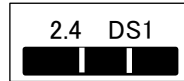
To recycle this product, disassemble it first, sort each part separately by material components and follow your local recycling regulations.

[Disposal]

This product can be disposed of same as the standard electric products. Follow your local disposal regulations.

Bluetooth® Wireless Technology

- The splicer uses the Bluetooth technology for wireless data communication.
- The wireless data communication is done at a frequency of 2.4GHz band, and employs the DSSS modulation scheme. The estimated interference distance is 10m or less.



CAUTION!



When using the fusion splicer, the optical fiber cleaver and the ribbon fiber stripper near medical devices, turn the wireless communication function of these off.



Turn the power of the fusion splicer off in the aircraft.
For the optical fiber cleaver and the ribbon fiber stripper, remove batteries to turn off the wireless data communication.

Typical wireless certifications are:

USA FCC Rules Part 15 FCC ID : QOQ11

CANADA Industry Canada Rules RSS-247 IC : 5123A-11

European Union RE directive 2014/53/EU
RE Directive: 2014/53/EU
EN300 328, EN301 489-1, EN301 489-17 and EN 60950-1

JAPAN Radio-wave Law Article38-24 paragraph 1 R209-J00255

- If you have any questions for other countries, contact an authorized Fujikura distributor listed in the following web site:

<https://www.fusionsplicer.fujikura.com/service/index.html>

General information

Introduction

This fusion splicer can splice a single optical fiber. Moreover, new functions were added and made the splicer much improved in versatility. In order to master the splicer, please read this instruction manual

Splice mode

This fusion splicer has not only automatic modes (AUTO mode), but also special modes. The AUTO mode consists of [SM AUTO], [MM AUTO], [NZ AUTO], [DS AUTO] mode. Select the splice mode according to the fiber type.

If does not know the fiber type to splice, use the [AUTO SM/NZ/DS/BIF/MM] mode. The splicer analyzes the core profile for fiber, identifies the fiber such as SMF, NZDSF, MMF, BIF, etc. and selects the optimal splice mode automatically.

When using these AUTO mode, the automatic arc calibration function is enabled.

The special modes consist of [SM-SM] for SMF (ITU-T G652), [NZ-NZ] for NZDSF (ITU-T G655), [DS-DS] for DSF (ITU-T G653), [MM-MM] for MMF (ITU-T G651) and others.

Special modes requires executing [Arc Calibration] before splicing.

Automatic arc calibration function

This function is calibration the arc power in real time. When select the automatic mode, this function is enabled. Performing the [Arc calibration] function before splicing is not necessary.

It doesn't work in the special splice modes. When using these modes, performing [Arc calibration] before splicing is strongly recommended.



LCD monitor

This splicer is equipped with an LCD monitor. LCD monitos are manufactured at a high quality factory, but the pixels of the LCD monitor may appear black or may keep glowing red / blue / green.

Also, the monitor may be difficult to see depending on the angle.

These are not defects but are charctristic of LCD monitors.

Automatic wind-protector

The wind-protector operation during splicing can be selected by choosing the mode which wind-protector opens and closes.

Fast heating system

When a protection sleeve is loaded, the heater lid will close automatically and the shrink process will start automatically.

Field Assembly Optical connector splice

The connection of a field assembly optical connector by heating of a protection sleeve can be performed by this fusion splicer.

Moreover, versatility is improved by portability.

Corresponds to short length splice

In addition to the standard splice, splice of 5-mm interference also recently became possible.



A specialized tool is needed in order to perform 5-mm prepared.

Upgrade of software

The firmware of the splicer can upgrade to the latest version on the Internet using the "Data Connection" app.

Before getting the "Data Connection", refer to the section "Getting the Instruction Manual and the Utility Software" and get the Utility Software at first. Then install the "Data Connection" from the Utility Software.

Wireless data communication

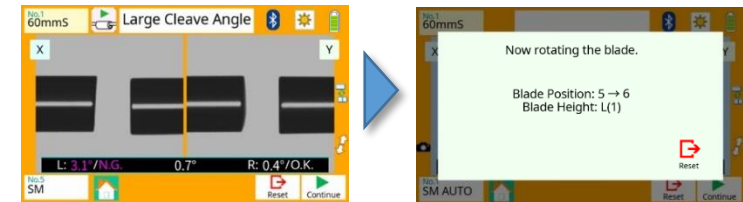
This fusion splicer features wireless data communication with the optical fiber cleaver (CT50) and ribbon fiber stripper (RS02/03) via Bluetooth. This capability allows the splicer to monitor and change various settings within the cleaver. The splicer can assess blade wear by analyzing the fiber image after cleaving, and then inform the operator with an on-screen alarm. Once a blade position has been expended, the splicer can then rotate the blade to the next available unconsumed position.

The communication parameters between splicer and cleaver, stripper are setup prior to shipment when these items are ordered together. Once AAA batteries are placed in the cleaver, or turn the power on the stripper, it is immediately paired to the splicer, and it is available to track blade life of cleaver and to change the heating mode of stripper depending on the splice mode automatically.

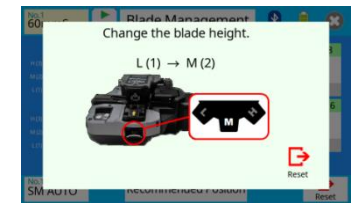


Convenient usage of wireless data communication function with cleaver CT50

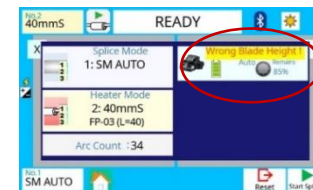
It is difficult for operators to track blade wear. However, it is easy to detect blade wear by correlating blade positions with cleaving errors given by the splicer. If the splicer detects that a blade position has reached its cleave limit, the splicer sends a command to the cleaver to rotate the blade to the next position. By using this function, the operator can maximize blade life like never before. The operator can now use a cleaver without worrying about tracking blade life, and can be confident they are making reliable splices.



The timing and judgment of blade rotation made by the splicer can be adjusted in the settings menu. A message to raise blade height can also be displayed when all 16 positions are expended. There is no need for the operator to make blade management decisions.



The cleaver records cleaves per position per height of the blade. Even if an operator changes the blade position by mistake, the splicer will display a message on-screen to alert the user to this mistake. This further relieves the operator of cleaver management issues.

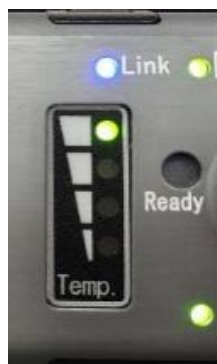
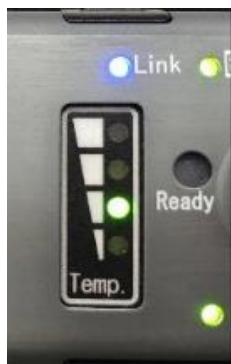


Convenient usage of wireless data communication function
with the ribbon stripper RS02/03

Using a fiber holder, a fiber with 200 to 400 umm coating diameter can be stripped by a rebbon fiber stripperr. This fusion splicer also performs wireless communication with RS03.

The ribbon fiber stripper settings are automatically changed according to the splice mode.

To make easy field work, operator can change the setting of the RS03 at any time with this fusion splicer.



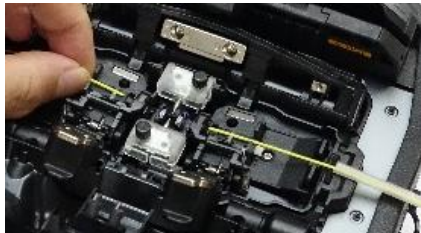
New sheath clamp

Easy sleeve positioning clamp

The sheath clamp is optimized for the 60mm length sleeve. In case of using 60mm length sleeve, it is easy to position the center of the protection sleeve over the splice point.

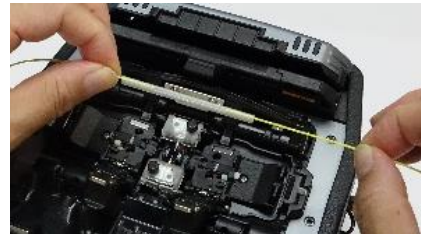
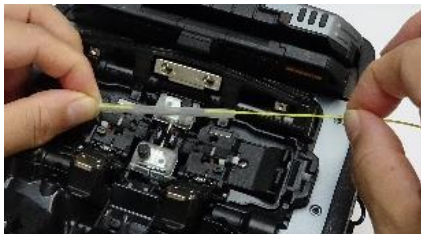
e.g. in case setting sleeve on the right

(1) Hold the both side of fibers

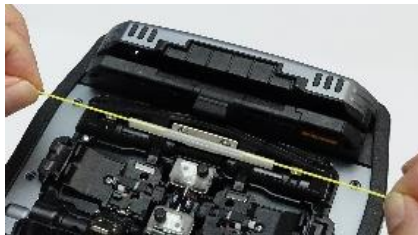


sleeve

(2) Slide the sleeve into left hand



(3) Slide left hand



(4) Ready to move fiber to heater

Fiber retention clamp

The "fiber retention clamp" enables to hold fibers even if sheath clamp open. It is useful for automatic wind protector function.

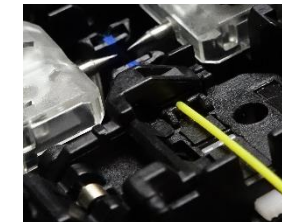
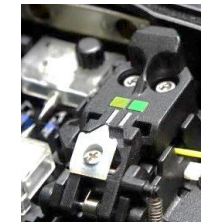
You can select the function ON/OFF by the yellow/green switch.

fiber retention clamp

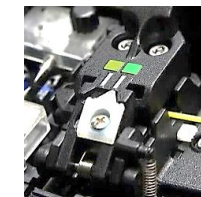


Sheath clamp (opened)

Yellow label → retain fiber

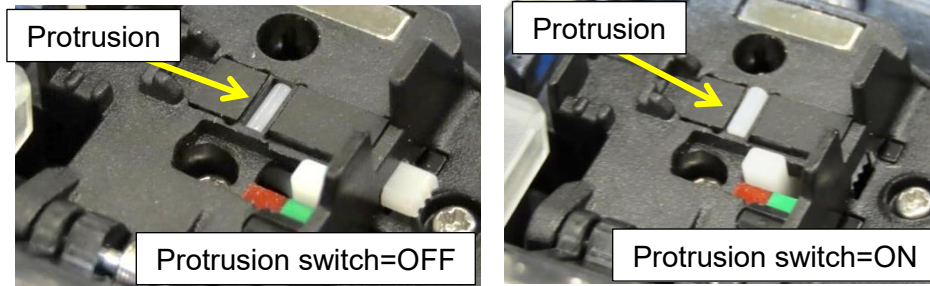


Green label → release fiber



Corresponds to loose tube fiber

The sheath clamp has the protrusion part inside to splice the loose buffer cable. There is the switch of the protrusion on the base of the sheath clamp. It can easily splice the loose buffer cable without changing the sheath clamp to others.



- Do not use the protrusion part when splicing the fiber except for the loose buffer cable. Because the protrusion part may damage the fiber except for the loose buffer cable.
- This protrusion part can be removed.

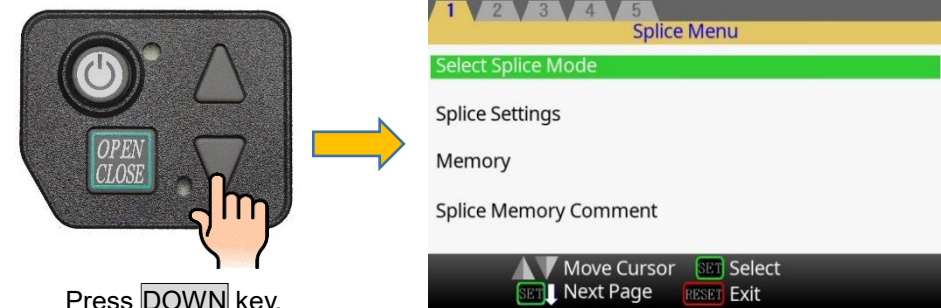
Touch Panel Display & New designed Menu Screen

The splicer has a touch panel display and new designed menu. The operator can select or change the setting immediately by pressing the icons in the monitor.



Sheet key & Classic Menu Screen

The splicer also has an external sheet key and a classic menu. Press the **DOWN** key in sheet key in [READY] screen. The previous setting menu appears. The operator can use the splicer like a previous splicer.



Classic Menu

Power supply connector for the device

*The USB connector of this splicer can supply the power to the device like a LED lamp or a cell phone *1*



LED lamp



Cell phone

Connector type	Current capacity
USB 2.0 Type A	Max 0.5A

** It does not guarantee charging to all smartphones.*

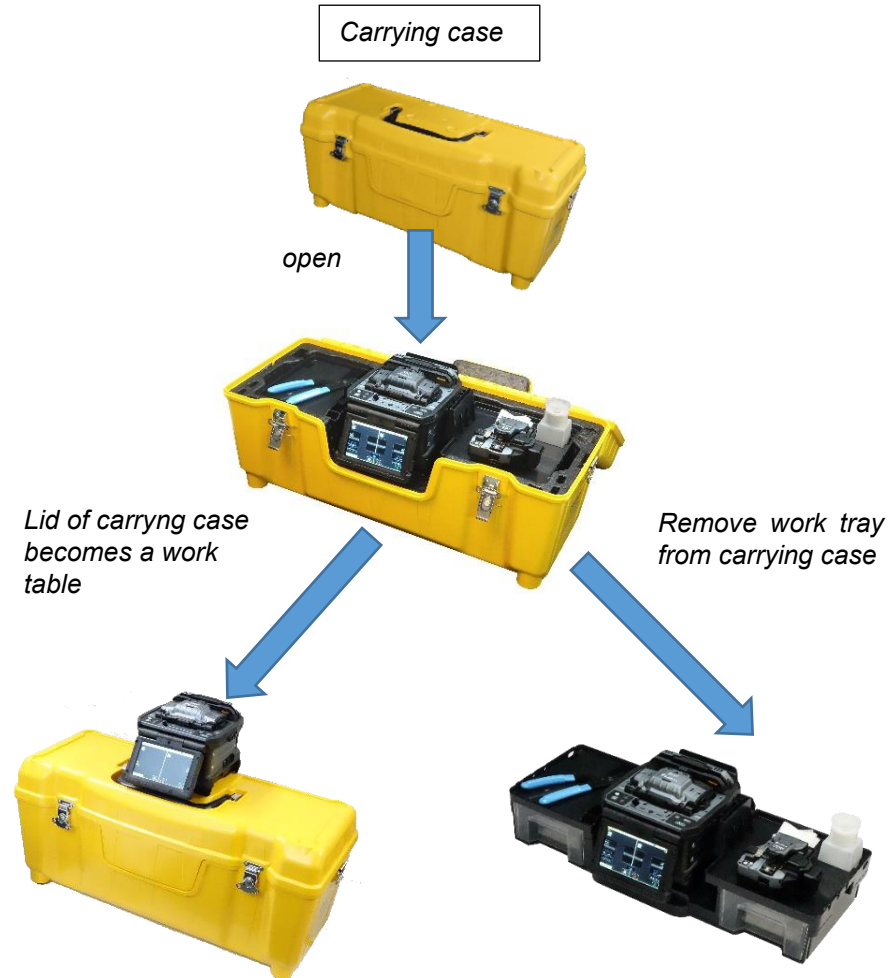
** If use it by a battery pack, a number of splicing and heating will be reduced. Also, if remain of a battery decrease, the power supply to external devices will become unstable.*

** Connecting a device outside the specifications may affect the splicing behavior. When the behavior of the fusion splicer is unstable, remove the device.*

Newly designed carrying case and work tray

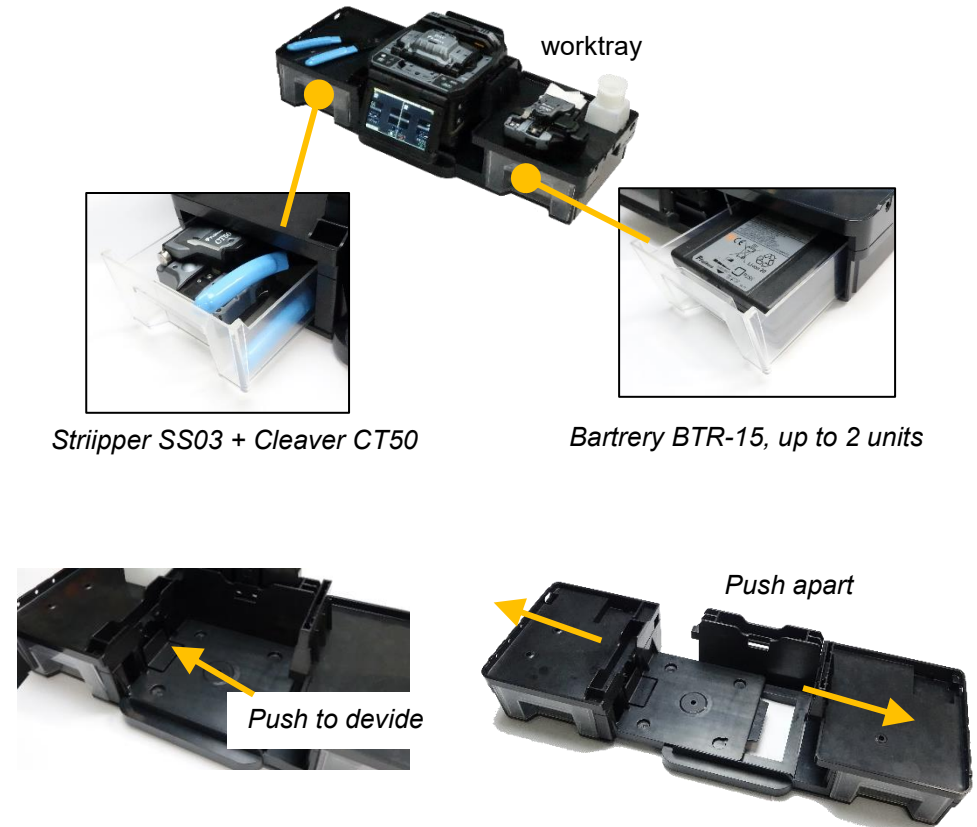
Carrying case

The new carrying case has a large space inside, allowing you to store all the tools you need. The work tray attached to the carrying case can be taken out. The work tray can be fixed on a tripod stand to improve work efficiency.



Work tray

The work tray has two drawers for storing the tools without dust. The drawers are just the right size for tools or battery pack. Also, the work tray can be divided into two, so you can use it properly according to the space.



Protection sleeve stand

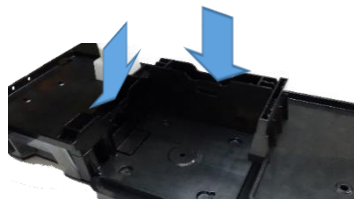
The work tray has a stand to place the protection sleeve after heating process.
Protection sleeve stand can be detached.



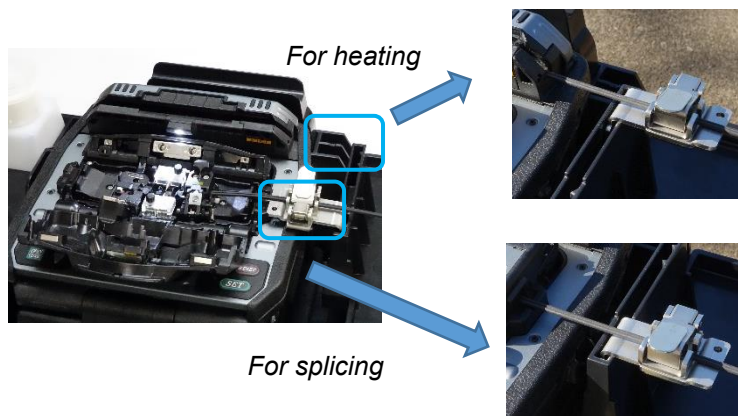
Detouchable sleeve stand

Configuration 2

Configuration 1

Drop cable holding stand

The work tray has a stand for placing the drop cable clamp (CLAMP-12DC).
The stand has 2 positons. One is the position during splicing. Another is the positon during heating. It can help user operation.



Description of product

Components of splicer

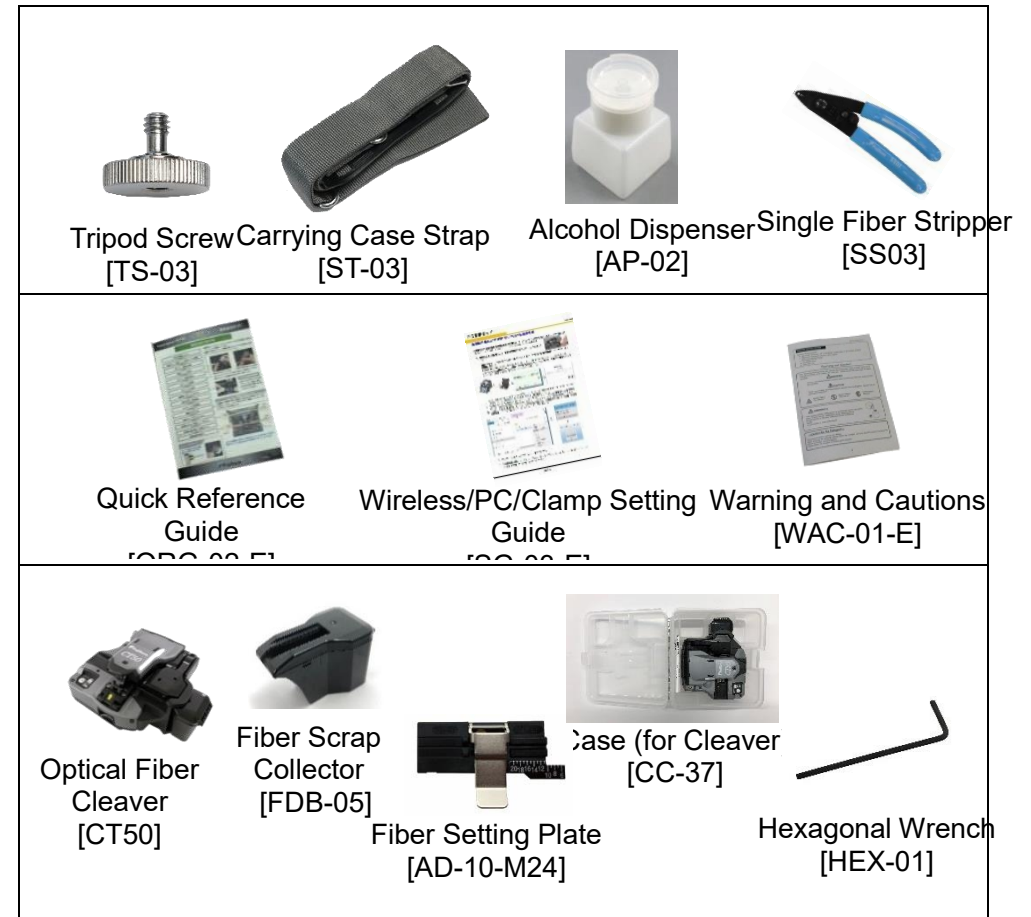
The standard package of the splicer is the following.

Check the equipment items mentioned of list.




Standard package list (1 of 2)



Standard package list (2 of 2)

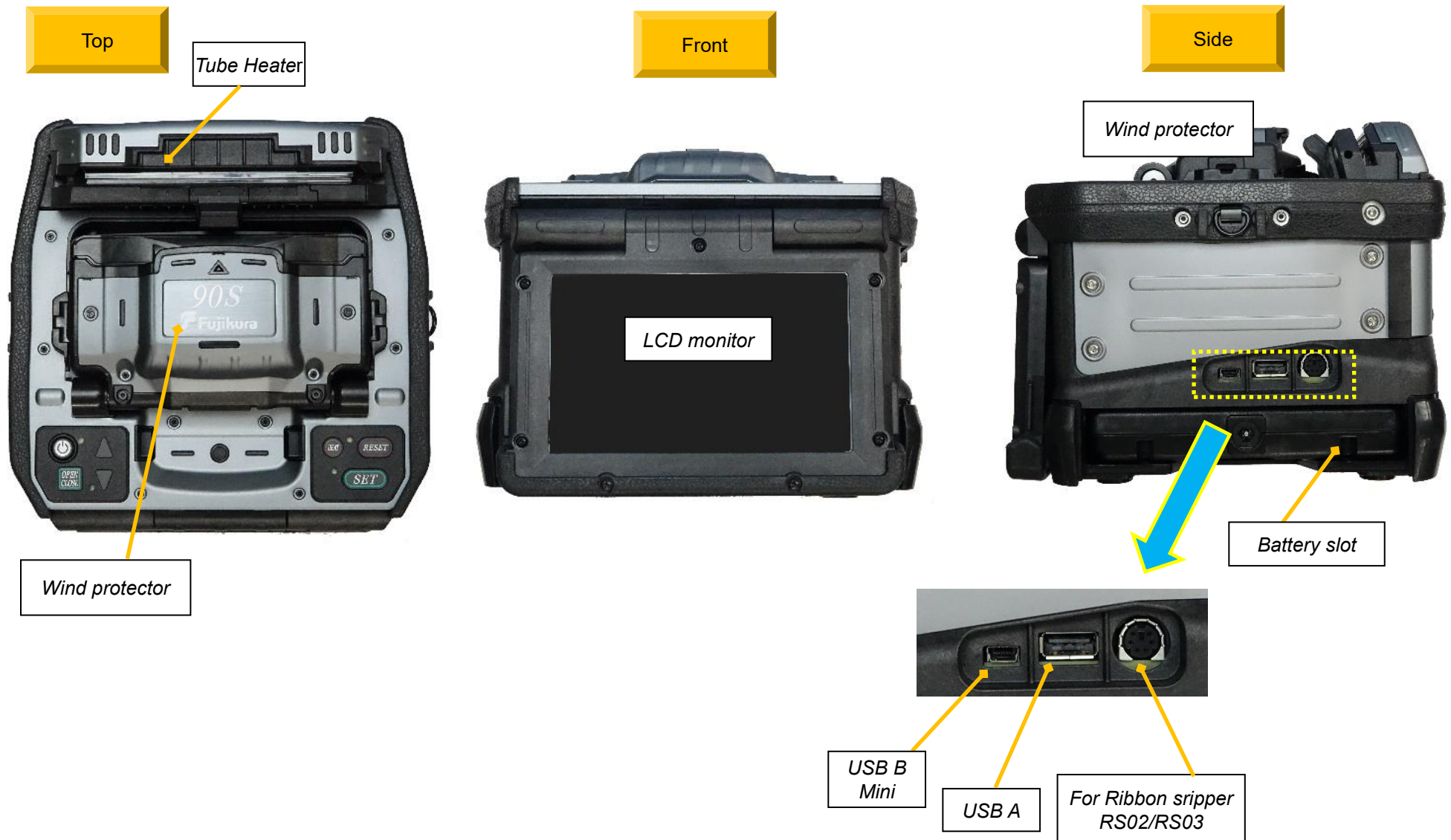


Other necessary items for splicing operation

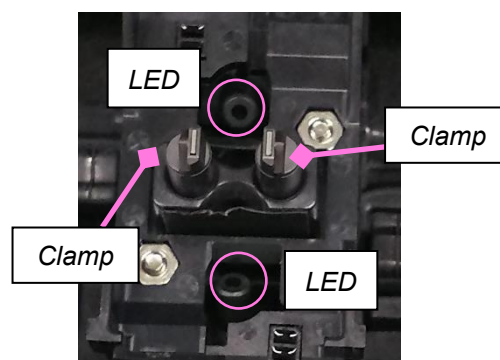
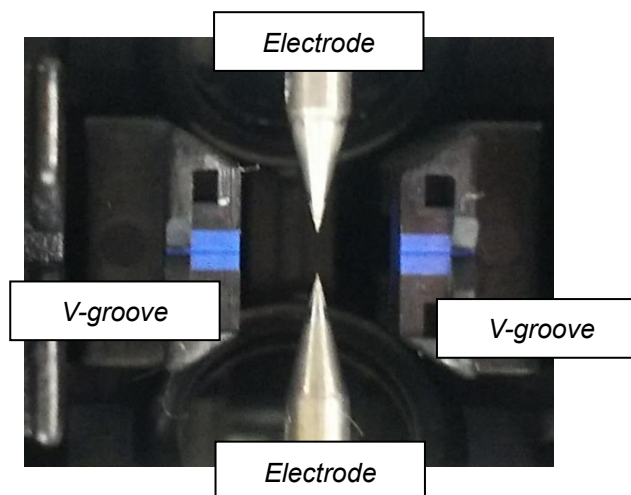
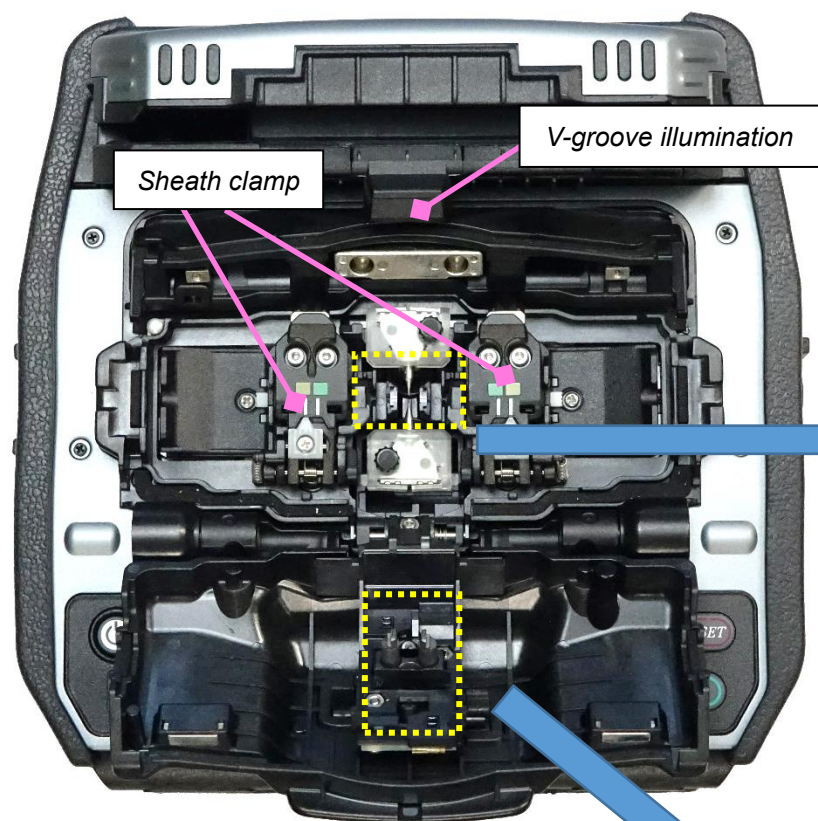
Fiber coating diameter	UV coating 250μm	Nylon coating 900μm
Fiber holder (Option)	<p>[FH-70-250]</p>  <p>* Old model [FH-60-250] can also be used.</p>	<p>[FH-70-900]</p>  <p>* Old model [FH-60-900] can also be used.</p>
Fiber protection sleeves (option)	<p><u>Standard sleeve</u> 60mm length [FP-03] 40mm length [FP-03 (L = 40)]</p> 	
	<p><u>Micro sleeve</u> 15mm length [FPS01-400-15]</p>	<p><u>Micro sleeve</u> 20mm length [FPS01-900-20]</p>

Description of Splicer

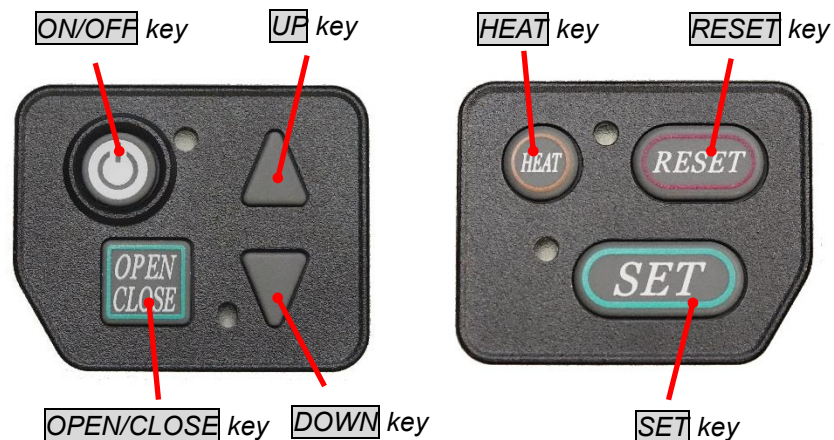
Structure



Inside of
Wind protector



Operation of sheet key



Key name	Key function
OPEN/CLOSE key	To open and close the wind-protector.
ON/OFF key	To turn ON/OFF the power.
HEAT key	Starts the tube heater heating process. If the HEAT key is pressed once during heating, LED will start blinking. Heating operation is stopped if the HEAT key is pressed again when the LED is blinking.
RESET key	Depending on the menu status, "RESET" or "EXIT." [RESET] Quits any state except the tube heater heating process. After pressing this key, the splicer will return to the ready state with a beep sound. [EXIT] Returns to the previous function.
SET key	Starts the splicing operation, or progresses through a PAUSE state. Moves the cursor direction of arrow in the menu.
UP/DOWN arrow keys	These arrows are used to move the cursor for navigating the menu, or to select alpha numeric text. They also allow operation of the motors "Backward" and "Forward" during manual motor control.

Basic Operation

Splicing work preparation

Multiple work environment configurations can be created using the carrying case and work table.

Use of work table



In the case of use only with splicer

Use in a location which does not have vibration, a shock, etc. at the time of performing fusion splice work. In work [at the unstable place where a main part is shaky], the possibility of damage from a fall becomes high.



- Arrange safety belts/devices for equipments and accessories on the tray before use. Straps for small accessories may be recommended. In case the equipment/accessories were dropped to a person under operation area, this would result in serious injury or fatal accident.
- Do not operate the splicer in an unstable or unbalanced position. The splicer may shift or lose balance, causing the unit to fall. Possible personal injury or equipment damage may result.
- Do not operate splicer near hot objects, in hot temperature environments, in dusty / humid atmospheres or when water-condensation is present on the splicer.

Power supply

The power supply of a splicer can be operated with AC power supply and a battery.

Insert or detaching power unit

Inserting power supply unit

Insert power unit into the power unit dock until it clicks into place.



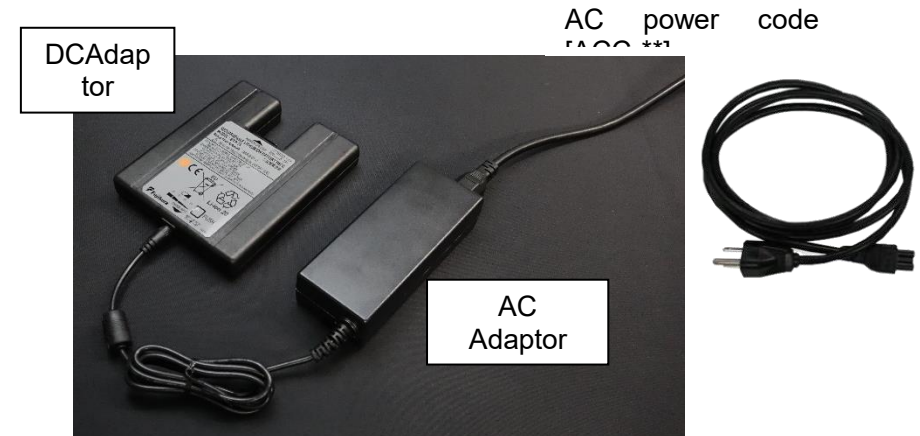
Detaching power unit supply

Turn off the splicer before removing the power unit.
Hook a finger on the bottom of the power supply unit and remove the power supply unit from the splicer body.



AC Operation

1. When operating the splicer with AC power, use the AC adapter (ADC-20), DC adapter (DCA-03) and AC power cord (ACC-xx).
2. Insert the DC adapter into the splicer body.
3. Insert the AC power cord into the AC inlet of the AC adapter.
4. Insert the supply terminal of the AC adapter into the DC inlet of the DC adapter.



AC generators commonly produce abnormally high AC output voltage.



Measure the output AC voltage with a circuit tester before connecting the AC power cord. Such abnormally high voltage or frequency from a generator may cause fuming, electric shock or equipment damage and may result in personal injury, death or fire.



Check the AC voltage before inserting the power cord to generator.

DC operation with external battery

1. When operating the splicer with DC power, use the DC adapter (DCA-03) and DC cord (DCC-20 or DCC-21).
2. Insert the DC adapter into the splicer body.
3. Set the terminal of the DC cord with the external battery.
4. Insert the DC cord into the DC inlet of the DC adapter



- Do not supply DC16V or greater, the AC adapter will be damaged immediately.
- In case DC16V or greater is supplied, or polarity (positive / negative) is wrong, The AC adapter protection circuit shuts down the DC output and DC Warning LED [HIGH ~ INPUT] turns on (red color)

Battery Operation

Please use the supplied battery pack BTR-15.

Before using the battery

Check the remaining battery capacity. If it is 20% or less before operation, splicer can only work a few times.

Keep below practices to prevent battery damage.







- The capacity of the battery gradually decreases as nature even if it is not used. If the battery discharges completely, the battery may no longer be able to be re-charged. Charge the battery before long time storage and after every use.
- If a battery is to be stored for a long time, periodical charge of every six months is recommended regardless of battery charge level of the battery.
- Follow below conditions

Operation	: -10 degree C ~ 50 degree C
Charging	: 0 degree C ~ 40 degree C
Storage	: -20 degree C ~ 30 degree C

How to check remaining battery capacity by the splicer display

If splicer is already equipped with the battery, turn splicer ON. Power source of "Battery" is automatically identified and the remaining battery capacity is displayed on the "READY" screen.

100~75%	75~50%	50~25%	Less than 25%
			

Remaining battery capacity



Remaining battery capacity

The battery charge indicator on a screen is an approximate estimation of battery charge, and is affected by environmental conditions and battery quality.

If splicing on battery power, we recommend fully charging the battery before operating.








➤ To provide the maximum number of fiber splices and heating cycles, please use the power-saving mode.

How to check remaining battery capacity by the battery pack

If battery is not inserting in the splicer, simply press the battery check push button on the battery pack. The remaining battery capacity is indicated on the LED indicator.



Remaining battery capacity indicator	Remaining battery	
	4 LED	95~100%
	3 LED	65~95%
	2 LED	40~65%
	1 LED	15~40%
	1 LED Flashing	Less than 15%

How to charge the battery

Plug the AC power cord (ACC-xx) into the inlet of the AC adapter (ADC-20). Plug the supply terminal of AC adapter into the inlet of the battery pack (BTR-15). During charging, do not place the battery on top of AC adapter or vice-versa. Battery charge is completed in approximately five hours. After completion, disconnect the supply terminal of AC adapter and AC power cord battery charge cord.



The battery can be charge while splicer is in use. Installed BTR-15 into power dock and connect to ADC-20 AC adapter/ battery charger.



➤ The battery pack can be charged also with AC and DC.



- When connecting the cords to AC adaptor, plug DC or AC cord before battery charge cord. When disconnecting them, unplug the battery charge cord before DC or AC cord.
- Do not place battery on top of AC adapter or vice-versa.
- The battery can be charge while splicer is in use. Installed BTR-09 into power dock and connect to ADC-18 AC adapter/ battery charger.
- CHARGE LED turns off when battery charge is completed. If CHARGE LED flashes, replace the battery with a new one.
- If battery charge does not complete in five hours or CHARGE LED does not turn ON the battery, AC adapter or both need replacement. Ask your service agent for further instruction.

Turning Splicer ON/OFF

Turning Splicer ON

Press **ON/OFF** key and hold it until the green LED turns on. The following warning screen is displayed.



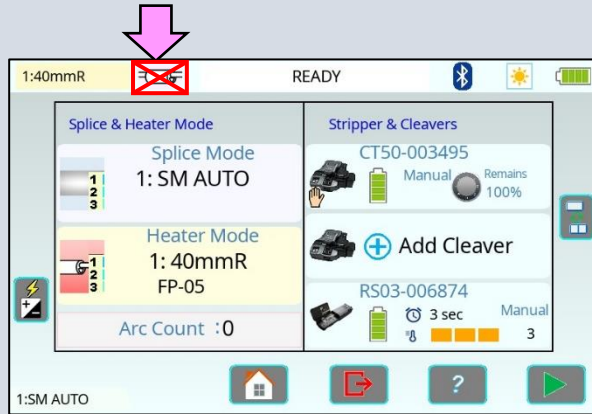
The READY screen is displayed after all the motors are reset to their initial positions when you select [Agree]. The power source type is then identified. If the battery is used, the remaining battery capacity is displayed.

Turning Splicer OFF

Press **ON/OFF** key and hold until the red LED turns off and then detach.



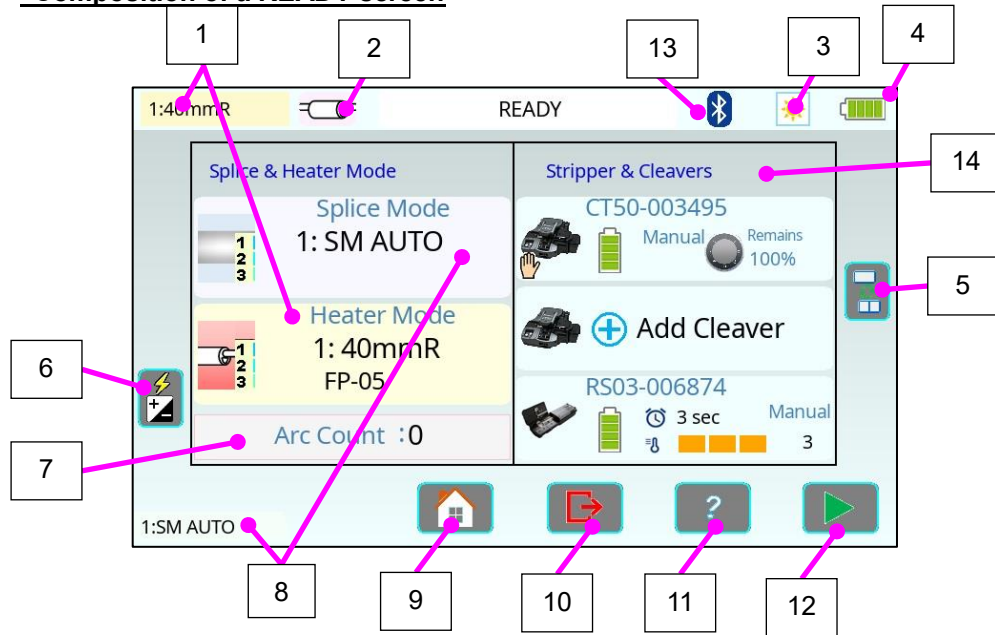
- **Heater Calibration function**
- When you kept the splicer with powered-off for 1 week or longer, the Heater Calibration function automatically starts after booting up.
- During this process, "X" mark appears on the heater icon as below.
- Wait until the calibration finishes and the "X" mark disappears.



- The license message is displayed twice a month when the splicer is turn on.
- There is a possibility that a language is fixed depending on the country of shipment.

Splicer settings check / READY screen

Composition of a READY screen

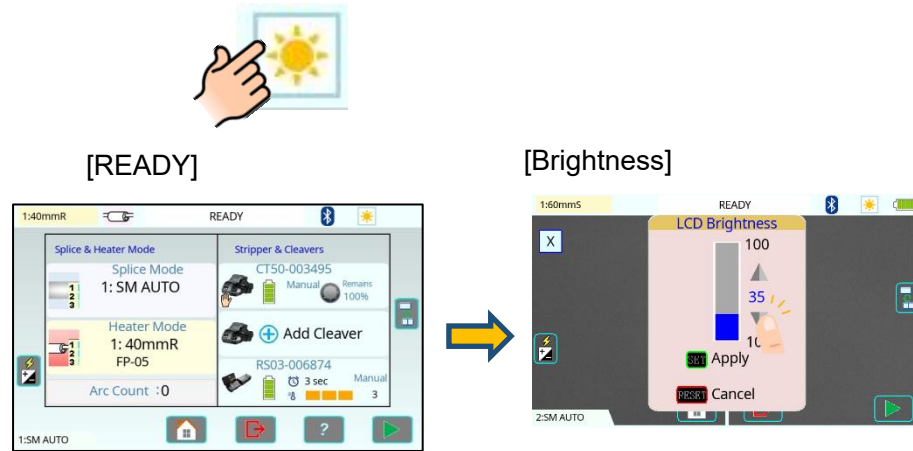


No.	Icon name	Key Function
6	Arc Calibration	After selection, "Arc Calibration" function in [Maintenance] can be selected directly.
7	Arc Count	The number of the arc discharging in [Maintenance] is displayed.
8	Splice Mode	Current "Splice Mode" is displayed. After selection the [Splice Mode] screen appears immediately.
9	Main Menu	After selection the [Main Menu] screen appears.
10	Reset	This is RESET key. The function is as same as RESET key in the sheet key
11	Help	This is HELP icon. This function shows information to you.
12	Start	This is SET key. The function is as same as SET key in the sheet key.
13	Bluetooth	After selection the [Bluetooth] screen appears.
14	Stripper & Cleaves	This area shows the status of the paring tools. Press Cleaver icon. Enter to [Blade Management] screen appears. And this icon shows the status of the cleaver. Stripper icon doesn't press. It shows the status.

No.	Icon name	Key Function
1	Heater Mode	Current "Heater mode" is displayed. After selection the [Heater Mode] screen appears.
2	Heat	This is HEAT key in the touch panel. After selection in [READY] screen the heater operation starts.
3	LCD Brightness	After selection the [LCD Brightness] window appears.
4	Battery Indicator	This icon shows the battery capacity.
5	Changing screen	Press this icon, the screen in [READY] state is changed [X/Y] camera and Status screen.

LCD Brightness Adjustment

Monitor visibility changes depending on environmental conditions. To change monitor brightness, press the light icon at the upper right side on READY screen. This causes the LCD Brightness window to appear. Press the **Up/Down** Arrow key to change value and press the **SET** key to set the value.

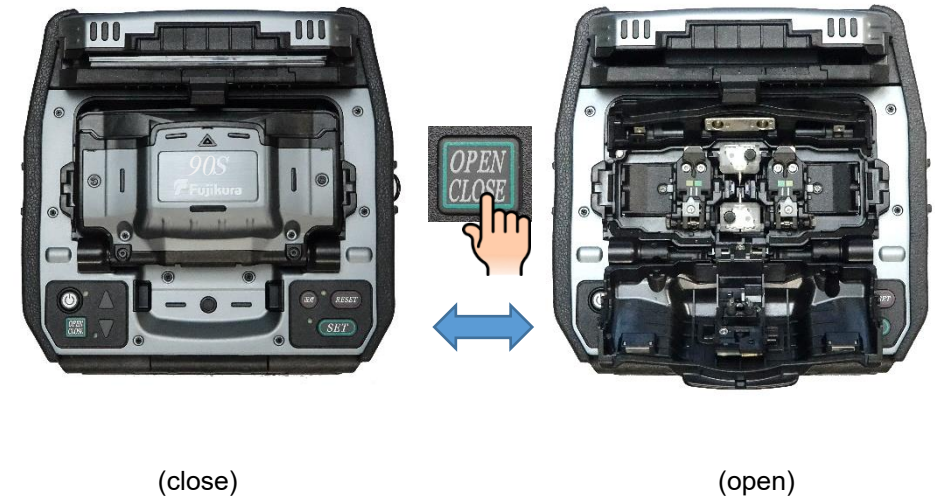


Wireless communication with tools

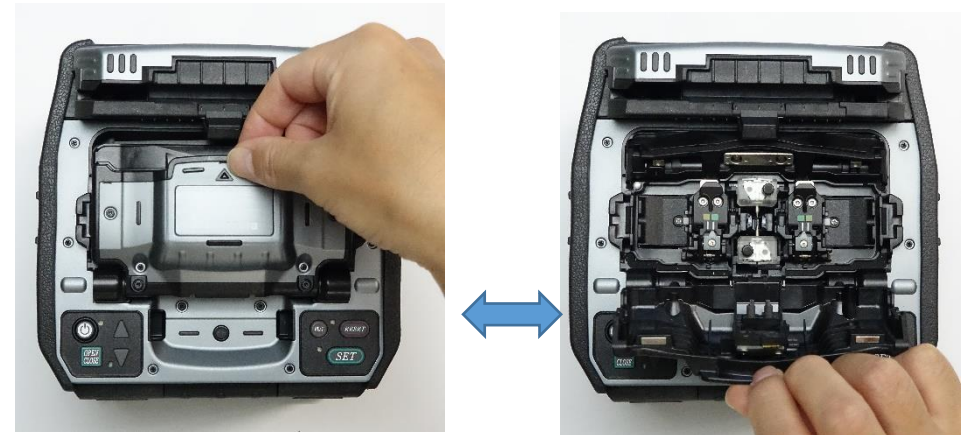
When there are tools have already been set to perform the wireless communications near the splicer, the splicer and tools start the wireless communication automatically. After connecting, the status icons are displayed in LCD monitor.

Wind-protector automatic opening-and-closing function

If the **OPEN/CLOSE** key is pressed on a READY screen, the wind-protector will open or close.



In addition, you can open/close it by manually.



Operation mode

Selection of the operation mode

Each operation mode consists of parameters shown below so that operation of the equipment before and after of work can be set up.

The extraction work of a fiber can be smoothly done by working by changing the operation mode according to the contents of work.

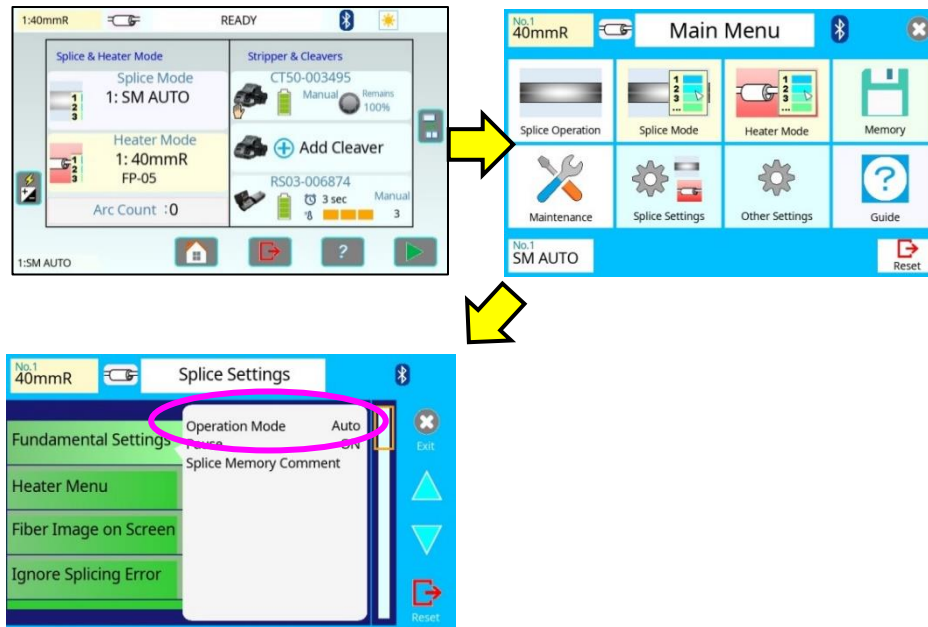
Parameter	Description
Operation mode	
Auto-LR	<p><i>Before splicing:</i> Start splicing automatically after set fibers on left and right side.</p> <p><i>After splicing:</i> Proof test, wind-protector opening, and sheath clamp opening are automatically performed.</p>
Auto	<p><i>Before splicing:</i> Start splicing automatically after set fibers on left and right side.</p> <p><i>After splicing:</i> wind-protector opening and a proof test are simultaneously done. Perform sheath clamp opening manually.</p>
Norm-LR	<p><i>Before splicing:</i> Start splicing automatically after set fibers on left and right side.</p> <p><i>After splicing:</i> If press SET key, proof test, wind-protector opening and sheath clamp opening are simultaneously done.</p>
Normal	<p><i>Before splicing:</i> Start splicing automatically after set fibers on left and right side.</p> <p><i>After splicing:</i> If press SET key, proof test and wind-protector opening are simultaneously done. Perform sheath clamp opening manually.</p>
manual	<p><i>Before splicing:</i> If press SET key, start splicing.</p> <p><i>After splicing:</i> If press SET key, proof test and wind-protector opening are simultaneously done. Perform sheath clamp opening manually.</p>

A continuation of the operation mode parameter

Parameter	Description
Operation mode	
Customized	Operation mode
	Sheath clamp auto release
	Setup of "ON" or "OFF" can be performed.
	Auto start trigger
	Setup of "OFF", "Fiber set" or "Cover close" can be performed.
	Cover close reaction time
	Time from setting fibers in the splicer until closing wind-protector can be set up.
	Wind-protector motion (At the time of customized was selected)
	Power on
	Setup of wind-protector motion at the time of power on "open" or "close".
	Reset
	Setup of wind-protector motion at the time of Reset is pressed "open" or "close".
	Finish
	Setup of wind-protector motion after the end of splicing "open" or "close".
	Error
	Setup of wind-protector motion at the time of error "open" or "close".

How to change the operation mode

Touch the **[Home]** icon on **[Ready]** screen, a **[Main menu]** screen will be displayed. Touch the **[Splice setting]** icon to enter the **[Splice setting]** screen and touch the "Operation mode" to select the favorite operation.



Select of the Splice mode

The optimal splice setting for a specific fiber combination consists of the splicing parameters listed below. In other words, the optimal splicing parameters depend on the fiber combinations, and are different depending on the fiber used.

- Parameters for controlling arc discharge.
- Parameters for calculating estimated splice loss.
- Parameters for controlling fiber alignment and splicing procedures.
- Threshold for error messages.

A series of optimal splice parameters for major fiber combinations are already stored in the splicer. These parameters are stored in the database area and can be copied to the user-programmable area. These splice parameters can be edited for a specific fiber combination.

How to select the "Splice mode"



- **[AUTO SM/NZ/DS/BIF/MM]**
Use this mode if the fiber type is not identified.
- **[** AUTO]**
Use this mode if the fiber type is identified.
- **[** FAST]**
Use this mode if the fiber type is identified and prefer quick splice with high yield to consistent splice loss.
- **[SM-SM] and others**
Use this mode for splicing special fibers.
This mode enables to set specific parameters for each splicing.
Execute **[Arc Calibration]** before using this mode.

How to check the splice mode

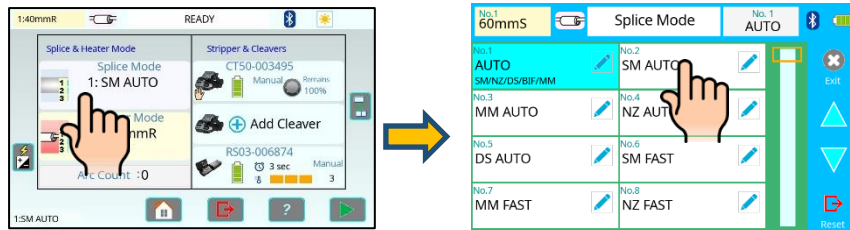
The current splice mode is displayed in the monitor as shown below



How to change the splice mode

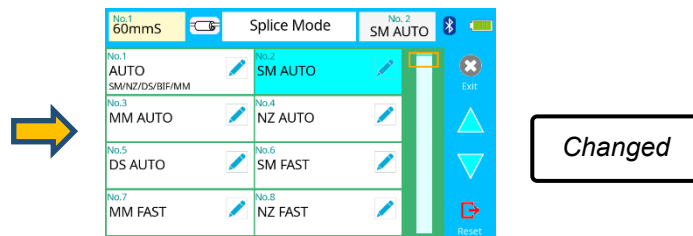
Select an appropriate splice mode for type of fiber to be spliced.

1. Select **Splice Mode** icon at [READY] state. The [Splice Mode] screen appears.
2. Select the suitable splice mode in the list.
3. The color of the selected icon change to blue.



Select "Splice Mode"

Touch the mode to be selected



Select of the Heater mode

Each tube-heating mode is optimized for a type of Fujikura protection sleeve. These modes can be found in database area for reference. Copy the appropriate one and paste it to the user-programmable area. The operator can edit the user-programmable modes.

The parameter in Heater mode becomes an addition and change with upgrade of software.

DataBase

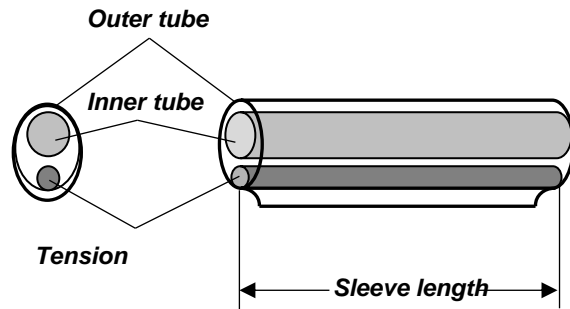
Parameter	Description
60mmS FP-03	For standard 60mm protection sleeve, Such as Fujikura FP-03 or FP-03M protection sleeves.
40mmS FP-03(L=40)	For standard 60mm protection sleeve, Such as Fujikura FP-03 or FP-03M protection sleeves. Note : Cleave length 8mm.
15mmS FPS01-400-15	400 or less um of diameters of coating. Splice of the interference length of 5 mm or less.
mmS FPS01-400-	400 or less um of diameters of coating. In addition, there are 20, 25, and 34 or 40 mm length.
20mmS FPS01-900-20	900 or less um of diameters of coating. Splice of the interference length of 6 mm or less
mmS FPS01-900-	900 or less um of diameters of coating. In addition, there are 25, and 34 or 40 mm length.
60mmS FPS01-DC-60	For Splice of a drops cable.
FUSE2/3 ST-FC FUSE900 SC-LC- ST-FC	For Fuse connect splice.
FUSE2/3 SC-LC	
40mmR FP-05	For standard 40mm protection sleeve, Such as Fujikura FP-05 protection sleeves.
40mmR FP-04T	For standard 40mm protection sleeve, Such as Fujikura FP-04T protection sleeves.
28mmR FPS08-28	For standard 28mm protection sleeve, Such as Fujikura FPS08-28 protection sleeves.
30mmR FPS04-30	For standard 30mm protection sleeve, Such as Fujikura FPS04-30 protection sleeves.

Parameter	Description
mmS-L FPS01-900-	900 or less μm of diameters of coating with Covering material of Hytrel. In addition, there are 25, and 34 mm length.
60mmSS SLIM 60	For slim type 60mm protection sleeve.
40mmSS SLIM 40	For slim type 40mm protection sleeve.

The dimensions of the protection sleeve after heat shrink

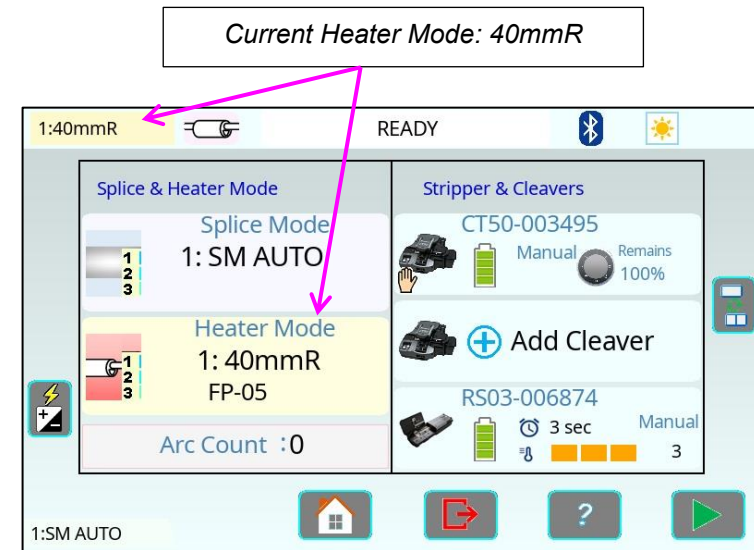
Form	Tension member	Sleeve length	Prepare fiber length	Diameter of an adaptation optical fiber	Diameter of a result
FP-03	SUS	60mm	16mm or less	250~900 μm	3.1mm
FP-03(40mm)	SUS	40mm	10mm or less	250~900 μm	3.1mm
FP-04T	Glass Ceramic	40mm	10mm or less	250~900 μm	4.0mm
FPS01-400-15	SUS	15mm	5mm or less	~400 μm	1.5mm
FPS01-900-20	SUS	20mm	6mm or less	~900 μm	2.3mm

* The dimensions of the protection sleeve after shrink are varied depending on the diameter of the fiber.

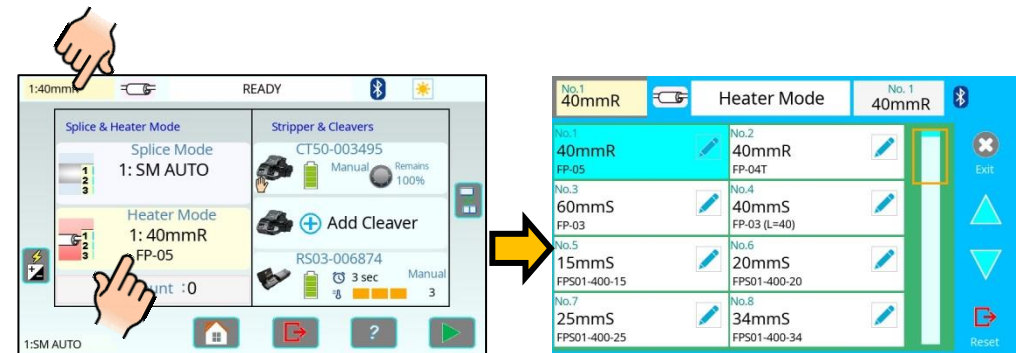


How to check the current heater mode

The current heater mode is displayed on the [READY] screen.



If you press these **Heater Mode** icons, enter to [Heater Mode] screen directly.



- When using a protection sleeve which is not made by Fujikura, please set parameters based on the specific sleeve.
- When the sleeve of another company is used, the durability of a protection point cannot be warranted.

Preparation of fiber

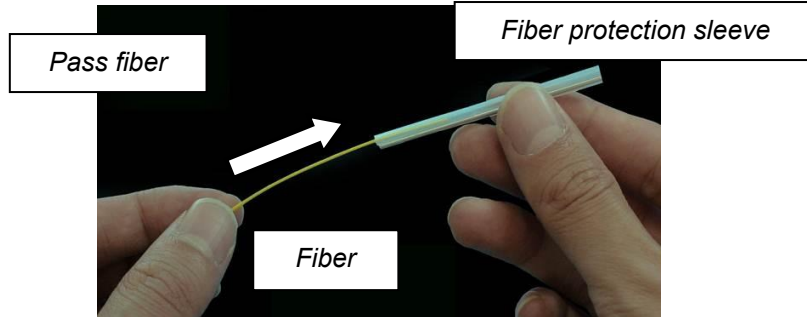
Cleaning optical fiber

Clean optical fiber with alcohol-moistened gauze or lint-free tissue approximately 500mm from the tip. Dust and particulates from the fiber coating can enter inside the protection sleeve and might result in a future fiber break or transmission attenuation.

Placing protection sleeve over fiber

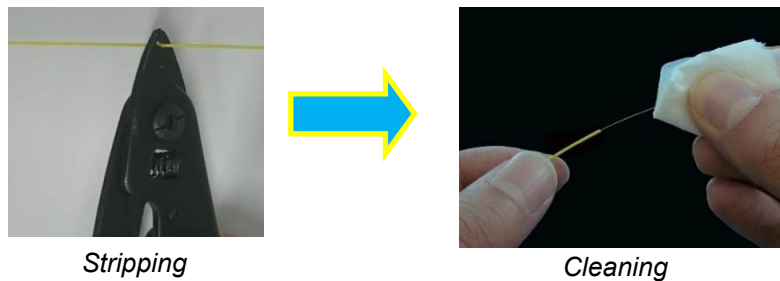
Place the protection sleeve over the Right side fiber.

- Since a left hand serves as a standard at the time of fiber conveyance, the method of inserting a sleeve in a right-hand side fiber is recommended.



Fiber coating stripping and cleaning of bare fiber

Strip the outer coating 30 to 40 mm from fiber tip with a stripping tool. Clean the fiber with alcohol moistened gauze or lint-free tissue thoroughly. Frequently replace cleaning gauze to insure splice quality.



- Use a high quality alcohol, greater than 99% purity.

Fiber Cleaving when using a sheath clamp

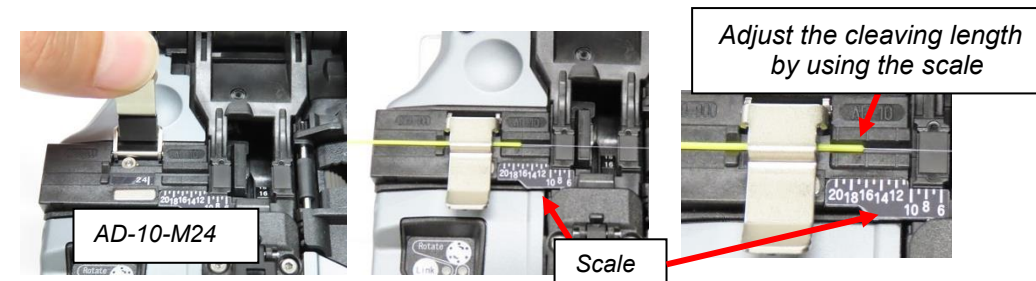
1. Take out the CT50 from the carrying case and release the lock from the lever.



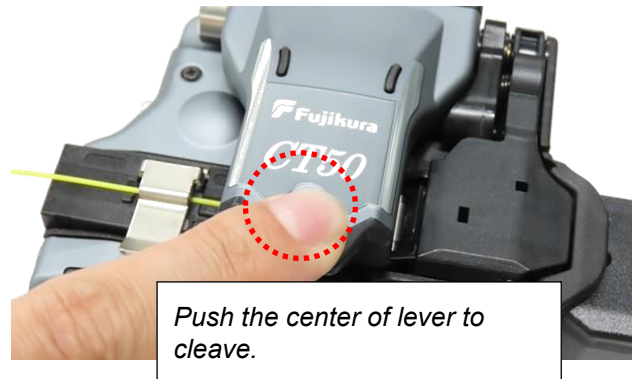
2. Lift the lever until it stops. The blade is automatically set at the start position and is now ready to cleave the fiber.



3. Open the lid of the fiber plate AD-10-M24. Set the cleaned fiber onto the fiber plate. Check and adjust the fiber length using the scale on the fiber plate.



4. Close and gently push down on the Lever until it stops. The blade automatically moves and cleaves the fiber. Lift the Lever until it stops and remove the fiber from the cleaver. Be careful not to allow the fiber to contact anything, as this can contaminate the end-face of the fiber.

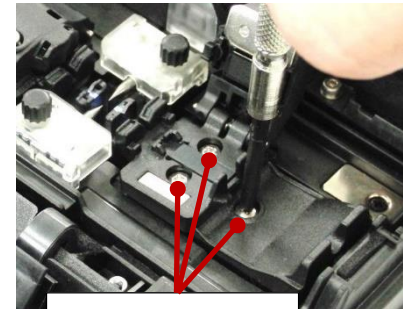


- Do not put fingers in the cleaving area as personal injury may result.

Fiber Cleaving when using a Fiber Holder

Set the Fiber holder set Plate(SP-03)

1. Loosen the 3 screws and remove each sheath clamp from the splicer.



2. Attach the Fiber holder set plate (SP-03) on the base and tighten 3 screws.
3. Set the fiber onto the fiber holder and close the lid of the fiber holder. Methods of setting the fiber are as follows.



Set the fiber onto fiber holder

1. Open the lid of a fiber holder and then set the fiber onto the fiber holder.
2. Adjust the position of fiber and then close the lid of fiber holder. The position of the fiber is dependent on the fiber holder as shown below.

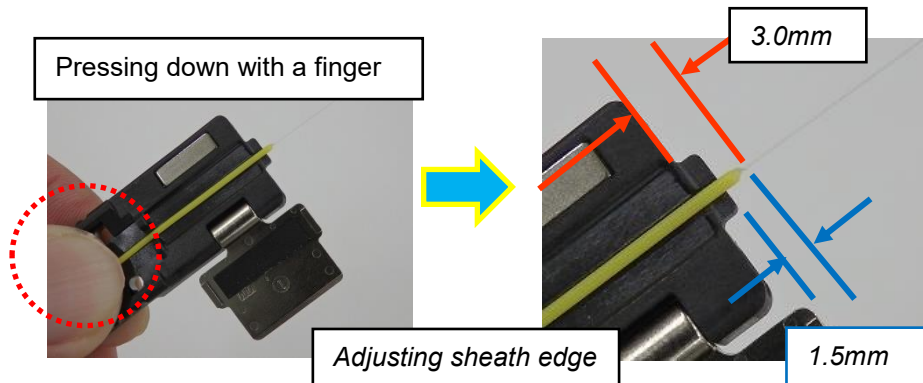


- Select a suitable fiber holder based on the fiber coating diameter.
- If fiber coating has some memory curl, place fiber so that the curve of memory is turned downwards.
- Close the lid of a fiber holder while pressing down with a finger on the coating (refer to figure below).

In case of Fiber holder "FH-70 series"

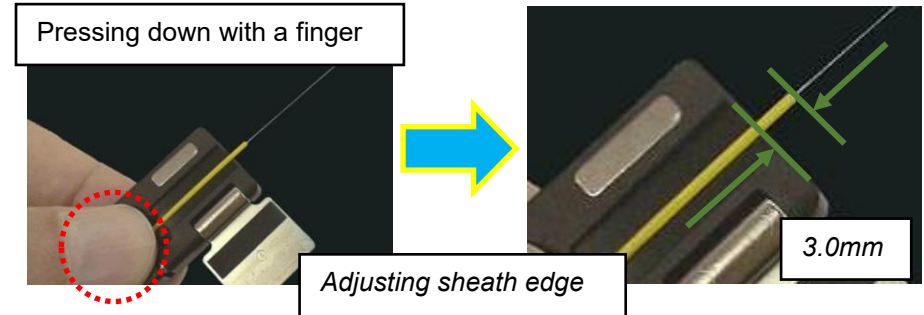
Use either the edge, or the extruded fiber support of the fiber holder as the reference point. Adjust the position of the sheath edge as follows:

- If the reference point is set as the edge of the fiber holder, set the fiber onto the fiber holder with the fiber sheath 3.0mm from the edge of the fiber holder.
- If the reference point is set as the extruded fiber support of the fiber holder, set the fiber onto the fiber holder with the fiber sheath 1.5mm from the extruded surface of the fiber holder.



In case of Fiber holder "FH-60 series"

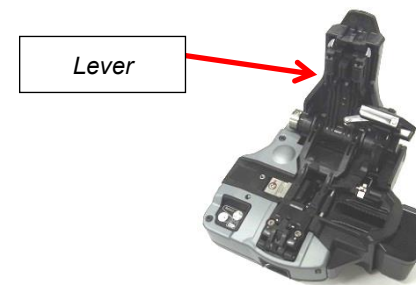
Set the fiber onto the fiber holder with the fiber sheath 3.0mm from the edge of the fiber holder.



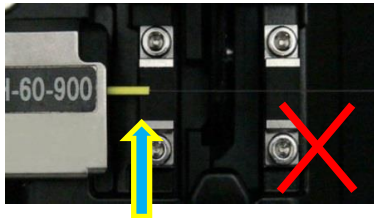
- Select a suitable fiber holder based on the fiber coating diameter.
- If fiber coating has some memory curl, place fiber so that the curl is pointed downwards.
- Close the lid of a fiber holder while pressing down with a finger on the coating (refer to figure below).

Fiber Cleaving

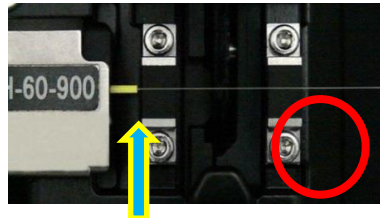
1. Lift the Lever until it stops. The blade is automatically set at the start position and is now ready to cleave the fiber.



2. Push the fiber holder towards. Check the position of the fiber coating. If it sits on the rubber pad, adjust the fiber position in the Fiber Holder until it doesn't sit on the pad.



Not Good



Good



Confirm the sheath of fiber is not on pad when fiber holder is used.

3. Close and gently push down on the Lever until it stops. The blade automatically moves and the fiber is cleaved. The scrap the cleaved fiber scrap is automatically deposited into the Fiber Scrap Box [FDB-05]. Properly dispose of the scrap by emptying the Fiber Scrap Box at an appropriate time.



4. Lift the Lever until it stops and remove the fiber from the cleaver. Be careful not to contaminate the end-face of the fiber by touching anything with it.

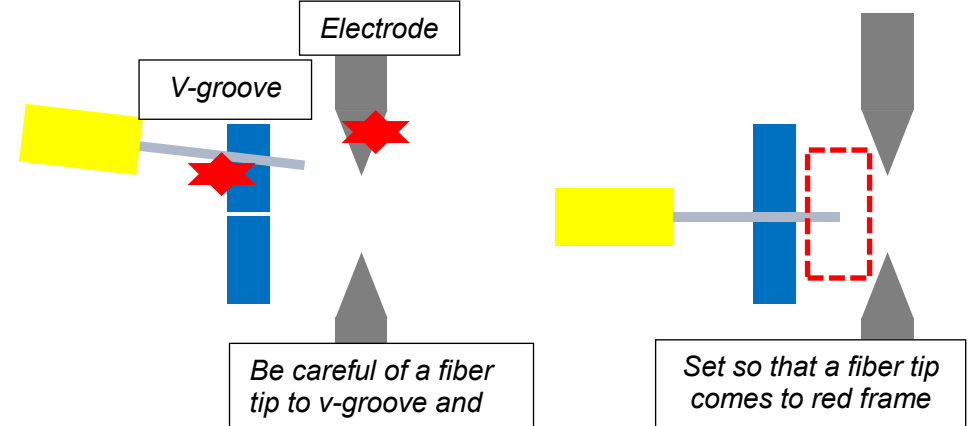
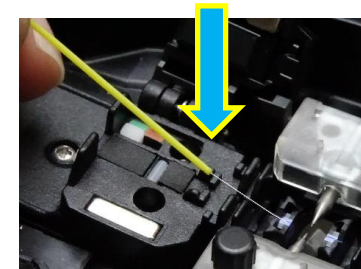


➤ Do not open the lid of the fiber holder before splicing. If it is opened, cleave length can be changed.

Loading fiber to splicer

Using sheath clamp

1. Open the wind-protector and sheath clamps.
2. Place prepared fiber onto v-groove so that the fiber tip is located between the v-groove edge and tip of electrode.



➤ Be careful not to contact the prepared fiber tips into anything to maintain fiber end-face quality.

3. Hold fiber with fingers and close sheath clamp so that the fiber does not move. Make sure the fiber is placed in the bottom of the v-grooves. If fiber is not placed properly, reload fiber.

The prolonged storage back and when splicing for the first time, we recommend you execute for an Arc Calibration. Refer to [Arc Calibration].

Wind-protector motion and sheath clamp motion

This unit has the Wind-Protector automatic opening-and-closing mechanism and switching action differs by the chosen operation mode.

Operation Mode	Wind-protector motion					
	When error occurred such as Fat, Thin, Loss etc.		When Error not occurred	When error occurred except for having enumerated to the following	When the power supply starts	When RESET key is pressed
	end of splicing	Pause 1	end of splicing			
Auto	closed	open				
Auto-LR						
Normal	closed	closed	open			open
Norm-LR						
Manual	closed					
Customized	closed			open/closed		

* When the power supply is off, "Wind-Protector" state is closed.
So please be sure to press a power button and to turn off a power supply.

Time after setting a fiber until "Wind-Protector" closes is short by "Auto" and "fast" mode, and is set up a little long by "Normal" mode.
Time after setting a fiber until "Wind-Protector" closes can be changed in "customized" mode

Moreover, sheath clamp motion differs by ON/OFF of the "proof test" setup in splice mode.

Operation Mode	sheath clamp motion	
	proof test	
	ON	OFF
Auto	—	—
Auto-LR	open	—
Normal	—	—
Norm-LR	open	—
Manual	—	—
Customized	open / —	—

As it is shown in the above-mentioned table, the sheath clamp motion after the end of connection changes with ON/OFF of a "proof test" setup in splice mode.

Arc Calibration

Atmospheric conditions such as temperature, humidity, and pressure are constantly changing, which creates variability in the arc temperature. This splicer is equipped with temperature sensor that is used in a constant feedback monitoring control system to regulate the arc power at a constant level. Changes in arc power due to electrode wear and glass adhesion cannot be corrected automatically. Also, the center position of arc discharge sometimes shifts to the left or right. In this case, the fiber splicing position has to be shifted in relation to the arc discharge center. It is necessary to perform an arc power calibration to eliminate both of these issues.



- Arc calibration is performed automatically using [AUTO] mode only. So arc calibration does not have to be performed when splicing in this mode.
- Execute [Arc calibration] before using non-auto mode.
- When performing the [Arc Calibration] function change the arc power "factor" value. The factor value is used in the algorithm program for all splicing. The arc power value will not change in the splice modes

Operation procedure

1. Select the **Arc Calibration** icon in the [READY] screen.
2. Load prepared fibers into the splicer.

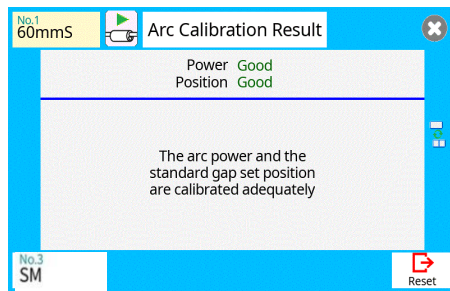


3. Press **SET** key to initiate the ARC Calibration.
4. A message appears after Arc Calibration. Please check it and take the appropriate action displayed with the message.

- Use standard SMF ITU-T G652 fiber for Arc Calibration.
- Use well prepared fibers for arc calibration. Dust on the fiber surface affects arc calibration.
- Cleave angle threshold does not link to the parameter "Cleave Limit" in splicing modes. Cleave angle threshold is independently set for arc calibration. See section [Maintenance Settings] to change cleave angle threshold.

"Good" message

Arc power and splicing position calibration have successfully completed. Press **RESET** key to exit.

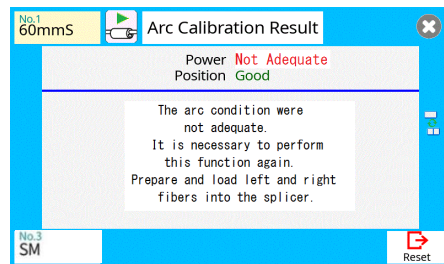


Result: Good

"Not adequate" message

Arc power and splicing position calibration are completed but further calibration is strongly recommended, as the change from the previous arc calibration is too large.

Press **SET** key to perform arc calibration, or **RESET** key to exit (arc calibration is not completed).



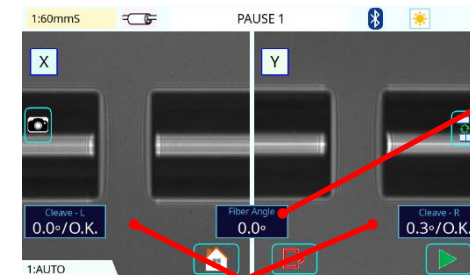
Result: Not Adequate

- In some cases, multiple iterations of arc calibration are needed until the calibration process is successfully completed and the "Test Finish" message is displayed. Arc calibration can be considered almost completed if multiple iterations are completed without receiving the message.
- Number threshold can be set so that "Test Finish" message is displayed after specific number of arc calibrations is performed. See section [Maintenance Settings] for detail

Splicing procedure

To make a good splice, the optical fiber is observed with the image processing system equipped in the splicer. However, there are some cases when the image processing system cannot detect a faulty splice. Visual inspection with the monitor is often necessary for better splicing yield. The instruction below describes standard operating procedure.

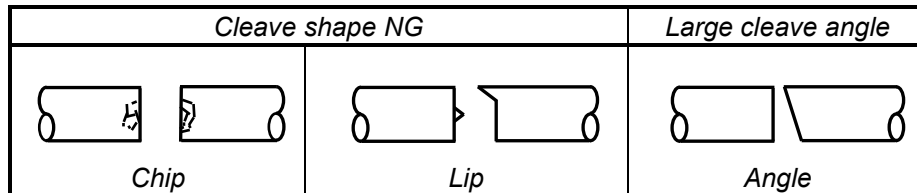
1. Fibers loaded in the splicer move forward toward each other. The fiber forward motion stops at a certain position shortly after the cleaning arc is performed.
2. Next, the cleave angle and end-face quality are checked. If the measured cleave angle is greater than its set threshold or fiber chipping is detected, the buzzer will sound and an error message warns the operator.



Fiber angle

Left and Right cleave angle

3. If no error message is displayed, the end-face conditions are used for visual inspection as shown below. If observed, remove the fiber from the splicer and repeat fiber preparation. These visual defects may cause a faulty splice.



- The pause after cleave angle check and fiber alignment can be "disabled". See section [Splice Settings] for detail.
- The cleave angle threshold can be changed. See section [Splice Menu].
- The cleave angle error message can be ignored by pressing **SET** key to go on to the next step. To disable the cleave angle error. See section [Splice Settings] for detail.
- Cleave angle, during the splicing operation can be hidden. See section [Splice Settings] for detail.
- The splicer will rotate the cleaver blade when the splicer detects cleaving defects at a particular frequency and then determines that position unusable.

4. Cladding axis offset measurements can be displayed and after completion of arc discharge is performed to splice the fibers.

5. Estimated splice loss is displayed upon completion of splicing. Splice loss is affected by certain factors stated. These factors are taken into account to calculate, or estimate, splice loss. The calculation is based on certain dimensional parameters, such as MFD.

If either the cleave angle measured or the estimated splice loss exceeds its set threshold, an error message is displayed. If the spliced fiber is detected as abnormal, the "Fat", "Thin" or "Bubble" error message is displayed.

If no error message is displayed but the splice looks poor by visual inspection through the monitor, it is strongly recommended to repeat the splice from the beginning.



Splice loss may be improved in some cases by additional arc discharges. Press **SET** key for an additional arc discharge (re-arc). Splice loss estimate and splice check are performed again.







- Restriction of the number of times of additional arc discharge can be set up.
Since excessive additional arc discharge becomes the cause of worsening splice intensity and a splice loss, it can forbid the arc discharge more than the suitable number of times.
Refer to [Setting Menu] for details.

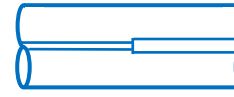
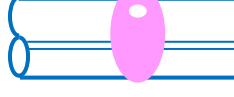
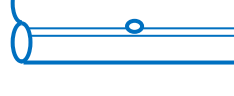


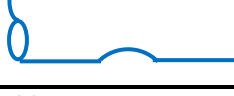



- Splice point sometimes looks a bit fatter than other parts. This is considered a normal splice, and does not affect splice loss.
- To change threshold for estimated splice loss or fiber angle, see section [Splice Mode].
- Error messages, such as "Estimated splice loss", "Splice angle", "Fat", "Thin" and "Bubble" can be ignored. This function can be set to "disabled". See section [Splice Settings] for detail.

Splice loss increase: Cause and remedy (1 of 2)

Symptom	Cause	Remedy
Axis offset 	Dust on v-groove or fiber clamp chip	Clean V-groove and fiber clamp chip.
Fiber angle 	Dust on v-groove or fiber clamp chip	Clean v-groove and fiber clamp chip.
	Bad fiber end-face quality	Check if fiber cleaver is well conditioned.
Core step 	Dust on v-groove or fiber clamp chip	Clean v-groove and fiber clamp chip.
Core curve 	Bad fiber end-face quality.	Check if fiber cleaver is well conditioned.
	Prefuse power too low or prefuse time too short.	Increase [Prefuse Power] and/or [Prefuse Time].

Splice loss increase: Cause and remedy (2 of 2)

Symptom	Cause	Remedy
MFD mismatch 	Arc power too low	Increase [Arc Power] and/or [Arc Time].
Combustion 	Bad fiber end-face quality	Check the cleaver
	Dust still present after cleaning fiber or cleaning arc.	Clean fiber thoroughly or Increase [Cleaning Arc Time]
Bubbles 	Bad fiber end-face quality	Check if fiber cleaver is well conditioned.
	Prefuse power too low or prefuse time too short.	Increase [Prefuse Power] and/or [Prefuse Time].
Separation 	Fiber stuffing too small	Perform [Motor Calibration]
	Prefuse power too high or prefuse time too long.	Decrease [Prefuse Power] and/or [Prefuse Time].
Fat 	Fiber stuffing too much	Decrease [Overlap] and perform [Motor Calibration].
Thin 	Arc power not adequate	Perform [Arc Calibration].
	Some arc parameters not adequate	Adjust [Prefuse Power], [Prefuse Time] or [Overlap].
Line 	Some arc parameters not adequate	Adjust [Prefuse Power], [Prefuse Time] or [Overlap].



A vertical line sometimes appears at the splice point when MM fibers or dissimilar fibers (different diameters) are spliced. This does not affect splice quality, such as splice loss or tensile strength.

Storing splicing results

Splicing results is stored in memory.



After the 2000th result is stored, 2001st splice result is written over 1st result.


Storing results automatically

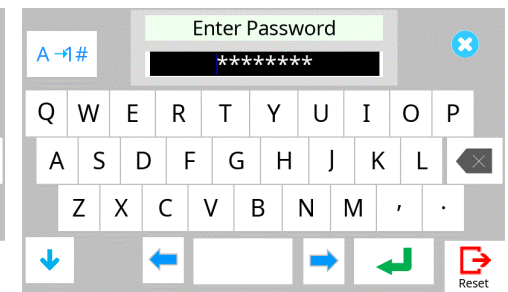
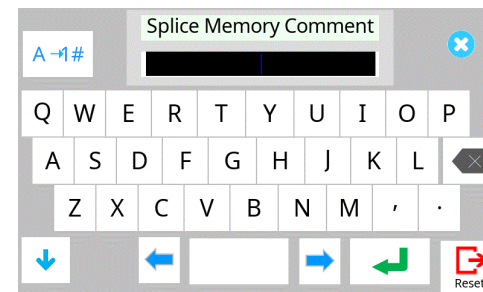
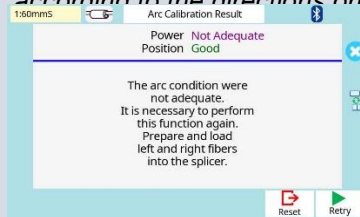
The splice result is automatically stored in memory when **RESET** is pressed upon completion of the splice at the [Finish] screen or when the wind-protector is opened upon completion of the splice at the [Finish] screen.

Once a certain comment is recorded, the same comment is recorded into subsequent splice results. To change comments, see the next paragraph.

How to input Mode Title/Comment/Password

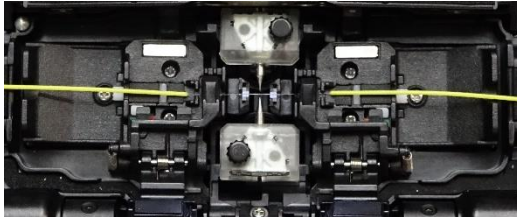
Character list below is displayed by selecting Mode Title / Comments / Password.

1. Input the selected character by using the keypad in the monitor.
2. Select  icon on completion of inputting characters.
3. In the case of Password input, the next screen image is displayed if the correct password is input. If the input password is incorrect, the previous screen image is displayed.



Fiber proof test

The strength of the splice point can be checked. After splicing when a proof-test is performed by pressing the **SET** key or opening wind-protector. If the operation mode is set to "Auto" or "Auto-LR", a proof-test will be performed automatically.

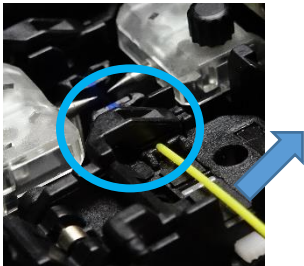


A motion changes by the selected operation mode. When a [Proof test] setup is OFF, sheath clamp will not open after splicing.

Using the fiber retention clamp

In case of using "fiber retention clamping" function, it still hold fiber even though sheath clamp opens.

Picking up the fiber, the "fiber retention clamp" automatically releases.



Picking up the fiber.



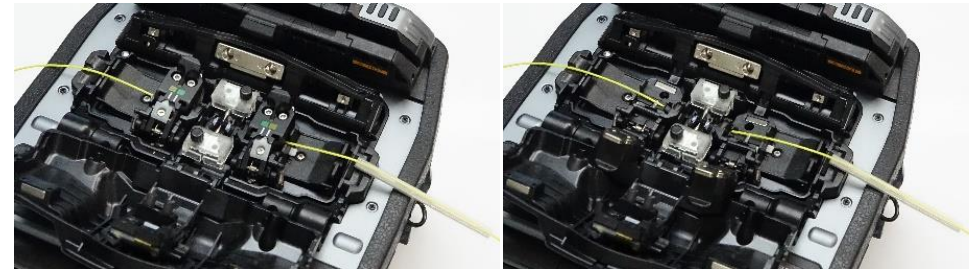
Clamp automatically releases

Heating protection sleeve

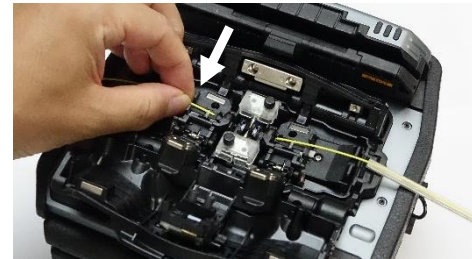
When using 60mm length sleeve

The sheath clamp is optimized for the 60mm length sleeve. In case of using 60mm length sleeve, it is easy to position the center of the protection sleeve over the splice point.

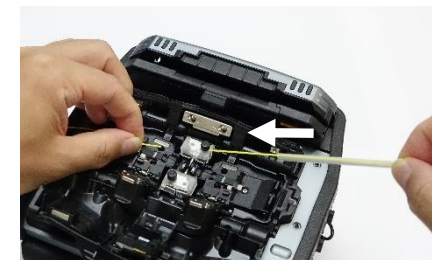
1. Splice finishes and wind protector opens. "Fiber retention clamp" holds fiber.



2. Hold the left fiber at the end of sheath clamp as below.



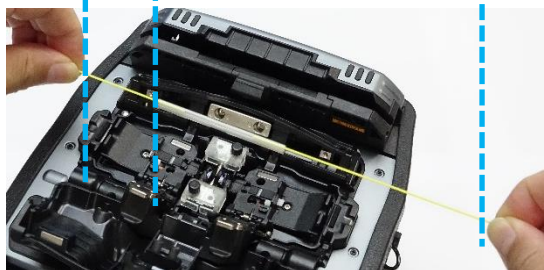
3. Make the fiber slant to slide the sleeve toward the left.



4. The sleeve slide and reach to the left hand.



5. Slide the left hand. Keep the right hand to the same position.

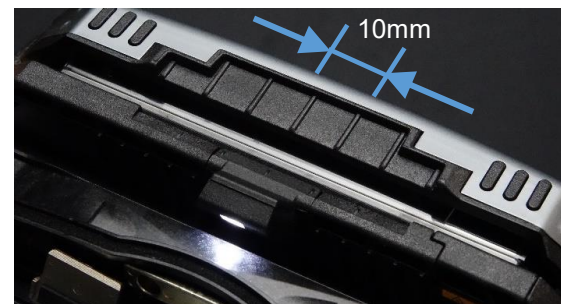


6. Move to the heater.



When using short length sleeve less than 60mm

When use the 40mm length sleeve or micro sleeve, using sleeve scale on the surface of theater would be convenient.



In case of 40mm sleeve, set the sleeve as below.



If a protection sleeve is not centered enough, the protection sleeve may not shrink completely as below.



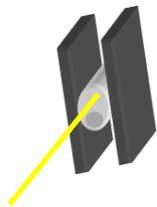
- Make sure the splice point is located at the center of the protection sleeve.
- Keep holding fiber until fiber is completely transferred to tube heater.

After setting fiber to the heater, the heater lid automatically closes. Keep applying tension to the fiber until then.

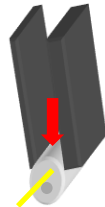


Two heater plates sandwich the sleeve as below. Releasing tension earlier may fall the sleeve from the proper heating location.

Notes at the time of a sleeve set!!



Apply tension to the fiber until heater holds the fiber.



Release tension before closing the lid.



- If **HEAT** key is pressed during tube heating, the HEAT LED blinks. If **HEAT** key is pressed again, the tube heating process is aborted.



- Protection sleeve may stick to heater plate surface. Use a cotton swab to help remove sleeve from heater.
- Since it gets very hot in the heater and the sleeve will get hot, you should not touch the sleeve immediately after heating.

After finishing heating process, the lid automatically opens and you can remove fiber from the heater.

Visually inspect the finished sleeve to verify no bubbles or debris/dust is present in the sleeve.

Maintenance of Splicing Quality

Cleaning and Checking Before Splicing

It is possible to maintain the performance of the splicer for a long time with proper cleaning and maintenance.

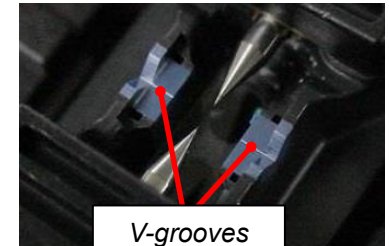
Critical cleaning points and maintenance checks are described below.

Cleaning V-grooves

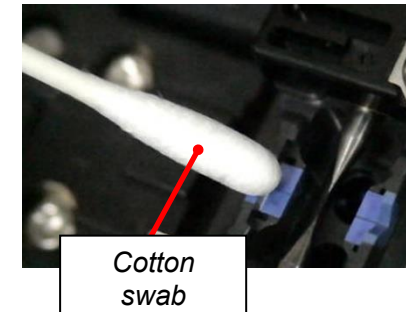
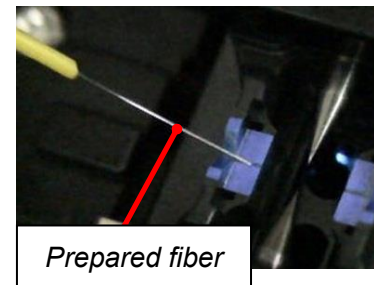
If contaminants are present in the V-grooves, proper clamping may not occur, resulting in higher splice loss. The V-grooves should be frequently inspected and periodically cleaned during normal operation.

To clean the V-grooves do the following:

1. Open the wind-protector.
2. Clean the bottom of the V-groove with an alcohol-moistened thin cotton swab. Remove excess alcohol from the V-groove with a clean dry swab.



3. If the contaminants in the V-groove cannot be removed with an alcohol-moistened thin cotton swab, use a cleaved fiber end-face to dislodge contaminants from the bottom of the V-groove. Repeat step section 2 after this procedure.



- Be careful not to touch the electrode tips.
- Execute [Arc Calibration] after cleaning.

Cleaning V-groove Clamp Chips

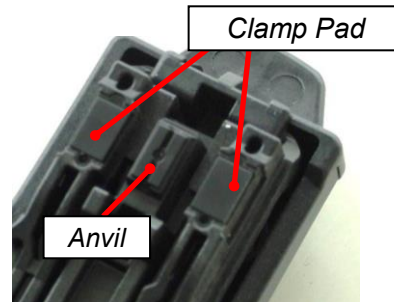
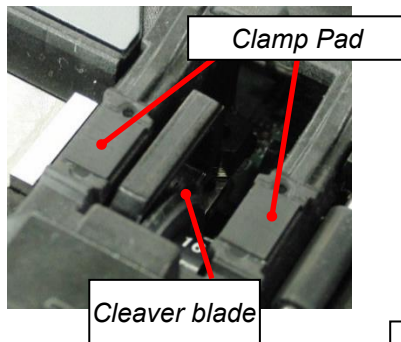
If contaminants are present on the clamp chips, proper clamping may not occur, resulting in poor quality splices. The fiber clamp chips should be frequently inspected and periodically cleaned during normal operation. To clean the clamp chips do the following:



1. Open the wind-protector.
2. Clean the surface of the chip clamp with an alcohol-moistened thin cotton swab. Remove excess alcohol from the chip clamp with a clean dry swab.

Cleaning Fiber Cleaver

If the circular blade or clamp pads of the fiber cleaver become contaminated, the cleaving quality could degrade. This may lead to fiber surface or end-face contamination, resulting in higher splice loss. Clean the circular blade or clamp pads with cotton swab moistened with alcohol.



CT50

Arc Calibration

See Section [Arc Calibration].

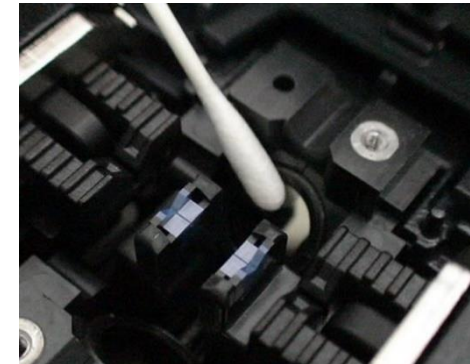
Periodical checking and cleaning

In order to maintain the splicing quality of the splicer, periodic inspection and cleaning are recommended.

Cleaning of Objective Lens

If the surface of the objective lens becomes dirty, inaccurate observation of the fiber position may occur, resulting in higher splice loss or poor splicer operation. Therefore, it is necessary to clean the objective lens. If not done periodically, dirt may accumulate and become impossible to remove. To clean the objective lens, do the following:

1. Before cleaning the objective lens, always turn off the splicer.
2. Gently clean the lens with an alcohol-impregnated thin cotton swab. Remove excess alcohol from the lens surface with a clean dry swab.



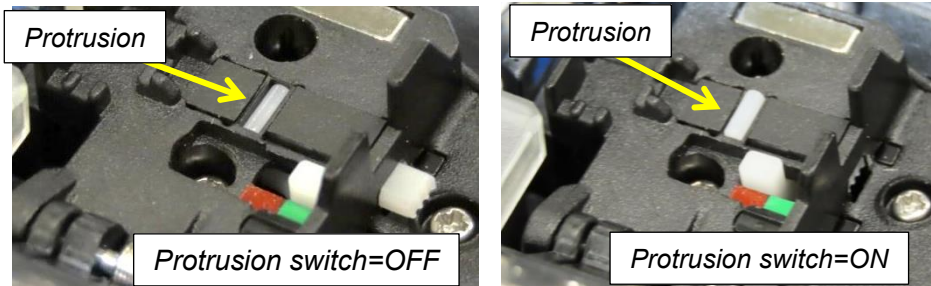
3. Verify the lens surface is clean and free of streaks or smudges.
4. Turn on the power and verify no smudges or streaks are visible on the monitor screen. Perform the Dust Check procedure.



- Remove electrodes before cleaning objective lens.
- Do not hit or touch the tip of the electrode when cleaning.

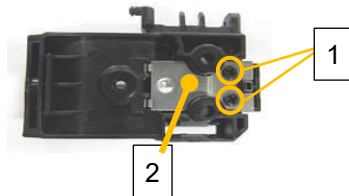
Protrusion of the sheath clamp for loose tube

The sheath clamp equips protrusion for loose tube fiber.
The protrusion enables to hold fiber clamp loose tube fiber.
However, it may damage other types of fiber coating.



If you do not have opportunity to splice loose tube fiber, you can remove it.

- 1: Remove two screws located underneath of the sheath clamp.
- 2: Remove metal parts as below



- 3: Remove below parts from inside, two plastic parts and spring.



- 4: Store removed parts for future use,

Change the cleaver CT50 blade position

The cleaving of the end face deteriorates when the cleaving blade wears. The CT50 uses a circular blade that has 16 positions. Each position can cleave approximately 1,250 fibers. The blade can be rotated automatically or manually.

- Automatically rotate -

When the wireless data communication function of the splicer is on, the splicer analyzes the cleaving end face. And then the splicer judges the worn of the cleaving blade, and automatically rotates the cleaving blade. The parameter are set prior shipment. As a result, the life of the blade may be able to be longer than rotating the blade by cleavage count.

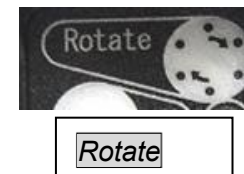
- Manual rotate -

When not using the wireless data communication function, refer to cleaving count function that installed into the splicer. Otherwise please observe the cleaving end face. And make a judgment for end of blade life at the current position. And then rotate the cleaving blade by the method that described below and use the part that doesn't wear.

The CT50 uses a circular blade that has 16 positions. Each position can cleave 1,250 fibers. Rotate to the next number for a new blade position after cleaving more than 1,250 fibers. Check the Blade Position Number printed to the side of the blade. This procedure describes how to rotate it by 3 methods.

Method1: Rotate the blade using the Rotate Button

1. Open Lever until it stops.
2. Press **Rotate** button. The blade rotates during pressing **Rotate** button.
3. Check the blade position number.



Method2: Rotate the blade using a Smartphone or splicer

1. Open the Lever until it stops.
2. Rotate the blade using the splicer or the application software "Splice+".

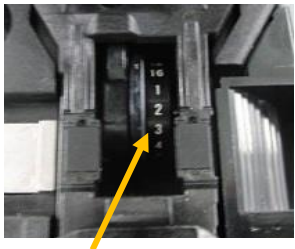


- In this method, it is necessary to connect the smartphone or splicer by wireless data communication with CT50 before rotating the blade.
- If an error occurs when attempting to rotate the blade, the Batt. LED indicator will blink red. In this case, close Lever and repeat. If same problem happens, contact a Fujikura authorized distributor.

Method3: Rotate the blade manually by Blade Rotating Dial.

This method can rotate the blade without the battery. If battery power is low, use this method.

1. Close the Lever and then rotate the Blade Rotating Dial in the direction of the arrow until it clicks.
2. Check that the Blade Position has advanced to next number.



Blade Position Number



Blade Rotating Dial

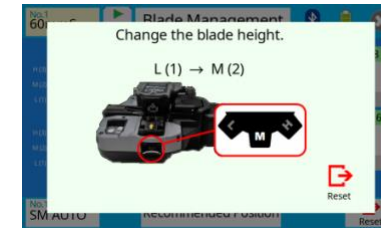


Arrow

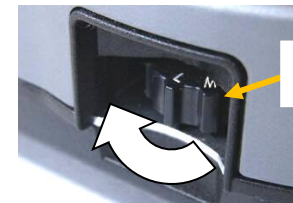
Blade Position Number and Blade Rotating Dial

Changing the CT50 Blade Height

When using the wireless data communication, a message to raise blade height can also be displayed when all 16 positions are expended. There is no need for the operator to make blade management decisions. The Blade height can be changed by rotating the Blade Height Dial located on the front of the cleaver. It can be raised a total of 2 times.

**Method**

1. Verify the position of the Blade Height Dial.
2. Rotate it to next number. Do not rotate more than one position at one time.



Blade Height Dial

Front view



- Replace the blade after raising it 2 times, and after all 16 positions have been used.
- The Cleave Blade and Arm set for CT50 is user serviceable. Contact your Fujikura distributor for details.

Blade Replacement

After the circular blade has been raised 2 times and rotated through all 3 positions (a total of approximately 60,000 for CT50 fiber cleaving), it needs to be replaced. The user can replace the cleaver blade. Contact to Fujikura authorized distributor.

Clamp Arm Replacement

*When the clamp pad is worn, it needs to be replaced.
If the user needs assistance in replacing the pad or with obtaining parts they should contact the nearest Fujikura authorized distributor.*

Cleaver
Blade



Clamp arm




Wireless data communication

Wireless data communication function of the splicer

The splicer features wireless data communication with the optical fiber cleaver (CT50) and optical fiber stripper (RS03) via Bluetooth. This capability allows the splicer to monitor and change various settings within the cleaver. The splicer can assess blade wear by analyzing the fiber image after cleaving, and then inform the operator with an on-screen alarm. Once a blade position has been expended, the splicer can then rotate the blade to the next available unconsumed position.



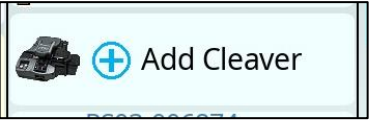
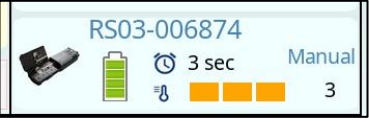
How to check the status of Wireless data communication

When the [Splicer] in Bluetooth menu is set "ON", the wireless data communication sign  appears at the upper right corner.

Also when the splicer has already been paired with the device, the icon of each tool appears at the right side in the LCD monitor.

Selecting each icon takes you to the menu which is able to edit.



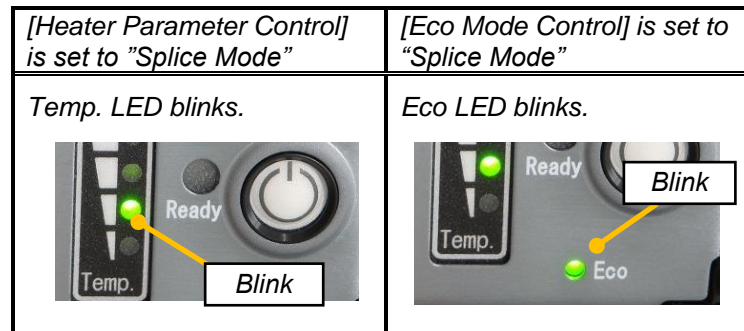
icon	Description
	When the [Splicer] in Bluetooth menu is set "ON", this sign appears. Press this icon, enter to [Bluetooth] menu in "Other Setting" directly.
	This icon shows the status of paired cleaver as follows. 1: Serial Number 2: Battery capacity 3: Remaining of Blade life 4: Blade rotating and height (Auto or Manual) * Refer to "Cleaver Setting" section Press this icon, the [Blade Management] screen appears. It shows the detail of the cleaving blade.
	This splicer can connect with 2 fiber cleaver by the wireless communication. This icon appears when the splicer connects with 1 cleaver or nothing. When pressing this icon, enter to [Bluetooth] menu directly.
	This icon shows the status of paired ribbon stripper as follows. 1: Serial Number 2: Battery capacity 3: Heating time 4: Heater Temperature 5: Control machine Press this icon, the [Ribbon Stripper Management] menu appears.

How to check the communication status with Stripper & Cleaver

- During the connection process,
 RS03: The Link LED on the RS03 lights up.
 CT50: The Link LED on the CT50 lights up when starting the pairing and then lights off



- When the following parameter is set to "Splice Mode", each LED blinks during the connection process. (Only Stripper RS03)

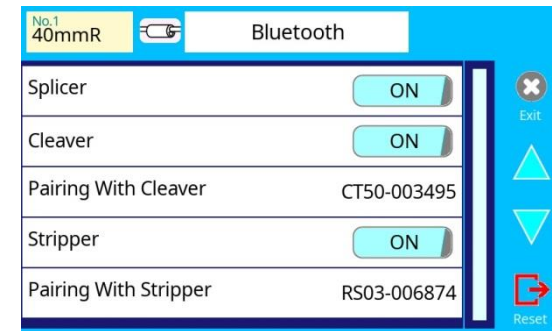


How to establish wireless data communication

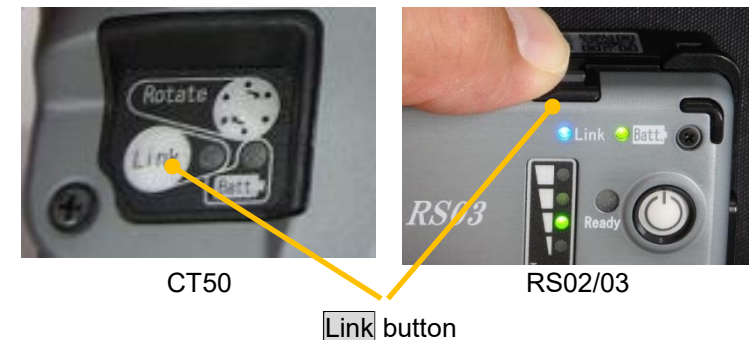
If purchased separately, the CT50, RS02/03 and compatible splicer will need to be paired before cleaver management begins. Instructions on how to connect the splicer to the cleaver and stripper, via Bluetooth, are on the next page. After initial pairing, those machine are always paired, communication between splicer, cleaver and stripper resumes automatically even after power cycling. However, when Bluetooth is turned off on either device, communication of cleaver data ceases.

Procedure:

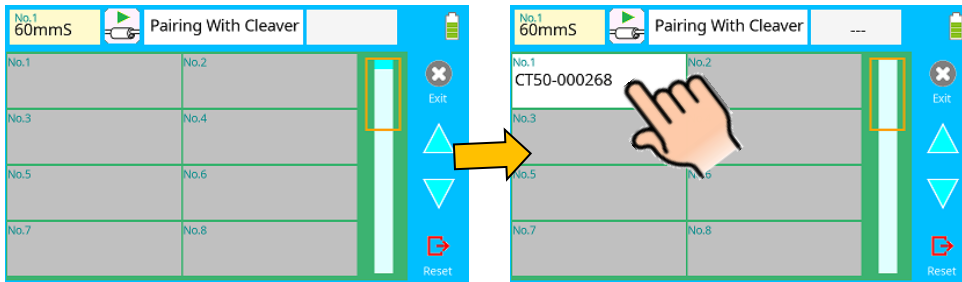
- Turn the splicer power on.
- Place batteries in the cleaver or the stripper.
- Press the [Bluetooth] Icon of wireless data communication on the screen of splicer to open the [Bluetooth] Menu.
- Set [Splicer], [Cleaver] and [Stripper] setting to "ON". Tap with finger to switch between "ON" and "OFF".



- Press the [Pairing With Cleaver] icon or [Pairing With Stripper] icon.
- Hold the "LINK" button for 6 seconds of cleaver or stripper. The Link LED will begin blinking blue and then wait for the command from the splicer to pair.



- The cleaver or stripper that can be connected to the screen of the splicer is displayed in white, so please tap with your finger to pair.



- When pairing is successful, the “LINK” LED of the cleaver or stripper stops blinking and remains on briefly before turning off.
- Press the “RESET” icon or button to return to the [Ready] screen, the serial number of the paired cleaver is now shown.

To confirm successful pairing, press the LINK button on the cleaver or the stripper for 1 second. When connected correctly, the “LINK” LED briefly turns on.

Change the device

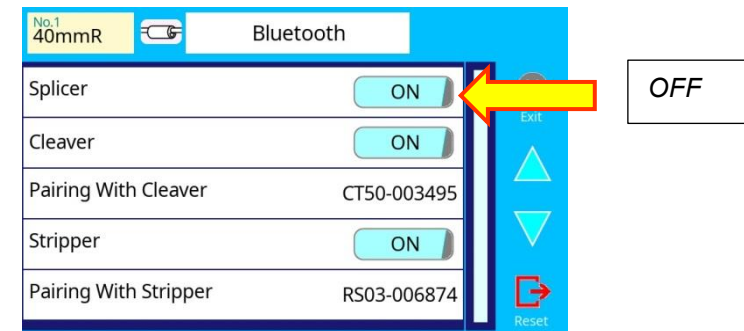
- Turn [Splicer] and [Stripper] or [Cleaver] in Bluetooth menu “ON”.
- Select [Pairing With Stripper] or [Pairing With Cleaver] in Bluetooth menu. Press **[ENT]** key. This will cause the [Device List] screen to appear.
- Hold the “LINK” button for 6 seconds of cleaver or stripper. The Link LED will begin blinking blue and then wait for the command from the splicer to pair.
- When Splicer finds the new pairing tool, it adds the serial number to the [Device List] screen.
- Select the stripper or cleaver which you want to connect with. Then press **[ENT]** key.
- This initiates the wireless data communication with the new stripper or cleaver.

How to turn off the wireless data communication

Please turn off the wireless data communication function when using this splicer in places where wireless data communication is prohibited. In order to stop output of all electromagnetic waves, Bluetooth must be turned off on both the cleaver and the splicer. Turning Bluetooth off on one device does not disable wave output for the other.

Procedure in case of the splicer

- Open the [Bluetooth] menu screen.
- Turn off the [Splicer] on the [Bluetooth] Menu.
- Press the [RESET] key or [ESC] key to return the [Ready] screen. And then make sure the cleaver icon and the stripper icon have disappeared.



Procedures in case of Cleaver

Procedure1

- Remove the battery from the cleaver to stop all communication.

Remove the battery when transporting by aircraft.



**It is not possible to count cleaves or rotate the blade without batteries installed.*

Procedure2

1. Press and Hold the Link button on the CT50 for 6 seconds.
2. The blue LED light blinks quickly and then turns off. Now wireless data communication has ceased.

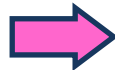


On the pairing screen of the splicer, "Paired" is displayed, but wireless data communication can't be used unless it is reestablished. If you want to reestablish the wireless data communication, refer to the procedure how to establish the wireless data communication

Procedures in case of Ribbon Stripper

Procedure1

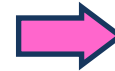
1. Press and Hold the Link button on the RS02/03 for 6 seconds.
2. The blue LED light turns off. Now wireless data communication has ceased.



On the pairing screen of the splicer, "Paired" is displayed, but wireless data communication can't be used unless it is reestablished. If you want to reestablish the wireless data communication, refer to the procedure how to establish the wireless data communication.

Procedure2 (In the case of RS03)

- Remove the battery from the stripper to stop all communication.
Remove the battery when transporting by aircraft.



**Once the wireless connection between the stripper and the splicer or a smartphone is successful, the RS03 continuously tries to maintain a connection, even when the power is off. It is necessary to turn the wireless communication function OFF by these methods to disable the connection with the stripper.*

Blade Management Menu

By using the [Blade Management] menu, it is simple to check wear condition of the cleave blade during splice operation. The splicer determines whether or not to rotate the cleaver blade by assessing cleave quality for the current position. It analyzes the fiber edge to determine whether or not the cleave angle and quality are sufficient. This ensures the operator will always have optimal splices.

The procedure below explains how to display the “Blade Management” menu.

Procedure

1. Select the **Cleaver** icon on the [Ready] screen or select the “Blade Position” on the “Blade Settings” menu.
2. [Blade Management] menu is displayed.
It is displayed the cleaving count for each positions by a list.



	No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8
HOB	0	0	0	0	0	0	0	0
MID	0	0	0	0	0	0	0	0
LLO	1014	1041	1175	1167	1522	1134	1530	1439
	No.9	No.10	No.11	No.12	No.13	No.14	No.15	No.16
HOB	0	0	0	0	0	0	0	0
MID	0	0	0	0	0	0	0	0
LLO	1185	1218	1025	1407	1338	1484	1259	1060

Blade Height : L(1)

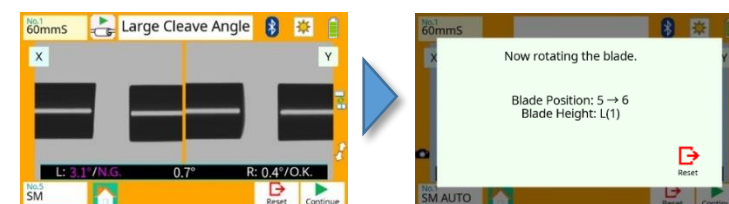
No.1 SM AUTO Recommended Position Reset

- Blue cursor is a current blade position.
- Gray cursors are worn blade positions.
- Green cursor is a recommended position when the current position is not suitable.
- Red cursor is the blade position to change. User can move the cursor by the **UP**, **DOWN** and **MENU** key.

Convenient usage of wireless data communication function

Convenient usage with cleaver CT50

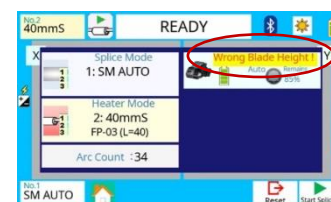
It is difficult for operators to track blade wear. However, it is easy to detect blade wear by correlating blade positions with cleaving errors given by the splicer. If the splicer detects that a blade position has reached its cleave limit, the splicer sends a command to the cleaver to rotate the blade to the next position. By using this function, the operator can maximize blade life like never before. The operator can now use a cleaver without worrying about tracking blade life, and can be confident they are making reliable splices.



The timing and judgment of blade rotation made by the splicer can be adjusted in the settings menu. A message to raise blade height can also be displayed when all 16 positions are expended. There is no need for the operator to make blade management decisions.



The cleaver records cleaves per position per height of the blade. Even if an operator changes the blade position by mistake, the splicer will display a message on-screen to alert the user to this mistake. This further relieves the operator of cleaver management issues.



Convenient usage with the ribbon stripper RS02/03

Using a fiber holder, a fiber with 200 to 400 umm coating diameter can be stripped by a rebbon stripperr. This fusion splicer also performs wireless communication with RS02/RS03.

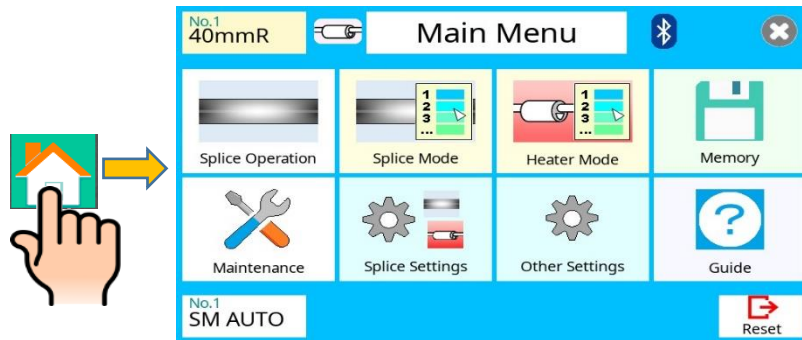
The ribbon fiber stripper settings are automatically changed according to the splice mode.

To make easy field work, operator can change the setting of the RS02/03 at any time with this fusion splicer.



Main Menu

Composition of Main Menu



Method:

1. Select [Main Menu] on the [READY] screen to get to the [Main Menu] screen.
2. Selecting various parts of the main menu screen do the following.

Setting parameters

Icon Name	Description
Splice Operation	Returns to [READY] screen.
Splice Mode	[Splice Mode] screen appears. This allows access to the splicing parameters.
Heater Mode	[Heater Mode] screen appears. This allows access to the heating parameters.
Memory	[Memory] screen appears. This allows review of the splice result or to change comments.
Maintenance	[Maintenance Menu] screen appears. This allows review of the splicer condition.
Splice Settings	[Splice Setting] screen appears. This allows review/edit of splice parameters and motion of the splicer during the operation.

A continuation of icon list

Icon Name	Description
Other Setting	[Other Setting] screen appears. This allows review/edit the wireless communication and the supervisor settings.
Guide	[Guide/Promotion] screen appears. It shows the procedure how to use this splicer with Built in instruction guide.

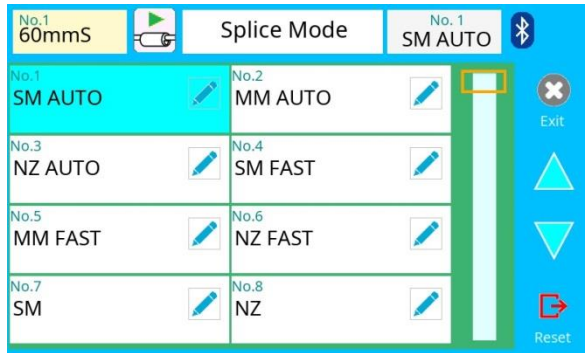
Refer to each section for details of each parameter.

Splice mode menu

Composition of Splice Menu

Common parameters for all the modes for splicing can be set.

[Splice Mode] screen appears when selecting the [Splice Mode] icon at [READY] screen.



How to change the splice mode.

1. When selecting the listed icon at [Splice Mode] screen, the color of the icon changes to blue and the splice mode is changed.
2. Press **RESET** icon to return to the [READY] screen.



Splice Mode

The optimal splice setting for a specific fiber combination consists of the splicing parameters listed below. In other words, the optimal splicing parameters depend on the fiber combinations, and are different from fiber to fiber.

- Parameters for controlling arc discharge.
- Parameters for calculating estimated splice loss.
- Parameters for controlling fiber alignment and splicing procedures.
- Threshold for error messages.

A series of optimal splice parameters for major fiber combinations are already stored in the splicer. These parameters are stored in the database area and can be copied to the user-programmable area. These splice parameters can be edited for a specific fiber combination.

How to select the "Splice mode"

- [AUTO SM/NZ/DS/BIF/MM]

Use this mode if the fiber type is not identified.

- [SM AUTO] and others

Use this mode if the fiber type is identified.

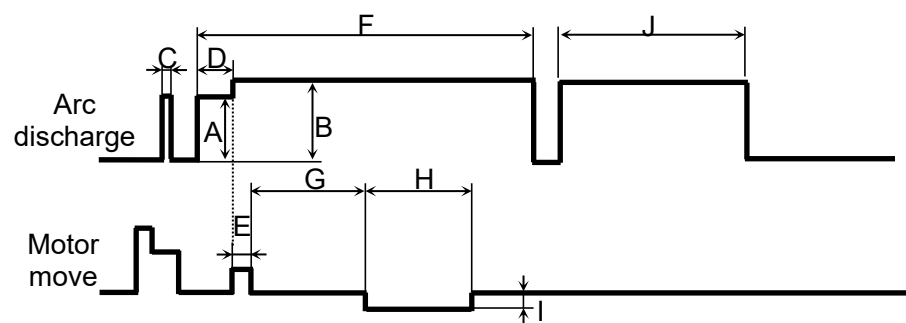
- [SM FAST] and others

Use this mode if the fiber type is identified and prefer quick splice with high yield to consistent splice loss.

- [SM-SM] and others

Use this mode for splicing special fibers. This mode enables to set specific parameters for each splicing. Execute [Arc Calibration] before using this mode.

Below is a figure showing the Arc discharge conditions (relationship between "Arc power" and "Motor motion"). The conditions can be edited by changing the splicing parameters listed below. Depending on splice mode, certain parameters cannot be changed.



A: Prefuse power B: Arc power C: Cleaning arc time
D: Prefuse time E: Overlap F: Arc time
G: Taper wait time H: Taper time related to taper length I: Taper speed
J: Rear arc time

Select Splice Mode

AUTO splice mode

In AUTO mode, the amount of heat applied to the fiber is calibrated in real time by analyzing the cladding illumination during arc discharge and adjusting the arc current accordingly. This splice mode does not require the operator to perform an arc calibration.

This mode identifies the type of fiber and selects optimized splice condition automatically and splice.

If the fiber type is identified, you can work splicing with stability by selecting AUTO mode for each fiber type.

Database of splice mode (AUTO)

Splice mode	Description
AUTO SM/NZ/DS/BIF/ MM	This splice mode can splice standard telecommunications grade fiber, including SMF (ITU-T G652), NZDSF (ITU-T G655), DSF (ITU-T G653), BIF (ITU-T G657) and MMF (ITU-T G651). This mode uses the standard parameter. Therefore the splicer loss may be higher than other Auto mode. If the fiber type is identified, uses the specific Auto mode.
SM AUTO	This splice mode can splice the standard SM fiber. MFD: 9 to 10 μ m, Wavelength: 1310nm, ITU-T G.652
MM AUTO	This splice mode can splice the standard MM fiber. Core diameter: 50.0 μ m, 62.5 μ m, ITU-T G.651
NZ AUTO	This splice mode can splice the standard NZDS fiber. MFD: 8 to 10 μ m, Wavelength: 1550nm, ITU-T G.655
DS AUTO	This splice mode can splice the standard DS fiber MFD: 7 to 9 μ m, Wavelength: 1550nm, ITU-T G.653

Points to note: of AUTO SM/NZ/DS/BIF/MM mode



- NZDS is specified using the splicing mode for standard NZDS fiber. However, for best results, it is recommended that the optimum splice mode be selected for a specific type of NZDS fiber. This is due to the variation in the NZDS fiber properties and optimum splicing parameters are different from one type of NZDS fiber to the next.

Special splice mode

In this mode, the parameters are set in detail and can be changed.

Use this splice mode when need to change the parameter setting, for example, splice loss is high.

Automatic arc calibration doesn't work in this splice mode. When this mode selected, perform the "Arc Calibration" manually before splicing.

Database of splice mode (Special)

Splice mode	Description
SM-SM	For splicing standard SM fiber. MFD: 9 to 10 μm , Wavelength: 1310nm, ITU-T G.652
NZ-NZ	For splicing standard NZDS fiber MFD: 8 to 10 μm , Wavelength: 1550nm, ITU-T G.655
DS-DS	For splicing standard DS fiber MFD: 7 to 9 μm , Wavelength: 1550nm, ITU-T G.653
MM-MM	For splicing standard MM fiber. Core diameter: 50.0 μm , 62.5 μm , ITU-T G.651

Fast splice mode

Use this mode if the fiber type is identified and prefer quick splice with high yield to consistent splice loss.

Automatic arc calibration doesn't work in this splice mode. When this mode selected, perform the "Arc Calibration" manually before splicing.

Database of splice mode (Fast)

Splice mode	Description
SM FAST	For splicing standard Single-mode fiber (ITU-T G652). The MFD is 9 to 10 μm at wavelength of 1310 nm. Automatic arc calibration doesn't work in this splice mode. Execute [Arc Calibration] before splicing.
NZ FAST	For splicing Non-zero dispersion-shifted fiber (ITU-T G655). The MFD is 8 to 10 μm at wavelength of 1550 nm. Automatic arc calibration doesn't work in this splice mode. Execute [Arc Calibration] before splicing.
DS FAST	For splicing Dispersion-shifted fiber (ITU-T G653). The MFD is 7 to 9 μm at wavelength near 1550 nm. Automatic arc calibration doesn't work in this splice mode. Execute [Arc Calibration] before splicing.
MM FAST	For splicing Multi-mode fiber (ITU-T G651). Core diameter : 50.0 to 62.5 μm Automatic arc calibration does not work in this mode. Execute [Arc Calibration] before splicing.

Attenuation splice mode


Use this splice mode when you need intentionally splice loss by making axis offset. Select AT1 or AT2 from Fiber type.

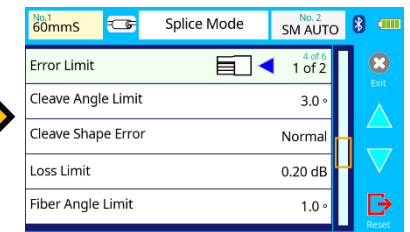
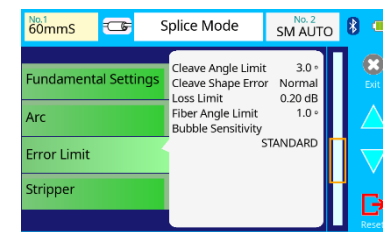
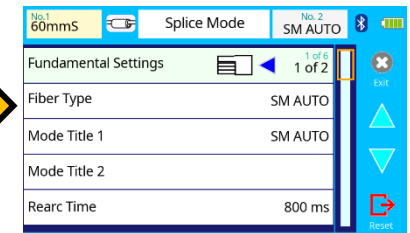
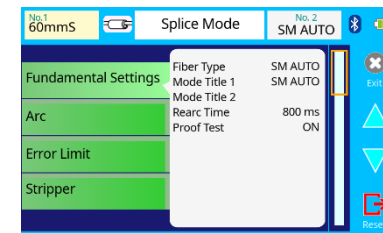
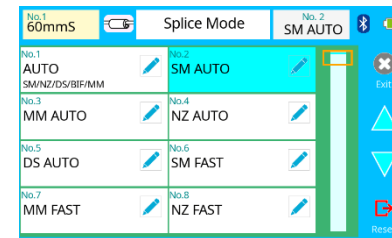
Splice mode	Description
AT1 (SM)(DS)	[AT1] creates an intentional core axial offset and splices fibers. [AT1] mode provides an estimated splice loss, but this should be regarded as a reference as the estimated splice loss may not be correct in some cases, depending on fiber properties. A power meter is recommended for correct splice loss measurements.
AT2 (SM)(DS)(MM)	This mode allows the users to set a starting core offset value and a finishing core offset value. Set [Start Offset] manually and then splicing starts. Re-arcng is performed continuously / automatically until the axial offset reaches [Stop Offset] value. A splice loss estimate is not performed.

Editing Splice Mode

Splicing parameters in each splice mode can be modified. Arc power and Arc time are considered the two most vital parameters.


To edit parameters follow the steps below:

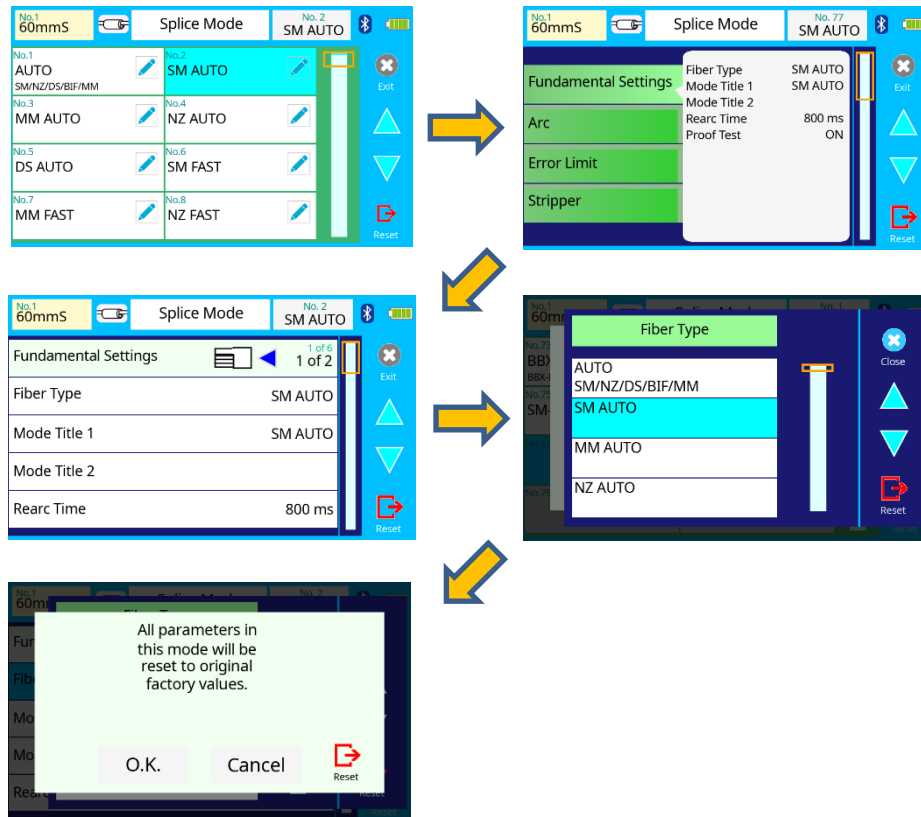
1. Select the  icon in the [Splice Mode] screen, to show the splice mode.
2. The category is displayed in left side. The parameters included in the category are displayed in the right side.
3. Select and change the category icon and find the target parameter.
4. Select the parameter displayed in right side to show the parameter edit screen.
5. Select and change the target parameter.



Initializing edited parameters

Edited parameters can easily be initialized to their preset parameters by performing the following procedure:

1. Press  icon.
2. Enter the [Fundamental Settings] screen.
3. Select Fiber Type icon and select the same Fiber Type.
4. All parameters are overwritten by the factory value in the data base.

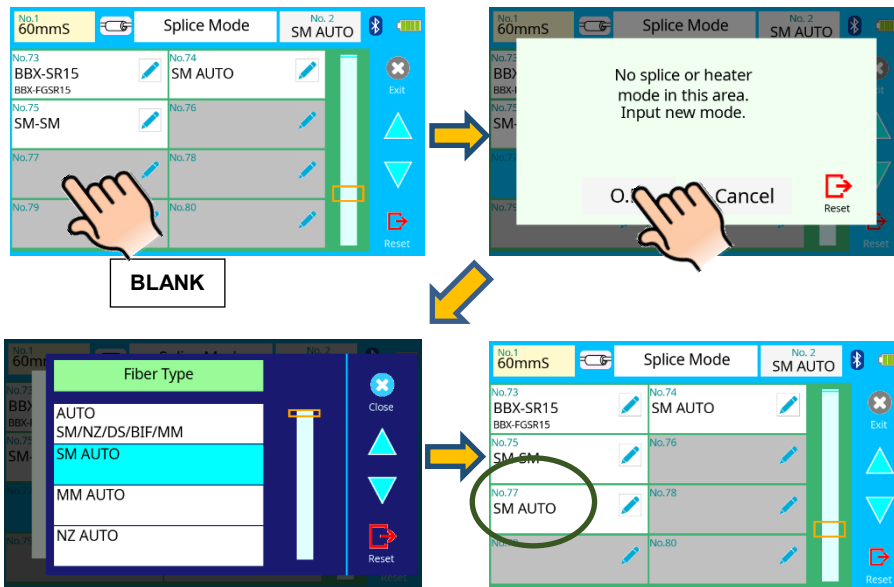


Creating or deleting splice modes

How to create a splice mode


There are necessary splice modes stored when the splicer is first delivered, and all the other modes are displayed [BLANK]. Follow the steps below to add a splice mode:

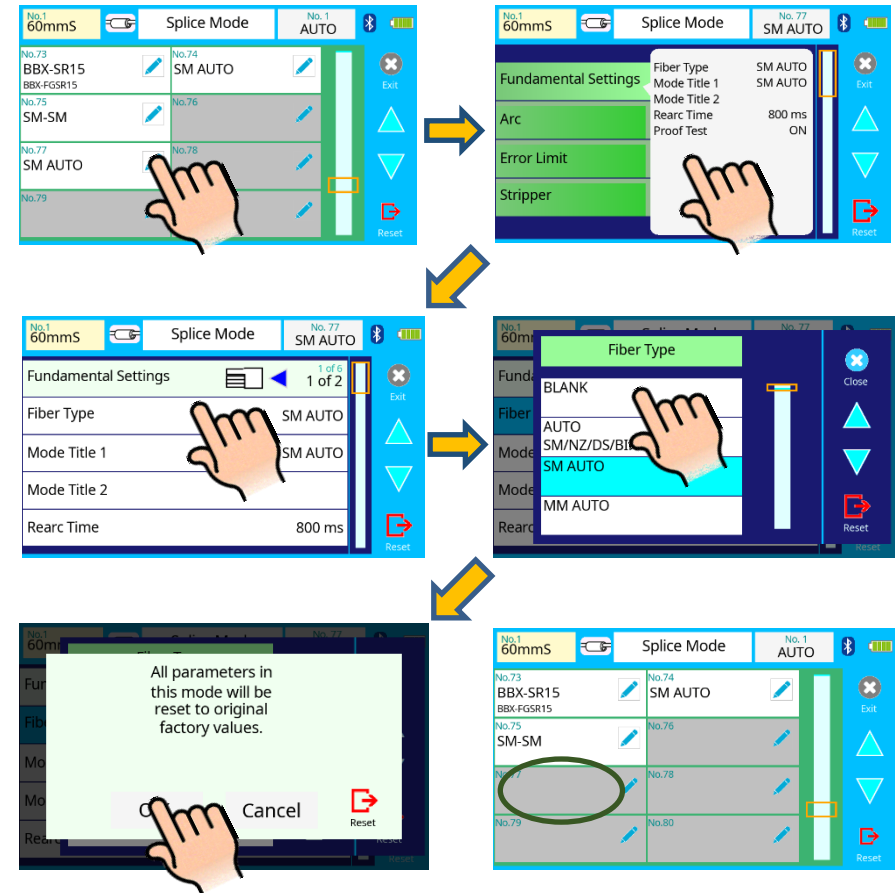
1. Select "BLANK" icon which color is a gray in [Splice Mode] screen.
2. Change "Fiber Type" to the splice mode in the data base.
3. These parameters selected "Fiber Type" are installed to the splice mode.



How to erase splice mode

Splice mode can be erased. Follow the below steps to erase splice mode.

1. Press  icon of the mode to be erased.
2. Select [Fiber Type] and change it into [BLANK]



Detail of the parameters in splice mode

AUTO mode and FAST mode: **[** AUTO]**, **[** FAST]**

Below is a list of Splicing parameters for AUTO modes and FAST mode. Only a limited number of parameters listed below are displayed for those modes to simplify the operation. Additional hidden parameters are all fixed values set at the factory.

Parameter	Description
Fundamental Settings	
Fiber Type	List of splice modes stored in database is displayed. A selected splice mode stored in the database area is copied to a selected splice mode in the user-programmable area.
Mode Title1	Title for a splice mode expressed in up to 11 characters.
Mode Title2	Detailed explanation for a splice mode expressed in up to 15 characters. Title2 is displayed at the [Splice Mode Select] menu.
Rearc Time	Splice loss may be improved by an additional "rearc" discharge in some cases. The duration of this additional arc can be changed by this parameter.
Proof Test	If [Proof Test] is set to "ON", a proof-test is performed upon opening the wind protector after splicing or by pressing the RESET key.
Arc	
Cleaning Arc	A cleaning arc burns off microscopic dust particles on the surface of the fiber with an arc discharge for a short period of time. The duration of the cleaning arc can be changed by this parameter.
Arc Power	Arc Power is fixed at STANDARD. Arc Power is changed automatically.
Arc Time	Arc Time is fixed at 6000ms. This is automatically changed depending on the cladding illumination during Arc Discharge.

Parameter	Description
Error Limit	
Cleave Angle Limit	Error message is displayed if the cleave angle of either the left or right fiber ends exceeds the selected threshold (cleave limit).
Cleave Shape Error	Error message is displayed if the cleaved end face of either left or right fiber exceeds the selected threshold (cleave shape).
Loss Limit	Error message is displayed if the estimated splice loss exceeds selected threshold (loss limit).
Fiber Angle Limit	An error message is displayed if the fiber offset exceeds the selected threshold (Fiber Angle).
Bubble Sensitivity	An error message is displayed if the bubble of fiber exceeds the selected threshold (bubble).
Stripper	
Heat Temperature Level	These are stripper parameters. They are automatically sent to the stripper if [Heater Parameter Control] in "Stripper Setting" menu is set to "Splice Mode". See the detail in "Bluetooth" section.
Heat Finish Time	

Special mode: [SM], [NZ], [DS], [MM]

Splicing parameters: standard modes

In other splice modes in the user-selectable database, the user can select from a series of factory-set splicing modes for various splicing combinations. Below are the descriptions of the various parameters used in these modes.

Parameter	Description
Fundamental Settings	
Fiber Type	A list of splice modes stored in the splicer database is displayed. Upon inputting the appropriate mode, the selected splice mode stored in database area is copied to a selected splice mode in user-programmable area.
Mode Title1	Title for a splice mode expressed in up to 11 characters.
Mode Title2	Detail explanation for a splice mode expressed in up to 15 characters. Title2 is displayed at the [Splice Mode Select] menu.
Rearc Time	Splice loss may be improved by an additional "rear" discharge in some cases. The duration of this additional arc can be changed by this parameter.
Proof test	An ON/OFF setup of the proof test done after splice is performed.
Gap Settings	
Cleaning Arc	A cleaning arc removes dust on the surface of the fiber with an arc discharge for a short period of time. The duration of the cleaning arc can be changed by this parameter.
Gap	Sets the end-face gap between the left and right fibers at the time of aligning and pre-fusion discharge.
Gapset Position	Sets the relative position of the splicing location to the center of electrodes. Splice loss may be improved in the case of dissimilar fiber splicing by shifting [Gapset Pos] towards a fiber whose MFD is bigger than the other fiber MFD.

Parameter	Description
XY Aignment	
Focus-L/R	Sets the focal point for fiber observation. The focal point moves closer to the core when [Focus] value is increased. "Auto" focus is strongly recommended, as [Focus] optimization is very difficult. Left and right fibers are focused independently even if they are a different fiber type (dissimilar fiber splicing). If the fiber core cannot be observed (e.g. MM fiber), use the "Edge" parameter. [Align] and [Est. Mode] are automatically fixed to the "Clad" setting. [ECF] and [Auto Power] are automatically fixed to the "OFF" setting.
Align	Sets the aligning method for the fibers. "Core" :Aligns fibers by core position. "Clad" :Aligns fibers by center position of the cladding of the fiber. "Manual" :Aligns fibers manually.
ECF	Sets the axial offset ratio for ECF. See [ECF Splice] for detail. For a splice mode in which arc time is 5 sec. or longer, setting [ECF] "OFF" is recommended. If [Align] is set to "Edge", "Clad" or "Manual", [ECF] is automatically fixed to "OFF". If [ECF] is set "OFF", [Auto Power] is automatically fixed to "OFF".
Auto Power	Optimizes Arc power according to core concentricity-error. This function is used in combination with ECF. If [ECF] is set to "OFF", [Auto Power] is automatically fixed to "OFF"

Parameter	Description
Prefuse and Stuff	
Prefuse Power	Sets the power of the prefuse arc, which is an arc discharge occurring from the beginning until the fibers begin stuffing. If [Prefuse Power] is set too low, axial offset may occur if cleaved angles are relatively poor. If [Prefuse Power] is set too high, fiber end faces are fused excessively and splice loss gets worse.
Prefuse Time	Sets the duration of the prefuse arc, which is arc discharge occurring from the beginning until the fibers begin stuffing. Longer [Prefuse Time] is synonymous with higher [Prefuse Power].
Overlap	Sets the overlap amount of fibers at the fiber stuffing stage. Relatively small [Overlap] is recommended if the [Prefuse Power] is low, while relatively large [Overlap] is recommended if the [Prefuse Power] is high.
Arc	
Arc1 Power	Arc discharge can be separated into two stages. Arc1 Power is the first stage. This sets Arc1 Power.
Arc1 Time	Sets Arc1 time. Caution If Arc1 Time is set 1 sec. or less and Arc2 Power is set to "OFF", the splice may break during proof-test stage.
Arc2 Power	Arc2 is the second arc discharge stage. This sets Arc2 Power.
Arc2 Time	Sets the total Arc2 time. Usually set this value to "0sec". It is possible to set a very long arc time. However, when the total of the Arc 1 time and Arc2 time exceeds 30 seconds, always adjust the function [Arc2 ON Time] and [Arc2 OFF Time] to weaken the arc power. A continuous arc over 30 seconds, without weakening the arc power, may damage the arc discharge unit.
Arc2 On-Time	During Arc2 discharge, arc power can be pulsed by turning the arc on and off. This sets the amount of time that Arc2 is ON.
Arc2 Off-Time	Sets Arc2 OFF Time during Arc2. When the Arc2 discharge is intermittent, re-arc discharge is also intermittent. When continuous re-arc discharge is necessary, set this parameter to "OFF".

Parameter	Description
Tapering	
Taper Splice	Splice loss is sometimes improved when the fiber is tapered (pulled) during arc discharge to make the splice thinner. This sets taper function "ON". The following three parameters determine the taper shape.
Taper Wait	Sets the taper wait time from the end of fiber stuffing until the start of pulling fiber.
Taper Speed	Sets the fiber pulling speed.
Taper Length	Sets the fiber pulling length.
Estimation	
Estimating Mode	Selects splice loss estimation to "OFF" "Clad" "Core" "Core-Fine"
MFD-Left MFD-Right	Sets MFD of the fibers. This MFD value is taken into account for estimating splice loss.
Minimum Loss	This amount is added to the estimated splice loss originally calculated. When splicing specialty or dissimilar fibers, a high actual splice loss may occur even with optimized arc conditions. To make the actual splice loss concur with the estimated splice loss, set the minimum value of estimate to the minimum optimized actual splice loss.
Wave Length	Sets the wave length. This value is taken into account for estimating splice loss.
Core Bending Coef.	Determines how Core bending (core step / core curve) influences splice loss estimation. If "Estimating Mode" is set "OFF" or "CLAD," Core bending is automatically set "OFF."

Parameter	Description
Error Limit	
Cleave Angle Limit	An error message is displayed if the cleave angle of either the left or right fiber ends exceeds the selected threshold (cleave limit). "OFF": Does not make judgment on cleave angle.
Cleave Shape Error	Error message is displayed if the cleaved end face of either left or right fiber exceeds the selected threshold (cleave shape). "OFF": Does not make judgment on cleave shape.
Fiber Angle Limit	An error message is displayed if the bend angle of the two fibers spliced exceeds the selected threshold (Fiber Angle Limit). "OFF": Does not make judgment on fiber angle.
Loss Limit	An error message is displayed if the estimated splice loss exceeds selected threshold (loss limit).
Bubble Sensitivity	An error message is displayed if the bubble of fiber exceeds the selected threshold (bubble).
Stripper	
Heat Temperature Level	These are stripper parameters. They are automatically sent to the stripper if [Heater Parameter Control] in "Stripper Setting" menu is set to "Splice Mode". See the detail in "Bluetooth" section.
Heat Finish Time	

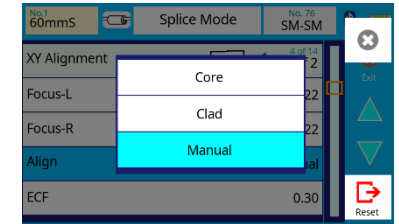


➤ Menu changes when [Splice Mode] is set to [** AUTO] or [** FAST]

Manual Splice Mode

This mode is to manually align and splice fibers. The following procedure is required, and is different from standard automatic splicing.

1. Select a splice mode that allows the splice parameter [Align] in page two of splice mode edit menu to be changed to "manual" (i.e. SM-SM mode).
2. Press **SET** key to drive the fibers forward. The fibers stop moving forward at the Gapset position.
3. Select a motor to be manually moved by pressing **MENU** key. The name of the motor to be moved is displayed in the monitor. Motor speed can be selected "fast" or "slow" by pressing **SET** key.
4. Press **Up/Down** Arrow key to move the selected motor and drive the fibers forward or backward.
5. After manual alignment is completed, press **UP** key to arc and splice the fibers.



Motor	Up Arrow key	Down Arrow key
ZL/ZR	Forward	Backward
X/Y	Upward	Downward
Focus X	Lens moves nearer fiber.	Lens moves away from fiber.
Focus Y		

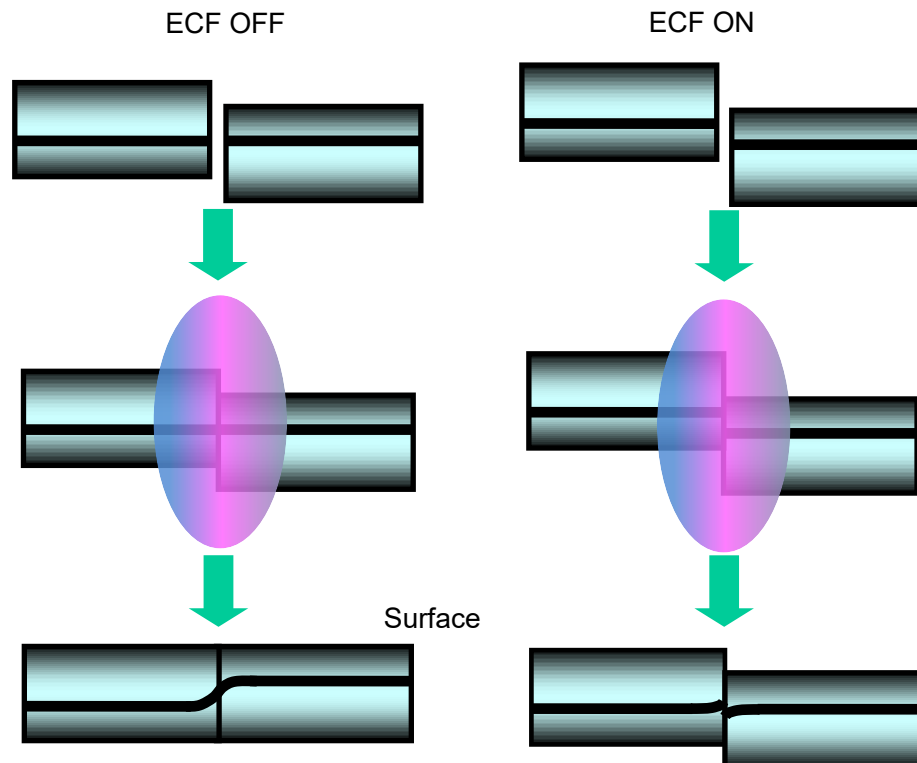


- The splicer beeps if motor reaches its limit and stops. Press the opposite arrow key to move the motor again.
- Display messages can be erased by pressing ENT key. The message can be displayed by pressing ENT key again. [** AUTO] or [** FAST]

ECF Splice

When fibers having some core concentricity-error are aligned using the core-to-core method, their outer claddings are not aligned in line with each other as shown below. However, surface tension created during arc discharge aligns the fibers cladding-to-cladding due to the viscous self-centering effect. This results in a high splice loss due to the fact that the cores of the fibers are offset during the process.

The ECF (Eccentricity Correct Function) function in the splicer prevents this from happening. The amount of offset expected due to this surface tension phenomenon is calculated in advance, and this is taken into account to determine an intentional core axis offset amount that is added after the fiber cores are aligned. With this function, the fibers are core-to-core spliced even with the effect mentioned above. Some "Core step" may remain at splice point but this gives much lower splice loss than core axial offset. A long arc discharge counteracts ECF, because surface tension eventually aligns and splices fibers cladding-to-cladding. Canceling [ECF] by setting this "OFF" reduces core step amount and increases core axial offset.



Attenuation splice mode (AT1,AT2)

Attenuation splice mode makes an intentional core axial offset to create attenuation at the splice point. Two types of attenuation splice modes are included in the splicer as stated below. Select either "AT1(SM)", "AT1 (DS)", "AT2(SM)", "AT2 (DS) or AT2 (MM) in data base area at [Fiber Type].

[AT1]

[AT1] creates an intentional core axial offset and splices fibers. [AT1] mode provides an estimated splice loss, but this should be regarded as a reference as the estimated splice loss may not be correct in some cases, depending on fiber properties. A power meter is recommended for correct splice loss measurements.

Parameter	Description
Target Loss	Sets target splice loss.
Coefficient	If actual splice loss measured does not match [Target Loss], the "coefficient" can be used to adjust this. This is often more practical than "Target loss" or "MFD" in terms of accuracy.
MFD-Left MFD-Right	Sets MFD of fibers to be spliced.
Other Parameters	Refer to other splice modes for complete description.

[AT2]

This mode allows the users to set a starting core offset value and a finishing core offset value. Set [Start Offset] manually and then splicing starts. Re-arc is performed continuously / automatically until the axial offset reaches [Stop Offset] value. A splice loss estimate is not performed.

Parameter	Description
Start Offset	Sets axial offset amount before splicing.
Stop Offset	Re-arc is continuously performed until axial offset reaches specific offset amount [Stop Offset]. Axial offset amount decreases as splicing occurs, so [Stop Offset] must always be smaller than [Start Offset]. The maximum amount of [Stop Offset] is 80% of [Start Offset].
Other Parameters	Refer to other splice modes for complete description.



[AT2] mode provides more stable performance than [AT1] mode, but some variation may inevitably occur. To decrease variation, set the [Cleave Limit] as low as possible. Attenuation splices made with [AT1] / [AT2] modes are not as accurate as power meter attenuation feedback splicing. [AT2 (MM)] mode is for attenuation splicing with MM fiber. Cladding alignment is performed with [AT2 (MM)] mode.

Heater Mode Menu

Composition of the Heater Mode Menu

Common parameters for all heating modes can be set in this menu
[Heater Mode] screen appears when selecting the [Heater Mode] icon at [READY] screen.



How to change the heater mode.

1. When selecting the listed icon at [Heater Mode] screen, the color of the icon changes to blue and the splice mode is changed.
2. Select the [RESET] icon to return to the [READY] screen.



- When using a non-Fujikura protection sleeve, please set up parameters in separate heater modes.
- When using a non-Fujikura protection sleeve, the splice protection quality cannot be guaranteed.

Select Heater Mode

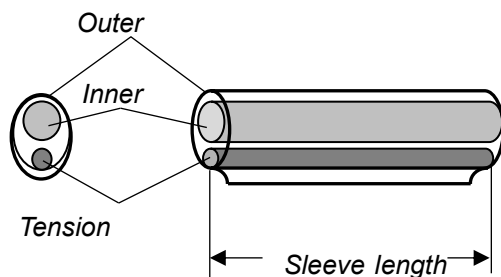
Each tube-heating mode is optimized for a type of Fujikura protection sleeve.
These modes can be found in the database area for reference. Copy the appropriate one and paste it to the user-programmable area. The operator can edit the user-programmable modes.

Parameter	Description
60mmS FP-03	For standard 60mm protection sleeve, Such as Fujikura FP-03 or FP-03M protection sleeves.
40mmS FP-03(L=40)	For standard 40mm protection sleeve, Such as Fujikura FP-03(L=40) protection sleeves. Note: Cleave length 8mm with Nylon coated fiber.
15mmS FPS01-400-15	400 or less um of diameters of coating. Splice of the interference length of 5 mm or less.
mmS FPS01-400-	400 or less um of diameters of coating. In addition, there are 20, 25, and 34 or 40 mm length.
20mmS FPS01-900-20	900 or less um of diameters of coating. Splice of the interference length of 6 mm or less
mmS FPS01-900-	900 or less um of diameters of coating. In addition, there are 25, and 34 or 40 mm length.
60mmS FPS01-DC-60	For Splice of a drops cable.
FUSE2/3 ST-FC	For Fuse connect splice.
FUSE900 SC-LC-ST-FC	
FUSE2/3 SC-LC	
40mmR FP-05	For standard 40mm protection sleeve, Such as Fujikura FP-05 protection sleeves.
40mmR FP-04T	For standard 40mm protection sleeve, Such as Fujikura FP-04T protection sleeves.
28mmR FPS08-28	For standard 28mm protection sleeve, Such as Fujikura FPS08-28 protection sleeves.
30mmR FPS04-30	For standard 30mm protection sleeve, Such as Fujikura FPS04-30 protection sleeves.
mmS-L FPS01-900-	900 or less um of diameters of coating with Covering material of Hytrel. In addition, there are 25, and 34 mm length.
60mmSS SLIM 60	For slim type 60mm protection sleeve.
40mmSS SLIM 40	For slim type 40mm protection sleeve.

The dimensions of the Protection Sleeve after heat shrink


<i>Form</i>	<i>Tension member</i>	<i>Sleeve length</i>	<i>Prepare fiber length</i>	<i>Diameter of an adaptation optical fiber</i>	<i>Diameter of a result</i>
<i>FP-03</i>	<i>SUS</i>	<i>60mm</i>	<i>16mm or less</i>	<i>250~900um</i>	<i>3.1mm</i>
<i>FP-03(40mm)</i>	<i>SUS</i>	<i>40mm</i>	<i>10mm or less</i>	<i>250~900um</i>	<i>3.1mm</i>
<i>FP-04T</i>	<i>Glass Ceramic</i>	<i>40mm</i>	<i>10mm or less</i>	<i>250~900um</i>	<i>4.0mm</i>
<i>FPS01-400-15</i>	<i>SUS</i>	<i>15mm</i>	<i>5mm or less</i>	<i>~400um</i>	<i>1.5mm</i>
<i>FPS01-900-20</i>	<i>SUS</i>	<i>20mm</i>	<i>6mm or less</i>	<i>~900um</i>	<i>2.3mm</i>

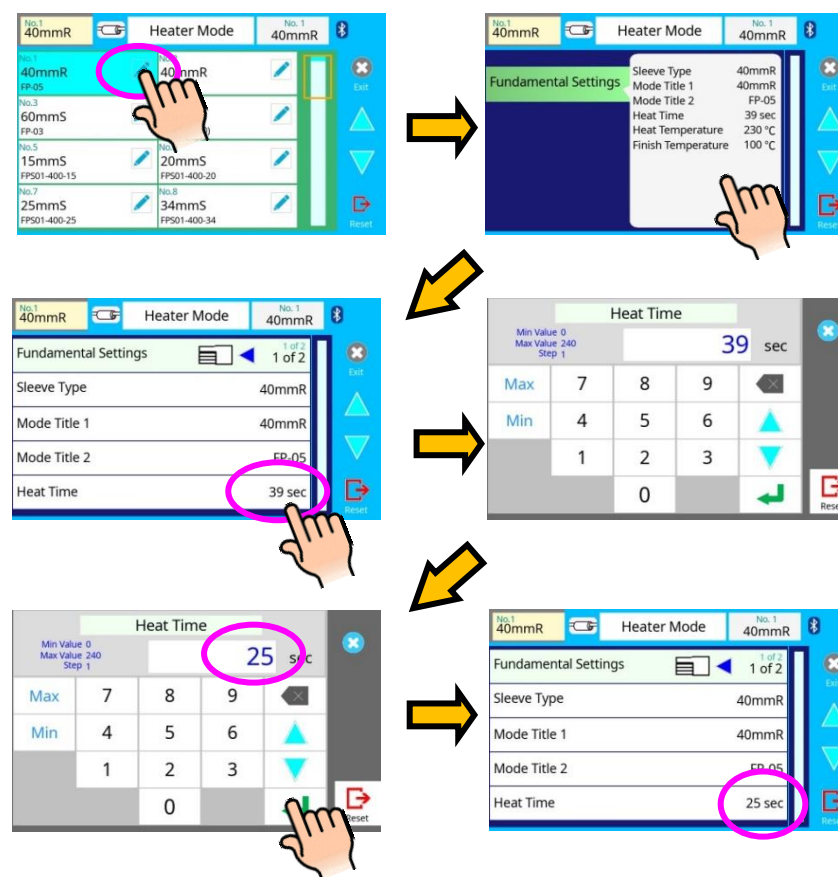
The dimensions of the protection sleeve after shrink are varied depending on the diameter of the fiber.



Referring to or Editing Heater Mode


Tube-heating conditions stored in heater mode can be edited or changed

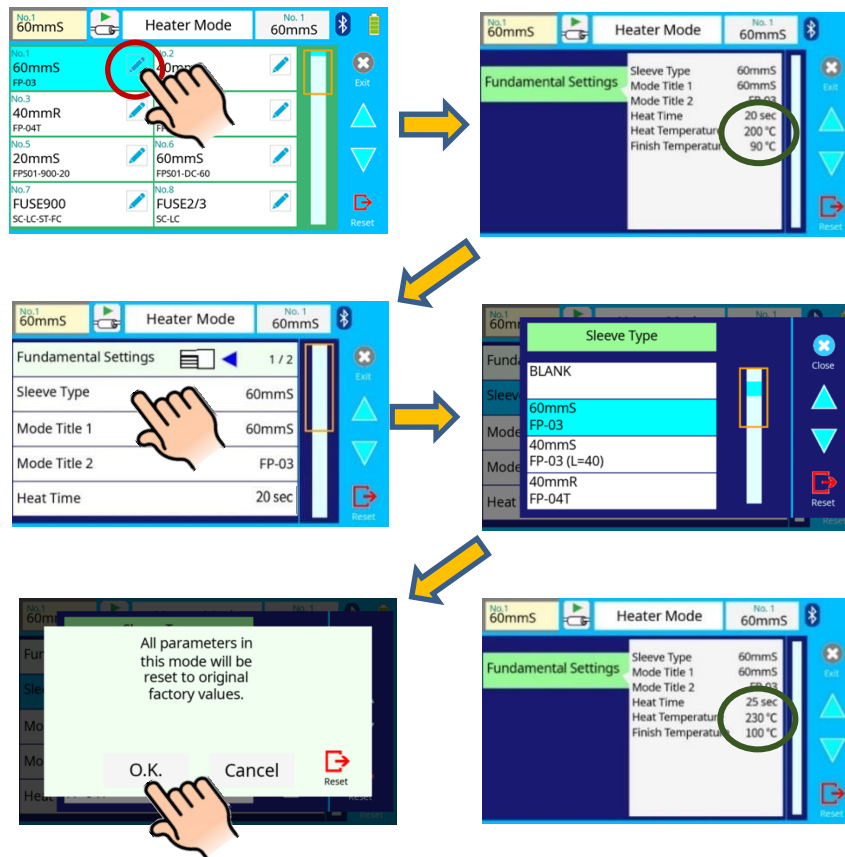
1. Select the  icon in the [Heater Mode] menu, to show the heater mode.
The category is displayed in left side. The parameters included in the category are displayed in the right side.
2. Select and change the category icon and find the target parameter.
3. Select the parameter displayed in right side to show the parameter edit screen.
4. Select and change the target parameter.



Initialization edited parameters

Tube-heating conditions stored in heater mode can be edited or changed

1. Select the  icon in the [Heater Mode] menu, to show the heater mode.
The category is displayed in left side. The parameters included in the category are displayed in the right side.
2. Select and change the category icon and find the target parameter.
3. Select the parameter displayed in right side to show the parameter edit screen.
4. Select and change the target parameter.

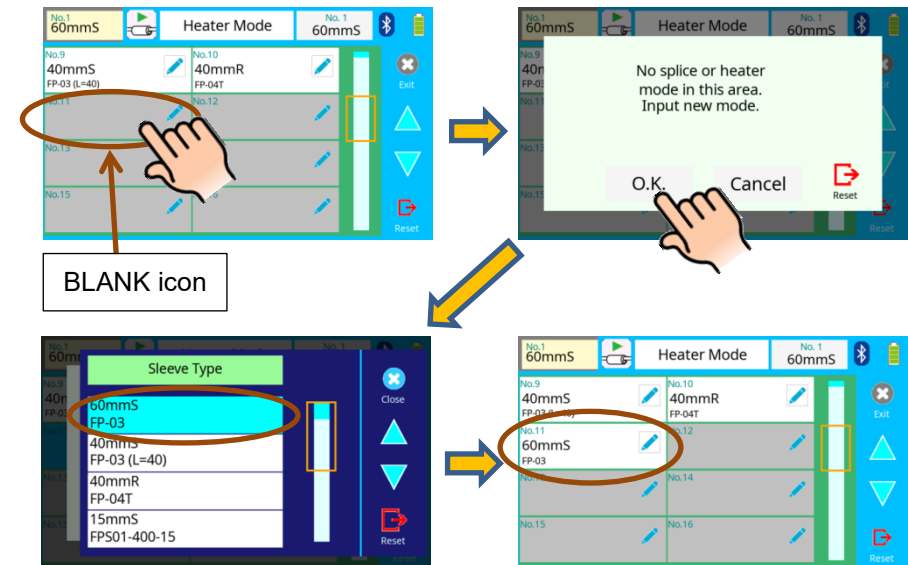


Creating and Deleting Heater Mode

Creating heater modes


There are necessary heater modes stored when the splicer is first delivered, and all the other modes are displayed [BLANK]. Follow the steps below to add a heater mode:

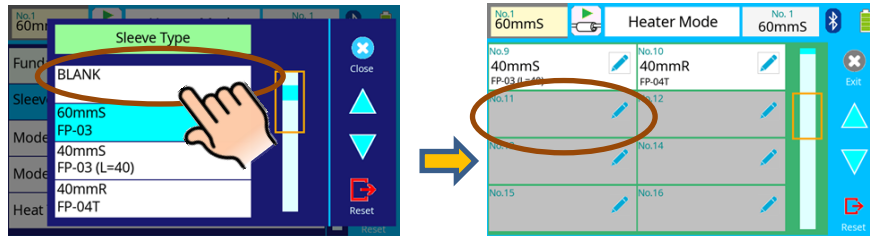
1. Select "BLANK" icon which color is a gray in [Heater Mode] screen.
2. Change "Sleeve Type" to the heater mode in the data base.
3. The parameters selected "Sleeve Type" are installed to the heater mode.



Deleting Heater Mode

Heater mode can be erased. Follow the below steps to erase heater mode.

1. Select the  icon in the [Heater Mode] menu, to show the heater mode.
2. Select [Sleeve Type] and change to [BLANK]



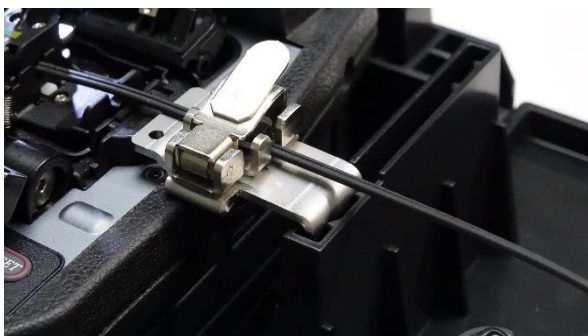
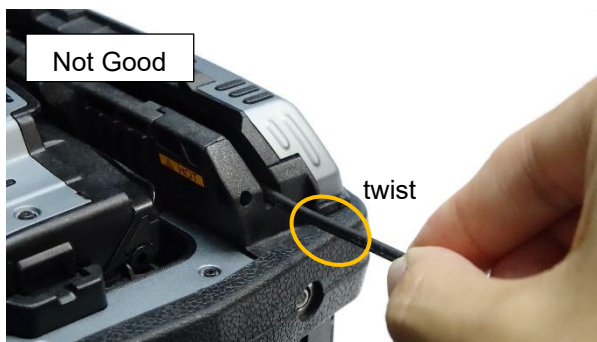
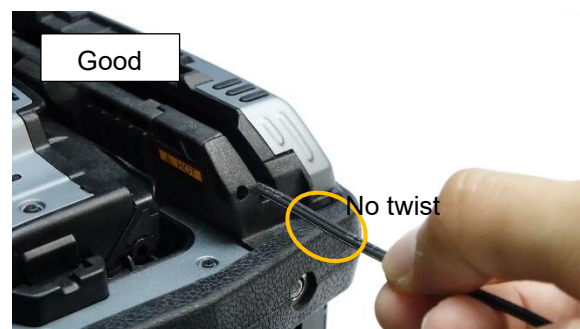
Detail of the parameter in Heater Mode Menu

The parameters in the Heater Mode Menu are listed below:

Parameter	Description
Sleeve type	Sets sleeve type. List of all heating modes are displayed. Select a mode in the list and this is copied to a user-programmable mode.
Mode Title1	Title of a heater mode that is displayed in the lower right part of the monitor during the splicing/heating process. Max number of characters used is 7.
Mode Title2	Description of a heater mode in the [Sleeve Type] screen. Max number of characters used is 15.
Heat Time	Sets heating time from the beginning to the end (cool-down completion). Heating time is automatically adjusted with atmospheric conditions, such as ambient temperature. Heating time may be longer or shorter than [Heat time] set.
Heat Temperature	Sets heating temperature.
Finish Temperature	<p>Sets the finish temperature. The buzzer beeps after completion of the heating.</p> <p>Caution</p> <p>Do not touch the shrunk sleeve after removing the fiber from the tube heater. It may be hot. Hot sleeves easily deform and can cause some residual stress at the splice point. Use J-plate to cool down the sleeve.</p>

Tube heating drop cable

Be careful not to twist fiber especially for using drop cable.

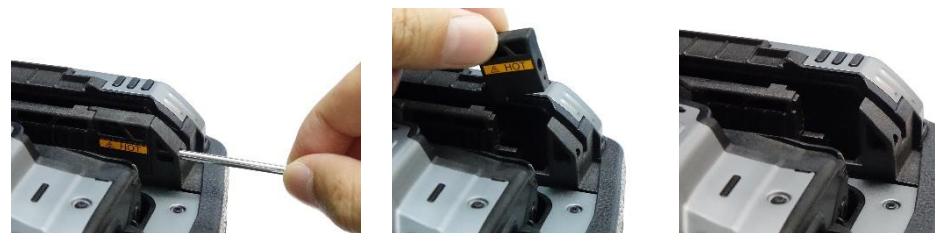


Tube heating Splice-on-Connector

This splicer is applicable to tube-heating for splicer-on-connector. In case of Fujikura Fuse Connect, removing the right clamp of the heater is necessary as below.

Remove heater clamp

Loosen the screw in the right side of the heater and remove the clamp by screw driver. Then, it enables to set the splice-on-connector with the connector holder.



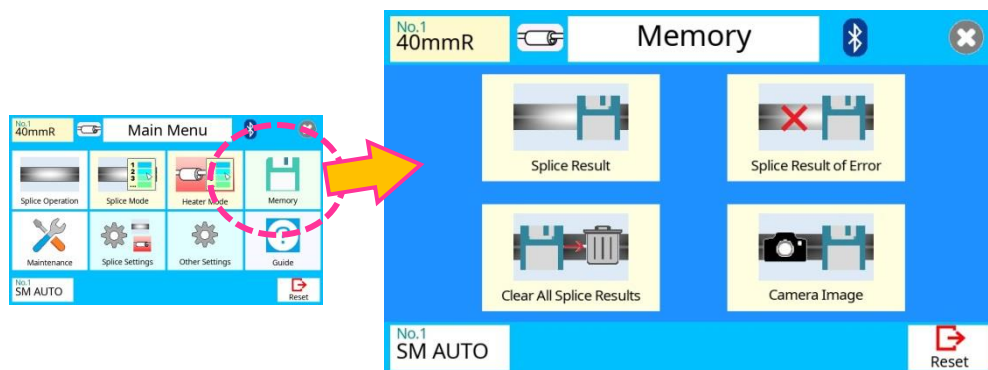
When using Fujikura Fuse Connect, where a clamp is removed, a connector holder is set to heater right-hand side, and heating can be performed.

Please press down a connector holder from a top in the yellow direction of a line, and attach a screw.

Memory Menu

Composition of the Memory Menu

This splicer stores up to 20,000 splice results. Contents of splice data stored vary depending on the splice mode.



Memory Menu Settings

List of Memory Menu parameters

Parameter	Description
Splice Result	Up to 20,000 splice results can be stored and displayed. The stored data varies according to the splice mode. Selecting "Splice Result" enables display of all stored splice data records.
Splice Result of Error	Selecting "Splice Result of Errors" will display splice data records for only the splices in which some error message occurred. The error message for each splice is included in the available data.
Clear All Splice Results	All splicing results can be deleted at once.
Camera Image	Up to 100 camera images can be stored and displayed.

Review, editing, and deletion of splice results

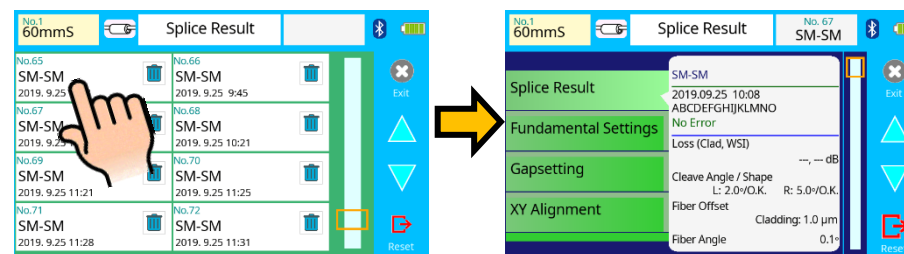
Splicing results stored in the memory can be displayed. Comments can be added or edited.





Memory Data can be downloaded by USB.
Refer to instruction manual of "Data Connection"

Display and editing splice result data

1. Select the **Memory** icon in the [Main Menu] screen. Select the **Splice Results** icon to display the [Splice Results] Menu. This enables access to all the splice data stored in memory.
2. Move the cursor using the "UP" or "DOWN" arrow icon to scroll to the desired memory area, and then touch the screen for a specific memory number. This displays the detailed data for the selected splice record.
3. To add or edit comments, select the target result icon to display the [Input Comment] screen.



Delete of splice result data

1. Please refer to the above to display the splice memory.
2. Select the desired target result and click the  icon
3. Click the  icon
4. To confirm and delete the data for the selected record, then press “Yes”.

Splice Result Error

Error messages can only be displayed for splice results that generated an error.

1. Select the Memory icon in the [Main Menu] screen.
Select the Splice Result of Error icon to display the [Splice Result of Error] Menu. This enables access to all the splice data stored in memory.
2. Move the cursor using the “UP” or “DOWN” arrow icon to scroll to the desired memory area, and then touch the screen for a specific memory number. This displays the detailed data for the selected splice record.
3. The error message is displayed on the first page of the splice data. It will be flashing on and off.
4. Please refer to the section above for how to delete data.

Clear All Splice Results

All splicing results can be deleted at once.

1. Select the Clear All Splice Results icon in the [Memory] Menu.
2. Press the “Execute” icon to confirm and delete all splice results data.

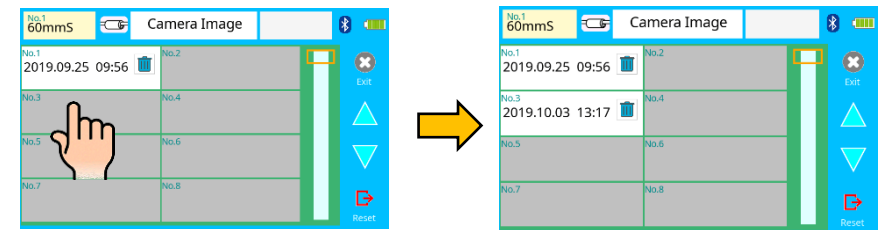
Camera Image

This function is used to store the fiber image after splice or error occurred. A total of 100 images can be stored.

1. Select the Camera Image icon in the [Memory] screen.
2. Select the desired target memory to display or delete.

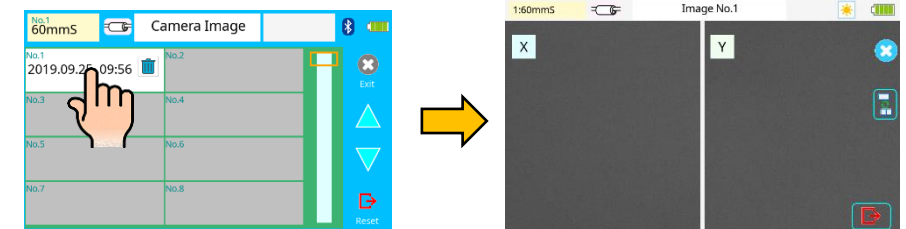
How to store the Camera Image Data

Select a specific memory number location where there is no image already stored. Press the “O.K.” icon to store the camera image data to that location.




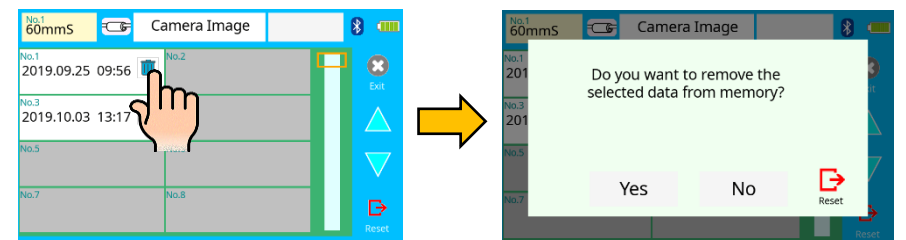
How to display the Camera Image Data

Select the desired memory number. The fiber image data is displayed.



How to delete the Camera Image Data

Press the  icon for the image data to be deleted. The confirmation screen is displayed. Select the “Yes” icon to confirm deletion. The camera image data is deleted.

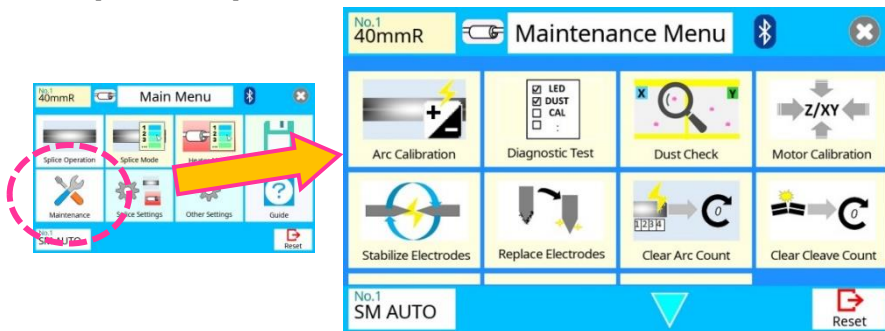


Max number of image storage is 100, and the image cannot be over-written, so delete some images to store new images.

Maintenance Menu

Composition of the Maintenance Menu

Common parameters for all the modes for Maintenance Menu can be set. [Maintenance Menu] screen appears when selecting the Maintenance Menu icon at the [Main Menu] screen.



Detail of the Maintenance Menu

The parameters in the Maintenance Menu are listed below:

Maintenance parameter list

Parameter	Description
Arc Calibration	When executing the Arc Calibration, select this icon. Check the Arc Calibration Section.
Diagnostic Test	Perform this function in the event of splicer operation trouble. Check the Diagnostic Test section.
Dust Check	Checks the optical path for dust/dirt and judges if it adversely affects splice quality. Check the Dust Check section.
Motor Calibration	Check the Motor Calibration section.
Stabilize Electrode	Check the Stabilize Electrode section.
Replace Electrode	Check the Replace Electrode section.
Clear Arc Count	Check the Clear Arc Count section.
Clear Cleave Count	Check the Clear Cleave Count section.
Battery Discharge	Check the Battery Discharge section.
Motor Drive	Check the Clear Cleave Count section.
Maintenance Info.	Check the Maintenance Info. section.

Arc Calibration

Atmospheric conditions such as temperature, humidity, and pressure are constantly changing, which creates variability in the arc temperature. This splicer is equipped with a temperature sensor that is used in a constant feedback monitoring control system to regulate the arc power to a constant level. Changes in arc power due to electrode wear and glass adhesion cannot be corrected automatically. Also, the center position of arc discharge sometimes shifts to the left or right. In this case, the fiber splicing position has to be shifted in relation to the arc discharge center. It is necessary to perform an arc power calibration to eliminate both of these issues.



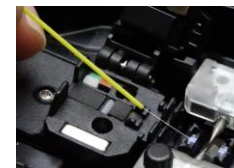
Arc calibration is performed automatically using [AUTO] mode only, so arc calibration does not have to be performed when splicing in this mode.

Execute [Arc calibration] before using non-auto mode.

When performing the [Arc Calibration] function, change the arc power "factor" value. The factor value is used in the algorithm program for all splicing. The arc power value will not change in the splice modes.

Operation procedure

1. Select **[Arc Calibration]** icon in [Maintenance Menu] to display.
2. Load prepared fibers in the splicer
3. Close the wind protector and press **[SET]** key to initiate the ARC Calibration.
4. A message appears after Arc Calibration. Please check it and take the appropriate action displayed with the message. A message appears after Arc Calibration. Please check it and take the appropriate action displayed with the message.



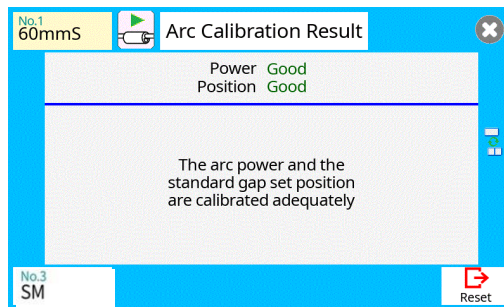
Use standard SMF ITU-T G652 fiber for Arc Calibration.

Use well prepared fibers for arc calibration. Dust on the fiber surface affects arc calibration.

Cleave angle threshold does not link to the parameter "Cleave Limit" in splicing modes. Cleave angle threshold is independently set for arc calibration. See section [Maintenance Settings] to change cleave angle threshold.

“Good” Message

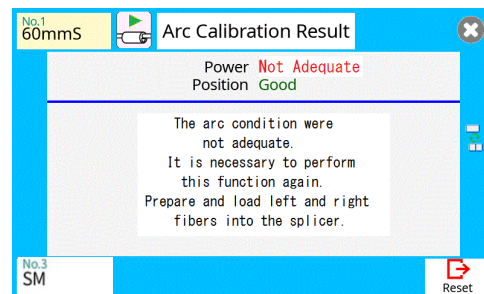
Arc power and splicing position calibration have successfully completed. Press **RESET** key to exit.



Result: Good

“Not Adequate” Message

Arc power and splicing position calibration are completed but further calibration is strongly recommended, as the change from the previous arc calibration is too large. Press **SET** key to perform arc calibration, or **RESET** key (arc calibration is not completed).



Result: Not Adequate



- It may take several times until “Good” depending on using environment.
- Number threshold can be set so that "Test Finish" message is displayed after specific number of arc calibrations is performed. See section [Machine Settings] for detail.

Diagnostic Test

The splicer has a built in diagnostic test feature that allows the operator to perform a simple one step evaluation of splicer performance covering several different critical variables. Perform this function in the event of splicer operation trouble.

Operation procedure

1. Select the **Diagnostic Test** icon in the [Maintenance Menu] and execute
2. Upon completion of all checks and adjustments, a list of results is displayed. If the dust check result fails, clean the objective lenses. In the case that cleaning doesn't eliminate contamination, there is a possibility that the contamination may have entered the inside of the optical path. Please contact the authorized distributor for additional instructions.
3. The dust check and motor calibration functions exist as independent instructions in [Maintenance Menu]. It is possible to execute them independently.

Check Item	Description
LED Check	Measures and adjusts the brightness of the illumination LED.
Dust Check	Checks the optical path for dust/dirt and judges if it adversely affects splice quality. If contamination exists, this function indicates the location.
Motor Calibration	Checks the Motor Limit Sensor.
Arc Calibration	Automatically calibrates the arc power factor and fiber splicing position.
I/O Port Check	Checks for normal operation of the splicer input and output port.
Memory Check	Checks the internal splicer memory.

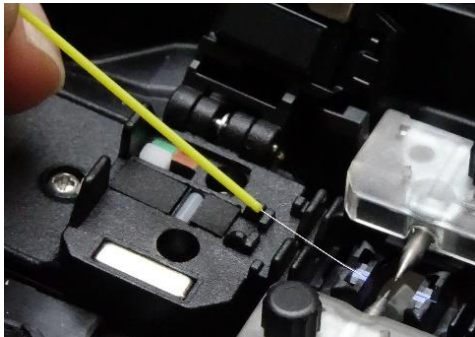


- Before the start of the test, remove the fibers from the splicer.
- When the Motor check is completed, prepare and load the fibers into the splicer and press **SET** key

Dust Check

The splicer observes fibers through image processing. Dust or contaminants on the cameras and lenses may interfere with normal observation of fibers and degrade splice quality. This function checks the optical path for the presence or absence of contaminants and judges whether they will reduce splice quality.

1. Select the **Dust Check** icon in the [Maintenance Menu].
2. If fibers are set in the splicer, remove them and press **SET** key again. The splicer begins the dust check.
3. After observation, the location of contamination judged as a potential problem blinks on the display.
4. If contamination is discovered, clean the objective lenses and redo [Dust Check] for cleaning instructions.
5. Press to finish dust check.



In case you have cleaned the objective lenses, and dirt or dust still remains, contact the authorized distributor.

Motor Calibration

Motors were adjusted at the factory before shipping. However, motor performance could change due to various reasons. This function automatically calibrates the speed of all motors.

Operation Procedure

1. Select the **Motor Calibration** icon in the [Maintenance Menu].
2. Load prepared fibers in the splicer and press **SET** key.
3. Speeds for all motors are automatically calibrated. Upon completion, [Maintenance Menu] is displayed.



Perform this function when a "Fat" or "Thin" error has occurred.

Stabilize Electrodes

In the event of sudden change in environmental conditions, etc., the arc power may become unstable, resulting in higher splice loss. This is especially likely to happen when the splicer is moved from lower elevations to higher elevations. Over time the arc power will eventually stabilize, however this process can be expedited by stabilizing the electrodes. This function can also be used in the case where many arc calibrations are required to get a "Test OK" message during the [Arc Calibration] process.

Operation Procedure

1. Select the **Stabilize Electrodes** icon.
2. Load the prepared fibers into the splicer.
3. Press **SET** key and the splicer begins to stabilize the electrodes by doing the following:
 - Perform 4 short arc discharges to measure the arc position.
 - Perform 30-cycle continuous discharges to stabilize the electrodes.
4. After completing stabilization, always perform an additional [Arc Calibration].

Replace Electrodes

When the number of arc discharges reaches the setting value, a message prompting to replace the electrodes is displayed immediately after turning on the power. Using the worn electrodes will result in greater splice loss and reduced splice strength.

Replacement Procedure

1. Select the **Replace Electrodes** icon in [Maintenance Menu].
2. Instruction messages will appear on the screen to turn off the power. Press and hold **SET** key till the LED color changes from green to red.
3. Loosen screw located on electrode by manual.
4. Take the old electrode out.
5. Install the new electrodes with care; do not touch the electrode tips.
6. Tighten screw by manual

Loose the screw



Remove the old electrode



Tighten the screw



Install the new electrode



- Apply tightening torque by manual when tightening screw to fix electrode.
- Make sure the electrodes are attached firmly after tightening screws.

7. Turn on the power, prepare and load the prepared fibers into the splicer and press SET key. After executing the arc calibration, the splicer will repeat arc discharge 30 times in succession to stabilize the electrodes.

Upon completion of repeated arc discharge, the splicer executes an arc calibration again. The operator should repeat arc calibration until the "Test Finish" message appears. For details of the arc calibration process, see section [Arc Calibration].

Clear Arc Count

This function enables the stored number of arc discharges to be reset.

1. Select the **Clear Arc Count** icon.
2. When the confirmation screen "Is it OK to clear?" appears, press **SET** key to clear.



This function is included in the [Replace Electrodes] function. The number of arc discharges in the "Total Arc Count" field displayed on the [Maintenance Info.] screen cannot be reset.

Clear Cleaver Counter

This function resets the number of cleaves stored in [Maintenance Info.].

During the wireless communication with the cleaver CT50, this function clears the memory inside the cleaver CT50.

1. Select the **Clear Cleaver Counter** icon.
2. When the confirmation screen "Is it OK to clear?" appears, select "OK" key to clear.

Parameter	Descriptions
Cleave Count	The number of times of cleave is displayed.
Blade Position	The position of a blade is displayed.
Blade Height	The height of a blade is displayed.



- This function must be performed after the cleaver is adjusted.

Battery Discharge

This function can discharge the battery pack.

If there is some gap between the battery indicator and the actual capacity, perform this function to readjust the battery indicator.

When executing this, the splicer starts to use the heater to discharge the battery pack.



- During use this function, the splicer heats the heater to discharge the battery pack. Therefore the part around the heater may be hot. Take care not to injure your figure by the heater.

Motor Drive

Some splicer motors can be manually operated individually. In the course of splicing, the motors can also be operated by calling this menu in a [PAUSE], or [FINISH] state.

1. Select the **Motor Drive** icon.
2. The name of the selected motor is displayed in the bottom section of the screen. Select the motor by using icon.
3. Press icon to drive the motor in the desired direction.

Motor	UP arrow key	DOWN arrow key
ZL/ZR	Forward	backward
X/Y	Upward	Downward
Focus X/Y	Close to the fiber	Far from the fiber



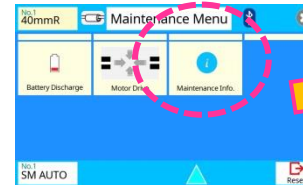
When the motor reaches the limit of the operating range, the buzzer sounds and the motor stops. Press the opposite arrow key to reverse and move the motor again.

If the motor is moved too much after splicing, the fiber may break.

Maintenance Info

The maintenance information is displayed in the Maintenance Info screen.

When pressing **Next Page** icon, "Software License" page appears.



When selecting [Maintenance Info], the following information is displayed:

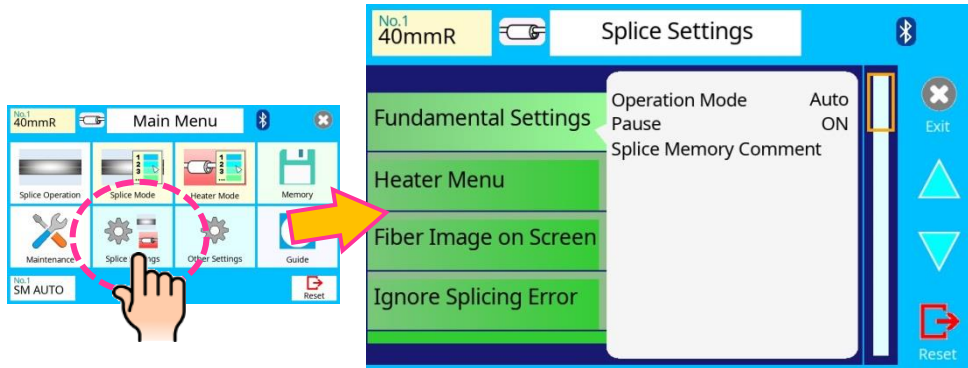
Parameter	Description
Serial Num.	Displays the serial number of the splicer.
Version	Displays the software version.
Arc Count	Displays the number of arc discharges since electrode replacement. Performing the function [Replace Electrodes] or [Clear Arc Count] resets this parameter to zero.
Total Count	Displays the total number of arc discharges.
Last Authorized Service	Displays the date of last authorized service.
Next Authorized Service	Displays the scheduled date of next authorized service.
Cleave Count	Displays the total number of Cleaves.
Blade Position	Displays the current Blade Position.
Blade Height	Displays the current Blade Height.

Splice Settings Menu

Composition of the Splice Settings Menu

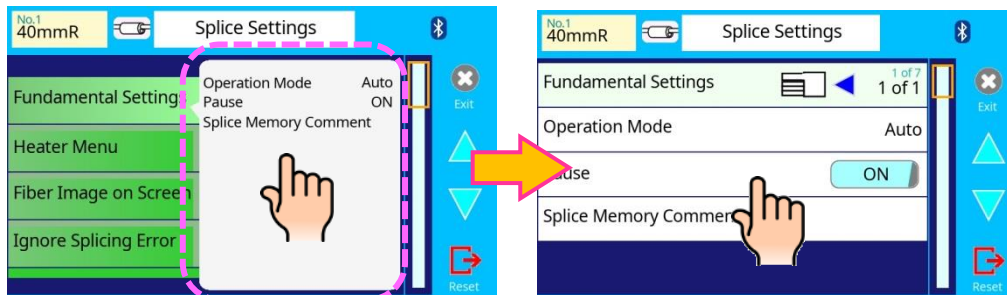
Common parameters for all splice modes can be set.

[Splice Settings] screen appears when selecting the [Splice Settings] icon at [READY] screen.



How to change the settings

1. The category is displayed in left side. The parameters included in the category are displayed in the right side.
2. Select and change the category icon and find the target parameter.
3. Select the parameter displayed in right side, to show the parameter edit screen.
4. Select and change the target parameter.



List of Splicing Settings parameters

Parameter	description
Fundamental settings	
Operation Mode	Automated wind-protector has several operation modes.
Pause1	If "Pause1" is set to "ON", the splicing operation pauses when fibers are forwarded to gap-set position. Cleave angles are displayed during the pause.
Pause2	If "Pause 2" is set to "ON", the splicing operation pauses after fiber alignment is completed. With ECF "ON", core-to-core alignment is made after this pause.
Splice Memory Comment	A comment can be added to the memory saved at the time of the end of connection.
Heater Menu	
Auto Cover Open	Select the heater cover motion. [ON]: The heater cover opens except for heating operation. [OFF]: The heater cover closes except for pressing the HEAT key.
Cover Close Time	The heater cover automatically closes if it performs no operation after "Cover Close Time". [Max Value]: 1000sec [OFF]: The heater cover does not close automatically. It is recommends to use this to prevent a dust with inserting inside.

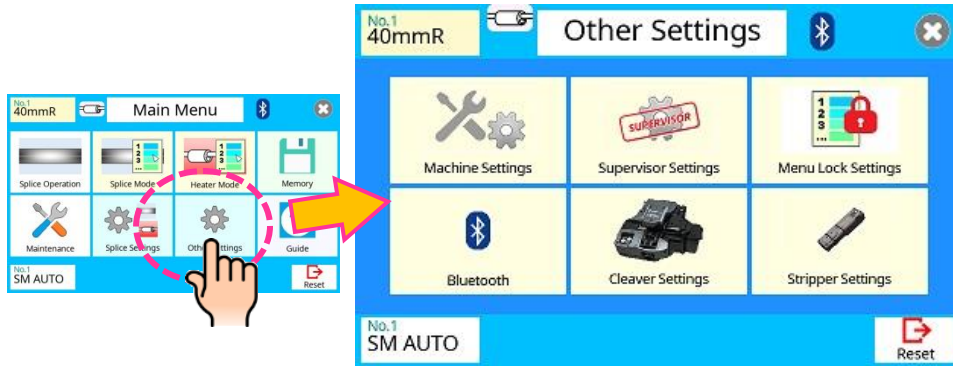
Parameter	description
Fiber Image on Screen	
Gapset	Sets the method of displaying the fiber image on the screen during Splicing operation. X: Enlarged display of X-axis image Y : Enlarged display of Y-axis image X▲▼Y: Composite display vertically of X-axis and Y-axis images
Aligning	
Arc	
Estimation	
Pause1	Sets the method of displaying the fiber image on the screen during Pause and Finish.
Pause2	
Finish	
Ignore Splicing Error	
Loss	Set to "Enable" or "Disable". Enable:An operator can accept and bypass an error shown on the left by pressing the SET key. Disable: An operator can't bypass an error shown on the left.
Bubble	
Fat	
Thin	
Cleave Angle	Set to "Enable" or "Disable". Enable :An operator can accept and continue with the error as shown on the left by pressing the SET key. Disable : An operator can't override the error as shown on the left. The unit repeats the alignment when the operator presses the SET key.
Cleave Shape	
Offset	
Gap Difference	
Other Settings	
Max Num. of Rearcs	The re-arc process sometimes improves the splice loss. However, excessive re-arc may decrease the splice strength. With this function, it is possible to limit the number of re-arcs or to disable re-arc discharge.
Cleaver Counter Mode	Set to "OFF", "1" or "2". OFF: The splicer does not increment the "Cleave Count". 1: The splicer increments the "Cleave Count" +1 for each splicing 2: The splicer increments the "Cleave Count" +2 for each splicing.

Other Settings Menu

Composition of the Other Settings Menu

Common parameters for all the modes for Other Settings Menu can be set in this menu.

Select the **Other Settings** icon at [Main Menu] screen to enter this menu.



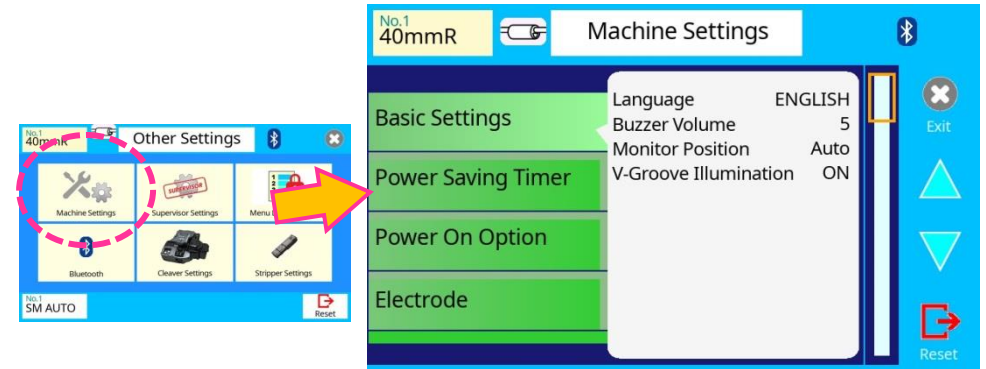
Detail of the Other Settings Menu

The parameters in the Other Settings Menu are listed below:

Parameter	Description
Machine Settings	Check the Machine Settings section.
Supervisor Setting	Check the Supervisor Settings section.
Menu Lock Settings	Check the Menu Lock Settings section.
Bluetooth	Check the Bluetooth section.
Cleaver Settings	Check the Cleaver Settings section.
Stripper Settings	Check the Stripper Settings section.

Machine Settings

Basic operation and maintenance parameters can be changed in this menu.



The list of warning and maintenance parameters in this menu follow:

Parameters List of the Machine setting menu (1 of 3)

Parameter	Description
Basic Settings	
Language	Select the language displayed on the screen. The language that can be displayed is controlled by the software version and region code.
Buzzer Volume	Sets the Buzzer Volume level.
V-Groove Illumination	Sets the lighting condition in the splicer. If "V-Groove Illumination" is set to "ON", the V-Groove will be illuminated when the Wind Protector is open.
USB Drive Mode	Sets the USB Drive Mode enable or disable. If this mode is enabled and the splicer and any PC are connected with a USB cable, the splicer enters the USB Drive Mode. See Section [Install the Instruction Manual and the Utility Software].

Parameters List of the Machine setting menu (2 of 3)

Parameter	Description
Power Saving Timer (with Battery) (with AC Adaptor)	
Dimming	Setting this function dims the brightness of the LCD monitor if the splicer is idle a certain period of time.
Sleep	Setting this function turns off the power supply to the LCD monitor if the splicer is idle a certain period of time. Always set this function to a specific shutdown time when using the battery pack. When the power supply to the LCD monitor turns off, the LED near the ON/OFF key blinks. Pressing any key turns on the LCD monitor.
Shut Down	Automatically turns off the power supply to the splicer if it is idle a certain period of time. The function serves to prevent the battery running low if the splicer is left on for an extended period of time.
Power on Option	
Opening Title1	Sets the message to be displayed when the power is turned on. Max. number of characters : 15
Opening Title2	
Quick Boot	If set to "ON", the splicer boots up quickly.
Authorized Service Reminder	If set to "ON", the splicer appears the message in the LCD monitor after the date of "Next Authorized Service".
Electrodes	
Electrode Caution	The number of times splices can be made with a Caution displayed. If the value is exceeded, an alarm will be displayed.
Electrode Warning	The number of times splices can be made with a Warning displayed. If the value is exceeded, an alarm will be displayed.
Alarm Display during Reset	If set to "ON", the warning text will be displayed during RESET operation.

Parameters List of the Machine setting menu (3 of 3)

Parameter	Description
Cleaver Blade Alarm	
Blade position Change	Determines if an alarm is set. (*1) In OFF, alarm is not displayed.
Blade Height Change	Determines if an alarm is set. (*1) In OFF, alarm is not displayed.
Blade Replacement	Determines if an alarm is set. (*1) In OFF, alarm is not displayed.
Arc Calibration	
Cleave Limit	The threshold of cleave angle error in the [Arc Calibration].
Max Number of Tests	The maximum number of tests to finish the [Arc Calibration] with "Test Finished" message.

*1) These alarm functions turn OFF when wireless data communication function is unavailable.

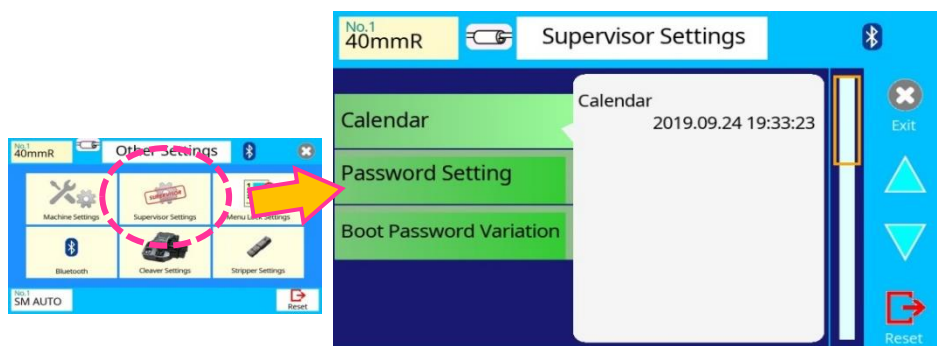
"Power Saving Timer" function is important for energy conservation.



If the power saving function is not set during battery use, the number of splice cycles will be decreased. The splicer automatically identifies if it is running on battery or power supply power. Additionally, an independent power saving setting can be programmed, enabling automatic utilization of the power saving after detecting a battery power source.

Supervisor Settings

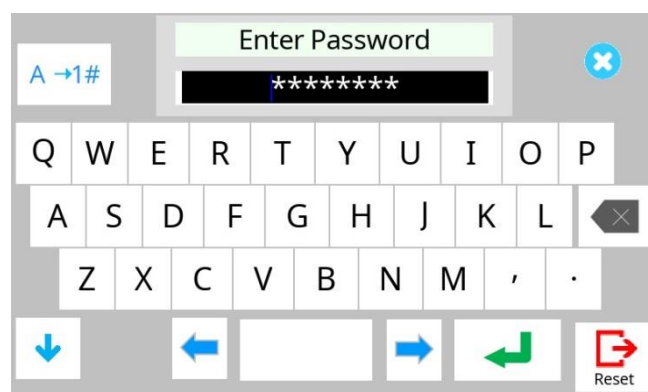
Used by an Administrator to limit operators from selecting or changing certain functions.



How to enter the Menu Lock Setting

Before entering the Supervisor Setting menu, the following windows may be displayed. Enter the password. The initial password is "0".

When unblocking the password, it is necessary to send back the splicer to the service center. Take care not to forget it after changing the password.



If you want to unlock the password, contact to Fujikura authorized distributor.

The list of Supervisor Settings parameters in this menu follow:

Parameter	Description
Calendar	
Calendar	Sets the date and time in the calendar.
Password Setting	
Supervisor Password	Sets a password to access the [Supervisor Settings] menus. Maximum Characters: 9 At the time of shipment from factory, the password is set to "0". In the event you have forgotten your password, contact the authorized distributor.
Boot Password	Changes the password to access the [Boot password]. The default password is set to "0" when the splicer is delivered.
Password Boot Lock From	Sets a date after which a password is required at splicer boot up to continue operation.
Boot Lock Message1	Sets the messages to be displayed on the boot password entry screen.
Boot Lock Message1	NOTE: The max number of message characters is 15
Boot Password Variation	
Boot Password 1~12	This function enables switching between up to 12 "Boot Passwords" at different dates.
Password Boot Lock From 1~12	For more details, refer to [About "Boot Password Variation"] on the following page.

About "Boot Password Variation"

"Boot Password Variation"

This parameter determines whether the boot password variation function is utilized or not. The default setting is "OFF".

"Boot Password 1"... "Boot Password 12"

Initial default password settings are all "0".

"Boot Password Lock From 1"... "Boot Password Lock From 12"

May be selected as "OFF", or dates may be entered to activate the password lock functions; Initial default date settings for all Boot Passwords are "OFF".

Example

Boot Password	AA	Boot Password Lock From	2015.05.01
Boot Password 1	BB	Boot Password Lock From 1	2015.06.01
Boot Password 2	CC	Boot Password Lock From 2	2015.07.01
Boot Password 3	DD	Boot Password Lock From 3	2015.08.01
Boot Password 4	EE	Boot Password Lock From 4	2015.09.01
Boot Password 5	FF	Boot Password Lock From 5	2015.10.01
Boot Password 6	GG	Boot Password Lock From 6	2015.11.01
Boot Password 7	HH	Boot Password Lock From 7	2016.01.01
Boot Password 8	II	Boot Password Lock From 8	2015.12.01
Boot Password 9	JJ	Boot Password Lock From 9	2016.02.01
Boot Password 10	KK	Boot Password Lock From 10	2016.02.01
Boot Password 11	LL	Boot Password Lock From 11	2016.03.01
Boot Password 12	MM	Boot Password Lock From 12	2016.04.01



NOTE

1

NOTE

2

If the present date (date of splicer operation) is between "2015.09.01" and "2015.9.30", the splicer displays "Enter Boot Password 4" at boot-up. Inputting "EE" unlocks the splicer in this case.

NOTE1:

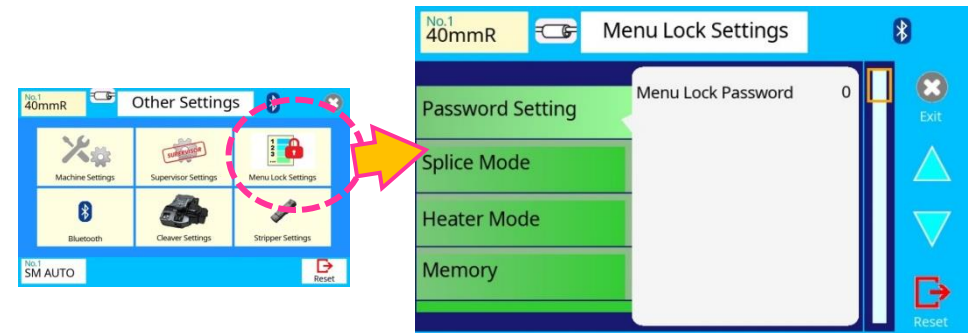
It is not necessary to input dates in order. The splicer sorts the passwords by date. In this example, the splicer uses "Boot Password 8" before "Boot Password 7".

NOTE2:

If two or more date settings are the same, the splicer uses the password with the smallest suffix number. In this example, if the present date (date of splicer operation) is between "2016.02.01" and "2016.02.29", the splicer applies "Boot Password 9" for the boot-up password, and the splicer ignores "Boot Password 10".

Menu Lock Settings

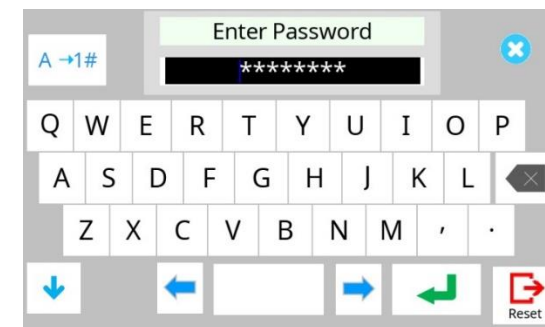
Used by Administrator to limit operator from selecting or changing certain functions.



How to enter the Menu Lock Setting

Before entering the Menu Lock Setting menu, the following windows may be displayed. Enter the password. The initial password is "0".

When unblocking the password, it is necessary to send back the splicer to the service center. Take care not to forget it after changing the password.



If you want to unlock the password, contact to Fujikura authorized distributor.

The list of Menu Lock Settings parameters (1 of 2)

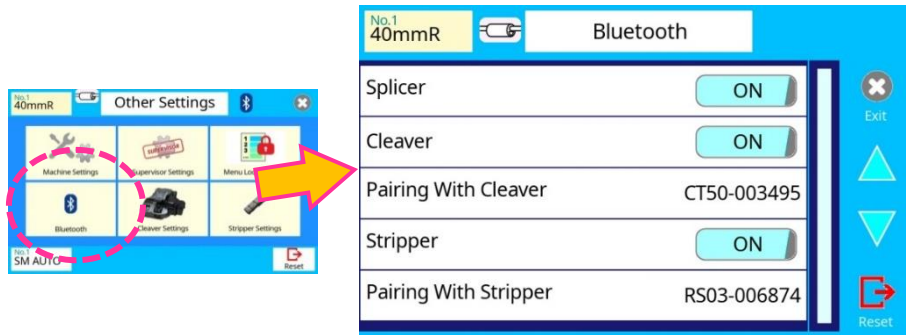
Parameter	Descriptions
Password Setting	
Menu Lock Password	Sets a password to access the [Menu Lock Password] menus. Maximum Characters: 9 At the time of shipment from factory, the password is set to "0". In the event you have forgotten your password, contact the authorized distributor.
Splice Mode	
Edit	Setting to "Disable" prevents unauthorized editing and selecting of splice modes.
Select	
Heater Mode	
Edit	Setting to "Disable" prevents unauthorized editing and selecting of heater modes.
Select	
Memory	
Clear All Splice Result	Setting to "Disable" prevents unauthorized erasing of splice result data from memory.
Password Setting	
Menu Lock Password	Sets a password to access the [Menu Lock Password] menus. Maximum Characters: 9 At the time of shipment from factory, the password is set to "0". In the event you have forgotten your password, contact the authorized distributor.
Splice Mode	
Edit	Setting to "Disable" prevents unauthorized editing and selecting of splice modes.
Select	
Heater Mode	
Edit	Setting to "Disable" prevents unauthorized editing and selecting of heater modes.
Select	
Memory	
Clear All Splice Result	Setting to "Disable" prevents unauthorized erasing of splice result data from memory.

The list of Menu Lock Settings parameters (2 of 2)

Parameter	Descriptions
Splice Settings	
Splice Operation	Setting to “Disable” prevents unauthorized editing of the [Splice Settings] menu.
Ignore Splicing Error	
Others	
Machine Settings	
Basic Settings	Setting to “Disable” prevents unauthorized editing of the [Machine Settings] menu.
Power Saving Timer	
Power On Option	
Electrode	
Cleaver Blade Alarm	
Arc Calibration	
Cleaver	
Cleaver Settings	Setting to “Disable” prevents unauthorized changing of the [Cleaver Settings] menu.
Maintenance Menu	
Arc Calibration	Setting to “Disable” prevents unauthorized changing of various maintenance parameters.
Diagnostic Test	
Dust Check	
Motor Calibration	
Stabilize Electrodes	
Replace Electrodes	
Clear Arc Count	
Clear Cleaver Counter	
Motor Drive	
Maintenance Info.	

Bluetooth Menu

This function configures the wireless data communication with the RS02/03 ribbon stripper or CT50 cleaver.



Regarding Bluetooth:

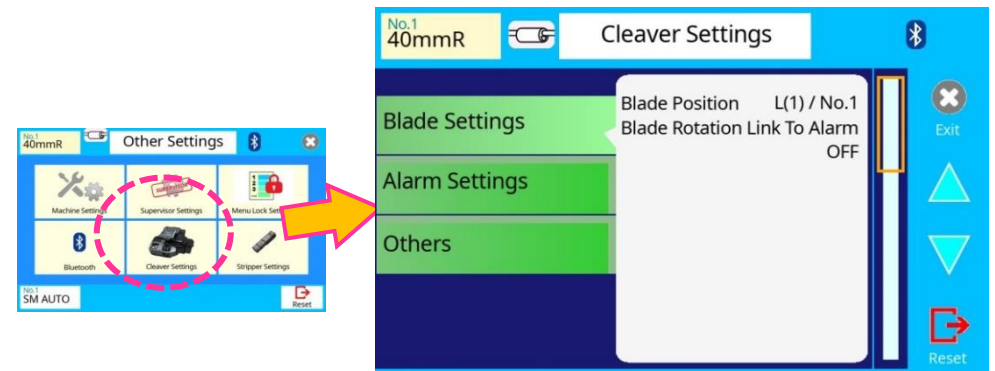
The splicer features wireless data communication with the optical fiber cleaver (CT50) and optical fiber stripper (RS02/03) via Bluetooth. This capability allows the splicer to monitor and change various settings within the cleaver. Refer to the “Wireless Communication” section in this document regarding the advantage of using the wireless communication function.

List of the Bluetooth parameters

Parameter	Description
Splicer	Turns the wireless data communication function of the splicer ON/OFF.
Cleaver	Toggles ON/OFF the wireless data communication with the CT50.
Pairing With Cleaver	Indicates the status of the wireless data communication. Use this function to select the specific wireless cleaver, as the splicer can pair with 2 cleavers.
Stripper	Turns the wireless data communication with the RS02/03 ON/OFF.
Pairing With Stripper	Indicates the status of the wireless data communication. Use this function to select the specific wireless stripper, as the splicer can only pair with a single stripper at a time.

Cleaver Setting Menu

This menu enables parameter selection to control the splicer interface with the CT50 cleaver.



List of the Cleaver Settings parameters

Parameter	Description
Blade Setting	
Blade Position	Shows the cleaved fiber count at all blade positions of the cleaver (48 positions) during the splicer connecting with the cleaver.
Blade Rotation Link to Alarm	Sets the splicer's action when the splicer detects the cleaver blade is worn, according the following 3 options: <u>"Auto Without Confirmation":</u> The splicer rotates the cleaver blade automatically without notifying or seeking confirmation from the operator. <u>"Auto With Confirmation":</u> Displays the message "Cleaver blade is worn. Rotate to new position?" If the operator selects [Yes], the splicer will rotate the cleaver blade. If the operator selects [No], the splicer will not rotate the cleaver blade. <u>"OFF":</u> The splicer does not rotate the blade.

List of the Cleaver Settings parameters

Parameter	Description
Alarm Settings	
Blade Position Change	ON/OFF setting enables or disables display of each warning message for cleaver blade wear. If "OFF" is selected for an alarm, no warning is indicated on the READY screen. If "ON" is selected, the alarm will be displayed for the operator when required.
Blade Height Change	
Blade Replacement	
Blade Alarm Detection	<p>Selects the judgment criteria for the cleaver blade wear and blade rotation alarm according to the following three options:</p> <p><u>"Cleaving Count"</u>: Rotation alarm is based on the number of cleaved fibers at the current blade position.</p> <p><u>"Image Analysis"</u>: Rotation alarm is based on the number of cleaning errors that occur during the specified number of splices.</p> <p><u>"OFF"</u>: Does not execute Blade Alarm Detection.</p>
Number of Cleaving Errors	These parameters set the criteria for the cleaver blade alarm.
Number of Cleaves	Example: If the "Number of Cleaving Errors" is set to 3 and the "Number of Splices" is set to 10, the cleaver blade alarm window will be displayed if 3 cleaving errors occur with the most recent 10 splices.
Incorrect Blade Position	ON/OFF setting enables or disables the warning that the cleaver blade height is wrong. If "OFF" is selected, no warning is displayed.
Low Battery	Sets the value for remaining cleaver battery capacity before replacement. The splicer communicates with the cleaver to monitor the battery status and inform the operator of the need for cleaver battery replacement.
Others	
Error Indicator on Cleaver	ON/OFF setup of the display of cleaver error warnings on the cleaver. If "OFF" is selected, no warning is displayed on the cleaver.
Device Name	Sets the device name of the CT50 cleaver that is linked to the splicer by Bluetooth.

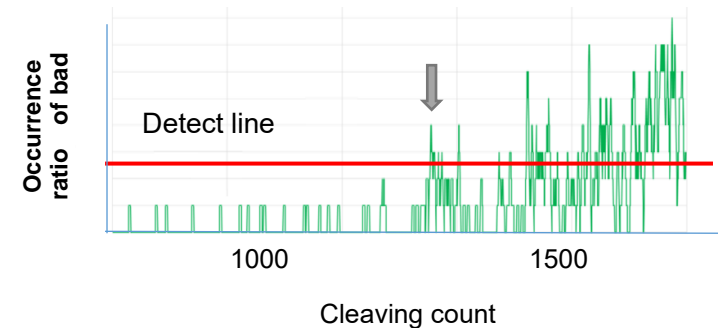
*1 The wear of blade

The right figure shows the occurrence rate of bad cleaving.

According to the graph, the rate is increases gradually.

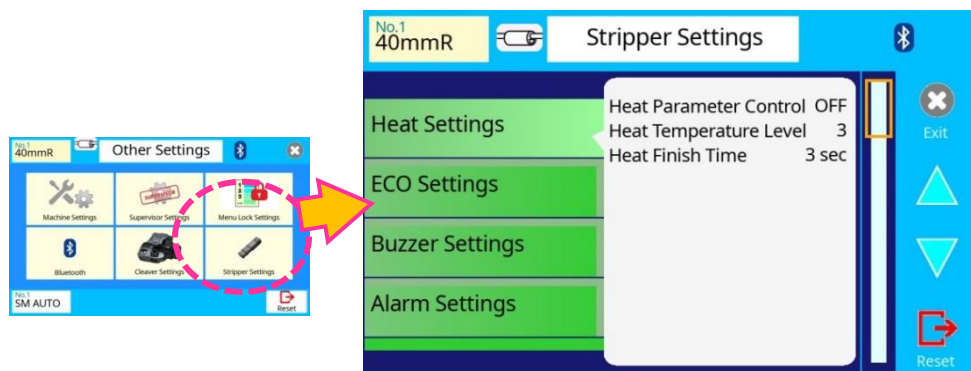
The recommended threshold value for determining an expanded position is below.

- Number of Cleaving Errors: 3 times
- Number of Cleavers: 10 times



Stripper Setting Menu

This menu enables parameter selection to control the splicer interface with the RS02/03 ribbon stripper.



These parameters can't be selected when the wireless data communication function is unavailable. It is necessary to set "Heter Parameter Control" "ON" when controlling the RS02/03 by the splicer.

Parameter list of Striper Setting

Parameter	Descriptions
Heat Settings	
Heat Parameter Control	Selects the machine to control the heater parameter of RS02/03. [OFF]: RS02/03 works according to the heat parameters saved in the internal memory of RS02/03. [ON]: The splicer controls RS02/03 with the splicer parameters set in [Splice Mode].
Heat Temperature Level	Sets the heater temperature level of the stripper. Note: This parameter is not used when selecting the "OFF" on "Heat Parameter Control".
Heat Finish Time	Sets the heating time of the stripper. Note: This parameter is not used when selecting the "OFF" on "Heat Parameter Control".

Parameter list of Striper Setting

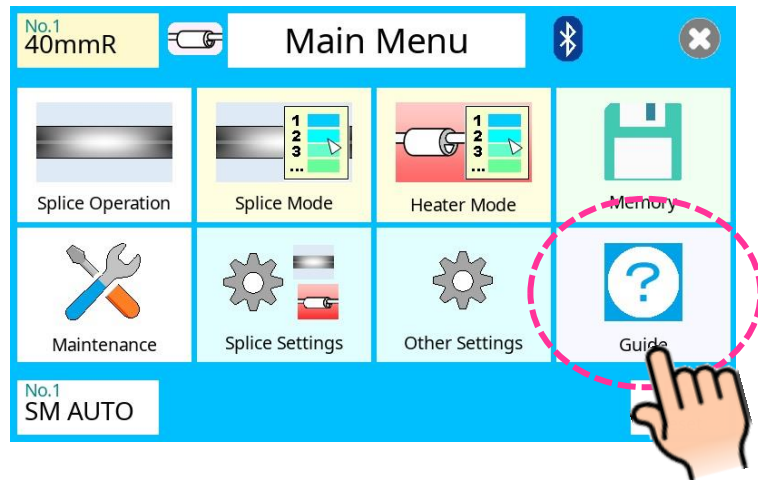
Parameter list of Stripper Setting

Parameter	Descriptions
ECO Settings	
ECO Mode Control By	Selects the machine to control the parameters in ECO mode of RS02/03. . [Stripper]: The parameters in ECO mode saved in the internal memory of RS 02/03 are used. [Splicer]: The splicer controls the ECO mode of RS02/03 with parameters that set into the memory of splicer.
ECO Mode	Toggles ECO mode ON/OFF. Note: This parameter is disable when selecting the “Splicer” on “ECO Mode Control by”.
Temperature Keeping	Sets the time delay before ECO mode initiates.
Buzzer Settings	
Buzzer Volume	Sets buzzer volume and under what conditions it is activated.
Power On (Only RS03)	
Power Off (Only RS03)	
Heat Finish	
Auto Shut Down (Only RS03)	
End of Charging (Only RS03)	
Alarm Settings	
Blade Replacement	Sets value for number of operations before blade replacement. The stripper informs the user of the need for replacement by changing the color of the “Strip window” in READY screen.
Low Battery (Only RS03)	Sets value for battery capacity before recharging. The stripper informs the user of the need for recharging by changing the color of the “Strip window” in READY screen.
Others	
Auto Shut Down Time	Sets the time for automatic shutoff. This preserves battery life of the RS03 stripper if it is not being used.
Device Name	Sets the name of the RS02/03 stripper.

Reference Guide

This menu shows the new features, the basic operation and information about this splicer.

Select the **Guide** icon at [Main Menu] screen to enter this menu.



Instruction Manual and the Utility Software

How to install the instruction manual and the Utility Software

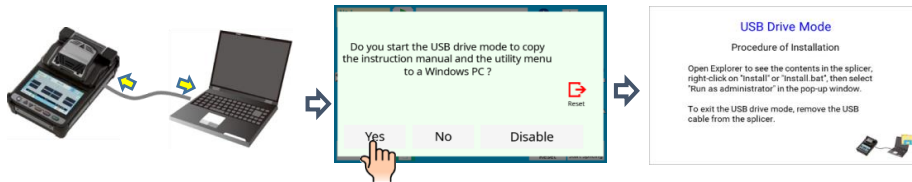
The splicer has the instruction manual and the utility software on its hard drive. You can install both onto a Windows PC with the following procedure.

Procedure to install the instruction manual and the utility software

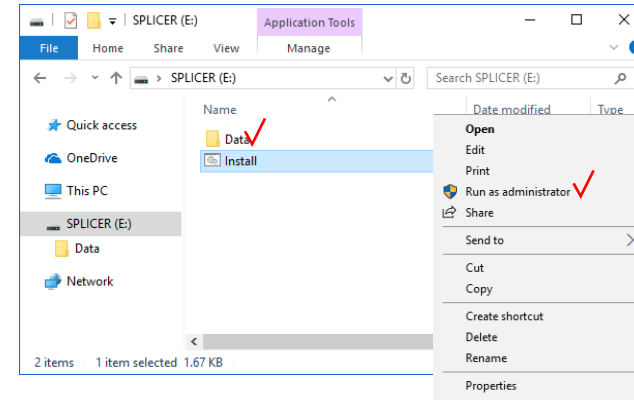
1. Turn on the power of the splicer, then connect the splicer to the PC with a USB cable.



2. A confirmation window will open. Tap [Yes] to start the USB Drive Mode. *
*If the window doesn't open, tap [Home]→ [Other Settings] → [Machine Settings] icons to open the Machine Settings menu. Then set the [USB Drive Mode] in the [Basic Settings] group to [Enable]. Then tap [Reset] to go back to the [READY] screen.



3. Open the Windows Explorer on the PC. You will find an attached drive named "SPLICER" and a file named "Install" or "Install.bat" on the drive.
4. Right click on "Install" or "Install.bat", then select "Run as administrator" in the pop-up window. If a confirmation message appears, click "Yes" to continue the installation.
5. The utility software opens automatically after the installation. Shortcut icons for the instruction manual and the utility software will appear on the desktop at the same time.



6. Disconnect the USB cable to finish the USB drive mode.

To open the instruction manual, double-click the shortcut icon on the desktop or click [Instruction Manual (PDF)] button on the menu of the utility software.

Note1: If it is failure to install the DataConnection to your PC, confirm whether the PV can connect to internet or not at first.

Note2: During installing this software, the software allows you to access to Fujikura web site, "www.fujikura.co.jp/dev/splicers/", ask to administrator of your PC.

Error Message List

Press **ENT** when an error is shown on the monitor. The [HELP] screen displays the following:

When an error is in the list below, the splicer repeats the alignment when the operator presses the **SET** key.

- L-Too Long Fiber
- R-Too Long Fiber
- LR-Too Long Fiber
- L-Too Dusty Fiber
- R-Too Dusty Fiber
- ZL Motor Overrun (Forward)
- ZR Motor Overrun (Forward)
- ZL Motor Overrun (Backward)
- X Motor Overrun
- Y Motor Overrun
- Focus-X Motor Overrun
- Focus-Y Motor Overrun
- Cannot detect fiber (in AUTO mode)
- L/R-Bad Fiber Position

When an error is in the list below, the splicer carries out operation which changes with preset values of "Ignore Splicing Error", when the operator presses the **SET** key.

See Section [Splice Settings].

- Large Cleave Angle
- Cleave Shape NG
- Thin
- Fat
- Bubble
- Dust Burned
- Large Gap Difference
- High Loss Estimated

Follow the solution precisely as shown in the list below. If it is not possible to eliminate the problem, the splicer may require service by a qualified service center. Consult the authorized distributor with the following information:

- Model name of the splicer
- Serial number of the splicer
- Error message
- Situation when the error occurs

Error Message List (1 of 8)

Error Message	Reason	Solution
L-Too Long Fiber	<ul style="list-style-type: none"> •The cleave length (bare fiber part) is too long. •Dust or dirt is on the objective lens. 	<ul style="list-style-type: none"> •Confirm the setting position of the stripped fiber end on the fiber cleaver. Check the cleave length. •Execute the [Dust Check]. Clean the lens when dust or dirt exists.
R-Too Long Fiber		
LR-Too Long Fiber		
X-Dark Back Ground	<ul style="list-style-type: none"> •Dust or dirt is on the objective lens. •The LED or Camera might be damaged. 	<ul style="list-style-type: none"> • Execute the [Dust Check]. Clean the lens when dust or dirt exists. •Consult your distributor.
Y-Dark Back Ground		
L-Too Dusty Fiber	<ul style="list-style-type: none"> •Dust or dirt is on the fiber surface. •Dust or dirt is on the objective lens. •[Cleaning Arc] time is too short or "OFF." •Splicing indistinct core fibers with the SM or DS modes. •[Align] is set to "Core" to splice indistinct core fibers when using other splice modes. •[Focus] is incorrectly set when using other splice modes. 	<ul style="list-style-type: none"> •Completely prepare the fiber again (strip, clean and cleave). •Execute the [Dust Check]. Clean the lens if dust or dirt exists. •Set the [Cleaning Arc] time to "150ms". When splicing carbon coated fibers, set to "200ms". •Use the MM mode to splice indistinct core fibers (i.e. MM fiber). •Set [Align] to "Clad" to splice indistinct core fibers (i.e. MM fiber). •Set [Focus] to "Edge" to splice indistinct core fibers (i.e. MM fiber). To splice distinct core fibers, "Auto" or the correct focus value should be entered.
R-Too Dusty Fiber		

Error Message List (2 of 8)

Error Message	Reason	Solution
ZL Motor Overrun (Forward)	<ul style="list-style-type: none"> •The fiber is not set correctly at the bottom of the V-groove. The fiber is not located in the Camera's field of view. •The cleave length (bare fiber part) is too short. 	<ul style="list-style-type: none"> •Press RESET key, and set the fiber again to seat it correctly at the bottom of the V-groove. •Confirm the setting position of the stripped fiber end on the fiber cleaver. Check the cleave length.
ZR Motor Overrun (Forward)		
ZL Motor Overrun (Backward)	<ul style="list-style-type: none"> •The taper speed or taper time is set too high. 	<ul style="list-style-type: none"> •Adjust the taper parameters in the splice mode.
ZR Motor Overrun (Backward)	<ul style="list-style-type: none"> •Only occurs in manual motor operation. 	
X motor Overrun	<ul style="list-style-type: none"> •The fiber is not set correctly at the bottom of the V-groove. The fiber is offset too far and it exceeds the X or Y motor range. 	<ul style="list-style-type: none"> •Press RESET key and re-position the fiber again to seat it correctly at the bottom of the V-groove.
Y Motor Overrun		
Focus X Motor Overrun	<ul style="list-style-type: none"> •The fiber is not set correctly at the bottom of the V-groove. The fiber position is out of focus range. 	<ul style="list-style-type: none"> •Press RESET key, and re-position the fiber again to seat it correctly at the bottom of the V-groove
Focus Y Motor Overrun	<ul style="list-style-type: none"> •Dust or dirt is on the fiber surface resulting in focus failure. •Dust or dirt is on the objective lens. 	<ul style="list-style-type: none"> •Completely prepare the fiber again (strip, clean and cleave). •Execute the [Dust Check]. Clean the lens.
Cover Opened	<ul style="list-style-type: none"> •The wind-protector is opened during splicing operation. 	<ul style="list-style-type: none"> •Press RESET key after closing the wind-protector.

Error Message List (3 of 8)

Error Message	Reason	Solution
ZL/R X/Y Focus X/Y Cover F/R Heater Motor trouble	•Motor might be damaged.	•Consult the authorized distributor.
Cannot detect fiber in AUTO mode	•Dust or dirt is on the fiber surface.	• Completely prepare the fiber again (strip, clean and cleave). Select the suitable splice mode.
	•The left and right fiber types are different.	
	•Splicing non-standard fibers.	
Strong Arc Power	•Unable to calibrate due to strong arc.	•Replace the electrodes by using the [Replace Electrodes] function in. If this does not eliminate the problem, consult the authorized distributor.
Weak Arc Power	•Unable to calibrate due to weak arc.	
Too Left /Right Arc	•Unable to calibrate due to poor arc field position (too far left or Right).	
Fiber Separation	•The fiber stuff amount is insufficient.	•Execute the [Motor Calibration] function. If using other splice modes, check the [Overlap] setting in the splice mode.
	•The pre-fuse power or pre-fuse time is set too high.	•Check the [Prefuse Power] and [Prefuse Time] settings in the splice mode.
L/R-Bad Fiber Position	•The fiber is not set correctly at the bottom of the V-groove.	•Press RESET key, and re-position the fiber again to seat it correctly at the bottom of the V-groove.

Error Message List (4 of 8)

Error Message	Reason	Solution
No Arc Discharge	•Arc Discharge did not occur.	•Assure the electrodes are in proper position. •Replace the electrodes. •Consult the authorized distributor.
Large Cleave Angle	•Bad fiber end-face.	•Check the condition of the fiber cleaver. If the blade is worn, rotate the blade to a new position.
	•[Cleave Limit] is set too low.	•Increase the [Cleave Limit] to an adequate limit.
Large Fiber Angle	•Dust or dirt is on the V-groove or the clamp chip.	•Clean the V-groove and clamp chip, and set the fibers again. If the error occurs again, strip, clean and cleave the fibers.
	•Bad fiber end-face.	•Check the condition of fiber cleaver. If the blade is worn, rotate the blade to a new position.
Cleave Shape NG	•Bad fiber end-face.	•Check the condition of fiber cleaver. If the blade is worn, rotate the blade to a new position.
Arc Discharge Delayed	•Arc Discharge is delayed	•Assure the electrodes are in proper position. •Execute the [Stabilize Electrode] function. •Replace the electrodes.

Error Message List (5 of 8)

Error Message	Reason	Solution
Thin Fiber	·Inadequate arc power	·Calibrate the arc power with the [Arc Calibration] function.
	·Prefuse power or time is set too high	·If using the Special mode, adjust or initialize [Prefuse Power] or [Prefuse Time] settings. For normal splice mode, the prefuse is fixed and cannot be adjusted.
	·Insufficient [Overlap] setting	·If using the Special mode, adjust or initialize [Overlap] setting. For normal splice mode, the overlap is fixed and cannot be adjusted. ·Execute [Motor Calibration] function in the maintenance menu to calibrate the stuff amount.
Fat Fiber	·Too much [Overlap] setting	
Too Tapering Fiber	·Too much fiber taper.	·If using the taper splice function, the error message may appear meaning the fiber is tapered too much.
Bubble	·Bad fiber end-face.	·Check the condition of fiber cleaver. When the blade is worn, rotate the blade.
	·Prefuse power or time is set too low	·If using the Special mode, adjust or initialize [Prefuse Power] or [Prefuse Time] settings. For normal splice mode, the prefuse is fixed and cannot be adjusted.

Error Message List (6 of 8)

Error Message	Reason	Solution
Large Dust Burn	·Bad fiber end-face.	·Check the condition of the fiber cleaver. If the blade is worn, rotate the blade to a new position.
	·[Cleaning Arc] time is too short or "OFF."	·Dust still present after cleaning fiber or cleaning arc. Clean fiber thoroughly or Increase [Cleaning Arc Time]
High Estimated Loss (1/2)	·Insufficient fiber cleaning.	·Dust or dirt on the fiber surface results in bad splice loss and low tensile strength. ·Clean the fiber surface sufficiently. ·Do not clean the fiber after cleaving to prevent dust on the fiber end-face. ·Avoid any contact with the fiber end-face.
	·Bad fiber end-face.	·Check the condition of fiber cleaver. If the blade is worn, rotate the blade to a new position. ·Confirm the [Cleave Limit] setting. 2.0° or less is recommended.
	·Dust or dirt is on the V-groove or the clamp chip.	·Dust or dirt on the V-groove or clamp chip causes poor fiber movement during fiber stuffing. Clean them periodically.
	·Dust or dirt is on the lens	·Execute the [Dust Check]. If dust or dirt exists, clean the lenses.
	·Bad electrode condition.	·Replace the electrodes if they appear worn (rounded tip shape), dirty or bent.

Error Message List (7 of 8)

Error Message	Reason	Solution
High Estimated Loss (2/2)	·Inadequate arc power.	·Calibrate the arc power with the [Arc Calibration] function.
	·Using unsuitable splice mode	·Select a suitable splice mode for the fibers to be spliced.
	·[Loss Limit] is set too low.	·Increase [Loss Limit] to an adequate limit.
	·Inadequate arc parameters in special mode	·Confirm the arc parameters are adequate to splice the fibers.
	·Inadequate estimating parameters in special mode	·Confirm the estimating parameters are adequate to estimate the loss. The MFD mismatch function does not work for certain types of specialty fibers. In these cases, set the [MFD Mismatch] to "OFF".

Error Message List (8 of 8)

Error Message	Reason	Solution
There is dust after executing Dust Check function	·Dirt or dust exists in optical path.	·Clean the objective lenses by referring see section [Cleaning of Objective Lens]. ·When the above processes cannot remove the dirt or dust, consult the authorized distributor.
X Camera Y Camera Trouble	·The Camera may be damaged.	·Consult the authorized distributor.
Heater Oven Trouble	·Heater does not heat.	·Consult the authorized distributor.
Communication error	·Broken the internal device	·Consult the authorized distributor.
Temperature Sensor NG	·Temperature Sensor may be damaged.	·Consult the authorized distributor.
Cover Trouble	·Cannot Open and Close cover	·Check sheath clamps are closed. ·Confirm obstructions and fibers are not around the cover. ·Confirm sheath clamps or fiber holders are set properly.

Questions and Troubleshooting

Power Supply

- (1) Power does not turn on when pressing **ON/OFF** key
 - The battery may not be charged. Charge is performed.
- (2) Power does not turn off when pressing **ON/OFF** key
 - Press and hold the key until the LED color changes from green to red.
- (3) Few splices can be made with a fully charged battery pack
 - If the power saving function is not enabled, battery power degrades quicker. Always enable it to conserve power usage.
 - The battery pack has reached the end of its service life. Install a new battery pack.
 - The battery pack uses chemical reaction. The capacity decreases at low temperature, especially at lower than 0 degree C.
 - At high altitude, the arc discharge current is increased. In this condition, battery power degrades quicker due to large power consumption.
- (4) “CHARGE” LED on blinks during battery recharge
 - The battery pack has a fault or has reached the end of its service life. Install a new battery pack. If the LED blinks again after install, contact the authorized distributor.
 - The battery pack has been used under the environment (especially 40 degrees C or more) where temperature is high, or direct rays.
- (5) Method to change the power saving function settings
 - Refer to [Machine Settings] function.
- (6) Battery indicator is not displayed.
 - At the time of AC adaptor use, a battery indicator is not displayed on a screen.

Splicing Operation

- (1) Error message appears on monitor
 - Refer to [Error Message List] function.
- (2) Inconsistent splice loss / High splice loss
 - Clean the V-grooves, fiber clamps, heater and objective lenses.
 - Replace the electrodes.
 - “High Estimated Loss” error message section in the [Error Message List].
 - If the fiber has curl or bend memory, position the fiber so the crown (curve) of the memory is turned downward.
 - The splice loss varies according to the cleave angle, arc conditions and fiber cleanliness.
 - If the splice loss is still too high or inconsistent after performing the above-mentioned remedies, contact the authorized distributor. Regular service (at least once a year) is recommended to maintain high splicing quality.
- (3) Confirmation of splicing procedures
 - Refer to [Basic Operation] function.
- (4) Monitor suddenly turned off
 - The power saving function is automatically enabled when using a battery pack. The splicer switches to the power saving state after an extended period of splicer inactivity. Press any key to return to the normal state. To change the length of time before the splicer switches to the power saving state, Refer to [Machine Settings] function.
- (5) Splicer power suddenly turned off without “Low Battery” message
 - The power saving function is automatically enabled when using a battery pack. The splicer turns the splicer power off after an extended period of splicer inactivity. Press **ON/OFF** key to turn on the splicer again. To change the length of time before the splicer turns the splicer power off, section [Machine Settings] function.
- (6) Method to initialize arc condition of Splice mode
 - Refer to [Initialization in the edited parameter] in [Splice Menu].

(7) Error message can be over-ridden

- See Section [Splice Settings] to not allow error message override.

(8) Unable to change Arc Power and Arc Time

- The settings cannot be changed in AUTO modes.
- If using the “Special Mode”, the Arc Power and Arc Time may be locked by administrator, preventing them from being changed.

(9) Method to set Pause

- See Section [Splice Menu] in [Splice Mode].

(10) Method to display Cleave Angle, Fiber Angle / Offsets

- See Section [Splice Menu]. The fiber angle is not displayable in the SM, DS, MM or AUTO mode.

(11) Incorrect splice mode selected and used in AUTO mode

- The AUTO mode can detect only standard SM, DS, MM and NZDS fibers. When splicing specialty fibers, the AUTO mode may identify them incorrectly.

Tube-heating Operation

(1) Fiber protection sleeve does not shrink completely

- Fiber protection sleeve might not be set to the tube heater properly.
- When setting the fiber to the heater, do not remove hands from the fiber until the heater cover closes and the buzzer sounds. If releasing hands from the fiber rapidly, the protection sleeve may not be set to the heatable position.
- If the protection sleeve is not centered between yellow lines, the protection sleeve might not shrink completely.
- Extend the heating time.
 - Refer to [Heater Mode].

(2) Heater LED on panel keyboard blinks

- Pressing the **HEAT** key during heating causes the LED to blink. The tube heater is turned off if the **HEAT** key is pressed again. If, after 2 seconds have gone by without pressing the **HEAT** key again, the LED stays on continuously and the heater returns to its normal state. The LED will turn off when the heat cycle is completed.
- If the heating temperature does not reach its inputted setting, the LED blinks and the alarm sounds. If this happens, contact the authorized distributor.

(3) Fiber protection sleeve adhered to heating plate after shrink

- Use a cotton swab or a similar soft tip object to push and remove the sleeve. If the black coating is removed, contact your authorized distributor.

(4) Method to initialize heating condition of Heater mode

- See Section [Referring to or editing Heater Mode].

(5) Method to cancel heating process

- **RESET** key does not cancel the heater. Press **HEAT** key twice to cancel the heating process.

Wireless data communication

(1) Wireless data communication is unsuccessful.

- Check the power of each device to ensure it is “ON”. If it is “Off”, turn the device “ON”.
- Check the Link LED of each device. If it is not lit, push and hold the **Link** button on each device. This will cause the Link LED of the device to light and start the pairing process.
- Check the [Splicer] and [Stripper], [Cleave] in Bluetooth menu of the splicer. If they are “Off”, turn them “ON”.
- RS02/03, CT50 already connect with other splicer. Push and hold the **Link** button on the device. This will cause the Link LED of the device to blink and start the pairing process. After this, try to connect with the stripper. Refer to Wireless data communication section.

- (2) Cannot change the parameters of the RS02/03 or CT50 with the splicer.
- The RS02/03 or CT50 may be already connected to another splicer. Push and hold the Link button on the device. This will cause the Link LED of the device to blink and start the pairing process. After this, try to connect with the stripper. Refer to Wireless data communication section.

Supervising

- (1) What functions can be disabled
- See Section [Menu Lock Settings].
- (2) Method to lock “selection” or “editing” of Splice or Heater mode
- See Section [Menu Lock Settings].
- (3) Method to set parameters of Splice or Heater mode from a PC
- Refer to the communication software “Data Connection” included in CD-ROM.
- (4) Forgot password
- Contact the authorized distributor.

Other Functions

- (1) Method to hide messages on [READY] screen
- Change the fiber image from X/Y view to X magnified view or Y magnified view by pressing X/Y key.
- (2) Too many repetitions until “Test Finish” indicated in [Arc Calibration]
- The splicer needs to repeat the arc calibration after replacing the electrodes or when the environmental conditions change drastically. The number of arc calibrations can be set to a specific amount. When the splicer completes the set amount of calibrations, it indicates “Test Finish”. However, this does not mean it is completely calibrated.
- (3) “Test Finish” is never indicated after many repetitions in [Arc Calibration]
- Execute [Stabilize Electrodes] function in [Maintenance Menu]. If the splicer still does not indicate “Test Finish”, replace the electrodes. See section [Replace Electrodes] function.

- (4) No arc power change after [Arc Calibration]
- An internal factor is calibrated and adjusted for the specific arc power selected. The displayed arc power in each splice mode does not change.
 - The calibration results affect all splice modes.
- (5) Method to input different comments after each splice in splice results data
- See section [Splice Memory Comment].
- (6) Method to download splice results from splicer to PC
- Refer to the instruction manual “Data Connection” included in the CD-ROM. Press [F1] key after installing the software to display the instruction manual. Contact the authorized distributor for further inquiries.

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Guarantee and Contact Address

Warranty

1. Warranty period and limits

If the product fails due to defects or workmanship within the warranty period stipulated by the Fujikura-authorized distributor, they will repair it free of charge. Please ask the authorized distributor. However, note that repairs will be charged for the following regardless of the warranty period:

- (1) Failure due to natural disaster.*
- (2) Failure due to mishandling.*
- (3) Failure due to handling where the operating procedures or instructions described in the instruction manual were disregarded.*
- (4) Consumable items (discharge electrodes etc.)
Please note that the memory of the splice results, parameters, etc. may be deleted during the repair.*
- (5) Failure due to use of abnormal AC power.*

In most cases, damage to the AC adapter from an abnormal supply voltages occur within the warranty period. The specification of AC input voltage is up to AC240V (340V-peak).

2. Warranty item coverage

The warrantee covers the Splicer's and Accessories' standard package except for consumables like batteries or electrodes.

3. Before shipping the splicer

Please consult the authorized distributor first.

4. Information required for repair

Include documentation with the splicer informing us of the details listed below.

- (1) Your full name, section, division, company, address, phone number, fax number and e-mail address.*
- (2) Model name and serial number of the splicer.*
- (3) Problems encountered*
 - What problems did your splicer encounter and when?*
 - What is its present operational state?*
 - the Observations, screenshots, files, images, pertinent error messages, etc. relating to the problem*

5. Transporting the splicer

Since the splicer is a high-precision machine, always use the original carrying case for transportation and storage in order to protect it against humidity, vibration and shock. When requesting splicer repair, please send it, along with its accessories, in its original carrying case.

6. Disclaimer

Please note the memory contents, such as splicing results, splice mode, etc., may be lost depending on the kind of repair.

Contact Address

Inquiries concerning products should be made to the authorized distributor or one of the following:

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