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 that are not purchased from our authorized distributors.

Fujikura

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 fusion splicer, without first consulting a nearest Fujikura authorized distributor for instruction. Tightening the original screw without the protector present may damage mechanism inside.

Note: LCD monitor
  This fusion splicer is equipped with an LCD monitor. LCD monitors 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 characteristic of LCD monitors.

Table of Contents

Safety Information

The fusion splicer is 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 fusion splicer receives the following faults: • Fumes, bad smell, noise, or over-heat occurs. • Liquid or foreign matter falls into cabinet. • Fusion splicer is damaged or dropped. If this occurs, ask our service center for repair. Leaving the fusion 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 fusion 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 fusion 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 fusion splicer in an environment where flammable liquids or vapors exist. Risk of dangerous fire or explosion could result from the fusion splicer's electrical arc in such an environment.
🚫	Do not use compressed gas or canned air to clean the fusion splicer. They may contain flammable materials that could ignite during the electrical discharge.
🚫	Do not touch the electrodes when the fusion 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 Fusing stops when wind-protector is open. Turn the fusion 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.
	• <u>AC generators commonly produce abnormally high AC output voltage or irregular frequencies.</u> 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.
	•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 fusion splicer uses a three-prong (core) AC cord that contains an earthed ground safety mechanism. The fusion 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 fusion 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 fusion 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 fusion splicer, AC power cord and AC plugs with wet hands. This may result in electric shock.
🚫	Do not operate fusion splicer near hot objects, in hot temperature environments, in dusty / humid atmospheres or when water-condensation is present on the fusion splicer. This may result in electric shock, fusion 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.

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⚠️ *CAUTIONS!*

🚫	*Do not store fusion 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 fusion splicer in an unstable or unbalanced position. The fusion splicer may shift or lose balance, causing the unit to fall. Possible personal injury or equipment damage may result.*
🚫	*The fusion 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 fusion splicer from damage, moisture, vibration and shock during storage and transportation.*

⚠️ *CAUTIONS!*

❗	*Follow the below listed instructions for handling electrodes.* • *Use only specified electrodes.* • *Set the new electrodes in the correct position.* • *Replace the electrodes as a pair.* *Failure to follow the above instructions may cause abnormal fusing. It can result in equipment damage or degradation in splicing performance.*
🚫	*Do not use any chemical other than pure alcohol (99% or greater) to clean the objective lens, V-groove, LCD monitor, etc., of the fusion splicer. Otherwise, blurring, discoloration, damage or deterioration may result.*
🚫	*The fusion splicer requires no lubrication. Oil or grease may degrade the splicing performance and damage the fusion 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 nearest Fujikiura 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 poroducts. Follow your local disposal regulations.*

Bluetooth® Wireless Technology

・*The fusion 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 a nearest Fujikura authorized 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 implemented so the splicer has improved 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 you do not know the fiber type, 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 modes, the automatic fusing power 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 [Fusing Power Calibration] before splicing.

Automatic fusing power calibration function

This function calibrates the fusing power in real time. When selecting an automatic mode, this function is enabled. Performing the [Fusing Power calibration] function before splicing is not necessary.
It doesn't work in the special splice modes. When using these modes, performing [Fusing Power calibration] before splicing is strongly recommended.

Automatic wind-protector

The wind-protector operation can be customized by choosing the preferred operating mode for the wind-protector opening and closing

Fast heating system

When a protection sleeve is loaded, the heater lid will close automatically and the shrink process will start automatically. In addition, by using a dual sided heater, we achieve faster heating times.

Field Assembly Optical connector splice

The assembly of a field splice-on optical connector can be performed by heating of a protection sleeve can be performed by this fusion splicer. Moreover, its versatility is improved by its portability.

Compatible with short length splices

In addition to standard cleave length splices, a splice with 5-mm cleaves is also possible.

> ➢ A specialized tool is needed in order to perform the 5-mm cleave length splices

Upgrade of software

The firmware of the splicer can be upgraded to the latest version using the "Data Connection" app.
Before getting "Data Connection", refer to the section "Getting the Instruction Manual and the Utility Software" and download the Utility Software first. Then install the "Data Connection" program from the Utility Software.

Active Fusion Control

ACTIVE FUSION
CONTROL TECHNOLOGY

Reducing Occurrence
Of
High Splice Loss

Real-Time Fusion Control

The fusion power is easily affected by changes in the usage environment. This core alignment fusion splicer has real-time fusion power control by analyzing the fiber's brightness intensity during fusion. And it contributes to reduce splice loss stably.
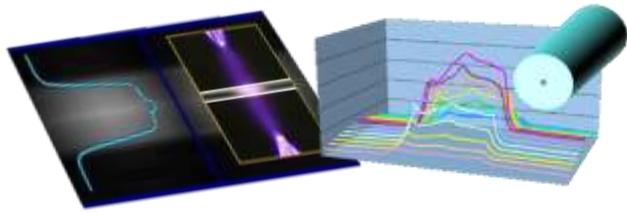
Cleave end face Analysis

One of main cause of high splice loss is bad cleave end face.
This core alignment fusion splicer analyzes the condition of the cleave end face and performs optimal fusion control to reduce splice loss.
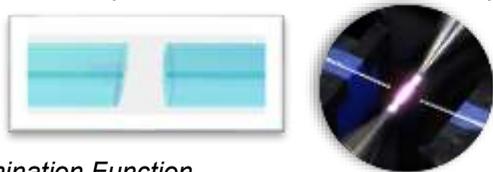
Fiber Discrimination Function

The adequate fusion power parameter is different in accordance with fiber type. This fusion splicer automatically identifies the optimum splice parameters in accordance with the fiber type.
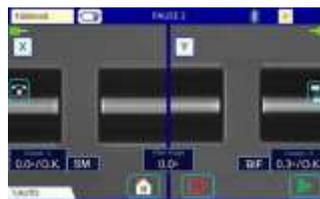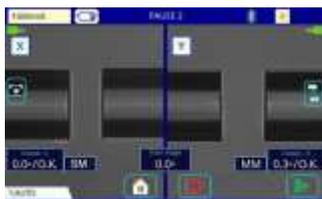
Active Blade Management Technology

ACTIVE BLADE
MANAGEMENT TECHNOLOGY

Reducing Occurrence
Of
Bad Clevae Angle
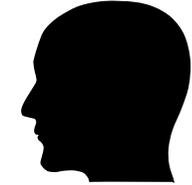
Automatic blade rotation

This fusion splicer and CT50 fiber cleaver are enabled with wireless data connectivity. This capability allows automatic cleaver blade rotation when the splicer judges the blade is worn. Also, this fusion splicer can connect to two CT50s simultaneously. It can check and manage each cleaver individually.
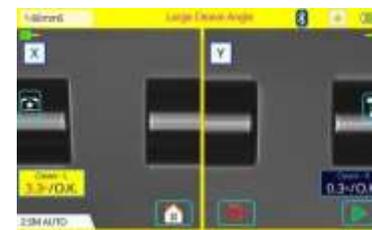
Motorized blade

It is easy to detect blade wear by correlating blade positions with cleaving errors given by the splicer. If the splicer detects blade wear by analyzing the fiber image, the splicer sends a command to the cleaver to rotate the blade to the rotate the blade to the next available unconsumed position. By using this function, it can get the low-splice loss and stability.
The splicer informs the operator with an on-screen alarm during rotation the balde.

Blade Life management

This fusion splicer displays the remaining blade life and informs the user when a blade height change, position change, or new blade is required. 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. The timing and judgment of blade rotation made by the splicer can be adjusted in the settings menu.
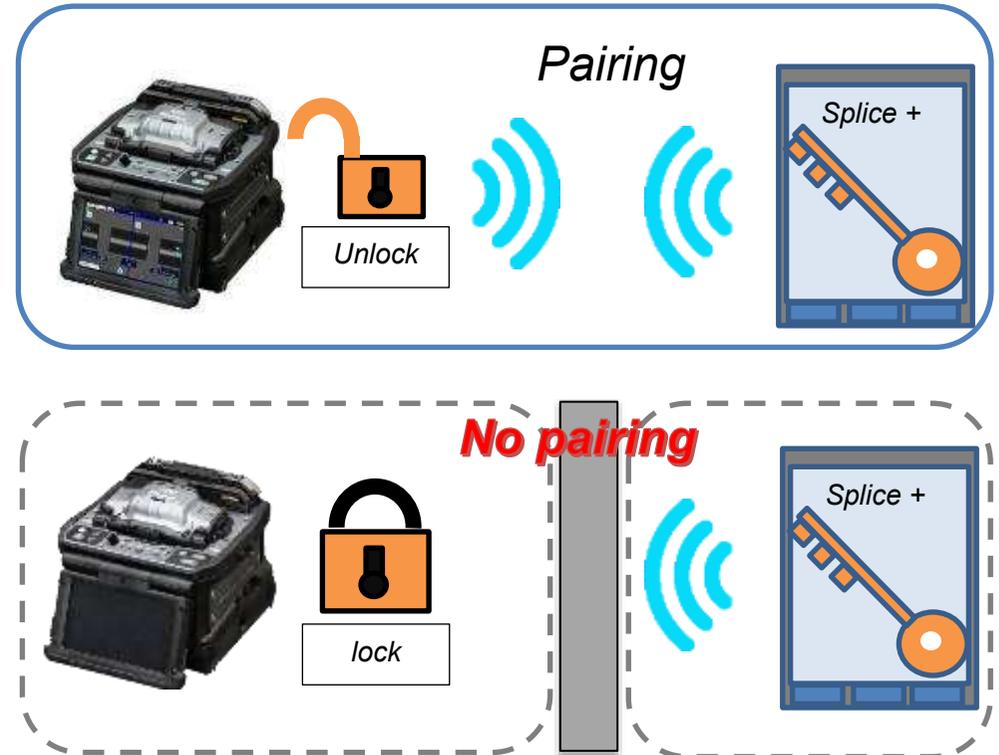
The communication parameters between splicer and cleavers are setup prior to shipment when these items are ordered together. Once AAA batteries are placed in the cleaver, this is immediately paired to the splicer. Upon pairing, the splicer is ready to track cleaver blade life, automatically.

Benefit of wireless security function "Smart Lock"

"Smart Lock" can be used by connecting a smartphone and the fusion splicer via Bluetooth communication.

This function locks and unlocks the fusion splicer by Bluetooth communication with a smartphone.

It will be locked automatically if the fusion splicer is stolen. Therefore, it is possible to prevent unauthorized use after theft.

Furthermore, this function may help the effect of suppressing theft.

The "Splice+" smart phone application is required to use this feature.

Newly designed sheath clamp

Easy sleeve positioning

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

e.g. in case setting *protection* sleeve on the right

(1) Hold both fibers, with your left hand positioned just behind the sheath clamp

(2) Slide the protection sleeve until it touches your left hand, while holding tension on the splice.

(3) Slide left hand away from the protection sleeve

(4) Slide left hand away from the protection sleeve.

Fiber Retention Clamp

The sheath clamp features a secondary clamp, "Fiber Retention Clamp", which retains the fiber after the sheath clamp is opened. This mechanism prevents the fiber from flying out after the sheath clamps open. When the fiber is lifted by hand, the Fiber Retention Clamp opens and releases the fiber automatically. There is a switch to control this retention system on top of the sheath clamp.

Sheath clamp (opened)   *Photomicrograph*
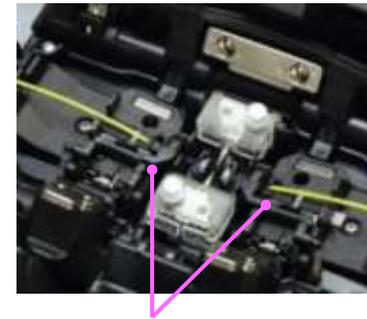
Fiber Retention Clamp   *Fiber Retention Clamp*

Green label: retain fiber ***Recommended**	
Yellow label: release fiber	
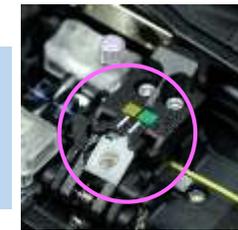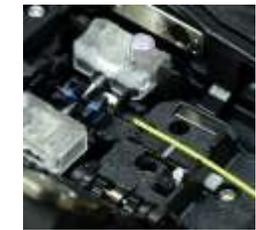
Compatibility with loose tube fiber

The sheath clamp has a retractable protrusion for splicing loose buffer fiber. The switch for this feature is on the base of the sheath clamp. You can now easily splice loose buffer fiber without changing the sheath clamp.

Protrusion for loose tube

Protrusion switch=OFF

Protrusion for loose tube

Protrusion switch=ON

> ➢ *Do not use the protrusion part when splicing standard fiber. Only use this with loose buffer fiber, since the protrusion part may damage the tight buffer fiber.*
> ➢ *This protrusion part can be removed. Refer to "How to remove and install the protrusion" section in this document.*

Newly designed carrying case and work tray
Carrying case

The new carrying case has more 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.

Open

Lid of carrying case becomes a work table

Remove work tray from carrying case

Work tray

The work tray has two drawers for storing the tools to prevent dust accumulation.
The drawers are just the right size for tools or battery pack.
Also, the work tray can be divided, so you can use it according to your work space.

Work tray

Stripper SS03 + Cleaver CT50

Battery BTR-15, up to 2 units

Push apart

Push to divide
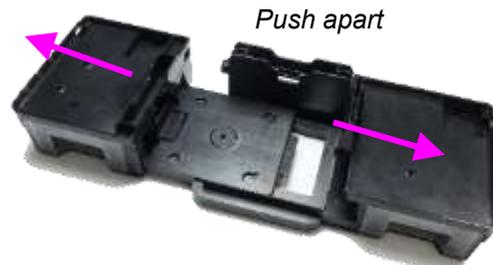
Protection sleeve stand

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

Protection sleeve stand

Detachable
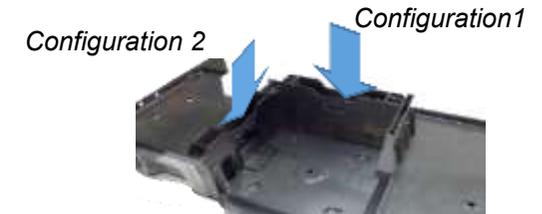
Configuration1

Configuration 2

Drop cable holding stand

The work tray has a stand for placing the drop cable clamp (CLAMP-DC-12).
The stand has two positons. One is the position during splicing. Another is
the positon during heating.
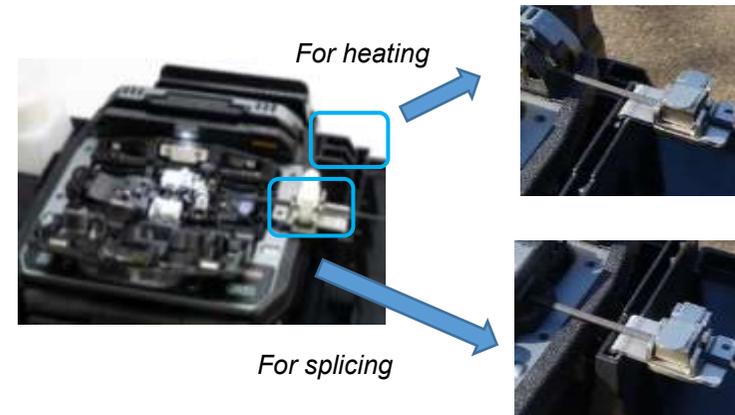
For heating

For splicing

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Other features

Touch Panel Display & New designed Menu Screen

The fusion splicer has a touch panel display and newly designed menu. The operator can select or change settings by touching icons on the monitor.

Sheet key & Classic Menu Screen

The fusion splicer also has an external sheet key and a classic menu. Press the DOWN key in sheet key in [READY] screen. The classic menu appears. The operator can now use the fusion splicer like previousfusion splicers.

Press DOWN key.
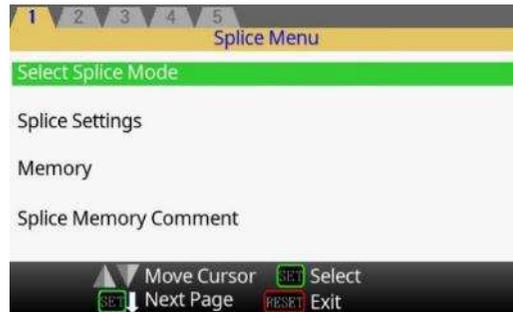
Classic Menu

Touchscreen Calibration

Touch detection accuracy of the touchscreen were adjusted in the factory before shipping. However, the accuracy could change due to various reasons.
If the response of the touchscreen is not good, adjust it according to the following procedure.

Adjustment procedure

Press DOWN key in [READY] screen and enter the classic menu.

1. Select [Touchscreen Calibration] function in the [Maintenance Menu] of the classic menu.
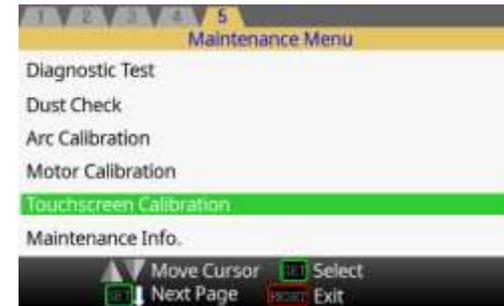
2. Follow the procedures and finish the calibration.

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Power supply connector for the device

The USB type A connector of this fusion splicer can supply power to devices like an LED lamp, for splicing in a dark environment, or to charge a cell phone *

*NOTE: It is not guaranteed to charge all smartphones.

Connector type	Current capacity
USB 2.0 Type A	Max 0.5A

> ➢ *When the fusion splicer battery is used to power other devices, the number of splice and heat cycles will be reduced.*
> ➢ *When the remaining battery power is low, the power supplied to external devices will become unstable.*
> ➢ *Connecting a device outside the above specifications may affect splicing behavior. When the behavior of the fusion splicer is unstable, remove the device.*

Description of product
Components of splicer
The standard package of the splicer is the following.
Check the equipment items mentioned in this list.

Standard package list (1 of 2)

Standard package list (2 of 2)

Core Alignment Fusion Splicer [90S+]

Battery Pack [BTR-15]

AC Adapter [ADC-20]

AC Power Cord [ACC-xx]

USB Cable [USB-01]

Fusion splicer Strap [ST-02]

Electrodes (spare) [ELCT2-16B]

Fiber Holder Set Plate [SP-03]

Work Table J-Plate [JP-09]

Work Table Right [WT-08R]

Carrying Case [CC-39]

Work Table Left [WT-08L]

Optical Fiber Cleaver [CT50]

Alcohol Dispenser [AP-02]

Single Fiber Stripper [SS03]

Tripod Screw [TS-03]

Carrying Case Strap [ST-03]

Quick Reference Guide [QRG-02-E]

Wireless/PC/Clamp Setting Guide [SG-03-E]

Warning and Cautions [WAC-01-E]

Other necessary items for splicing operation

Fiber coating diameter	UV coating 250μm	Nylon coating 900μm
Fiber holder (Optional)	[FH-70-250] * Old model [FH-60-250] can also be used.	[FH-70-900] * Old model [FH-60-900] can also be used.

Fiber protection sleeves (optional)	<u>Standard sleeve</u>
	   60mm length [FP-03], [FP-03M]
	   40mm length [FP-03 (L = 40)]	

Description of Splicer

Structure

Top view

Tube heater

Wind protector

Front view

Wind-Protector

LCD monitor

Side view

External terminal

Power unit dock

USB port Mini

USB port A

Ribbon Stripper terminal

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Inside of Wind protector

Fusion work area

V-groove illumination

Sheath Clamp

Fiber Retention Clamp Switch

Fiber Retention Clamp Switch

Fiber Retention Clamp

LED

V-groove Clamp

V-groove Clamp

LED

Electrode

V-groove

V-groove

Electrode

Operation of sheet key

ON/OFF key   ON/OFF LED   UP key   HEAT key   HEAT LED   RESET key
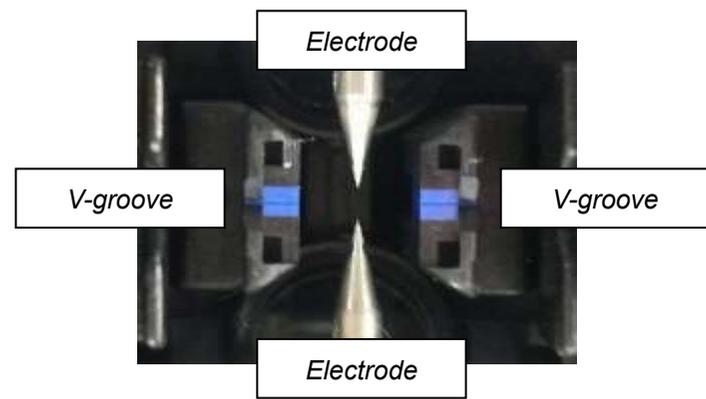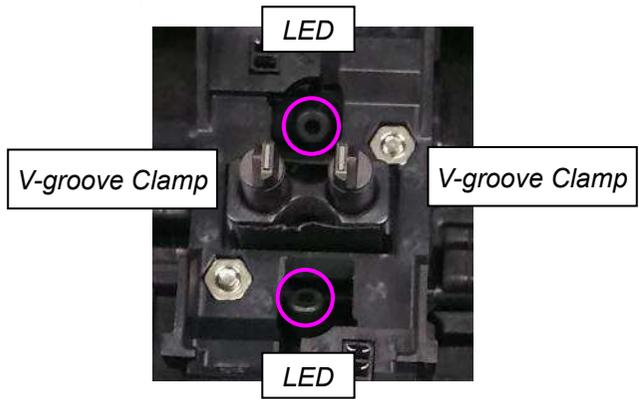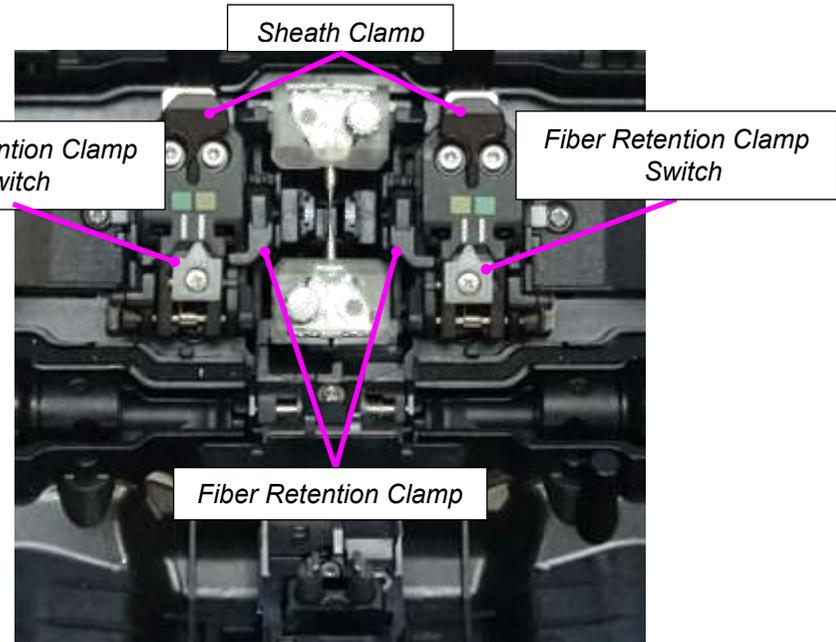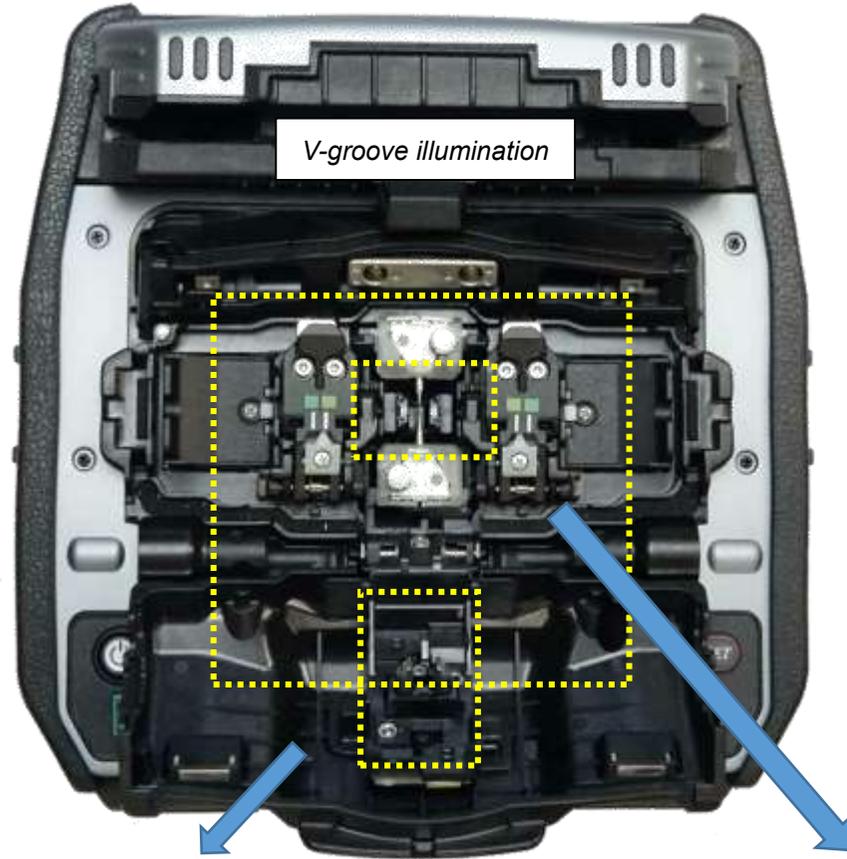
OPEN/CLOSE key   DOWN key   SET key
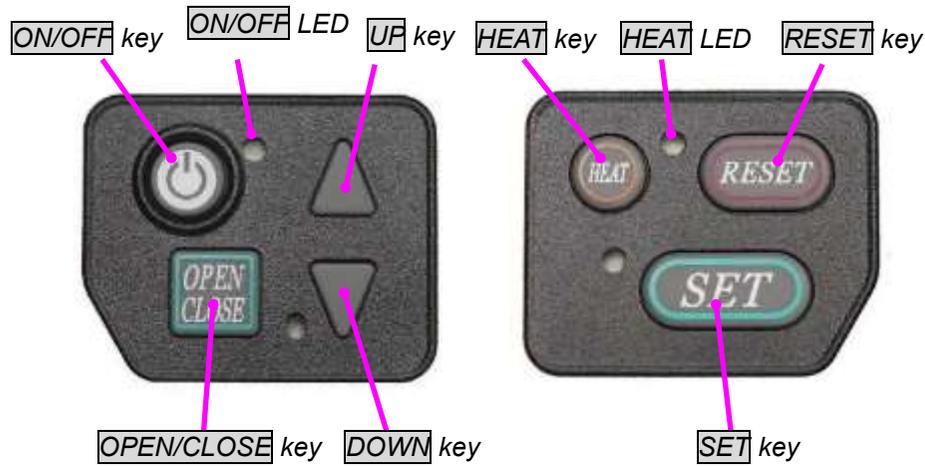
Key name	Key function
OPEN/CLOSE key	To open and close the wind-protector.
ON/OFF key ON/OFF LED	To turn ON/OFF the power. LED turns green when pressing ON/OFF key, turns red when pressing the ON/OFF key again.
HEAT key HEAT LED	Starts the tube heater heating process. If the HEAT key is pressed once during heating, LED will start blinking. Heating operation is stopped if the HEAT key is pressed again when the LED is blinking.
RESET key	Regardless the splicer's status, [RESET] stops any function except the tube heater heating process. After pressing, the splicer will return to the ready state with a beep sound.
SET key	Starts the splicing operation, or progresses through a PAUSE state.
UP/DOWN arrow keys	These arrows are used to move the cursor for navigating the menu, or to select alphanumeric 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

Remove work table from carrying case

Work tray

Carrying case

Remove the fusion splicer from carrying case and put on top of the lid.

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 equipment and accessories on the tray before use. Straps for small accessories may be recommended. If the equipment/accessories were dropped on a person under splicing work area, this could result in a serious injury or fatal accident.
> ➢ Do not operate the fusion splicer in an unstable or unbalanced position. The fusion splicer may shift or lose balance, causing the unit to fall. Possible personal injury or equipment damage may result.
> ➢ Do not operate the fusion splicer near hot objects, in hot temperature environments, in dusty / humid conditions, or when water condensation is present on the fusion splicer.

Power supply

The fusion splicer can be operated with AC power supply or battery.

Insert or detaching power unit

Inserting power supply unit

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

Detaching power supply

Turn off the fusion splicer before removing the power unit.
Take the cover off and then hook a finger on the bottom of the power supply unit and remove the power supply unit from the fusion splicer body.
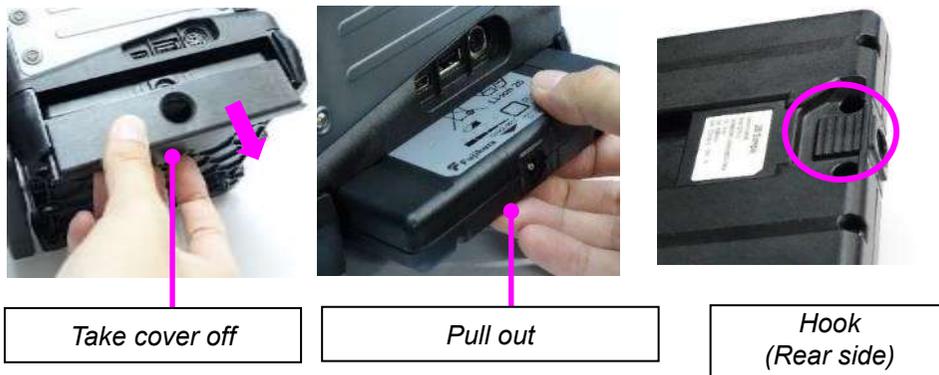
| Take cover off | Pull out | Hook (Rear side) |

AC Operation

1. *When operating the fusion splicer with AC power, use AC adapter (ADC-20) and AC power cord (ACC-xx), or either Power Unit of the following;*
   Battery Pack (BTR-15) or DC adapter (DCA-03).
   *The Battery pack (BTR-15) can use while charging.
2. *Attach the power unit into the fusion splicer body and put the cover on it.*
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 inlet of the power unit.*

Battery pack or DC adapter
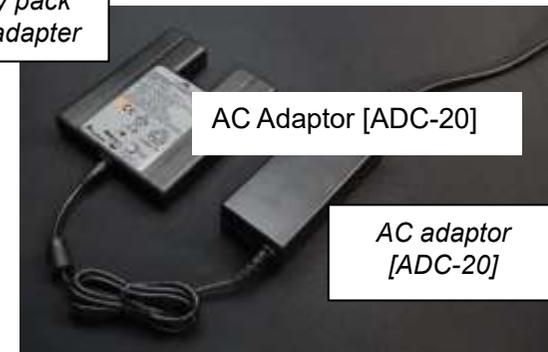
AC Adaptor [ADC-20]

AC adaptor [ADC-20]

AC power code [ACC-**]

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.

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DC operation with external battery

1. *When operating the fusion splicer with DC power, use the Power Unit, Battery Pack (BTR-15) or DC supply (DCA-03), and DC cord (DCC-20 or DCC-21).*
2. *Attach the power unit into the fusion splicer body and put the cover on it.*
3. *Connect the DC cord to the DC supply.*
4. *Insert the DC cord into the inlet of the Power Unit.*

DC cord [DCC-20]

Car Cigar socket to BTR-15 or DCA-03

DC cord [DCC-21]

Car battery to BTR-15 or DCA-03

> ➢ *Do not supply DC15V or greater.*
> ➢ *If the polarity (positive / negative) is wrong, the protection circuit in DCA-03 or BTR-15 shuts down the DC output.*

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, you will only be able to use the machine for long.

Adhere to below practices to prevent battery damage.

> ➢ *The charge of the battery pack after air transport may be 30% or less in accordance with the aviation law. When it arrives, please charge the battery pack to full.*
> ➢ *The capacity of the battery gradually decreases 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 storing for a long time and after every use.*
> ➢ *If a battery is to be stored for a long time, periodical charge every six months is recommended regardless of battery charge level.*
> ➢ *Follow below operating 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 from the splicer display

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

Remaining battery capacity

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

The battery charge indicator on-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 inserted 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	*75~100%*
	3 LED	*50~75%*
	2 LED	*25~50%*
	1 LED	*10~25%*
	1 LED Flashing	*Less than 10%*

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).
While charging, do not place the battery on top of AC adapter or vise-versa.
Battery charge is completed in approximately five to eight hours. However, it takes more depending on the environmental.
After completion, disconnect the supply terminal of AC adapter and AC power cord.
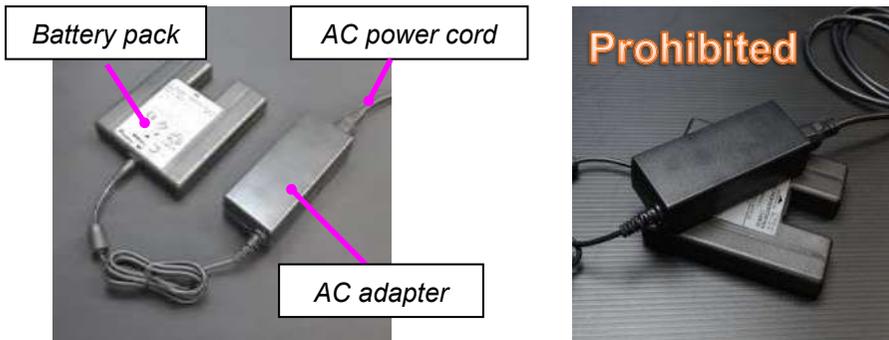
The battery can be charge while splicer is in use. Installed BTR-15 into power dock, and then connect to AC adaptor, ADC-20 or DC power cord.

> ➢ *The battery pack can be charged with AC and DC.*

> ➢ *Do not place battery on top of AC adapter or vise-versa.*
> ➢ *The battery can be charge while the fusion splicer is in use. Installed BTR-15 into power dock and connect to AC adaptor, ADC-20 or DC cord.*
> ➢ *If battery charge does not complete or LED indicator of BTR-15 does not light up, AC adapter or both need replacement. Ask your local service center for further instruction.*

Turning Splicer ON/OFF

<u>Turning Fusion Splicer ON</u>

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

> ➢ *The license message is displayed twice a month when the fusion splicer is turned on.*
> ➢ *There is a possibility that a language is fixed depending on the country of shipment.*

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.

> ➢ *Heater Calibration function*
> ➢ *If the splicer has been 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.*

<u>Turning Fusion Splicer OFF</u>

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

When the power is off but the sheath clamp is open, the wind-protector may not close and the display shows the message below.
In this case, please close the sheath clamp and turn off the power by pressing the ON/OFF key.

Check sheath clamps
are closed.

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Splicer settings check / READY screen

__Composition of a READY screen__

No.	Icon name	Key Function
6	Fusing Power Calibration	After tapping, "Fusing Power Calibration" function in [Maintenance] can be selected directly.
7	Fusing Count	The number of fusings in [Maintenance] is displayed.
8	Splice Mode	Current "Splice Mode" is displayed. After tapping, the [Splice Mode] screen appears immediately.
9	Main Menu	After tapping, the [Main Menu] screen appears.
10	Reset	This is RESET key. The function is as same as RESET key on 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 tapping, the [Bluetooth] screen appears.
14	Cleaves & Stripper	This area shows the status of the paired tools. Press Cleaver icon and [Blade Management] screen appears. This icon shows the status of the cleaver. The stripper icon cannot be pressed. It only shows the status when the stripper is available by bluetooth.

No.	Icon name	Key Function
1	Heater Mode	Current "Heater mode" is displayed. After tapping, the [Heater Mode] screen appears.
2	Heat	This is HEAT key in the touch panel. After tapping at [READY] screen the heater operation starts.
3	LCD Brightness	After tapping, the [LCD Brightness] window appears.
4	Battery Indicator	This icon shows the battery capacity.
5	Changing screen	Tap this icon, the screen in [READY] state changes between [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.

[READY]

[Brightness]

Wireless communication with tools

When the cleaver or the ribbon fiber stripper has been paired to the fusion splicer, the fusion splicer and tools start wireless communication automatically.
After connecting, the status icons is displayed on the monitor.

Wind protector automatic opening-and-closing function

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

(Close)

(Open)

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

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Operation mode

Selection of the operation mode

Each operation mode consists of parameters shown below so that operation of the equipment can be customized.

You can change the operation of the fusion splicer's automated features according to the operator's speed and preferences.

Parameter	Description	
Operation mode		
Auto-LR	Before splicing:	Start splicing automatically after setting fibers on left and right sides.
	After splicing:	Proof test, wind-protector opening, and sheath clamp opening are automatically performed.
Auto	Before splicing:	Start splicing automatically after setting fibers on left and right sides.
	After splicing:	Wind-protector opening and proof test are simultaneously done. Perform sheath clamp opening manually.
Norm-LR	Before splicing:	Start splicing automatically after setting fibers on left and right sides.
	After splicing:	If press SET key, proof test, wind-protector opening and sheath clamp opening are simultaneously done.
Normal	Before splicing:	Start splicing automatically after setting fibers on left and right sides.
	After splicing:	If press SET key, proof test and wind-protector opening are simultaneously done. Perform sheath clamp opening manually.
manual	Before splicing:	If press SET key, start splicing.
	After splicing:	If press SET key, proof test and wind-protector opening are simultaneously done. Perform sheath clamp opening manually.

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 chosen for triggering sheath clamp opening.	
	Auto start trigger	
	Options of "Fiber Set", "Cover Close", and "OFF" can be selected for triggering when the fusion splicer begins the splicing process.	
	Cover close reaction time	
	Time between setting the fibers in the fusion splicer until the wind-protector closes.	
	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 splicing: "open" or "close".	
	Error	
	Setup of wind-protector motion at the time of error "open" or "close".	

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How to change the operation mode

Touch the Main Menu 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.
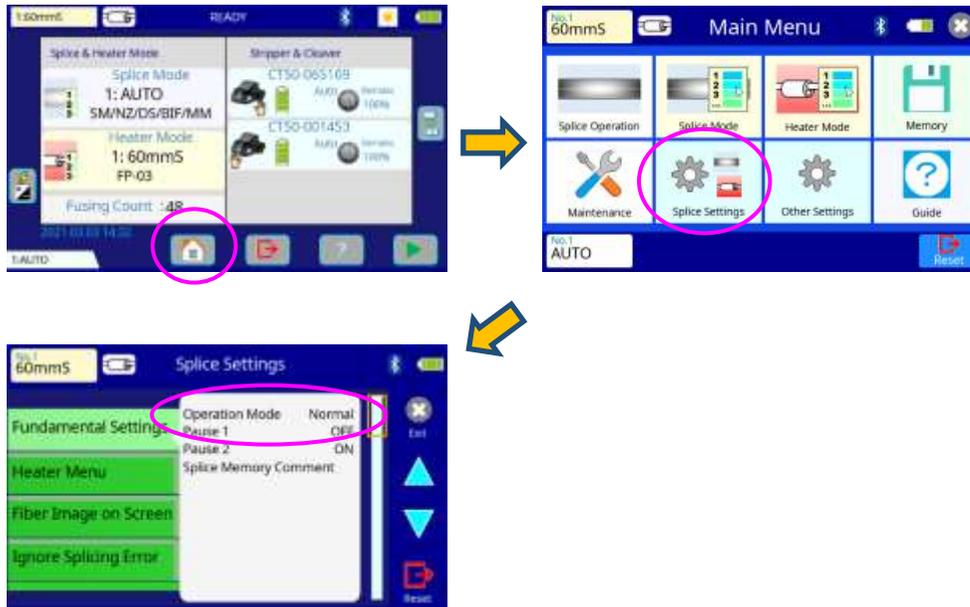
Select of the Splice mode

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 fusing.
- 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 fusion splicer. These parameters are stored in the database area and can be copied to the user-programmable area. These fusion 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 [Fusing Power 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

Changed

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 FPS-08-28	For standard 28mm protection sleeve, Such as Fujikura FPS08-28 protection sleeves.
30mmR FPS-04-30	For standard 30mm protection sleeve, Such as Fujikura FPS04-30 protection sleeves.

Parameter	Description
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

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	250~900µm	3.1mm
FP-03(40mm)	SUS	40mm	10mm or less	250~900µm	3.1mm
FP-04T	Glass Ceramic	40mm	10mm or less	250~900µm	4.0mm
FPS01-400-15	SUS	15mm	5mm or less	~400µm	1.5mm
FPS01-900-20	SUS	20mm	6mm or less	~900µm	2.3mm

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

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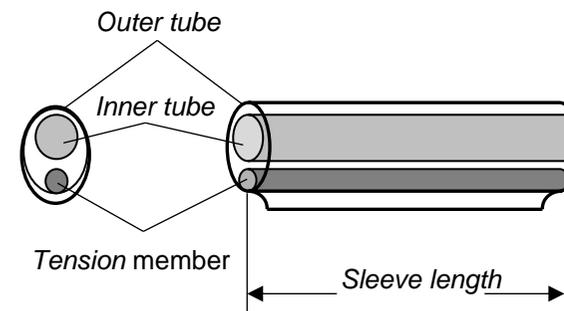
How to check the current heater mode
   The current heater mode is displayed on the [READY] screen.

If you press these Heater Mode *icons, enter to [Heater Mode] screen directly.*
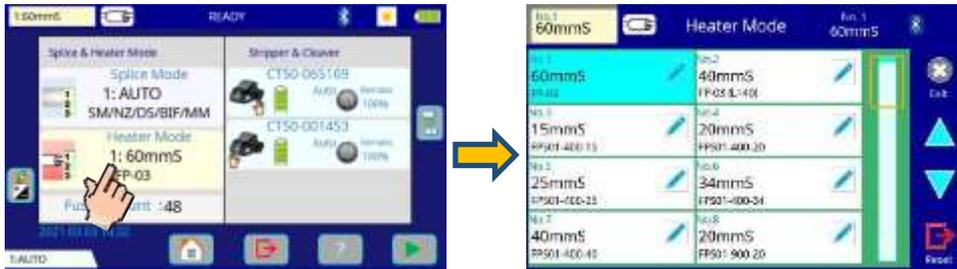
> ➢ *When using a protection sleeve that is not made by Fujikura, please set parameters based on the specific sleeve.*
> ➢ *When the sleeve of another company is used, the durability of a protection point cannot be warrantied.*

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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.

> ➤ Following the convention of the operator holding the left fiber in their left hand, place the protection sleeve on the right side of the fiber.

Fiber protection sleeve

Pass fiber
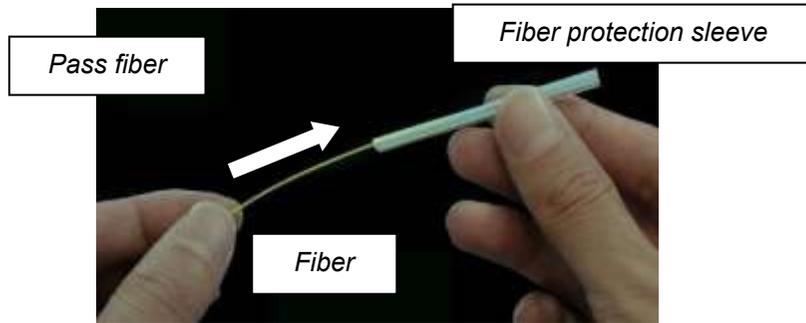
Fiber

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.

Stripping

Cleaning
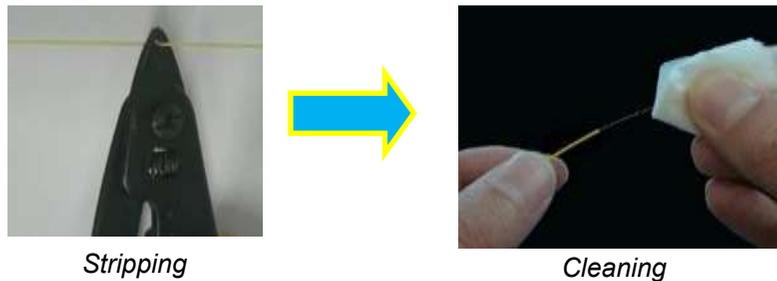
> ➤ Use a high quality alcohol, greater than 99% purity.

Fiber Cleaving when using a sheath clamp

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

Lock

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.

Adjust the cleaving length by using the scale

AD-10-M24

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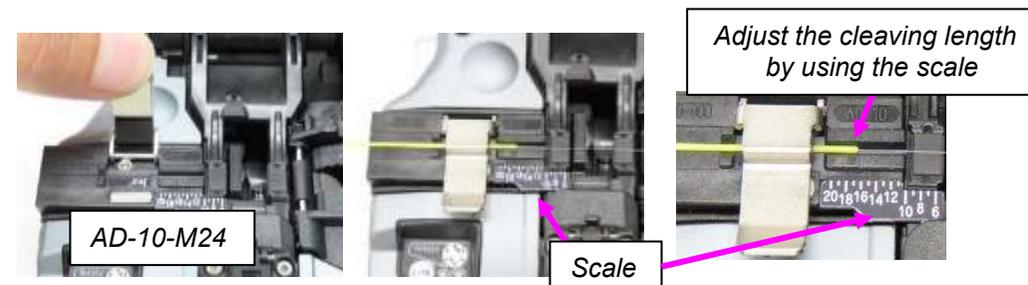
4. Close and gently push down on the Lever until it stops. The blade automatically moves and cleaves the fiber.
Lift the Lever until it stops and remove the fiber from the cleaver. Be careful not to allow the fiber to contact anything, as this can contaminate the end-face of the fiber.

Push the center of lever to cleave.

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

Fiber Cleaving when using a Fiber Holder

Install the Fiber holder set Plate (SP-03)

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

Loosen 3 screws
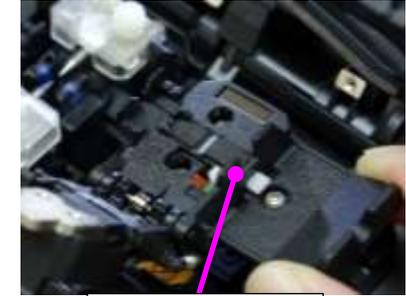
Sheath clamp

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.
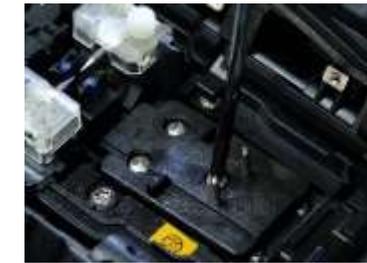
Set the fiber onto fiber holder

1. *Open the lid of a fiber holder and then set the fiber in the fiber holder.*

2. *Adjust the fiber position and then close the lid of the 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 nose of the fiber holder as the reference point. Adjust the position of the sheath edge as follows:
- *If the reference point used is the edge of the fiber holder, set the fiber in the fiber holder with the fiber coating 3.0mm from the edge of the fiber holder.*
- *If the reference point used is the extruded nose of the fiber holder, set the fiber in the fiber holder with the fiber coating 1.5mm from the extruded nose of the fiber holder.*

Pressing down with a finger

Adjusting coating edge

3.0mm

1.5mm
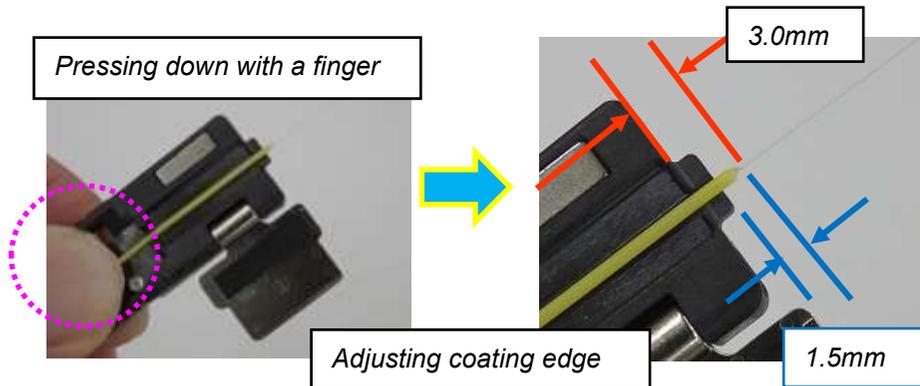
In case of Fiber holder "FH-60 series"

Set the fiber in the fiber holder with the fiber coating 3.0mm from the edge of the fiber holder.

Pressing down with a finger

Adjusting coating edge

3.0mm
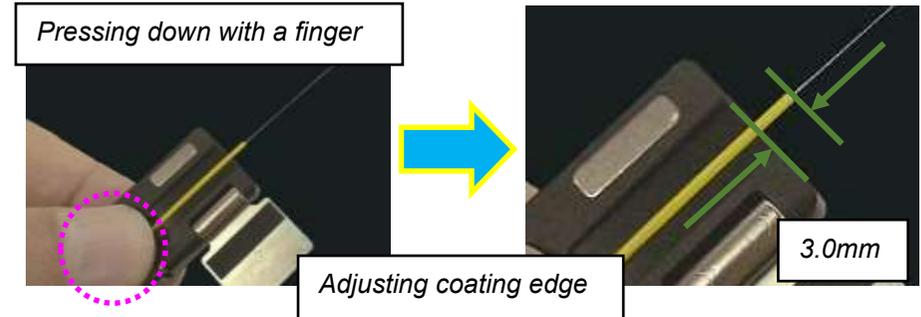
> ➢ *Select a suitable fiber holder based on the fiber coating diameter.*
> ➢ *If fiber coating has some memory curl, place fiber so that the curl is pointed downwards.*
> ➢ *Close the lid of a fiber holder while pressing down with a finger on the coating (refer to figure above).*

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.*

Lever
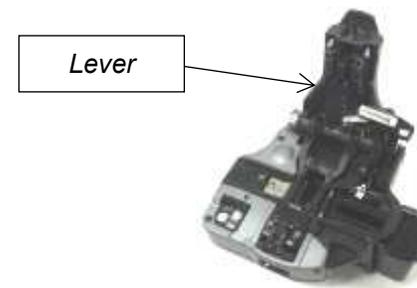
2. *Push the fiber holder forward. Check the position of the fiber coating. If it sits on the rubber pad, adjust the fiber position in the Fiber Holder until it does not sit on the pad.*

Not Good   *Good*

> ➢ *Confirm coating 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 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 in splicer

<u>Using sheath clamp</u>

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.*

Electrode

V-groove

Be careful of fiber tip with v-groove and electrode.

Set so that fiber tip comes to red frame area.
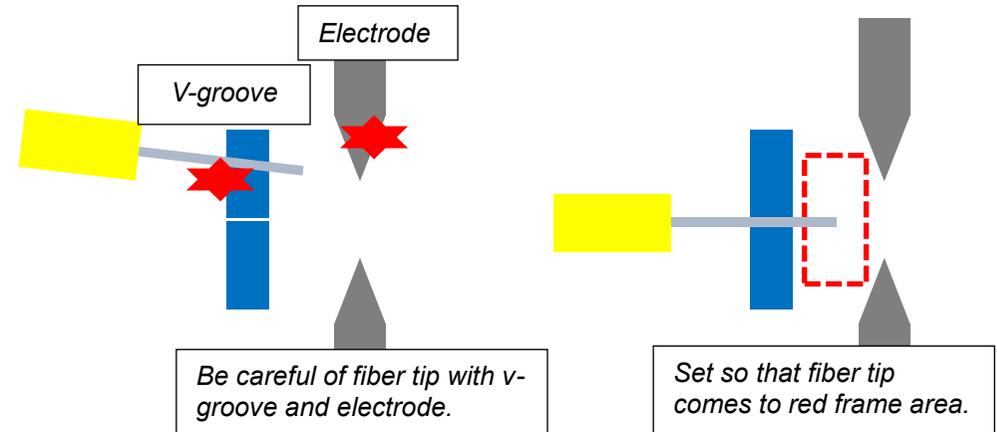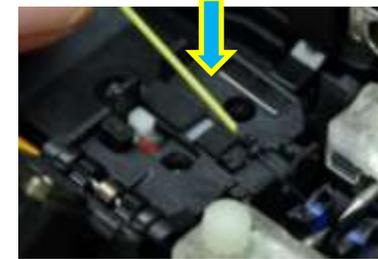
> ➢ *Be careful not to contact the prepared fiber tips into anything to maintain fiber end-face quality.*

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 a Fusing Power Calibration.
Refer to [Fusing Power Calibration].

Wind-protector motion and sheath clamp motion

This unit has automated Wind-Protector opening-and-closing mechanism and movement changes with 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	Pause1	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 with "Auto" and "fast" mode, and is little longer with "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.

Fusing Power Calibration

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

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

Operation procedure

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

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

> ➢ *Use standard SMF ITU-T G652, G655 or G657 fiber for Fusing Power Calibration.*
> ➢ *Use well prepared fibers for fusing power calibration. Dust on the fiber surface affects fusing power calibration.*
> ➢ *Cleave angle threshold does not link to the parameter "Cleave Limit" in splicing modes. Cleave angle threshold is independently set for fusing power calibration. See section [Maintenance Settings] to change cleave angle threshold.*

> ➢ *In some cases, multiple iterations of fusing power calibration are needed until the calibration process is successfully completed and the "Good" message is displayed.*
> ➢ *A number threshold can be set so that a "Test Finish" message is displayed after specific number of fusing power calibrations is performed. See section [Maintenance Settings] for detail*

"Good" message

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

Result: Good

"Not adequate" message

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

Result: Not Adequate

Splicing procedure

To make a good splice, the optical fiber is observed with the image processing system equipped in the fusion 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 fusion splicer move forward toward each other. The fiber forward motion stops at a certain position shortly after the cleaning fusing is performed.
2. Next, the cleave angle and fiber angle 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.

Left and Right cleave angle

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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 fusion splicer and repeat fiber preparation. These visual defects may cause a faulty splice.*

Cleave Shape NG		Large Cleave Angle
Chip	Lip	Angle
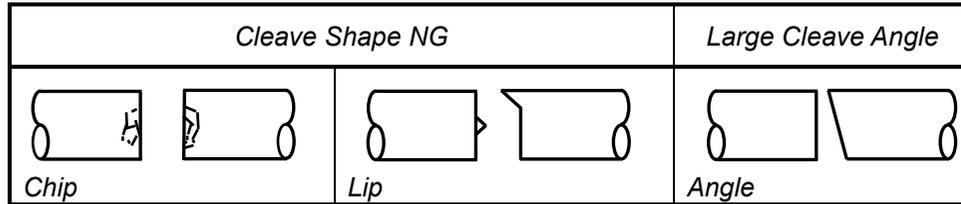
> ➢ *The pause after cleave angle check and fiber alignment can be "disabled". See section [Splice Settings] for detail.*
> ➢ *The cleave angle threshold can be changed. See section [Splice Menu].*
> ➢ *The cleave angle error message can be ignored by pressing* SET *key to go on to the next step. To 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 fusion splicer will rotate the cleaver blade when the fusion splicer detects cleaving defects at a particular frequency and then determines that position unusable.*

4. *The splicer aligns the fiber by observing the core or clad depending on setting.*

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 fusing. Press SET *key for an additional fusing (re-fusing). Splice loss estimate and splice check are performed again.*

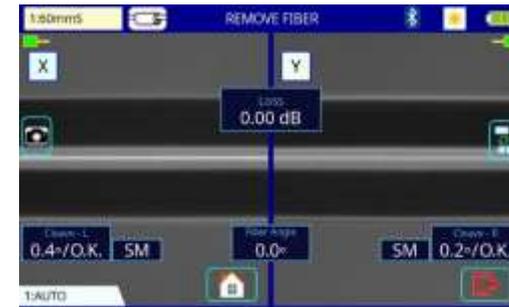> ➢ *Restriction of the number of times of additional fusing can be set up.*
> *Since excessive additional fusing becomes the cause of worsening splice intensity and a splice loss, it can forbid the fusing more than the suitable number of times.*
> *Refer to [Setting Menu] for details.*

> ➢ *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 v-groove clamp chip	Clean V-groove and v-groove clamp chip.
Fiber angle	Dust on v-groove or v-groove clamp chip	Clean v-groove and v-groove clamp chip.
	Bad fiber end-face quality	Check if fiber cleaver is well conditioned.
Core step	Dust on v-groove or v-groove clamp chip	Clean v-groove and v-groove 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].
MFD mismatch	Fusing power too low	Increase [Fusing Power] and/or [Fusing Time].
Combustion	Bad fiber end-face quality	Check the cleaver
	Dust still present after cleaning fiber or cleaning fusing.	Clean fiber thoroughly or Increase [Cleaning Fusing 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].
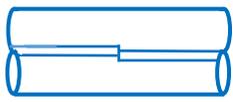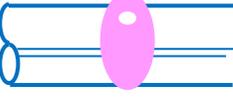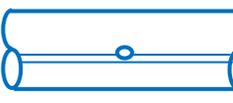
Splice loss increase: Cause and remedy (2 of 2)

Symptom	Cause	Remedy
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	Fusing power not adequate	Perform [Fusing Power Calibration].
	Some fusing parameters not adequate	Adjust [Prefuse Power], [Prefuse Time] or [Overlap].
Line	Some fusing parameters not adequate	Adjust [Prefuse Power], [Prefuse Time] or [Overlap].
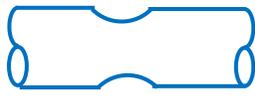
➤ A vertical line sometimes appears at the splice point when MM fibers or dissimilar fibers (different diameters) are spliced. This does not affect splice quality, such as splice loss or tensile strength.

A loss becomes high when the following errors occur.

➤ Electric discharge may become unstable when usage environment changes significantly. In such a case, please use it after performing "Stabilize Electrodes".

➤ *When SET key has been pushed, "Stabilize Electrodes" is performed. Please perform an " Fusing Power Calibration" after the end of "Stabilize Electrodes" according to the directions on a screen.*
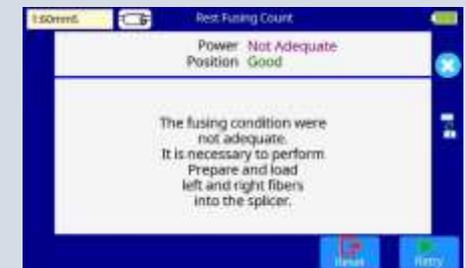
Storing splicing results

Splicing results is stored in memory.

👉 ➤ *After the 20,000th result is stored, 20,001st splice result is written over first 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.
If a comment is entered, 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.*
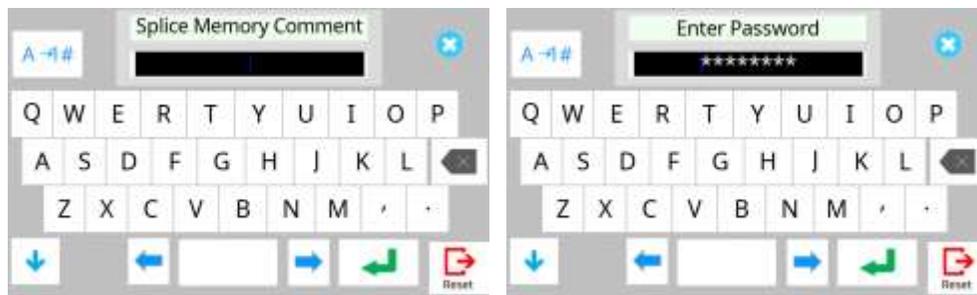
Fiber proof test

The strength of the splice point can be checked. After splicing, 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.

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

When using the "fiber retention clamp" function, the fiber is held even though sheath clamps open.
Picking up the fiber automatically releases the "fiber retention clamps."

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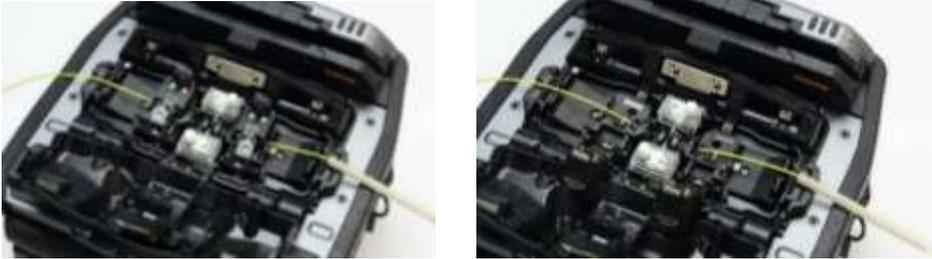
2. Hold the left fiber at the end of sheath clamp shown below.

3. Tilt the fiber to slide the protection sleeve toward the left while maintaining tension.
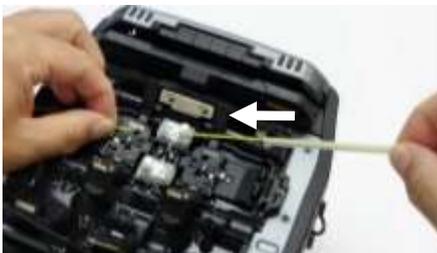
4. The protection sleeve slides and reaches your left hand.

5. Slide your left hand left. Keep your right hand in the same position.
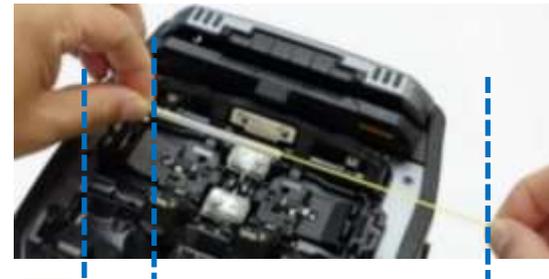
6. Move to the heater.

When using short length sleeve less than 60mm

When using the 40mm length protection sleeve or micro protection sleeve, use the sleeve scale on the surface of the heater.

For the 40mm protection sleeve, set the protection sleeve as shown 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 tension until fiber is completely transferred to tube heater.*

After setting fiber in the heater, the heater lid automatically closes. Keep tension on the fiber until then.

Two-heater plates sandwich the protection sleeve as shown below. Releasing tension earlier may cause the protection sleeve to fall from the proper heating location.

Notes at the time of a protection sleeve set!

Apply tension until heater holds the fiber.   *If you release tension before the lid closes*

> ➢ *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 the protection sleeve from heater.*
> ➢ *Since it gets very hot in the heater and the protection sleeve will get hot, you should not touch the ptotection sleeve immediately after heating.*

After finishing heating process, the lid automatically opens and you can remove fiber from the heater.
Visually inspect the finished protection sleeve to verify no bubbles or debris/dust is present in the protection sleeve.

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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 line-fee cotton swab. Remove excess alcohol from the V-groove with a clean dry lint-free swab.*
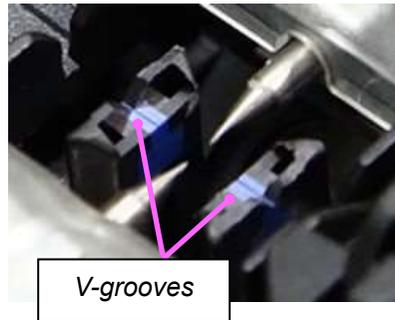
V-grooves

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.*

Prepared fiber

Cotton swab

⚠ ➢ *Be careful not to touch the electrode tips.*
➢ *Execute [Fusing Powe Calibration] after cleaning.*
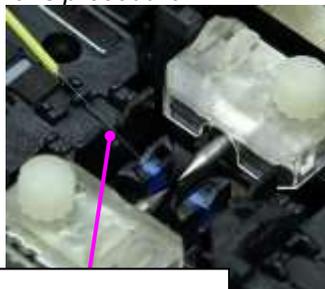
Cleaning V-groove Clamp Chips

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

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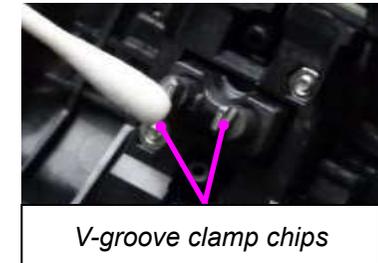
1. *Open the wind-protector.*
2. *Clean the surface of the chip clamp with an alcohol-moistened thin lint-free cotton swab. Remove excess alcohol from the chip clamp with a clean dry lint-free swab.*

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 lint-free cotton swab moistened with alcohol.

Clamp Pad

Cleaver blade

Clamp Pad

Anvil

CT50
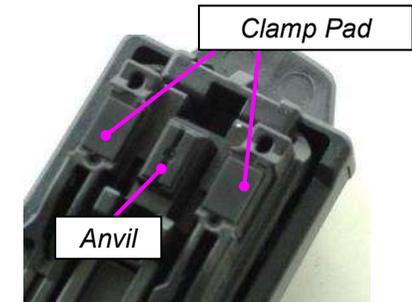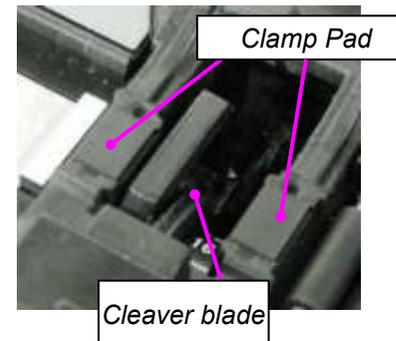
Fusing Calibration

See Section [Fusing power 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-moistened thin lint-free cotton swab. Remove excess alcohol from the lens surface with a clean dry lint-free swab.

Cotton swab
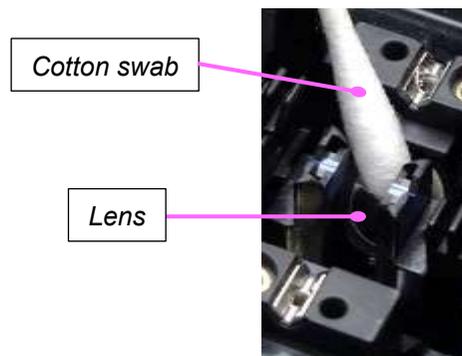
Lens

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.*

Change the cleaver CT50 blade position

The fiber end face quality deteriorates as the cleaver blade wears. The CT50 uses a circular blade that has 16 positions. Each position can cleave approximally 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 in relation to the current blade position. Then the splicer judges the cleaver blade worn if several errors occur in a short period, and automatically rotates the cleaver blade. These parameters are set prior shipment. As a result, the life of the blade may be longer than the 1,250 count.*

- Manual rotate -

When not using the wireless data communication function, use the cleave count function in the splicer. Otherwise, visually monitor the fiber end face and make your own judgment for end of blade life at the current position. Then rotate the cleaver blade as described below to an unworn position.
Check the blade position number printed to the left of the blade. Below shows 3 procedure for rotating the blade.

Method1: Rotate the blade using the Rotate Button
1. Open Lever until it stops.
2. Press Rotate button. The blade rotates while pressing the Rotate button.
3. Check the blade position number.

Rotate button

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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 mobile application "Splice+".

> ➢ *With this method, it is necessary to pair the smartphone or fusion splicer via Bluetooth with the 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.
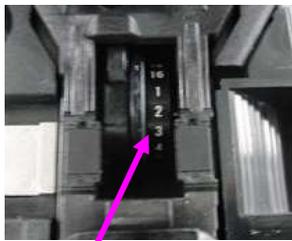
Blade Position Number   *Blade Rotating Dial*   *Arrow*
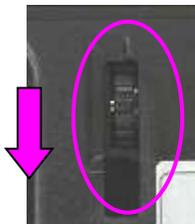
Blade Position Number and Blade Rotating Dial

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 two 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 the nearest Fujikura authorized distributor for ordering details.*

Blade Replacement

After the circular blade has been raised twice and rotated through all positions three times (approximately 60,000 for CT50 single fiber cleaving), it needs to be replaced. The user can replace the cleaver blade. Contact the nearest Fujikura authorized distributor for ordering a new blade.

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

How to remove and install the Protrusion of the sheath clamp

The sheath clamp is equipped with a protrusion for loose tube fiber.
The protrusion pinches the loose tube fiber against the tight buffer fiber within.
However, it may damage other types of fiber coating.
If you do not splice loose tube fiber, you can remove it with following procedure.

Protrusion

Protrusion switch=OFF

Protrusion

Protrusion switch=ON
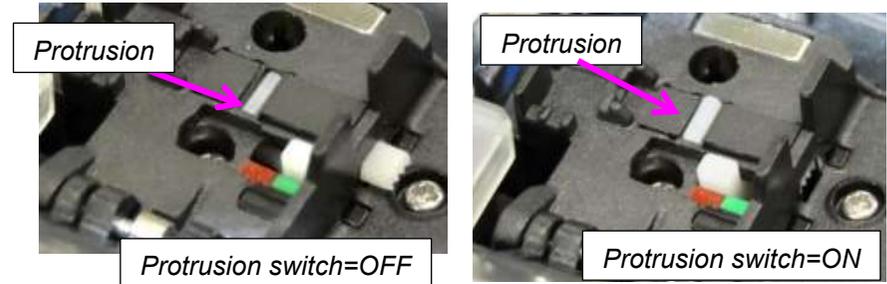
How to remove:

1. Remove two screws located underneath of the sheath clamp.
2. Remove metal parts as below
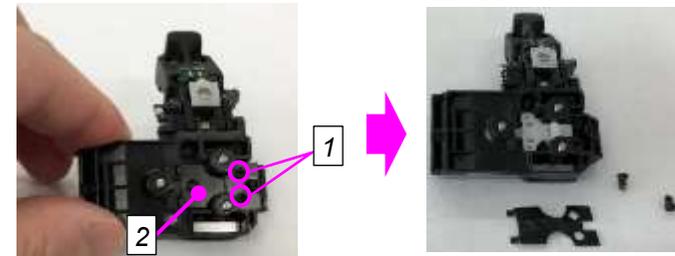
3. Remove below parts from inside, two plastic parts and spring.
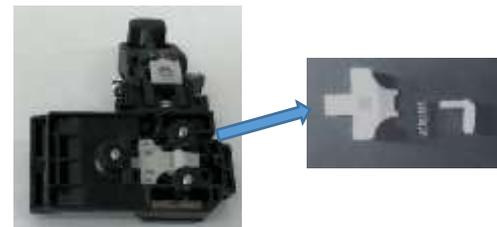
4. Store removed parts for future use.

> ⓘ ➢ *Take care not to lose the removed parts.*

5. Attach the metal plate to the sheath clamp. Then tighten two screws with 20 cNm.

> ➤ Do not overtighten the screws.

How to itstall:
1. Remove two screws located underneath of the sheath clamp.
2. Remove metal parts as below.
3. Install the protrusion to the sheath clamp by using the tweezer.
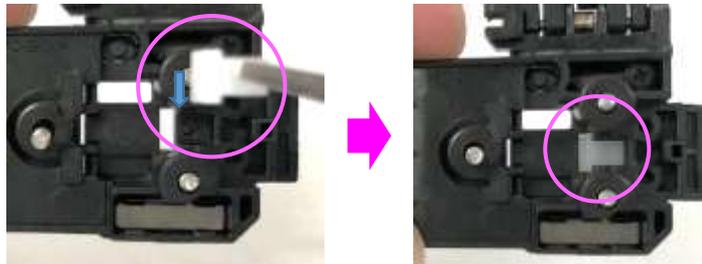
4. Tilt the white plastic part to make a space for the spring as below photo while keeping to not fall. After placed the spring, adjust the position with tweezers as below so each spring edge fit the convex of clamp and concave of white part.

Space

Space

5. Put the big plastic part in the pot of the clamp while keeping pressing down the small plastic part with tweezers.

6. Place the metal plate and fix by two self-tapping screws with torque 20 cNm.

> ➤ Do not overtighten the screws.
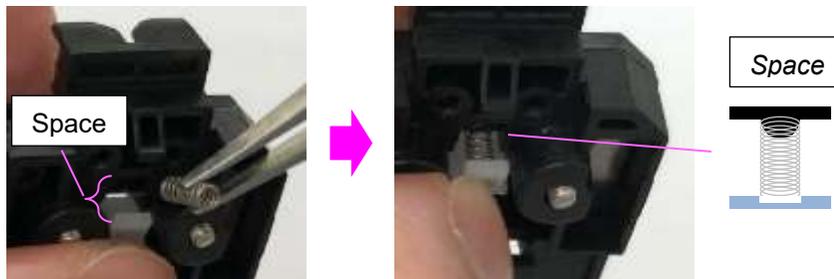
Wireless data communication

Wireless data communication function of the splicer

The splicer features wireless data communication with the optical fiber cleaver (CT50) 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 has been paired with a device, the icon of each tool appears on the right side of the LCD monitor.

Selecting each icon takes you to its user menu.

icon	Description
	Tap this icon, to enter the [Bluetooth] menu in "Other Setting" directly.
CT50-008727 Auto Remains 93%	*This icon shows the status of the paired cleaver.* *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 and the [Blade Management] screen appears. It shows details of the cleaver blade life.*
⊕ Add Cleaver	*This splicer can connect with 2 cleavers via Bluetooth.* *This icon appears when the splicer is connected to 1 cleaver or none.* *When pressing this icon you enter the [Bluetooth] menu directly.*
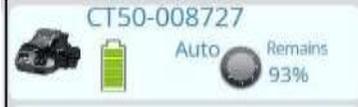
How to check the communication status with Cleaver

During the connection process,

CT50: The Link LED on the CT50 lights up when starting the pairing and then lights off

Blight
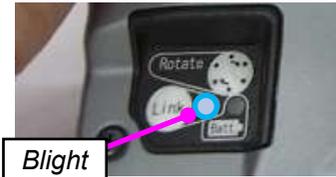
CT50

How to establish wireless data communication

If purchased separately, the CT50 and compatible splicer will need to be paired before cleaver management begins. Instructions on how to connect the splicer to the cleaver and ribbon fiber 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.

<u>Procedure:</u>

1. *Turn the splicer power on.*
2. *Place batteries in the cleaver or turn the ribbon fiber stripper power on.*
3. *Press the [Bluetooth] Icon at the [READY] screen to open the [Bluetooth] Menu.*
4. *Set [Splicer], [Cleaver] and [Stripper] setting to "ON". Tap with finger to switch between "ON" and "OFF".*
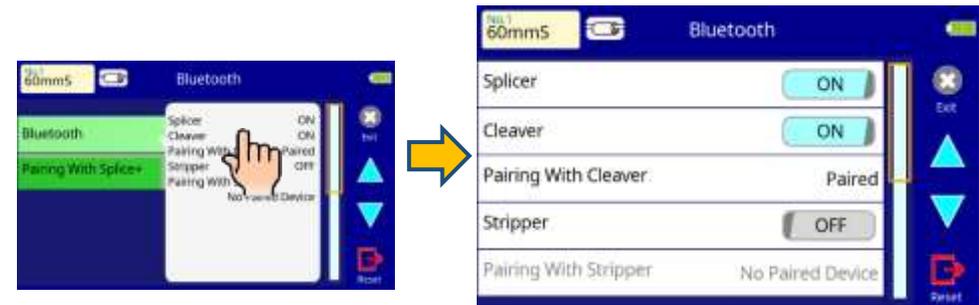
5. *Press the [Pairing With Cleaver] icon.*

6. *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.*

CT50

Link button

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7. The cleaver or stripper requesting pairing appears on the screen of the splicer and is displayed in white. Tap with your finger to pair.

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 the cleaver, the ribbon fiber stripper and the splicer. Turning Bluetooth off on one device does not disable wave output for the other.

Procedure in case of the splicer

1. Open the [Bluetooth] menu screen.
2. Turn off the [Splicer] on the [Bluetooth] Menu.
3. Press the [RESET] key to return the [Ready] screen.
    Make sure the cleaver and stripper icons have disappeared.

8. When pairing is successful, the "LINK" LED of the cleaver or the ribbon fiber stripper stops blinking and remains on briefly before turning off.

9. Press the "RESET" icon or button to return to the [Ready] screen, the serial number of the paired cleaver now shows.

    To confirm successful paring, press the LINK button on the cleaver or the ribbon fiber stripper for 1 second. When connected correctly, the "LINK" LED briefly turns on.

Change the device

1. Turn [Splicer] and [Stripper] or [Cleaver] in Bluetooth menu "ON".
2. Select [Pairing With Stripper] or [Pairing With Cleaver] in the Bluetooth menu.
    Touching either one will make the [Device List] screen appear.
3. Hold the "LINK" button for 6 seconds of cleaver or ribbon fiber stripper. The Link
    LED will begin blinking blue and then wait for the command from the splicer to
    pair.
4. For each unique device, it adds the serial number to the [Device List] screen.
5. Touch the serial number on-screen of the cleaver or the ribbon fiber stripper you
    want to connect to.
6. This initiates the wireless data communication with the new ribbon fiber stripper
    or cleaver.

<u>Procedure for Cleaver</u>

<u>*Procedure1*</u>
･*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.

<u>*Procedure2*</u>
 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
on establishing wireless data communication.*

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 displays the cleave count for each positions in a table.

- *Blue* cell is current blade position.
- *Gray* cell are worn blade positions.
- *Green* cell is a recommended position when the current position is not suitable.
- *Red* cursor is the user's tool for selecting a position to rotate to. User can select the position by touching the monotor.

Benefit of wireless data communication function

Convenient usage with cleaver CT50

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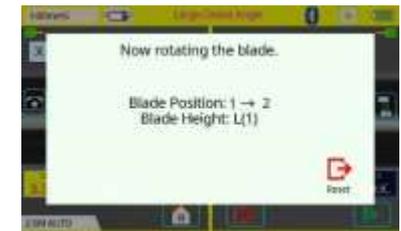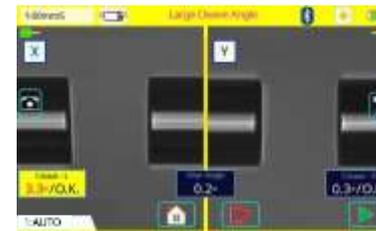
2. The timing and judgment of blade rotation made by the splicer can be adjusted in the settings menu. A message to raise blade height can also be displayed when all 16 positions are expended. There is no need for the operator to make blade management decisions.

3. 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.

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Benefit of wireless security function "Smart Lock"

"Smart Lock" can be used by connecting a smartphone and the fusion splicer via Bluetooth communication.
This function locks and unlocks the fusion splicer by Bluetooth communication with a smartphone.
It will be locked automatically if the fusion splicer is stolen. Therefore, it is possible to prevent unauthorized use after theft.
Furthermore, this function may help the effect of suppressing theft.
The "Splice+" smart phone application is required to use this feature.
The procedure below explains how to set the "Smart Lock".

Procedure

1. Press the [Bluetooth] Icon at the [READY] screen to open the [Bluetooth] Menu.Set [Splicer] setting to "ON".

2. Select [Paring With Splice+] menu and set [Splice+] setting to "ON".

3. Tap the splice+ icon in your smartphone. Then select the FUSION SPLICER in the Splice+.

4. Select the [Pairing With Splice+] in the splicer. Then press [Set] key.

5. Wait until the splicer shown is in the Splice+. Tap the icon. Icon color will change (Light blue), when pairing is finished.

Pairing status

Before pairing	After pairing

Confirm the pairing finished in the splicer.

➢ Try again if pairing fails.

6. Set the password, expiration date and time to lock in the Splice+. Then, tap "OK".

Setting completed.

➢ If you disable the Smart Lock setting, the password will be initialized.

Unlock procedure
The fusion splicer will be automatically locked when the specified time has passed after the released pairing splicer and smartphone, or when you turn the splicer off.
The procedure below explains how to unlock the fusion splicer.

1. Turn the splicer on.   The splicer shows below message shows.

2. Turn the Splice+ on.
3. Pairing will start automatically in the Splice+. Then the splicer is unlocked.

* Pairing with another smartphone.
 (In case you change smartphone to new one, or lose, etc.)

☞   ➢   It needs the password you set in Smart Lock setting on the other smartphone.

1. Press the SET button when the splicer shows below message shows.

SET

2. Turn the Splice+ on and select the FUSION SPLICER in the Splice+.

3. Press the SET button in the splicer and start pairing.

SET   SET

4. Wait until the splicer shown is in the Splice+. Tap the icon.
   Icon color will change (Light blue), when pairing finished

5. Input the password in the Splice+.Then the splicer is unlocked.
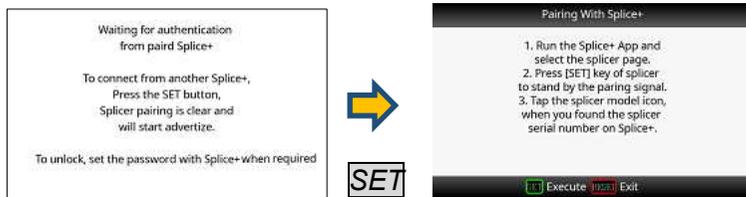
☞   ➢   The password you set in Smart Lock setting on the other smartphone.

❗   ➢   If you have forgotten the password, contact to the nearest Fujikura authorized distributor.

Main Menu
Composition of Main Menu

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.

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.

Splice mode menu
Composition of Splice Menu

Common parameters for all modes for splicing can be set.
[Splice Mode] screen appears when selecting the [Splice Mode] icon at [READY] screen.
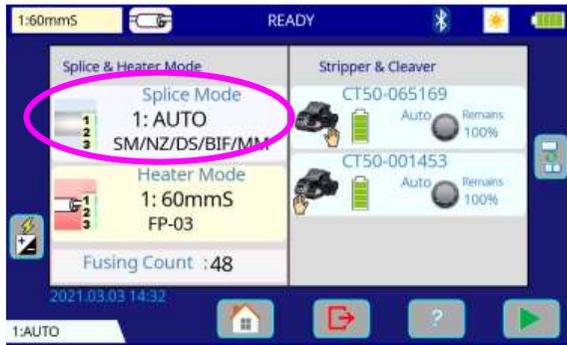
How to change the splice mode.
1. When selecting the listed icon at [Splice Mode] screen, the color of the icon changes to blue and the splice mode is changed.
2. Press [RESET] icon to return to the [READY] screen.

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 fusing.
- 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.
➢ **[G652/SM AUTO] and others**
 Use this mode if the fiber type is identified.
➢ **[G652/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 [Fusing Power Calibration] before using this mode.

Below is a figure showing the fusing conditions (relationship between " Fusing 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.
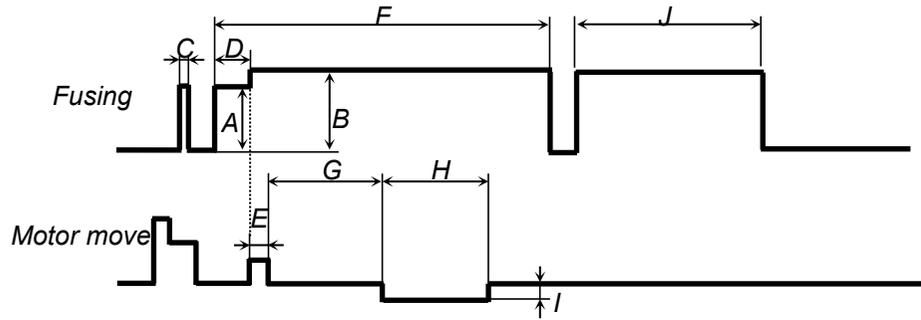
A: Prefuse power
D: Prefuse time
G: Taper wait time
J: Re-fusing time

B: Fusing power
E: Overlap
H: Taper time related to taper length

C: Cleaning fuse time
F：Fusing time
I: Taper speed

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 fusing and adjusting the fusing current accordingly. This splice mode does not require the operator to perform a fusing power 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 parameters. Therefore, the splice loss may be higher than another Auto mode. If the fiber type is identified, uses the specific Auto mode.
G652/SM AUTO	This splice mode can splice standard SM fiber. MFD: 9 to 10µm, Wavelength: 1310nm, ITU-T G.652
G651/MM AUTO	This splice mode can splice the standard MM fiber. Core diameter: 50.0µm, 62.5 µm, ITU-T G.651
G655/NZ AUTO	This splice mode can splice the standard NZDS fiber. MFD: 8 to 10 µm, Wavelength: 1550nm, ITU-T G.655
G653/DS AUTO	This splice mode can splice the standard DS fiber MFD: 7 to 9 µm, Wavelength: 1550nm, ITU-T G.653

Points to note: 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 fusing power calibration doesn't work in this splice mode. With this mode selected, perform the "Fusing Power 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: 50.0μm, 62.5 μm, ITU-T G.651

Fast splice mode

Use this mode if the fiber type is identified and prefer quick splices with high yield to consistent splice loss.
Automatic fusing power calibration doesn't work in this splice mode. With this mode selected, perform the "Fusing Power Calibration" manually before splicing.

Database of splice mode (Fast)

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

Attenuation splice mode

Use this splice mode when you need intentionally splice loss by making axial 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-fusing 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. Fusing power and Fusing 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 to the left. The parameters included in the category are displayed on the right.*
3. *Select and change the category icon and find the target parameter.*
4. *Select the parameter displayed on the right side to show the parameter edit screen.*
5. *Select and change the target parameter.*
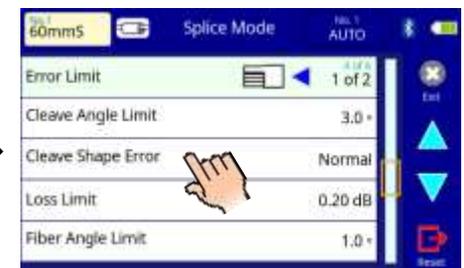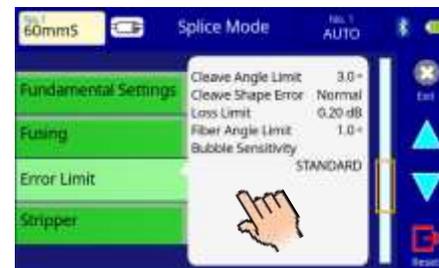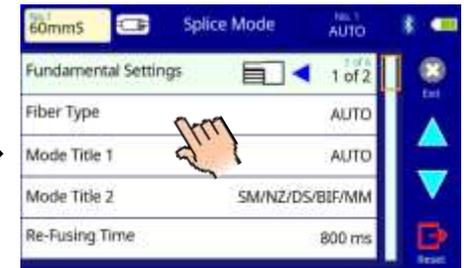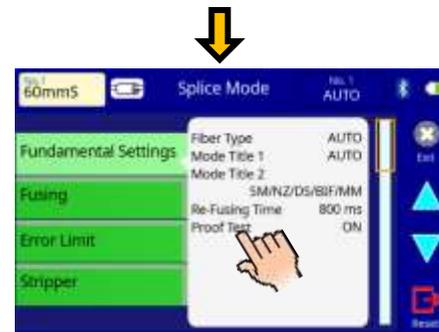
Initializing edited parameters

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 database.
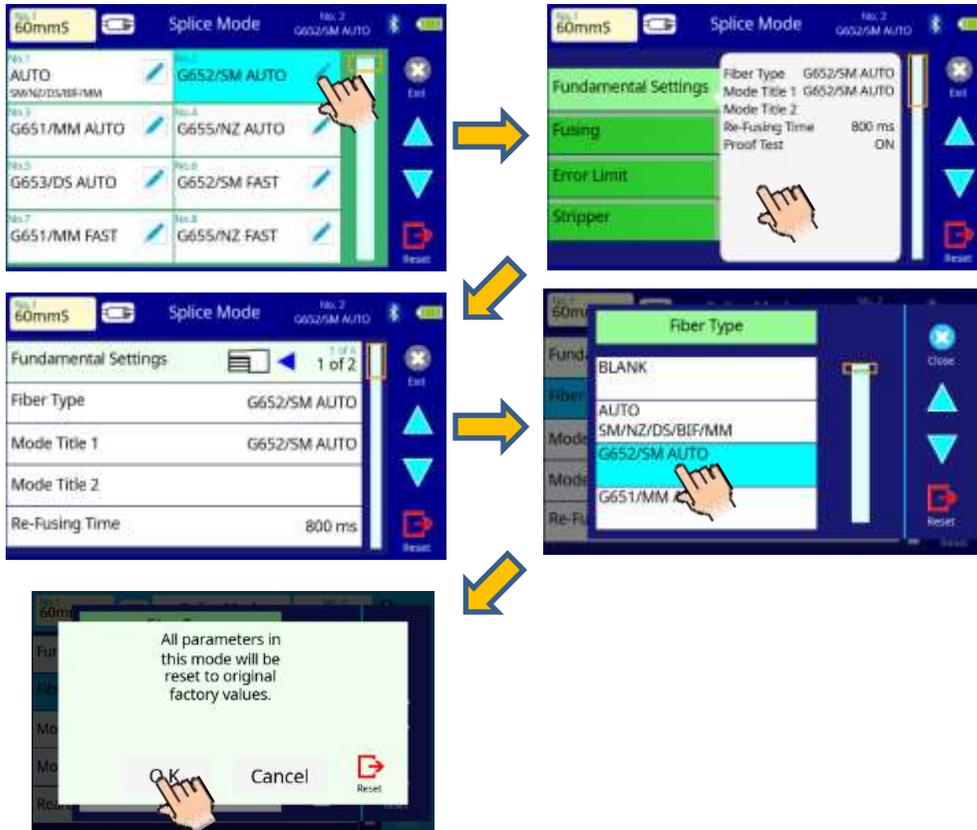
Creating or deleting splice modes

How to create a splice mode

There are a standard set of splice modes listed when the splicer is first shipped, and all the other modes are displayed [BLANK]. Follow the steps below to add a splice mode:

1. *Select a "BLANK" splice mode that is gray in [Splice Mode] screen.*
2. *Change "Fiber Type" to the splice mode in the database.*
3. *The parameters of the selected "Fiber Type" are now installed in the splice mode.*
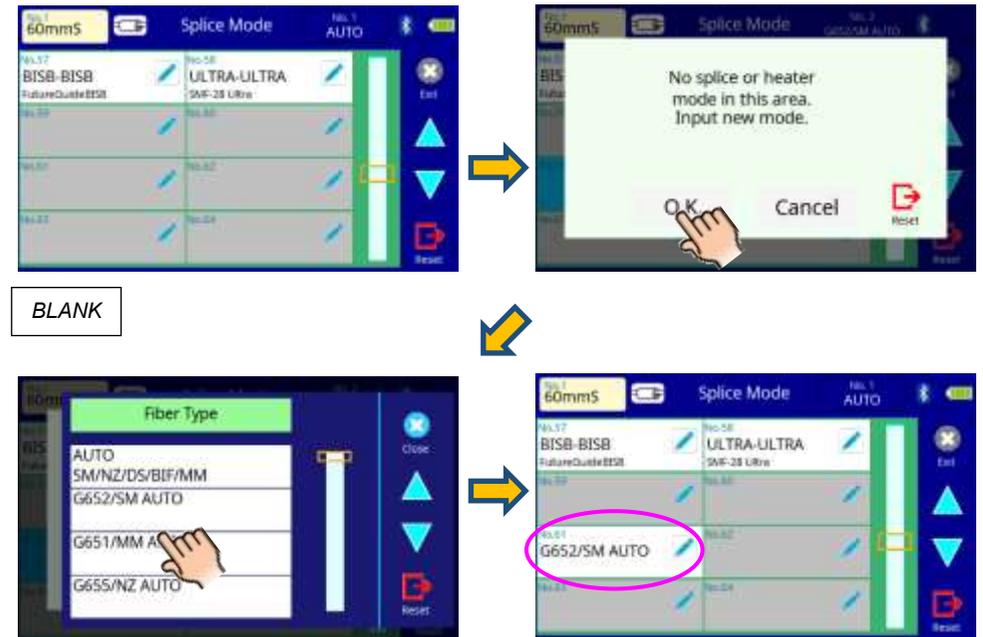
BLANK

How to erase splice mode

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

1. *Press* ✏ *icon of the mode to be erased.*
2. *Select [Fiber Type] and change it into [BLANK]*
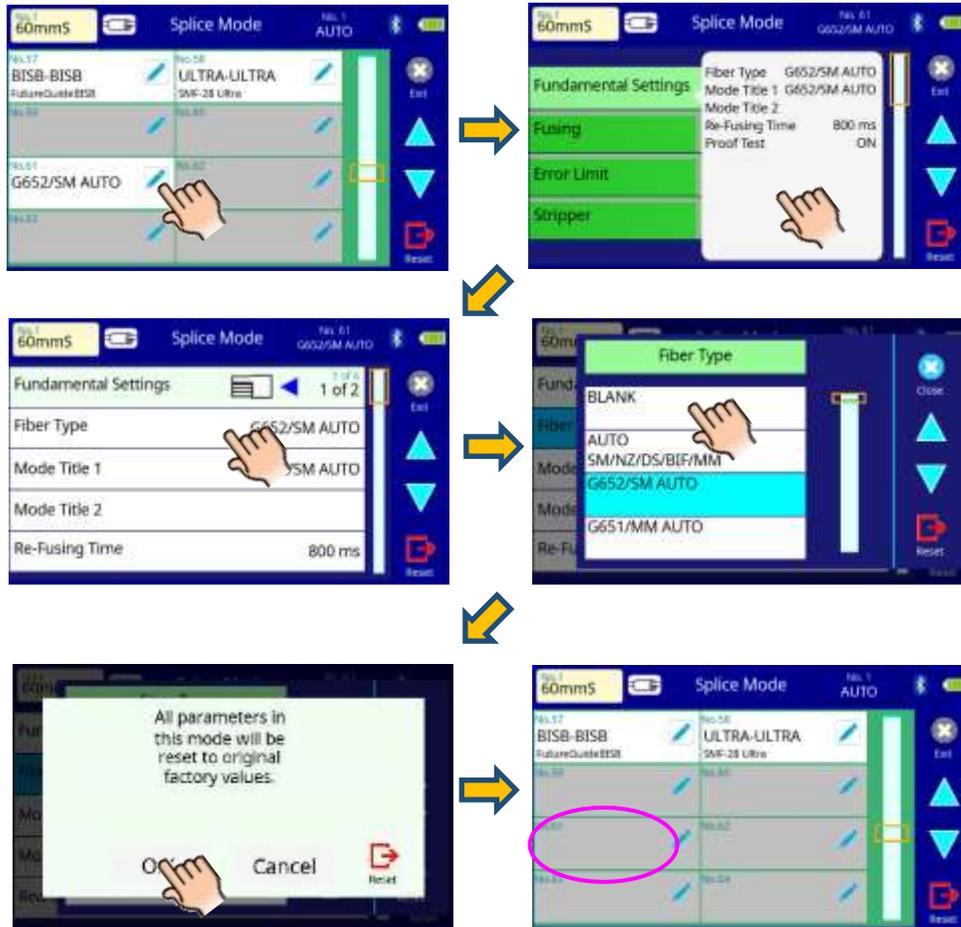
Detail of the parameters in splice mode

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.
Re-fusing Time	Splice loss may be improved by an additional "re-fusing" in some cases. The duration of this additional fusing 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.
Fusing	
Cleaning Fuse	A cleaning fuse burns off microscopic dust particles on the surface of the fiber with a fusing for a short period. The duration of the cleaning fuse can be changed by this parameter.
Active Fusion Control	If [Active Fusion Control] is set to "ON", the fusing power and time are controlled actomatically depending on the cleave angle, fiber type and an environment.
Fusing Power	Fusing Power is fixed at STANDARD. Fusing Power is changed automatically.
Fusing Time	Fusing Time is fixed at 2000ms. This is automatically changed depending on the cladding illumination during Fusing.

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 list (1 of 5)

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.
Re-fusing Time	Splice loss may be improved by an additional "re-fusing" in some cases. The duration of this additional fusing can be changed by this parameter.
Proof test	An ON/OFF setup of the proof test done after splice is performed.
Gap Settings	
Cleaning Fuse	A cleaning fuse removes dust on the surface of the fiber with a fusing for a short period. The duration of the cleaning fuse can be changed by this parameter.
Active Fusion Control	If [Active Fusion Control] is set to "ON", the fusing power and time are controlled actomatically depending on the cleave angle, fiber type and an environment.
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 list (2 of 5)

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 fusing 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 Fusing 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 list (3 of 5)

Parameter	Description
Prefuse and Stuff	
Prefuse Power	Sets the power of the prefuse, which is a fusing 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, which is a fusing 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.
Fusing	
Fusing1 Power	Fusing can be separated into two stages. Fusing1 Power is the first stage. This sets Fusing1 Power.
Fusing1 Time	Sets Fusing1 time. Caution If Fusing1Time is set 1 sec. or less and Fusing2 Power is set to "OFF", the splice may break during proof-test stage.
Fusing2 Power	Fusing2 is the second fusing stage. This sets Fusing2 Power.
Fusing2 Time	Sets the total Fusing2 time. Usually set this value to "0sec". It is possible to set a very long fusing time. However, when the total of the Fusing1 time and Fusing2 time exceeds 30 seconds, always adjust the function [Fusing2 ON Time] and [Fusing2 OFF Time] to weaken the fusing power. A continuous fusing over 30 seconds, without weakening the fusing power, may damage the fusing unit.
Fusing2 On-Time	During Fusing2, fusing power can be pulsed by turning the fusing on and off. This sets the amount of time that Fusing2 is ON.
Fusing2 Off-Time	Sets Fusing2 OFF Time during Fusing2. When the Fusing2 is intermittent, re-fusing is also intermittent. When continuous re-fusing is necessary, set this parameter to "OFF".

Parameter list (4 of 5)

Parameter	Description
Tapering	
Taper Splice	Splice loss is sometimes improved when the fiber is tapered (pulled) during fusing 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 fusing 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."
MFD Mismatch Coef.	Determines how MFD mismatch influences splice loss estimation. If "Estimating Mode" is set "OFF" or "CLAD," MFD mismatch is automatically set "OFF."

Parameter list (5 of 5)

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 the SET key to drive the fibers forward. The fibers stop moving forward at the Gapset position.

3. Select a motor by pressing the arrow icon ◀ ▶ on the "PAUSE 2" screen.

4. Press this icon 🔲 to switch the motor speed Fast or Slow.

5. Press the Up/Down key to move the selected motor and change the image or position of the fiber.

Select a motor

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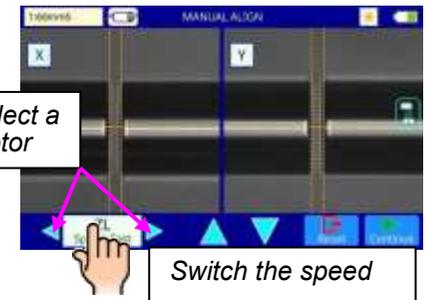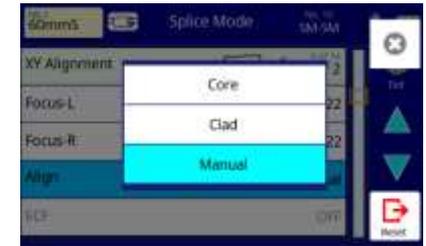
Motor	Up Arrow key	Down Arrow key
ZL/ZR	Forward	Backward
X/Y	Upward	Downward
Focus X Focus Y	Lens moves nearer fiber.	Lens moves away from fiber.

> ➢ The fusion splicer beeps if motor reaches its limit and stops. Press the opposite arrow key to move the motor again.

6. After manual alignment is completed, press SET key to fusing and splice the fibers.

ECF Splice

When fibers having some core concentricity-error are aligned using the core-to-core method, their outer claddings are not aligned with each other as shown below. However, surface tension created during fusing 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 fusion 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 fusing counteracts ECF, because surface tension eventually aligns the spliced fibers cladding-to-cladding. Canceling [ECF] by setting this "OFF" reduces core step amount and increases core axial offset.

| ECF OFF | ECF ON |

Surface tension
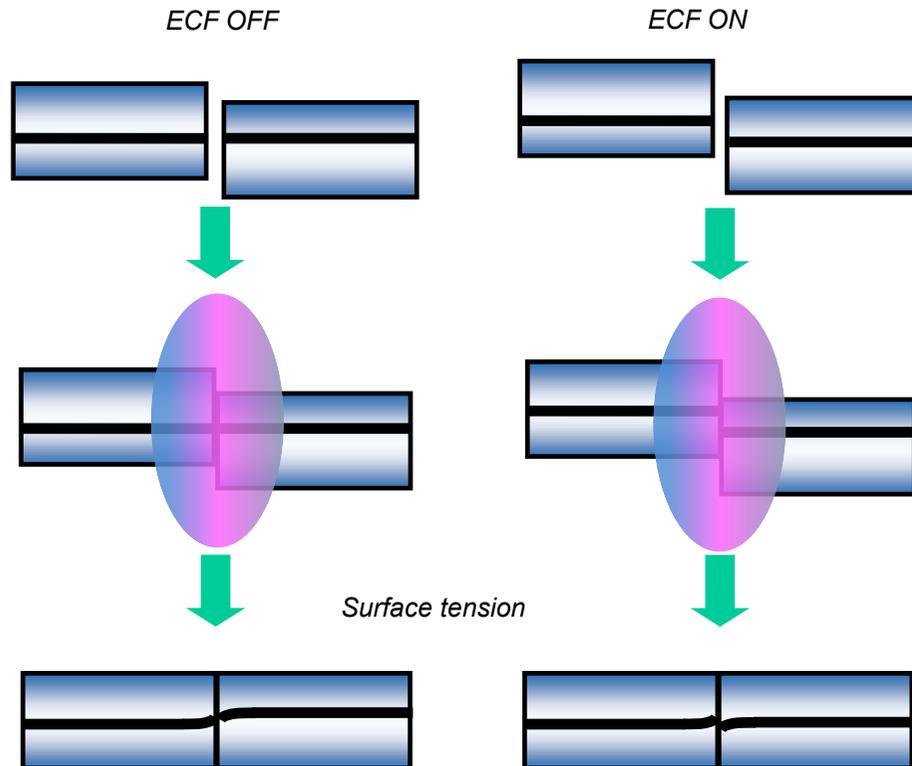
Attenuation splice mode (AT1,AT2)

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 fusion 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-fusing 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-fusing 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.*
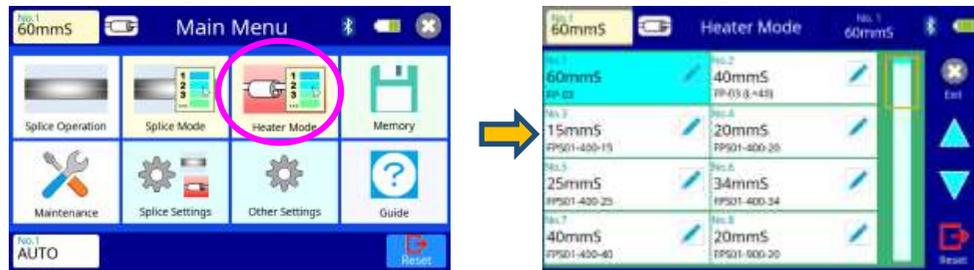
How to change the heater mode.

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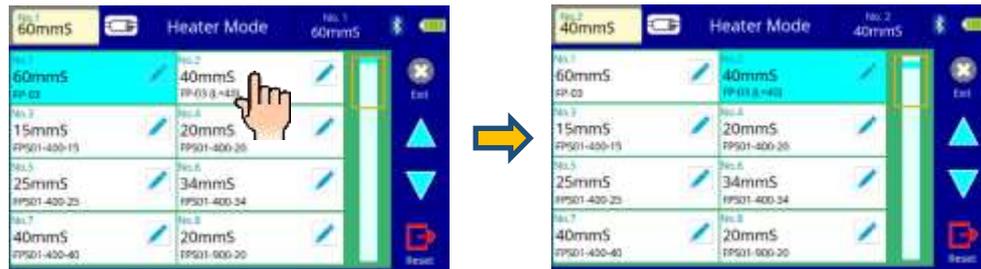
> ➢ *When using a non-Fujikura protection sleeve, please set up parameters in separate heater modes.*
> ➢ *When using a non-Fujikura protection sleeve, the splice protection quality cannot be guaranteed.*

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	
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 FPS-08-28	*For standard 28mm protection sleeve, Such as Fujikura FPS08-28 protection sleeves.*
30mmR FPS-04-30	*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

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	250~900um	3.1mm
FP-03(40mm)	SUS	40mm	10mm or less	250~900um	3.1mm
FP-04T	Glass Ceramic	40mm	10mm or less	250~900um	4.0mm
FPS01-400-15	SUS	15mm	5mm or less	~400um	1.5mm
FPS01-900-20	SUS	20mm	6mm or less	~900um	2.3mm

The dimensions of the protection sleeve after shrink vary depending on the diameter of the fiber.
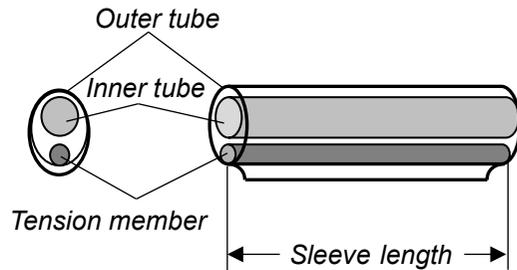
Referring to or Editing Heater Mode

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

Initialization of edited parameters

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

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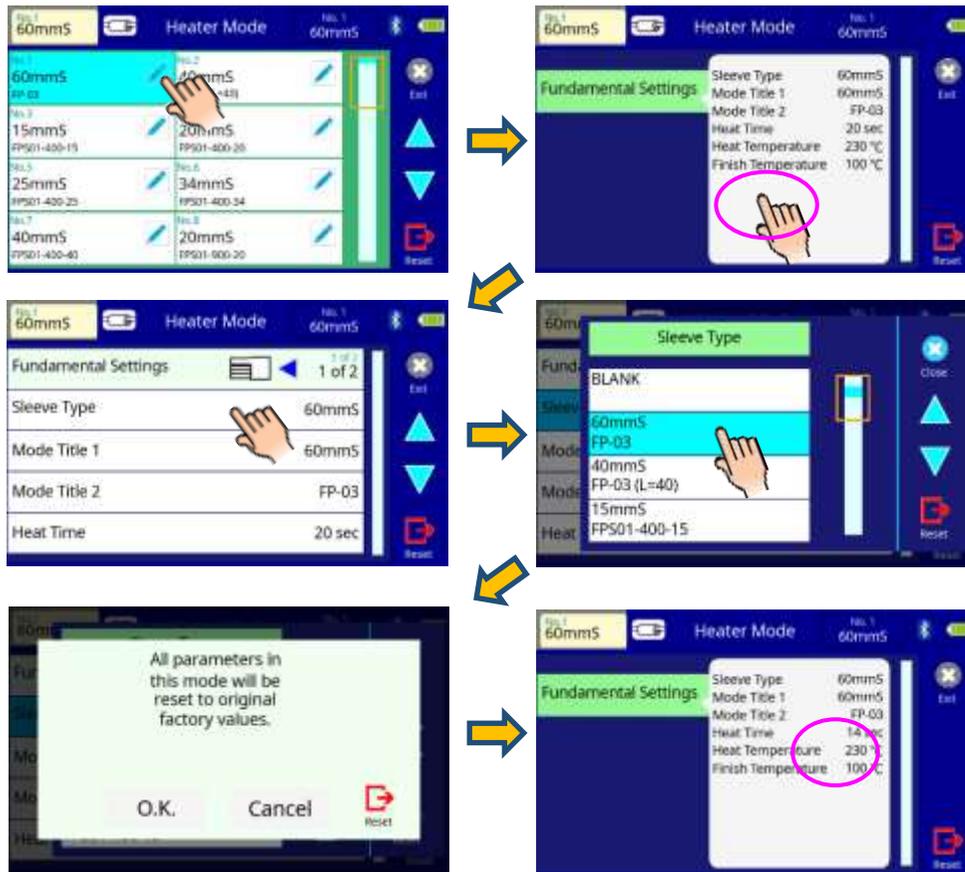
Creating and Deleting Heater Mode

Creating heater modes

There are necessary heater modes stored when the fusion 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 database.
3. The parameters selected "Sleeve Type" are installed to the heater mode.

BLANK icon
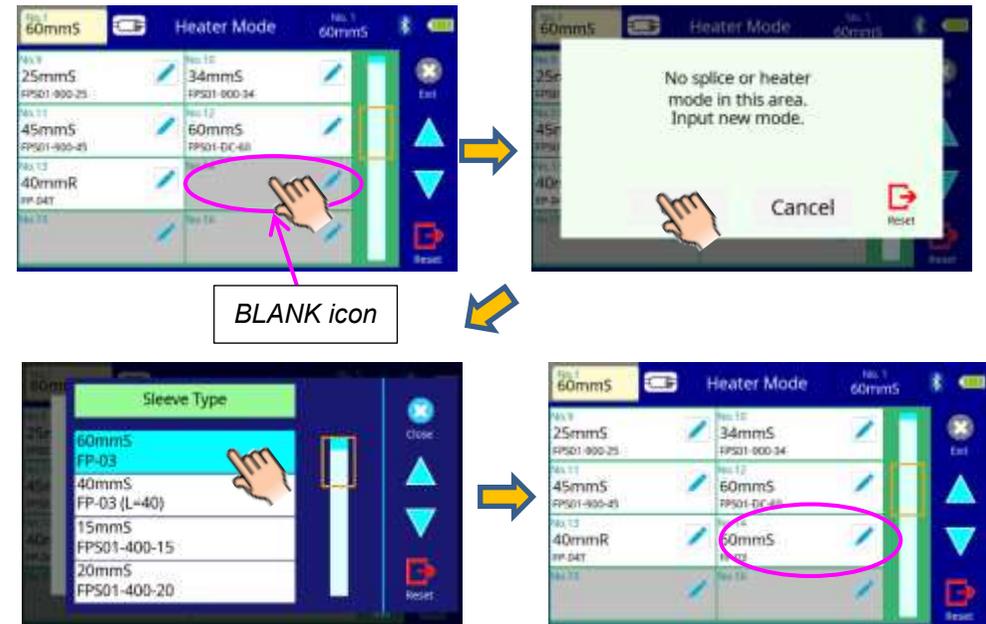
Deleting Heater Mode

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 details.*
2.   *Select [Sleeve Type] and change to [BLANK]*
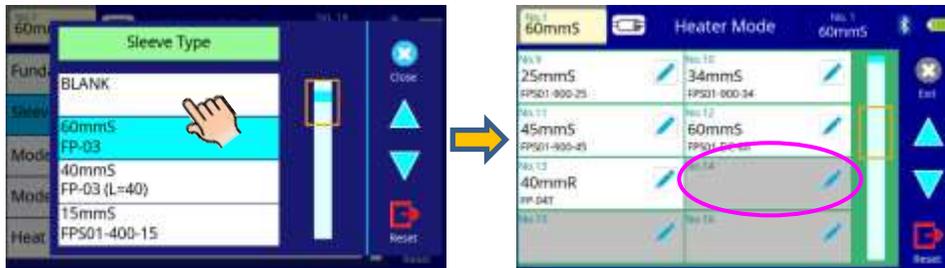
Detail of the parameter in Heater Mode Menu

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	Sets the finish temperature. The buzzer beeps after completion of the heating. Caution Do not touch the shrunken 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.

Tube heating drop cable

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

Good

No twist

Not Good

Twist
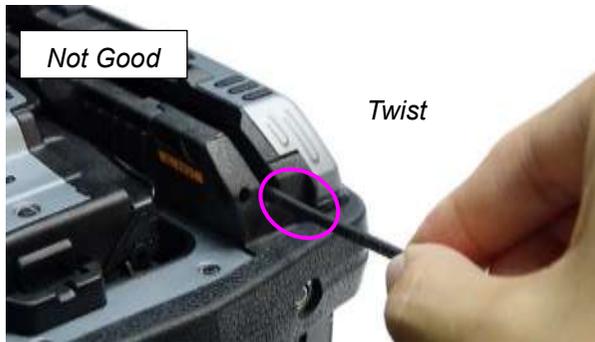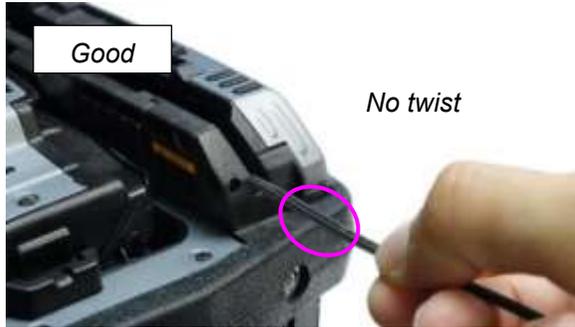
for splicing

for heating

Tube heating Splice-on-Connector

This fusion splicer is applicable for heating splicer-on-connectors.
When using a Fujikura Fuse Connect, removing the right clamp of the heater is required.

Remove heater clamp

Loosen the screw on the right side of the heater and remove the clamp with a screwdriver. This allows you to place the splice-on-connector in the tube-heater using the connector holder.

To reinstall, press down on the connector holder from the top so it is secure against the fusion splicer body, and reinsert the screw on the right side.

Memory Menu
Composition of the Memory Menu
 This fusion splicer stores up to 20,000 splice results. Contents of splice data stored vary depending on the splice mode.
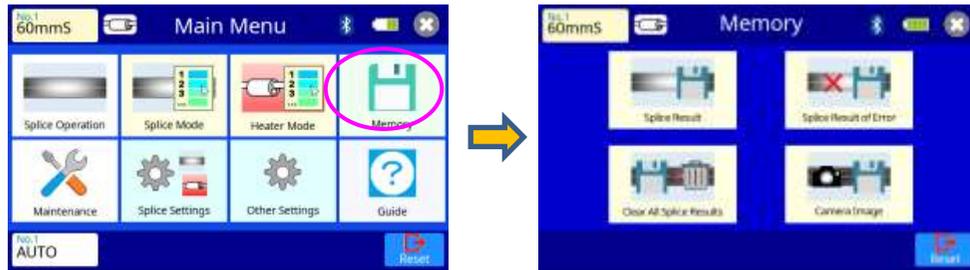
Memory Menu Settings
 List of Memory Menu parameters

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 at 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.
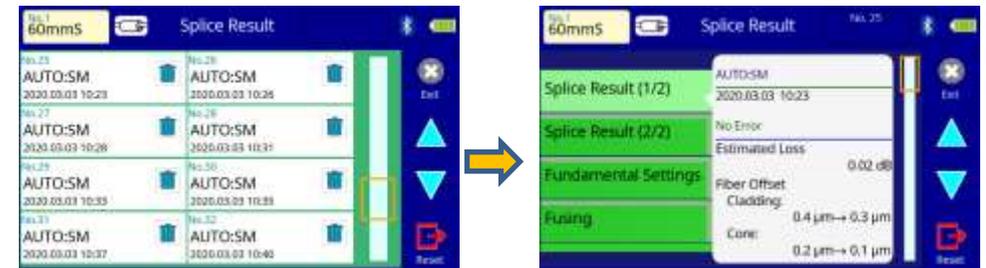
Delete of splice result data

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 100images 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.
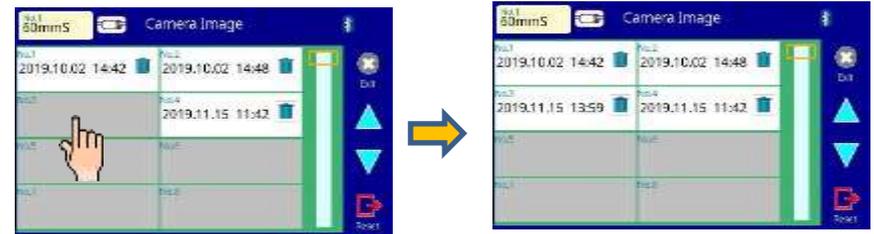
How to display the Camera Image Data

Select the desired memory number. The fiber image data is displayed.
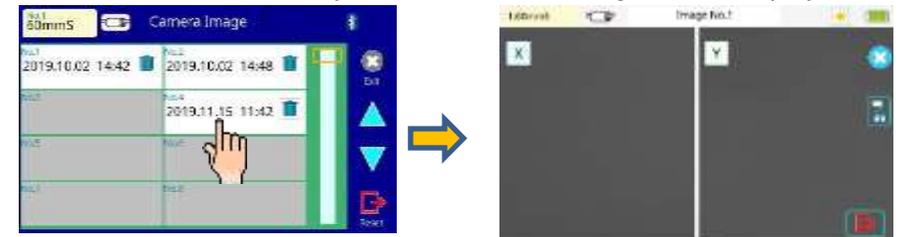
How to delete the Camera Image Data

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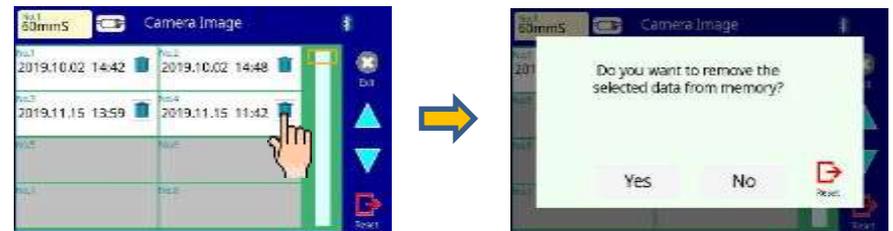
➢ Max number of image storage is 100, and the image cannot be over-written, so delete some images to store new images.

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.
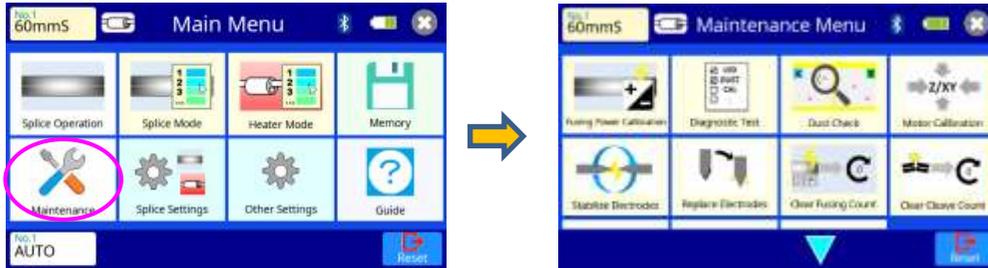
Detail of the Maintenance Menu

The parameters in the Maintenance Menu are listed below:

Maintenance parameter list

Parameter	Description
Fusing Power Calibration	When executing the Fusing Power Calibration, select this icon. Check the Fusing Power Section.
Diagnostic Test	Perform this function in the event of fusion 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 Fusing Count	Check the Clear Fusing 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.

Fusing Power Calibration

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

> ➢ Fusing power calibration is performed automatically using [AUTO] mode only, so fusing power calibration does not have to be performed when splicing in this mode. Execute [Fusing Power calibration] before using non-auto mode.
> ➢ When performing the [Fusing Power Calibration] function, it changes the fusing power "factor" value. The factor value is used in the algorithm programs for all splicing. The fusing power value displayed will not change in the splice modes.

Operation procedure

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

> ➢ Use standard SMF ITU-T G652, G655 or G657 fiber for Fusing Power Calibration.
> ➢ Use well prepared fibers for fusing power calibration. Dust on the fiber surface affects fusing power calibration.
> ➢ Cleave angle threshold does not link to the parameter "Cleave Limit" in splicing modes. Cleave angle threshold is independently set for fusing power calibration. See section [Maintenance Settings] to change cleave angle threshold.

"Good" Message

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

Result: Good

"Not Adequate" Message

Fusing power and splicing position calibration are completed but further calibration is strongly recommended, as the change from the previous fusing power calibration is too large.
Press SET *key to perform fusing power calibration, or* RESET *key (fusing power 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 a "Test Finish" message is displayed after specific number of fusing power calibrations is performed. See section [Machine Settings] for detail.*

Diagnostic Test

The fusion splicer has a built in diagnostic test feature that allows the operator to perform a simple one-step evaluation of fusion splicer performance covering several different critical variables. Perform this function in the event of fusion 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 inside the optical path. Please contact the nearest Fujikura 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.
Fusing Power Calibration	Automatically calibrates the fusing power factor and fiber splicing position.
I/O Port Check	Checks for normal operation of the fusion splicer input and output port.
Memory Check	Checks the internal fusion splicer memory.

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

Dust Check

The fusion 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 fusion splicer, remove them and press SET key again. The fusion 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 remain, contact your Fujikura 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 fusion 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" fiber error has occurred.*

Stabilize Electrodes

In the event of sudden change in environmental conditions, the fusing power may become unstable, resulting in higher splice loss. This is especially likely to happen when the fusion splicer is moved from lower elevations to higher elevations. Over time, the fusing 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 fusing power calibrations are required to get a "Good" message during the [Fusing Power Calibration] process.

Operation Procedure

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

Replace Electrodes

When the number of fusings reaches the end-of-life 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 until the LED color changes from green to red.
3. Loosen the set-screw located on the electrode by hand.
4. Take the old electrode out.
5. Install the new electrodes with care; do not touch the electrode tips.
6. Tighten screw by hand.

| Loose the screw | ➡ | Remove the old electrode |

| Tighten the screw | ⬅ | Install the new electrode |
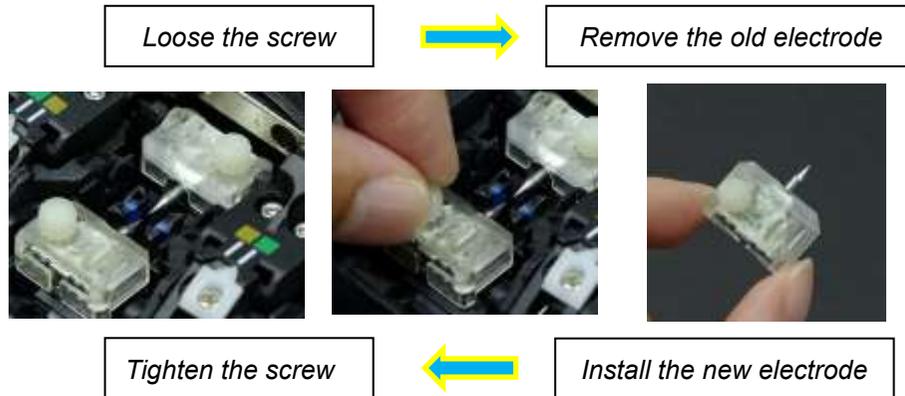
> ➢ Apply tightening torque by hand when tightening the screw to secure the electrode.
> ➢ Make sure the electrodes are attached firmly after tightening screws.

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

Upon completion of repeated fusing, the fusion splicer executes an fusing power calibration again. The operator should repeat fusing power calibration until the "Good" message appears. For details of the fusing power calibration process, see section [Fusing Power Calibration].

Clear Fusing Count

This function enables the stored number of fusings to be reset.
1. Select the Clear Fusing 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 fusing in the "Total Fusing 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 single fiber cleaves.
Blade Position	The current position of the blade.
Blade Height	The current height of the blade.

> ➢ This function must be performed after the cleaver blade is replaced.

Battery Discharge

This function can discharge the battery pack.

If the battery indicator and the actual capacity differ, perform this function to readjust the battery indicator.

When executing, the fusion splicer uses the heater to discharge the battery pack.

> ➤ During this function, the fusion splicer uses the heater to discharge the battery pack. Therefore, the fusion splicer body around the heater may be hot. Take care not to injure your figure by the heater.

Motor Drive

Some fusion splicer motors can be manually operated individually. When 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 the up/down arrows to drive the motor in the desired direction.

Motor	UP arrow icon	DOWN arrow icon
ZL/ZR	Forward	Backward
X/Y	Upward	Downward
Focus X/Y	Close to the fiber	Far from the fiber
Wind Protector	Open Wind Protector	Close Wind Protector

> 👉 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 motors are 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.
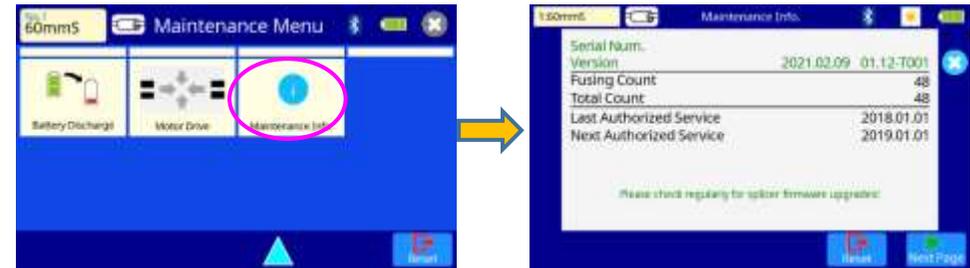
When selecting [Maintenance Info], the following information is displayed:

Parameter	Description
Serial Num.	Displays the serial number of the fusion splicer.
Version	Displays the software version.
Fusing Count	Displays the number of fusings since electrode replacement. Performing the function [Replace Electrodes] or [Clear Fusing Count] resets this parameter to zero.
Total Count	Displays the total number of fusings.
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.
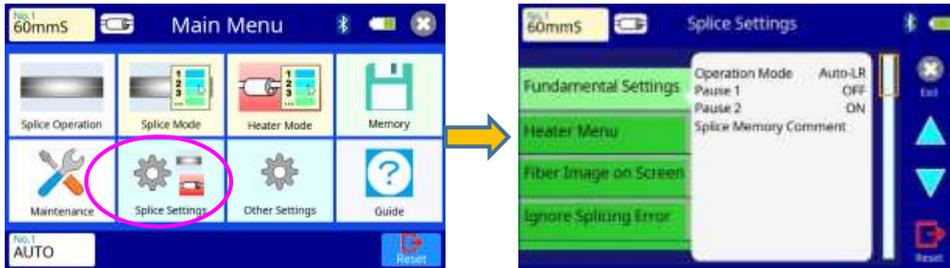
How to change the settings

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

List of Splicing Settings parameters (1 of 2)

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.

List of Splicing Settings parameters (2 of 2)

Parameter	description
Fiber Image on Screen	

Gapset
Aligning
Fusing
Estimation
	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 horizontally of X-axis and
	          Y-axis images

Pause1
Pause2
 	
Finish
	Sets the method of displaying the fiber image on the screen during Splicing operation.
	  X : X-axis image + *DATA
	  Y : Y-axis image + *DATA
	  X/Y : Composite display horizontally of X-axis and
	          Y-axis images
	
	  *DATA : Display results of cleave angle and offset
	            measurements.

Ignore Splicing Error	

Loss
Bubble
Fat
Thin
	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.

Cleave Angle
Cleave Shape
Offset
Gap Difference
	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.

Parameter	description
Other Settings	
Max Num. of Fusings	The re-fusing process sometimes improves the splice loss. However, excessive re-fusing may decrease the splice strength. With this function, it is possible to limit the number of refusings or to disable re-fusing.

Cleaver Counter Mode	Set to "OFF", "1" or "2".
	OFF: The fusion splicer does not increment the "Cleave Count".
	  1: The fusion splicer increments the "Cleave Count" +1 for
	    each splicing
	  2: The fusion 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.
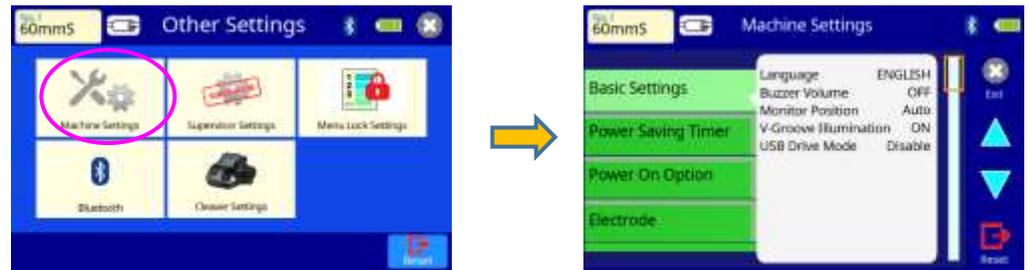
The list of warning and maintenance parameters in this menu follow:

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.
Monitor Position	Sets the operational direction of splicer. [Front] is for front monitor operation. [Rear] is for rear monitor operation. [Auto] is switched to front monitor operation or rear monitor operation automatically.
V-Groove Illumination	Sets the lighting condition in the fusion 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 fusion splicer and any PC are connected with a USB cable, the fusion 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 fusion splicer is idle a certain period.
Sleep	Setting this function turns off the power supply to the LCD monitor if the fusion splicer is idle a certain period. 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 fusion splicer if it is idle a certain period. The function serves to prevent the battery running low if the fusion splicer is left on for an extended period.
Power on Option	
Opening Title1	Sets the message to be displayed when the power is turned on.
Opening Title2	Max. number of characters : 15
Quick Boot	If set to "ON", the fusion splicer boots up quickly.
Authorized Service Reminder	If set to "ON", the fusion 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.
Fusing Power Calibration	
Cleave Limit	The threshold of cleave angle error in the [Fusing Power Calibration].
Max Number of Tests	The maximum number of tests to finish the [Fusing Power] 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 fusion 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 features after detecting that power is supplied by the battery.

Supervisor Settings

Used by an Administrator to limit operators from selecting or changing certain functions.
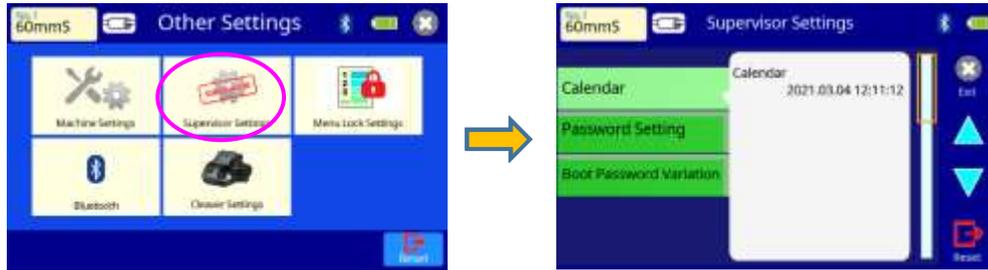
How to enter the Menu Lock Setting

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

If you need to bypass the password because it was forgotten or lost, it is necessary to send back the splicer to the service center. Take care not to forget it after changing the password.
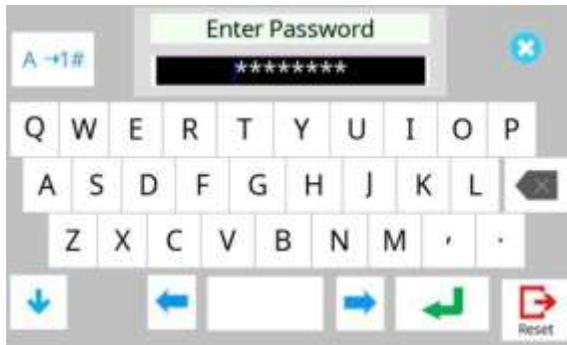
If you want to bypass the password, contact to the nearest Fujikura authorized distributor.

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 nearest Fujikura 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	2019.05.01	
Boot Password 1	BB	Boot Password Lock From 1	2019.06.01	
Boot Password 2	CC	Boot Password Lock From 2	2019.07.01	
Boot Password 3	DD	Boot Password Lock From 3	2019.08.01	
Boot Password 4	EE	Boot Password Lock From 4	2019.09.01	
Boot Password 5	FF	Boot Password Lock From 5	2019.10.01	
Boot Password 6	GG	Boot Password Lock From 6	2019.11.01	
Boot Password 7	HH	Boot Password Lock From 7	2020.01.01	※1
Boot Password 8	II	Boot Password Lock From 8	2020.12.01	
Boot Password 9	JJ	Boot Password Lock From 9	2020.02.01	※2
Boot Password 10	KK	Boot Password Lock From 10	2020.02.01	
Boot Password 11	LL	Boot Password Lock From 11	2020.03.01	
Boot Password 12	MM	Boot Password Lock From 12	2020.04.01	

> If the present date (date of splicer operation) is between "2019.09.01" and "2019.9.30", 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 "2020.02.01" and "2020.02.29", 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.
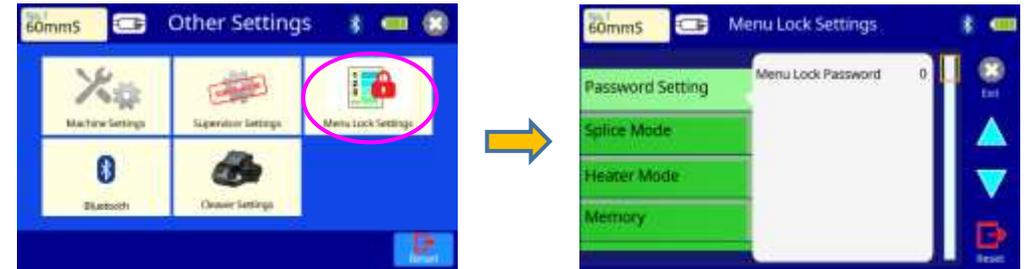
How to enter the Menu Lock Setting

> Before entering the Menu Lock Setting menu, the following windows may be displayed. Enter the password. The initial password is "0".
> If you need to bypass the password because it was forgotten or lost, 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 the neareset 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 nearest Fujikura authorized distributor.
Splice Mode	
Select	Setting to "Disable" prevents unauthorized editing and selecting of splice modes.
Edit	
Heater Mode	
Select	Setting to "Disable" prevents unauthorized editing and selecting of heater modes.
Edit	
Memory	
Clear All Splice Result	Setting to "Disable" prevents unauthorized erasing of splice result data from memory.
Splice Settings	
Splice Operation	Setting to "Disable" prevents unauthorized editing of the [Splice Settings] menu.
Fiber image on Screen	
Ignore Splicing Error	
Other splice Settings	
Machine Settings	
Basic Settings	Setting to "Disable" prevents unauthorized erasing of splice result data from memory.
Power Saving Timer	
Power On Option	
Electrode	
Cleaver Blade Alarm	
Fusing Power Calibration	

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

Parameter	Descriptions
Maintenance Menu	
Replace Electrodes	Setting to "Disable" prevents unauthorized changing of various maintenance parameters.
Stabilize Electrodes	
Clear Fusing Count	
Clear Cleaver Counter	
Battery Discharge	
Motor Drive	
Diagnostic Test	
Dust Check	
Fusing Power Calibration	
Motor Calibratio	
Cleaver Setting	
Cleaver Setting	Setting to "Disable" prevents unauthorized changing of the [Cleaver Setting] menu.
Stripper Setting	
Stripper Setting	Setting to "Disable" prevents unauthorized changing of the [Stripper Setting] menu.

Bluetooth Menu

This function configures the wireless data communication with cleaver CT50 or "Splice+" smart phone application.
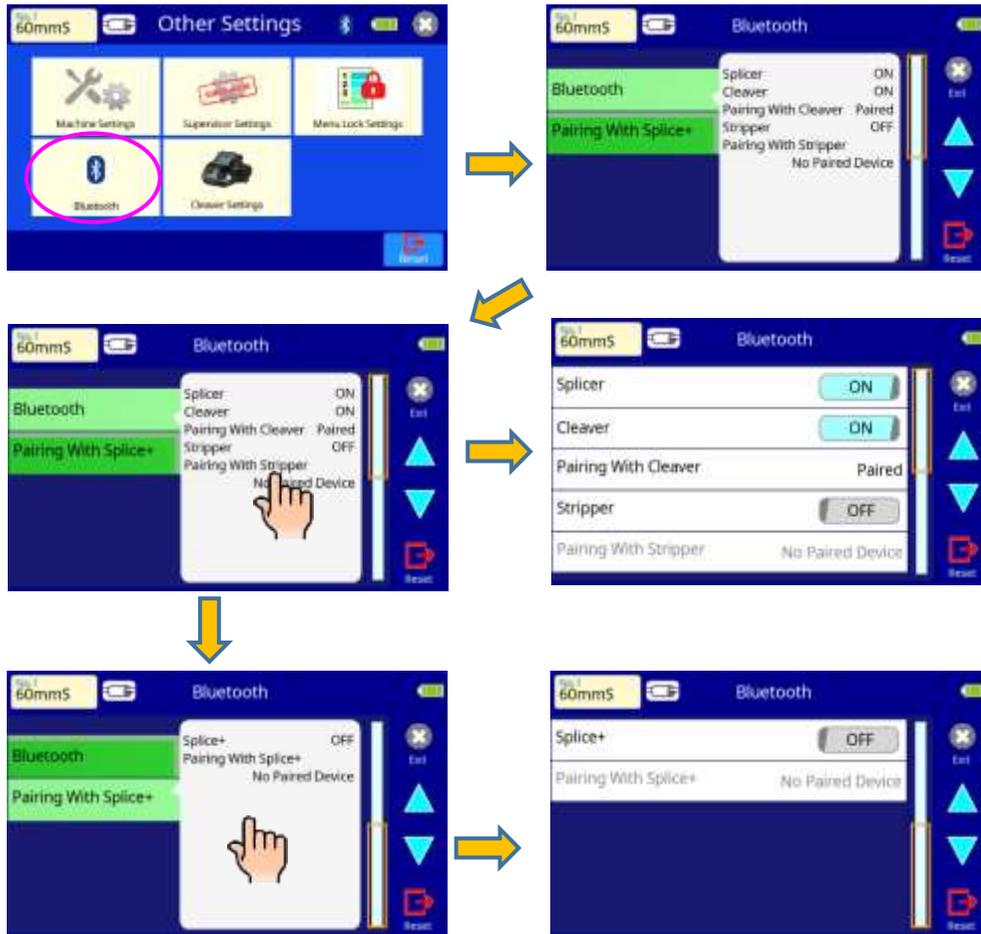
Regarding Bluetooth:

The splicer features wireless data communication with the optical fiber cleaver (CT50) 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.
Paring 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.
Paring 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.
Splice+	Turns the wireless data communication function of the "Splice+" smart phone application ON/OFF.
Paring With Splice+	Indicates the status of the wireless data communication.

Cleaver Setting Menu

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

List of the Cleaver Settings parameters (1 of 2)

Parameter	Description
Blade Setting	
Blade Position	Shows the cleaved fiber count at all blade positions of the cleaver (48 positions) while the splicer is connected to the cleaver.
Blade Rotation Link to Alarm	Determines the splicer's response when it detects a cleaver blade position is worn. There are 3 options: "Auto Without Confirmation": The splicer rotates the cleaver blade automatically without notifying or seeking confirmation from the operator. "Auto With Confirmation": 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. "OFF": The splicer does not rotate the blade.

List of the Cleaver Settings parameters (2 of 2)

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	Selects the judgment criteria for the cleaver blade wear and blade rotation alarm according to the following three options: "Cleaving Count": Rotation alarm is based on the number of cleaved fibers at the current blade position. "Image Analysis": Rotation alarm is based on the number of cleaving errors that occur during the specified number of cleaves. "OFF": Does not execute Blade Alarm Detection.
Number of Cleaving Errors	These parameters set the criteria for the cleaver blade alarm. Example: If the "Number of Cleaving Errors" is set to 3 and the "Number of Cleaves" is set to 10, the cleaver blade alarm window will be displayed if 3 cleaving errors occur with the most recent 10 cleaves.
Number of Cleaves	
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 increases gradually.
The recommended threshold value for determining an expanded position is below.
- Number of Cleaving Errors: 3 times
- Number of Cleavers: 10 times
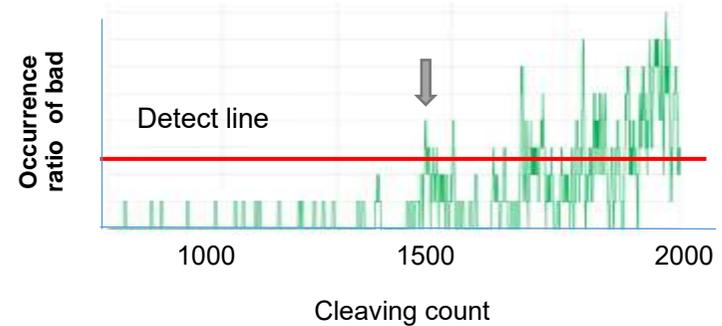
Stripper Setting Menu

The ribbon stripper icon is displayed when the bluetooth function is available for RS02/RS03.

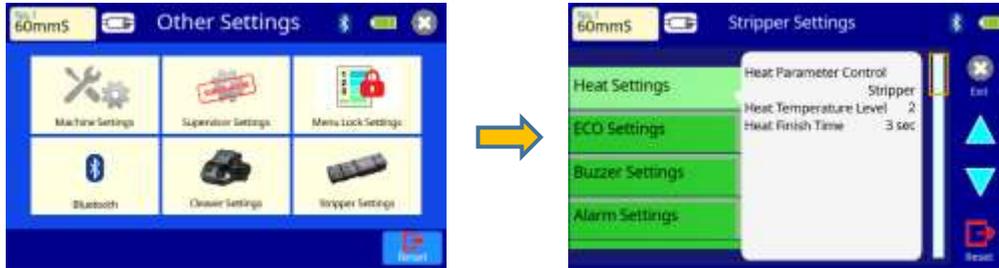*This menu enables parameter selection to control the fusion splicer interface with the ribbon fiber stripper RS02/03. It is necessary to turn "ON" the parameter of "Stripper" at Bluetooth settings menu.*

These parameters can't be selected when the wireless data communication function is unavailable.

It is necessary to set "Heater Parameter Control" "ON" when controlling the RS02/03 by the fusion splicer.

Parameter list of Stripper Setting (1 of 2)

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 fusion splicer controls RS02/03 with the fusion 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 Stripper Setting (2 of 2)

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 fusion splicer controls the ECO mode of RS02/03 with parameters that set into the memory of fusion 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 product has a built-in instruction manual
Select the Guide *icon at [Main Menu] screen to enter this manual.*

Splice with Sheath Clamp	
Necessary items	*Describes the tools and procedure of splicing and tube heating with sheath clamp.*
Preparation	
Splice operation	
Protecting Splice Point	
Splice with Fiber Holder	
Necessary items	*Describes the tools and procedure of splicing and tube heating with fiber holder.*
Preparation	
Splice operation	
Protecting Splice Point	
Daily Check	
Fusion Splicer	*Describes how to check and clean the splicer and tools.*
Optical Fiber Cleaver	
Blade Rotation	
Blade Height Adjustment	
Ribbon Fiber Stripper	
Single Fiber Stripper	
Maintenance Menu	
Diagnostic Test	*Describes how to perform tasks on the Maintenance Menu*
Dust Check	
Electrode Replacement	
Fusing Power Calibration	
Stabilize Electrode	
Setting Menu	
Splice Setting	*Describes the settings of the fusion splicer and how to reference stored splice results.*
Motion of Wind Protector	
Brightness/Monitor Angle	
Power save	
Data Storage	
Others	
Instruction Manual: PDF file	*Describes the other settings of the fusion splicer.*
Wireless Function with CT50	
Wireless Function with RS02/03	
PC communication	
Promotion	
Active Blade Management	*Introduction of the new features of this machine.*

List of the reference guide (1 of 2)

Parameter	Descriptions
Features Introduction	
Touch Panel & Classic Meu	*Introduces the new features equipped to this machine and describes the fusion splicer operation in each Operation Mode.*
Automated Wind Protector	
Operation Mode: Auto-LR	
Operation Mode: Auto	
Operation Mode: Customized	
Automated Tube Heater	
Fiber Retention Clamp	
Easy Sleeve Positioning Clamp	
Protrusion for loose tube fiber	
Separated Work Tray	
Short Cleaved Splicing	
Splice On Connector	
Power Supply	
Power Supply Setting	*Describes how to supply power to the fusion splicer and how to use battery.*
AC Power Supply	
DC Power Supply	
Battery Power Supply	
Battery Level	
Battery Charge	
Splice & Heater Mode	
Splice Mode Selection	*Describes how to select and set parameters of the splice or heater modes.*
Splice Condition Setting	
Heater Mode Selection	
Heater Condition Setting	

Instruction Manual and the Utility Software

How to install the instruction manual and the Utility Software

The fusion 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 fusion splicer, and then connect the fusion 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 [Main Menu]→ [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.
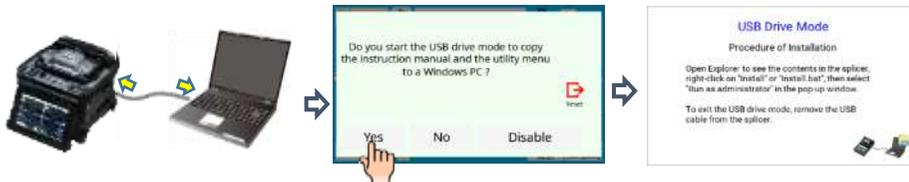
3. Open the Windows Explorer on the PC. You will find an attached drive named "SPLICER" and a file named "Install" or "Install.bat" on the drive.

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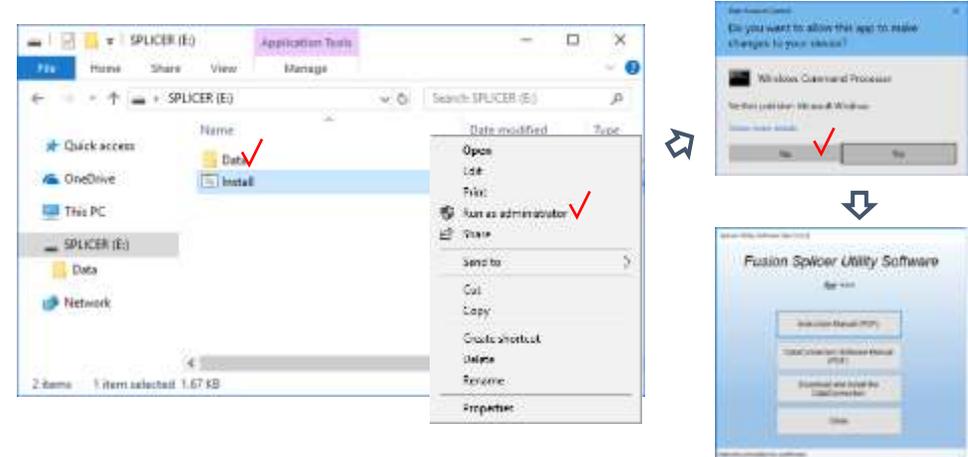
6. Disconnect the USB cable to finish the USB drive mode.

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 fails to install the DataConnection on your PC, confirm whether the PC can connect to internet.
Note2: During installation, the software allows you to access to Fujikura web site, "www.fujikura.co.jp/dev/splicers/ ". Ask your PC administrator for permission to access if you are unable.

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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 fusion 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 fusion 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
  ·High Loss Estimated

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

  ·Model name of the fusion splicer
  ·Serial number of the fusion splicer
  ·Error message
  ·Situation when the error occurs
 -Video or picture if possible

Error Message List (1 of 8)

Error Message	Reason	Solution
L-Too Long Fiber R-Too Long Fiber LR-Too Long Fiber	·The cleave length (bare fiber part) is too long. ·Dust or dirt is on the objective lens.	·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.
X-Dark Back Ground Y-Dark Back Ground	·Dust or dirt is on the objective lens. ·The LED or Camera might be damaged.	·Execute the [Dust Check]. Clean the lens when dust or dirt exists. ·Consult the nearest Fujikura authorized distributor.
L-Too Dusty Fiber R-Too Dusty Fiber	•Dust or dirt is on the fiber surface. •Dust or dirt is on the objective lens. •[Cleaning Fuse] 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.	•Completely prepare the fiber again (strip, clean and cleave). •Execute the [Dust Check]. Clean the lens if dust or dirt exists. •Set the [Cleaning Fuse] 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.

Error Message List (2 of 8)

Error Message	Reason	Solution
ZL Motor Overrun (Forward) ZR Motor Overrun (Forward)	·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.	·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.
ZL Motor Overrun (Backward)	·The taper speed or taper time is set too high.	·Adjust the taper parameters in the splice mode.
ZR Motor Overrun (Backward)	·Only occurs in manual motor operation.	
X motor Overrun Y Motor Overrun	·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.	·Press RESET key and re-position the fiber again to seat it correctly at the bottom of the V-groove.
Focus X Motor Overrun Focus Y Motor Overrun	·The fiber is not set correctly at the bottom of the V-groove. The fiber position is out of focus range. ·Dust or dirt is on the fiber surface resulting in focus failure. ·Dust or dirt is on the objective lens.	·Press RESET key, and re-position the fiber again to seat it correctly at the bottom of the V-groove ·Completely prepare the fiber again (strip, clean and cleave). ·Execute the [Dust Check]. Clean the lens.
Cover Opened	·The wind-protector is opened during splicing operation.	·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 nearest Fujikura 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 Fusing Power	·Unable to calibrate due to strong fusing.	·Replace the electrodes by using the [Replace Electrodes] function in. If this does not eliminate the problem, consult the nearest Fujikura authorized distributor.
Weak Fusing Power	·Unable to calibrate due to weak fusing.	
Too Left /Right Fusing	·Unable to calibrate due to poor fusing 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 Fusing	·Fusing did not occur.	·Assure the electrodes are in proper position. ·Replace the electrodes. ·Consult the nearest Fujikura 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.
Fusing Delayed	·Fusing 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 fusing power	·Calibrate the fusing power with the [Fusing Power 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.
Fat Fiber	·Too much [Overlap] setting	·Execute [Motor Calibration] function in the maintenance menu to calibrate the stuff amount.
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 Fuse] time is too short or "OFF."	·Dust still present after cleaning fiber or cleaning fuse. Clean fiber thoroughly or Increase [Cleaning Fuse 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 fusing power.	·Calibrate the fusing power with the [Fusing Power 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 fusing parameters in special mode	·Confirm the fusing 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 nearest Fujikura authorized distributor.
X Camera Y Camera Trouble	·The Camera may be damaged.	·Consult the nearest Fujikura authorized distributor.
Heater Oven Trouble	·Heater does not heat.	·Consult the nearest Fujikura authorized distributor.
Communication error	·Broken the internal device	·Consult the nearest Fujikura authorized distributor.
Temperature Sensor NG	·Temperature Sensor may be damaged.	·Consult the nearest Fujikura 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. Attempt charging the battery.*

(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 fusing current is increased. In this condition, battery power*
    degrades quicker due to large power consumption.

(4)   Method to change the power saving function settings
   ·*Refer to [Machine Settings] function.*

(5)   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, v-groove 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, fusing conditions and fiber*
   cleanliness.
   ·*If the splice loss is still too high or inconsistent after performing the above-*
    mentioned remedies, contact the nearest Fujikura 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 fusion splicer switches to the power saving state after an extended period
    of fusion splicer inactivity.   Press any key to return to the normal state. To
    change the length of time before the fusion splicer switches to the power saving
    state, Refer to [Machine Settings] function.

(5)   Fusion splicer power suddenly turned off without "Low Battery" message
   ·*The power saving function is automatically enabled when using a battery pack.*
    The fusion splicer turns the power off after an extended period of fusion splicer
    inactivity. Press ON/OFF *key to turn on the fusion splicer again. To change the*
    length of time before the fusion splicer turns the power off, section [Machine
    Settings] function.

(6)   Method to initialize fusing 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 Fusing Power and Fusing Time
  ·The settings cannot be changed in AUTO modes.
  ·If using the "Special Mode", the Fusing Power and Fusing 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 heater does not reach the current mode's temperature value, the LED blinks and the alarm sounds. If this happens, contact the nearest Fujikura 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 protection sleeve. If the black coating is removed, contact the nearest Fujikura 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 paring process.
  ·Check the [Splicer] and [Stripper], [Cleaver] in Bluetooth menu of the fusion splicer. If they are "Off", turn them "ON".
  ·CT50 are already connected with the fusion splicer. Push and hold the Link button on the device. This will cause the Link LED of the device to blink and start the paring process. After this, try to connect with the stripper. Refer to Wireless data communication section.

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

(3)   Cannot connect to the smartphone.
　·Check the specification of the smartphone.The required specifications are as
　follows.
　The Bluetooth wireless communication function of the splicer is not guaranteed
　to work with all smartphones.
　　Wireless communication technology: Bluetooth 4.1 or later
　　OS version for iPhone: iOS8.0 or later   (after iPhone6)
　　　　　　　　Android: Android 5.0 or later

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 on fusion
　 splicer hard-drive.

(4)   Forgot password
　·Contact the nearest Fujikura 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 [Fusing Power Calibration]
　·The fusion splicer needs to repeat the fusing power calibration after replacing
　the electrodes or when the environmental conditions change drastically. The
　number of fusing power calibrations can be set to a specific amount. When the
　fusion 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 [Fusing Power
　Calibration]
　·Execute [Stabilize Electrodes] function in [Maintenance Menu]. If the fusion
　splicer still does not indicate "Test Finish", replace the electrodes. See section
　[Replace Electrodes] function.

(4)   No using power change after [Fusing Power Calibration]
　·An internal factor is calibrated and adjusted for the specific fusing power
　 selected.   The displayed fusing power in each splice mode does not change.
　·The fusing power 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 fusion splicer to PC
　·Refer to the instruction manual "Data Connection" included in the splicer.
　 Press [F1] key after installing the software to display the instruction manual.
　 Contact the the nearest Fujikura authorized distributor for further inquiries.

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　·iOS® is a registered trademark of Cisco Systems Inc. of the United States.
　·Android® is the registered trademarks of Google Inc.

Warranty and Contact Address

Warranty

1. Warranty period

Please ask to the nearest Fujikura authorized distributor of your country about the warranty period of this product.

2. Warranty item coverage

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

3. Not covered by the warranty

Warranty is NOT covered in below cases:
  (1) Damage or malfunction caused by inappropriate condition or environment, incorrect handling or operation procedure that are disregarded of instruction manual.
  (2) Damage or malfunction due to modification, disassembly, repairing by not authorized Fujikura distributor.
  (3) Damage or malfunction caused by the usage of consumable, accessory, product not approved by Fujikura.
  (4) Damage or malfunction caused by fires, earthquakes, floods, lighting or other natural disasters, or inappropriate voltage.
  (5) Consumables such as electrode, battery, blade, rubber, sponge rubber, etc. (Excluding damage or malfunction before using just after purchased.)
  (6) Damage or malfunction caused by drop, dust, dewing, exposure to water.
  (7) Crack, discoloration, grime at external appearance after using.
  (8) Serial number is incorrect or not recorded serial number at Fujikura.
  (9) Travel expense for a trip of repairing requested by customer.
  (10) Shipping cost for repairing product.
  (11) In case this product was resold, leased or transported outside the country where the authorized Fujikura distributor sold it.

4. Information required for repairing

If you have any questions for repair, contact the nearest Fujikura authorized distributor listed in the following web site:

  ・ *https://www.fusionsplicer.fujikura.com/service/index.html*

Please include documentation with the fusion splicer information as listed below.
  (1) Your full name, company, address, phone number, and e-mail address.
  (2) Model name and serial number of the fusion splicer.
  (3) Problems encountered
    ・ What problems did your fusion splicer encounter and when?
    ・ What is its present operational state?
    ・ Observations, files, images, error messages, etc. relating to the problem.

5. Transporting the fusion splicer

Since the fusion 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 fusion 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 nearest Fujikura authorized distributor or one of the following:

Fujikura Europe Ltd.
  C51 Barwell Business Park
  Leatherhead Road, Chessington, Surrey KT9 2NY
  UK
  General inquiries: +44-20-8240-2000
  Service & support: +44-20-8240-2020
  URL https://www.fujikura.co.uk

AFL
  260 Parkway East
  Duncan, SOUTH CAROLINA 29334
  U.S.A.
  General inquiries: +1-800-235-3423
  Service & support: +1-800-866-3602
  P.O.Box 3127 Spartanburg, SC   29304-3127
  URL https://www.aflglobal.com

Fujikura Asia Ltd.
  438A Alexandra Road, Block A Alexandra Techno Park #08-03,
  SINGAPORE, 119967
  General inquiries, service & support: +65-6-278-8955
  URL https://www.fujikura.com.sg

Fujikura Ltd.
  1-5-1 Kiba, Koto-ku, Tokyo 135-8512
  Japan
  General inquiries: +81-3-5606-1164
  Service & support: +81-43-484-3962
  URL   https://www.fujikura.com

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