

Instruction manual

Fusion Splicer 36S/37S/38S/41S



**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.

This manual is subject to change without notice.

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

Please consent beforehand.

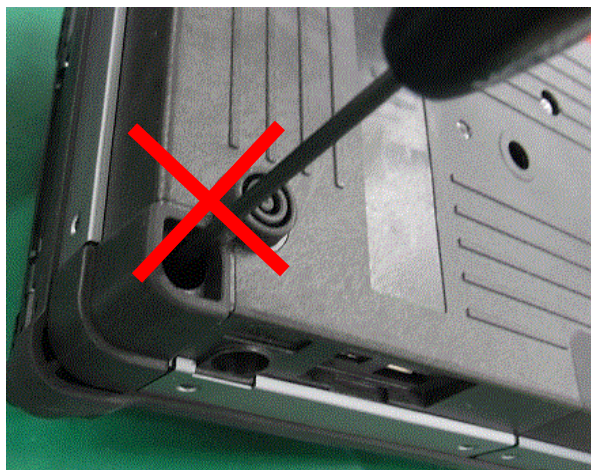
The software equipped in splicer and its related documents are protected by copyright laws and international treaty provisions as well as other intellectual property laws.

Copying some or all of instruction manual without notice is forbidden. Moreover, it cannot be used without permission from our company for non-individual purposes.

---Caution for Air Transport---

This product contains a Lithium Ion Battery.
When shipping this product, please inform the transport company that this product contains a lithium ion battery before shipping.
Please follow the directions of the transport company.

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



Splicer stability decreases when the protector is detached.

Wireless communication function/Certification

- *The 36S/37S/38S/41S uses wireless communication.
The when shipping from the factory, wireless communication is set to OFF.*
 - *The wireless communication function shall be used in accordance with local statutory and regulatory requirements in the country/region where the product is used.*
 - *Confirm certification of the 36S/37S/38S/41S is in accordance with local statutes and regulation before turning the wireless communication function ON. You may be prosecuted for uncertified use.*
 - *The latest status of the electromagnetic compliance certification is described in the product page on the Fujikura web site. Refer to “Bluetooth” section.*

If you have any questions, contact an authorized distributor.

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

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 precautions 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 precaution.



CAUTION!

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

Symbol means "Pay attention"



Pay attention to hot surface!

Symbol means "Must not do"



You must not disassemble!

Symbol means "Must do"



You must disconnect a plug!



WARNINGS!

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



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

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



Use only the AC adapter provided with the splicer. Using an improper AC power source may cause fumes, 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 fumes, electric shock, or equipment damage, and may result in personal injury, death, or fire.



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



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



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



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

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



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



WARNINGS!

Use only proper power source.

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



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



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



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



WARNINGS!



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



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



When using the optional battery, follow the instructions below.

Failure to follow these may result in an explosion or personal injury.

- Do not charge battery in any other manner 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 liquid, take care so the liquid does not contact the skin or eyes. If contact occurs, immediately wash skin or eyes thoroughly and see a doctor. Dispose of a leaking battery and call the service center for replacement.
- Do not stack battery on top of AC adapter while charging.
- If battery does not charge 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 and result in personal injury or equipment damage.



CAUTIONS!



Do not store splicer in areas 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 cause a burn.



Do not place the splicer in an unstable or unbalanced position. The splicer may fall, possibly causing personal injury or equipment damage.



The splicer is precisely adjusted and aligned, so protect it from shock or impact. Failure to do so may result in possible equipment malfunction. Use supplied carrying case for transportation and storage. The carrying case protects the splicer from damage, moisture, vibration and shock during storage and transportation.



CAUTIONS!



Follow the instructions below for handling electrodes.

- Use only specified electrodes.
- Install new electrodes in the correct position.
- Replace the electrodes as a pair.

Failure to follow the above instructions may cause abnormal arc discharge. 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, mirror, LCD monitor, etc., of the splicer. Otherwise blurring, discoloration, damage, or deterioration may result.



The splicer requires no lubrication. Oil or grease may degrade the splicing performance and damage the splicer.



The equipment must be repaired or adjusted by a qualified technician or engineer. Incorrect repair may cause fire or electric shock. Should any problems arise, please contact the authorized distributor.

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 for further information.

In other countries

[Recycling]

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

[Disposal]

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

Bluetooth® Wireless Technology



- The 36S/37S/38S/41S uses Bluetooth technology for wireless communication.
- The wireless communication is done at a frequency of 2400MHz frequency band, and employs the DSSS modulation scheme. The estimated interference distance is 10m or less.
- The wireless data communications can be intercepted by Third parties.

2.4 DS1



CAUTION!



The 36S/37S/38S/41S is compliant with the rules on the technical standard conformance of specified wireless equipment based on the Radio Law/ Telecommunications Business Act., as shown by the technical compliance mark depicted on the name plate. Do not remove the screws and alter the inside of the 36S/37S/38S/41S, as this voids the conformity certification. Use of uncertified equipment violates the law.



Do not use the 36S/37S/38S/41S near a microwave oven or in environments where magnetism, electrostatic charge, or radio interference is generated. Also note the presence of other devices using the same 2.4GHz band may lower processing speeds.



Wearers of the electronic medical equipment such as implanted pacemakers or defibrillators must carry and use the 36S/37S/38S/41S at least 22cm away from the implanted device. The signal from the 36S/37S/38S/41S may interfere with operation of medical equipment.



When using the 36S/37S/38S/41S near a medical facility or in the hospital, turn the wireless communication function of the 36S/37S/38S/41S off. The signal from the 36S/37S/38S/41S may interfere with operation of the medical equipment.



Turn the wireless communication function off near fire alarms, automatic doors and other automatic control equipment. Failure to do so may cause the equipment to fail or malfunction.



When shipping the 36S/37S/38S/41S by air, detach the battery from the main body. The signal from the 36S/37S/38S/41S may interfere with operation of the aircraft. Consult the specific airline for aircraft shipping instructions..



CAUTION!

When using the wireless communication function of the 36S/37S/38S/41S in foreign countries,

- The wireless communication function shall be used in accordance with local electromagnetic emissions/susceptibility statutes and regulations.
- Confirm certification of the 36S/37S/38S/41S is in accordance with local statutory and regulatory requirements before turning the wireless communication function ON. If you use it in the countries without the certification, you may be prosecuted.
- The status of the electromagnetic compliance certificate is described in the product web site. Please refer to it before using the wireless communication function.

36S/37S/38S/41S product web site:

<https://www.fusionsplicer.fujikura.com/>

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

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

Typical wireless certifications are:

USA (Part 15 of the FCC Rules)

FCC ID : QOQBGM111

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions. (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CANADA (RSS-247 of the Industry Canada Rules)

IC : 5123A-BGM111

European Union (RE directive 2014/53/EU)

Safety : EN 61010-1

EMC : EN 301 489-1 v3.1.1

Spectrum : EN 300 328 v2.1.1

JAPAN (Article 38-24 paragraph 1)

Certification number: R209-J00192

Introduction

This fusion splicer 36S/37S/38S/41S can splice a single optical fiber. Moreover, a new functions were added and made the 36S/37S/38S/41S splicer more versatile. In order to master 36S/37S/38S/41S, please read this instruction manual.



Splice mode

The 36S/37S/38S/41S has not only standard splice modes, but also automatic modes (AUTO mode). The AUTO mode consists of [SM AUTO], [MM AUTO], [NZ AUTO], [DS AUTO] mode. When using AUTO mode, the automatic arc calibration function is enabled.

The standard modes consists of [SM] for SMF (ITU-T G652), [NZ] for NZDSF (ITU-T G655), [DS] for DSF (ITU-T G653) and [MM] for MMF (ITU-T G651). This mode requires executing [Arc Calibration] before splicing.

Automatic arc calibration function

This function calibrates the arc power at every splice. When the automatic arc calibration function is enabled, performing the [Arc calibration] function before a splice operation is not necessary. The automatic arc calibration function works in AUTO modes only. It doesn't work in the standard splice modes. When using those modes, performing [Arc calibration] before splicing is strongly recommended.

New features of the 36S/37S/38S/41S

Connector Splicing

The fabrication of a field assembly optical connector can be performed by a 36S/37S/38S/41S by heating the protection sleeve. Moreover, versatility is improved by portability.

Short Length Splicing

In addition to the standard splice, the 36S/37S/38S/41S is capable of making splices with a 5-mm cleave length.



- A specialized tool is needed in to prepare fibers for 5-mm splices.

Cleave Counter

Status and cleave quality alarms of the current optical fiber cleaver are displayed. The large cleave angle, unacceptable cleave shape, unnecessarily high splice loss, etc., can be proactively prevented. The current optical fiber cleaver is displayed in the alarm screen.

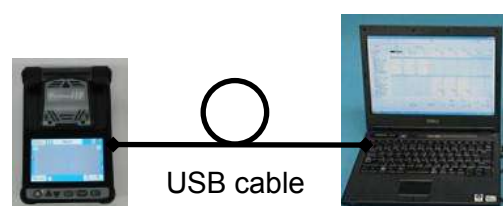
Work Tray

The work tray can be used when removed from the inside of the carrying case, and the carrying case itself can be used as a working table.



Upgradable Software

The software of 36S/37S/38S/41S is upgradable from on the Internet. Install Data Connection in attached CD manual to upgrade software.

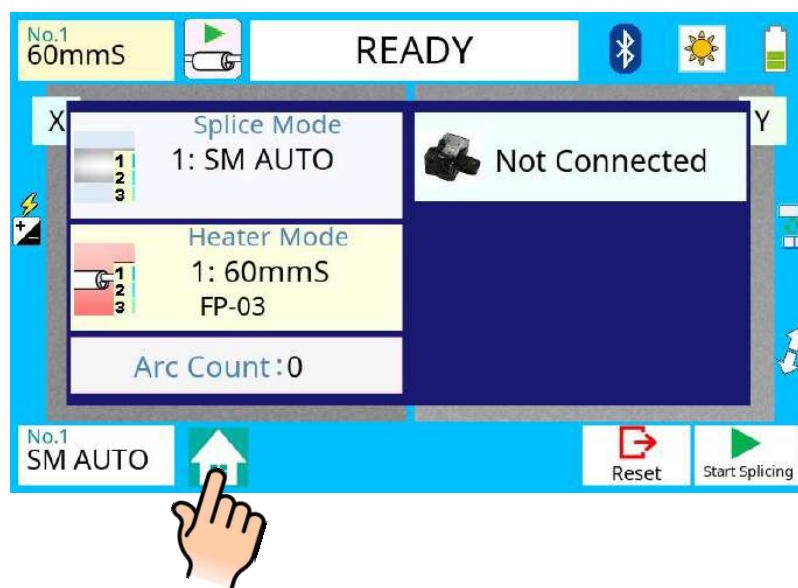


Wireless Communication

The 36S/37S/38S/41S can wirelessly communicate with the CT50 cleaver. After establishing communication between these tools, the 36S/37S/38S/41S automatically adjusts the settings of the connected tools in accordance with each splice mode. To facilitate field work, the operator can change the settings of the tools with the 36S/37S/38S/41S at any time.

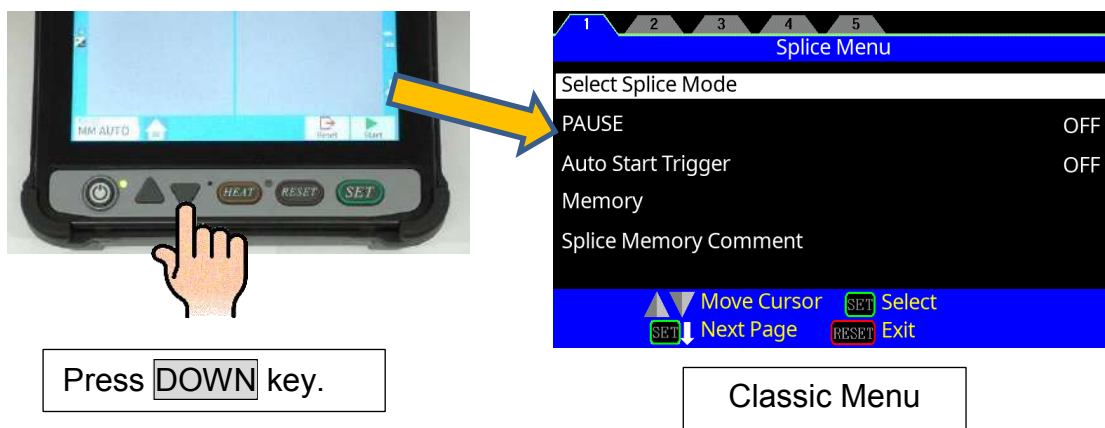
Touch Panel Display & New designed Menu Screen

The 36S/37S/38S/41S has a touch panel display and new designed menu. The operator can select or change the setting immediately by pressing the icons in the monitor.



Sheet key & Classic Menu Screen

The 36S/37S/38S/41S also has an external sheet key and a classic menu. Press the **DOWN** key in sheet key in [READY] screen. The previous setting menu appears. The operator can use 36S/37S/38S/41S like a previous splicer.



Press **DOWN** key.

Classic Menu

Components of Splicer

Standard Equipment

The standard equipment of the splicer is the following. Check the equipment items mentioned of list.

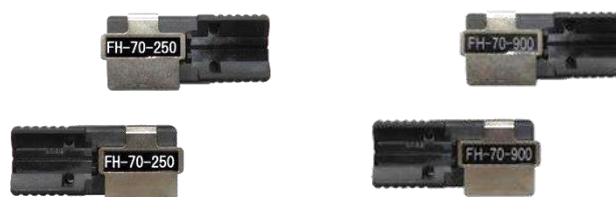
Standard Package List.

		
Fusion Splicer [36S/37S/38S/41S]	Carrying Case [CC-36]	
		
AC adapter [ADC-19A]	AC cord [ACC-**]	Set Plate [SP-31]
		
Spare Electrodes [ELCT2-16B]	Alcohol Pot [AP-02]	Instruction Manual [M-41]
		
		Quick Reference Guide [Q-41S]
		
		Warning and Cautions [W-41S]

Option parts



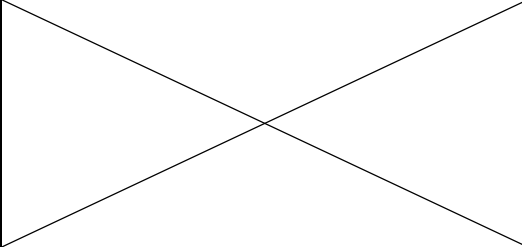





Fiber Holder

Fiber Coating Diameter	Applicable Fiber Holder
250um	FH-60-250 FH-70-250
900um	FH-60-900 FH-70-900



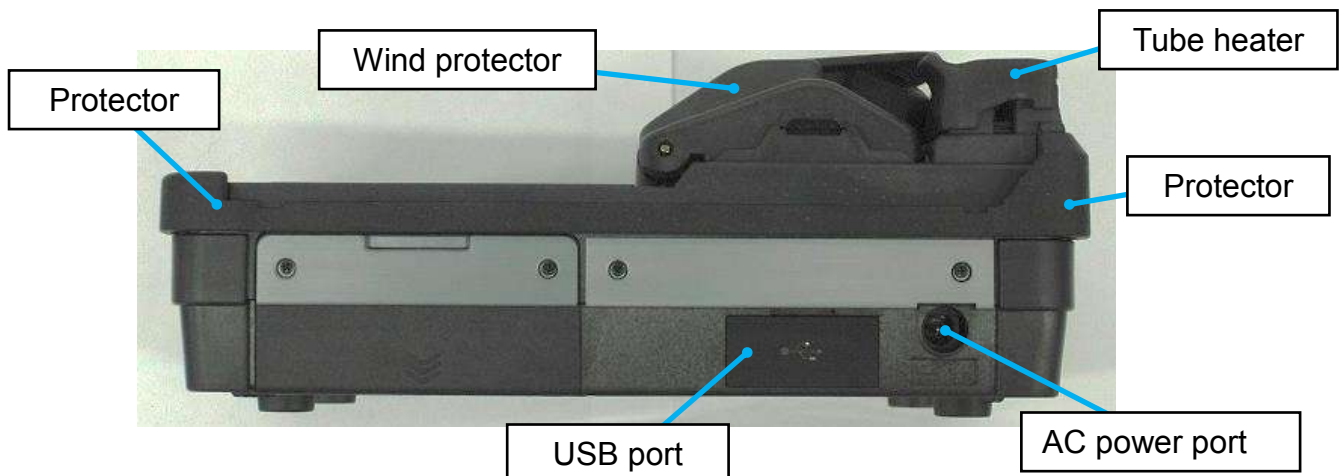
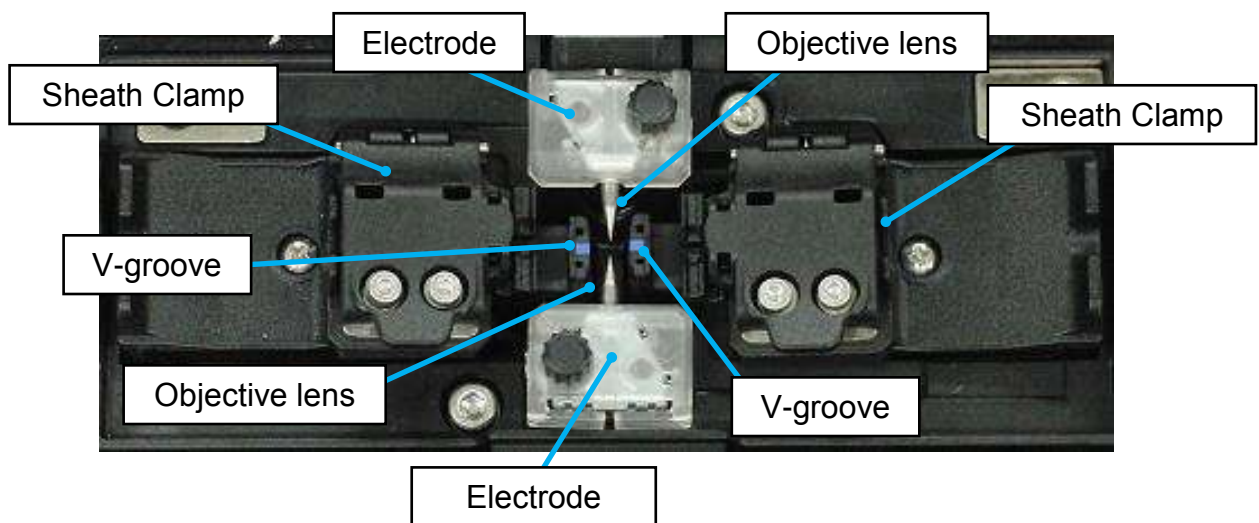
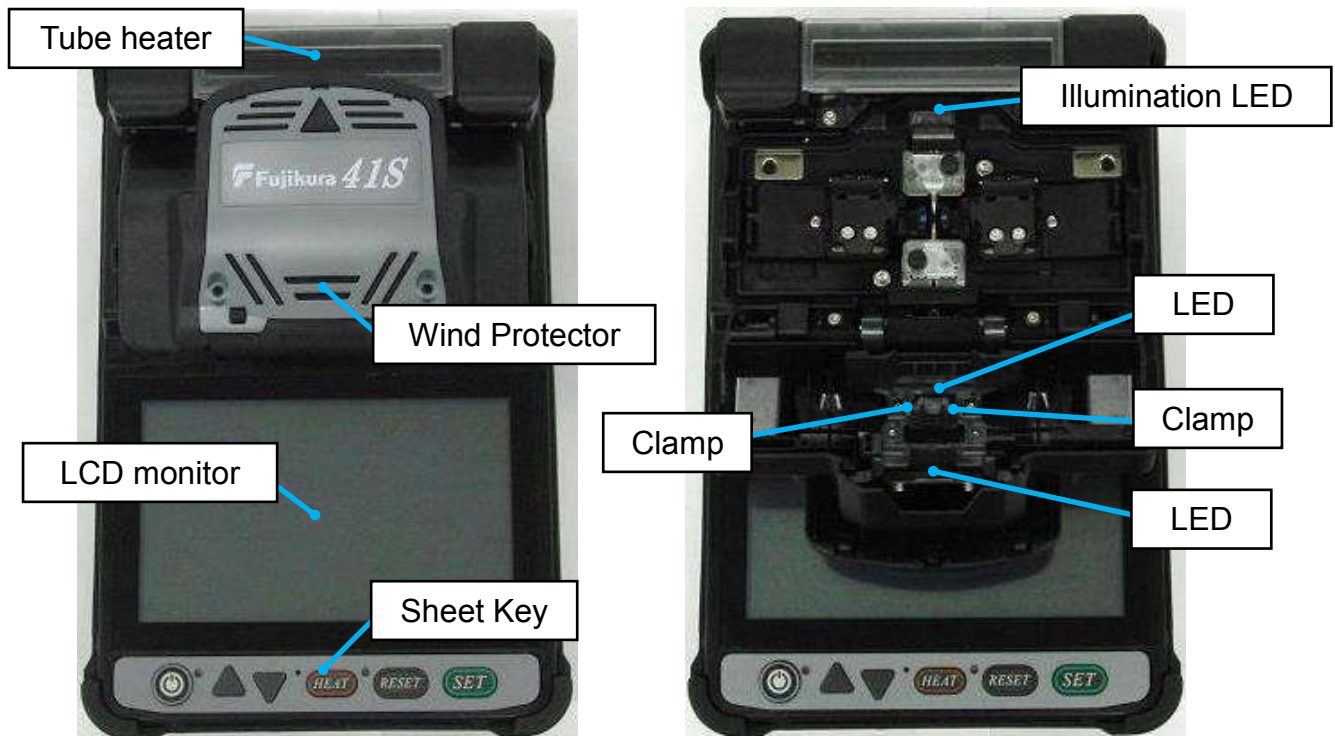
Other Necessary Items for Splicing Operation

Tools

Fiber coating diameter	UV Coating 0.25mm	Ny Coating 0.9mm
Fiber protection sleeves	<u>Standard sleeve</u> 60mm length [FP-03] 40mm length [FP-03 (L = 40)]	
	<u>Micro sleeve</u> 15mm length [FPS01-400-15]	<u>Micro sleeve</u> 20mm length [FPS01-900-20]
Fiber stripping tools	Single Fiber Stripper [SS01] 	
	Single Fiber Stripper [SS03] 	
Fiber Holder (Option)	[FH-60-250] or [FH-70-250] 	[FH-60-900] or [FH-70-900] 
Fiber cleaving tools	Fiber Cleaver [CT50] Cleave length : 10mm fixed (Coating3mm + Glass10mm)	
Fiber cleaning tools	Alcohol Pot [AP-02] with alcohol (purity > 99%) Lint-free tissue or gauze	

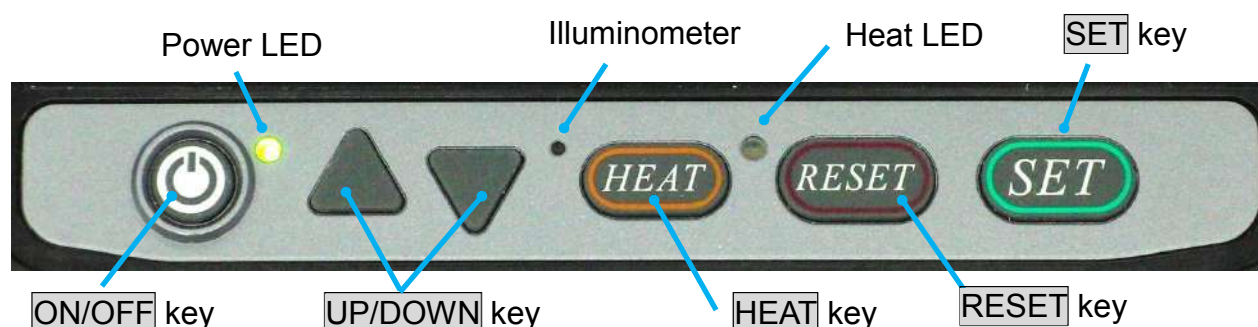
Description and Function of Splicer









structure



Sheet Key Operation

The outline of the sheet key



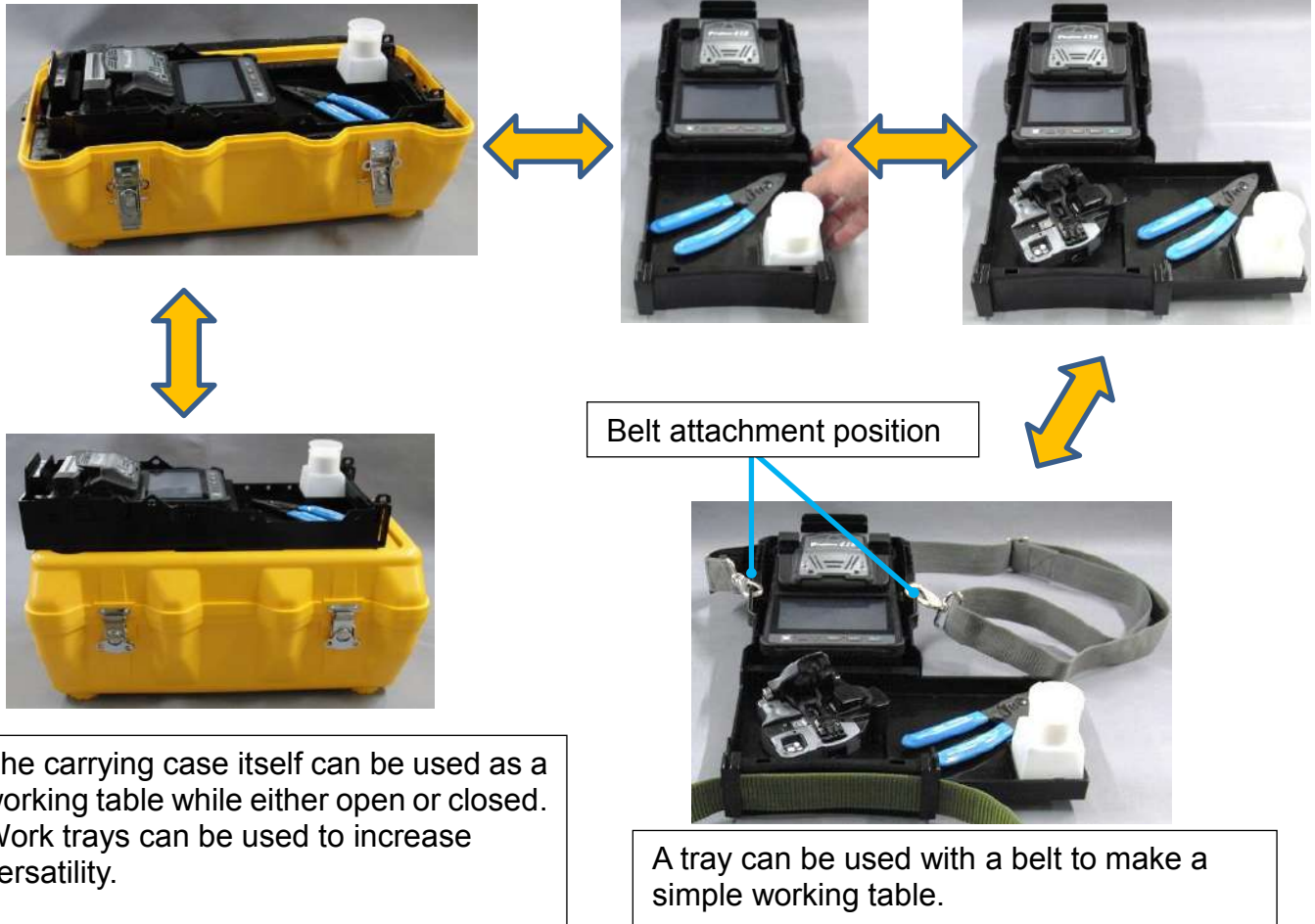
Key Symbol	Key Indicates Key Name	Key Function
	ON/OFF Power key	Turns power ON/OFF.
	Up/Down Arrow Keys	These arrows are used to move the cursor for navigating the menu, or to select alpha numeric text. They also allow operation of the motors "Backward" and "Forward" during manual motor control.
	HEAT Heat Key	Starts the tube heater heating process. If the HEAT key is pressed once during heating, LED will start blinking. Heating operation is stopped if the HEAT key is pressed again when the LED is blinking.
	RESET Reset Key	Depending on the menu status, "RESET" or "EXIT". [RESET] Quits any state except the tube heater heating process. After pressing this key, the splicer will return to the ready state with a beep sound. [EXIT] Returns to the previous function.
	SET Set Key	Starts the splicing operation, or progresses through through a PAUSE state. Moves the cursor direction of arrow in the menu.
	Power LED	Lights green during operation. Blinks at orange color during battery pack charging
	Heat LED	Lights orange during the tube heater operation. Blinks orange (accompanied by beep) when a heater error is detected.
	Illuminometer	Adjusts the monitor's brightness by sensing the illumination around the splicer. <u>Do not cover this hole.</u>

Work area preparation

Create a work environment for splicing, by using the splicer carrying case (open or closed), tray, and/or belt.

Use a work tray

Where a carrying case lid is opened, work can be started immediately.



- Arrange safety belts/devices for equipment and accessories on the tray before use. Dropping equipment/accessories from a high location could result in a serious injury or fatal accident to someone located below.

Environmental considerations

Choose a location for splicing work that is stable. An environment that the splicer can be well balanced, and isolated from vibration will lessen the chance it can fall and be damaged.

Power Supply

This section describes the procedure for using the power supply with the equipment. Splicer is operated with AC adapter (ADC-19A) or the internal battery. Use the only external AC adapter (ADC-19A) and AC Cord (ACC-**) with Splicer.



AC Adapter [ADC-19A]

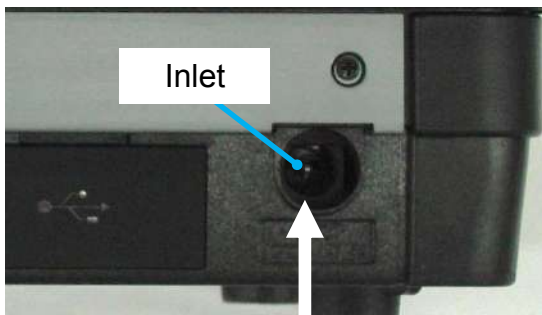


AC Cord [ACC-**]

AC Operation

Insert AC cord into the AC inlet of the AC adapter.

If high AC Voltage is supplied, the AC adapter will immediately be damaged.



ADC-19A



Insert

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 fumes, electric shock, or equipment damage and may result in personal injury, death or fire.

Notes: when using an AC adaptor BTR-11

If AC adaptor is used without battery pack BTR-11, an error may occur. Please operate the splicer with battery pack BTR-11



Battery Operation

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



Keep below practices to prevent battery damage.

- Battery charge will gradually drain even if it is not used. If the battery discharges completely, the battery may no longer be able to be re-charged. Charge the battery before long term storage and after every use.
- If a battery is to be stored for a long time, a periodic recharge every six months is recommended regardless of battery charge level.
- The temperature ranges for different battery functions are as follows:






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

How to charge the battery

Charge the BTR-11 battery pack by connecting the ADC-19A AC adaptor to the inlet. The charge LED (orange) will blink when battery charging starts. It takes about 4 hours to charge the battery. When charging is complete the LED will turn off, and the AC adaptor can be removed. It is possible to use the splicer while recharging.



Charge will started when power is supplied from ADC-19A.
Check the charge state by observing the LED in the sheet key.

	Splicer ON		Splicer OFF	
Normal		<u>LED : ON green</u> Check the battery capacity		<u>LED : OFF</u>
Charging		<u>Battery icon operates</u> 4 hours to charge the battery		<u>LED:Blinks orange</u> 4 hours to charge the battery
		<u>LED: Blinks orange rapidly (charge error)</u> Refer to *1		

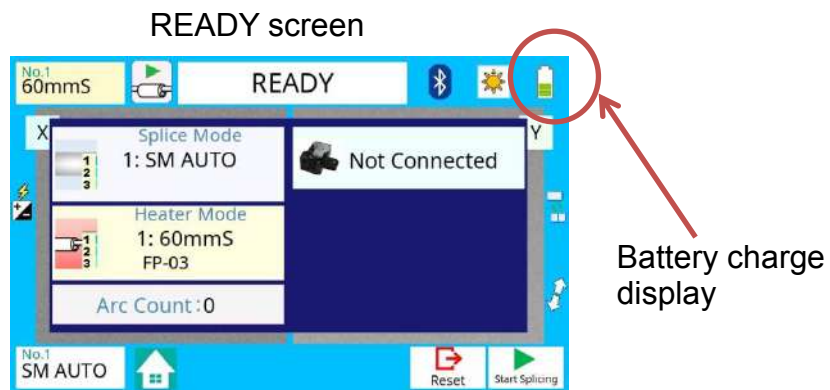
*1 A charge error occurs when the LED blinks rapidly when attempting a charge. This indicates the charge is not being performed and a likely fault with the battery. Exchange battery for a new BTR-11.

How to check the battery charge

Press **ON/OFF** key and hold it until the green LED turns on.



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



Remaining battery capacity display

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

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

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



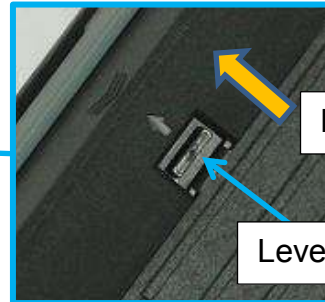
- To provide the maximum number of fiber splices and heating cycles, please use the power-saving mode.

Replace the Battery pack



- When exchanging batteries, be sure to power OFF the splicer and unplug the AC power supply. The splicer or battery can be damaged if “hot swapping” is attempted.

1. Turn Off splicer. Move the lever on the battery cover toward the arrow. The lock of the battery cover is released.



Move the lever.

Lever of battery cover

2. Slide the battery cover. Detach the battery connector.



3. Pull out the main part of a battery pack.



Installation the battery pack (BTR-11)

Take care to attach the connector to the battery using the proper polarization and reinstall. Confirm the lever on the battery cover is locked.

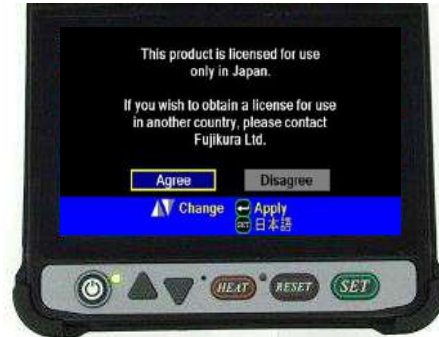


Lock the cover.

Turning Splicer ON/OFF

Turning Splicer ON

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



- The license message is displayed twice a month when the splicer is turned on.
- The language of the license may change depending on the country of shipment.

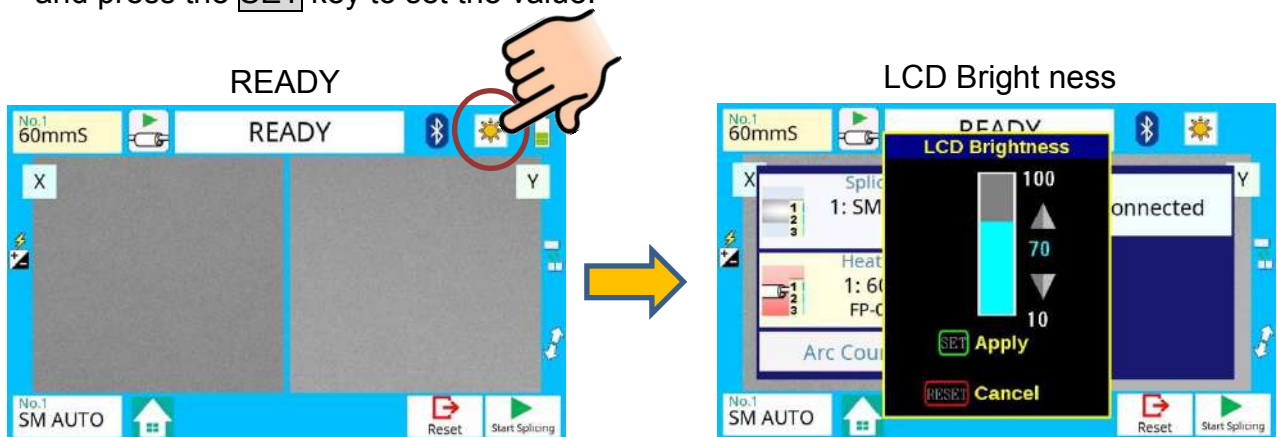
The READY screen is displayed after all the motors are initialized when you select [Agree]. The power source type is then identified. If the battery is used, the remaining battery capacity is displayed.

Turning Splicer OFF

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

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.



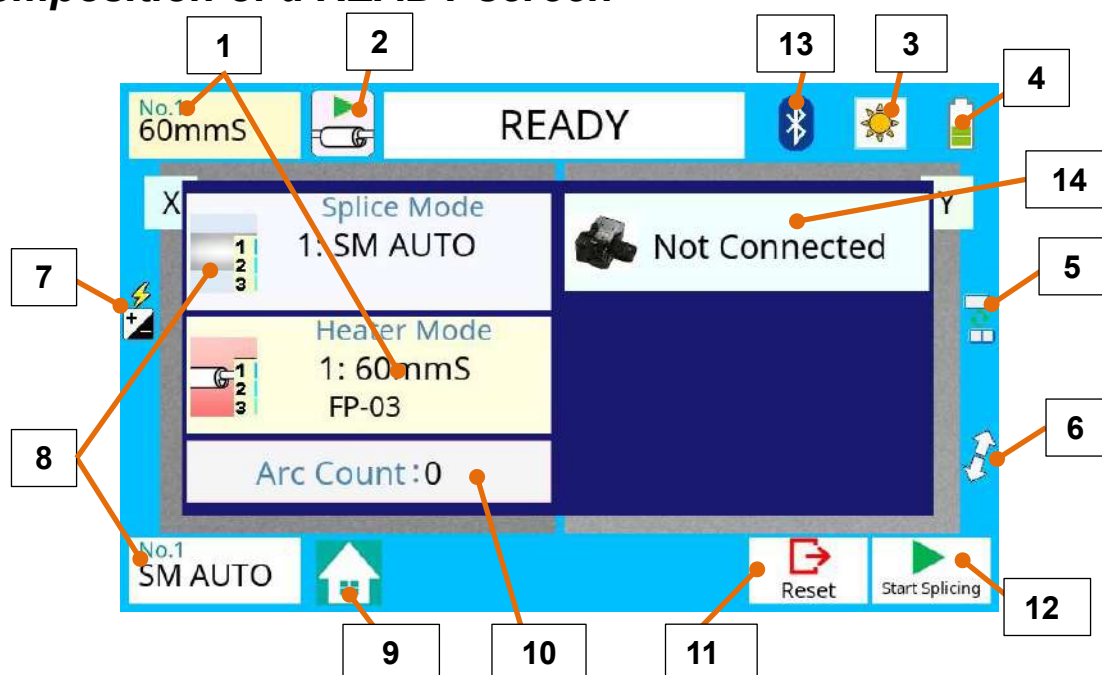
Push light icon at the upper right side on the READY screen.

SET key

Decided

Splicer Settings Check

Composition of a READY screen



No.	Icon Name	Key Function
1	Heater Mode	Current "Heater mode" is displayed. After selection the [Heater Mode] screen appears.
2	Heat	This is HEAT key in the touch panel. After selection in [READY] screen the heater operation starts.
3	LCD Brightness	After selection the [LCD Brightness] window appears.
4	Battery Indicator	This icon shows the battery capacity.
5	Changing screen	After selection, the screen in [READY] state is changed as follows. [X/Y] -> [X-Camera] -> [Y-Camera] -> [Current Setting]
6	Magnification	Changes the magnification of the fiber image in the screen.
7	Arc Calibration	After selection, "Arc Calibration" function in [Maintenance] can be selected directly.
8	Splice Mode	Current "Splice Mode" is displayed. After selection the [Splice Mode] screen appears immediately.
9	Main Menu	After selection the [Main Menu] screen appears.
10	Arc Count	The number of the arc discharging in [Maintenance] is displayed.
11	Reset	This is RESET key. The function is as same as RESET key in the sheet key
12	Start	This is SET key. The function is as same as SET key in the sheet key.
13	Link	After selection the [Paring With Cleaver] screen appears.
14	Wireless condition	This icon shows the condition of the wireless communication between the cleaver and the splicer. After selection the [Cleaver Settings] screen appears.

Confirm the Splice mode and the Heater mode are correct before splicing the fiber.

Splice Mode

Select appropriate splicing mode for the specific fiber combination. Current mode is displayed on the READY screen.

Heater Mode

Select appropriate heating mode for the specific protection sleeve used. Current mode is displayed on the READY screen.



Select of the Splice Mode

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

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

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

➤ How to select the “Splice Mode”

[AUTO] and others

Use this mode if the fiber type is identified.



[SM] and others

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

Splice Mode selection

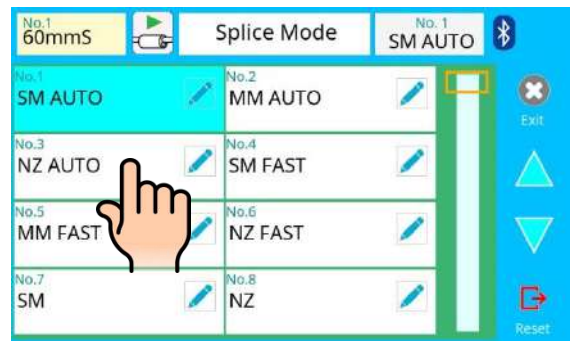
How to change the splice mode

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

1. Select [Splice Mode] key at [READY]. 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 the part of Splice Mode.



Select the suitable splice mode.



Finished

How to check the splice mode

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



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.

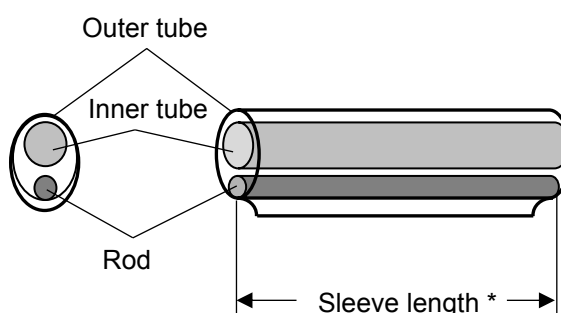
Data Base

Parameter	Description
60mmS FP-03	For standard 60mm protection sleeves, such as Fujikura FP-03 or FP-03M protection sleeves.
60mmS FP-03(250um)	For standard 60mm protection sleeve and 250um diameter coating, such as Fujikura FP-03 or FP-03M protection sleeves.
40mmS FP-03(L=40)	For standard 60mm protection sleeves for fibers with 8mm cleave length, such as Fujikura FP-03 or FP-03M protection sleeves.
60mmSS SLIM 60	For slim type 60mm protection sleeves.
40mmSS SLIM 40	For slim type 40mm protection sleeves.
15mmS FPS01-400-15	For 400 or less um diameter coating and splice length of 5 mm or less
20mmS FPS01-900-20	For 900 or less um diameter coating and splice length of 6 mm or less
60mmS FPS01-DC-60	For drop cable splice.
FUSE900 SC-LC-ST-FC	For Fuse connect splice.
FUSE2/3 SC-LC	

The dimensions of the Protection Sleeve after heat shrink

Form	Rod Material	Sleeve length	Prepared fiber length	Diameter of optical fiber	Diameter 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 depends on the diameter of the fiber.

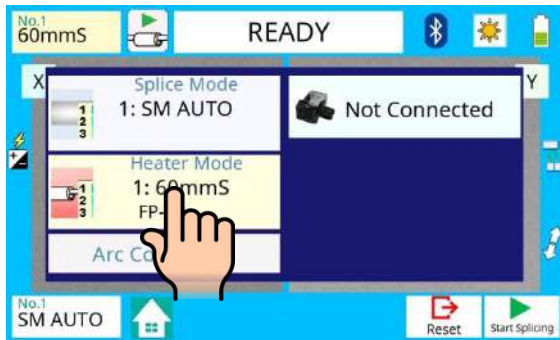


Selecting Heater mode

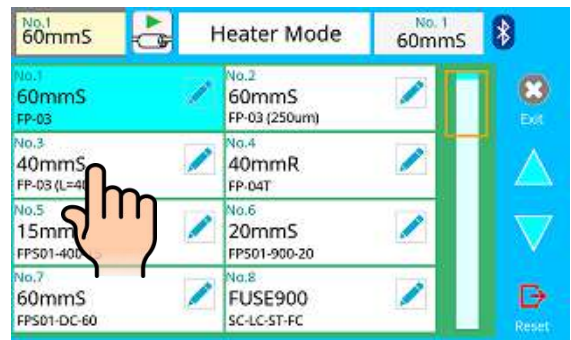
How to change the heater mode

Select the heater mode most suitable for the protection sleeve to be used.

1. Select the **Heater Mode** icon at [READY]. The [Heater Mode] screen appears.
2. Select the suitable heater mode in the list.
3. The color of the selected icon changes to blue.



Select the icon of Heater Mode.



Select the icon of the suitable heater mode.



How to check the heater mode

The current heater mode is displayed in the monitor as shown below.



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

Preparation of fiber

Cleaning optical fiber

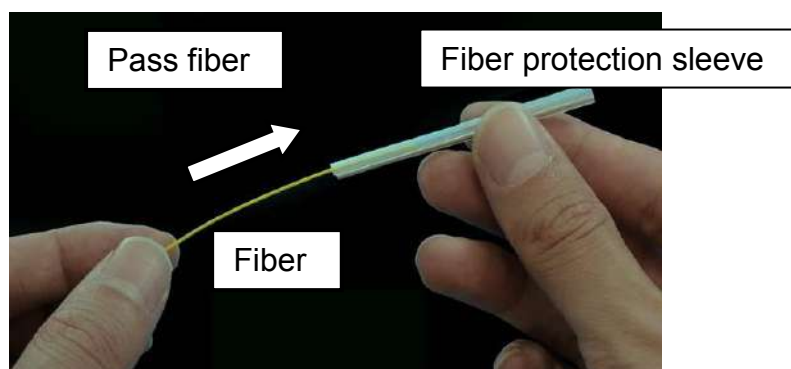
Clean optical fiber with alcohol-moistened gauze or lint-free tissue approximately 500mm from the tip. Dust and particulates from the fiber coating can enter inside the protection sleeve and might result in a future fiber break or transmission attenuation.

Placing protection sleeve over fiber

Place the protection sleeve over the Right side fiber.



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

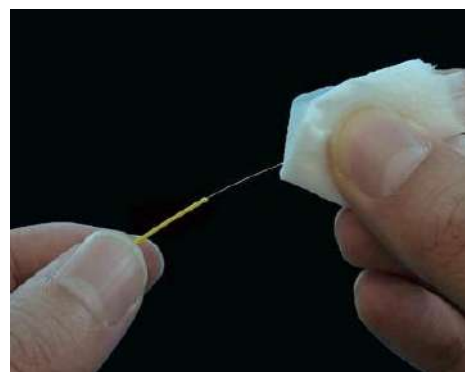
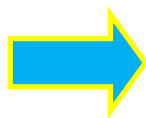


Fiber coating stripping and cleaning of bare fiber

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



Stripping



Cleaning

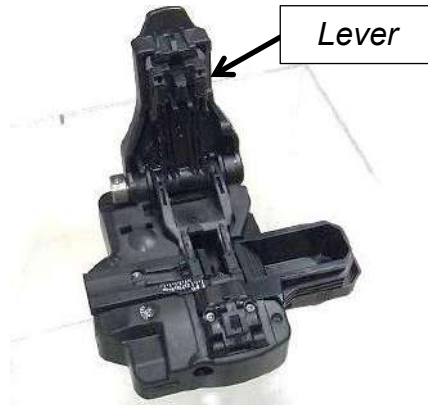


- Use a high quality alcohol, greater than 99% purity.

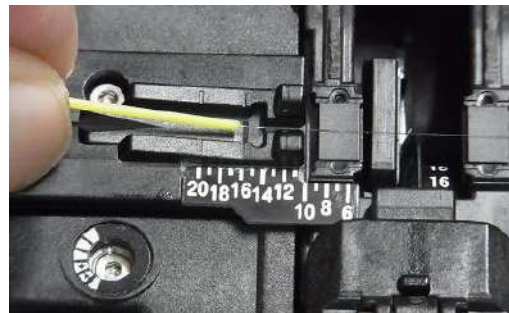
Fiber Cleaving with CT08 or CT50

Using Sheath Clamp

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



2. Set the cleaned fiber in the fiber adaptor. Check and adjust the fiber length using the scale on the adaptor.



3. Close, then gently push down on the Lever until it stops. The blade automatically 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.



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

Using a Fiber Holder

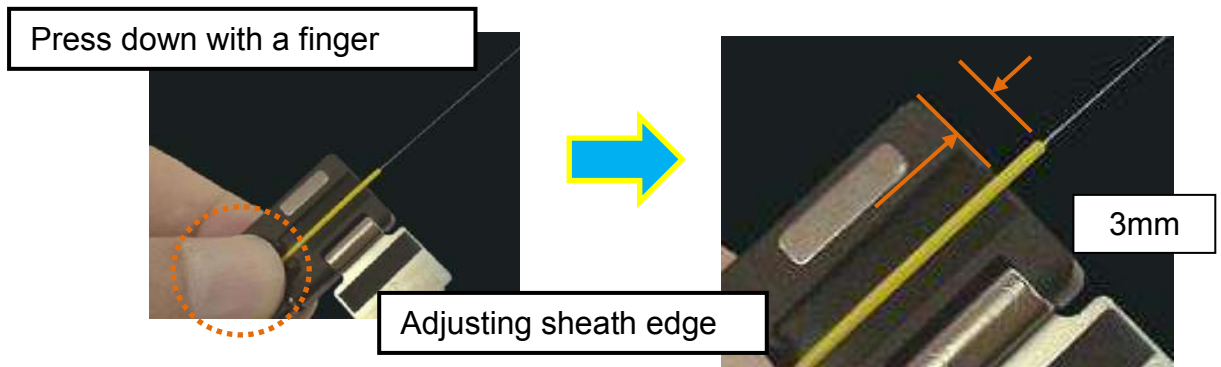
1. Open the lid of a fiber holder and then set the fiber onto the fiber holder.
2. Adjust the position of fiber and then close the lid of fiber holder. The position of the fiber is dependent on the fiber holder as shown below.



- Select a suitable fiber holder based on the fiber coating diameter.
- If fiber coating has some memory curl, place fiber so that the curl is pointed 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-60 series”:

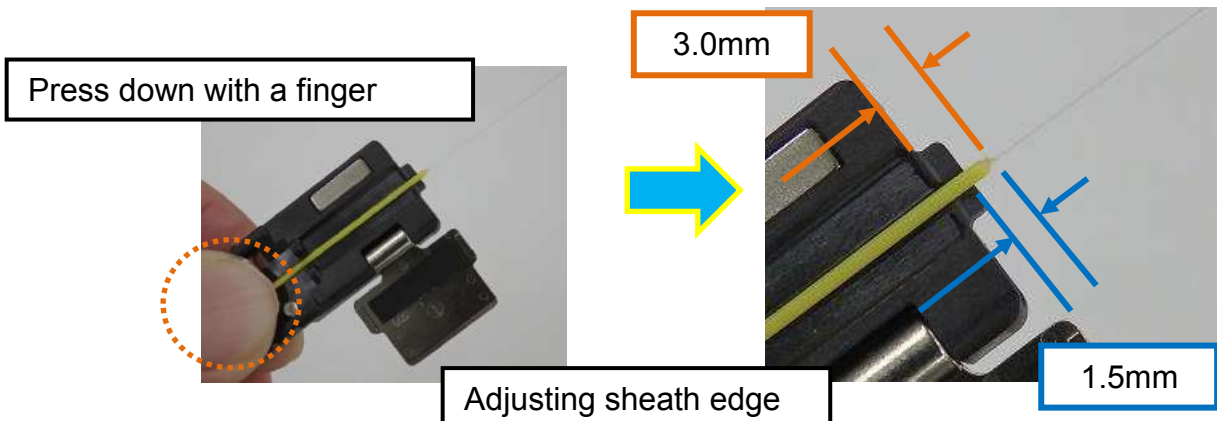
Set the fiber onto the fiber holder with the fiber sheath **3.0mm** from the edge of the fiber holder.



In case of Fiber holder “FH-70 series”:

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

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

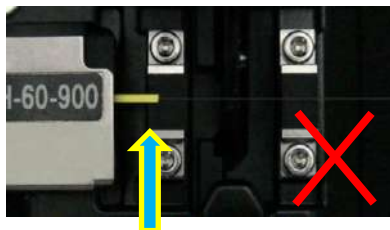


3. Detach the fiber adaptor from CT08 cleaver.

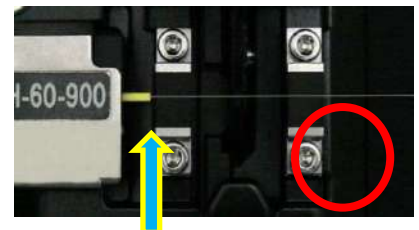
Lift the Lever until it stops. The blade is automatically set at the start position and is now ready to cleave the fiber.



4. Insert the Fiber holder into the cleaver. Check to ensure only bare fiber sits on the pads (not jacket or coating). Adjust the fiber position or prepare it again if necessary.



Not Good



Good



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

5. Close by gently pushing down on the Lever until it stops. The blade automatically cleaves the fiber.

Lift the Lever until it stops and remove the fiber from the cleaver.

Be careful not to touch the fiber to anything, as this can contaminate the end-face of the fiber.

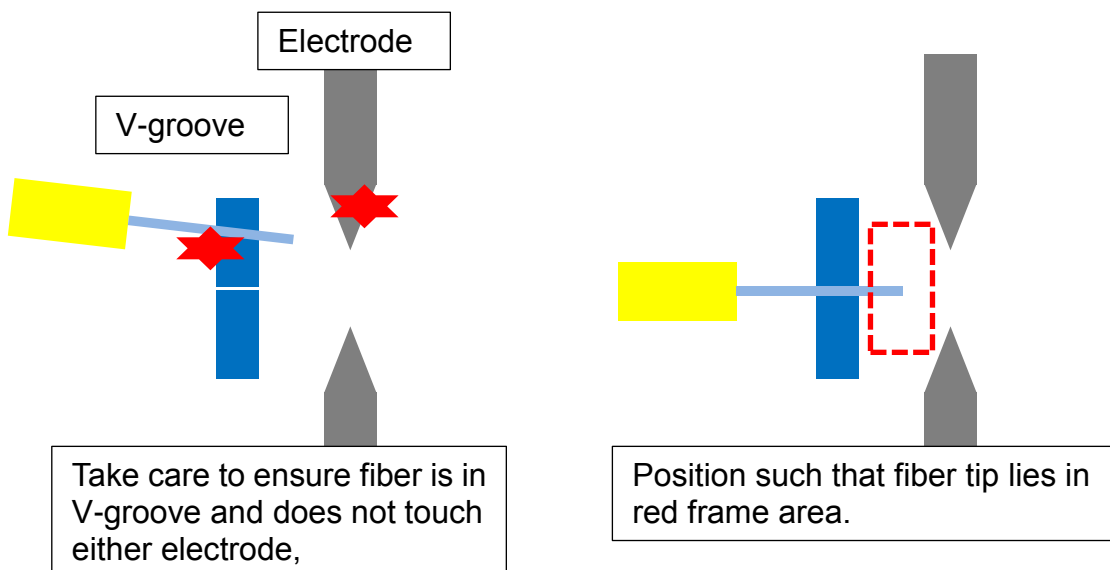
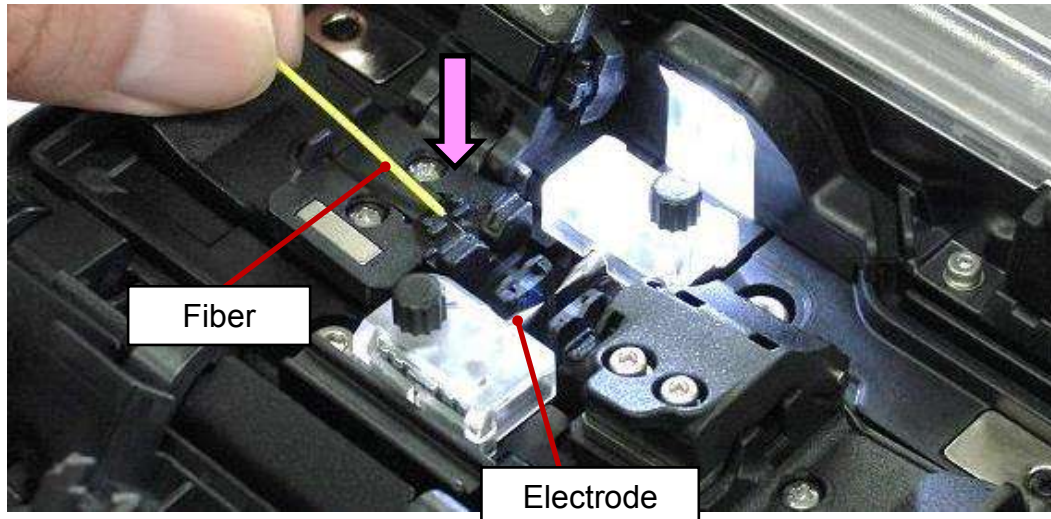


- Do not put fingers in the cleaving area as personal injury may result.

Loading fiber into the splicer

Using sheath clamp

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



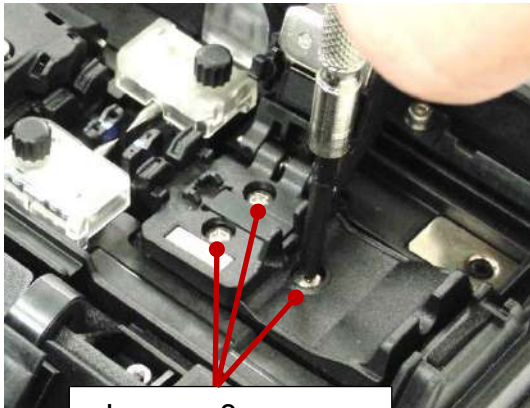
- Be careful not to contact the prepared fiber tips with anything to maintain fiber end-face quality.

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.
4. Close the wind-protector.

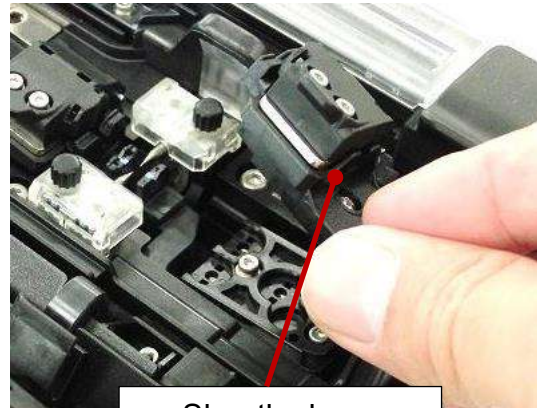
After prolonged storage or when splicing for the first time, we recommend you execute for an Arc Calibration before performing a splice.
Refer to [Arc Calibration].

Using Fiber Holder

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



Loosen 3 screws.



Sheath clamp

2. Insert each Set Plate "SP-31" into the base and tighten the 3 screws.



3. Place fiber holders so that the guide pins on the stage go to guide-holes in the fiber holders.



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

4. Close the wind-protector.

After prolonged storage or when splicing for the first time, we recommend you execute for an Arc Calibration before performing a splice.
Refer to [Arc Calibration].

Arc Calibration

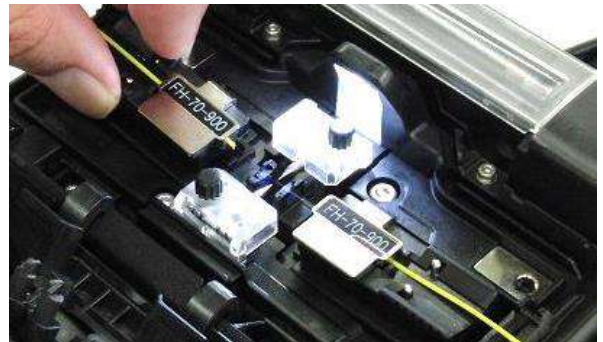
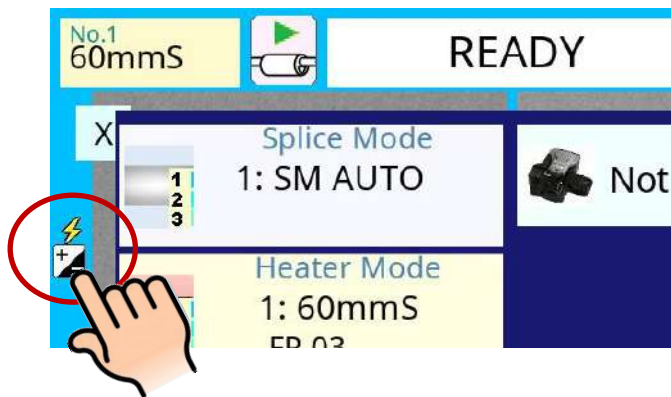
Atmospheric conditions such as temperature, humidity, and pressure are constantly changing, which creates variability in the arc temperature. This splicer is equipped with a temperature sensor that is used in a constant feedback monitoring control system to regulate the arc power to a constant level.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



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

Operation procedure

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

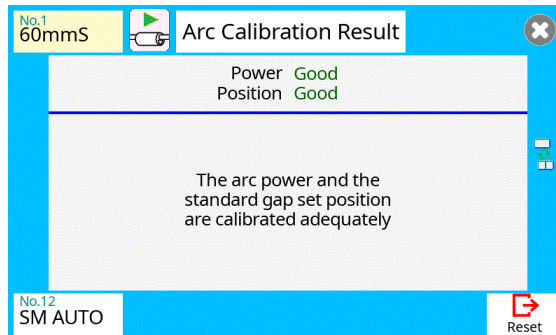


- Use standard SMF ITU-T G652 fiber for Arc Calibration.
- Use well prepared fibers for arc calibration. Dust on the fiber surface affects arc calibration.
- Cleave angle threshold does not link to the parameter "Cleave Limit" in splicing modes. Cleave angle threshold is independently set for arc calibration.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

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

“Good” message

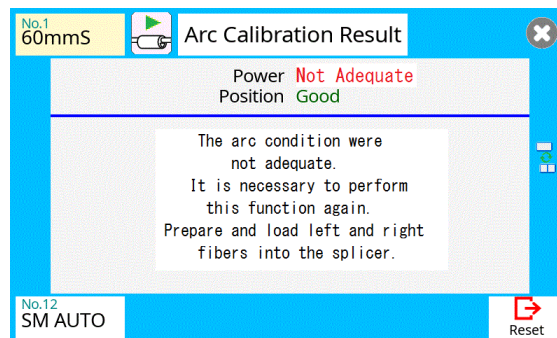
Arc power and splicing position calibration have successfully completed. Press **RESET** key to exit.



Result: Good

“Not Adequate” message

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



Result: Not Adequate

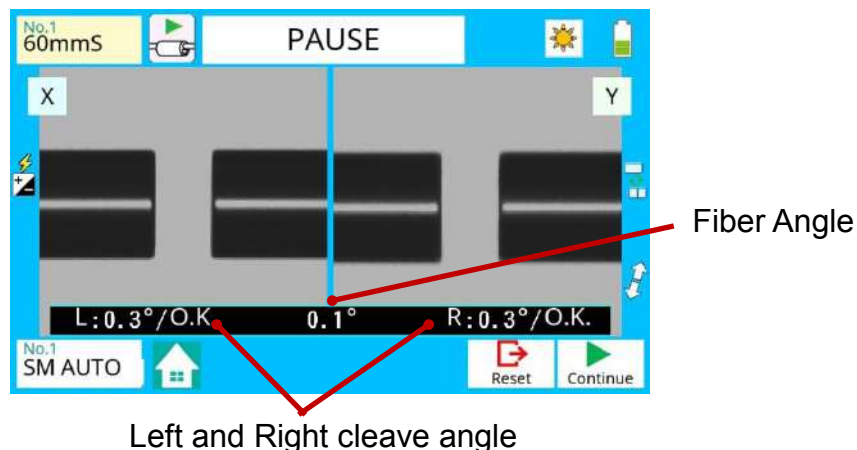


- In some cases, multiple iterations of arc calibration are needed until the calibration process is successfully completed and the "Test Finish" message is displayed. Arc calibration can be considered almost completed if multiple iterations are completed without receiving the message.
- Number threshold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

Splicing procedure

To make a good splice, the optical fiber is observed with the image processing system equipped in the 36S/37S/38S/41S. However, there are some cases when the image processing system cannot detect a faulty splice. Visual inspection with the monitor is often necessary for better splicing yield. The instruction below describes standard operating procedure.

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



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

Cleave Shape NG		Large Cleave Angle
 Chip		 Angle
 Lip		



- 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.

4. Cladding axis offset measurements can be displayed and after completion of arc discharge is performed to splice the fibers.
5. Estimated splice loss is displayed upon completion of splicing. Splice loss is affected by certain factors stated. These factors are taken into account to calculate, or estimate, splice loss. The calculation is based on certain dimensional parameters, such as MFD.

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

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



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



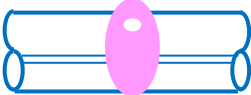
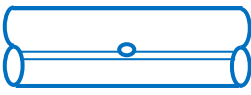



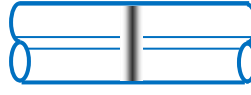


- Restriction of the number of times of additional arc discharge can be set up. Since excessive additional arc discharge becomes the cause of worsening splice intensity and a splice loss, it can forbid the arc discharge more than the suitable number of times. Refer to [Setting Menu] for details.



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

Splice loss increase: Cause and remedy

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



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

Storing splicing results

Splicing results is stored in memory.



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


Storing results automatically

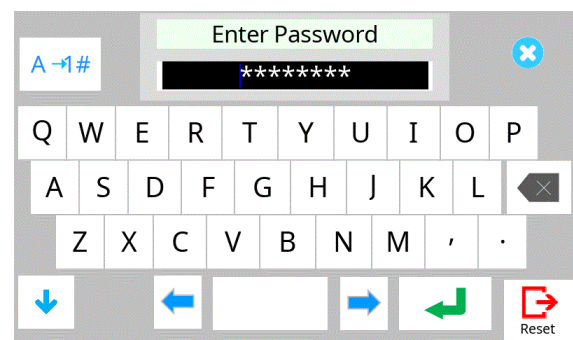
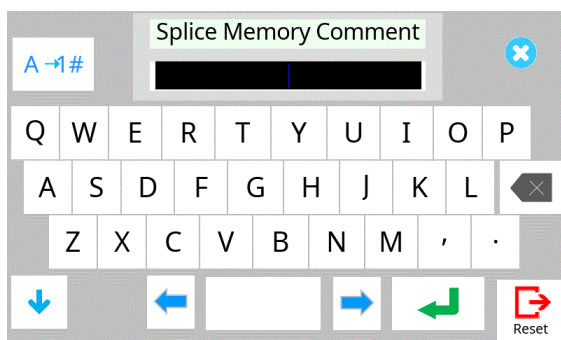
The splice result is automatically stored in memory when **RESET** is selected after completion of the splice at the [Finish] screen, or when the wind protector is opened upon completion of the splice at the [Finish] screen.

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

How to input Mode Title/Comment/Password

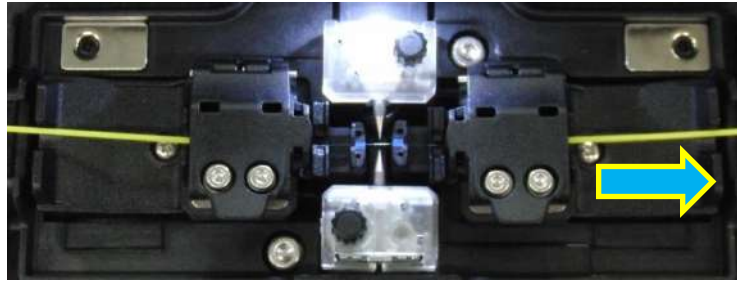
Character list below is displayed by selecting Mode Title / Comments / Password.

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



Fiber Proof Test

The strength of the splice point can be checked. When finished press **RESET** or open wind protector and fiber proof test will be performed.



Removing spliced fiber

1. Open lids of wind protector and tube heater.
2. Hold left fiber with left hand at the side of the sheath clamp and open left sheath clamp lid.
3. Open right sheath clamp lid.
4. Place the protection sleeve over the Right side fiber to splice point.
5. Hold right fiber with right hand, and remove spliced fiber from the splicer.



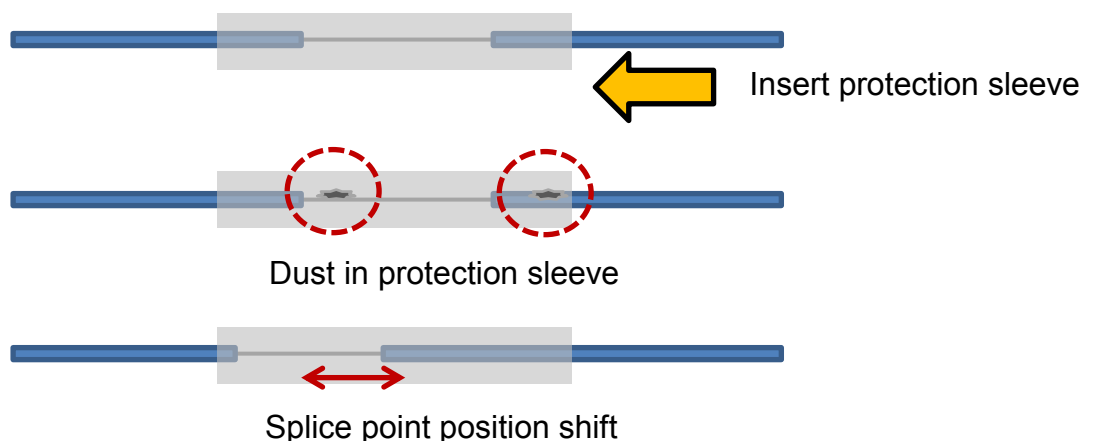
- Keep holding fiber until fiber is completely transferred to tube heater.

Insertion of the protection sleeve

Move the protection sleeve to the splice point, holding a fiber with the left hand. This prevents slack from occurring at a splice point and reduces the possibility of fracturing the fiber due to excessive tension.



- Verify the splice point is located in the center of a protection sleeve.
- Verify the fiber is not twisted.
- The rod in the splice protector prevents bending stress on the splice



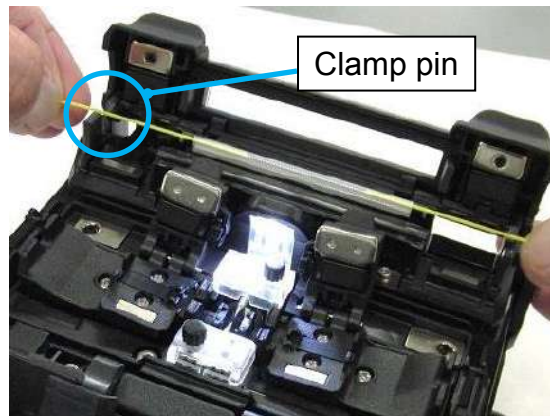
Heating protection sleeve

1. Transfer fiber with protection sleeve to tube heater.



- Make sure the splice point is located at the center of the protection sleeve.
- Make sure the rod in the protection sleeve is placed on bottom.

2. Place fiber with protection sleeve in tube heater. Pressing the clamp pin with the fiber closes the lid.



3. Press the **HEAT** key .The HEAT LED then turns on to indicate the heater is activated.



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

The buzzer beeps and the orange HEAT LED turns off when tube heating is completed.

4. Open tube heater lid and remove protected fiber from the tube heater. Apply some tension to the fiber while removing it from the tube heater.



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

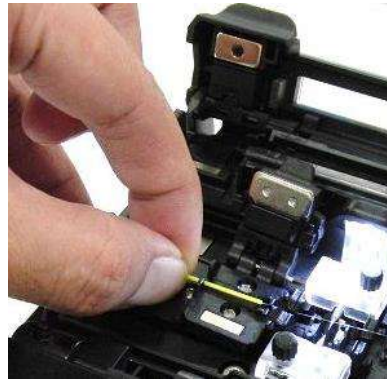
5. Visually inspect the finished sleeve to verify no bubbles or debris/dust is present in the sleeve.

When using 60mm length sleeve.

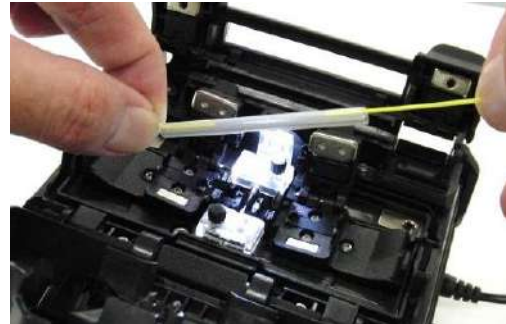
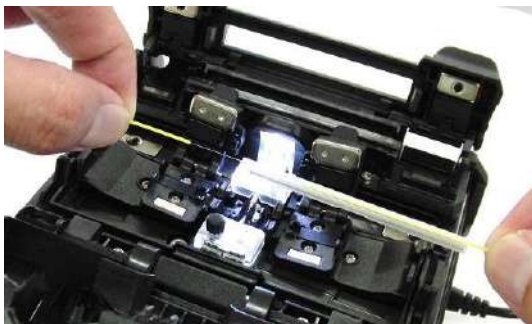
The sheath clamp is optimized for the 60mm length sleeve. In case of using 60mm length sleeve, it is easy to position the center of the protection sleeve over the splice point.

<Procedure>

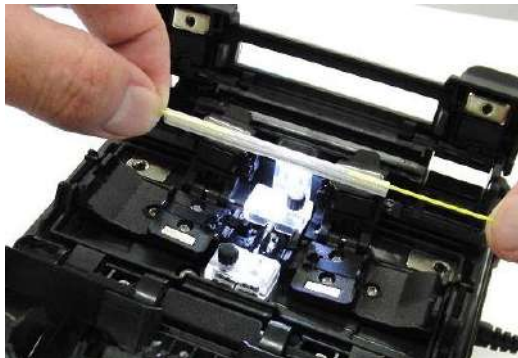
1. Open lid of wind protector and tube heater.
2. Hold left fiber with left hand at the side of the sheath clamp and open left sheath clamp lid. Do not release the left hand until step 5.



3. Open right sheath clamp lid and lift the fiber.
4. Raise the right side fiber. The protection sleeve will naturally slide toward the left side and stop at your finger. The center of the protection sleeve is located at the splice point.



5. Slide your left hand slightly to the left on the fiber.
6. Transfer fiber with protection sleeve to the tube heater. Place fiber with protection sleeve in tube heater simultaneously pressing the clamp pin with the fiber to close the lid.



Cleaning and Checking before Splicing

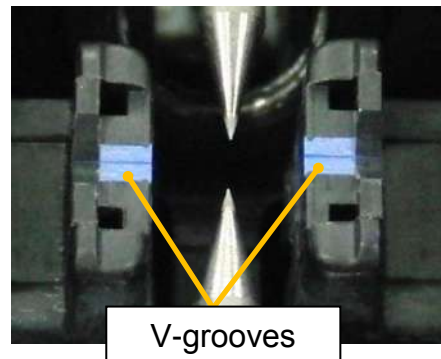
It is possible to maintain the performance of the splicer for a long time with proper cleaning and maintenance.

Critical cleaning points and maintenance checks are described below.

Cleaning V-grooves

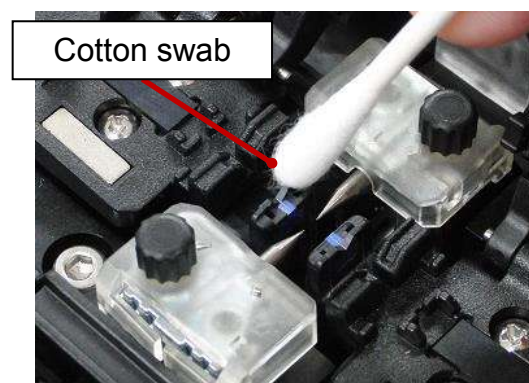
If contaminants are present in the V-grooves, proper clamping may not occur, resulting in higher splice loss. The V-grooves should be frequently inspected and periodically cleaned during normal operation. To clean the V-grooves do the following:

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



- Be careful to not contact the electrode tips.

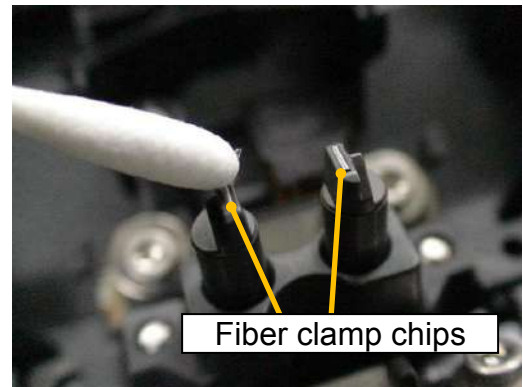
3. If the contaminants in the V-groove cannot be removed with an alcohol-moistened thin cotton swab, use a cleaved fiber end-face to dislodge contaminants from the bottom of the V-groove. Repeat step 2 after this procedure.



Cleaning Fiber Clamp Chips

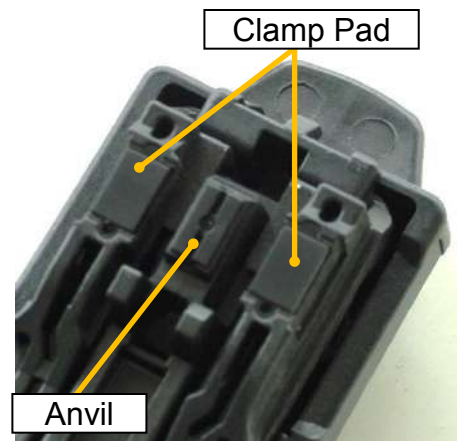
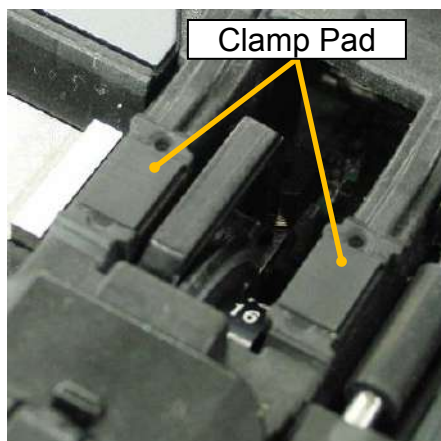
If contaminants are present on the clamp chips, proper clamping may not occur, resulting in poor quality splices. The fiber clamp chips should be frequently inspected and periodically cleaned during normal operation. To clean the clamp chips do the following:

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



Cleaning Fiber Cleaver

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



Arc Calibration

See Section [Maintenance Menu].

Periodic Checking and Cleaning

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

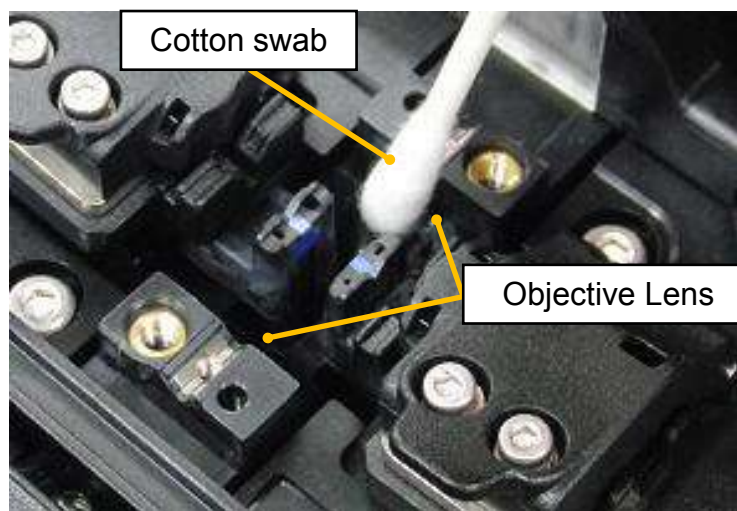
Cleaning of Objective Lens

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

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



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



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.

Error Messages

Cleaver Blade Alarm

Repositioning the CT50 Cleaver Blade

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

Method1: Rotate the blade using the Rotate Button

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



Rotate Button



Method2: Rotate the blade using a Smartphone or splicer

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

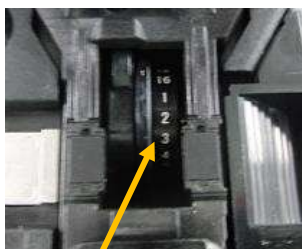


- In the Method2, the smartphone or splicer needs to connect the CT50 before rotating the blade.
- If an error occurs when attempting to rotate the blade, the Batt. LED indicator will blink red. In this case, close Lever and repeat. If same problem happens, contact a Fujikura authorized distributor.

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.

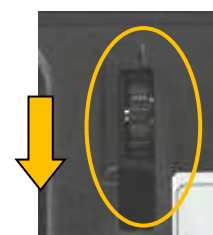
1. Close the Lever and then rotate the Blade Rotating Dial in the direction of the arrow until it clicks.
2. Check that the Blade Position has advanced to next number.



Blade Position Number



Blade Rotating Dial



Arrow

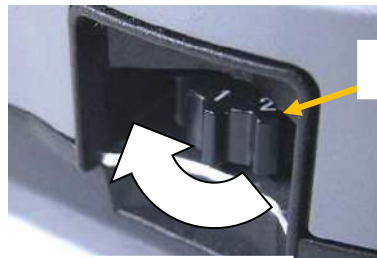
Blade Position Number and Blade Rotating Dial

Changing the CT50 Blade Height

The Blade height can be changed by rotating the Blade Height Dial located on the front of the cleaver. It can be raised a total of 2 times.

Method

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



Blade Height Dial

Front view

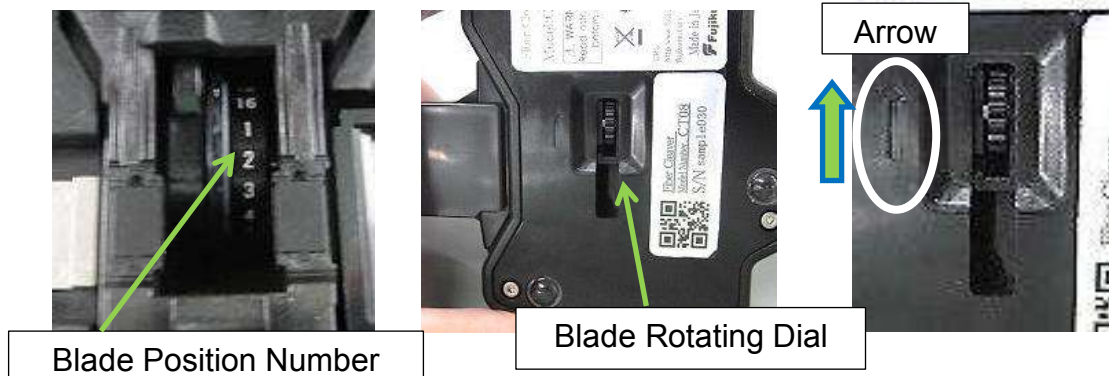


- Replace the blade after raising it 2 times, and after all 16 positions have been used.
- The Cleave Blade and Arm set for CT50 is user serviceable. Contact your Fujikura distributor for details.

Repositioning the CT08 Cleaver Blade

If the cleaver does not cleave properly, rotate the blade 1/16th of a turn to replace the worn out blade position with a sharp blade position. Blade life is normally 1000 cleaves per blade position. To rotate the blade, do the following:

1. Check the Blade Position Number printed to the side of the blade.
2. Close the Lever and then rotate the Blade Rotating Dial in the direction of the arrow until it clicks. The Blade Rotating Dial is located in the rear side.
3. Check that the Blade Position has advanced to next number.

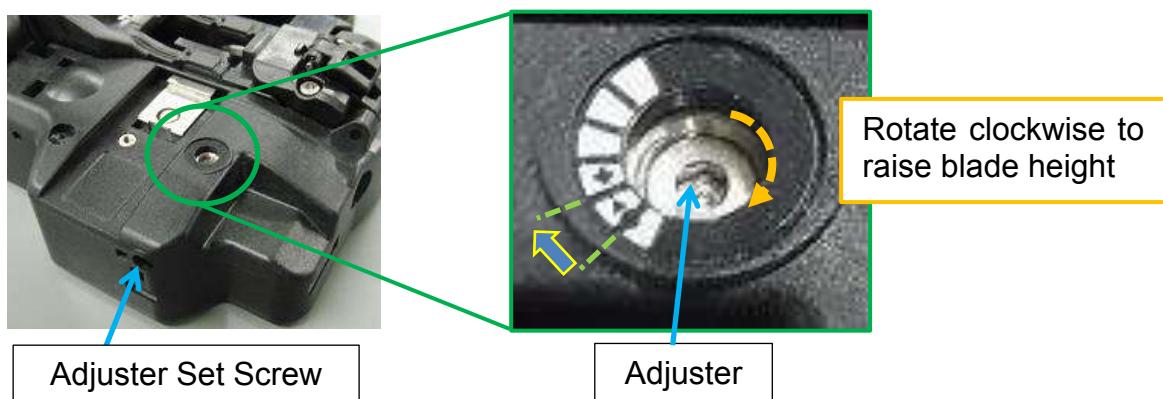


- Move the blade with 1 position at one time. If it is accidentally moved too far, rotate it backwards or forwards to get to the appropriate position.

Adjusting Blade Height of CT08

After the circular blade has been rotated a complete revolution (16 positions), its height needs to be adjusted to compensate for the wear.

1. Verify the position of the Blade Height Adjuster. It is locked by the Adjuster Set Screw to prevent turning.
2. Loosen the Adjuster Set Screw with the hexagon wrench (HEX-01) and then rotate the Adjuster one mark. Do not rotate more than one mark at one time.
3. Tighten the Adjuster Set Screw. Overtightening may cause breakage.



- Do not rotate more than one mark at one time.

Blade Replacement

After the circular blade has been raised 2 times and rotated through all 3 positions (a total of approximately 48,000 fiber splices), it needs to be replaced.

The cleaver blade is replaced by the service center. The blade of CT50/08 series user serviceable. Contact to Fujikura authorized distributor.

Clamp Arm Replacement

When the clamp pad is worn, it needs to be replaced.

If the user needs assistance in replacing the pad or with obtaining parts they should contact the nearest Fujikura authorized distributor.



Spare blade



Clamp Arm

Electrode Caution displayed

Replace Electrodes

See Section [Replace Electrodes].

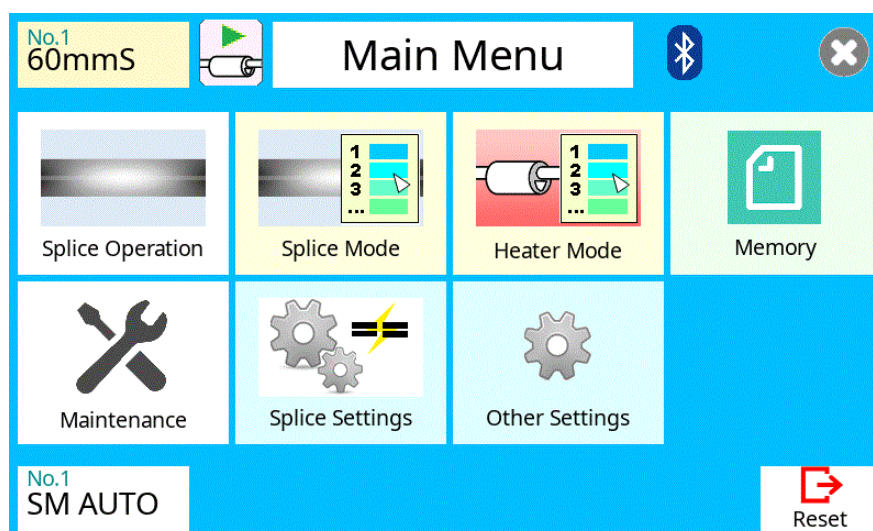
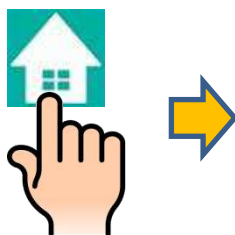
Another error displayed

Diagnostic Test

See Section [Diagnostic Test].

Composition of Main Menu

Main Menu icon



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

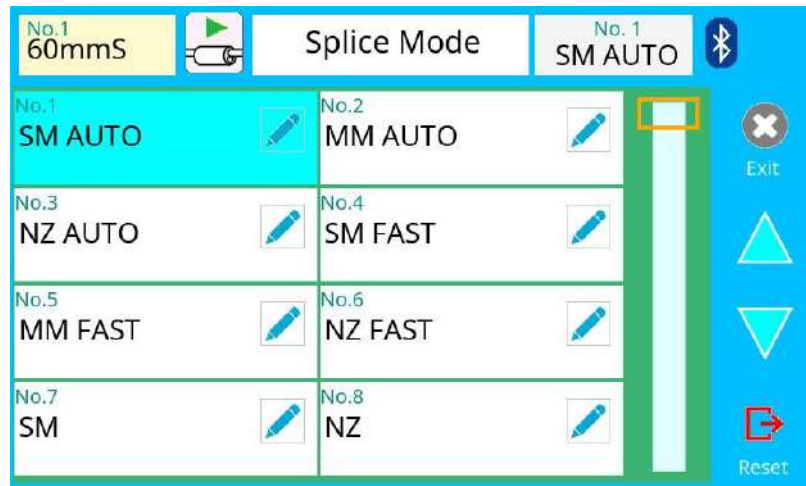
Icon Name	Description
Splice Operation	Returns to [READY] screen.
Splice Mode	[Splice Mode] screen appears. This allows access to the the splicing parameters.
Heater Mode	[Heater Mode] screen appears. This allows access to the heating parameters.
Memory	[Memory] screen appears. This allows review of 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.
Other Setting	[Other Setting] screen appears. This allows review/edit the wireless communication and the supervisor settings.

Refer to each section for details of each parameter.

Composition of Splice Mode

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

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



How to change the splice mode.

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



Splice Mode

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

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

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

➤ How to select the "Splice Mode"

[AUTO] and others

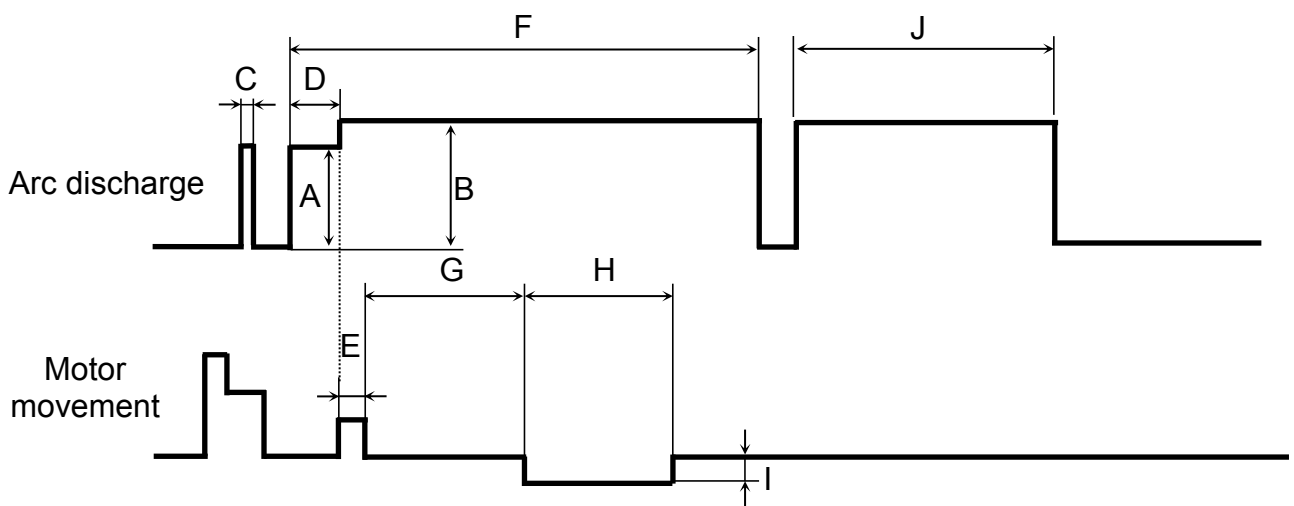
Use this mode if the fiber type is identified.



[SM] and others

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

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



A: Prefuse Power,
D: Prefuse Time,
G: Taper Wait Time,
I: Taper Speed,

B: Arc Power,
E: Overlap,
H: Taper Time (related to Taper Length)
J: Rearc Time

C: Cleaning Arc
F: Arc Time

Select Splice Mode

Database of splice mode

Splice Mode	Description
SM AUTO	This splice mode can splice the standard SM fiber (ITU-T G.652). The amount of heat applied to the fiber is calibrated in real time by analyzing the cladding illumination during arc discharge then adjusting The arc current accordingly. This splice mode does not require the operator to perform an arc calibration.
MM AUTO	This splice mode can splice the standard MM fiber (ITU-T G.651). The amount of heat applied to the fiber is calibrated in real time by analyzing the cladding illumination during arc discharge then adjusting The arc current accordingly. This splice mode does not require the operator to perform an arc calibration.
NZ AUTO	This splice mode can splice the standard NZDS fiber (ITU-T G.655). The amount of heat applied to the fiber is calibrated in real time by analyzing the cladding illumination during arc discharge then adjusting the arc current accordingly. This splice mode does not require the operator to perform an arc calibration.
DS AUTO	This splice mode can splice the standard DS fiber (ITU-T G.653). The amount of heat applied to the fiber is calibrated in real time by analyzing the cladding illumination during arc discharge then adjusting the arc current accordingly. This splice mode does not require the operator to perform an arc calibration.
AUTO SM/NZ/DS	This splice mode can splice standard telecommunications grade fiber, including SMF (ITU-T G.652), NZDSF (ITU-T G.655) and DSF (ITU-T G.653). The amount of heat applied to the fiber is calibrated in real time by analyzing the cladding illumination during arc discharge and adjusting the arc current accordingly. This splice mode does not require the operator to perform an arc calibration.

Points to note: of AUTO SM/NZ/DS 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 require different splicing parameters from one type of NZDS fiber to the next for optimal results.

Database of splice mode

Splice Mode	Description
SM	For splicing standard Single-mode fiber (ITU-T G652). The MFD is 9 to 10 um at wavelength of 1310 nm. Automatic arc calibration doesn't work in this splice mode.
NZ	For splicing Non-zero dispersion-shifted fiber (ITU-T G655). The MFD is 9 to 10 um at wavelength of 1550 nm. Automatic arc calibration doesn't work in this splice mode.
DS	For splicing Dispersion-shifted fiber (ITU-T G653). The MFD is 7 to 9 um at wavelength near 1550 nm. Automatic arc calibration doesn't work in this splice mode.
MM	For splicing Multi-mode fiber (ITU-T G651). Core diameter : 50.0 to 62.5 um Automatic arc calibration doesn't work in this splice mode. This mode is programmed to achieve the best splice loss of MM fiber. The appearance of splice point doesn't look fat.

Profile type


SMF :	ITU-T G652	MFD : 9~10 um, Wave length : 1310nm
NZDSF :	ITU-T G655	MFD : 8~10 um, Wave length : 1550nm
DSF :	ITU-T G653	MFD : 7~9 um, Wave length : 1550nm
MMF :	ITU-T G651	Core : 50.0um, 62.5 um

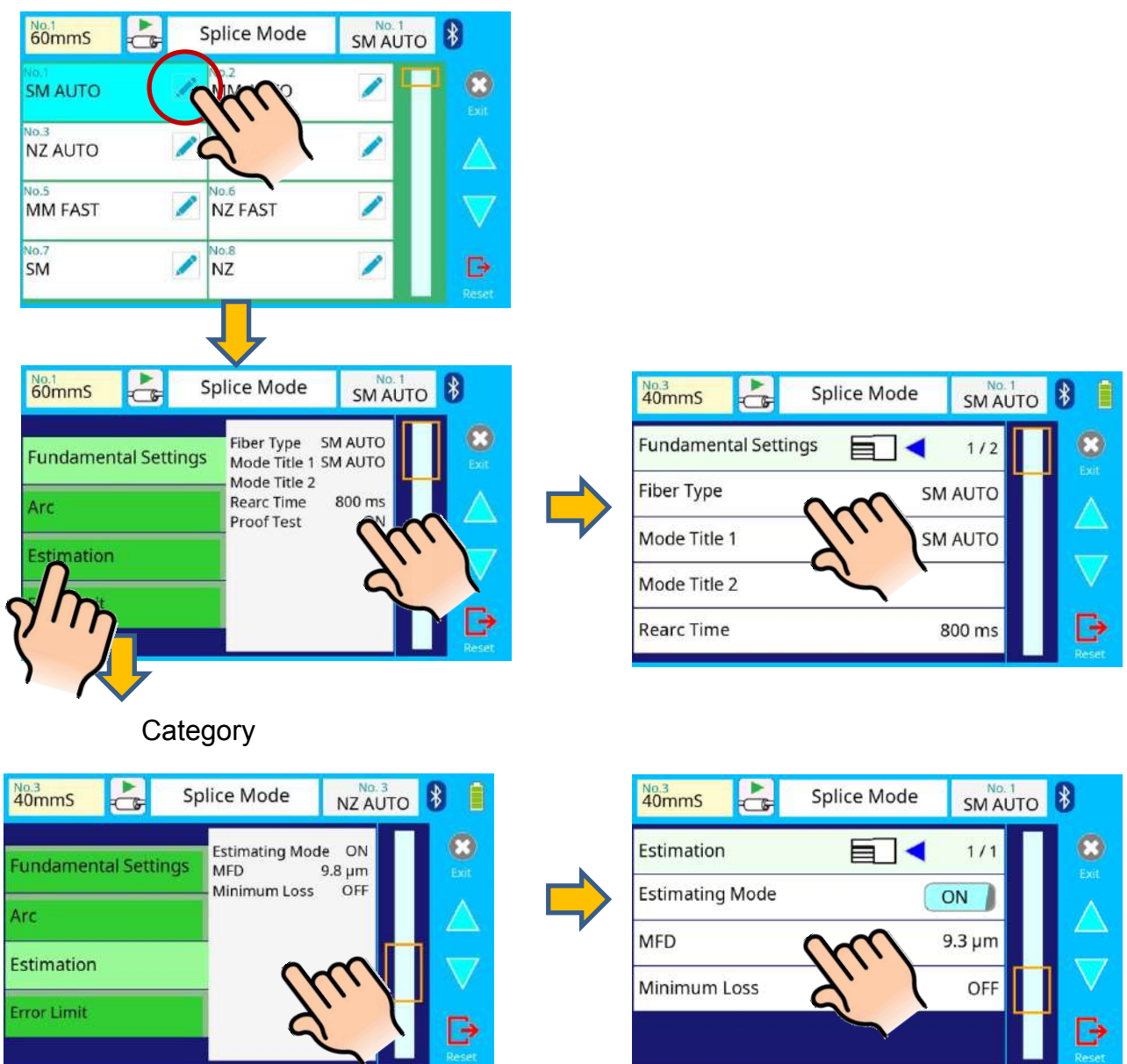
Database of splice mode (FAST)

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

Editing splice modes


Splicing parameters in each splice mode can be modified. Arc power and Arc time are considered the two most vital parameters. To edit parameters follow the steps below:

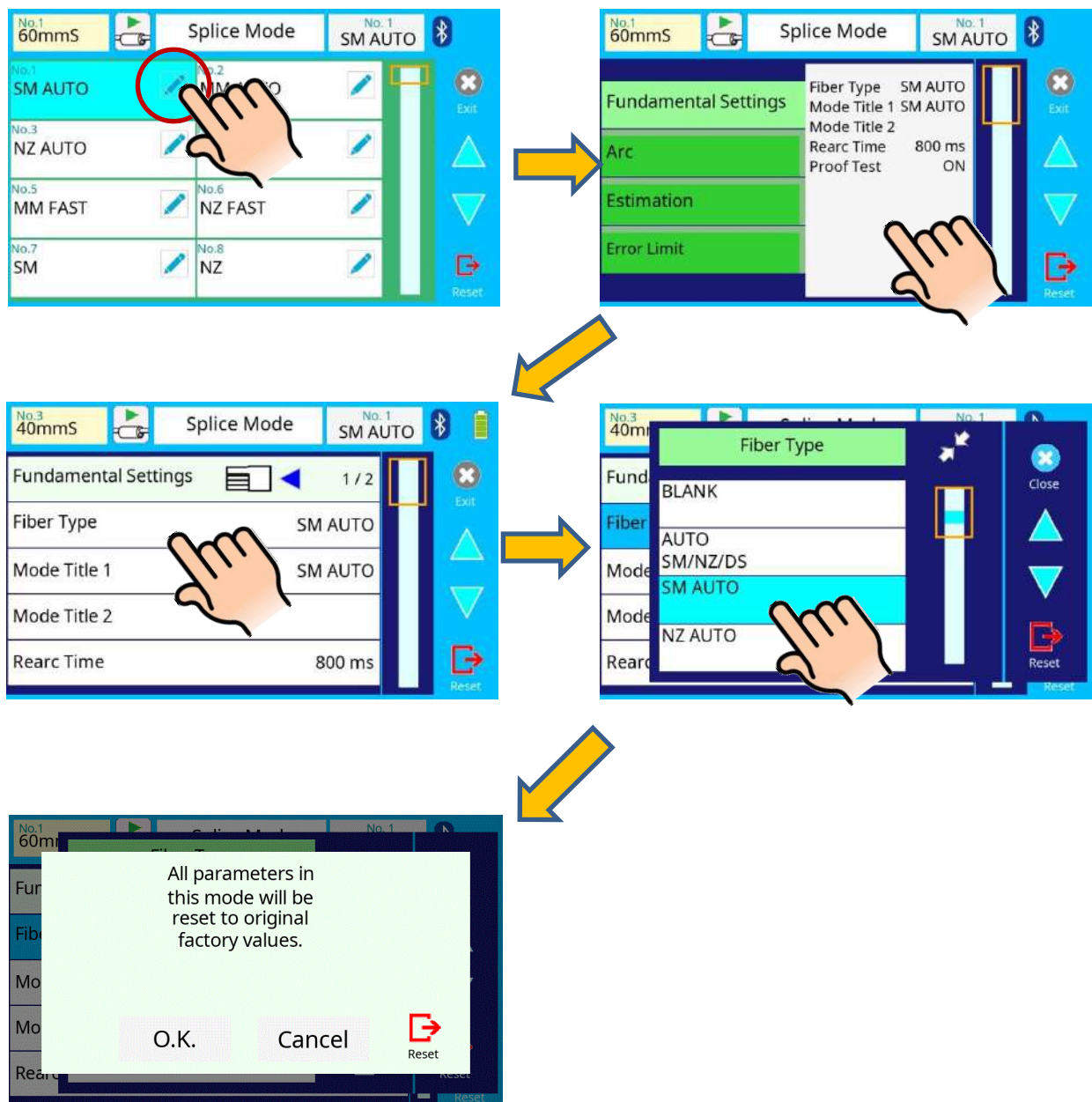
1. Select the  icon in the [Splice Mode] screen, to show the splice mode.
2. The category is displayed in left side. The parameters included in the category are displayed in the right side.
3. Select and change the category icon and find the target parameter.
4. Select the parameter displayed in right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



Initializing edited parameters

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

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

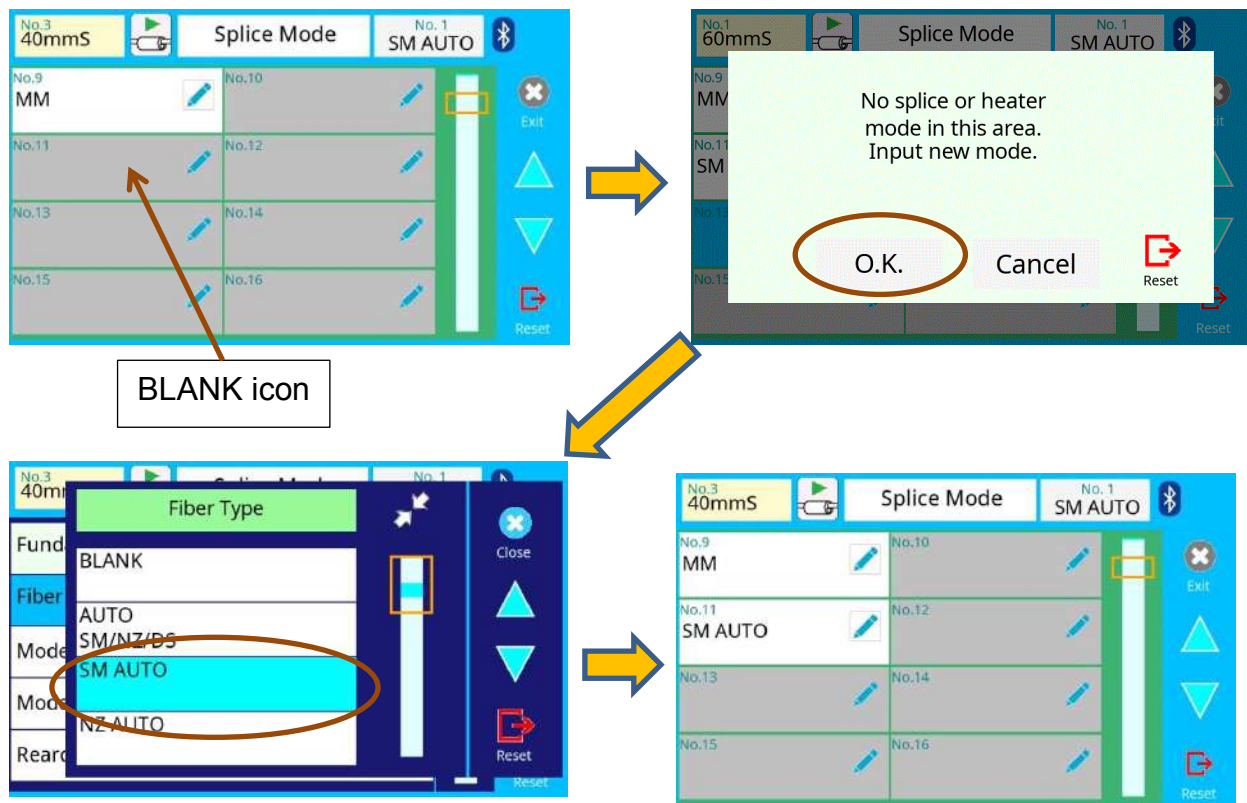


Creating or deleting splice modes

How to create a splice mode

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

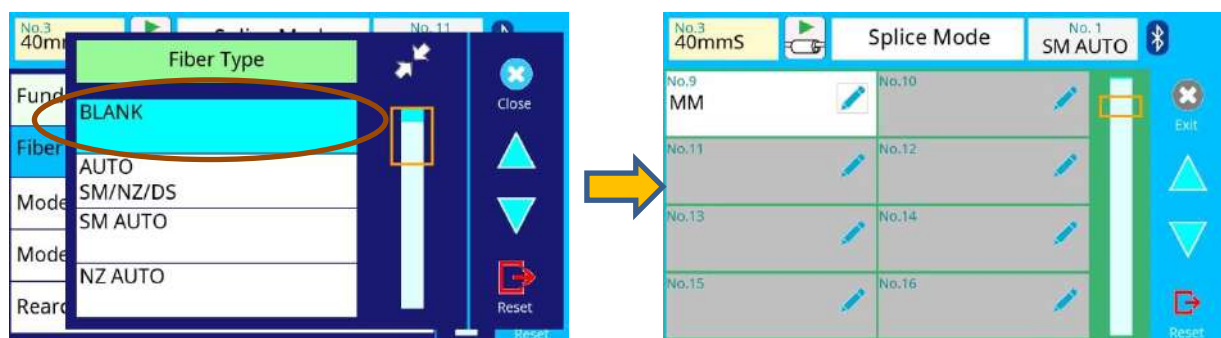
1. Select "BLANK" icon which color is a gray in [Splice Mode] screen.
2. Change "Fiber Type" to the splice mode in the data base.
3. These parameters selected "Fiber Type" are installed to the splice mode.



How to erase splice mode

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

1. Change "Fiber Type" to "BLANK".
2. All parameters are erased.



Detail of the parameters in splice mode

AUTO mode: [SM AUTO]], [MM AUTO]], [NZ AUTO]], [DS AUTO] [AUTO SM/NZ/DS]

Below is a list of Splicing parameters for AUTO modes

Only a limited number of parameters listed below are displayed for AUTO modes to simplify the operation. Additional hidden parameters are all fixed values set at the factory.

Parameter	Description
Fundamental Settings	
Fiber Type	List of splice modes stored in database is displayed. A selected splice mode stored in the database area is copied to a selected splice mode in the user-programmable area.
Mode Title1	Title for a splice mode expressed in up to 11 characters.
Mode Title2	Detailed explanation for a splice mode expressed in up to 15 characters. Title2 is displayed at the [Splice Mode Select] menu.
Rearc Time	Splice loss may be improved by an additional "rear" discharge in some cases. The duration of this additional arc can be changed by this parameter.
Proof Test	If [Proof Test] is set to "ON", a proof-test is performed upon opening the wind protector after splicing or by pressing the RESET key.
Arc	
Cleaning Arc	A cleaning arc burns off microscopic dust particles on the surface of the fiber with an arc discharge for a short period of time. The duration of the cleaning arc can be changed by this parameter.
Arc Power	Arc Power is fixed at STANDARD for AUTO modes. Arc Power is changed automatically.
Arc Time	Arc Time is fixed at 6000ms. This is automatically set depending on the cladding illumination during Arc Discharge.
Estimation	
Estimating Mode	Selects splice loss estimation to "OFF", "Clad", "WSI" or "Clad+WSI". OFF: Does not display the estimation loss after splicing Clad: Displays the loss calculated from the cladding image. WSI: Displays the loss calculated from the fiber image during the arc discharge. *Warm Splice Image Clad+WSI: Displays the loss of Clad and WSI. Note: Generally, the estimation loss from WSI is higher than the estimation loss from Clad.
MFD	Sets MFD of the fibers. This MFD value is taken into account when estimating splice loss.
Minimum Loss	This amount is added to the estimated splice loss originally calculated. When splicing specialty or dissimilar fibers, a high actual splice loss may occur even with optimized arc conditions. To make the actual splice loss concur with the estimated splice loss, set the minimum value of estimate to the minimum optimized actual splice loss.
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).
Fiber Angle Limit	Error message is displayed if the fiber offset exceeds the selected threshold (fiber angle).
Loss Limit	Error message is displayed if the estimated splice loss exceeds selected threshold (loss limit).

Standard modes: [SM], [NZ], [DS], [MM]

Splicing parameters: standard modes

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

Parameter	Description
Fundamental Settings	
Fiber Type	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	Detail explanation for a splice mode expressed in up to 15 characters. Title2 is displayed in the [Splice Mode Select] menu.
Rearc Time	Splice loss may be improved by an additional "rear" discharge in some cases. The duration of this additional arc can be changed by this parameter.
Proof Test	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.
Gap setting	
Cleaning Arc	A cleaning arc burns off microscopic dust particles on the surface of the fiber with an arc discharge for a short period of time. The duration of the cleaning arc can be changed by this parameter.
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.
Prefuse And Stuff	
Prefuse Power	Sets the power of the prefuse arc, which is an arc discharge that occurs until the fibers begin stuffing. If [Prefuse Power] is set too low, axial offset may occur if cleaved angles are relatively poor. If [Prefuse Power] is set too high, fiber end faces are fused excessively and splice loss gets worse.
Prefuse Time	Sets the duration of the prefuse arc, which is arc discharge that occurs until the fibers begin stuffing. Longer [Prefuse Time] produces a similar effect to higher [Prefuse Power].
Overlap	Sets the overlap amount of fibers at the fiber stuffing stage. Relatively small [Overlap] is recommended if the [Prefuse Power] is low, while relatively large [Overlap] is recommended if the [Prefuse Power] is high.
Arc	
Arc Power	Sets Arc Power. The arc intensity expressed in units of "bits".
Arc Time	Sets Arc time. The total arc discharge time including the pre-fuse time.

A continuation of edit parameter list

Parameter	Description
Tapering	
Taper Splice	Splice loss is sometimes improved when the fiber is tapered (pulled) during arc discharge to make the splice thinner. This sets taper function "ON". The following three parameters determine the taper shape.
Taper Wait	Sets the taper wait time from the end of fiber stuffing until the start of tapering.
Taper Speed	Sets the fiber pulling speed during taper.
Taper Length	Sets the fiber pulling length during taper.
Estimation	
Estimating Mode	<p>Selects splice loss estimation to "OFF", "Clad", "WSI" or "Clad+WSI".</p> <p>OFF: Does not display the estimation loss after splicing</p> <p>Clad: Displays the loss calculated from the cladding image.</p> <p>WSI: Displays the loss calculated from the fiber image during the arc discharging. *Warm Splice Image</p> <p>Clad+WSI: Displays the loss of Clad and WSI.</p> <p>Note: Generally, the estimation loss of WSI is higher than the estimation loss of Clad.</p>
MFD	Sets MFD of the fibers. This MFD value is taken into account when estimating splice loss.
Minimum Loss	This amount is added to the estimated splice loss originally calculated. When splicing specialty or dissimilar fibers, a high actual splice loss may occur even with optimized arc conditions. To make the actual splice loss concur with the estimated splice loss, set the minimum value of estimate to the minimum optimized actual splice loss.
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).
Fiber Angle Limit	Error message is displayed if the fiber offset exceeds the selected threshold (Fiber Angle).
Loss Limit	Error message is displayed if the estimated splice loss exceeds selected threshold (loss limit).

Composition of the Heater Menu

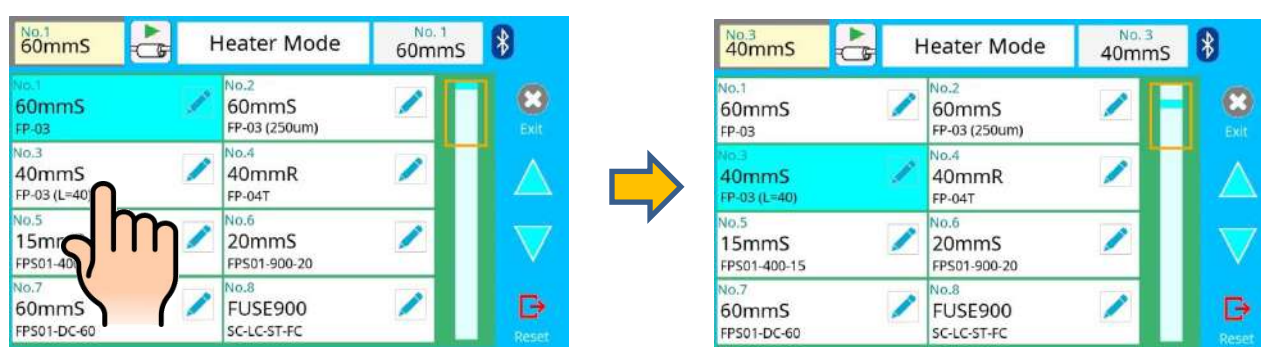
Common parameters for all heating modes can be set in this menu

[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.

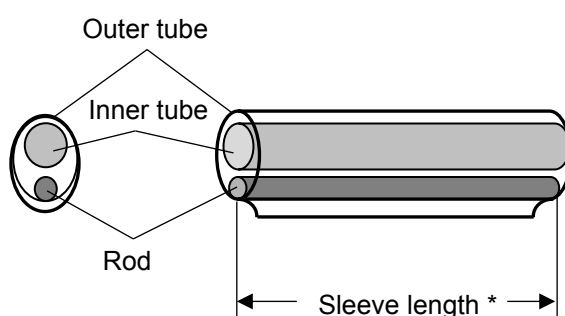
Data Base

Parameter	Description
60mmS FP-03	For standard 60mm protection sleeve, such as Fujikura FP-03 or FP-03M protection sleeves.
60mmS FP-03(250um)	For standard 60mm protection sleeve and 250um diameter coating, 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(40mm) or FP-03M protection sleeves. Note : Cleave length 8mm.
60mmSS SLIM 60	For slim type 60mm protection sleeve.
40mmSS SLIM 40	For slim type 40mm protection sleeve.
15mmS FPS01-400-15	For 400 or less um diameter coating and splice length of 5 mm or less
20mmS FPS01-900-20	For 900 or less um diameter coating and splice length of 6 mm or less
60mmS FPS01-DC-60	For drop cable splice.
FUSE900 SC-LC-ST-FC	For Fuse connect splice.
FUSE2/3 SC-LC	

The dimensions of the Protection Sleeve after shrink


Form	Rod Material	Sleeve length	Prepared fiber length	Diameter of optical fiber	Diameter 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 depends on the diameter of the fiber.



Referring to or Editing Heater Mode


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

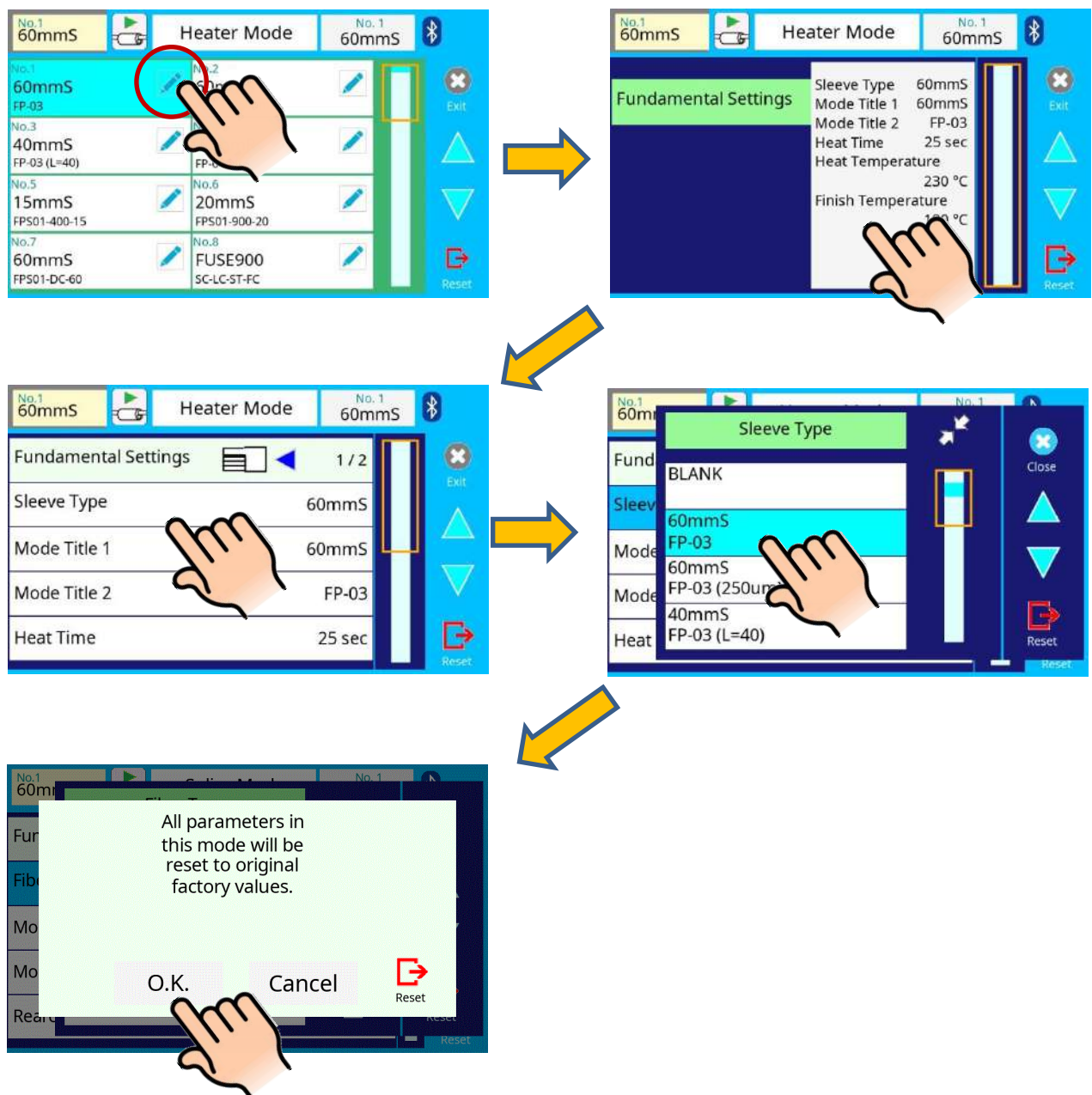
1. Select the  icon in the [Heater Mode] menu, to show the heater mode.
2. The category is displayed in left side. The parameters included in the category are displayed in the right side.
3. Select and change the category icon and find the target parameter.
4. Select the parameter displayed in right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



Initialization 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. Press Sleeve Type icon and select the same Sleeve Type.
4. All parameters are overwritten by the factory value in the data base.

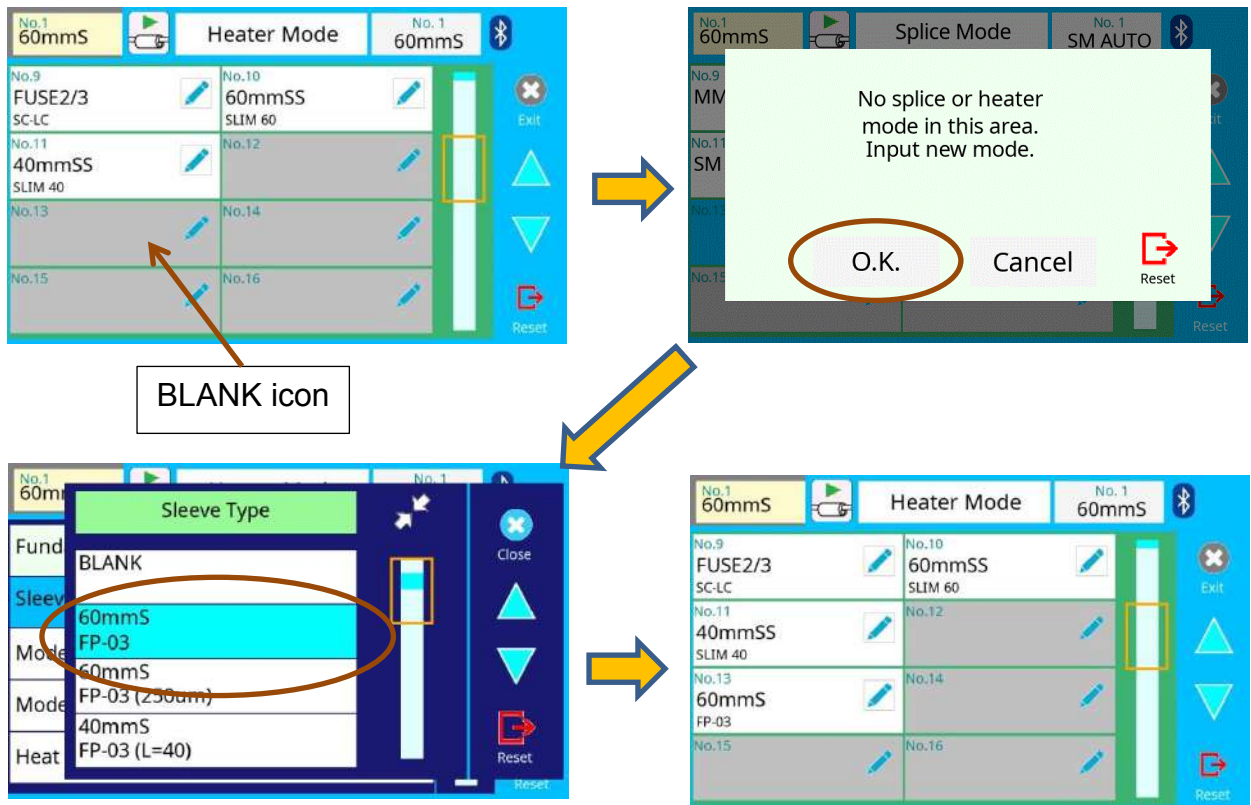


Creating or deleting heater modes

How to create heater mode

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

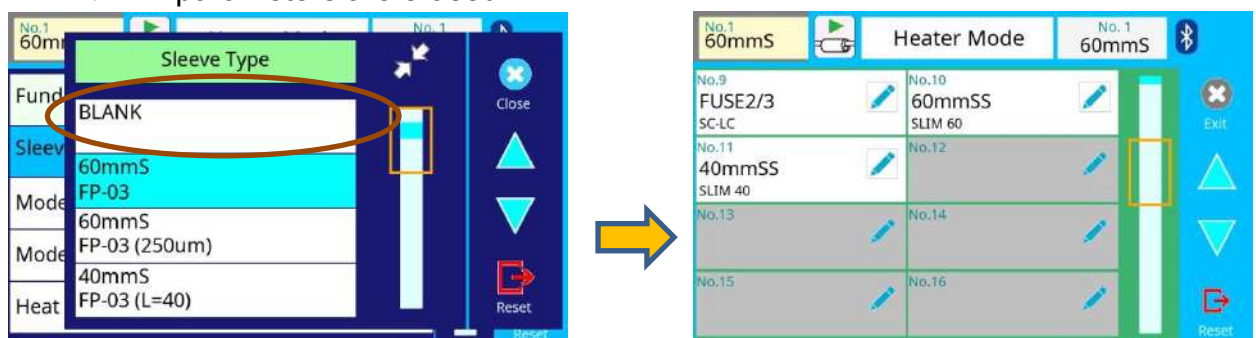
1. Select “BLANK” icon which color is a gray in [Heater Mode] screen.
2. Change “Sleeve Type” to the heater mode in the data base.
3. The parameters selected “Sleeve Type” are installed to the heater mode.



How to erase heater mode

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

1. Change “Sleeve Type” to “BLANK”.
2. All parameters are erased.



Detail of the parameters in heater mode

Below is a list of Heating parameters.

Heater mode parameters

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.

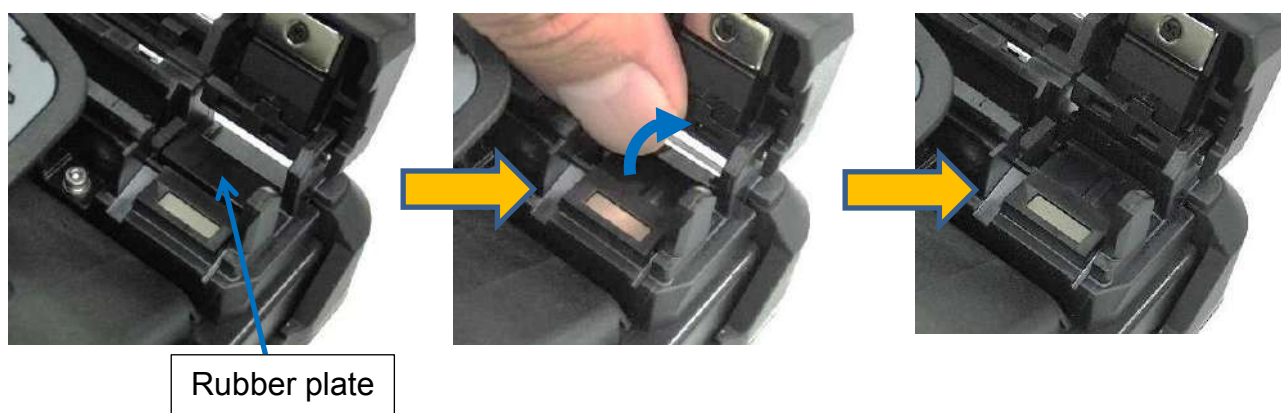
Connector installation

The heater of this splicer can be used to process spliced connectors.

It can be used for connectors from other companies by lifting the rubber plate up as shown below figure which facilitates performance of the heating operation.

When using Fujikura Fuse Connect, removal of the clamp is unnecessary.

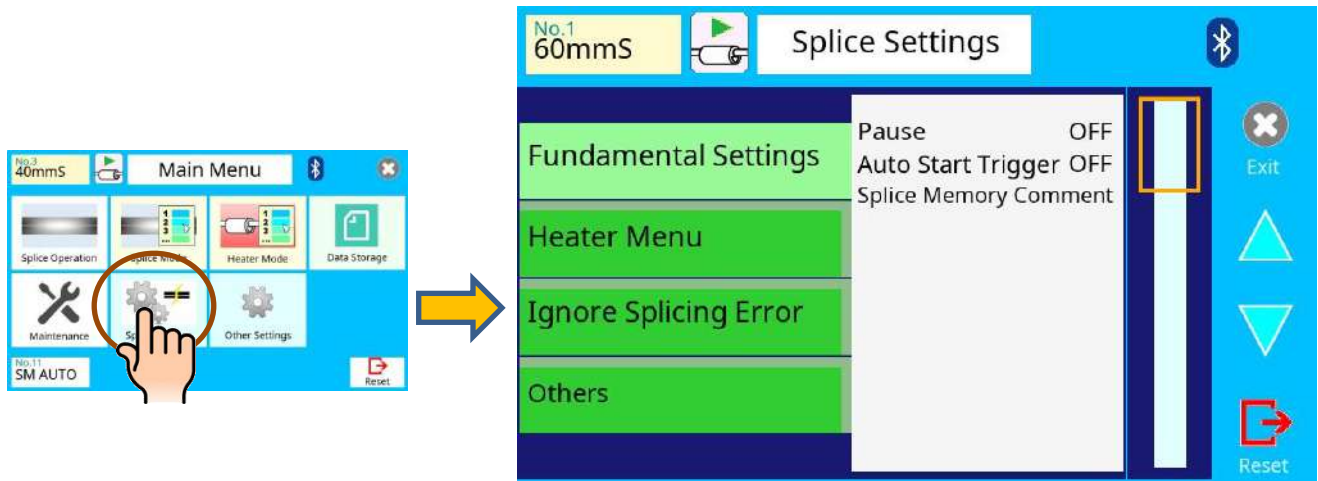
Heating heat-shrink tubing can be done in the usual manner although the sleeve position may need to be shifted prior to heating.



Composition of the Splice Settings Menu

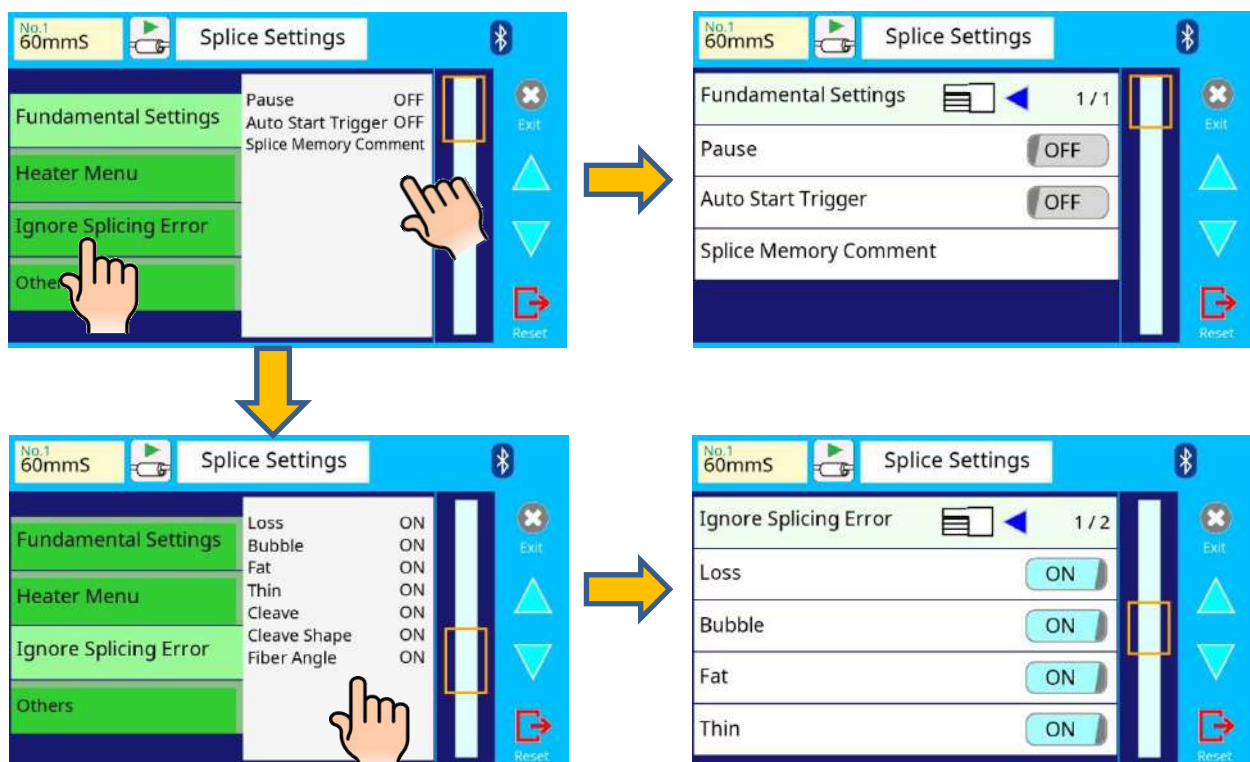
Common parameters for all splice modes can be set.

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



How to change the settings

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



Splice Settings parameter detail

The Splice Settings parameters are described below:

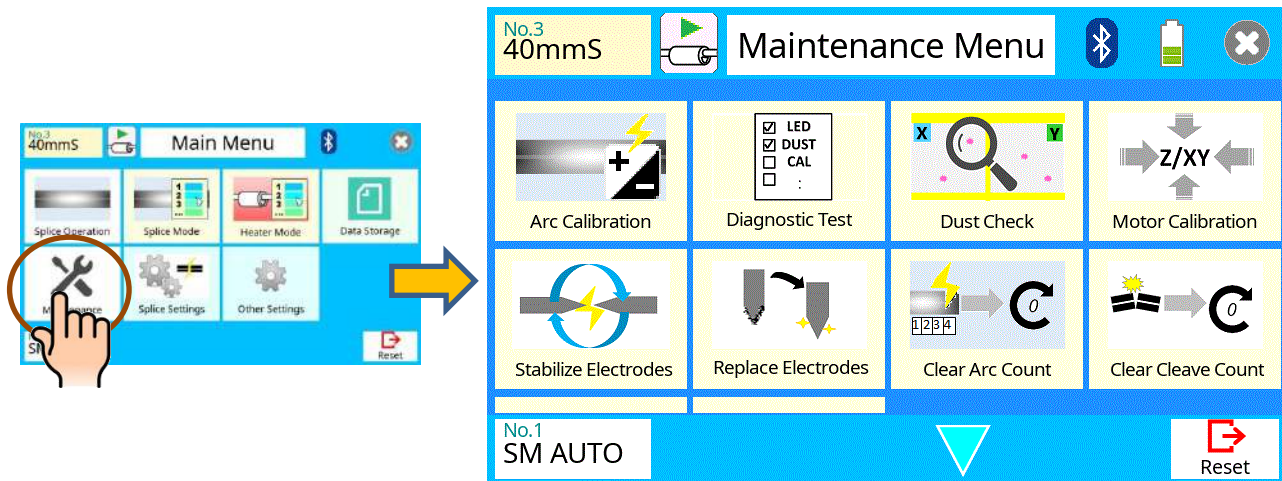
Splice Settings parameter list

Parameter	Description
Fundamental Settings	
Pause	If “Pause” is set to "ON", the splicing operation pauses after fiber alignment is completed.
Auto Start Trigger	Select of "ON", and "OFF" can be performed for splicing operation.
Splice Memory Comment	A comment can be added to the memory saved at the time of the end of connection.
Heater Menu	
Auto Start Trigger	Select of "ON", and "OFF", can be performed for the heating operation.
Ignore Splicing Error	
Loss	Set to “ON” or “OFF”. Enable : An operator can skip an error shown on the left by pressing the SET key. Disable : An operator can’t skip an error shown on the left.
Bubble	
Fat	
Thin	
Cleave	Set to “Enable” or “Disable”. Enable : An operator can skip an error as shown on the left by pressing the SET key. Disable : An operator can’t skip an error as shown on the left. The unit repeats the alignment when the operator presses the SET key.
Cleave Shape	
Fiber Angle	
Others	
Auto Fiber Forward	If “Auto Fiber Forward” is set to “ON”, fibers are automatically moved close to gap set as soon as wind protector is closed.
Max Num. of Rearcs	The re-arcng process may improve splice loss, but sometimes worsens it. Re-arcng also decreases the splice strength. With this function, it is possible to limit the number of or disable the ability to re-arc.
Cleave Counter Mode	Performing a splice increments the “Cleave Count”.

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 [READY] screen.



Detail of the Maintenance Menu

The parameters in the Maintenance Menu are listed below:

Maintenance parameter list

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

Arc Calibration

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



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

Operation procedure

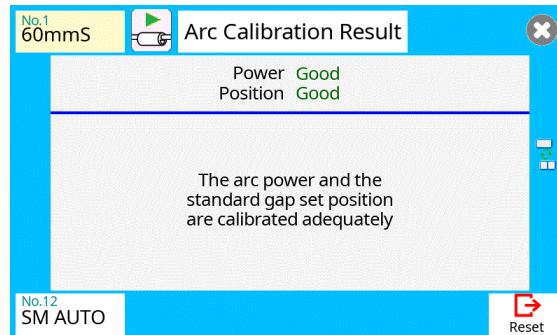
1. Select **Arc Calibration** icon in [Maintenance Menu] to display.
2. Load prepared fibers in the splicer
3. Close the wind protector and press **SET** key to initiate the ARC Calibration.
4. A message appears after Arc Calibration. Please check it and take the appropriate action displayed with the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



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

“Good” message

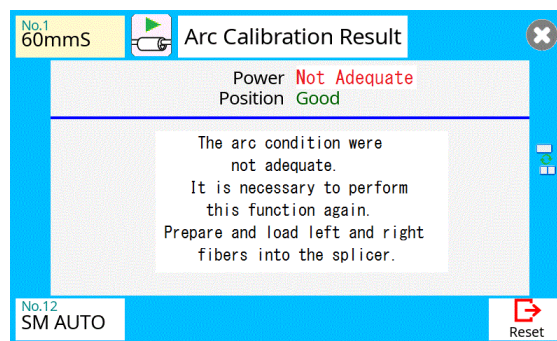
Arc power and splicing position calibration have successfully completed. Press **RESET** key to exit.



Result: Good

“Not Adequate” message

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



Result: Not Adequate



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

Diagnostic Test

The 36S/37S/38S/41S has a built in diagnostic test feature that allows the operator to perform a simple one step evaluation of splicer performance covering several different critical variables. Perform this function in the event of splicer operation trouble.

Operation Procedure

1. Select the **Diagnostic Test** icon in the [Maintenance Menu] and execute [Diagnostic Test]. The following checks will be made.

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



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

2. Upon completion of all checks and adjustments, a list of results is displayed. If the dust check result fails, clean the objective lenses. In the case that cleaning doesn't eliminate contamination, there is a possibility that the contamination may have entered the inside of the optical path. Please contact the authorized distributor for additional instructions.

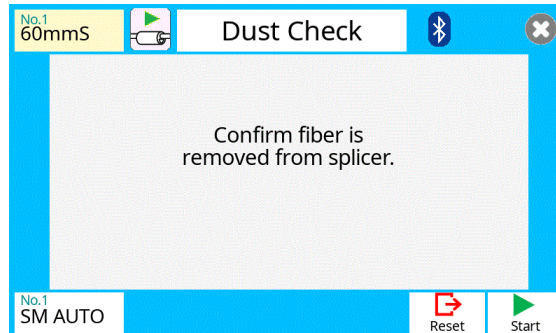
The dust check and motor calibration functions exist as independent instructions in [Maintenance Menu]. It is possible to execute them independently.

Dust Check

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

Operation Procedure

1. Select the **Dust Check** icon in the [Maintenance Menu].



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



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

Motor Calibration

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

Operation Procedure

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



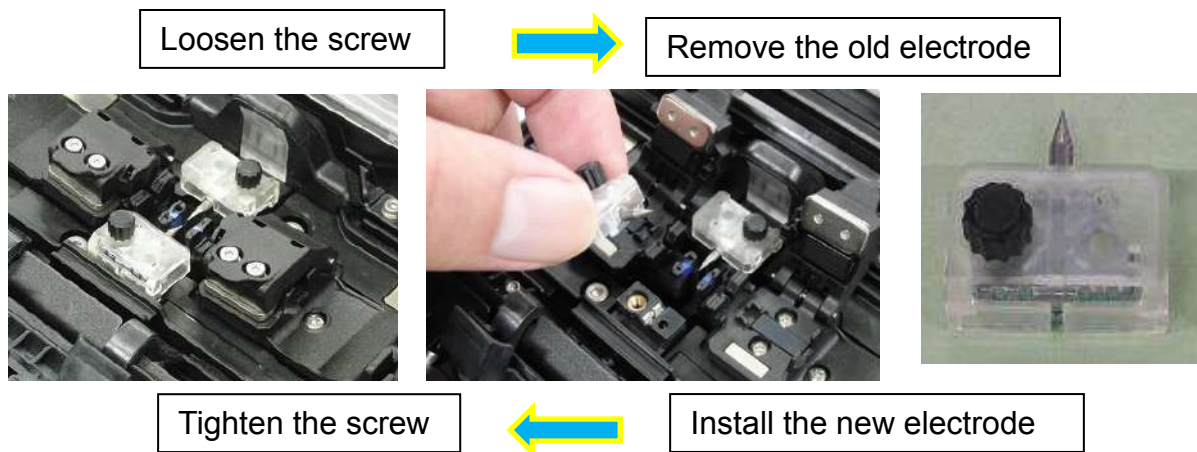
- Perform this function when a "Fat" or "Thin" error has occurred.

Replace Electrodes

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

Replacement Procedure

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



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

7. Turn on the power, prepare and load the prepared fibers into the splicer and press **SET** key. After executing the arc calibration, the splicer will repeat arc discharge 30 times in succession to stabilize the electrodes.
8. Upon completion of repeated arc discharge, the splicer executes an arc calibration again. The operator should repeat arc calibration until the "Test Finish" message appears. For details of the arc calibration process, see section [Arc Calibration].

Stabilize Electrodes

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

Operation Procedure

1. Select the **Stabilize Electrodes** icon .



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

Clear Arc Count

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

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



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

Clear Cleaver Counter

This function resets the number of cleaves stored in [Cleaver Counter].

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

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

This function must be performed after the cleaver is adjusted.

Motor Drive

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

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

Motor	Up Arrow key	Down Arrow key
ZL/ZR	Forward	Backward
X/Y	UP	DOWN



- When the motor reaches the limit of the operating range, the buzzer sounds and the motor stops. Press the opposite arrow key to reverse and move the motor again.
- If the motor is moved too much after splicing, the fiber may break.

Maintenance Info

The maintenance information is displayed in the Maintenance Info screen.



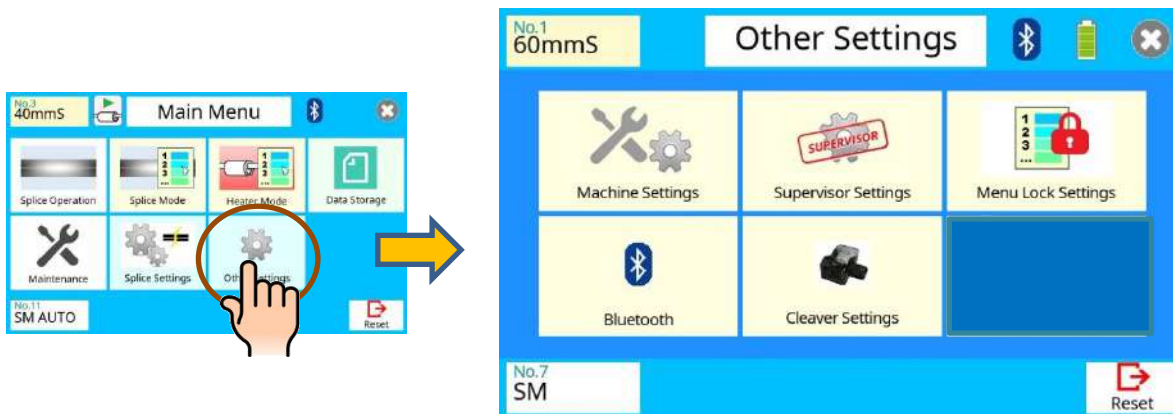
When selecting [Maintenance Info], the following information is displayed:

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

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 [READY] screen to enter this menu.



Detail of the Other Settings Menu

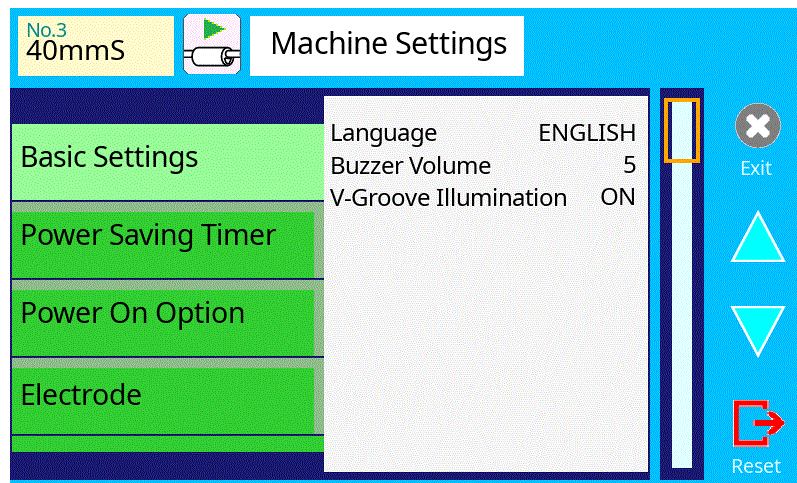
The parameters in the Other Settings Menu are listed below:

List of the Other settings

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.

Machine Settings

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



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

Parameter	Description
Basic Settings	
Language	Select the language displayed on the screen. The language that can be displayed is controlled by the software version and region code.
Buzzer Volume	Sets the Buzzer Volume level.
V-Groove Illumination	Sets the lighting condition in the splicer. If "V-Groove Illumination" is set to "ON", the V-Groove will be illuminated when the Wind Protector is open.
Power Saving Timer (with Battery) (with AC Adaptor)	
Dimming	Setting this function dims the brightness of the LCD monitor if the splicer is idle a certain period of time.
Sleep	Setting this function turns off the power supply to the LCD monitor if the splicer is idle a certain period of time. Always set this function to a specific shutdown time when using the battery pack. When the power supply to the LCD monitor turns off, the LED near the ON/OFF key blinks. Pressing any key turns on the LCD monitor.
Shut Down	Automatically turns off the power supply to the splicer if it is idle a certain period of time. The function serves to prevent the battery running low if the splicer is left on for an extended period of time.

Next Page



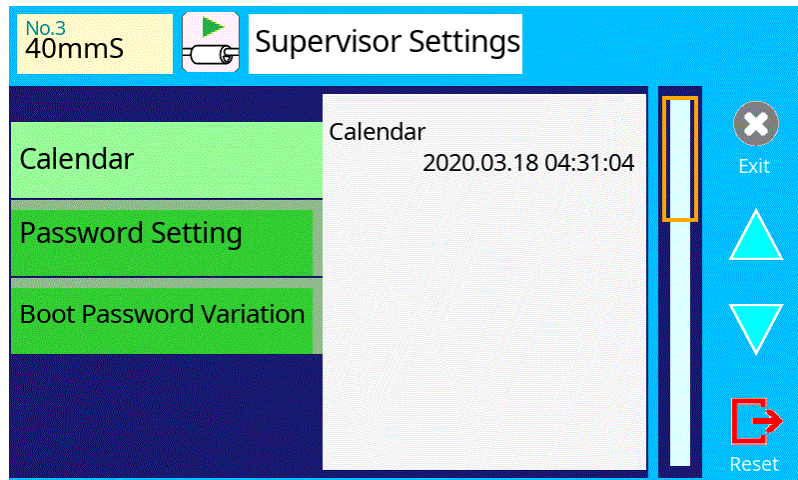
- **“Power Saving Timer” function is important for energy conservation.** If the power saving function is not set during battery use, the number of splice cycles will be decreased. The splicer automatically identifies if it is running on battery or power supply power. Additionally, an independent power saving setting can be programmed, enabling automatic utilization of the power saving after detecting a battery power source.

A continuation of other settings parameter list

Parameter	Description
Power On Option	
Opening Title1	Sets the message to be displayed when the power is turned on. Max. number of characters : 15 (Opening Title1) 15 (Opening Title2)
Opening Title2	
Quick Boot	If set to "ON", the splicer boots up quickly.
Authorized Service Reminder	If set to "ON", the splicer appears the message in the LCD monitor after the date of "Next Authorized Service".
Electrode	
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.
Cleaver Blade Alarm	
Blade position Change	Determines if an alarm is set. In OFF, alarm is not displayed.
Blade Height Change	Determines if an alarm is set. In OFF, alarm is not displayed.
Blade Replacement	Determines if an alarm is set. In OFF, alarm is not displayed.
Arc Calibration	
Cleave Limit	The threshold of cleave angle error in the [Arc Calibration].
Max Number of Tests	The maximum number of tests to finish the [Arc Calibration] with "Test Finished" message.

Supervisor Settings

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



The list of Supervisor Settings parameters in this menu follow:

Parameter	Description
Calendar	
Calendar	Sets the date and time in the calendar.
Password Setting	
Supervisor Password	Sets a password to access the [Supervisor Settings] menus. Maximum Characters: 9 At the time of shipment from factory, the password is set to "0". In the event you have forgotten your password, contact the authorized distributor.
Boot Password	Changes the password to access the [Boot password]. The default password is set to "0" when the splicer is delivered.
Password Boot Lock From	Sets a date after which a password is required at splicer boot up to continue operation.
Boot 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.



- Before editing the Machine Settings, the following windows may be displayed. In these windows, enter the "Boot Password" or "Boot Password 1~12".

About "Boot Password Variation"

"Boot Password Variation"

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

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

Initial default password settings are all "0".

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

May be selected as "OFF", or dates may be entered to activate the password lock functions;

Initial default date settings for all Boot Passwords are "OFF".

Example

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



NOTE1

NOTE2

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

NOTE 1

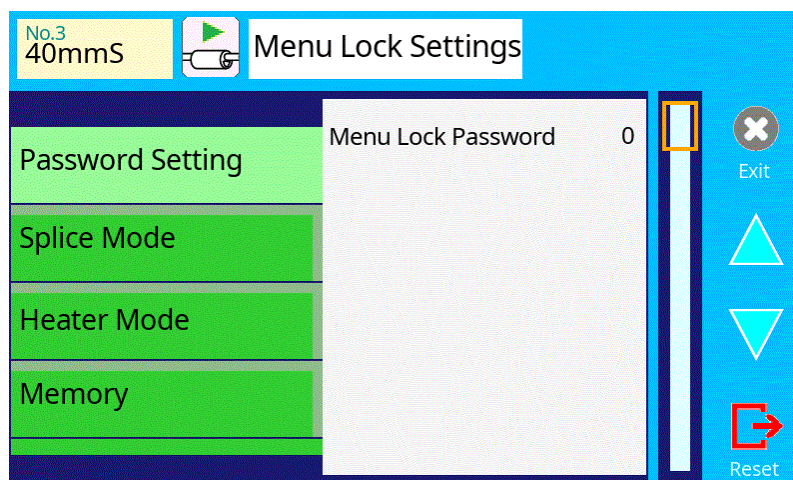
It is not necessary to input dates in order. The splicer sorts the passwords by date. In this example, the splicer uses "Boot Password 8" before "Boot Password 7".

NOTE 2

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

Menu Lock Settings

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



The list of Menu Lock Settings parameters in this menu follow:

Parameter	Descriptions
Password Setting	
Menu Lock Password	Sets a password to access the [Menu Lock Password] menus. Maximum Characters: 9 At the time of shipment from factory, the password is set to “0”. In the event you have forgotten your password, contact the authorized distributor.
Splice Mode	
Edit	Setting to “Disable” prevents unauthorized editing and selecting of splice modes.
Select	
Heater Mode	
Edit	Setting to “Disable” prevents unauthorized editing and selecting of heater modes.
Select	
Memory	
Clear All Splice Result	Setting to “Disable” prevents unauthorized erasing of splice result data from memory.
Splice Settings	
Splice Operation	Setting to “Disable” prevents unauthorized editing of the [Splice Settings] menu.
Ignore Splicing Error	
Others	
Machine Settings	
Basic Settings	Setting to “Disable” prevents unauthorized editing of the [Machine Settings] menu.
Power Saving Timer	
Power On Option	
Electrode	
Cleaver Blade Alarm	
Arc Calibration	

A continuation of edit parameter list

Parameter	Descriptions
Cleaver	
Cleaver Settings	Setting to “Disable” prevents unauthorized changing of the [Cleaver Settings] menu.
Maintenance Menu	
Replace Electrodes	Setting to “Disable” prevents unauthorized changing of various maintenance parameters.
Stabilize Electrodes	
Clear Arc Count	
Clear Cleaver Counter	
Motor Drive	
Diagnostic Test	
Dust Check	

Bluetooth Menu

This function configures wireless communications with the CT50 cleaver.



<i>Parameter</i>	<i>Description</i>
Splicer	Turns splicer wireless communications ON/OFF.
Cleaver	Turns the wireless connection with the Cleaver CT50 ON/OFF. When ON, the “Cleaver” window appears in Ready screen.
Paring With Cleaver	Indicates the status of the wireless connection. Use this function to select the specific wireless Cleaver, as the splicer can only pair with a single cleaver at a time.

Checking the wireless connection status

Splicer

Wireless communication function

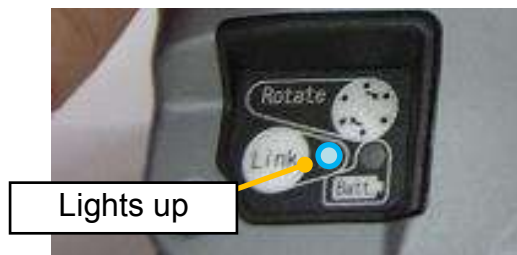
When the [Splicer] in Bluetooth menu is set “ON”, the wireless communication sign appears at the upper right corner.

Wireless window and information

1. Turn [Cleaver] in the “Bluetooth menu” ON, the wireless setting window appears in READY screen.
2. When the wireless connection is made between the splicer and the tool, the color of the special window is white.
3. If the color of the wireless setting window is gray, the wireless connection is not yet established. To connect wireless, select the [Paring With Cleaver] in Bluetooth menu. Refer to the next page.

Cleaver

During the connection process, the Link LED on the CT50 body lights up.



Connecting to the cleaver

Re-connection

Once the wireless connection is made between the splicer and the cleaver, the splicer will automatically connect with the cleaver in the future.

1. Turn the splicer "ON".
2. Turn [Splicer] and [Cleaver] in Bluetooth menu "ON". The splicer automatically attempts to connect wirelessly with the stripper it connected to most recently.

Initial connection

1. Turn [Splicer] and [Cleaver] in Bluetooth menu "ON".
2. Select [Pairing With Cleaver] in Bluetooth menu. Press **SET** key. This will cause the [Device List] screen to appear.
3. If "No Devices" message appears, press and hold the **Link** button on CT50.
4. When the serial number of the CT50 appears in [Device List], press **SET** key.
5. This initiates the wireless connection with the stripper.



Link button

CT50 cleaver

Changing the accessory

1. Turn [Splicer] and [Cleaver] in Bluetooth menu "ON".
2. Select [Pairing With Cleaver] in Bluetooth menu. Press **SET** key. This will cause the [Device List] screen to appear.
3. Select the stripper which you want to connect with. Then press **SET** key.
4. This initiates the wireless connection with the new cleaver.

Cleaver Setting

This selects the CT50 unit for parameter changes.

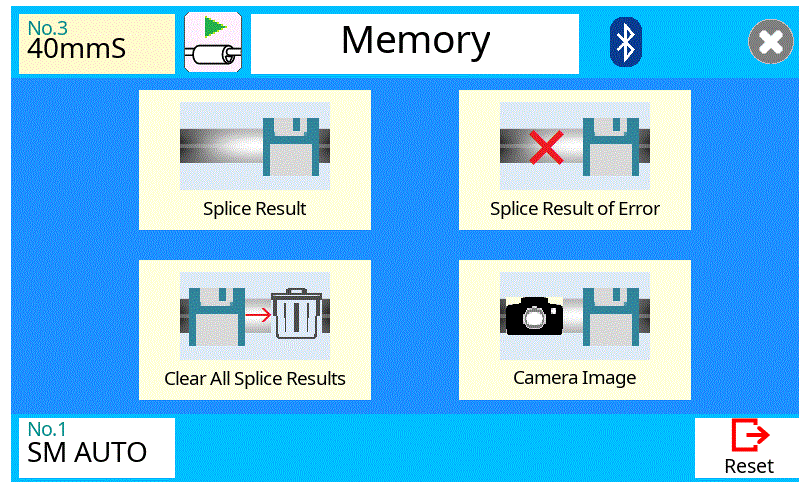


List of the Cleaver Settings

Parameter	Description
Blade Setting	
Blade Position	Show cleaving counts at all blade positions of the cleaver. (48 positions) Select the position want to change. Then the cleaver blade rotates automatically.
Blade Rotation Link to Alarm	Sets the splicer's action when the splicer detected the cleaver blade worn. <u>"Auto Without Confirmation"</u> : Rotate the cleaver blade automatically without any confirmation. <u>"Manual With Confirmation"</u> : Show the message "Do you change the blade position?" When the operator select [Yes], the splicer will rotate the cleaver blade. When the operator select [No], the splicer will not rotate the cleaver blade. <u>"OFF"</u> : Do not rotate.
Alarm Settings	
Blade Position Change	ON/OFF setup of the warning of the cleaver blade worn can be performed. In OFF, warning is not indicated on a READY screen.
Blade Height Change	
Blade Replacement	
Blade Alarm Detection	Sets how to detect the cleaver blade is worn. <u>"Image Analysis"</u> : Detects by the number of cleaving errors during specified number of splices. <u>"Cleaving Count"</u> : Detects by the number of cleaving counts.
Cleaving Count	
Incorrect Blade Position	ON/OFF setup of the warning of the cleaver blade height is wrong. In OFF, warning is not indicated.
Low Battery	Sets value for battery capacity before recharging. The cleaver informs the user of the need for replacing.
Others	
Error Indicator on Cleaver	ON/OFF setup of the warning on the cleaver's error. In OFF, warning is not indicated on the cleaver.
Device Name	Sets the name of the CT50 cleaver.

Composition of the Memory Menu

This splicer stores up to 10,000 splice results. Contents of data stored are different depending on the splice mode.



Review, editing, and deletion of splice results

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

Display and edit of splice result data

1. Select the **Memory** icon in [READY] screen.
Select the **Splice Results** icon to display [Splice Results] Menu. This will display the splice memory.
2. Select memory number by moving cursor to a specific memory number and selecting the target result. This displays the selected splice result.
3. To add or edit comments, select the target result icon to display [Input Comment] screen.

Display of splice result of errors

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

1. Select the splice result where an error occurred.
2. The error message is displayed

Deletion of all splice results

All splicing results can be deleted at once.

1. Select the [Clear All Splice Result] icon in Memory Menu.
2. Splice results are deleted

Camera Image

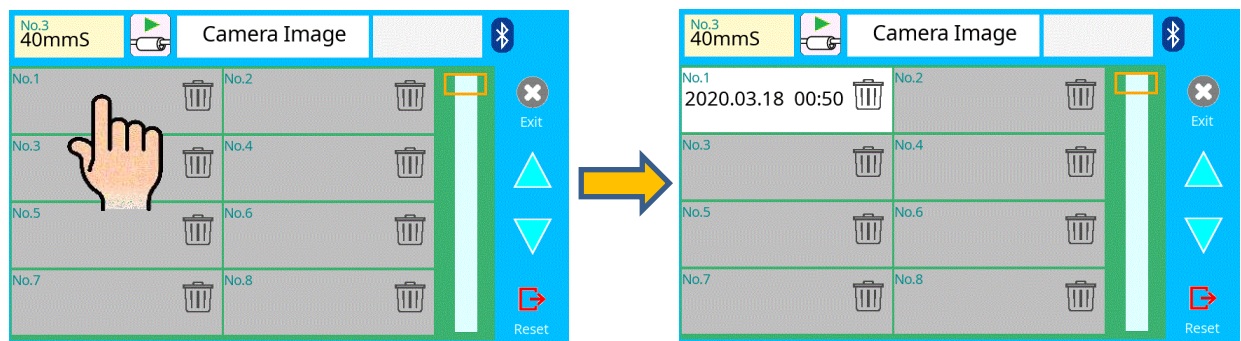
This function is used to store the fiber image after splice or error occurred. A total of 100 images can be stored.

How to store the Camera Image Data

Select [No Image] part to a specific memory number. The fiber image data is stored.

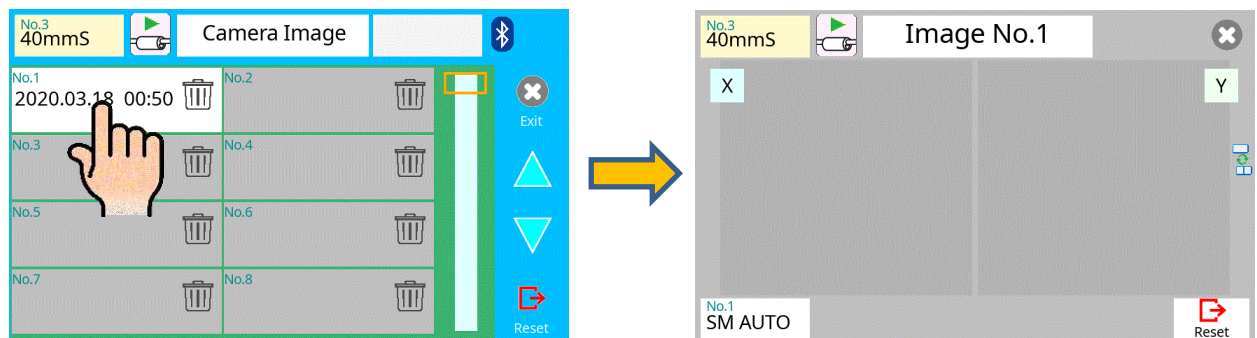


- Max number of image storage is 100, and the image cannot be over-written, so delete some images to store new images.



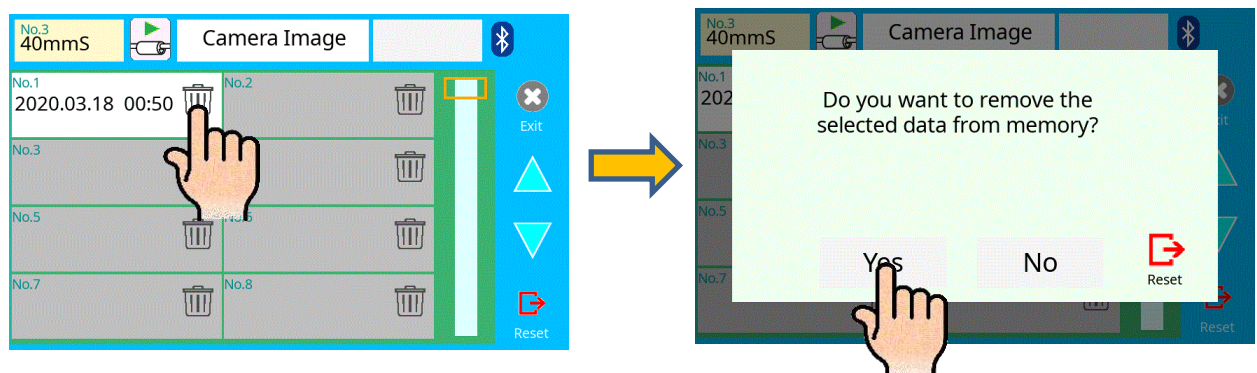
How to display Camera Image Data

Select memory number to a specific memory number. The fiber image data is displayed.



How to delete Camera Image Data

Press the trash icon in the list. The confirmation screens are displayed, and then select the "OK" icon. The camera image data is deleted.



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

When one of the errors listed below occurs, the splicer will repeat the alignment process 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
- L/R-Bad Fiber Position

When one of the errors listed below occurs, the splicer will change the preset values of "Ignore Splicing Error", when the operator presses the **SET** key:

See Section [Splice Settings].

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

Try implementing the solution shown in the table below for the specific issue you are encountering. If it is not possible to eliminate the problem, the splicer may require service by a qualified service center. Consult the authorized distributor with the following information:

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

Error Message List

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

Error Message List

Error Message	Reason	Solution
ZL Motor Overrun (Forward)	<ul style="list-style-type: none"> • The fiber is not set correctly at the bottom of the V-groove. The fiber is not located in the Camera's field of view. • The cleave length (bare fiber part) is too short. 	<ul style="list-style-type: none"> • Press RESET key, and set the fiber again to seat it correctly at the bottom of the V-groove. • Confirm the setting position of the stripped fiber end on the fiber cleaver. Check the cleave length.
ZR Motor Overrun (Forward)		
ZL Motor Overrun (Backward)	<ul style="list-style-type: none"> • The taper speed or taper time is set too high. 	<ul style="list-style-type: none"> • Adjust the taper parameters in the splice mode.
ZR Motor Overrun (Backward)	<ul style="list-style-type: none"> • Only occurs in manual motor operation. 	
X motor Overrun	<ul style="list-style-type: none"> • The fiber is not set correctly at the bottom of the V-groove. The fiber is offset too far and it exceeds the X or Y motor range. 	<ul style="list-style-type: none"> • Press RESET key and re-position the fiber again to seat it correctly at the bottom of the V-groove.
Y Motor Overrun		
Close Cover	<ul style="list-style-type: none"> • Unable to start splicing when the wind protector opens. 	<ul style="list-style-type: none"> • The splicer automatically starts splicing after closing the wind protector.
Cover Open	<ul style="list-style-type: none"> • The wind protector is opened during splicing operation. 	<ul style="list-style-type: none"> • Press RESET key after closing the wind protector.
ZL /ZR Motor Trouble	<ul style="list-style-type: none"> • Motor might be damaged. 	<ul style="list-style-type: none"> • Consult the authorized distributor.
Strong Arc Power	<ul style="list-style-type: none"> • Unable to calibrate due to strong arc. 	<ul style="list-style-type: none"> • Replace the electrodes by using the [Replace Electrodes] function in. If this does not eliminate the problem, consult the authorized distributor.
Weak Arc Power	<ul style="list-style-type: none"> • Unable to calibrate due to weak arc. 	
Too Left /Right Arc	<ul style="list-style-type: none"> • Unable to calibrate due to poor arc field position (too far left or Right). 	
Fiber Separation	<ul style="list-style-type: none"> • The fiber stuff amount is insufficient. 	<ul style="list-style-type: none"> • Execute the [Motor Calibration] function. If using other splice modes, check the [Overlap] setting in the splice mode.
	<ul style="list-style-type: none"> • The pre-fuse power or pre-fuse time is set too high. 	<ul style="list-style-type: none"> • Check the [Prefuse Power] and [Prefuse Time] settings in the splice mode.
L/R-Bad Fiber Position	<ul style="list-style-type: none"> • The fiber is not set correctly at the bottom of the V-groove. 	<ul style="list-style-type: none"> • Press RESET key, and re-position the fiber again to seat it correctly at the bottom of the V-groove.

Error Message List

Error Message	Reason	Solution
No Arc Discharge	• Arc Discharge did not occur.	<ul style="list-style-type: none"> • Assure the electrodes are in proper position. • Replace the electrodes. • Consult the authorized distributor.
Large Cleave Angle	• Bad fiber end-face.	• Check the condition of the fiber cleaver. If the blade is worn, rotate the blade to a new position.
	• [Cleave Limit] is set too low.	• Increase the [Cleave Limit] to an adequate limit.
Large Fiber Angle	• Dust or dirt is on the V-groove or the clamp chip.	• Clean the V-groove and clamp chip, and replace the fibers. If the error occurs again, strip, clean and cleave the fibers.
	• Bad fiber end-face.	• Check the condition of fiber cleaver. If the blade is worn, rotate the blade to a new position.
Cleave Shape NG	• Bad fiber end-face.	• Check the condition of fiber cleaver. If the blade is worn, rotate the blade to a new position.
Arc Discharge Delayed	• Arc Discharge is delayed	<ul style="list-style-type: none"> • Assure the electrodes are in proper position. • Execute the [Stabilize Electrode] function. • Replace the electrodes.
Thin Fiber	• Inadequate arc power	• Calibrate the arc power with the [Arc Calibration] function.
	• Prefuse power or time is set too high	• If using the Other 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 Other 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 Other mode, adjust or initialize [Prefuse Power] or [Prefuse Time] settings. For normal splice mode, the prefuse is fixed and cannot be adjusted.
Large Dust Burn	• Bad fiber end-face.	• Check the condition of the fiber cleaver. If the blade is worn, rotate the blade to a new position.
	• [Cleaning Arc] time is too short or "OFF."	• Dust still present after cleaning fiber or cleaning arc. Clean fiber thoroughly or Increase [Cleaning Arc Time]

Error Message	Reason	Solution
High Estimated Loss	<ul style="list-style-type: none"> • Insufficient fiber cleaning. 	<ul style="list-style-type: none"> • 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.
	<ul style="list-style-type: none"> • Bad fiber end-face. 	<ul style="list-style-type: none"> • 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.
	<ul style="list-style-type: none"> • Dust or dirt is on the V-groove or the clamp chip. 	<ul style="list-style-type: none"> • Dust or dirt on the V-groove or clamp chip causes poor fiber movement during fiber stuffing. Clean them periodically.
	<ul style="list-style-type: none"> • Dust or dirt is on the lens 	<ul style="list-style-type: none"> • Execute the [Dust Check]. If dust or dirt exists, clean the lenses.
	<ul style="list-style-type: none"> • Bad electrode condition. 	<ul style="list-style-type: none"> • Replace the electrodes if they appear worn (rounded tip shape), dirty or bent.
	<ul style="list-style-type: none"> • Inadequate arc power. 	<ul style="list-style-type: none"> • Calibrate the arc power with the [Arc Calibration] function.
	<ul style="list-style-type: none"> • Using unsuitable splice mode 	<ul style="list-style-type: none"> • Select a suitable splice mode for the fibers to be spliced.
	<ul style="list-style-type: none"> • [Loss Limit] is set too low. 	<ul style="list-style-type: none"> • Increase [Loss Limit] to an adequate limit.
	<ul style="list-style-type: none"> • Inadequate arc parameters in other splice modes 	<ul style="list-style-type: none"> • Confirm the arc parameters are adequate to splice the fibers.
	<ul style="list-style-type: none"> • Inadequate estimating parameters in Other mode 	<ul style="list-style-type: none"> • Confirm the estimating parameters are adequate to estimate the loss.

Error Message	Reason	Solution
There is dust after executing Dust Check function	• Dirt or dust exists in optical path.	• Clean the objective lenses by referring see section [Cleaning of Objective Lens]. • When the above processes cannot remove the dirt or dust, consult the authorized distributor.
X Camera Y Camera Trouble	• The Camera may be damaged.	• Consult the authorized distributor.
Heater Oven Trouble	• Heater does not heat.	• Consult the authorized distributor.
Communication error	• Malfunctioning internal device	• Consult the authorized distributor.
Temperature Sensor NG	• Temperature Sensor may be damaged.	• Consult the authorized distributor.

Power Supply

- (1) Power does not turn on when pressing **ON/OFF** key
 - The battery may not be charged. Charge 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 produces power by a temperature dependent chemical reaction. The capacity decreases at low temperature (especially $<0^{\circ}\text{C}$).
 - At high altitude, the arc discharge current is increased. In this condition, battery power degrades quicker due to large power consumption.
- (4) “CHARGE” LED on blinks during battery recharge
 - The battery pack has a fault or has reached the end of its service life. Install a new battery pack. If the LED blinks again after install, contact the authorized distributor.
 - The battery pack has been used in a harsh environment where temperature is high ($>40^{\circ}\text{C}$), or in direct sunlight.
- (5) Method to change the power saving function settings
 - Refer to [Machine Settings] function.
- (6) Battery indicator is not displayed.
 - When using the AC adaptor, the battery indicator is not displayed on a screen.

Splicing Operation

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

- (7) Error message can be over-ridden
 - See Section [Splice Settings] to prevent error message override.
- (8) Unable to change Arc Power and Arc Time
 - The settings cannot be changed in AUTO modes.
 - If using the “Other Mode”, the Arc Power and Arc Time may be locked by administrator, preventing them from being changed.
- (9) Pauses not present or set improperly
 - See Section [Splice Menu] .
- (10) Cleave Angle, Fiber Angle / Offsets not properly displayed
 - 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
 - Extend the heating time. Refer to [Heater Mode].
- (2) Heater LED on panel keyboard blinks
 - Pressing the **HEAT** key during heating causes the LED to blink. The tube heater is turned off if the **HEAT** key is pressed again. If, after 2 seconds have gone by without pressing the **HEAT** key again, the LED stays on continuously and the heater returns to its normal state. The LED will turn off when the heat cycle is completed.
 - If the heating temperature does not reach its inputted setting, the LED blinks and the alarm sounds. If this happens, contact the authorized distributor.
- (3) Fiber protection sleeve adhered to heating plate after shrink
 - Use a cotton swab or a similar soft tip object to push and remove the sleeve. If the black coating is removed, contact your authorized distributor.
- (4) Cannot initialize heating condition of Heater mode
 - See Section [Referring to or editing Heater Mode].
- (5) Cannot cancel heating process
 - **RESET** key does not cancel the heater. Press **HEAT** key twice to cancel the heating process.

Wireless communication

- (1) Bluetooth wireless connection is unsuccessful.
 - Check the power of RS02/03 stripper to ensure it is "ON". If it is "Off", turn the RS02/03 "ON".
 - Check the Link LED of the RS02/03 stripper. If it is not lit, push and hold the **Link** button on the RS02/03. This will cause the Link LED of the RS02/03 to light and start the paring process.
 - Check the [Splicer] and [Stripper] in Bluetooth menu of the splicer. If they are "Off", turn them "ON". Refer to the "Other Settings" section.
 - RS02/03 already connects with other splicer. Push and hold the **Link** button on the RS02/03. This will cause the Link LED of the RS02/03 to blink and start the paring process. After this, try to connect with the stripper. Refer to Bluetooth section.
- (2) Cannot change the parameters of the RS02/03 with the splicer.
 - The RS02/03 may be already connected to another splicer. Push and hold the **Link** button on the RS02/03. This will cause the Link LED of the RS02/03 to blink and start the paring process. After this, try to connect with the stripper. Refer to Bluetooth section.

Supervising

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

Other Functions

- (1) Method to hide messages on the [READY] screen
 - Change the fiber image from X/Y view to X magnified view or Y magnified view by selecting the icon in the monitor.
- (2) Too many repetitions until the “Test Finish” result in [Arc Calibration]
 - The splicer needs to repeat the arc calibration after replacing the electrodes or when the environmental conditions change drastically. The number of arc calibrations can be set to a specific amount. When the splicer completes the set amount of calibrations, it indicates “Test Finish”. However, this does not mean it is completely calibrated.
- (3) “Test Finish” never results after many repetitions in [Arc Calibration]
 - Execute [Stabilize Electrodes] function in [Maintenance Menu]. If the splicer still does not indicate “Test Finish”, replace the electrodes. See section [Replace Electrodes] function.
- (4) No arc power change after [Arc Calibration]
 - An internal factor is calibrated and adjusted for the specific arc power selected. The displayed arc power in each splice mode does not change.
 - The calibration results affect all splice modes.
- (5) Method to input different comments after each splice in splice results data
 - See section [Splice Memory Comment].

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Warranty



1. Warranty period and limits

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

- (1) *Failure due to natural disaster.*
- (2) *Failure due to mishandling.*
- (3) *Failure due to handling where the operating procedures or instructions described in the instruction manual were disregarded.*
- (4) *Consumable items (discharge electrodes etc.)*
Please note that the memory of the splice results, parameters, etc. may be deleted during the repair.
- (5) *Failure due to use of abnormal AC power.*
In most cases, damage to the AC adapter from an abnormal supply voltages occur within the warranty period. The specification of AC input voltage is up to AC240V (340V-peak).

2. Warranty item coverage

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

3. Before shipping the splicer

Please consult the authorized distributor first.

4. Information required for repair

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

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

5. Transporting the splicer

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

6. Disclaimer

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

Contact Address



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

*Fujikura Europe Ltd.
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