SET

OME0724004H

Mass Fusion Splicer

TYPE-66M12

Guide to operation

SUMITOMO ELECTRIC INDUSTRIES, LTD.

IMPORTANT SAFETY PRECAUTIONS

This product has been designed and manufactured to assure personal safety. Improper use can result in fire, electric shock or injury to persons. Please read and observe all warnings instructions given in this operation manual.

Use your splicer only for its intended purpose.

♦ The meaning of these symbols

In the product and this operation manual, symbols are used to highlight warnings and cautions for you to read so that accidents can be prevented. The meanings of these symbols are as follows:

○Symbol used in the product

	This symbol, where it appears on the unit, indicates that hazardous voltage is present inside of the splicer.

○The meaning of these symbols

	This symbol indicates a warning, caution, or danger and alerts you important instructions have been included on the product or in the manual.
	This symbol indicates actions that are prohibited.
	This symbol indicates actions that must be taken.

○The meaning of Warning and Caution

 Warning	This symbol indicates explanations about extremely dangerous matters. If users ignore this symbol and handle the splicer the wrong way, serious injury such as fire or electric shock, or death could result.
 Caution	This symbol indicates explanations about dangerous matters. If users ignore this symbol and handle the splicer the wrong way, bodily injury and damage to the equipment could result.

Be sure to read all the following warnings and cautions before use.

 [Warning]

<Setting up and using splicer>

	1. This fusion splicer performs an arc discharge. Do not use the splicer in a hazardous location in which inflammable gas can generate or only electrical apparatus for explosive gas atmosphere can be used. 2. Never use spray cleaners such as Freon or Flammable gas on the splicer. Decomposition of arc by heat will cause toxic gas, or abnormal arc may result in damage or fire.

	3. Do not use and store the splicer out of the locations defined in a brochure and this manual. Doing so may cause splicer malfunction or deterioration, resulting in fire or electric shock. 4. To reduce the risk of fire, electric shock or malfunction, do not allow the splicer to be exposed to rain and get liquid such as water or a metallic object inside the splicer. Doing so can cause a fire, electric shock or malfunction by shorting out internal components. 5. Never use the battery, the AC power supply and the battery charger for the machines other than the specified splicer. Doing so may cause these items to damage, resulting in fire or heat generation. 6. Do not make mechanical or electrical modifications to the splicer since this may expose you to dangerous voltage or other hazards. 7. Do not touch the electrodes during and after arc discharge. Doing so may cause personal injury or electric shock. 8. The heating plate of the heat shrink oven may be hot during heating. Do not touch the protection sleeve directly after heating. Doing so may cause burn.
	9. Avoid places with too much dust or dirt. Dirt or dust that can accumulate in the fusion splicer causes short circuit and insufficient cooling, which may lead to splicer malfunction or deterioration, resulting in fire or electric shock. 10. Always use the connection method as defined in this manual. Failure to do so may cause a fire or electric shock. 11. Only use a voltage within the indicated power voltage. Failure to do so may cause a fire or electric shock. 12. Check for condensation before operating. If necessary, dry the splicer with a hair dryer before operation. If water or other liquid, a metallic object or other foreign substance gets inside the splicer, immediately turn off the power and disconnect the power plug. Contact qualified service personnel. 13. In a high location, take safety measures to prevent fall of operators. Dropping the splicer could result in personal injury or damage to the splicer. Fix the splicer to a worktable or a tripod with the screw on the bottom of the splicer. 14. If an abnormal condition such as unusual noise, smoke or unusual odor occurs, immediately turn off the power and disconnect the power plug. Next, contact our maintenance service center. 15. Be sure to turn off the splicer and unplug the power cord or remove the battery before replacing the electrodes. 16. The heating plate of the heat shrink oven may be hot during and after heating. Avoid touching it directly. 17. Do not operate in the rain. Doing so may cause power supply module or battery module to be short-circuited. 18. Do not expose the splicer to extremely high temperature and high humidity or to direct sunlight for prolonged periods. 19. Only use original Sumitomo electrodes (ER-10). Failure to do so may cause the splicer to malfunction.

<Handling of power cord and plug >

	1. To reduce the risk of electric shock, do not plug/unplug the power cord or remove the battery with wet hands.
	2. Disconnect the power cord by grasping the plug, not the cord. Failure to do so may cause damage to the power cord, resulting in fire, electric shock or malfunction. 3. Before charging the battery, make sure that the pins of the battery charge cord are not bent or broken. Using the battery charge cord with a bent or broken pin will cause internal short circuit, resulting in fire or electric shock.

<Handling of battery>

	1. Do not burn the battery or throw it into a fire. Doing so may cause heat generation, bursting and fire. 2. Do not place the battery in microwave ovens, high-pressure containers. 3. Do not let water or sea water wet or soak the battery. Safety and protective devices to prevent danger are built in the battery. If these devices are damaged, excessive current flow may cause abnormal chemical reaction in battery fluid, heat generation, bursting and fire. 4. Do not throw or impact the battery. Safety and protective devices to prevent danger are built in the battery. If these devices are damaged, excessive current flow may cause abnormal chemical reaction in battery fluid, heat generation, bursting and fire. 5. Do not pierce the battery with nails, strike the battery with a hammer, or step on the battery. Doing so will cause internal short circuit, heat generation, bursting and fire. 6. Do not disassemble or modify the battery. Safety and protective devices to prevent danger are built in the battery. If these devices are damaged, excessive current flow may cause loss of control during charging or discharging of the battery, heat generation, bursting and fire. 7. Make sure the polarities are correctly connected. Do not attempt to connect the battery or other equipment when you cannot do. Reversed connections may cause abnormal chemical reaction in battery fluid, heat generation, bursting and fire. 8. Do not solder any lead wires directly to the battery. Do not directly connect the positive and negative terminals with a conductive material such as a wire. Do not carry or store the battery together with any personal jewelry, hairpins or other Metallic objects. Doing so can cause an electrical short circuit. Also excessive current flow may cause abnormal chemical reaction in battery, heat generation, bursting and fire. 9. Do not use or leave the battery under high temperature conditions such as near fire.
	10. Only use a specified battery charger. Failure to do so can cause the battery to be overcharged or excessive current flow may cause abnormal chemical reaction in battery fluid, heat generation, bursting and fire. 11. Use the battery only for the application for which it was designed. Failure to do so will result in a loss of performance and a shortened life expectancy. Also excessive current flow may cause loss of control during charging or discharging of the battery, heat generation, bursting and fire.

⚠ [Caution]

<Transportation and storage>

	1. The TYPE-66 is a precision instrument. When transporting the splicer, use its specified transport case and do not shock or impact it. 2. Do not use and store the splicer out of the locations defined in a brochure and this manual. Failure to do so may cause splicer malfunction or deterioration, resulting in fire or electric shock.

	3. Only use alcohol to clean the splicer. To prevent malfunction and damage, do not use any other kind of chemicals. 4. Never use spray cleaners such as Freon or Flammable gas on the splicer. Heat by arc will cause chemical reactions to occur to gas component, which will deteriorate a microscope lens, resulting in a loss of splicing capability.
	5. Avoid places with too much dust or dirt. Dirt or dust that can accumulate in the fusion splicer causes short circuit and insufficient cooling, which may lead to splicer malfunction or deterioration, resulting in fire or electric shock. 6. If you are not going to use the splicer for a while, remove the battery before storing it. Failure to do so will shorten a battery life. 7. Unplug the fusion splicer or remove the battery before attempting any electrical maintenance or if not using the splicer for a prolonged period. Failure to do so can cause a fire. 8. We recommend your splicer to be annually over-hauled to keep it in good condition.

<Battery handling and charging>

	1. Make sure the polarities are correctly connected. Do not attempt to connect the battery or other equipment when you cannot do. Reversed connections may cause abnormal chemical reaction in battery fluid, heat generation, bursting and fire. 2. Do not carry or store the battery together with any personal jewelry, hairpins or other metallic objects. Doing so can cause an electrical short circuit. Also excessive current flow may cause abnormal chemical reaction in battery, heat generation, bursting and fire. 3. Do not miss usage of the batteries differing in capacity, type, and manufacturer.
	4. The battery's optimum charging temperature range is 0 to 45˚C. Whenever possible, place the charger in a location that is within this temperature range. Avoid charging the battery at extremely low temperature (below 0˚C). Failure to do so may lead to deterioration in performance and battery leakage. 5. Always turn off the power to the splicer after use. Failure to do so can cause the battery to be overcharged and deteriorated in performance. 6. In the event the battery leaks and the fluid gets into one's eyes, do not rub the eyes. Immediately wash them thoroughly with clean water enough from the tap and consult a doctor urgently. 7. Unplug the fusion splicer or remove the battery before attempting any electrical maintenance or if not using the splicer for a prolonged period. Failure to do so can cause a fire. 8. The battery module for the TYPE-66 is heavier in weight than those for other models. Pay attention not to drop the battery module when installing and removing it.

<Handling of optical fiber >

	1. Never look into optical fibers or the end of an optical cable attached to the optical output when the device is active. The laser radiation can seriously damage your eyesight.
	2. Wear safety glasses at all times for protection from glass fibers.

RoHS Directive (2002/95/EC)

The TYPE-66 optical fusion splicer is RoHS-compliant.

WEEE Directive (Waste Electrical and Electronic Equipment; 2002/96/EC)

The European Union has enacted a Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE Directive). This directive is applicable in the European Union member states. The crossed out wheelie bin symbol found on our products indicates that it should not be disposed of together with household waste.

To prevent possible harm to human health and the environment, waste electrical equipment must be disposed of in an approved and environmentally safe recycling process.

For further information on how to dispose of the product correctly, please contact the product supplier, or the local authority responsible for waste disposal in your area.

IMPORTANT : TYPE-66 SOFTWARE USER LICENSE

ATTENTION : The software installed in the TYPE-66 SPLICER (“this software”) is the property of SUMITOMO ELECTRIC INDUSTRIES, LTD. The usage of this software is granted by a license. CAREFULLY READ AND THIS LICENSE BEFORE USING THIS PRODUCT.

The copyright and all other rights to this software, its documentation and the writings concerning this software (“the writings”), which contain CD-ROM, operation manual, guiding document, data tables, command lists, writing information (photos, images, drawing, text) on appended other printed materials, shall remain with SUMITOMO ELECTRIC INDUSTRIES, LTD. By commencing the use of this software, you acknowledge that you have read the following license and indicate that you agree to its terms. In case of disagreement, contact SUMITOMO ELECTRIC INDUSTRIES, LTD. or our product supplier.

LICENSE AGREEMENT

This license is the entire agreement between SUMITOMO ELECTRIC INDUSTRIES, LTD. and you.

1. LICENSE

The following restricted rights are granted. YOU MAY :

a) use on a splicer in which this software is installed.
b) create or distribute a construction manual based on the writings on condition that you clarify their source.
c) create an execution report of construction based on displayed information, and the writings.
d) create a document (manual or execution report) concerning the maintenance of the splicer in which this software is installed or control its splice-quality upon displayed information and the writings.
e) make one copy of the writings for archival or backup purpose.

2. RESTRICTIONS

The following act is forbidden on this license, except our prior written consent. YOU MAY NOT :

1) sell, distribute, rent, lease, transfer, or disclose the whole or part of the writings to the public or unidentified parties and transfer, disclose or display the electrical format of the writings through online media.
2) make copy of the writings except as permitted in this license.
3) reverse engineer, decompile, disassemble this software and analyze, modify or merge the program.

3. CONTRACTING PARTIES

If you rent, lease, transfer, or resell the splicer, in which this software is installed, to a corporation or other entity, then this agreement is formed by and between SUMITOMO ELECTRIC INDUSTRIES, LTD. and such entity. You shall be liable for such entity to agree to the same all conditions of this license.

4. TERM AND TERMINATION

This agreement shall continue in effect until terminated. You may terminate the agreement at anytime by stopping the use of the splicer in which this software is installed. If you fail to comply with any of the provision of this license, your license will be automatically terminated. Upon termination, you shall transfer the writings to the owner of splicer (In the case that you transfer the splicer to other corporation or entity) or return them to us, otherwise erase or destroy them by appropriate means. You shall forever hold in confidence all trade secrets brought by this license. Further you agree not to disclose to any third party.

5. LIMITATION OF LIABILITY

SUMITOMO ELECTRIC INDUSTRIES, LTD. and our supplier shall not be liable for consequential, incidental or accidental damages in connection with this software or this agreement and whether this software shall meet your special requirements, special efforts or special method beyond the range described in the operation manual concerning this software.

6. GENERAL

If any provision of this agreement is declared by the court of competent jurisdiction to be invalid, illegal, or unenforceable, such provision shall be severed from the agreement and the other provisions shall remain in full force and effect.

Notification of North American patents on the TYPE-66

U.S. Patents
4,812,010
5,777,867
6,287,020
6,437,299
6,518,551
6,519,405

CANADA Patents
2,183,840
2,321,400

Table of contents

1. General

Thank you very much for purchasing the TYPE-66 Mass Fusion Splicer (hereinafter called “the TYPE-66”).

The TYPE-66 automatically pre-inspects and aligns a pair of optical fibers with equipped microscopes, and then fuses them together with heat from an electric arc to form a low-loss splice. A protection sleeve is applied over the bare glass and cured in the built-in heat shrink oven.
Before using the TYPE-66, read all instructions completely.

> ⚠ Caution
>
> Read this manual carefully in its entirety to fully understand machine capabilities. Save this manual in a location in which you can easily get to see.

Product overview

Optical fiber requirement

The TYPE-66 can splice the following optical fiber types.

Material	Silica grass
Profile type	SMF (ITU-T G.652), MMF (ITU-T G.651) DSF (ITU-T G.653), NZDSF (ITU-T G.655)
Fiber diameter	125µm
Fiber count	1,2,4,5,6,8,10,12
Cleave length	10mm

Features overview

The TYPE-66 key features are:

- **Dual heat shrink oven** (For more information, see page 46.)
  2 heat shrink ovens are equipped with the fusion splicer. The ovens run individually and splicing operation can be improved more effectively.

- **Auto start** (For more information, see page 47.)
  In addition to the function that automatically starts the splicing process when the hood is closed, the function that automatically starts the heat¥ing cycle when fiber is placed into the heat shrink oven is provided. These functions enable performing fusion splice and heat shrink protection without keypad operation.

Standard package

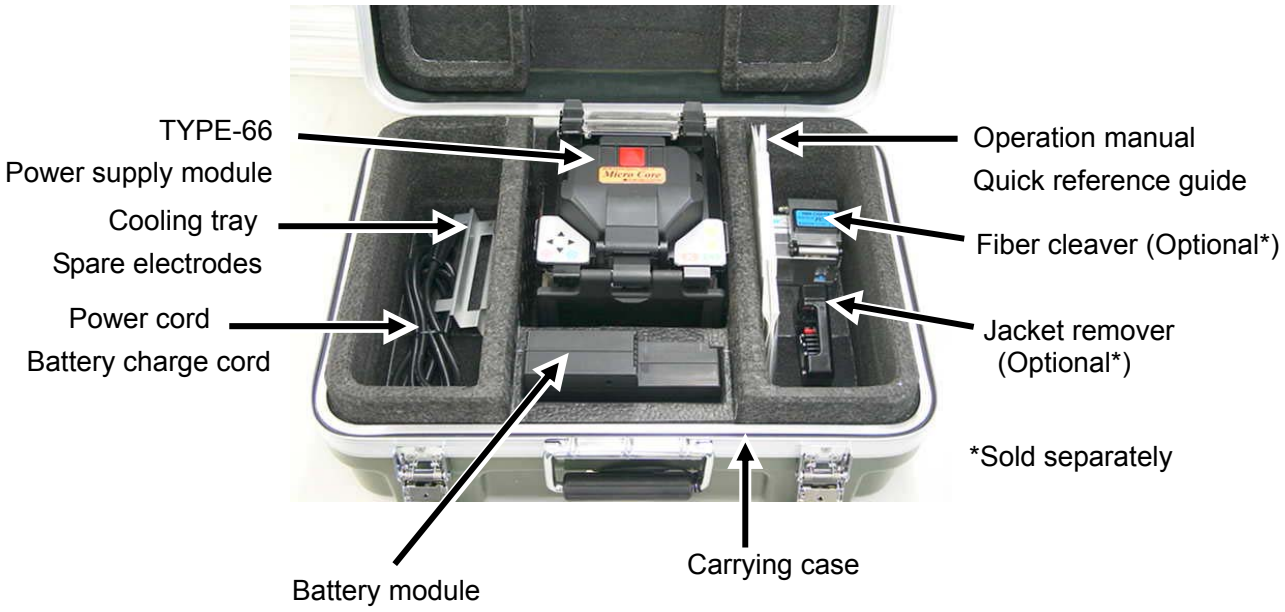
Here is an example of TYPE-66 standard package.

Package contents (example)

No.	Description	Part number	Quantity
1	Fusion splicer TYPE-66	TYPE-66M12	1 pc
2	Power supply module (Battery charger)	PS-66	1 pc
3	Battery module	BU-66S	1 pc
4	Power cord	PC-AC<X>	1 pc
5	Battery charge cord	BCC-66	1 pc
6	Cooling tray	-	1 pc
7	Spare electrodes	ER-10	1 pair
8	Operation manual *1	OME0724004	1 pc
9	Quick reference guide *1	OME0724004-2	1 pc
10	Carrying case	CC-66	1 pc

*1: The latest version is provided.

The above package is an example. The package contents vary depending on the customers' requests.



Optional accessories

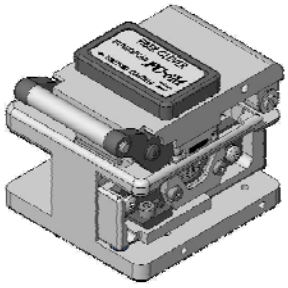
The following optional accessories are provided for the TYPE-66. For further details, please contact our sales personnel.

Battery

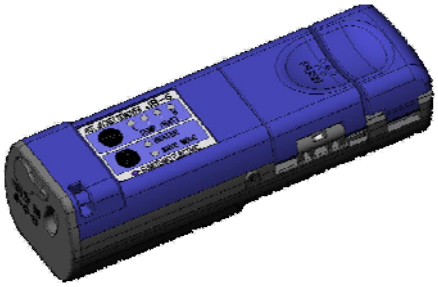
Description	Part No.	Remarks
Battery module	BU-66S BU-66L	Nominal capacity: 4500mAh Nominal capacity: 9000mAh
Car battery cable	PC-V66	Plugged into a car's cigarette lighter jack to supply electric power to splicer

Tools (Jacket remover, Fiber cleaver, and etc)

Description	Part No.	Remarks
Fiber cleaver	FC-7M-F8 FC-7R-F	Applicable fiber: Single fiber and up to 8-fiber ribbon Replacement blade for FC-7 and FC-6: FCP-20BL Replacement blade for FC-7R: FCP-20BL(7R)
	FC-6M(-C)	Applicable fiber: Single fiber and up to 12-fiber ribbon
Jacket remover	JR-M03	Applicable fiber: Single fiber Applicable coating diameter: 250μm, 900μm
Hot Jacket remover	JR-6	Applicable fiber: single fiber and up to 12-fiber ribbon Replacement blade for JR-6: JR-6BL
Dispenser	HR-3	Dispenser for alcohol
Fiber holders	FHS-025	For single fiber with 0.25mm coating
	FHS-05	For single fiber with 0.5mm coating
	FHS-09	For single fiber with 0.9mm coating
	FHM-2	For 2-fiber ribbon
	FHM-4	For 4-fiber ribbon
	FHM-5	For 5-fiber ribbon
	FHM-6	For 6-fiber ribbon
	FHM-8	For 8-fiber ribbon
	FHM-10	For 10-fiber ribbon
	FHM-12	For 12-fiber ribbon



[FC-6M]



[JR-6]

Consumables

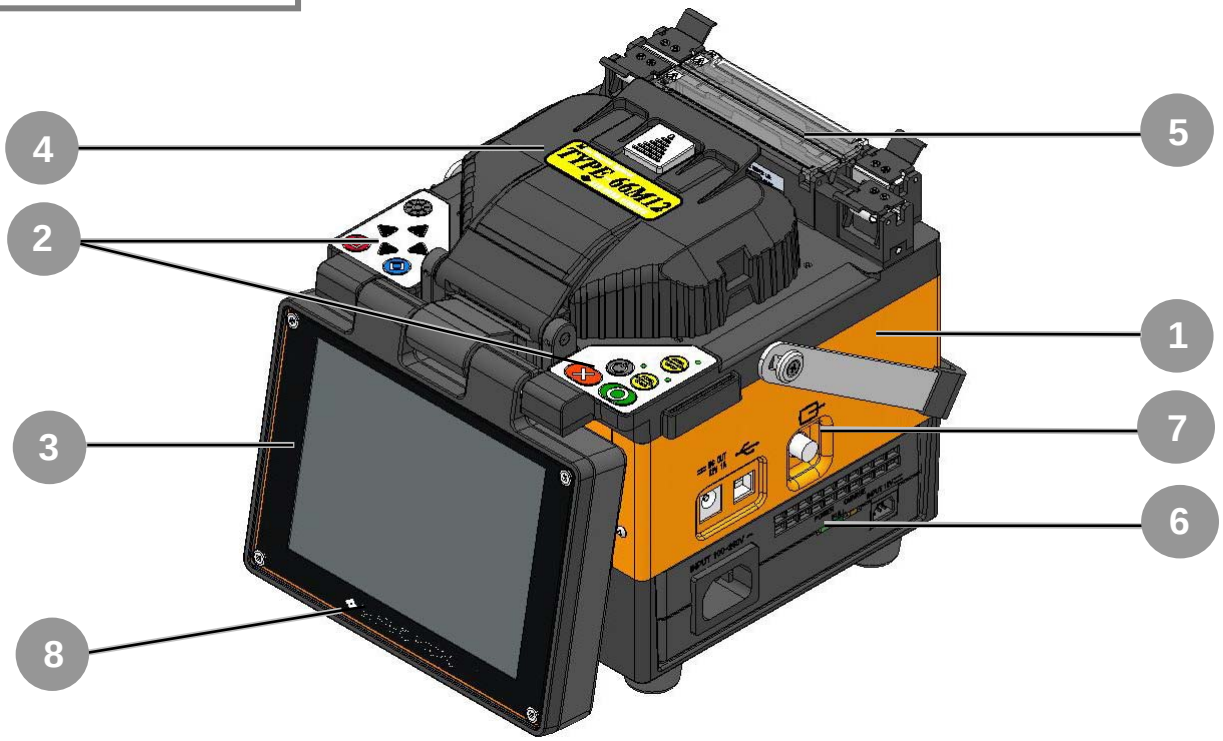
Fiber protection sleeves FPS-1 FPS-40 FPS-5 FPS-6	 60mm, for single fiber (50 pcs per package) 40mm, for single fiber (50 pcs per package) 40mm, for up to 8-fiber ribbon (25 pcs per package) 40mm, for up to 12-fiber ribbon (25 pcs per package)
Battery module (BU-66S/L) Electrodes (ER-10) Mirror protection glass (MPG-2) Monitor protection panel	Battery modules and electrodes are considered consumables that degrade with time and usage and are replaceable by a customer. Therefore they will not be covered under warranty.
Monitor	Monitors are considered a component that degrades and is deteriorated with time and usage. Sumitomo maintenance service center should replace the monitors and the parts cost for replacement is charged. They might not be covered under warranty.

- Regarding standard equipment, consumables, or optional accessories, please order the new item you need with the item description and part number to our sales personnel.

- For repair, please read “Warranty and repair service” at page 51 and contact our maintenance service center.

Structure

Fusion splicer



1 Main body
TYPE-66 fusion splicer

2 Keypad
Keys are used to turn on/off the power, perform a splice and heat shrink protection, and setup functions.

3 Monitor
Displays fiber image, splice data and menu.

4 Hood
Provides protection from the environment.

5 Heat shrink oven
Used to heat and shrink fiber protection sleeves. 2 heat shrink ovens (front and rear) are equipped.

6 Power module bay
Power supply or battery module is installed.

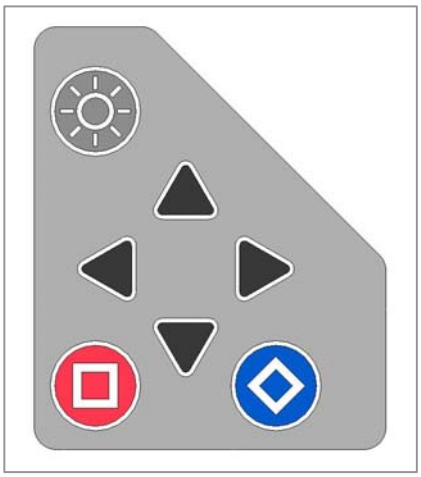
7 Input/output panel
DC output terminal for hot jacket remover and USB port

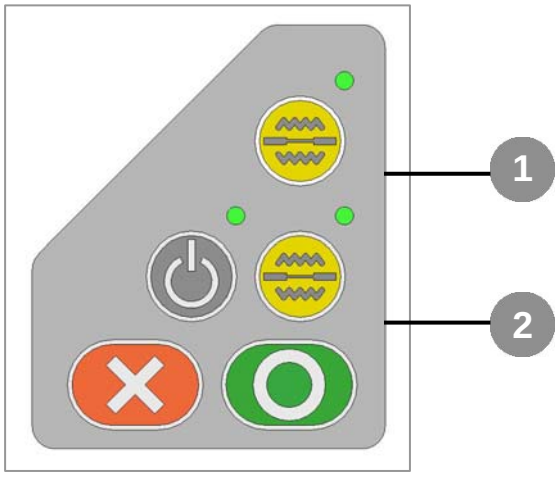
Caution

DC power can only be supplied while AC operation is performed.
(DC power cannot be supplied while battery operation is performed.)

8 Monitor protection panel
An acrylic panel protects a LCD monitor from impact and water.

Keypad





Brightness control key
Adjusts monitor brightness.

Up arrow key
Used to move cursor and enter numeric values.

Left arrow key
Used to access the menu screen and go back to Ready screen.

Down arrow key
Used to move cursor and enter numeric values.

Right arrow key
Used to select items and accept changes.

Square key
Used to access the condition screen and perform manual re-arcing of a completed splice.

Diamond key
Used to advance to a next page and display key guidance.

Power key / LED
Used to turn on and off the splicer. LED illuminates while the splicer is on.

SET key
Starts a splicing operation.

RESET key
Used to cancel a splicing operation. Initialization

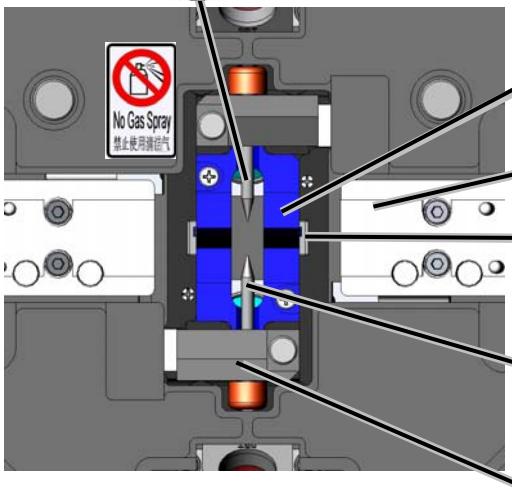
HEAT key [1] / LED
Starts/cancels the heating cycle of the rear heat shrink oven. LED illuminates during the heat cycle.

HEAT key [2] / LED
Starts/cancels the heating cycle of the front heat shrink oven. LED illuminates during the heat cycle.

LED illuminates during heating and blinks during cooling.

Do not press the keys on the keypad with a sharp object (e.g. a ballpoint pen, screwdriver, or nail) Doing so will damage the keypad.

V-grooves, electrodes, other components



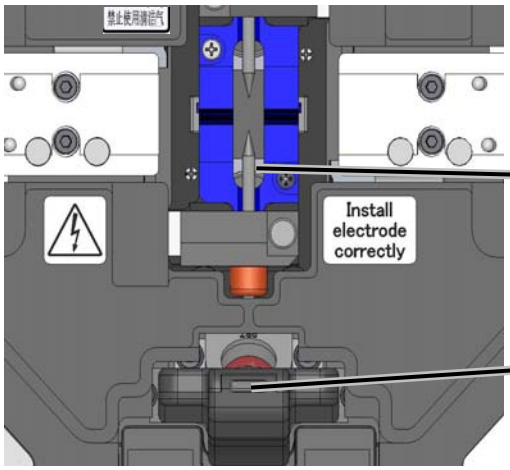
1 V-grooves
Keep bare fibers aligned.

2 Fiber holder stage
A fiber holder is placed on the stage.

3 Fiber guide
A small green light is illuminated for easy fiber placement.

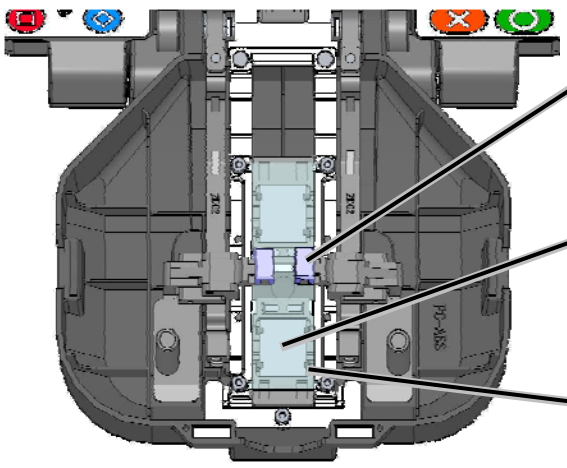
4 Electrodes
Arc is generated between the electrodes.

5 Electrode cover plate
Holds the electrode seated into the retaining groove.



6 Microscope objective lens
Fiber is observed with the lens.

7 V-groove illumination
Illuminates the V-groove. Lit when the hood is opened.

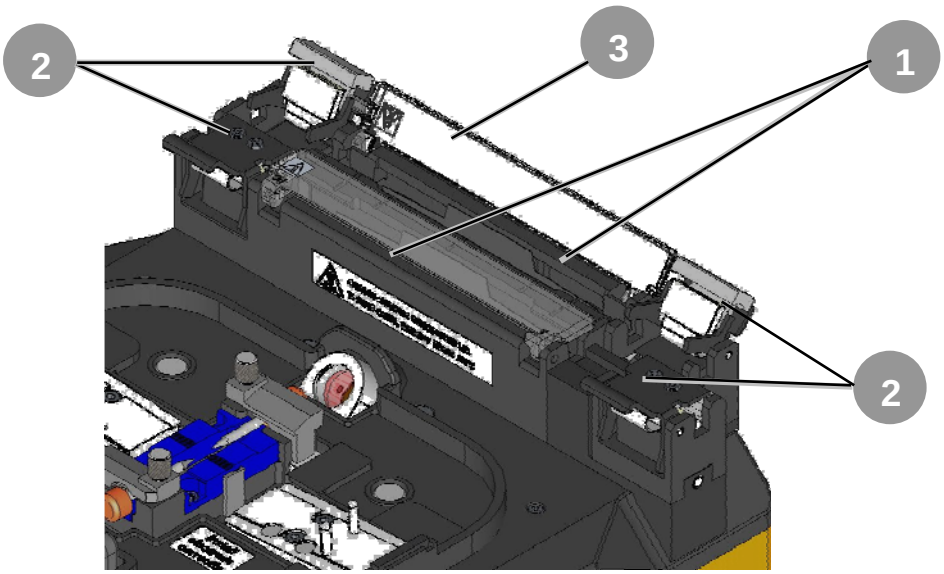


8 Bare fiber pads
Hold fibers seated into the V-grooves. Normally they are attached to the hood.

9 Mirror
Reflects the illumination for a microscope.
(Located below the mirror protection glass.)

10 Mirror protection glass
Protects the mirrors from any dust or dirt.

Heat shrink oven

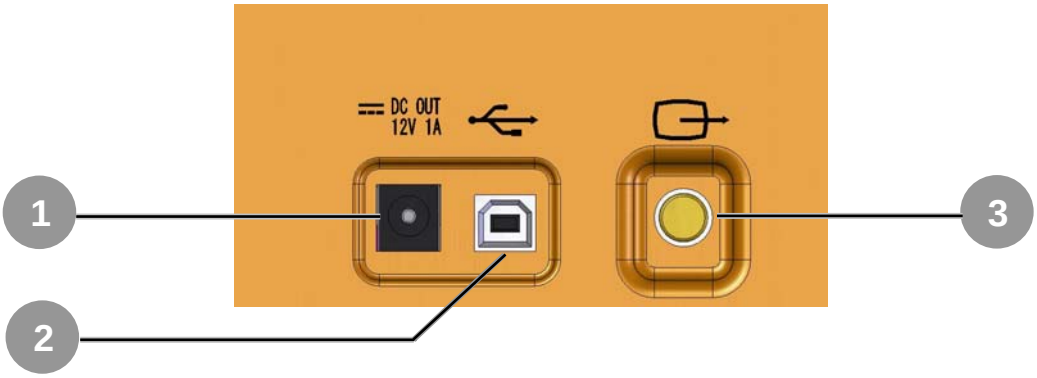


1 Heating plate
Heats fiber protection sleeve.

2 Heat shrink oven clamps
Hold fiber straight.

3 Heat shrink oven lid

Input/output panel



1 DC output terminal
Used to supply DC power to a hot jacket remover.

2 USB port
Used to download stored splice loss data when connected to a PC.

3 Video output terminal
Used for an external monitor.

2. Splice / Protection

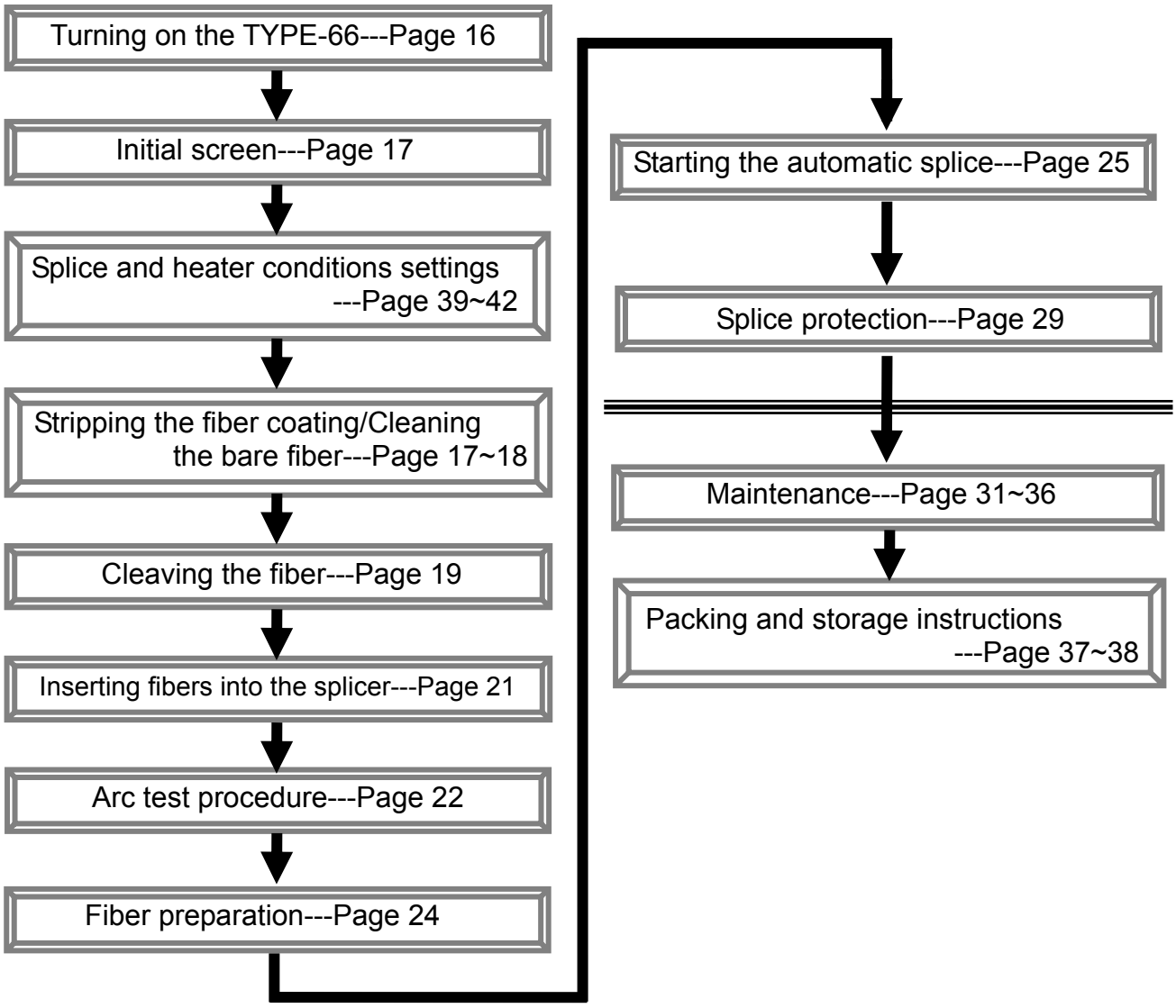
[Preparation for splicing]

Before splicing, collect all of the necessary equipment.

- TYPE-66
- Optical fiber being spliced
- Jacket remover
- Fiber cleaver
- Pure (more than 99%) alcohol
- Lint-free gauze wipes
- Fiber protection sleeve

[Operating procedures]

The following is a summary of the steps required to make a splice with the fusion splicer. For further information on each step, please see the page described below.



Preparing power supply

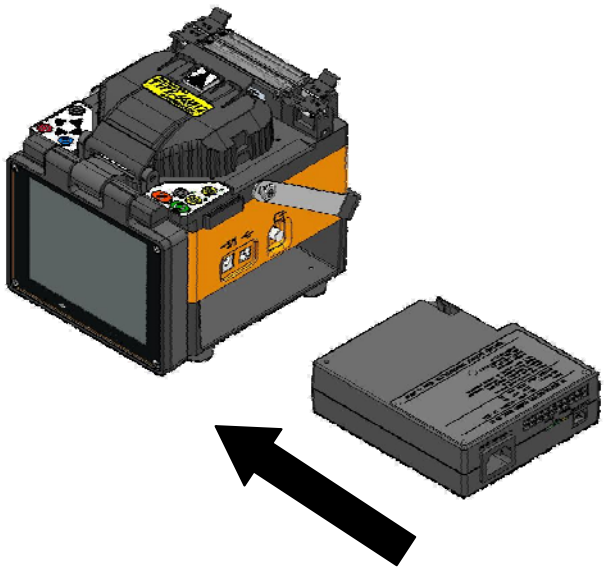
The TYPE-66 operates on a power supply module, or a battery module.

AC operation

Insert the power supply module (PS-66) into the module bay.

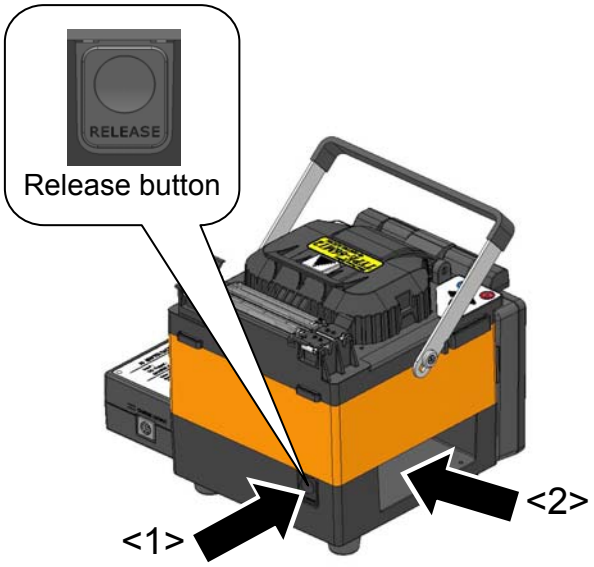
Installation

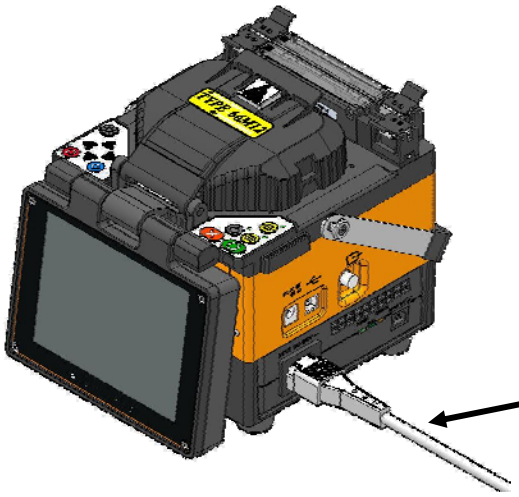
Insert the power supply module (PS-66) into the module bay and slide forward until it locks into space.



Removal

<1> While pressing the release button located on the rear of the splicer, <2>slide the module out of the module bay until it is free from the splicer.





Plugging

Insert the power cord into the power supply module completely. POWER LED lights up green when the AC power is supplied.

Caution

Check the voltage of AC power before use. The splicer should be grounded to earth.

If voltage or frequency beyond the range stated flows in the power supply module, a safety and protective device to prevent danger is activated and the power supply module will stop. In that case, a new power supply module should be purchased. Please contact our maintenance service center.

Battery operation

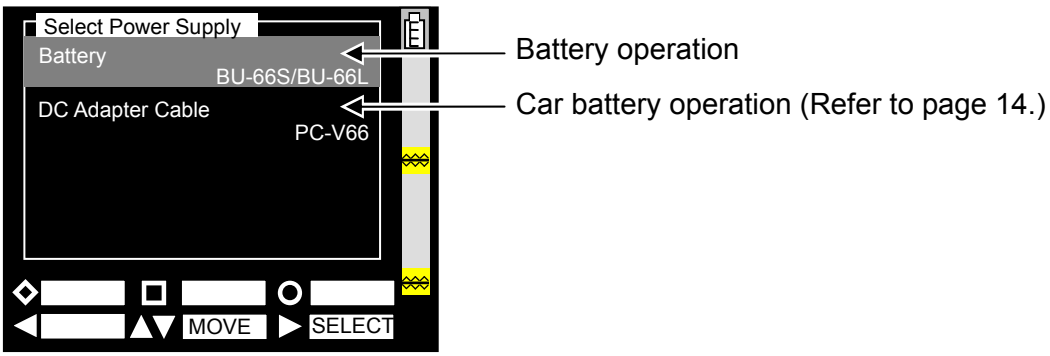
Insert the battery module (BU-66S/L) into the module bay in the same way as inserting the power supply module. (See “AC operation” at page 10 regarding installation and removal of the battery module.)

Before inserting the battery module, ensure that the battery is charged enough. (See “Battery level check” at page 12.)

[Reference]

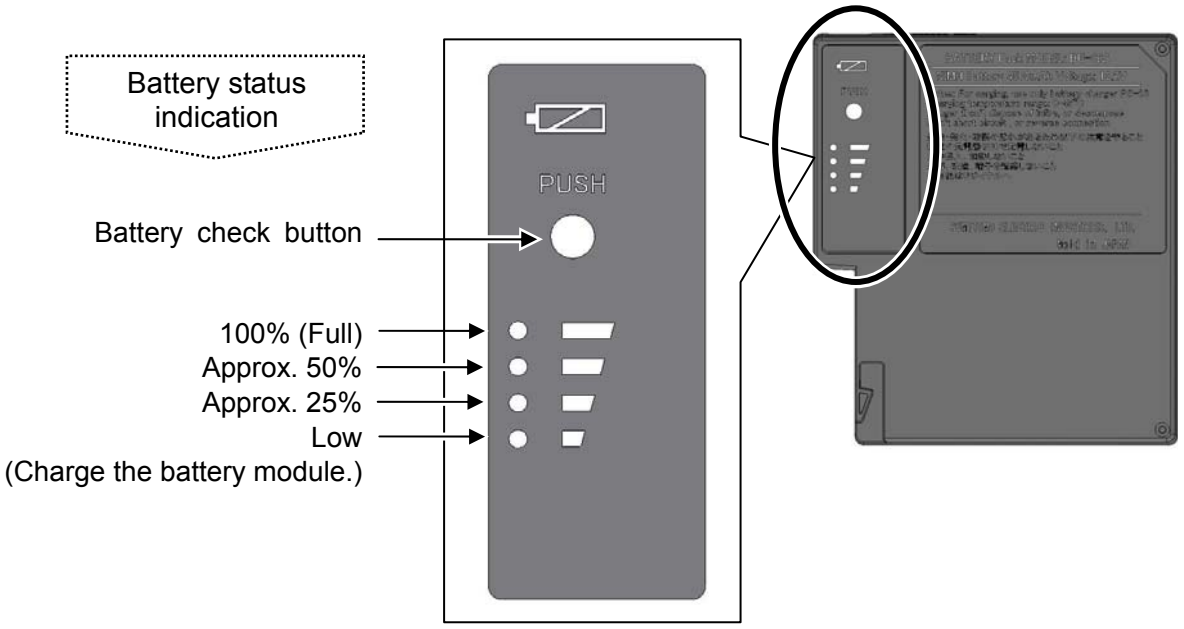
The splice cycles (splice + protection) per fully charged battery module is approximately **80 cycles**.(BU-66S)
approximately **160 cycles**.(BU-66L)
(Condition: Using an unused battery module, 1 splice cycle shall be completed in 90 seconds in room temperature, without using a heated jacket remover.)

If the power is turned on after the battery module is installed in the splicer, the screen that selects power supply will be displayed. Select the power supply that you use.



Battery level check

Press the battery check button. The LED will light up for a few seconds to indicate the battery status in one of four levels.



Indicator	Battery level
	Full
	Half
	Low
	No usable

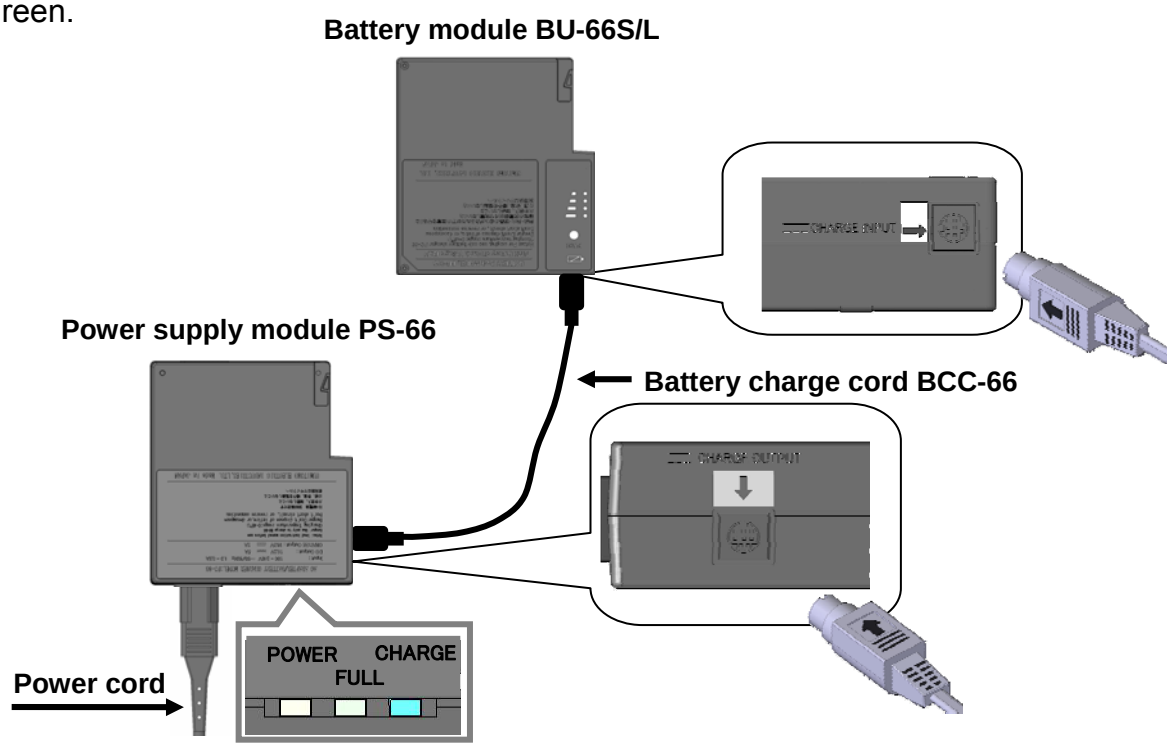
The battery level is also displayed by the battery level indicator on the monitor.

Be sure to charge the battery before use when the battery level is low.

The battery level is not displayed on AC operation.

Battery charging

1. First connect the Power supply module (PS-66) to the battery module (BU-66S/L) via the battery charge cord (BCC-66) with the arrows aligned.
2. Next connect the power cord to the power supply module.
3. The POWER LED of the power supply module lights up green. Then the CHARGE LED lights up orange to indicate that battery charging starts.
4. Charging time is different depending on the remaining power in the battery module. Typical charging time is 2 to 3 hours for BU-66S, and double this for BU-66L. When charging is complete, the CHARGE LED goes out and the FULL LED lights up green.

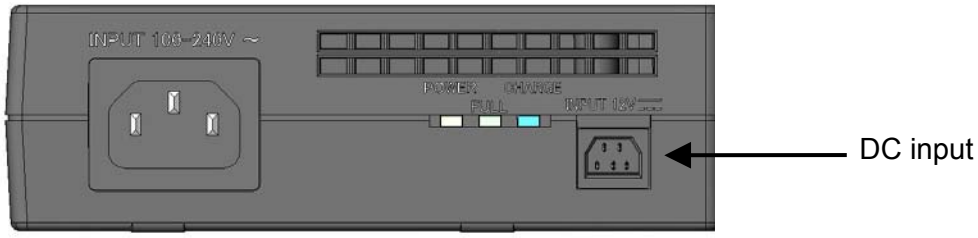


Caution

1. Never connect and disconnect the battery charge cord while the power supply module is plugged in. Doing so may cause the battery connector terminal to short circuit, resulting in damage to the internal components.
2. The battery module can be charged while installed in the splicer, but the power cannot be turned on. When charging is complete, remove the battery module from the splicer and re-install it.
3. Charge the battery module within the following temperature range. Failure to do so may lead to deterioration in performance.
   *Battery module's required temperature range: **0°C ~ +45°C**
4. BU-66S / BU-66L Ni-MH batteries first purchased or left unused in storage for a long period can become "deactivated" and the amount of time which "deactivated" Ni-MH batteries can be used may be short. To prevent this problem, discharge and recharge them several times. By repeating this cycle several times, the temporary reduction in performance caused by "deactivation" can be remedied and the batteries can be restored close to their original performance. Deactivation is specific to Ni-MH batteries and is not in fact battery faults.

DC operation (car battery)

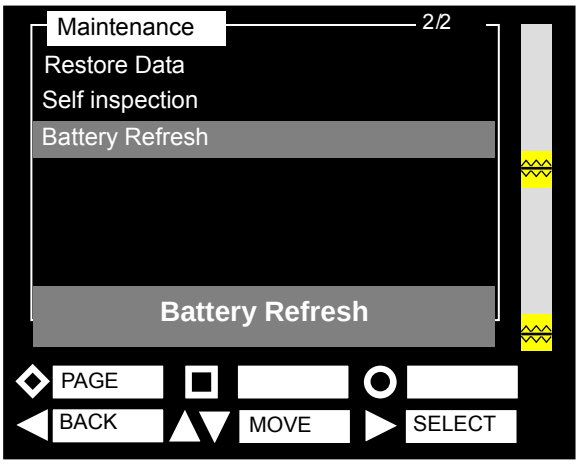
The car battery cable PC-V66 (option) is required to operate the splicer on DC power (car battery). Contact a sales representative.



Battery refreshing

To extend battery life it is recommended that batteries be completely drained before re-charging. Otherwise the battery module loses its ability to fully recharge.

• Battery refreshing can be done in Maintenance menu.



If “Battery Refresh” is selected, this screen is displayed and battery refreshing starts. When refreshing is complete, the TYPE-66 is automatically turned off. Connect the PS-66 power supply module to the BU-66 battery module for charging.

Refresh time depends on the amount of charge remaining in the battery module. A fully charged battery module takes about 7.5 hours to refresh.
A fully charged BU-66L doubles this time.

Precautions for battery module

- **Before using the battery module for the first time, charge the battery module. (The battery is not fully charged before shipping.)**
- The battery module is consumables. Repeated charging and discharging decreases battery life.
- Store the battery module within the following temperature range. Failure to do so may lead to deterioration in performance.
  *Battery module storage temperature range:
  -20°C ~ +50°C (if stored for less than 3 months)
  -20°C ~ +30°C (if stored for less than 1 year)

- Do not use or store the battery module at high temperature, such as in strong direct sunlight, in cars during hot weather. This may cause leakage of battery fluid.
- Charge the battery module fully before storing it for a long period. The battery module will lose its charge during storage.
- If you are not going to use the battery module for a long period, charge the battery module once every 6 months.
- To extend battery life, refresh the battery module once a month.

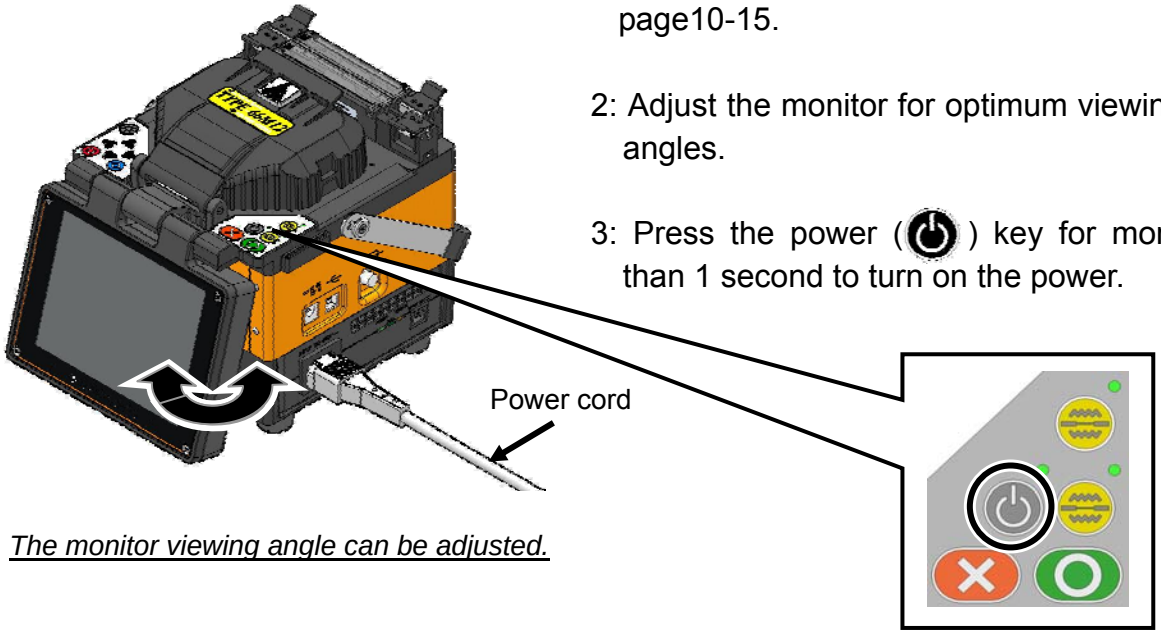
When should the battery be replaced?

If you are getting fewer than splice cycles per fully charged battery module, refresh the battery module. (See page 14.) If the splice cycles still do not increase after refreshing, consider replacing the battery.

When disposing of the battery, contact our maintenance service center or follow the local regulations.

Operating procedures

Turning on the TYPE-66



The monitor viewing angle can be adjusted.

1: Prepare the power supply, referring to page10-15.

2: Adjust the monitor for optimum viewing angles.

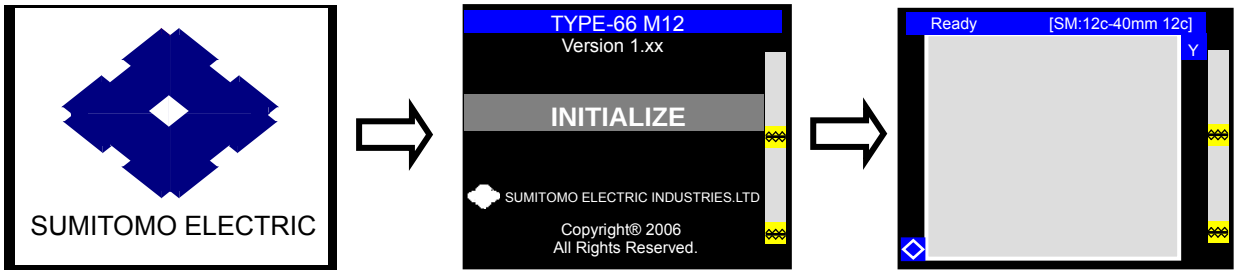
3: Press the power ( ) key for more than 1 second to turn on the power.

If you press the power key right after connecting the power cord to the power supply module, it may take a few seconds until the splicer is powered on.

Special note on monitors

Although bright spots or dark spots may appear on the screen, this is a unique characteristic of liquid crystal displays, and such do not constitute or imply a machine defect.

Initial screen



Startup screen

Initialize screen

Initialize is complete
→Ready screen

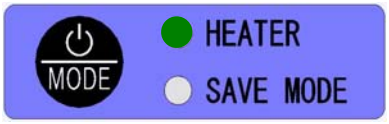
Fiber type and protection sleeve settings

Refer to page 39~42.

Stripping the fiber coating / Cleaning the bare fiber

An example shows use of Sumitomo JR-6 hot jacket remover. Please read the JR-6 operation manual before use. If you use another jacket remover, please refer to its operation manual.

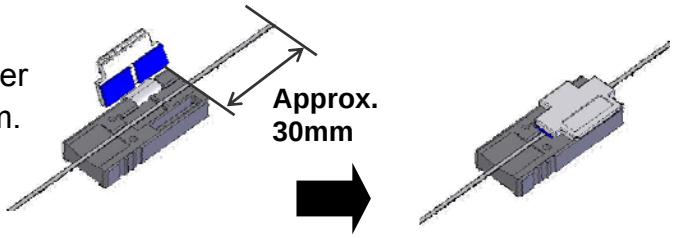
1: Turn on the power of the JR-6.



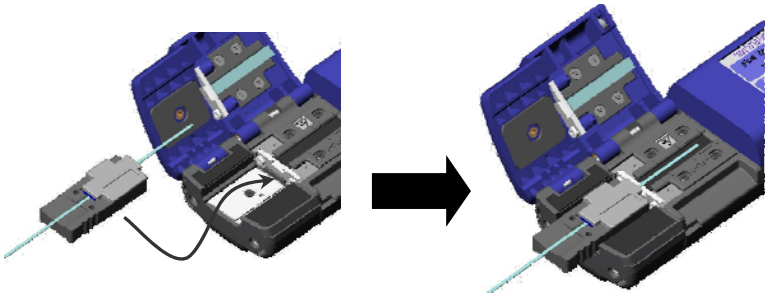
Press the POWER key for more than 1 second until the TEMP./BATT. indicator LEDs illuminate.

The indicator LEDs illuminate to indicate a current battery remaining capacity. Then the HEATER LED flashes in the red. The HEATER LED turns green when the JR-6 reaches the set temperature.

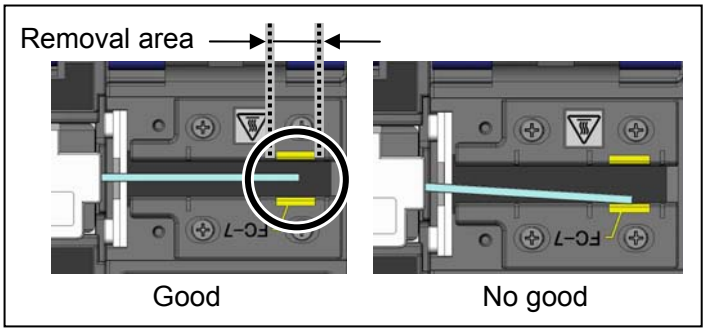
2: Place an optical fiber in a fiber holder with the ends protruding approx. 30mm.



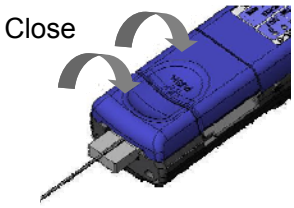
3: Place the fiber holder in the holder receptacle.



*Touch the edge of the fiber holder against the JR-6.

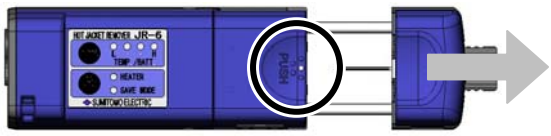


With use of Sumitomo fiber cleavers, ensure that the coating end is positioned in a specified area indicating "FC-7".



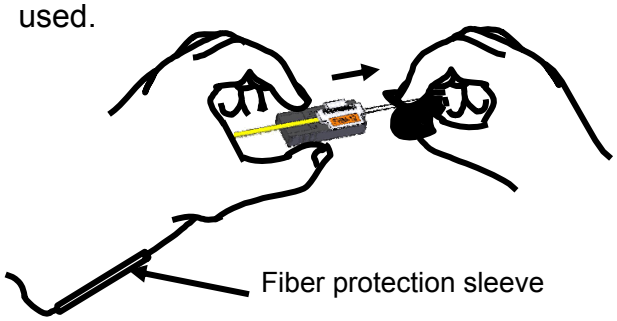
4: Close the main body lid and holder lid.
The HEATER LED flashes in green for approx. 5 seconds, and then keeps illuminated.

5: Ensure that the HEATER LED is lit in green and hold the JR-6, especially the "PUSH" portion of the main body lid firmly. Then slide the holder receptacle and holder lid slowly in the direction indicated by the arrow.



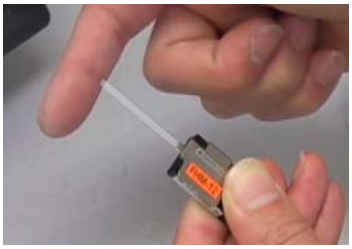
6: The fiber coating is removed. Take out the fiber holder from the JR-6.

7: Clean the bare fiber from the end of the fiber coating with a lint-free gauze pad moistened with pure (more than 99%) alcohol. Pull the bare fiber in the direction indicated by the arrow through the gauze pad. Do not reuse the gauze pad that was used.



Keep the fiber squeaky clean.

8: Lightly brush the ends with your finger to fan out all fibers in a straight line.



9: Repeat the stripping and cleaning processes for the other fiber.

<For single fiber>

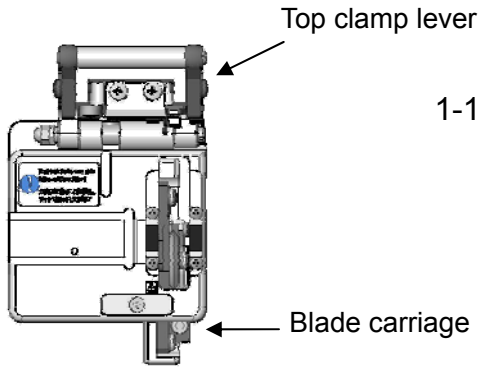
1. Remove the fiber coating with a jacket remover for single fiber. (ex. Sumitomo JR-M03).
2. Clean the bare fiber.
3. Place the fiber into the fiber holder. Ensure that the end of the fiber coating is aligned with the edge of the convex portion of the fiber holder.

Cleaving the fiber

An example shows use of Sumitomo FC-6M fiber cleaver. Please read the FC-6M operation manual before use. If you use another fiber cleaver, please refer to its operation manual.

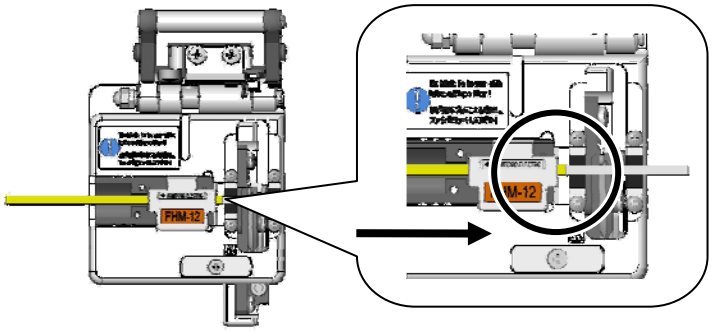
Standard cleave length: 10mm

1:



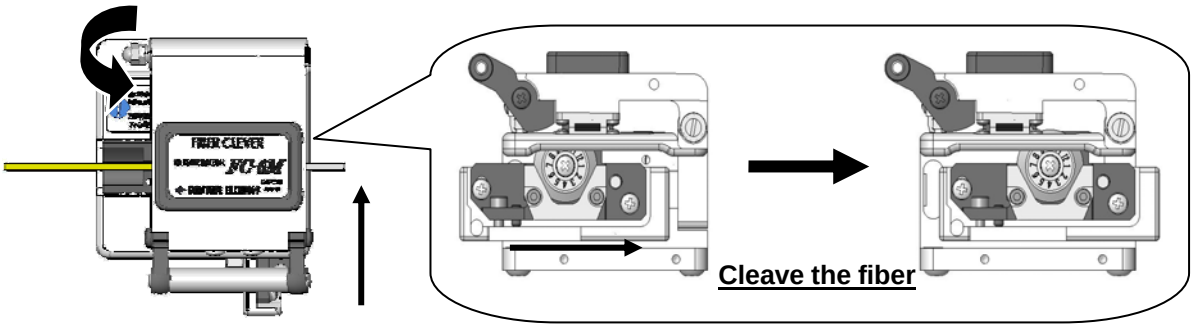
1-1: Open the coating clamp lid and the top clamp lever. The blade carriage should be in the forward position.

2:



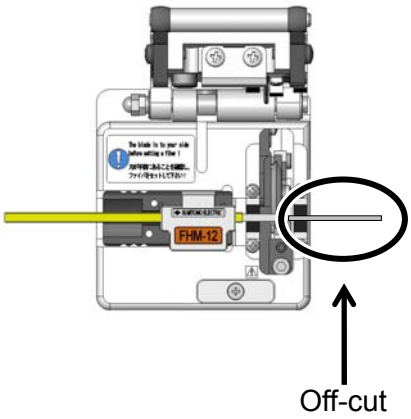
2-1: Place the fiber holder in the FC-6M. (Touch the edge of the fiber holder against the FC-6M.)
* Keep the fiber in the fiber holder after stripping the fiber coating/cleaning the bare fiber.

3:



3-1: Lower the top clamp lever. Slide the blade carriage to the rear of the cleaver as indicated by the arrow.

4:



The fiber is cleaved.

4-1: Open the top clamp lever.

4-2: Lift the fiber holder.

4-3: Lift the off-cut and dispose of it properly.

*Be careful not to touch the off-cut against the fiber end face.

4-4: Place the fiber holder into the TYPE-66.

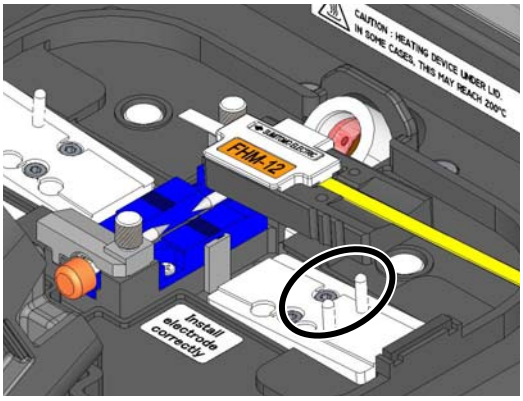
4-5: Cleave the other fiber in the same way.

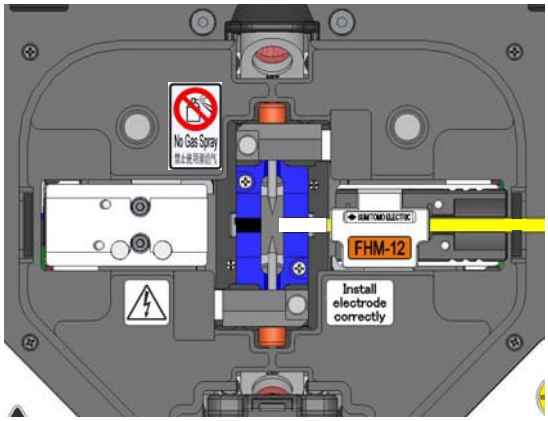
Caution

1. Do not re-clean the fiber after cleaving.
2. To avoid damaging or contaminating the delicate fiber ends, insert each fiber immediately after preparation.
3. Glass-fiber fragments are extremely sharp. Handle with care.

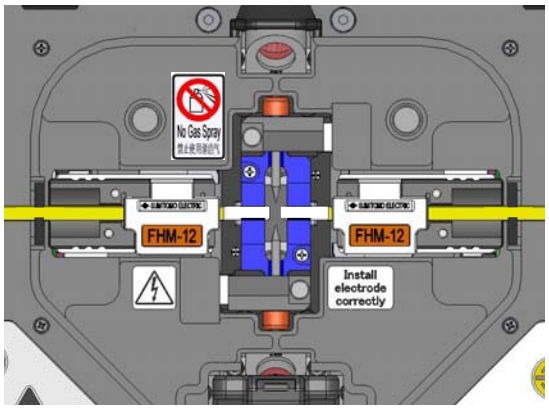
Inserting fibers into the splicer

0: Open the hood.



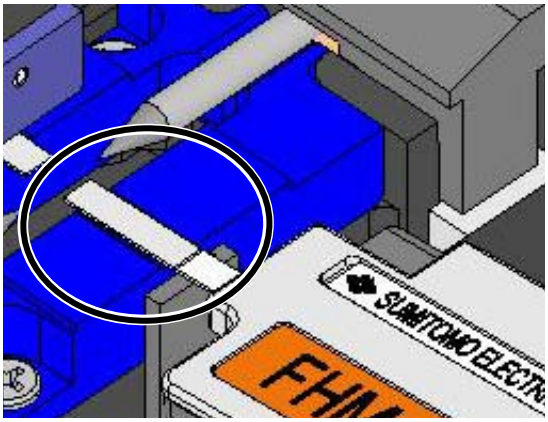


1: Place the fiber holder onto the holder stage, fitting the pin of the fiber holder stage into the hole of the fiber holder.



2: Place the other fiber holder in the same way.

Do not touch the fiber end face against any surface.



3: Ensure that the fibers are resting in the V-groove.

The position of fiber placement is different depending on the number of fibers.
Place the fibers looking at the illuminated fiber guide light.

4: Close the hood.

5: Start an arc test, and then the splicing process.

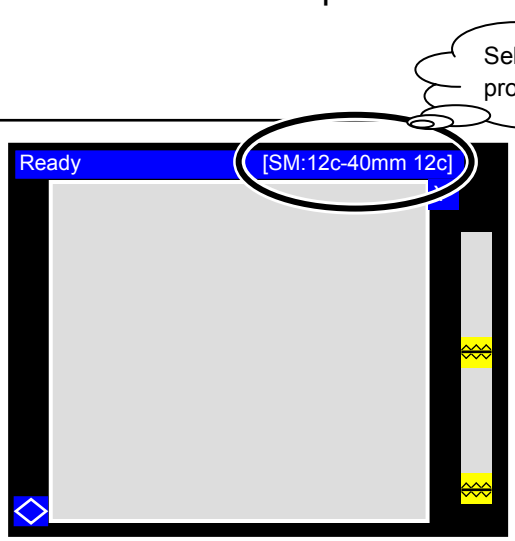
Arc test procedure

The fusion splicer has a built-in Arc test feature that should be used to ensure consistent high-quality splices with low splice losses. Performing an arc test automatically adjusts the arc power and position to compensate for environmental conditions, electrode wear and the melting characteristics of the fiber types in use.

.

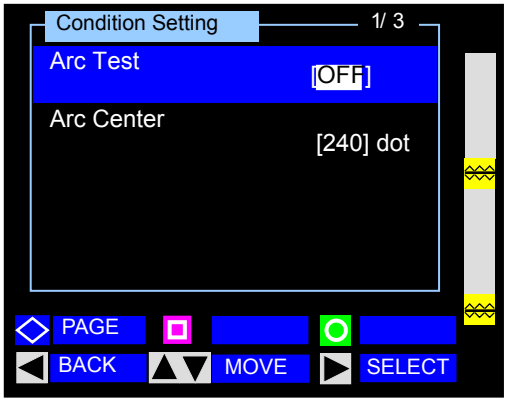
Situations that should prompt an arc test are:

- •Initial splicing set-up
- •Changing fiber types
- •Extreme changes in temperatures, humidity or air pressure
- •Poor splice performance
- •After electrode replacement

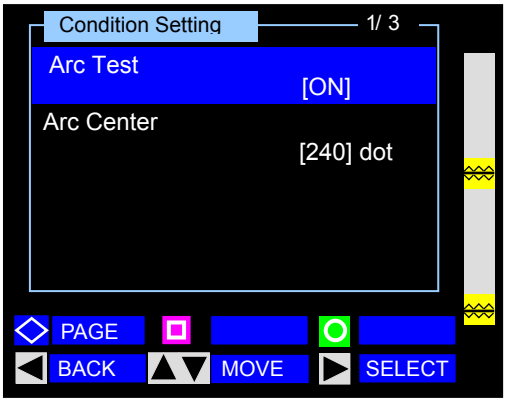


1: Strip the coatings, clean, cleave and insert the fibers. (Hereinafter called “prepare the fiber”)
*After initialization, check to see if the displayed fiber type and protection sleeve type are correct. (if not, change the settings, referring to page 39.)

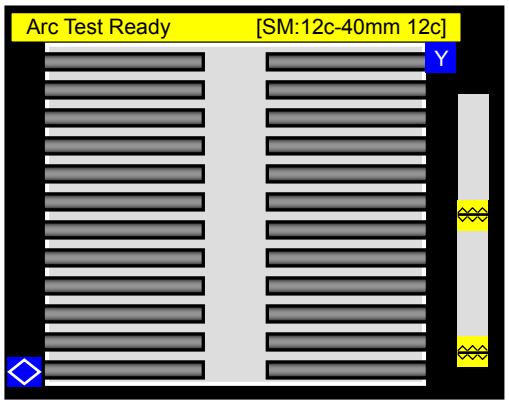
2: Press the (CONDITION) key.



3: The “condition setting” screen is displayed.
(“Arc Test” is selected.)
4: Press the ▶ (SELECT) key.
“OFF” is highlighted.
5: Press the ▲ or ▼ key to change to “ON”.

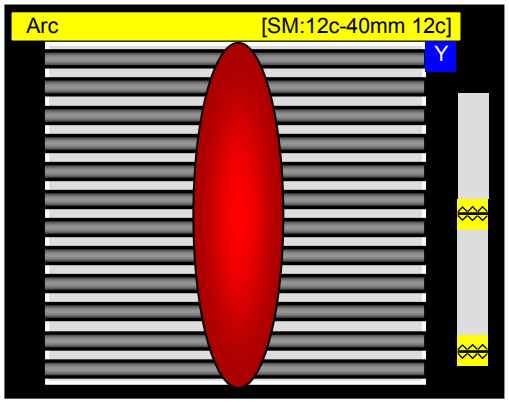


6: Press the ▶ (SELECT) key.
Make sure that “ON” is displayed.
7: Press the ◀ (BACK) key.
“Arc Test Ready” screen will be displayed.

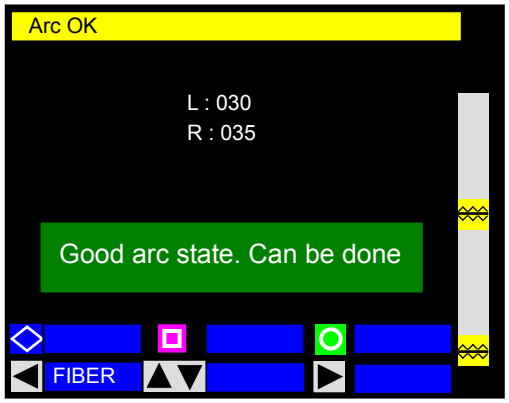


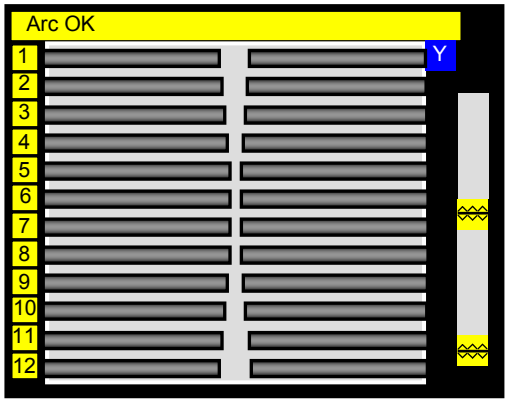
8: Ensure that “Arc Test Ready” is displayed at the upper left corner of the screen.

9: Press the (SET) key.
The fibers are moved forward.



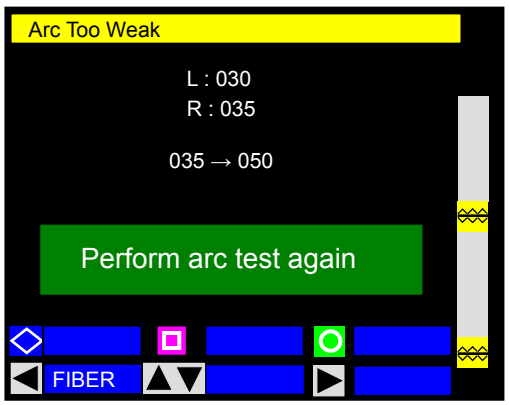
10: An arc test is started. (The fibers are not spliced.)

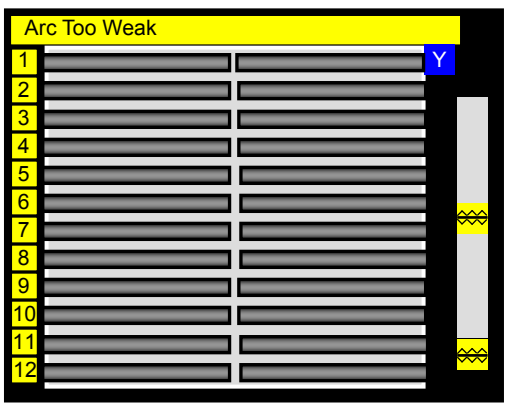




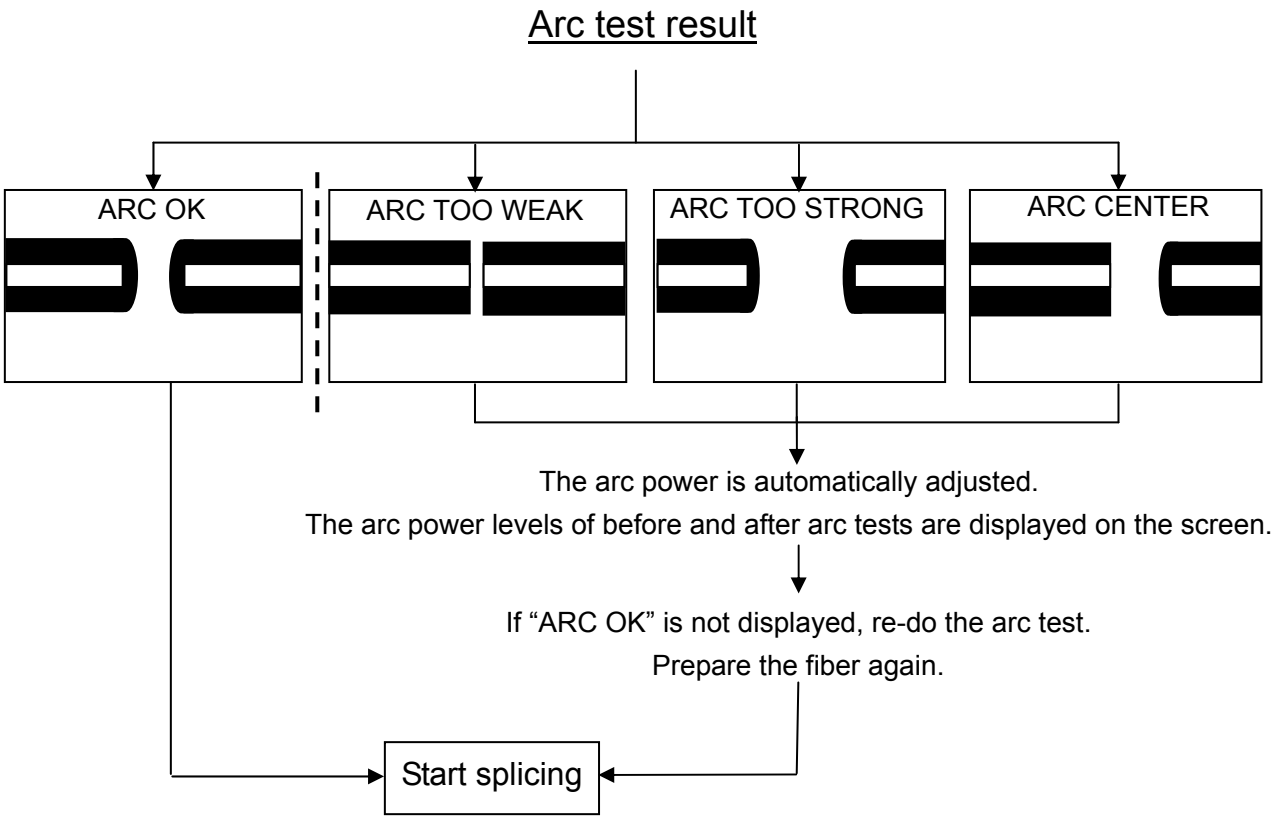
Press the ◀ (FIBER) key. The arc test result with fiber images will be displayed.

11: If “ARC OK” is displayed, begin the fiber preparation procedure to perform a splice.





12: If “ARC TOO WEAK”, “ARC TOO STRONG” or “ARC CENTER” is displayed, prepare the fiber again and repeat the test until “ARC OK” is displayed.



The adjusted arc power level is stored even if the splicer is turned off.

Fiber preparation

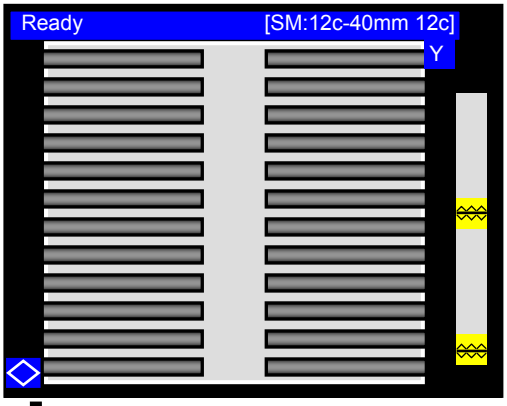
1: Be sure to slip the fiber protection sleeve over one of the fibers to be spliced before stripping and cleaving the fibers. The fiber protection sleeve cannot be installed after splicing.

2: Strip the fiber coating and clean the bare fiber.
Refer to page 17~18.

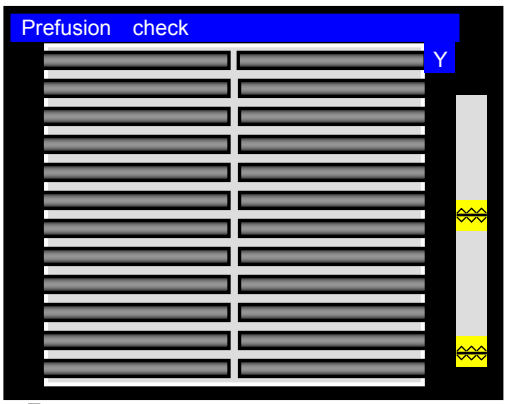
3: Cleave the bare fiber to proper cleave length.
Refer to page 19~20.

4: Insert the fiber into the splicer. Press the (SET) key to start the automatic splicing process.

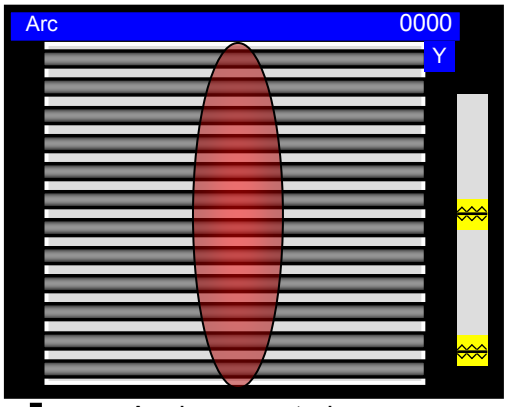
Starting the automatic splice



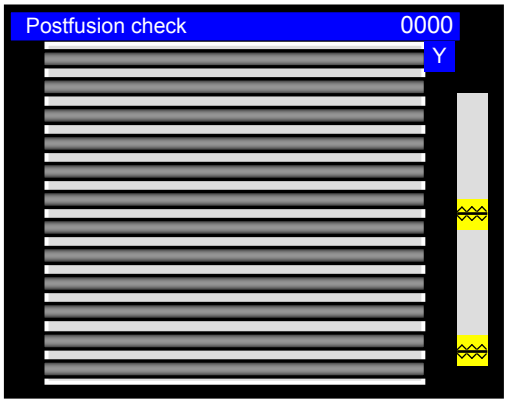
Press the (SET) key.



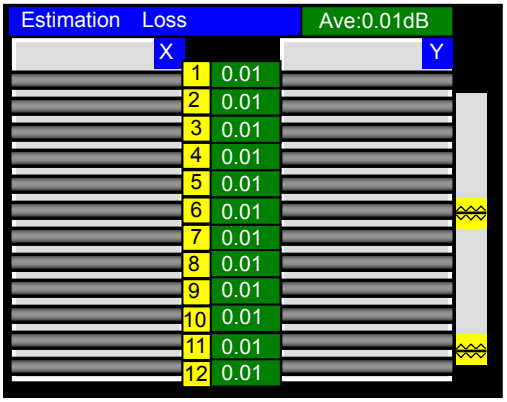
Inspection of fiber end face & dust



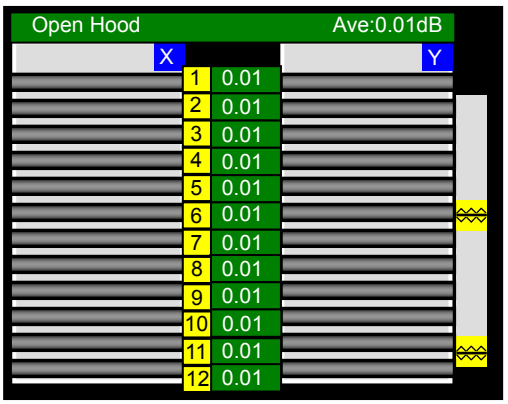
Arc is generated.
(Arc Count is displayed on the screen.)



Fiber inspection after splice

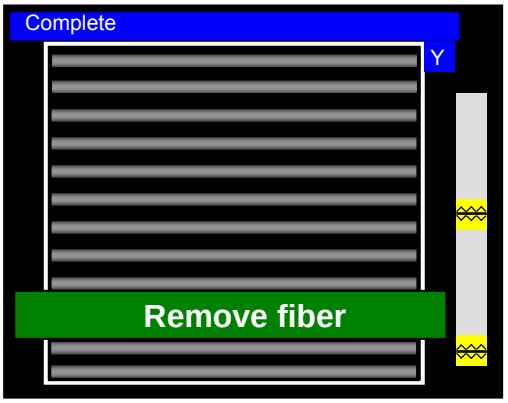


Estimated losses are displayed.



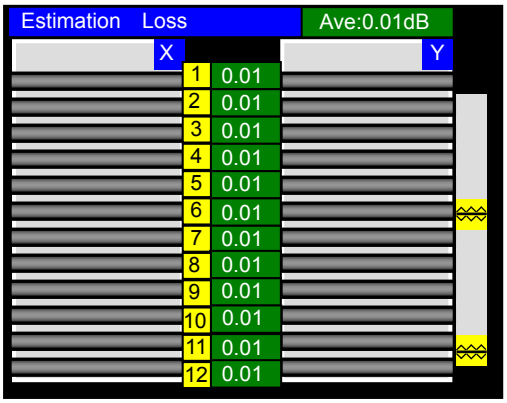
“Open Hood” is displayed.

Proof test is performed.



After proof test, “Complete” is displayed.

Checking splice data

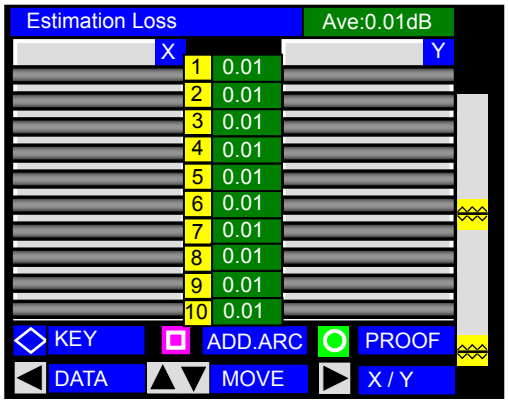


Estimated losses are displayed.

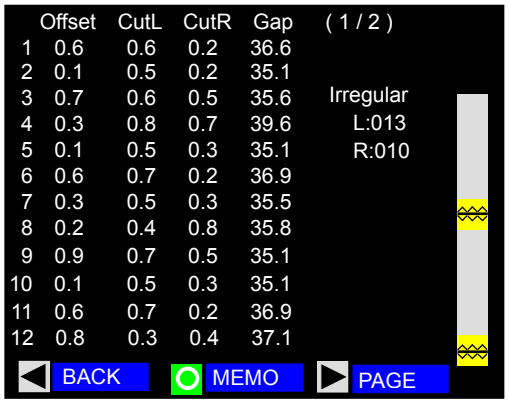
If splice data check is not necessary, go to the next page.

See also page 44 & 48.

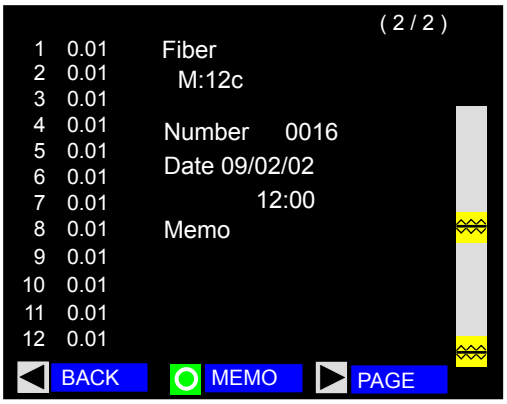
• After a splice, press the (KEY) key.
The screen shown below is displayed.



Press the ◀ (DATA) key.
The screen shown below is displayed.

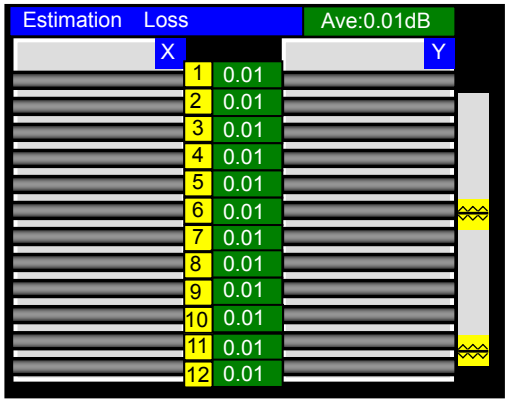


Splice data (1/2)



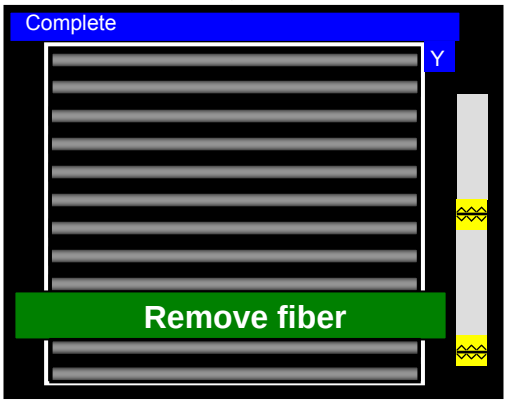
Splice data (2/2)

(if automatic proof test is selected)



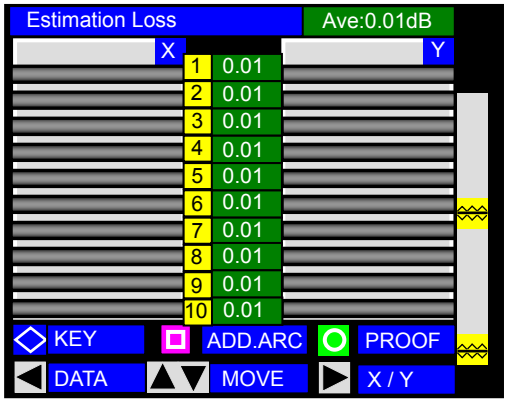
Open the hood.

The proof test is automatically started.



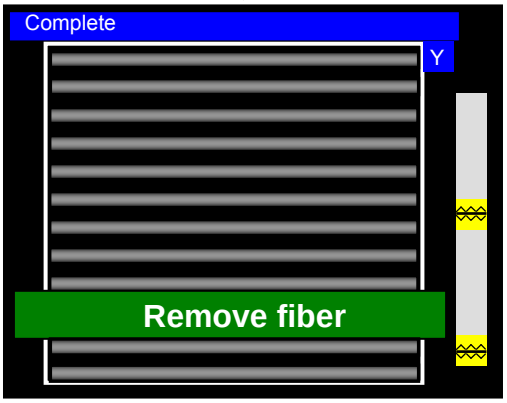
When a beep sounds, remove the fiber.

(if manual proof test is selected)



Press the (PROOF) key.

The proof test is started.

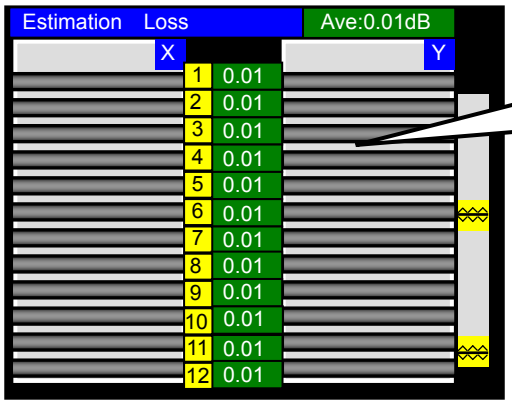


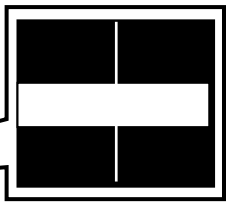
Open the hood and remove the fiber.

Take care to keep the spliced fiber straight. Do not flex it back and forth. Doing so will cause the spliced fiber to be broken, resulting in loss of the long term reliability of the fiber.

Evaluating splice quality

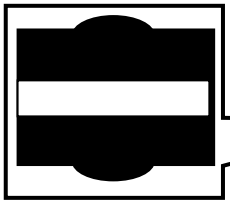
If the spliced fiber is as follows or estimated losses are high, re-do the entire splice.





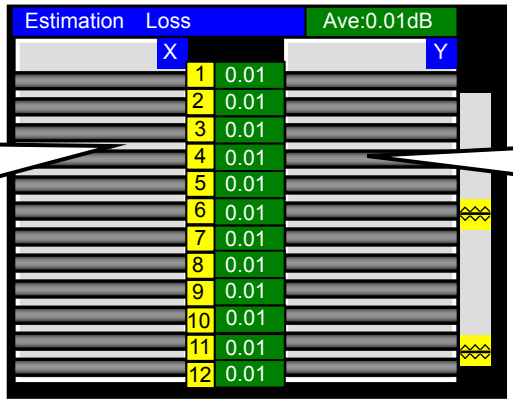
White line

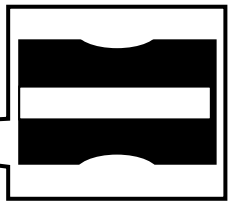
(Re-arc→NG→
Re-do splicing)



Bulging

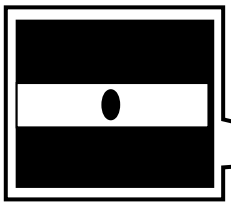
(Re-do splicing.)





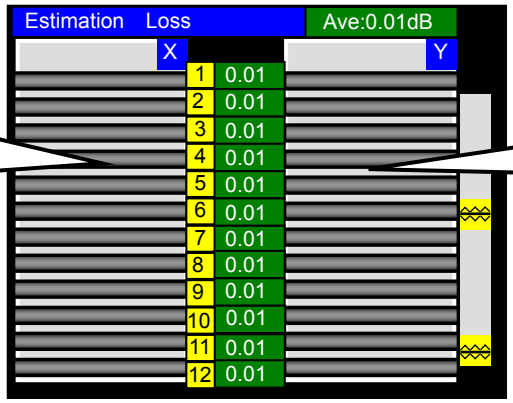
Neck-down

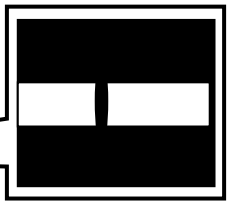
(Re-do splicing.)



Bubble

(Re-do splicing.)





Black line

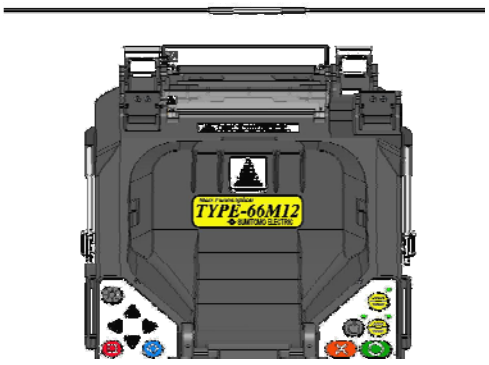
(Re-do splicing.)

After MMF or dissimilar fiber splicing, a line sometimes appears at the splice point. But it does not affect splice quality, such as splice loss, tensile strength, and etc.

Splice protection

0: Open the heat shrink oven lid and the heat shrink oven clamps. The left-hand clamp is conneted with the heat shrink oven lid and both are open together.

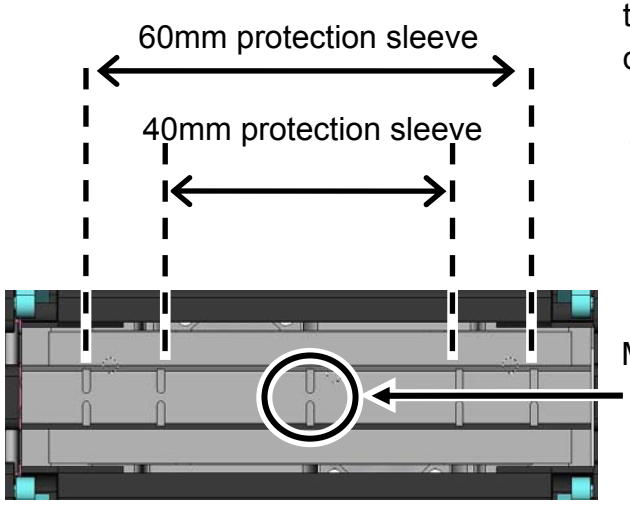
1: Open the hood and the lid of the one fiber holder. Slide the protection sleeve to the center of the splice.



2: Open the lid of the other fiber holder. Remove the fiber from the splicer.

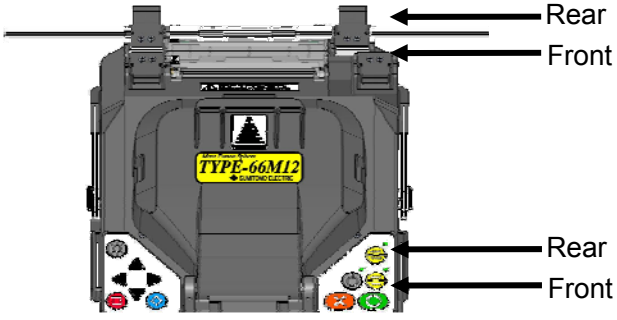
•Do not twist the fiber.
•Do not flex the fiber.

3: Lower the fiber coating clamp onto the right-hand fiber clamp.
While maintaining a slight tension on the fiber end, lower the fiber coating onto the left-hand fiber clamp and push down.



When lowering the fiber onto the heat shrink oven, use the markings on the heat shrink oven as a reference.

4: Press the (HEAT) key to start the shrinking process.
•The heat cycle is started.



If Auto start heating is set to ON, the heating operation is automatically started when the fiber is placed into the heat shrink oven.

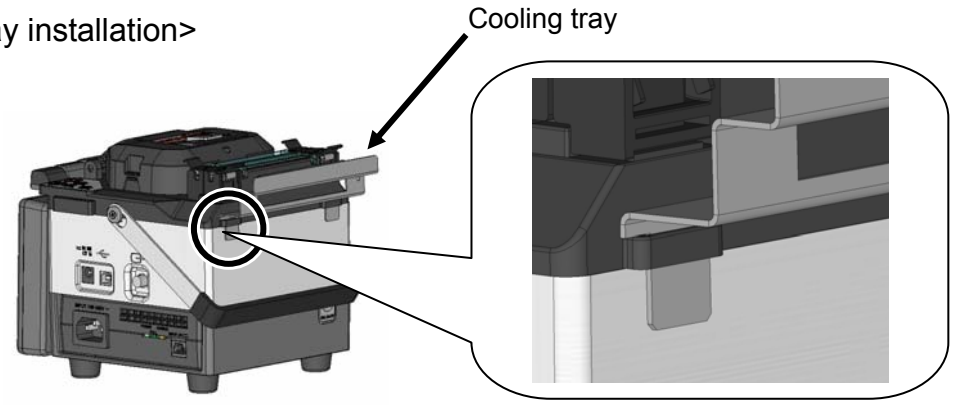
If you would like to cancel the heating process, press the (HEAT) key again.

The cooling fan still runs to cool down the heat shrink oven even after the heating process is completed.

5: A beep sounds when the heating process is completed. Remove the fiber protection sleeve.

6: Place the protection sleeve onto the cooling tray.

<Cooling tray installation>



Install the cooling tray into the splicer as shown above.

Caution

After the heat cycle is complete, the fiber protection sleeve may be hot. Handle with care.
Never touch the surface of the heating plate during the heating operation. Doing so may cause personal injury and damage to the heat shrink oven.

Evaluating protection sleeve

OK

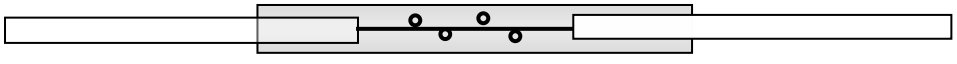
Completely shrunk, no bubbles, the splice is centered in a sleeve

NG

1: The shrinking sleeve is not centered over the splice.

2: Bend in bare fiber

3: Bubbles on bare fiber



3. Maintenance

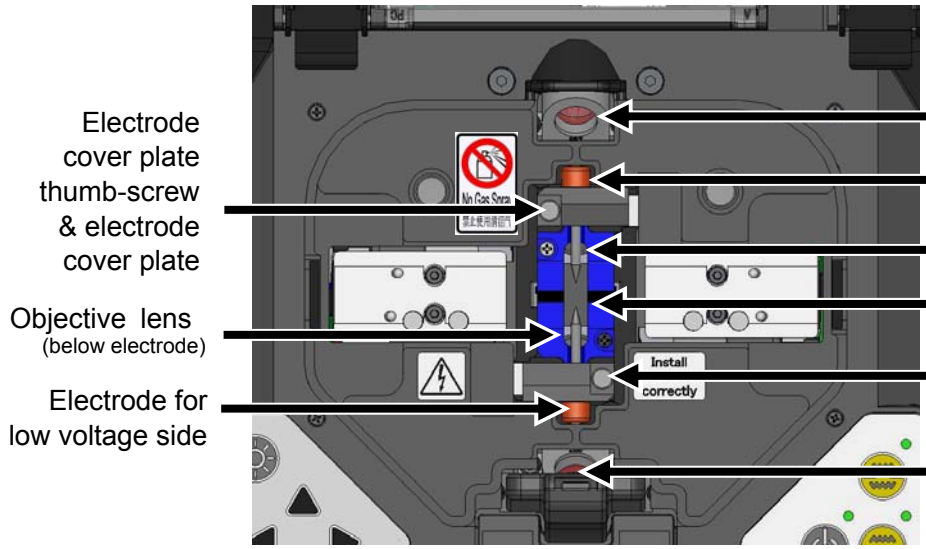
To keep excellent splice quality, regular cleaning and inspection are required. Especially cleaning should be performed before and after each use. We recommend your splicer to be checked through our maintenance service once a year.

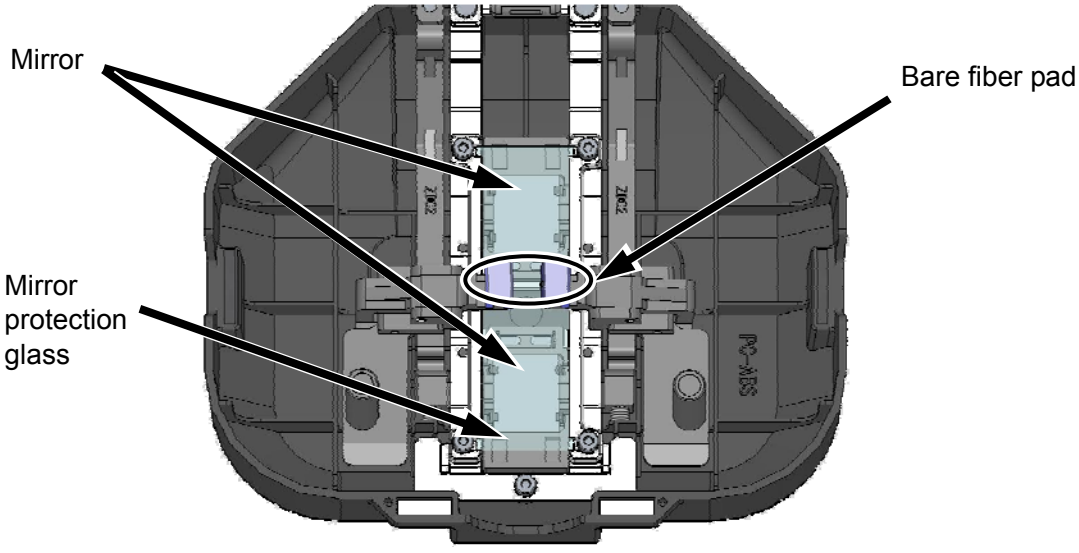
> Warning
>
> Turn off the TYPE-66 before maintenance work. Failure to do so may cause electric shock.

Cleaning

Clean each part with a cotton swab. Please bear in mind that daily cleaning can maintain splicer performance. Clean components before and after use.

Names of components



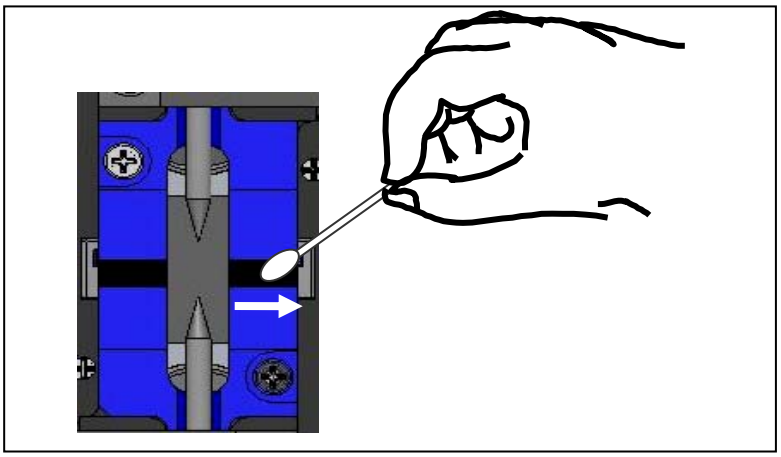


Cleaning V-grooves

Even tiny bits of dust or dirt in the V-grooves might cause the fiber to be offset. To avoid offset, carefully clean the V-grooves with a cotton swab moistened with alcohol.

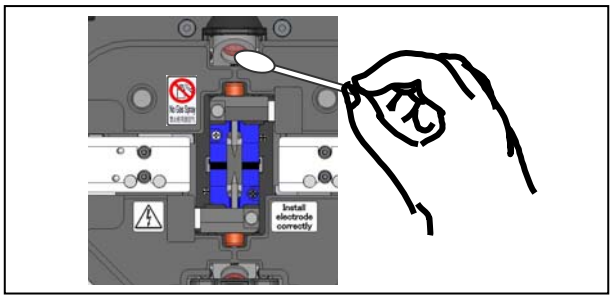
1: Prepare a cotton swab moistened with alcohol.

2: Brush the surface of the V-grooves.



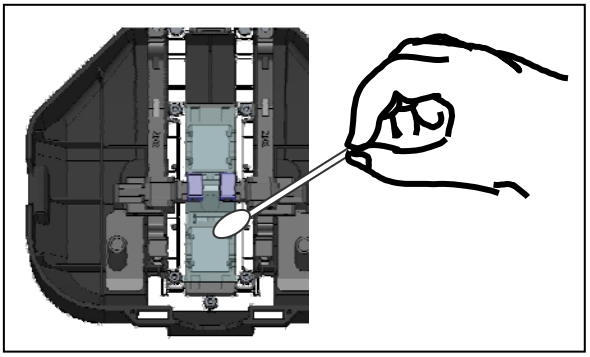
Cleaning LEDs and mirror protection glass

When a LED/mirror protection glass is dirty, a fiber image is unclear, resulting in imperfect image processing. If the display is uneven or LED error occurs, clean them with a cotton swab moistened with alcohol.



1: Prepare a cotton swab moistened with alcohol.

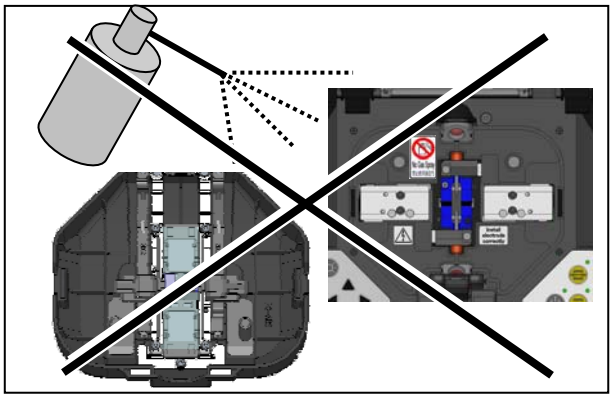
2: Gently wipe the surface of the LED.



3: Gently wipe the mirror protection glass. Do not clean the mirror protection glass hard. Doing so will damage to the glass, causing an error to occur.

4: Use a dry cotton swab to wipe off any excess alcohol.

5: If you cannot remove stain by cleaning the mirror protection glass, unscrew the 4 screws and replace the glass with a new one. After replacement, tighten the screws to hold the glass properly.

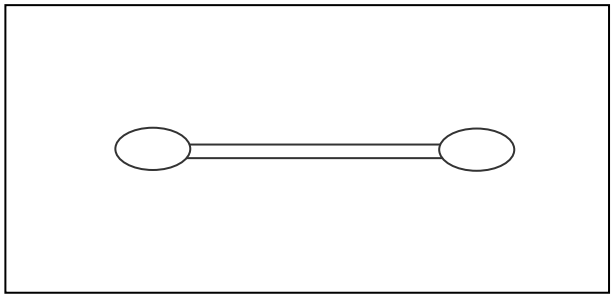


Prohibition

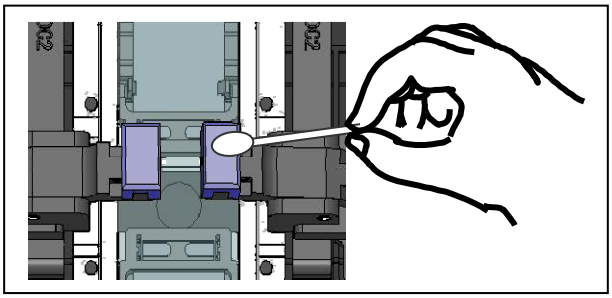
Do not use a canned air for cleaning. Chemical reaction may deteriorate the lens, resulting in a loss of splicing capability.

Cleaning bare fiber pads

Dirt on a bare fibre pad will also cause the fibrer to be offset. When fiber offset occurs, clean the bare fiber pad.

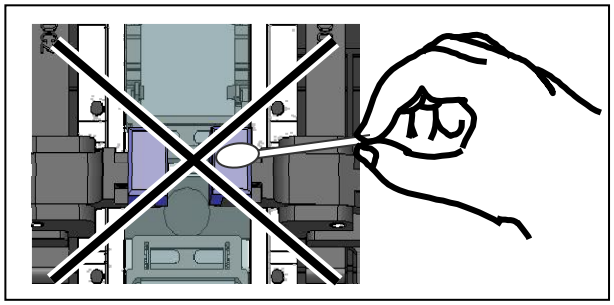


1: Prepare a cotton swab moistened with alcohol.



2: Clean the surface of the bare fiber pads.

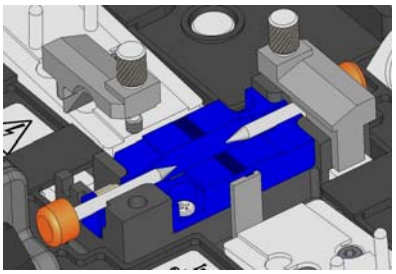
3: Use a dry cotton swab to wipe off any excess alcohol.



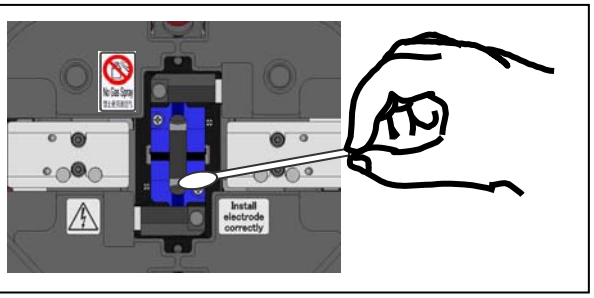
Do not apply too much force when cleaning.

Cleaning microscopes (objective lenses)

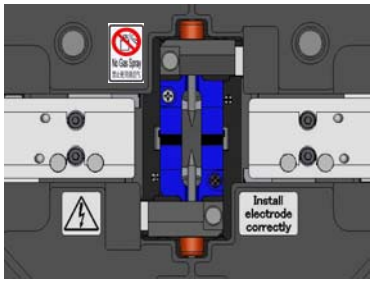
If an unclear fiber image is still displayed or LED error occurs again after cleaning LEDs or a mirror protection glass, clean the microscopes.



1: Remove the electrodes, referring to the “Replacing electrodes” at page 35.



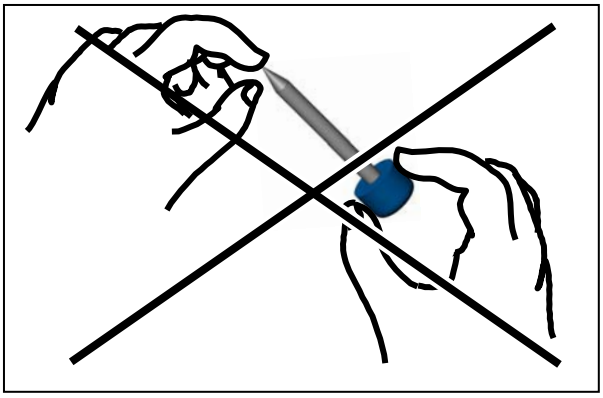
2: Prepare a cotton swab moistened with alcohol. Gently wipe the lens of the microscope in a circular motion.



3: Use a dry cotton swab to wipe off any excess alcohol.

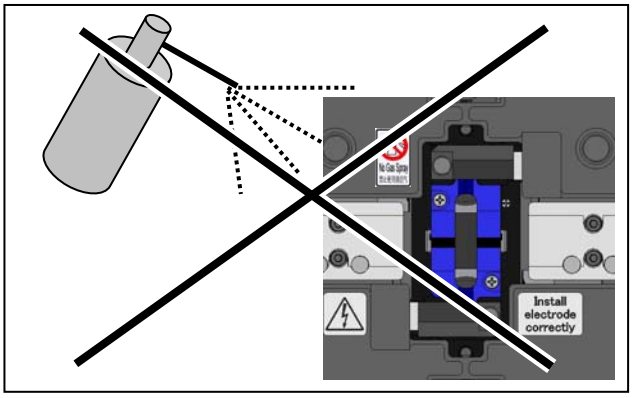
4: Re-fit the electrodes.

5: Perform an arc test.



Caution

An electrode tip is extremely sharp. Handle with care.

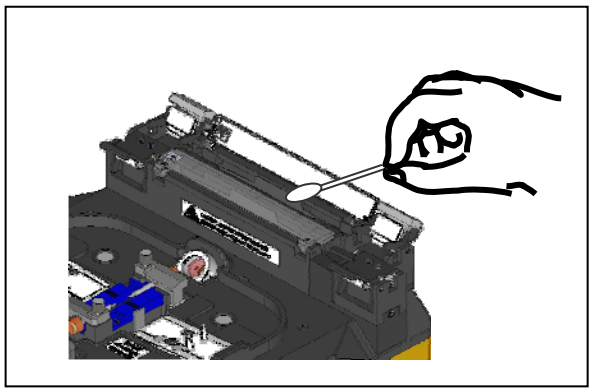


Prohibition

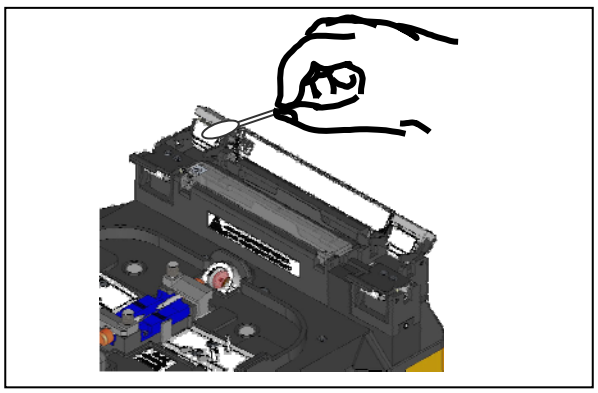
Do not use a canned air for cleaning. Chemical reaction may deteriorate the lens, resulting in a loss of splicing capability.

Cleaning heat shrink oven

Dirt and dust can accumulate in the heat shrink oven easily. Clean the heating plate regularly with a dry cotton swab.



Clean the heating plate with a dry cotton swab.



Clean the clamps of the heat shrink oven with a cotton swab moistened with alcohol.

Caution

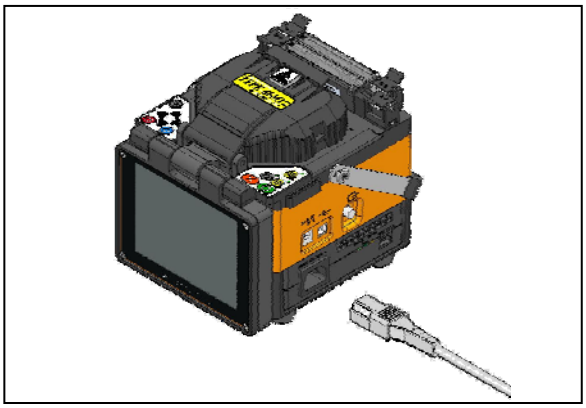
Remove moisture or alcohol on the heat shrink oven with a dry cotton swab.

Cleaning fiber holders

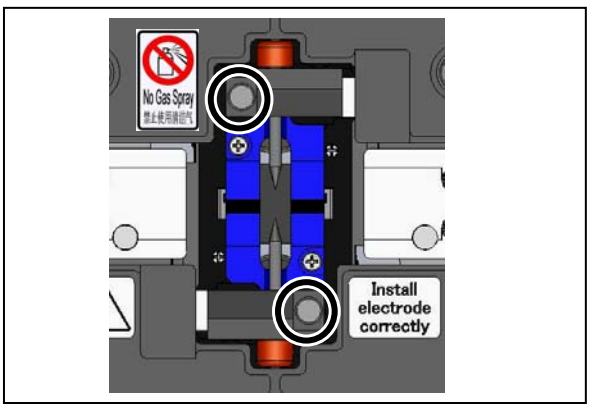
Clean the fiber holders with a cotton swab moistened with alcohol.

Replacing electrodes

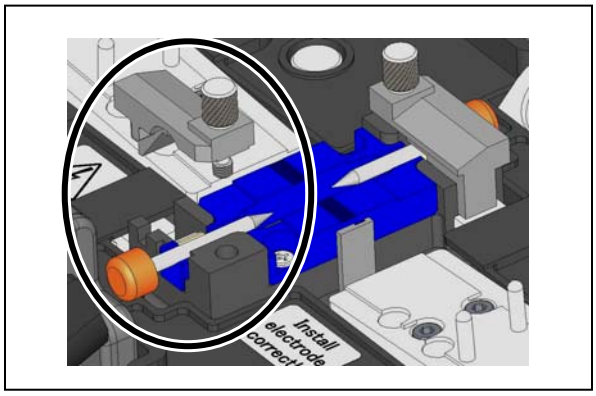
The electrodes will typically need replacing after approximately 1,000 discharges. If the number of arc discharge exceeds 1,000 times, Arc Count shown on the screen (refer to page 25) will be highlighted in red for warning. The electrode tip is extremely sharp. Handle with great care.



1: Turn off the splicer and unplug the power cord.



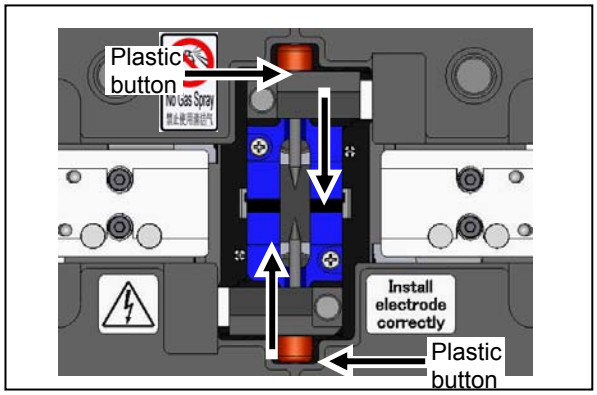
2: Using your fingers, loosen the thumbscrews.



3: Lift the electrode cover plate as shown in the left figure.
4: Remove the old electrode.
5: Install a new electrode.

Caution

When handling the electrodes, avoid touching the electrode tips with anything.

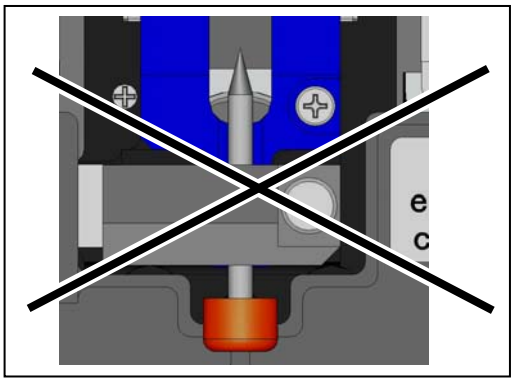


6: Tighten the thumbscrew while pushing the plastic button against the electrode cover plate.

7: Repeat step 2 to 5 for the other electrode. Always replace both electrodes at a time.

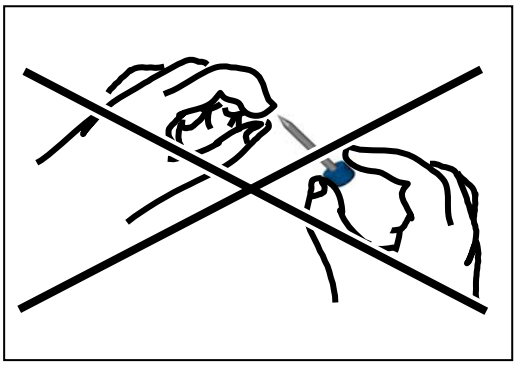
8: Plug the power cord into the power module and turn on the power to condition the electrodes.

Only use original Sumitomo electrodes.



Caution

Ensure that the new electrode is fully inserted with the plastic button against the cover plate.
Failure to do so may cause splicer malfunction or to lower splice performance.



Caution

An electrode tip is extremely sharp. Handle with care.

Caution

- Be sure to turn off the splicer and unplug the power cord or remove the battery before replacing the electrodes.
- Discard the old electrodes properly.

Caution

- Do not clean the electrode. Doing so may cause unstable arcing performance.

Replacing monitor protection panel

The damaged or contaminated monitor protection panel can be replaced.

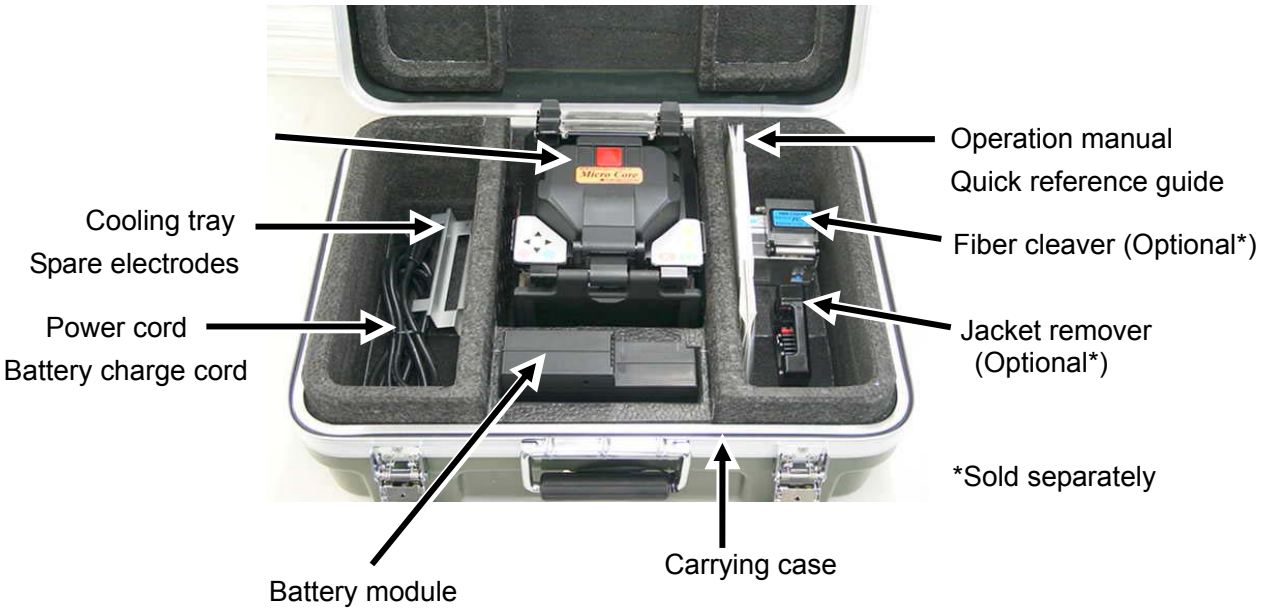
1: Unscrew the 4 screws to remove the monitor protection panel.
2: Fit a new monitor protection panel and tighten the 4 screws.

Caution

When fitting the panel to the monitor, pay attention not to let dust or dirt into the panel.

Packing and storage instructions

- Store the TYPE-66 and its accessories in a designated place in the case referring to the photo below.
- Store the splicer in the direction shown in the photo below.
- The splicer with a cooling tray cannot be stored in the case. Remove the cooling tray from the splicer and store it in the pocket.



The TYPE-66 fusion splicer is a precision instrument. Its rugged shipping case is custom designed to protect it from impact, dust, dirt, and moisture. Always store and transport the machine in its case. Observe the following instructions.

- Clean the TYPE-66 and all accessories before storing them.
- Be sure to remove the battery from the TYPE-66 and store it in a given place.

> ⚠ Warning
>
> Keeping the battery in the TYPE-66 may cause the battery terminal to be damaged or deteriorated, resulting in fire.

- Reposition the monitor before storing.
- Discard the liquid solvent properly, or lock the dispenser completely and put it in a plastic bag before packing the dispenser in the case.

Warning

Take extreme care of the handling of alcohol.

• Before storing the fiber cleaver, dispose of the fiber fragments collected in the off-cut collector in a proper way.

Caution

Glass fiber fragments are extremely sharp. Handle with care.

•Close the carrying case completely and latch it before transportation.

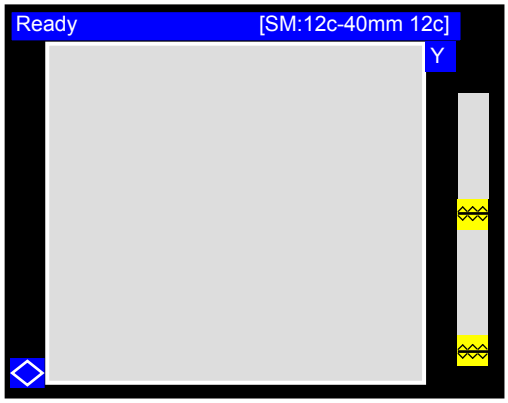
•Pay attention to storage temperature and dew condensation when storing the splicer. The battery module is self-discharged during storage. Perform temperature control and charge and discharge the battery once every 6 months.

Storage temperature -20°C ~ +50°C (if stored for less than 3 months)
-20°C ~ +30°C (if stored for less than 1 year)

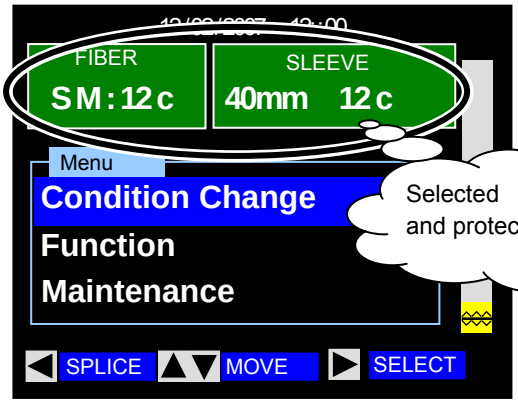
4. Functions

Splice and heater condition settings

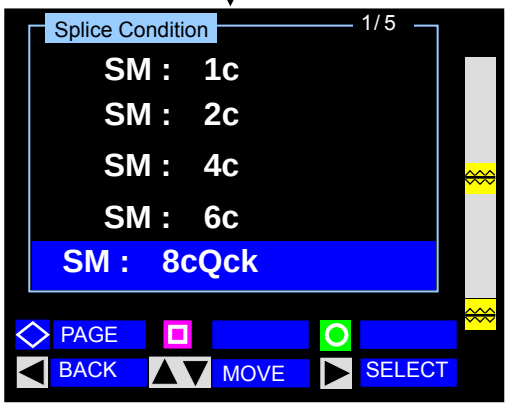
Fiber type and protection sleeve settings



From the Ready screen, press the ◀ (MENU) key to enter the MENU screen.



Press the ▶ (SELECT) key to enter the fiber selection screen.

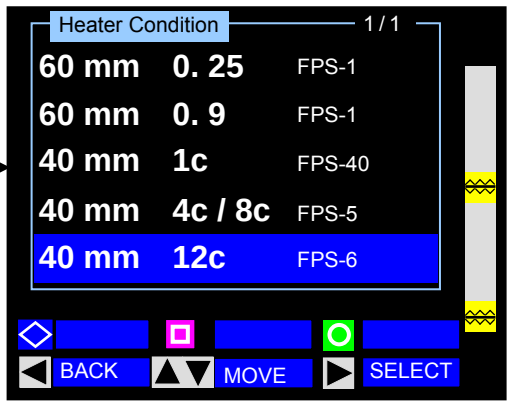


Select the fiber type being spliced. Press the ▶ (SELECT) key to enter the protection sleeve selection screen.

For the details of splice conditions, refer to page 40.

If you would like to change splice condition parameters, refer to page 42.

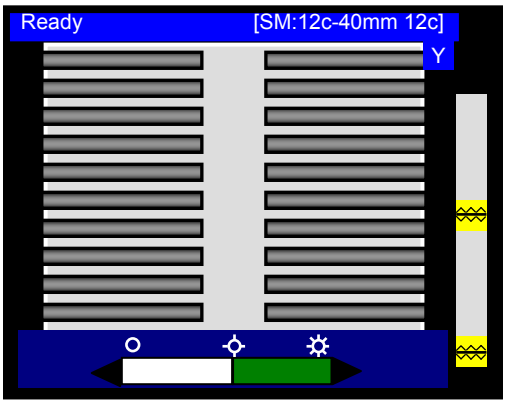
Selected fiber type and protection sleeve



Select the protection sleeve being used. Press the ▶ (SELECT) key to go to the Ready screen.

For the details of heater conditions, refer to page 40.

If you would like to change heater condition parameters, refer to page 42.



In this screen, monitor brightness can be adjusted if the ☼ (Brightness control) key is pressed.

Splice conditions

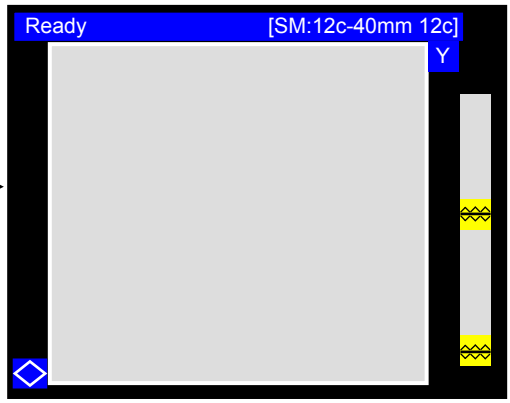
Page	Splice condition	Details
1/5	SM : 1c	Can be used for splicing single-mode single fiber (ITU-T G.652).
	SM : 2c	Can be used for splicing single-mode 2-fiber ribbon (ITU-T G.652).
	SM : 4c	Can be used for splicing single-mode 4-fiber ribbon (ITU-T G.652).
	SM : 6c	Can be used for splicing single-mode 6-fiber ribbon (ITU-T G.652).
	SM : 8cQck	Can be used for splicing single-mode 8-fiber ribbon (ITU-T G.652). "SM: 8cQck (Quick)" enables to perform a splice faster than "SM: 8cStd (Standard)".
2/5	SM : 8cStd	
	SM : 10cQck	Can be used for splicing single-mode 10-fiber ribbon (ITU-T G.652). "SM: 10cQck (Quick)" enables to perform a splice faster than "SM: 10cStd (Standard)".
	SM : 10cStd	
	SM : 12cQck	Can be used for splicing single-mode 12-fiber ribbon (ITU-T G.652). "SM: 12cQck (Quick)" enables to perform a splice faster than "SM: 12cStd (Standard)".
	SM : 12cStd	
3/5	MM : 1c	Can be used for splicing multimode single fiber (ITU-T G.651).
	MM : 2c	Can be used for splicing multimode 2-fiber ribbon (ITU-T G.651).
	MM : 4c	Can be used for splicing multimode 4-fiber ribbon (ITU-T G.651).
	MM : 5c	Can be used for splicing multimode 5-fiber ribbon (ITU-T G.651).
	MM : 12c	Can be used for splicing multimode 12-fiber ribbon (ITU-T G.651).
4/5	DSM : 1c	Can be used for splicing dispersion shifted single fiber (ITU-T G.653).
	DSM : 2c	Can be used for splicing dispersion shifted 2-fiber ribbon (ITU-T G.653).
	DSM : 4c	Can be used for splicing dispersion shifted 4-fiber ribbon (ITU-T G.653).
	DSM : 8c	Can be used for splicing dispersion shifted 8-fiber ribbon (ITU-T G.653).
	DSM : 12c	Can be used for splicing dispersion shifted 12-fiber ribbon (ITU-T G.653).
5/5	NZDS : 12c	Can be used for splicing non-zero dispersion-shifted 12-fiber ribbon (ITU-T G.655).

Heater conditions

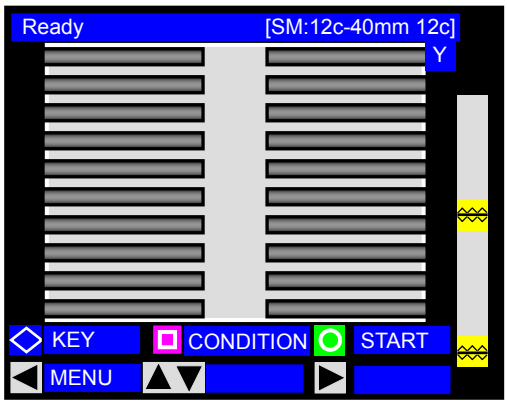
The heating conditions are optimized for Sumitomo protection sleeves. Select an appropriate heater condition for the protection sleeve you are using.

Page	Heater condition	Details
1/1	60mm 0.25 FPS-1	Can be used for heat shrinking 60mm protection sleeves for single fiber with 0.25mm coating, for example, Sumitomo FPS-1.
	60mm 0.9 FPS-1	Can be used for heat shrinking 60mm protection sleeves for single fiber with 0.9mm coating, for example, Sumitomo FPS-1.
	40mm 1c FPS-40	Can be used for heat shrinking 40mm protection sleeves for single fiber with 0.9mm coating, for example, Sumitomo FPS-40.
	40mm 4c/8c FPS-5	Can be used for heat shrinking 40mm protection sleeves for up to 8-fiber ribbon, for example, Sumitomo FPS-5.
	40mm 12c FPS-6	Can be used for heat shrinking 40mm protection sleeves for up to 12-fiber ribbon, for example, Sumitomo FPS-6.

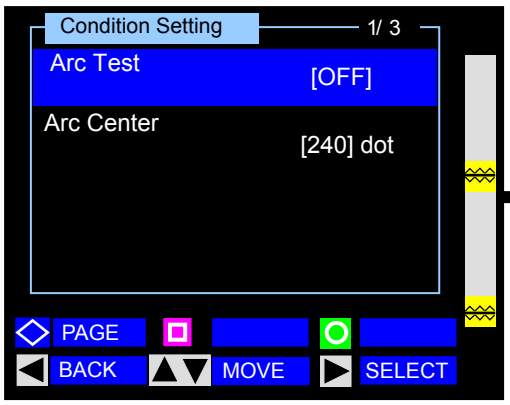
Changing splice and heating conditions



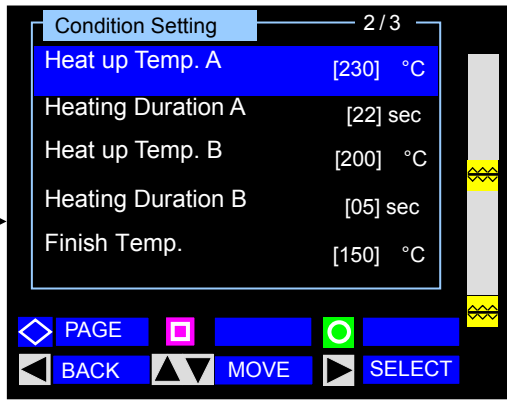
Press the ◇ key to display key guidance.



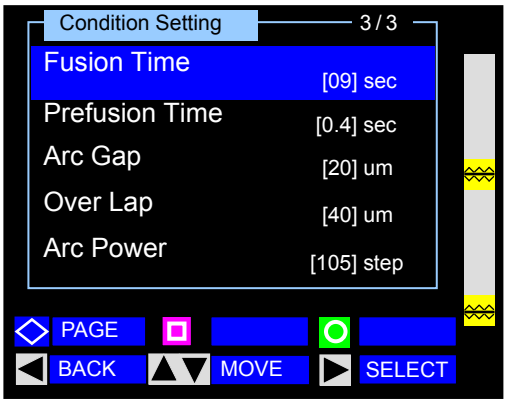
From the Ready screen, press the □ (CONDITION) key to enter the Condition Setting (1/3) screen.



1: Use the ▲▼ (MOVE) keys to select the parameter you would like to change.
2: Use the ▶ (SELECT) key to change the settings.
3: Press the ◇ (PAGE) key to go to the next (2/3) page.



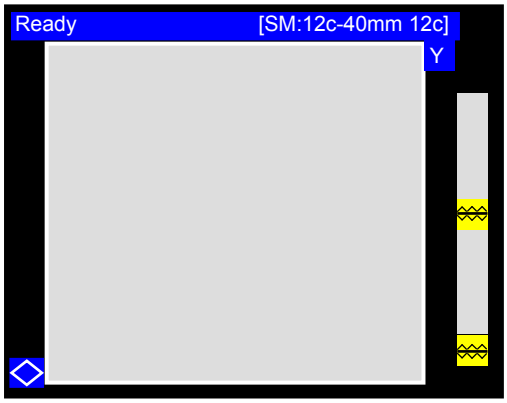
1: Use the ▲▼ (MOVE) keys to select the parameter you would like to change.
2: Use the ▶ (SELECT) key to change the settings.
3: Press the ◇ (PAGE) key to go to the next (3/3) page.



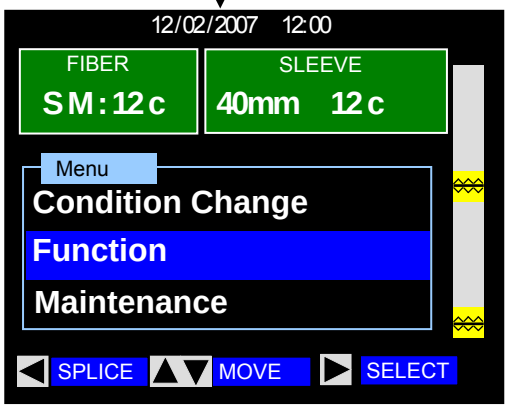
1: Use the ▲▼ (MOVE) keys to select the parameter you would like to change.
2: Use the ▶ (SELECT) key to change the settings.
3. Press the ◀ (BACK) key to go to the Ready screen.

Page	Condition setting
1/3	**<Arc Test>**
	To perform an arc test, select “ON”. After the arc test, this setting is automatically returned to “OFF”. For further detalis about the arc test, refer to page 22.
	<Arc Center>
	This is an arc center position set by the splicer. As the position is automatically set after an arc test, normally an operator does not need to change it manually.
2/3	**<Heat up Temp. A>**
	Center area starts raising up to the set temperature.
	<Heating Duration A>
	After heat shrink oven reaches Heat Up Temperature, it maintains the temperature of center area for this duration.
	<Heat up Temp. B>
	Both ends start raising up to the set temperature.
	<Heating Duration B>
	After heat shrink oven reaches Heat Up Temperature, it maintains the temperature of both ends for this duration.
	<Finish Temp.>
	This is the finish temperature to take out the sleeve. The flashing indication on the keypad stops at this temperature and a beep sounds.
3/3	**<Fusion Time>**
	Fusion time is the duration of arc discharge.
	<Prefusion Time>
	Pre-fusion time is the time in seconds the fiber ends wait after the arc discharge begins before beginning the overlap (feed).
	<Arc Gap>
	Arc gap is the distance between the left and right fibers before fusion takes place.
	<Over Lap>
	Over lap is the amount of over lap between the left and right fibers that occurs when the right fiber is fed forward during the arc fusion.
	<Arc Power>
	Expressed in a unitless step value, arc power controls the amount of heat the fibers are exposed to during the fusion arc. As the power is automatically set after an arc test, normally an operator does not need to change it manually.

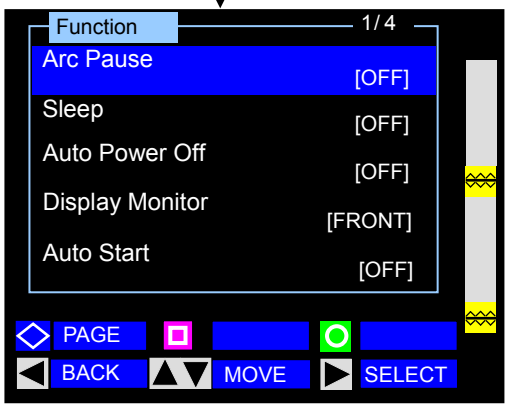
Function settings



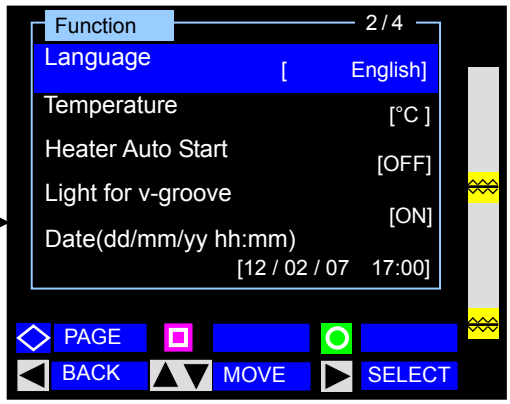
Press ◀(MENU) key to enter the Menu screen.



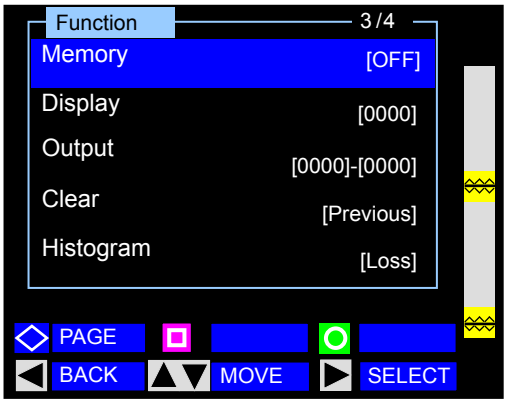
1: Using the ▲▼ (MOVE) keys, select "Function".
2: Press the ▶(SELECT) key to enter the function settings (1/4) screen.



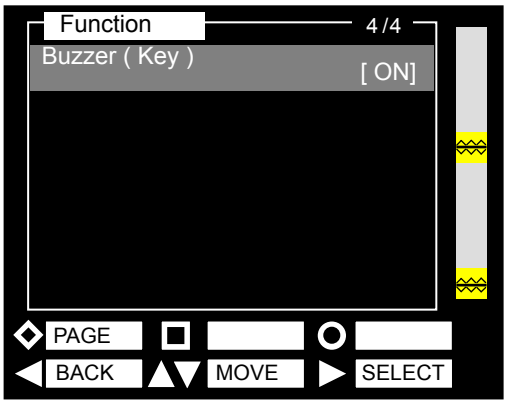
1: Use the ▲▼ (MOVE) keys to select the function you would like to change.
2: Use the ▶ (SELECT) key to change the settings.
3: Press the ◇ (PAGE) key to go to the next (2/4) page.



1: Use the ▲▼ (MOVE) keys to select the function you would like to change.
2: Use the ▶ (SELECT) key to change the settings.
3: Press the ◇ (PAGE) key to go to the next (3/4) page.

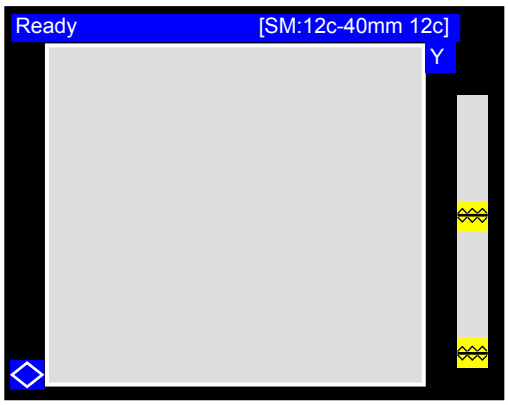


1: Use the ▲▼ (MOVE) keys to select the function you would like to change.
2: Use the ▶ (SELECT) key to change the settings.
3: Press the ◇ (PAGE) key to go to the next (4/4) page.

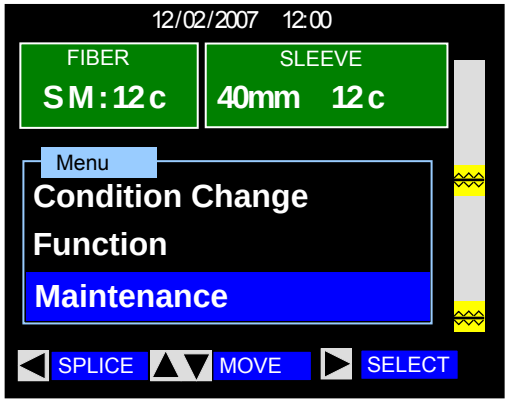


Page	Functions
1/4	**<Arc Pause>**
	This function stops the splicing process before arcing occurs. If you would like to check offset and fiber end faces, set this function to ON.
	<Sleep>
	If the splicer is not interrupted for a certain span of time, to minimize power consumption on standby, the monitor and 12VDC will be turned off. (The Power LED will be lit in orange.) To return to normal operation, press any key, except the Power key.
	<Auto Power Off>
	If the splicer is in Sleep mode and is not interrupted for another certain span of time, the splicer is automatically powered off. You need to switch on the splicer again.
	<Display Monitor>
	Front monitor type or Back monitor type can be selected.
	<Auto Start>
	This function starts the splicing process when the fiber is inserted in the splicer and the hood is closed.
2/4	**<Language>**
	The language being displayed can be selected. (Some languages cannot be selected.)
	<Temperature Unit>
	This function switches the temperature units.
	<Heater Auto Start>
	This function starts the heating process when the fiber is placed into the heat shrink oven.
	<Light for V-groove>
	This function sets the V-groove illumination to ON or OFF.
	<Date>
	This function sets the built-in clock of the splicer to local time.
3/4	**<Memory>**
	This function stores splice data such as cleave angle, offset and so on. (A total of 2,000 splice data points can be stored.)
	<Display>
	Stored splice data is displayed. Enter the memory location you would like to view.
	<Output>
	Stored splice data can be downloaded to a PC. Contact maintenance service center if you would like to use this function.
	<Clear>
	After data of 2,000 splices are stored, the oldest splice data is deleted and the latest splice data is stored. You can select “Previous” which deletes the previous splice data point or “All” which deletes all the stored data at a time.
	<Histogram>
	Stored splice data information (estimated loss or cleave angle) is displayed under the histogram. Select the data you would like to view under histogram.
4/4	**<Buzzer (Key)>**
	This function enables to select keypad buzzer ON/OFF.

Maintenance settings

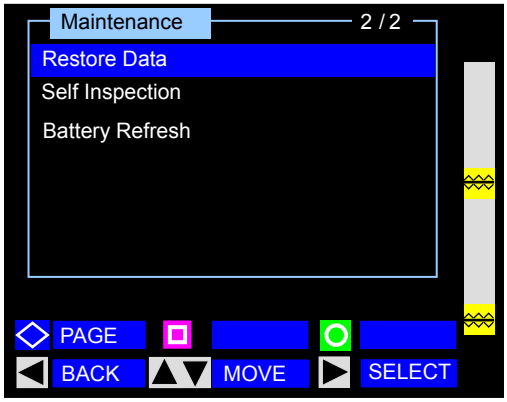


Press the ◀ (MENU) key to enter the Menu screen.



1: Using ▲▼ (MOVE) keys, select "Maintenance".
2: Press the ▶ (SELECT) key to enter the maintenance settings (1/2) screen.

1: Use the ▲▼ (MOVE) keys to select the function you would like to change.
2: Press the ▶ (SELECT) key to change the settings.
3: Press the ◇ (PAGE) key to go to the next (2/2) page.



Page	Maintenance
1/2	**<Conditioning Arc>**
	After the electrodes are replaced, this function is used to condition a new electrode. The number of conditioning arc is preset. Arc Count is automatically reset after conditioning arc is performed.
	<Reset Arc Count>
	Arc Count can be reset, while All Count cannot.
2/2	**<Restore Data>**
	All parameters except Arc Count and All Count are returned to the factory setting.
	<Self Inspection>
	The circuit board, optical unit, motors and heat shrink ovens are automatically inspected.
	<Battery Refresh>
	Used to refresh the battery module. (Refer to page 14.)

5. Other convenient functions

The TYPE-66 is provided with various functions. Set up the functions as necessary.

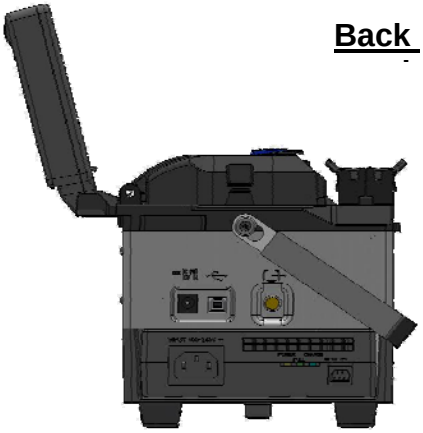
Back monitor type

The back monitor type is convenient when you would like to place the fiber to be spliced for installation closer to you. (See also page 43 & 44.)

Front monitor

Front

Back

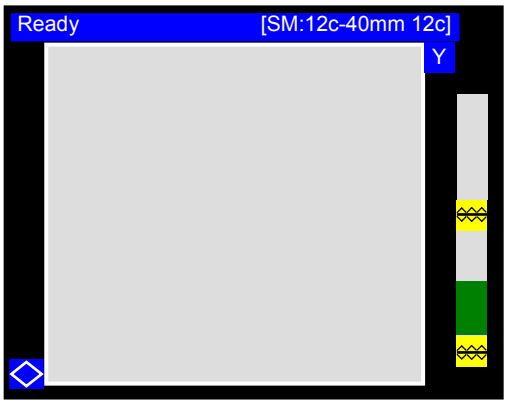


Front

Dual heat shrink oven

2 heat shrink ovens are equipped with the TYPE-66. The ovens run individually and splicing operation can be improved more effectively. Both ovens also can be operated simultaneously.

Heat cycle status indicator bar



Rear heat shrink oven

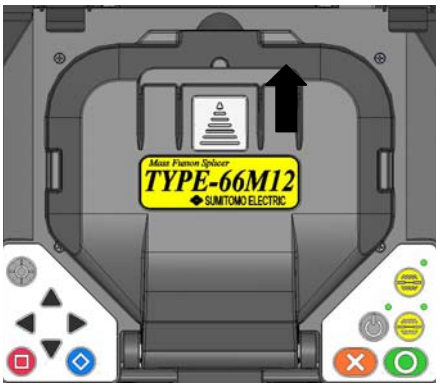
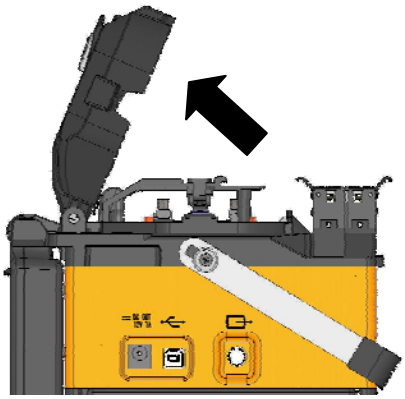
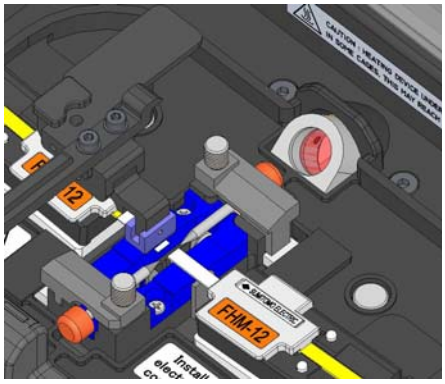
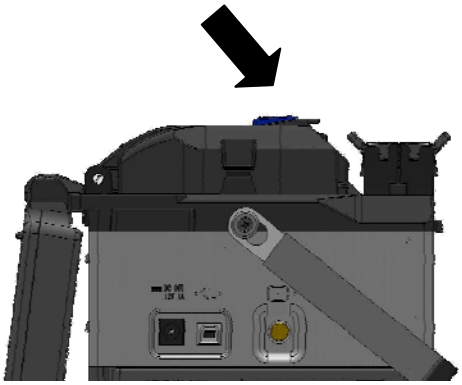
Front heat shrink oven

The heat cycle status indicator bar enables checking the progress of the heat cycle on the screen.

Detachable/attachable bare fiber pads

The bare fiber pad is moved in conjunction with the opening and closing of the hood. It can be separated from the hood to check to see if the fiber is clamped properly.

Detaching and attaching bare fiber pads

	
1: Slide the bare fiber pad release button in the direction indicated by the arrow.	2: When the hood is opened, the bare fiber pad is removed from the hood.
	
3: You can check if the fiber is placed seated in the V-groove properly by the pad.	4: When the hood is closed, the hood catches the bare fiber pad. The hood and the pad are moved together.

Auto start

The TYPE-66 is provided with Auto start function that automatically starts the splicing process and the heating operation.

Auto start splicing

When the fiber is inserted into the splicer and the hood is closed, the splicing process is automatically started. The (SET) key does not need pressing.

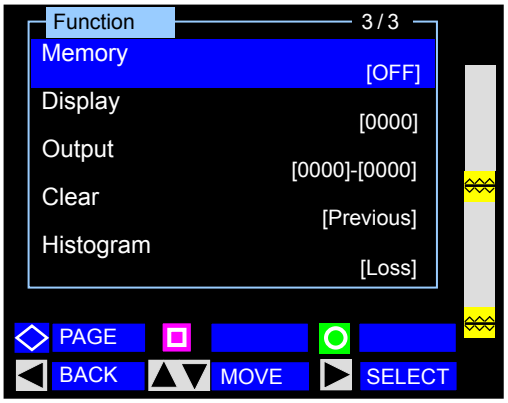
See also page 43 & 44.

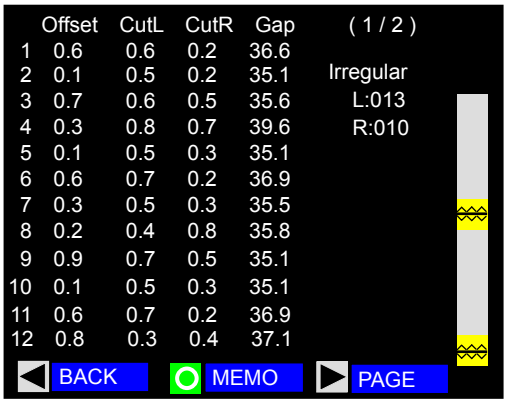
Auto start heating

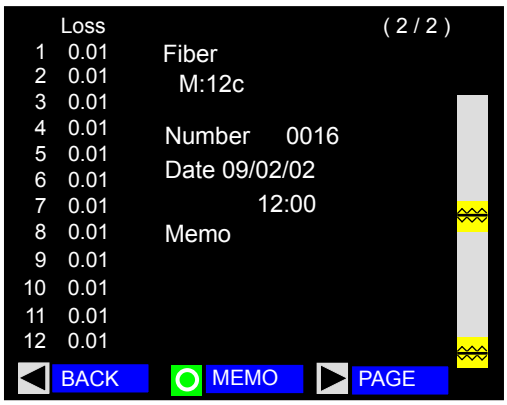
When the fiber is placed into the heat shrink oven, the heating operation is automatically started. The (HEAT) key does not need pressing.

See also page 43 & 44.

Splice data storage function







The TYPE-66 has the capability to record splice loss information for each splice that is performed. Set “Memory” to ON when you would like to store splice data.

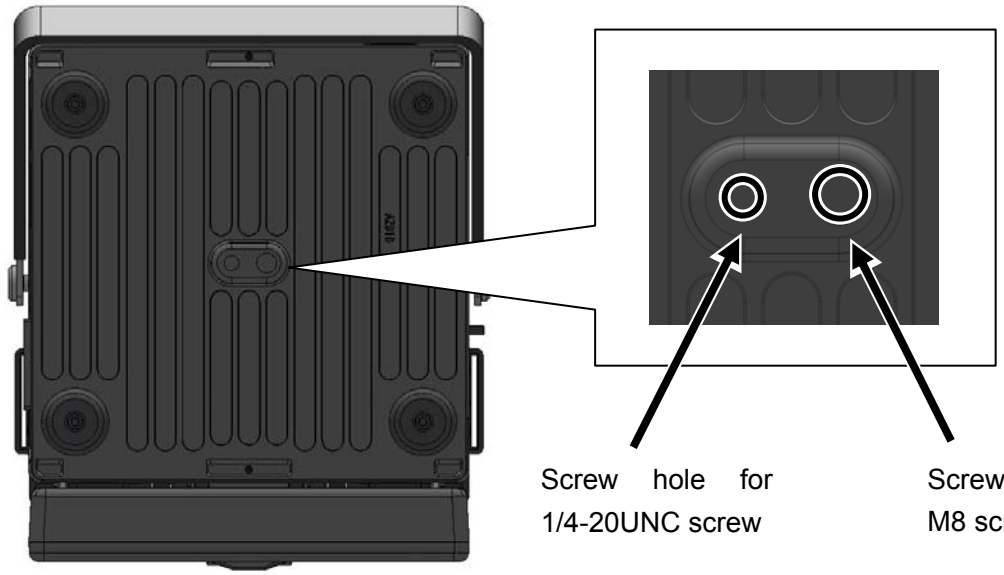
To display stored splice data, select “Display”. Enter the memory location you would like to view.

Description of data

- Offset: Inspected offset of diameter axis.
- CutL: Inspected cleave angle of left fiber.
- CutR: Inspected cleave angle of right fiber.
- Gap: Inspected arc gap
- Irregular: Inspected irregularity in fiber end position for left or right fibers.
- Loss: Estimated losses

Tripod fixing screws

The TYPE-66 has screw holes for M8 screw and 1/4-20UNC screw. In a high location, fix the splicer to a tripod to prevent it from dropping.



Caution

In a high location, fix the TYPE-66 to a tripod with the M8 screw or 1/4-20UNC screw on the bottom of the splicer to prevent the splicer from dropping.

6. Troubleshooting

For repair and technical support, contact maintenance service center address described in the back cover.

Arc problems

The electrodes typically need replacement after **1000 splices**. Some common symptoms that indicate the electrodes need replacing are:

- Fluttering or unstable arc observed on the monitor
- Sizzling noise while arcing
- Bubbles in the fibers after splicing
- Fiber burned in half
- Diameter faults
- High or inconsistent splice losses

Refer to page 35, “Replacing electrodes” for procedures.

If an electrode tip touches something, it will be deformed, causing poor arcing problems. Take care of the handling of electrodes.

Fiber breaking

When the splicing process is complete, a proof test may be performed on the fibers while in the fiber chucks. If the fibers are breaking when the proof test is performed, re-do an arc test. If the arc power level is too weak, the splice may be poor, resulting in fiber breaking.

If the fibers are breaking in spite of a good arc test result, clean the V-grooves and the bare fiber pads completely. Deterioration of a jacket remover/fiber cleaver may lead to fiber breaking. Clean the jacket remover/fiber cleaver completely.

Splicer does not power up

If the fusion splicer fails to turn on when the ON key is pressed, check the following:

- Verify that the power supply module or battery module is installed in the module bay properly
- Verify that the power plug is seated properly (the power cord is connected to the power supply module.)
- Verify that the LED of the power supply module lights up.
- If using battery operation, ensure that the battery module is fully charged.

If the splicer still does not power up after checking the above, contact our maintenance service center.

Warranty and repair service

Before requesting a repair, try to locate the problem and identify the cause by referring to “5 Troubleshooting” at page 50. If you ensure that your machine is really in need of a repair, contact our maintenance service center.

Warranty period

1. We warrant that this product (TYPE-66 fusion splicer, installed software, and other equipment), in the course of its normal use, will be free from defect in materials and workmanship for one year (except consumables) from the date you acquire it.

Services after warranty period

After the warranty period expires, all products may be repaired for a reasonable service charge.

2. The following cases are the exception for repairing and replacing the product free of charge.
   (1) Damage or malfunction caused by misuse, mishandling, non qualified repair, disassembly, modification, or any other irregular execution
   (2) Damage or malfunction caused by drop, fall or any other faulty treatment such as to be explained in precautions on this manual.
   (3) Damage or malfunction caused by actions that are beyond Sumitomo’s control including for example, fire, water flood, earthquake, lightening or similar disaster, or any other accident.
   (4) Damage or malfunction caused by the use of Product in conjunction with accessories, products, or consumables not specified or approved by Sumitomo.
   (5) Replacement of consumables
   (6) Travel expense that is charged if a trip for repair is requested by the customer.
   (7) Damage or malfunction caused by use of batteries and battery chargers not specified or approved by Sumitomo.
   (8) Products founds corroded due to exposure to water or dew condensation, or cracked or deformed circuit board.
3. The customer shall bear the cost of returning the product to Sumitomo.

<Availability of spare parts>

The availability of spare parts for the splicer must be guaranteed for a period of 7 years from the end of the sale. However due to parts manufacturer’s reason, spare parts for repair might be impossible to get within such period.

Error message list

Please contact maintenance service center when it is not recovered if you take the measures below.

Error message	Description and measure
Alignment Error (L)(R)(LR)	[Description] There is dust in the V-groove. There is dust on the fiber. [Measure] Clean the V-groove. Re-cleave the fiber.
Brightness Error Brightness Various Error LED error	[Description] The splicer failed in LED brightness adjustment. [Measure] Clean the LED, the mirror protection glass and the microscope lens.
CAMERA ERROR	[Measure] Turn off the power and turn it on again. If the error still persists, contact our maintenance service center.
Cut Error (Angle) (L)(R)(LR)	[Description] The cleave angle exceeds the allowable level. [Measure] Re-cleave the fiber.
Cut Error (Crack) (L)(R)(LR)	[Description] The splicer detected crack in an end-face inspection [Measure] Re-cleave the fiber.
Cut Error (LIP) (L)(R)(LR)	[Description] The splicer detected lip in an end-face inspection [Measure] Re-cleave the fiber.
Cut Error (Projection) (L)(R)(LR)	[Description] The splicer detected projection in an end-face inspection [Measure] Re-cleave the fiber.
DEVICE ERROR	[Description] The controlboard has a problem. [Measure] Please contact our maintenance service center.

Error message	Description and measure
Diameter Check Error (L)(R)(LR)	[Description] The spicer failed in image processing and the fiber diameter was not analyzed. [Measure] Place the fiber in the V-groove again.
Dust Error (L)(R)(LR)	[Description] There is dust or dirt on the fiber. [Measure] Re-cleave the fiber.
End Check Error (L)(R)(LR)	[Description] The spicer failed in image processing and the fiber end was not analyzed. [Measure] Place the fiber in the V-groove again.
Fiber Check Error (L)(R)(LR)	[Description] The fiber is not placed in the V-groove properly. [Measure] Place the fiber in the V-groove again.
Fiber Count Error (L)(R)(LR)	[Description] The number of the fiber being spliced is different from the settings. [Measure] Check that the number of the fiber being spliced matches with the settings.
Fiber Pitch Error (L)(R)(LR)	[Description] The fiber pitch exceeds the allowable level. [Measure] Place the fiber into the V-groove again.
Gap Error Irregularity Error (L)(R)(LR)	[Description] The irregularity of the fiber end exceeds the allowable level. [Measure] Recleave the fiber.
Hood Open Error	[Description] The hood is not closed completely. [Measure] Close the hood completely.

Error message	Description and measure
Initialize Error (L)(R)	[Description] The motor failed in returning to the initial position. [Measure] Check to see if any foreign material such as fiber coating residue around and in the fiber stage. Turn it off and turn it on again.
Inserting Fiber Error (L)(R)(LR)	[Description] The fiber was not inserted properly. [Measure] Place the fiber in the fiber holder again.
Splice Error (Splice) (Thin) (Thick) (Neck) (Bubble)	[Description] The spliced portion has a problem. Thin 1) The irregularity of the fiber end is high. 2) The Overlap value is low. 3) The arc power is strong. Thick 1) The irregularity of the fiber end is high. 2) The Overlap value is high. 3) The arc power is weak. Bubble Fiber irregularity or fiber end face problem. Neck Fiber irregularity or fiber end face problem. [Measure] Perform an arc test again to adjust arc power. Please check that the arc parameter such as Fusion time, Prefusion time, Overlap, and etc. has correct values. Re-arcing will sometimes resolve the problem.

[TYPE-66M12 specifications]

Optical fiber requirement	Material	Silica glass
	Profile type	SMF (ITU-T G.652), MMF (ITU-T G.651) DSF (ITU-T G.653), NZDSF (ITU-T G.655)
	Fiber diameter	125 μm
	Fiber coating diameter	Single fiber 0.25mm, 0.5mm, 0.9mm Ribbon fiber 0.28~0.4mm
	Cleave length	10mm
	Fiber count	1,2,4,5,6,8,10,12
Size and weight	Size (main body) *1	150W × 150D × 150H (mm)
	Weight	Approx. 2.7 kg (with PS-66) Approx. 2.9 kg (with BU-66S)
	Monitor	5.6” TFT color monitor
	Typical splice loss *2	SMF :0.05dB MMF :0.03dB DSF :0.08dB NZDSF :0.08dB
	Typical splice cycle time *2	Approx. 15 seconds (Single fiber) Approx. 18 seconds (4-fiber ribbon) Approx. 20 seconds (8-fiber ribbon) Approx. 20 seconds (12-fiber ribbon)
	Typical heating cycle time *3	FPS-1 (Single fiber) Approx. 55 seconds FPS-5 (8-fiber ribbon) Approx. 45 seconds FPS-6 (12-fiber ribbon) Approx. 75 seconds
	Splice & heat cycles per fully charged battery *4	Approx. 80 (BU-66S) Approx. 160 (BU-66L)
Functions	Loss Estimation	Provided
	Splice data storage	2,000 splices
	Tension test *5	1.96N (200gf)
	Heat shrink oven	2 built-in heat shrink ovens
	Automatic arc test	Provided
	V-groove white LED illumination	Provided
	Interface	USB1.1 type-B
Programs	Splice programs	Max. 60
	Heating programs	Max. 20
Power supply	AC operation	With PS-66 Input: AC 100/120/220/240V +/-10% 50/60Hz +/-5% Voltage Dips: within 30% 0.5periods, within 60% 50periods Fast transients/burst: within 1kV 5kHz 1minuite
	DC operation	With PS-66 and car battery cable Input: DC 12V (10.5 – 15V)
	Battery operation	With BU-66S or BU-66L Nominal capacity BU-66S: 4500mAh BU-66L: 9000mAh Nominal voltage: 13.2V
	DC output	12V For Sumitomo’s hot jacket remover
Environmental conditions	Operation temperature *6	-10 °C ~ +50 °C
	Storage temperature *6 *7	-40 °C ~ +80 °C
	Altitude	Max. 3,660m
	Windproof	Max. 15m/s

*1 The protrusion part is not included.

*2 With Sumitomo identical fiber (in room temperature. Varies depending on the condition of fiber.)

*3 With the power supply module in room temperature (20°C). If the battery module is used, the heating cycle time varies depending on the temperature and the remaining battery capacity.

*4 With a new battery, 1 splice cycle time (splice + protection) completes in 90 seconds, in room temperature. A hot jacket remover is not used. Splice & heat cycles may vary depending on the operating environment.

*5 Performed on the fiber stage after splicing.

*6 Non-condensing

*7 The Battery module storage temperature range: -20°C ~ +50°C (if stored for less than 3 months)
-20°C ~ +30°C (if stored for less than 1 year)

Revision H Jan 26, 2010
Revision G Sep. 29, 2009
Revision F Jul. 8, 2009

Tokyo (JAPAN)
Sumitomo Electric Industries, Ltd.
(Global Business Dept.)
3-9-1, Shibaura, Minato-ku, Tokyo 108-8539 JAPAN
Tel: +81 (0)3 6722 3246
http://www.sei.co.jp

North Carolina (U.S.A)
Sumitomo Electric Lightwave Corp.
78 Alexander Drive, P.O. Box 13445, Research Triangle park, NC27709 U.S.A
Tel: +1 919 541 8100
http://www.sumitomoelectric.com

London (U.K)
Sumitomo Electric Europe Ltd.
220 Centennial Park, Centennial Avenue, Elstree, Herts, WD6 3SL, U.K.
Tel: +44 (0)20 8953 8118
http://www.sumitomoelectric.com

Beijing (China)
Sumitomo Electric Consulting (Shanghai) Co., Ltd. (Beijing Branch)
Tel: +86 10 6590 8196

Shanghai (China)
Sumitomo Electric Consulting (Shanghai) Co., Ltd.
Tel: +86 21 6278 5978

Hong Kong
Sumitomo Electric Asia, Ltd.
Tel: +852 2576 0080

Guangzhou (China)
Sumitomo Electric Asia, Ltd. (Guangzhou Office)
Tel: +86 (0)20 8666 5780

Bangkok (Thailand)
Sumitomo Electric (Thailand) Limited
Tel: +66 (0)2 260 7231 to 5

Singapore
Sumitomo Electric Interconnect Products (Singapore) Pte Ltd.
Tel: +65 6261 3388

New Delhi (India)
Sumitomo Electric Industries, Ltd. (New Delhi Office)
Tel: +91 (0)11 439 5115/5116

Philippines
Sumitomo Electric Industries (Philippines) Incorporated
Tel: +63 2 811 2755