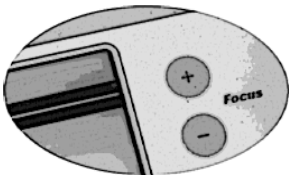
# User’s manual for the FSU 995 FA single fiber fusion splicer by Ericsson




ERICSSON

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# Introduction

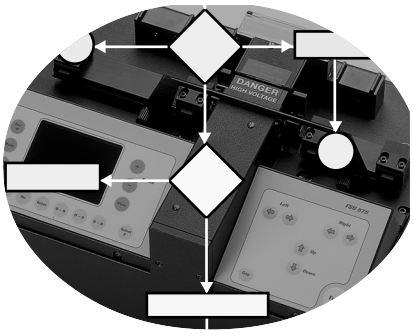
*FSU 995 FA*

The FSU 995 FA is designed to be “the only single fiber splicer you’ll ever need. ” It handles all basic single fiber splicing procedures, as well as more complex tasks such as tapering, attenuator making and erbium splicing. At the heart of the splicer’s operations is the hot core alignment process, which individualizes the splicing procedure to fit your fiber type and climactic conditions in order to offer the lowest possible splice loss every time. Then, just to make sure, the FSU 995 FA estimates this splice loss with an extremely accurate splice loss estimation technique based on mode coupling theory (micro-bending) and hot image processing.

There are two ways of categorizing the FSU 995 FA’s operations, and this manual will be organized according to both of them:

*Operations*

On the one hand, the FSU 995 FA splicing programs can be divided into two groups: Programs 01 - 10, which are the ten splicing programs that come pre-defined with the machine, and Programs 11 - 50 which are the forty editable slots you have for designing your own splicing programs to suit your special needs. In this manual, the instructions you will need to run the pre-defined programs (01 - 10) will be the focus of the section on “Basic Operation.” After you are familiar with the FSU basics, you can go on to the second section, “Advanced Operation,” which outlines the structure of splicing programs in greater detail, and describes the method for designing your own.



*Processes*

On the other hand, FSU 995 FA splicing programs (including the pre-defined ones) can be organized according to six splicing processes: normal splicing, hot core alignment, small core alignment, mode field matching, attenuator making, and pulling or tapering. Whereas, this cross-cut of FSU operations will be only mentioned briefly in the section on “Basic Operation”, it will play a large role in “Advanced Operation.” Generally speaking, even though you will not need to specify splicing processes when using the pre-defined programs, it is always helpful to keep splicing process in mind when discussing any splicing program, since it specifies the steps the FSU 995 FA goes through when splicing.

# Safety Information

## Operational Precautions

- **Do not use** the splicer in locations where there is a risk of **explosion**.
- **Never touch** the electrodes when the splicer is on.
- **Never open** the safety shield or the power supply during operation.
- **Never loosen** any screws except those mentioned in this manual, since you may harm important adjustments.
- **Do not insert** objects other than stripped and cleaned optical fiber or cleaning and maintenance tools into the splicer.

## Maintenance Precautions

- Never use hard objects to clean the V-grooves or electrodes. Use the supplied brush, or in the case of the V-grooves, isopropyl alcohol and cotton swabs.
- Never use acetone for cleaning any part of the splicer.
- Never use cans with compressed gas to clean any part of the splicer.
- Keep the electrode housing clean and dry at all times.
- Use the electrode cleaning program after every time you clean or change the electrodes, otherwise the arc will be unstable.

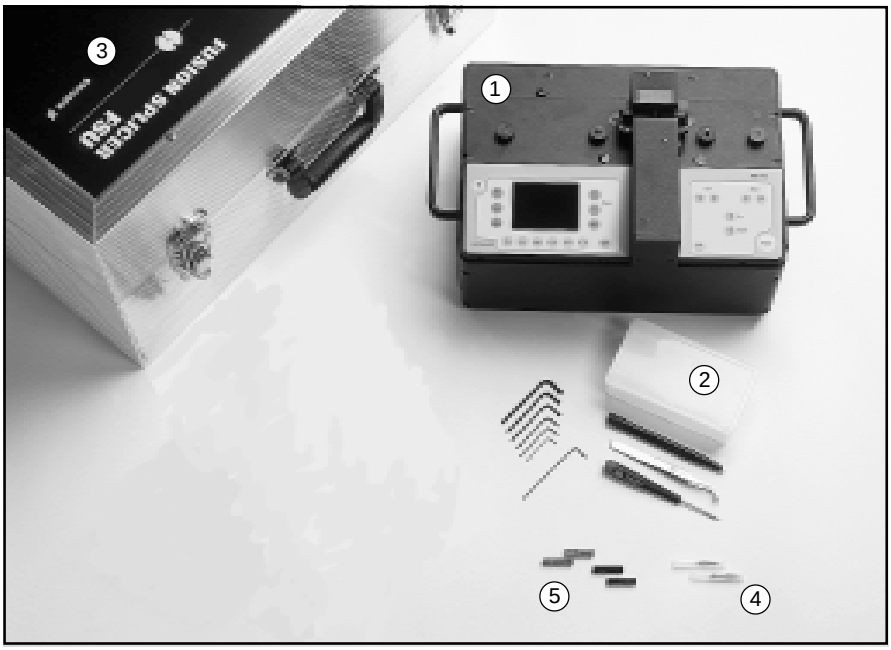
## Transport and Storage

- Never leave your splicer in direct sunlight or in places where it might be exposed to excessive heat (such as in vehicles parked in the sun).
- Always transport the splicer in its carrying case to avoid damage to its precision parts.
- Keep the humidity to a minimum where the splicer is stored. The humidity must not exceed 95%.
- If moisture forms on the optics when moving the splicer from an area with very cold temperature to a warmer environment, let the splicer sit and warm up before using it.
- Close the safety shield during transport.

General rule is...

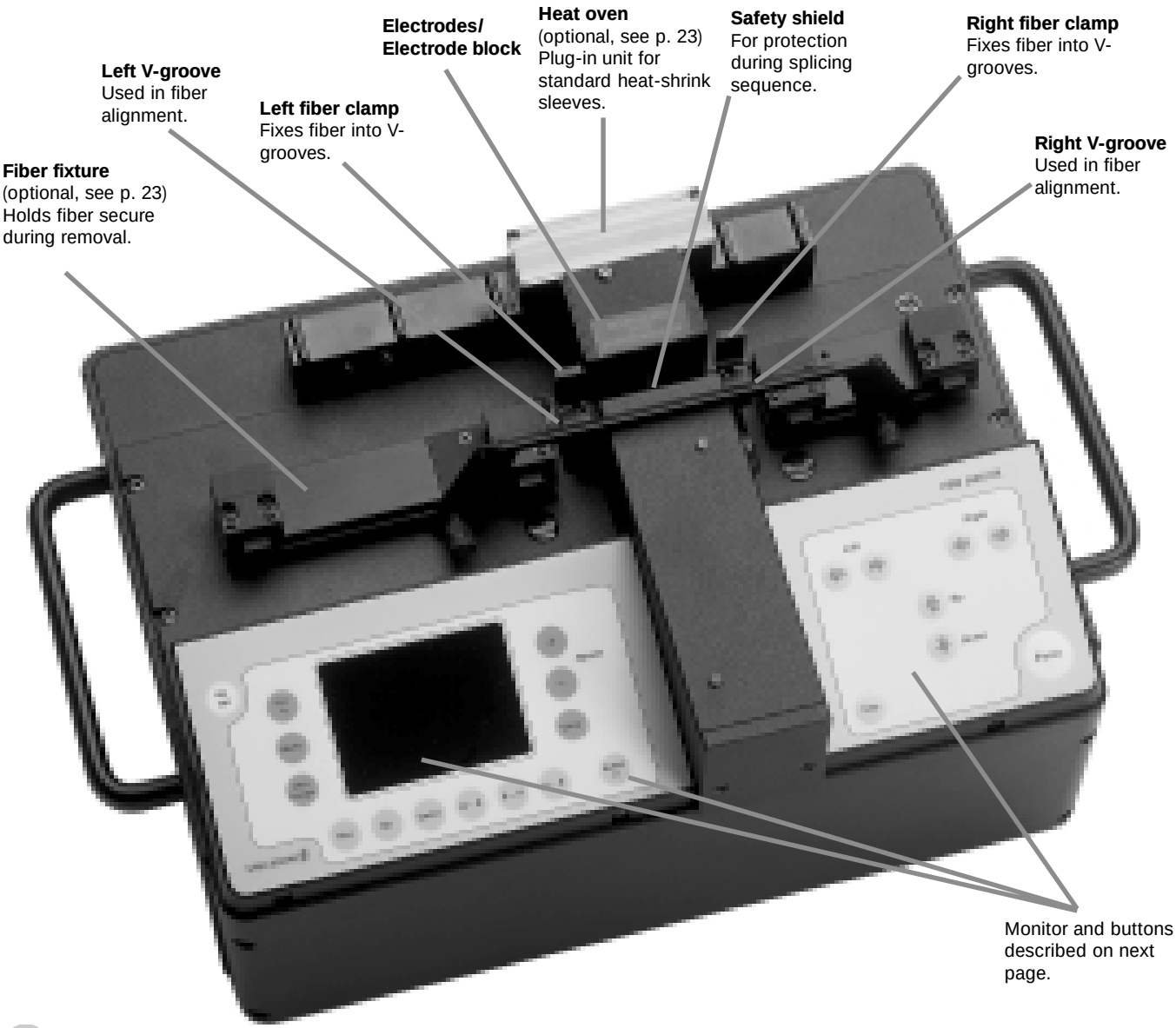
The FSU 995 FA is a precision instrument, and must be treated as such.

# Description of the FSU 995 FA

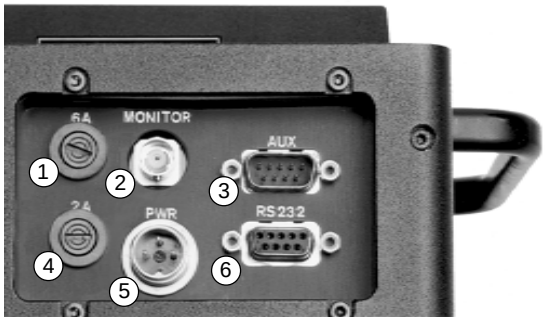



The FSU 995 FA is delivered in a rugged, cabin-size carrying case along with the basic set of tools for splicing, and this manual.

① FSU 995 FA fusion splicer
② Tool set with one electrode brush, one set of tweezers, a seven piece hexagonal key set, and one hex wrench
③ Carrying case
④ Pair of spare electrodes
⑤ Two pairs of V-grooves
-Blue (125 µm/1mm)
-Black (250 µm/2mm)

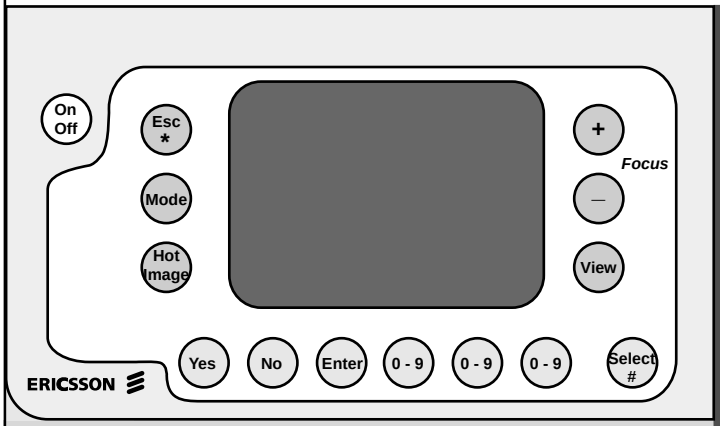


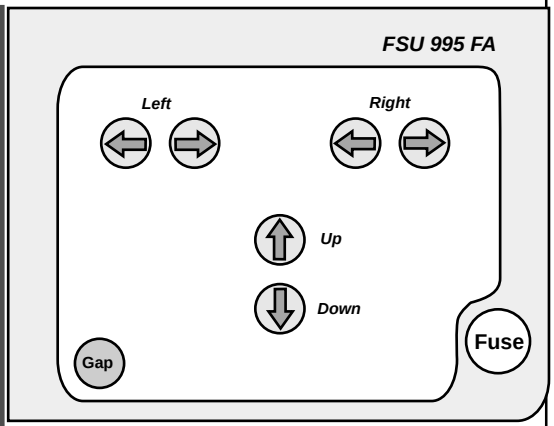
## Rear panel




① 6A Fuse
② Output for video
③ Auxiliary 12V video output (see Appendix B)
④ 2A Fuse
⑤ 12V power input
⑥ RS 232 (see Appendix B)

## Buttons




| | | |
|---|---|---|
| | On/Off | To turn splicer on and off. |
| | Esc/c | To abort operations and to access parameters. |
| | Mode | To change splice mode |
| | Hot Image | To flip through hot images. |
| Programming buttons | Yes | To answer “yes” to programming questions. |
| | No | To answer “no” to programming questions. |
| | Enter | To enter one’s selections. |
| | 0-9 | To choose first numerical place.* |
| | 0-9 | To choose second numerical place.* |
| | 0-9 | To choose third numerical place.* |
| | Select/# | To check battery and to access service parameters. |
| Monitor Controls | + | To adjust focus. |
| | - | To adjust focus. |
| | View | To change content of monitor. |

| | |
|---|---|
| *Left* arrows | To move left fiber along its own axis (e.g. toward right fiber). |
| *Right* arrows | To move right fiber along its own axis (e.g. away from left fiber). |
| Up arrow | For axial fiber alignment. |
| Down arrow | For axial fiber alignment. |
| Gap | To set a fine gap or close a gap. |
| Fuse | To initiate a splicing procedure. |

* For example, to get the number ‘147’, you would press the first button once, the second button 4 times, and the third 7 times.

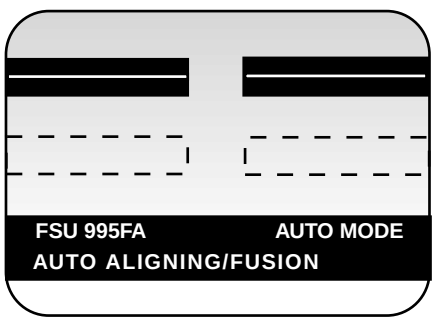
## Monitor

The FSU 995 FA monitor is organized into a viewing area that allows you to see the fibers from two different angles, and a text area that is itself divided into two text fields: a *mode field* and a *message field*. The *mode field* informs you which mode and programs you are working with. The *message field* poses questions, gives instructions and tells you what it is doing.

Fibers from 1st angle

If you press VIEW, you then see the fibers from the 2nd angle.

Mode field
Message field



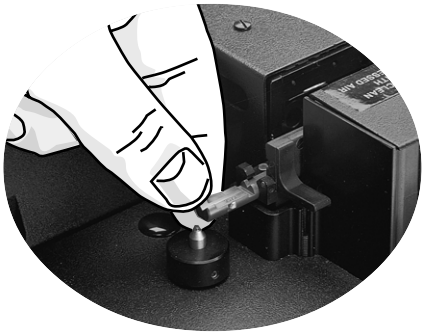
# Setting up the splicer

The adjacent set-up checklist is not in any way exhaustive, but it does present the basics you should have at hand before sitting down and splicing.

**Set-up checklist**

- ☐ Optical fiber
- ☐ Fiber holders
- ☐ Strippers
- ☐ Cleaner
- ☐ Cleaver
- ☐ Cotton swabs
- ☐ Isopropyl alcohol
- ☐ Electrode brush
- ☐ FSU 995 FA fusion splicer
- ☐ FSU 995 FA manual
- ☐ V-grooves
- ☐ Heat-shrink oven
- ☐ Heat-shrinkable sleeves
- ☐ Power supply or battery

## V-grooves



The FSU 995 FA is delivered with two sets of V-grooves, blue V-grooves and black V-grooves:

Use the **blue V-grooves** when you intend to clamp on bare fiber. They are designed for fiber with tight secondary coating with a cladding diameter of up to 125 μm and secondary coating diameter of up to 1 mm. (See also p. 11).

Use the **black V-grooves** when you intend to clamp on primary coating. They are designed for fiber with a nominal primary coating of 250 μm, as well as, loose-tube secondary coated fibers with a tube diameter of up to 2 mm. (See also p. 11).

It is also possible to order specially designed V-grooves from Ericsson by contacting your local service representative. If you do indeed need to change V-grooves, or install them for the first time, you should follow the instructions on page 67.

## Power connection

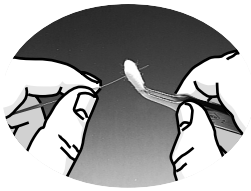
The FSU 995 FA can be operated by either a 12 V DC battery or a power supply unit rated at 50-60 Hz. In both cases the power cord is connected into the outlet marked PWR on the rear panel of the splicer (see also diagram of rear panel on previous page). If you are using the battery delivered by Ericsson, keep in mind that the battery is not charged on delivery (see p. 66).

# BASIC OPERATION - Quick guide

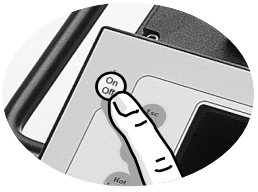
The following steps outline basic operation of the FSU 995 FA, and refer to the pages where they are explained in greater detail.

1 **Connect the splicer to the power supply** ..... 8

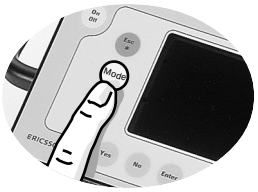
2 **Prepare the fibers** ..... 10
*Strip, clean and cleave the fibers.*



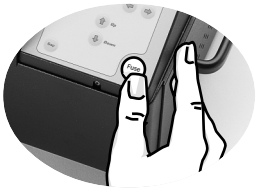
3 **Turn on the splicer and place the fibers** ..... 12
*Note: The splicer will turn off automatically when you re-open the safety shield after splicing.*



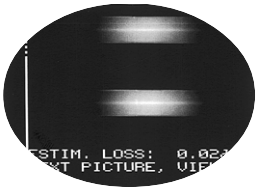

4 **Select splicing mode and program** ..... 14
*Choose between the two splicing modes: Automode and Manual mode. (Note that the splicer always starts in Automode when just turned on). A list of the pre-defined splicing programs (01-10) is found on page 16.*



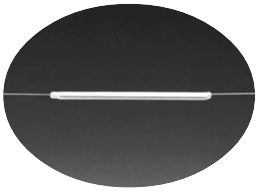

5 **Splice the fibers** ..... 17
*Press the fuse button.*



6 **Check the splice** ..... 21
*Check the splice visually by pressing VIEW and scrolling through stored images. Evaluate the splice quantitaly by taking note of the estimated splice loss.*



7 **Protect the splice** ..... 23
*Protect the splice with a heat-shrinkable sleeve.*

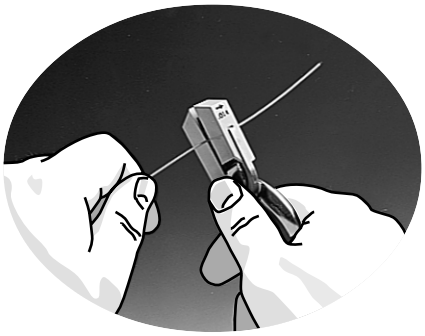


# Fiber preparation

## 1 Slip on a heat-shrinkable sleeve

Easily forgotten, yet so frustrating.  Remember to always slip a heat-shrinkable sleeve onto one of the fibers at the beginning of fiber preparation.

## 2 Strip the fiber



First remove at least 50mm of secondary coating (true for both tight and loose tube secondary coating) with a stripper appropriate to the type of coating you have.  Then remove around 25 mm of the primary coating with a stripper designed for primary coating.  (See also pictures below).

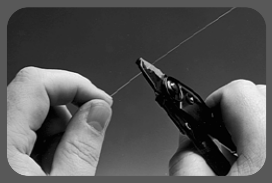
It is important that you do not put undue stress on the fibers by bending or crimping them.

v

Illustrations of strippers for secondary and primary coating

*Loose tube secondary coating*

*Tight secondary coating*



*Primary coating*

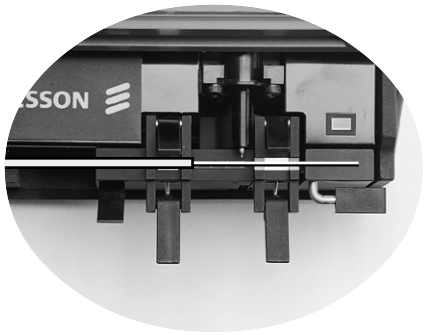
## 3 Clean the fiber

Clean the bare fibers with a tissue or a pair of cotton swabs soaked in **propanol** or **ethanol**.

**It is important that from this point on you are very careful with the fibers to ensure that they do not become dirty again** (such as laying them down on a dusty working surface, or even waving them around in the air).

It is also a good idea at this stage to check to be sure the **V-grooves** are clean, and if not, wipe them down as well.

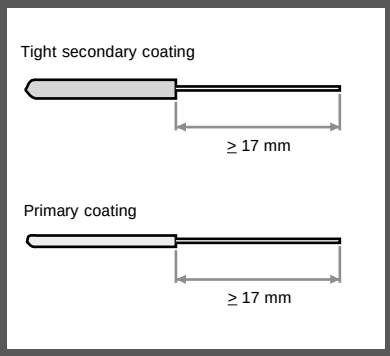
## 4 Cleave the fiber



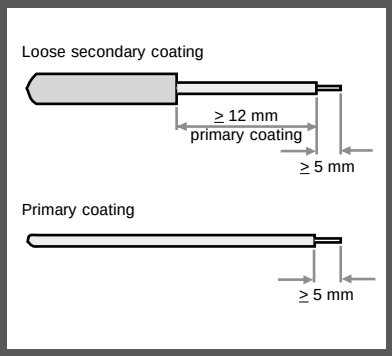
**Before cleaving the fiber, make sure the fiber is <u>clean</u> and properly prepared (See steps 1-3)**.

Cleave the fibers using a high quality cleaving tool that offers a flat end-face at an angle of less than 1° from the perpendicular (less than 0.5° for small core fiber). To ensure good splicing, you must also observe the instructions for cleaving lengths detailed below.

**Cleaving lengths** (plus V-groove selection)




*Use Blue V-grooves (Clamping on bare fiber)*




*Use Black V-grooves (Clamping on primary coating)*

**Fiber preparation checklist**

Fiber preparation is often the decisive phase in successful splicing, so it is important to ensure that you can check off on the adjacent points.

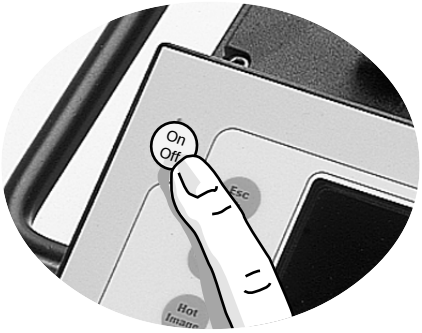
### Fiber preparation checklist

- ☐ The correct V-grooves have been selected
- ☐ The fiber clamps and V-grooves are clean
- ☐ The fibers are completely stripped
- ☐ The fibers are clean
- ☐ The end-faces are well-cleaved
- ☐ The correct cleaving lengths have been achieved

# Splicer preparation

## 1 Turn on the splicer

Turn on the splicer by pressing the ON/OFF button in the upper left-hand corner. (Remember that the splicer will turn off automatically when you open the safety shield after splicing.)




The splicer always starts in Automode, and thus will read "FSU 995 FA AUTO MODE" in the *mode field*. In the *message field* you will get a message telling you that it is calibrating parameters. Once calibration is completed, the splicer will tell you to "INSERT FIBERS" and to "CLOSE SAFETY SHIELD."

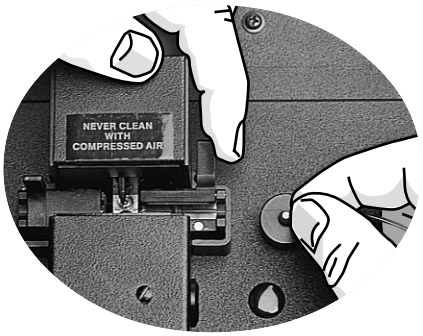
**"FSU 995 FA AUTO MODE**
**PARAMETER UPDATING...**

**INSERT FIBERS**

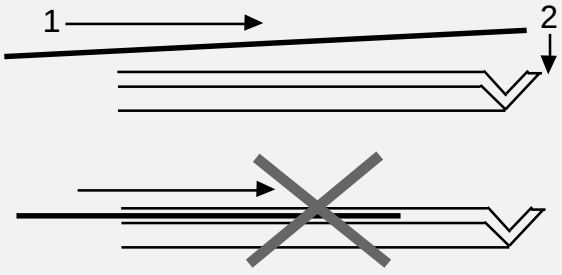
**CLOSE SAFETY SHIELD"**

## 2 Insert fibers

Place the fibers into the V-grooves until they are visible in the monitor, and then close the clamps. Make sure to avoid sliding the fibers along the V-grooves, but rather position them over the V-grooves and then tilt them down into place (see picture below).




Proper (and not so proper) insertion of the fibers:



## 3 Close the safety shield

Once you have placed the fibers so that you see them in the monitor and closed the fiber clamps, you must also close the safety shield by sliding it smoothly into place.

At this point the messages, “CLOSE SAFETY SHIELD” and “INSERT FIBERS” will be replaced with a new series of messages. The first will inform you which splicing program was last used (for example, “SM + SM P01”). The other messages will tell you about coming next stages in the splicing process: “AUTO ALIGNING/FUSION” and “PRESS FUSE BUTTON.” But first....

“ ***Program name Program #***
**(eg. SM + SM P01)**

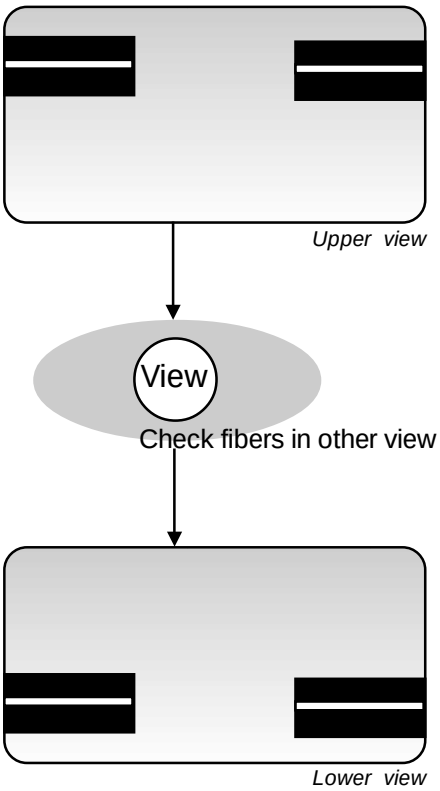
**AUTO ALIGNING/FUSION**

**PRESS FUSE BUTTON** ”

## 4 Check the fibers

Before you take any more steps toward splicing, you should check the fibers in the monitor to make sure they are clean and well-cleaved. (See illustrations below for examples of problems). If you see any defects, you should take the fibers out and re-prepare them. Don’t forget to check both views, which you can alternatively access by pressing VIEW.

If you are having difficulty seeing the fibers, you should try adjusting the focus by pressing the buttons (+) and (-).




The following pictures represent fiber preparation defects that necessitate re-preparation of the fibers.

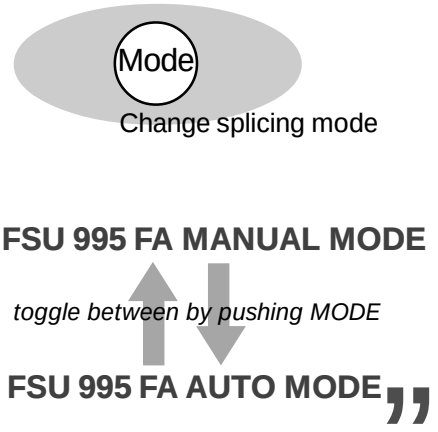
Dust on fiber | Tang | Chip | Large cleave angle

# Splicing mode and program selection

Though the splicer is saying in the *message field* to “PRESS FUSE BUTTON,” you should make sure the correct splicing mode and program are selected.

## 1 Select splicing mode

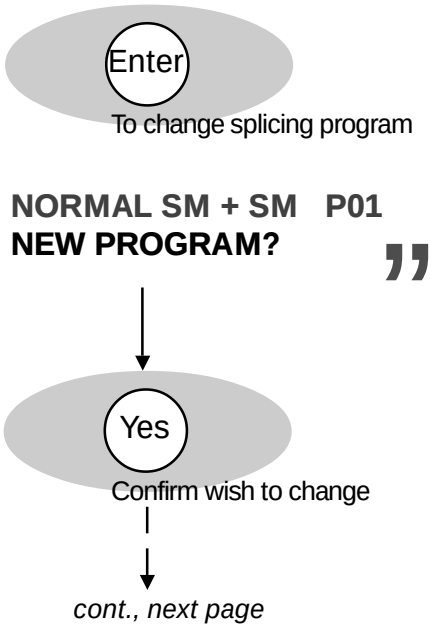
As mentioned earlier, the default splicing mode is Automode, and this will be the mode the splicer is in when you just turn it on. In Automode, the splicer automatically carries out fiber alignment and initiates fusion. However, if you want to manually align the fibers and initialize splicing, you can change to Manual mode by pushing the MODE button. The *mode field* will then read to “FSU 995 FA MANUAL MODE.” To change back to Automode, just push MODE again. Remember that you can always check which mode you are in during splicer preparation by reading what is displayed in the *mode field*.




## 2 Select splicing program

*In this section on Basic Operation, we are only going to use the pre-defined programs (Programs 01-10) as examples, but you would follow the same selection procedure if you wanted to load in one of your own programs created through the instructions outlined in the section on Advanced Operation.*

**A** The first step is to press the ENTER button. At this point both the *mode* and the *message field* will change. The *mode field* will display the current splicing program, and the *message field* will ask you if you want to change it. For the purposes of demonstration, we are going to assume that the current splicing program is program 01, NORMAL SM +SM.




**B** If you press (Yes), the message field will then be open for you to enter a new program.

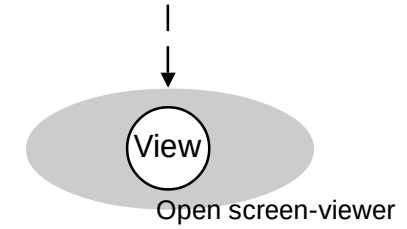
If you press (No), you will jump to step F.

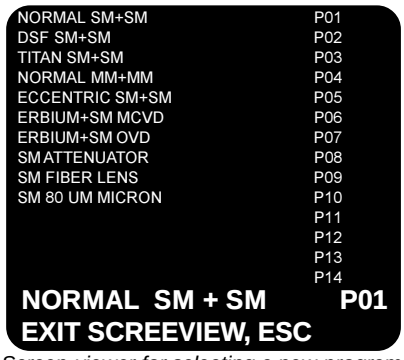
To see a list over the pre-defined programs (Programs 01-10), you can either look on page 16 of this manual, or follow the instruction in optional step BB on the next page as to how you can access the screen-viewer.

*cont., next page*

**BB** As an optional step, you can then press VIEW to see the sceen-viewer with a list over all of the the splicing programs in memory. To scroll through the pages, press VIEW.

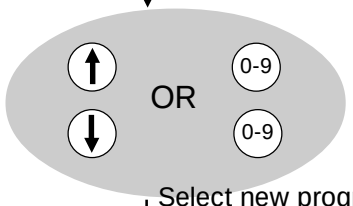
To escape from the screen-viewer, press ESC.



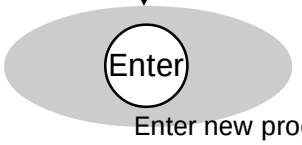




*Screen-viewer for selecting a new program*

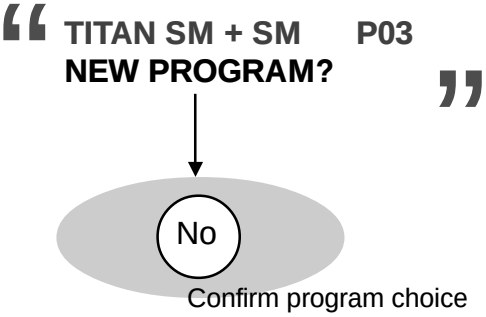
**C** To select a new program, you can either scroll through the programs using the ↑ and ↓ buttons, or you can type in the number of the program you want using the first two numerical buttons (from the left). Let's say we wanted to splice titanium fibers (P03). To do so we would either press the ↑ button twice, or type in "0" with the first numerical button and "3" with the second.




**D** You then confirm your selection by pressing ENTER.

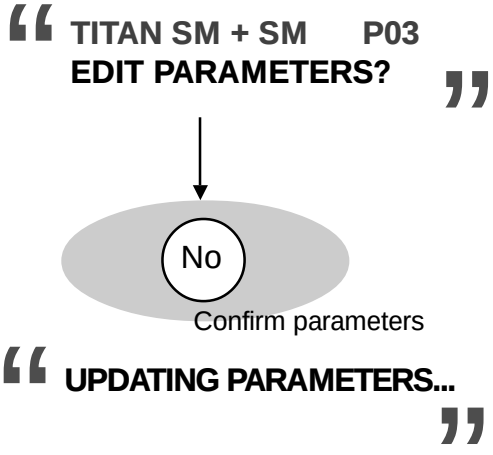



**E** The *mode field* will then display your new selected program (In our example, "TITAN SM + SM"), and in the *message field* the splicer will ask if you want to change the program again. If you are satisfied with the splicing program displayed, press No.




**F** The splicer will then ask whether you want to edit parameters. Splicing program editing is a function taken up in the section on Advanced Operation (see p. 43), but you should keep in mind that it is not possible to edit the parameters in Programs 01-10 (the ones we are using here as examples). So to end splicing program selection and return to splicing mode, you should press No again.

The splicer will then update the parameters in memory so they match those of the splicing program you have chosen, and return to splicing mode (see definition, following page)



## Splicing programs 01-10

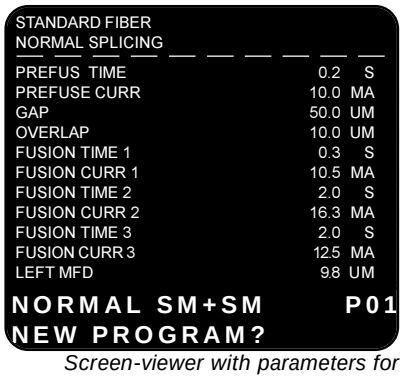
| Program Name | Prog. No. | Fiber type | Splicing process* |
|---|---|---|---|
| NORMAL SM + SM | 01 | Standard single fiber | Normal splicing |
| DSF SM + SM | 02 | Depressed cladding fiber | Normal splicing |
| TITAN SM + SM | 03 | Titanium fiber | Normal splicing |
| NORMAL MM + MM | 04 | Mulitmode fiber | Normal splicing |
| ECCENTRIC SM + SM | 05 | Standard single fiber with eccentric core | Hot core alignment |
| ERBIUM + SM MCVD** | 06 | Erbium fiber with single fiber | Mode field matching |
| ERBIUM + DSF OVD** | 07 | Erbium fiber with dispersion shifted fiber | Mode field matching |
| SM ATTENUATOR | 08 | Standard single fiber | Attenuator making |
| SM FIBER LENS | 09 | Standard single fiber | Pulling or tapering |
| SM 80 UM MICRON | 10 | Single fiber with 80 μm core | Normal splicing |

* *Splicing processes are explained in the section on Advanced Operation, see p. 28.*

** MCVD and OVD refer to fiber production methods, and respectively stand for "Modified Chemical Vapor Deposition" and "Outside Vapor Deposition."

### Viewing splicing program parameters

If you wish to look at a listing of the splicing program parameters for a particular program you should press ENTER, as if you wanted to change splicing program, and then, rather than answer "Yes" or "No" to the question "New program?," press VIEW. This will bring up the screen-viewer for the program in memory (see adjacent example). You can flip through pages by pressing VIEW, and when you are finished reviewing the parameters, you press ENTER to exit the screen-viewer (or press YES or NO, thereby directly entering the sequence for splicing program selection at step B, see p. 14). You should keep in mind, though, that this is only an option for non-confidential programs.




*Screen-viewer with parameters for Program 01*

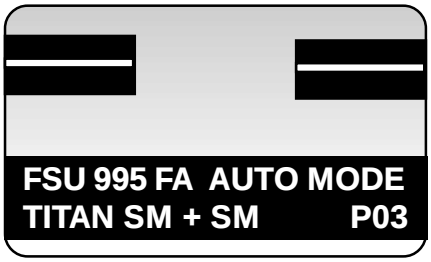
**Splicing mode**

The term "splicing mode" in singular is not to be confused with the two splicing modes: Automode and Manual mode. When the FSU 995 is "in splicing mode," or "returns to splicing mode," it means that it is ready to splice on your command. In short, it represents a state of splicing readiness. The FSU 995 FA exits splicing mode whenever you press ENTER to select a program or to edit a program.

# Automode splicing

## 1 Splicer ready

At this point you should have chosen Automode for the splicing mode (see p. 14), and a splicing program. Continuing with the example taken up in the section on splicing program selection, we will assume you have chosen Program 03. This will give you the adjacent screen, with “FSU 975 FA AUTO MODE” in the *mode field* and the program name and program number in the *message field*.



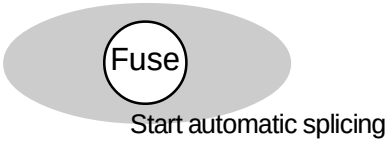

Once the fibres are in place and the safety shield has been closed, the splicer will then display a series of messages in the *message field* that tell you that it is ready.

“**AUTO ALIGNING/FUSION**

**PRESS FUSE BUTTON**”

## 2 Start splicing

To start the automatic splicing sequence, press FUSE . The splicer will then automatically align the fibers roughly, prefuses, focuses the view, performs fine alignment, and finally fuse the fibres.




During the entire sequence the chosen splicing program will be displayed in the *mode field* (in our example, “TITAN SM + SM P03”), while in the *message field* the splicer will keep you abreast of what it is doing.

“**TITAN SM + SM P03**

**ROUGH ALIGNMENT**
**PREFUSION WILL START**
**ROUGH ALIGNMENT**
**ALIGNING FIBERS**
**SPLICING WILL START**
**SPLICING...**”

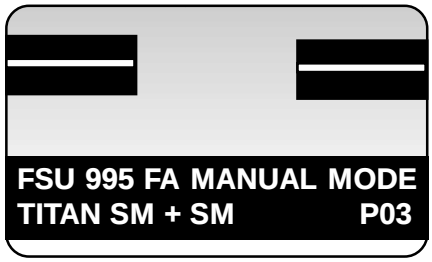
If at any point the splicer cannot carry out some part of the automatic sequence, a fault message will appear in the *message field*. If this occurs you should look at Trouble-shooting in Appendix A, p. 71.

You can interrupt the automatic sequence before the fibers are fused by pressing the * button. Press FUSE to re-start the splicing sequence.

# Manual mode splicing

## 1 Splicer ready

At this point you should have chosen Manual mode for the splicing mode (see p.14), and a splicing program. To continue our example, we will assume you have chosen Program 03 for titanium fiber splicing. This will give you the adjacent screen, with “FSU 995 FA MANUAL MODE” in the *mode field* and the program name (“TITAN SM + SM”) and program number (P03) in the *message field*.




The splicer will then display a series of messages in the *message field* that tell you that it is ready.

**“READY FOR PREFUSING**

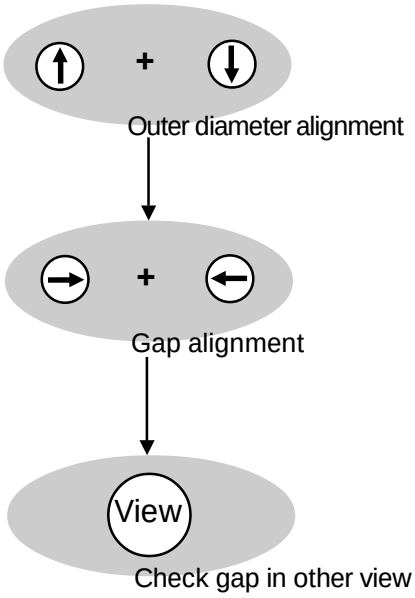
**PRESS FUSE BUTTON”**

## 2 Roughly align fibers

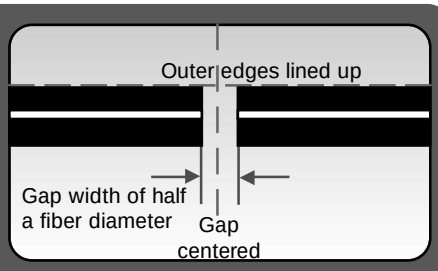
In order to roughly align the fibers with respect to each other, you should alternately press the ↑ and ↓ buttons for both the right and left fibers until the outer edges of the fibers line up.

When you think the fibers are lined up, you can start bringing the fibers towards each other by alternatively pressing the → and ← buttons for each of the fibers. Your goal is a gap equivalent to half a diameter of a fiber, centered horizontally in the monitor (see illustration below).

You should then press the VIEW button to ensure that the gap is also correct from the other camera angle.



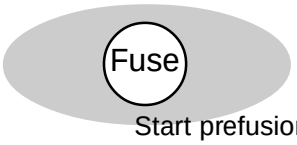

After rough alignment the situation should be as follows: the outer edges of the fibers line up, and the gap between their end-faces is the width of half a fiber diameter, and centered on the monitor.



## 3 Prefuse

Once the fibers are rough-aligned, you press the FUSE button. During prefusion the fibers are cleaned by low level heating.

After prefusion is complete the splicer sends new messages to the *message field*, telling you it is waiting for you to complete final inspection and alignment.

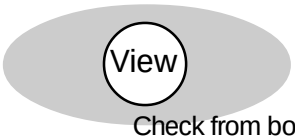



**“READY FOR SPLICING**

**PRESS FUSE BUTTON”**

## 4 Inspect fibers

This is your last chance to check the fibers before splicing, so you should switch between the two viewing angles by pressing VIEW button, looking for dust or any other imperfections. If dust remains, or you see any other problems you should abort the splicing procedure and re-prepare the fibers. For examples of problems you should watch out for, see p 13.




## 5 Adjust fiber alignment

Now that you have assured yourself that the fibers are clean and of good quality, you can fine-tune their alignment. In order to set the gap, you use the → and ← buttons, bringing the fibers as close together as possible without overlap.

The last movement before you set the gap must be to move the fibers inwards (closer together).

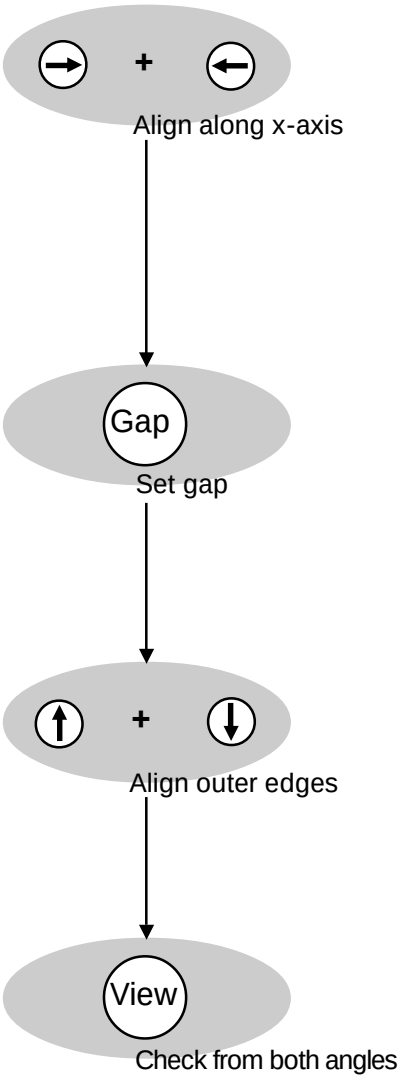
You then briefly press the GAP button. The resulting gap should be as narrow as possible, but still wide enough to allow for free movement of the fibers up and down (see illustration on next page).

After you have set the gap, do not press the → and ← buttons.

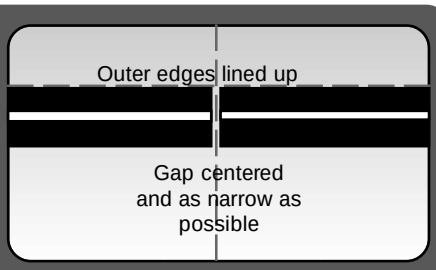
Using the ↑ and ↓ buttons you can now fine-tune the alignment of the outer fiber edges, making sure that the two fibers line up straight across the screen.

If at any point, you feel the view is not clear, use the + and - buttons to improve the focus.

Do not forget to adjust the fiber alignment from both camera angles, which you can toggle between by pressing VIEW.



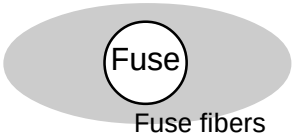
After fine-tuning the alignment, and before fusion, the alignment should be as follows: the outer edges of the fibers line up, and the gap between their end-faces is centered on the monitor and as small as possible while still allowing for up and down movement of the fibers.




## 6 Fuse

When the fibers are aligned to your satisfaction, you can press the FUSE button and start fusion. The splicer will follow the splicing program you chose earlier: in our case, program 03.

As the FSU 995 FA splices your fibers, it will read “Splicing....” in the *message field*.




Fuse fibers

“ **SPLICING...** ”

## 7 Check the splice

Once the splicing sequence is complete, you need to check the splice. The steps for this procedure are outlined in the following section.

# Splice evaluation

## 1 Loss estimation

After the splicing sequence is complete, the splicer estimates the splice loss and displays it in the mode field.

"FSU 995 FA AUTO MODE
**CHECKING SPLICE**

↓

"**ESTIM. LOSS: *x.xx* dB**
**NEXT PICTURE, VIEW**"

## 2 Re-fuse: Optional step

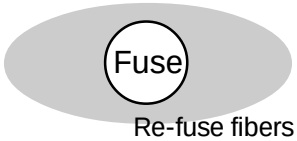
This option is **not** available if you are using the hot core or the small core alignment process (Program 05, in the case of the pre-defined programs).

With all other splicing processes, if you judge that the splice loss is too high, you can try to lower it by re-fusing. The splicer will present this option to you in the mode field, and you effectuate it by pressing FUSE again.

Do not re-fuse more than once, because multiple re-fusion can result in reduced splice strength and/or increased splice attenuation.

"**ESTIM. LOSS: *x.xx* dB**
**FOR REFUSING**

**PRESS FUSE BUTTON**"



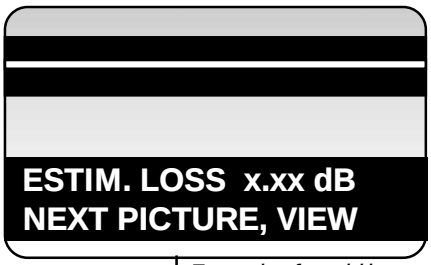

Re-fuse fibers (optional)

## 3 Evaluate splice visually

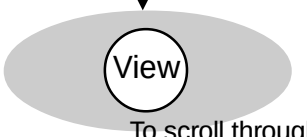
You should also visually evaluate the splice. The sequence of images available includes two cold (upper and lower view) and two stored hot images, taken during splicing. You can scroll through all of them by repeatedly pressing VIEW.

Image evaluation shows you the result of the splicing procedure, as well as, what happened during the splicing process, and is a particularly rich source of information for trouble-shooting. On the next page there are some tips as to what you should look for.

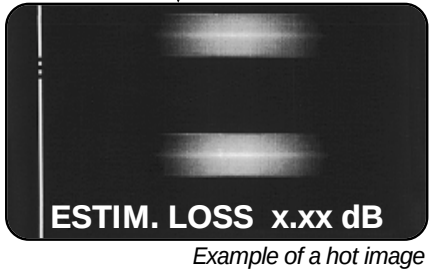
The FSU 995 FA also offers more advanced functionality in relation to hot image analysis, and if you are interested in using it, you should read page 60 in Advanced Operation.




*Example of a cold image*



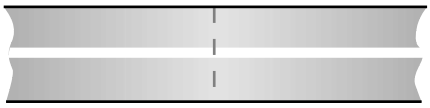

To scroll through images




*Example of a hot image*

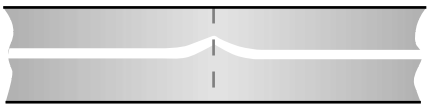
**Cold image and basic hot image analysis**

The best thing to have in your mind as you look at the images after splicing is a representation of a successful splice, such as the one here. The thing to note in particular is that the core and the outer edges form straight lines. If your splice does not look like this, you should check for one of the common splice defects shown below.



*Example of a successful splice*

Bent core

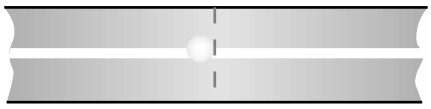


This is when the core, rather than form a straight line, bends at the splice point. A bent core is most often caused by a bad cleave, and is thus a problem that can be remedied by careful re-preparation of the fibers.

Core offset

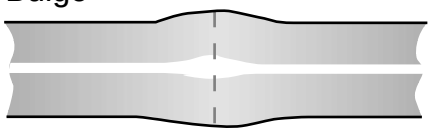
This is where the cores of the original fibers do not line up, even though their claddings do. This is most often the result of fibers with large core eccentricity, and you should use the Hot core or Small core alignment process with them when re-splicing.

Hot spot



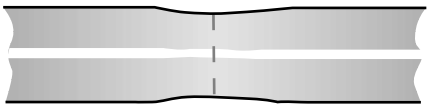
A hot spot shows up as a bright point on the fiber. It can be the result of a variety of factors: dirt on the fiber, poor cleaving, or air bubbles inside the fiber. When a hot spot is located outside the core, it reduces splice strength, when inside the core, it also contributes to higher splice loss. The best action to take is to carefully re-prepare the fibers.

Bulge



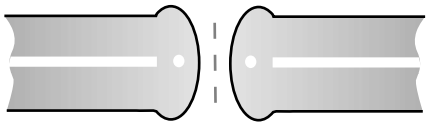
A bulge in the outer diameter usually indicates that you have used the wrong splicing program parameters, so you should check the program you are using before re-splicing.

Waisting



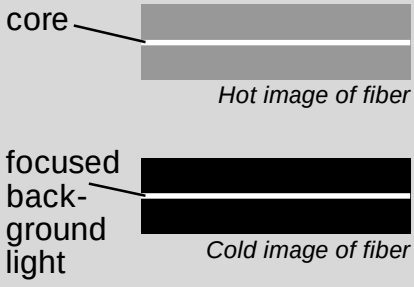
When the splice area is thinner than the fiber diameter, it means that either the fusion current was too high or that the fibers did not overlap sufficiently during splicing. You should check the program parameters before re-splicing.

Matchsticking



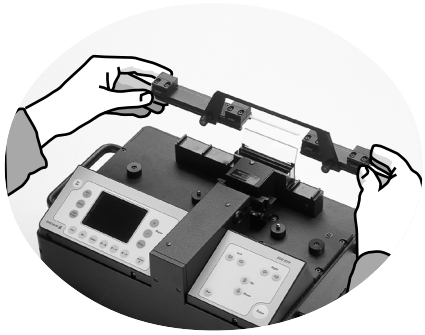
A number of problems can cause matchsticking. The most common causes are excessive fusion currents, dirty electrodes, and presence of primary coating left on the fibers. You should check these things and re-splice.

Throughout the splicing process, but especially during visual splice evaluation it is important to keep in mind the following: Whereas the white line one sees in hot images is the core, it is NOT in cold images. Rather, the white line one sees in a cold image is nothing more than the result of the round fiber acting as a lens and focusing the light shining through it.



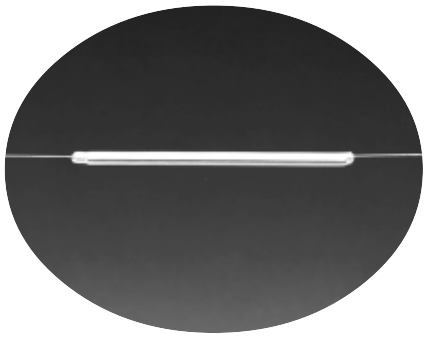
# Splice protection

## 1 Remove the fiber

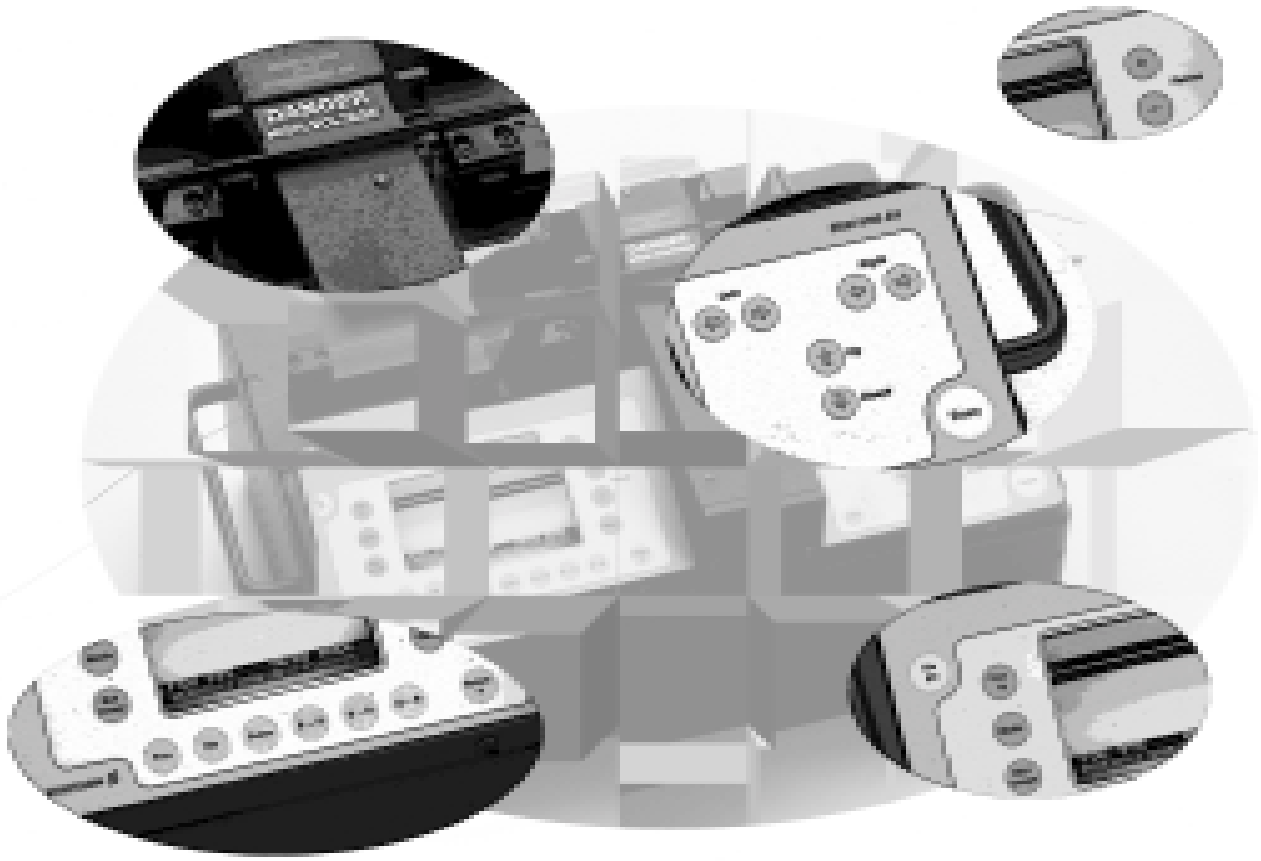


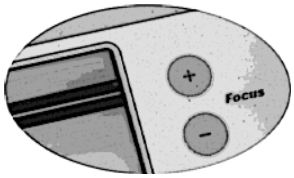
Once you are satisfied that you have a successful splice, you can open the safety shield – at which point the splicer will automatically turn off – and release the fiber clamps. You should then carefully transfer the spliced fiber to the heat oven. The simplest way to achieve this procedure without putting unnecessary torsional tension on the fiber is to use the fiber fixtures available for the FSU 995 FA (see adjacent picture).

## 2 Apply the heat-shrinkable sleeve



Make sure the heat-shrinkable sleeve is positioned over the splice area, and then carefully place the fiber into the heat oven. You should then follow the instructions that come with the heat oven. The heat oven is designed to evenly shrink the sleeve over the fiber, thereby protecting it without sealing in any bubbles that might cause attenuation problems.




Focus