FASE II

Compact Fusion Splicer

User Manual

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CONTENTS

1. INTRODUCTION

Safety First

WARNING! SHOCK HAZARD!
This splicer produces potentially lethal voltages at the electrodes.   **On no account should any physical contact be made with the electrodes unless the power has been switched off.**

Whilst every effort has been made to prevent erroneous firing of the arc, you should always take the following precautions:-

- Never tamper with the microscope hinge interlock.
- Never remove the electrode block covers with the unit switched on.
- Never remove the unit from the case.
- Never attempt to fire the arc with one or both of the electrode blocks missing.

Please read this manual thoroughly before attempting to use the Splicer.

What is Fusion Splicing?

The basic principle of fusion splicing is that two prepared fibres are brought together and their ends melted to form a homogenous join. To achieve a good splice (given two fibres with good ends), accurate positioning of the fibres and precise control of the arc temperature are both required.

In the past, the fibre cores have been aligned by either Local Light Injection and Detection or by Video Alignment. Optical fibre is now manufactured to higher standards than before, meaning that the core is consistently central within the cladding (a low concentricity error). This has allowed for a new generation of splicers, which achieve cladding alignment by means of fixed V-grooves, and rely on the concentricity of the fibre core to achieve core alignment.

FASE stands for Fixed Alignment Splicing Equipment. The FASE II fusion splicer uses an accurately machined V-block for the initial alignment of the fibres. During the fusion process, the fibres are pulled further into alignment due to surface tension (as the fibres become molten, surface tension causes the claddings of the fibre to align).

This surface tension effect has been increased in the FASE II splicer by the new technique[1] of axial reciprocation during fusion. After the molten fibres have been brought together, they are reciprocated (i.e. one of the fibres is "wiggled" in and out) in a controlled fashion whilst still molten. This increases the cladding alignment effect of the surface tension of the molten glass, producing a lower splice loss and a stronger joint.

1. Patent No. GB 2 271433

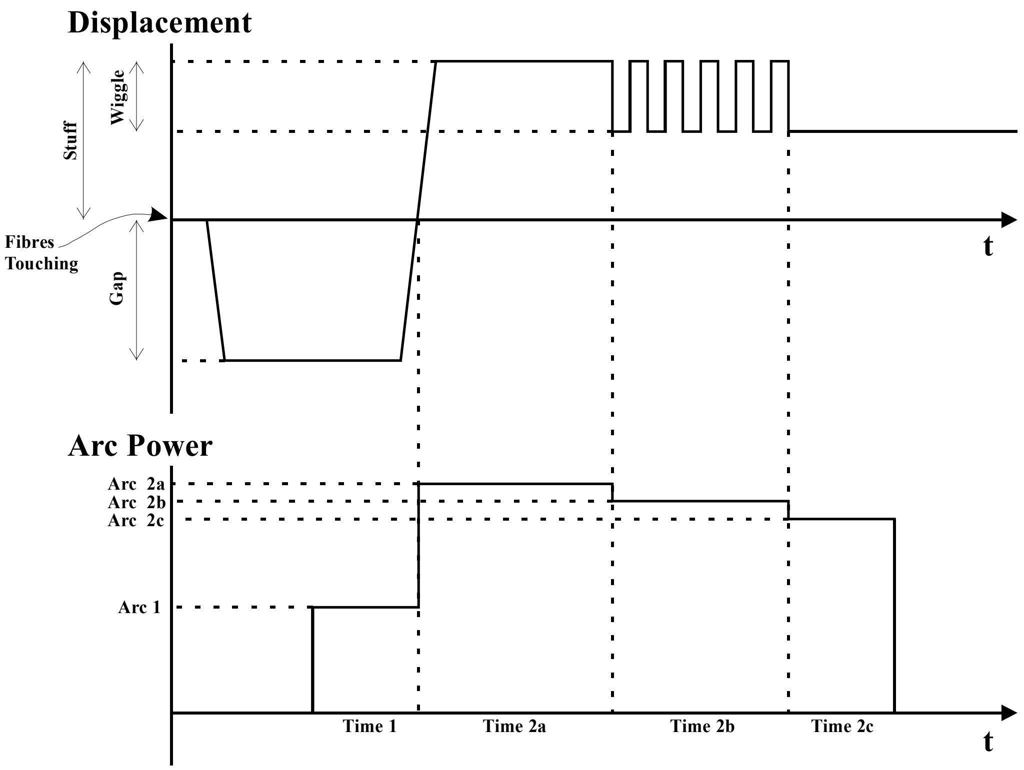


Figure 1: Splice timing with reciprocating action

Figure 1 shows the FASE II splice program timing. The fibres are moved apart to a distance of "Gap" before the arc is struck. An arc of power "Arc1" is then struck and maintained for "Time1". This starts to melt the glass of the fibre ends. At the end of "Time1", the fibres should be almost molten. The arc power is increased to "Arc2a" as the fibres are brought back together (removing "Gap"), and then pushed a further distance "Stuff" into one another. The arc power is adjusted to "Arc2b" for a time "Time2b", and then again to "Arc2c" for time "Time2c".

The accelerated surface tension effect is obtained by the reciprocation of the fibres during "Time2b". The amplitude of this reciprocation is set by the parameter "Wiggle". If "Time2b" is set to zero, "Wiggle" is ignored, and the resulting draw action is zero.

The eleven parameters are stored together in the splicer as one of ten Preset Programs. In addition, you can adjust the parameters by using one of the ten additional Custom Programs. For more information, see section 3 on "Splice Programs and Parameters"

Component Description of the Splicer

The FASE II fusion splicer has been ergonomically designed with the flexibility to splice a wide range of fibres. Figure 2 shows the layout of the fusion splicer.

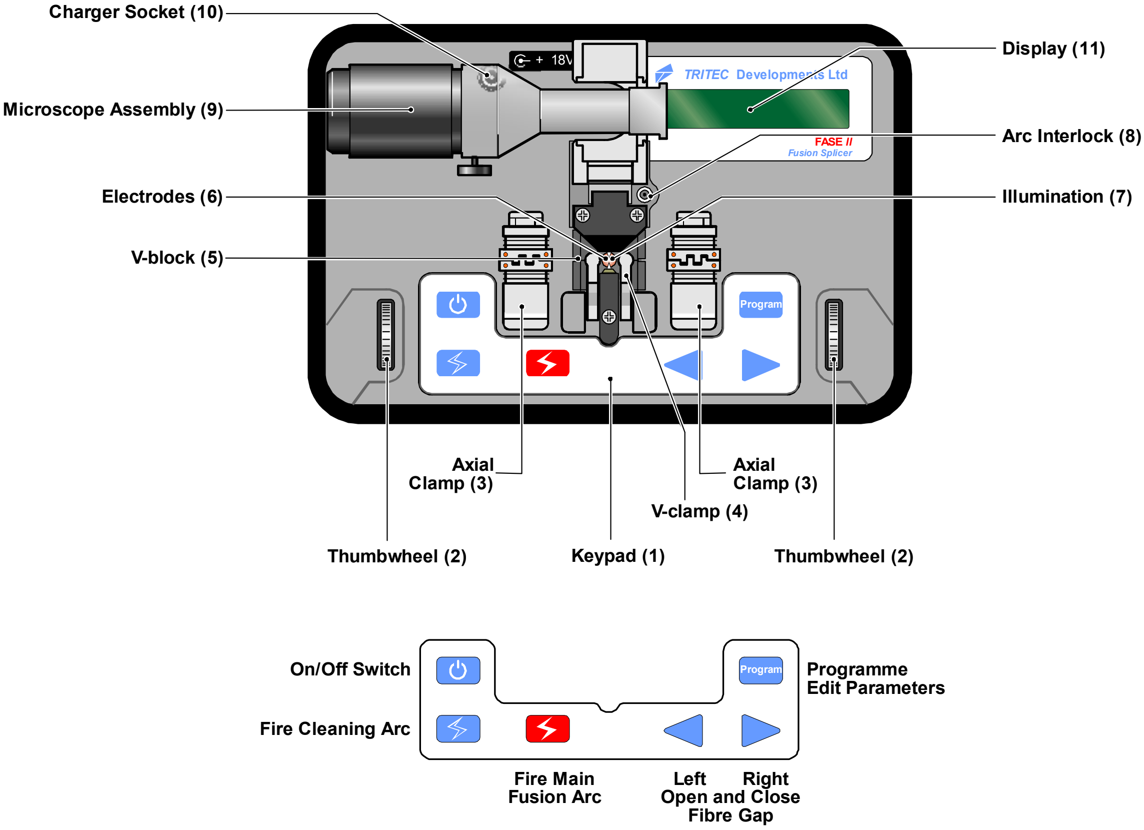


Figure 2: Layout of the FASE II Splicer

1. Keypad

The membrane keypad consists of six keys which control splice operation when the arc cover is closed. The keys have auxiliary functions when the arc cover is open.

Key	Name	Function with Arc Cover Closed	Function with Arc Cover Open
	On/Off	Switch splicer on or off	
	Cleaning Arc	Fire short cleaning arc	Display battery level
	Arc	Fire main fusion arc (& extra arc if required)	Toggle illumination on or off
	Left	Close fibre gap slightly	Alter splice program or custom parameter
	Right	Open fibre gap slightly	Alter splice program or custom parameter
Program	Program		View or edit splice program parameters

2. Thumbwheels

The thumbwheels are used for coarse adjustment of the gap between the fibres. Rotating the thumbwheel away from you moves the fibre inwards.

3. Axial Clamps

These spring-loaded clamps are used to hold the fibre. They are designed to be self-centring so that they always hold the fibre in the correct position regardless of the fibre coating diameter. Using the thumbwheels each axial clamp has a maximum travel of 5mm.

4. V-clamps

The V-clamps prevent the fibre from leaving the V-groove. A specially designed pad allows the fibre to slide freely underneath as the axial clamps are moved.

5. V-block

The ceramic V-block is a key component of the splicer. A precision machined V-groove within the block is used to accurately align the fibres. The block also supports the electrode blocks ensuring accurate alignment of the electrodes.

6. Electrodes

The fibres are fused together using a high-voltage DC arc, which is delivered across two tungsten electrodes. The electrodes are housed in blocks, allowing them to be simply replaced without having to adjust the gap between them.

The rear electrode carries very high voltages and is therefore covered with an insulating clamp.

7. Illumination

The fibres are illuminated by a yellow LED located beneath the electrodes. The LED is powered when the arc cover is closed to enable the fibres to be viewed down the microscope. It is also enabled whilst placing the fibres in the V-grooves, but can be toggled off (or on) by pressing the ⚡ key.

8. Arc Interlock

The arc interlock prevents the arc from being fired until the arc cover is closed.

WARNING!
Under no circumstances should any attempt be made to override this interlock.

9. Microscope Assembly

The microscope assembly is hinged so that it folds neatly onto the top plate when not in use and is designed to protect the operator from the arc during fusing.

The microscope provides the user with a clear X75 magnification image of the fibres during splicing. The eye-piece can be rotated to bring the fibres into focus. A filter within the microscope protects the user from ultra-violet and infra-red emissions.

10.Charger Socket

The charger socket is a 2.1mm low power DC socket. It is situated at the rear of the splicer top plate. It accepts 18V DC, with the centre-pin positive. A light adjacent to the socket illuminates when the unit is charging.

It is recommended that only the standard charger supplied with the unit is used.

11.Display

This is a 16 character by 2 line super-twist liquid crystal display (LCD). It is used to display the fusion parameters and to guide the operator through the splicing procedure.

2. Operation

This section describes in detail how to use the FASE II splicer.

Unpacking the Splicer

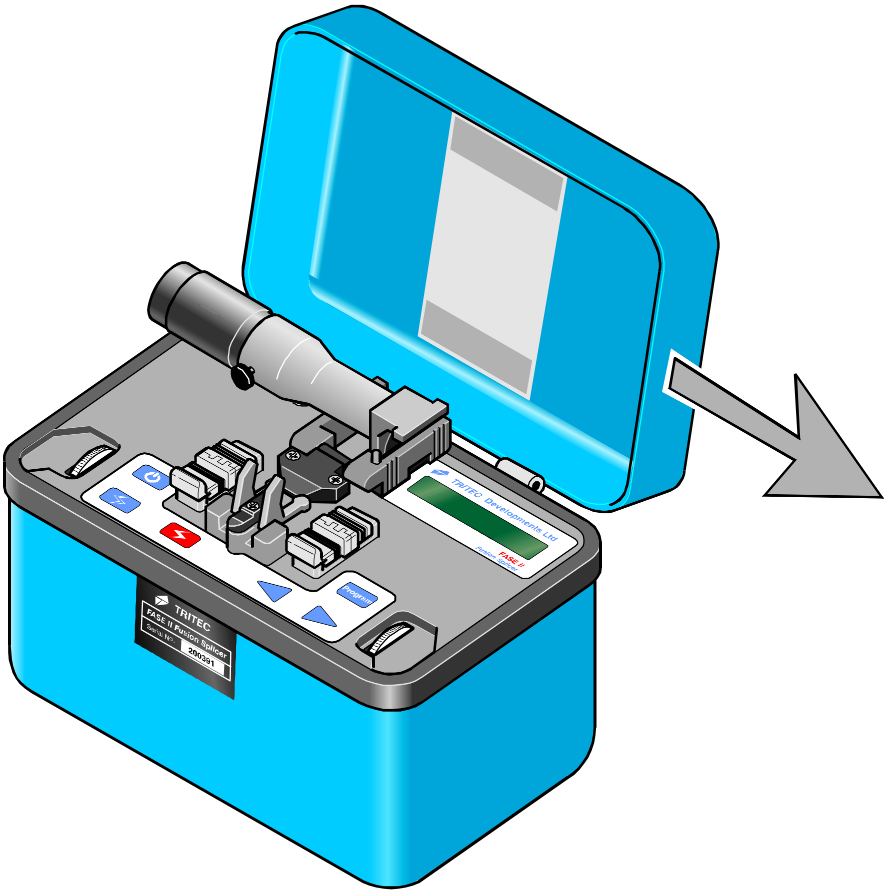


Figure 3: Removing the lid of the case

The splicer is housed in a compact rugged aluminium case. Open the case and remove the lid as shown in figure 3.

Inside the case lid there is a step by step guide on splicer operation.

Before using the splicer, perform the following routine maintenance:

- clean the V-grooves.
- check the electrodes and clean them if necessary.

For further details of cleaning the V-groove and checking the electrodes see section 4 on "Routine Maintenance".

Operator Decision Flowchart

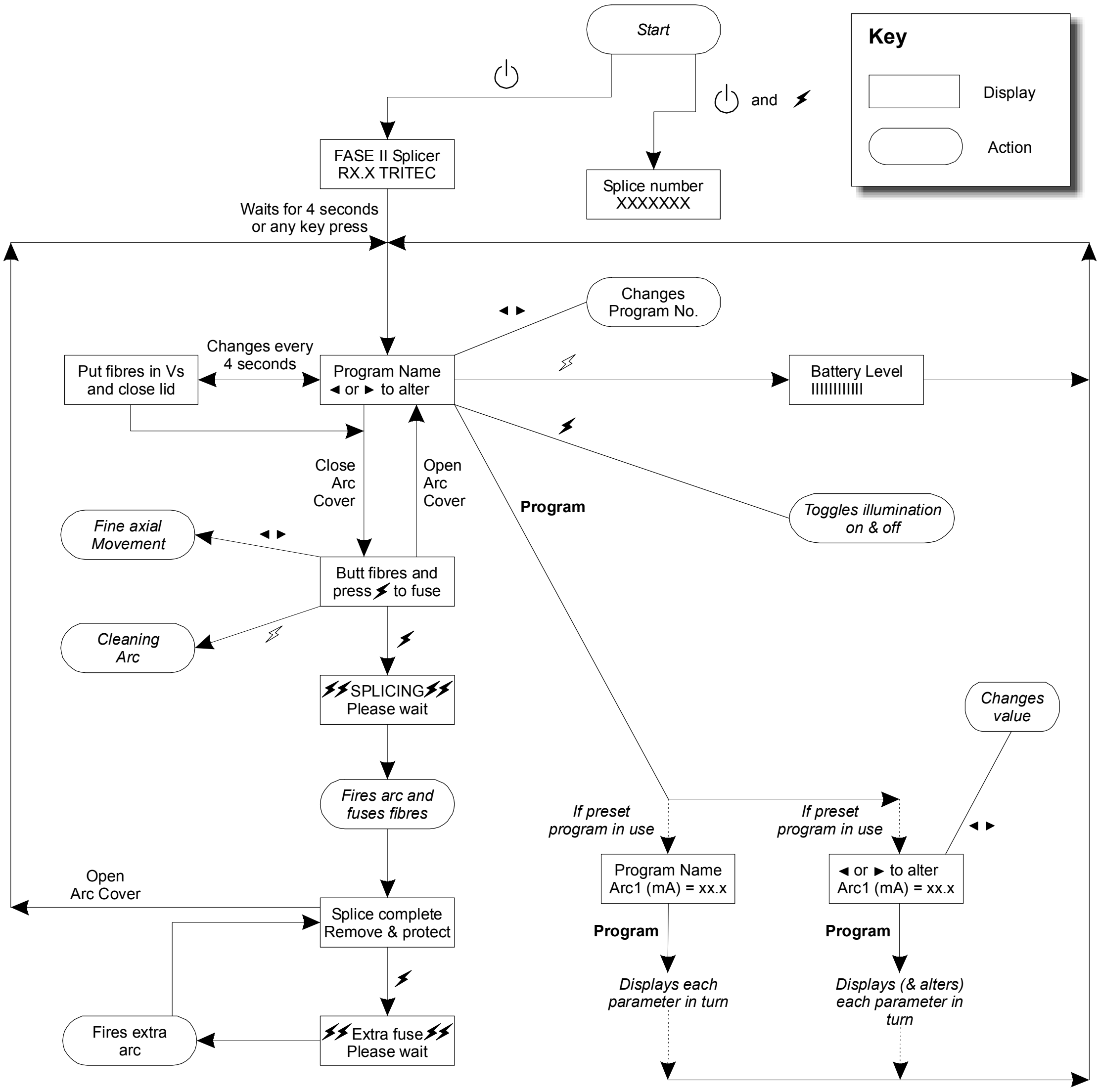


Figure 4: Operator Decision Flowchart

Switching On the Splicer

It is recommended that the splicer is charged for 10 hours before first using it.

The splicer is switched on by pressing the ⏻ key. The LCD displays the following message:

```
FASE II Splicer
R1.1   TRITEC
```

R1.1 is an example of the version of the software. This should be quoted when contacting the service engineer if any problems are encountered with the splicer.

After 4 seconds or after a key is pressed the display alternates between the messages:

```
     Program Name
   ◀ or ▶  to alter
```

and:

```
 Put fibres in V's
    and close lid
```

Charging the Splicer

The FASE II splicer is powered from an internal lead acid battery, which provides over 100 splices on one charge. If the display indicates that the battery charge is low, plug in the charger provided. To fully charge the battery takes 10 hours.

The battery charge can be checked at any time by pressing the ⚡ key with the arc cover open.

The splicer can be operated with the charger connected, as long as the battery charge is not low.

```
      Battery low
    Please charge
```

When the display first indicates that the battery is low there will be enough charge remaining to perform up to 10 further splices. Once the battery is discharged to its limit the splicer will display a warning message and then switch off to prevent complete discharge. In this situation, plug in the charger and allow the unit to charge for 10 minutes before using it again.

If the unit is to be left unused, it should be periodically charged every 6 months.

Accessing the Splice Counter

If the ⚡ key is held down whilst pressing the ⏻ key, the display shows a splice count:

```
Splice No.
XXXXXX
```

The counter may be reset at this stage by pressing the "**Program**" key, prompting the following display:

```
Press ⚡ to Reset
Splice Counter
```

Press the ⚡ key to reset the counter. If you press any other key, or do not press a key within 4 seconds, the display clears and the counter is not reset.

Selecting the Splice Program

Different fibre types have different thermal properties. To produce an optimum splice for every type of fibre, different splice programs are stored in the memory of the FASE II Splicer, for more information on choosing and customising programs, see the section on Splice Programs and Parameters.

The program currently in use is displayed on the LCD after the splicer is switched on:

```
     Program Name
 ◀ or ▶  to alter
```

This will not be displayed if the microscope is in place over the fibres.

To change the program press either ◀ or ▶ to step through the different programs. If you wish to view the parameters of a particular program, press the "**Program**" key after selecting the program. This will display the first parameter:

```
     Program Name
      Arc1 = xx.x
```

Repeatedly pressing the "**Program**" key will advance the display through all the parameters. The preset program parameters may not be changed.

If you select one of the ten custom programs and then press the "**Program**" key the display will show:

```
 ◀ or ▶  to alter
      Arc1 = xx.x
```

Change the parameter by pressing ◄ or ► . Pressing the "**Program**" key will advance the display to the next parameter.

Once you have selected a program this is stored by the splicer before it is switched off and will be restored next time it is switched on.

For information on choosing a splice program, see section 3 on "Splice Programs and Parameters".

Preparing the Fibres

The correct preparation of fibre ends is a critical factor in producing good splices. The fibres should be stripped of all primary and secondary coatings and thoroughly cleaned before being cleaved. If a fibre is dirty it may not sit in the V-groove correctly causing a misalignment of the two fibres.

The fibre should be cleaved so that 12-20 mm of bare fibre is left exposed (see figure 5). The cleave angle should be less than 1° to perform optimum splices with singlemode fibre.

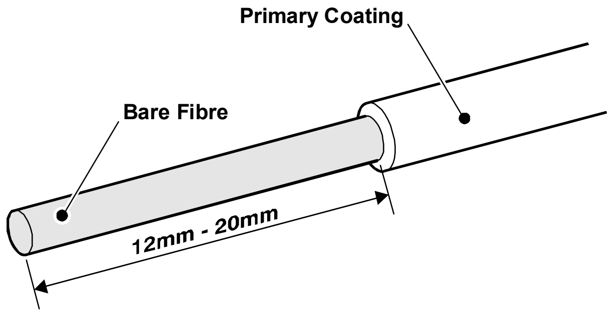


Figure 5: A stripped fibre

Hold the cleaved fibre about 60 mm from its end and place it in the V-groove whilst holding the axial clamp open (as shown in figure 6). With the fibre end just short of the electrodes clamp the fibre by closing the axial clamp. Check that the fibre is lying in the V-groove and then close the V-clamp. Repeat the process for the other fibre.

The illumination LED is enabled at this stage, to ease the positioning of the fibres. It can be toggled off (or on again) by pressing the ⚡ key. The illumination will always be enabled again as soon as the arc cover is closed.

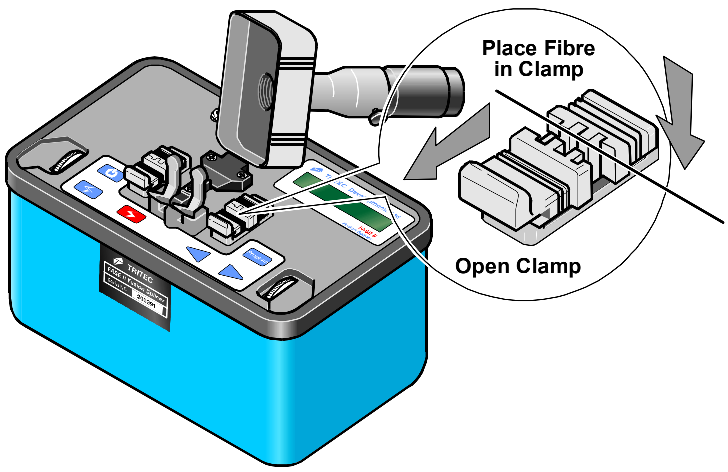


Figure 6: Placing the fibre in the clamp

Checking the Fibres

Operating the Microscope

The double hinge on the microscope allows it to be folded flat on the top plate so that the lid of the case can be closed after use.

To close the arc cover and use the microscope, the following steps should be taken:

- Hold the arc cover as shown in figure 7(a) and lift it towards the front of the splicer.
- The microscope body should swing towards the back of the splicer. Use your thumb to lock it in place once the arc cover is at 90° to the top plate, as in figure 7(b).
- Holding the microscope body as in figure 7(c), the arc cover can be closed.

During normal use the microscope is kept in position and is lifted out of the way for access to the fibres, as shown in figure 7(d).

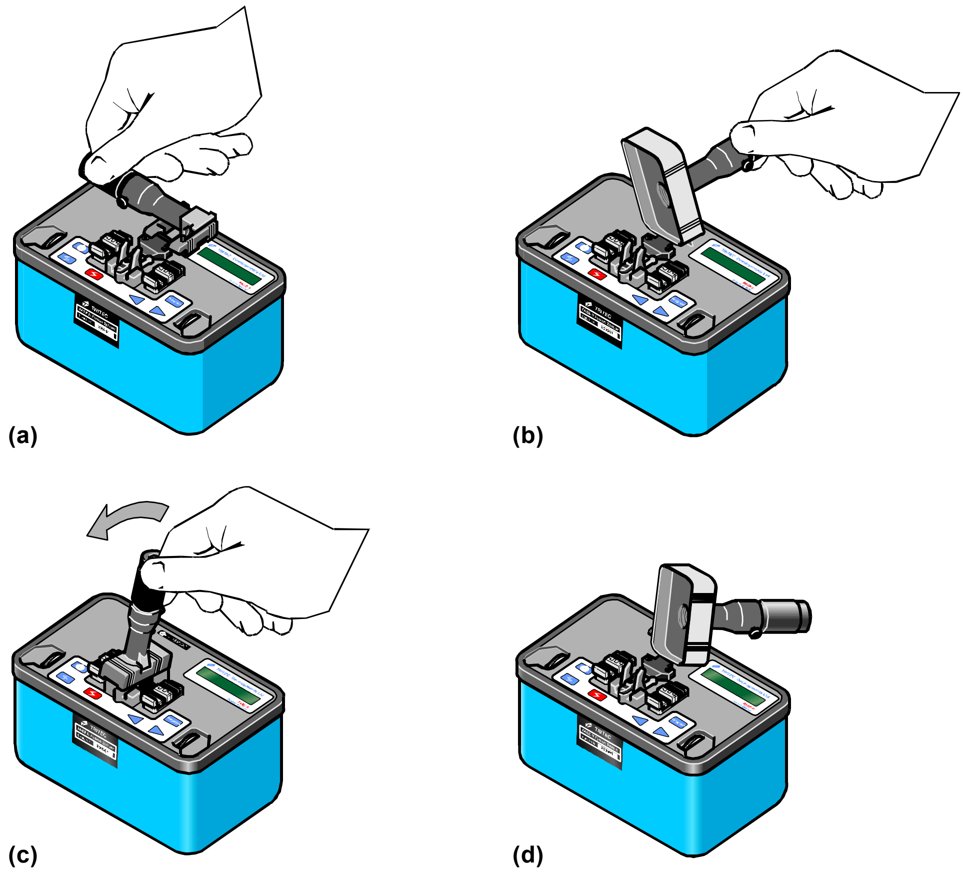


Figure 7: Erecting the microscope

The arc interlock is engaged when the arc cover is closed, and the arc may be fired. The display shows:

```
Butt fibres and
Press ⚡ to fuse
```

The fibres may now be viewed through the microscope. If the image is not sharp, adjust the focus by rotating the eyepiece.

Drive the fibres into view using the thumbwheels so that there is a small gap between the fibres.

The microscope inverts the image of the fibres so that moving the left hand thumbwheel appears to move the right hand fibre.

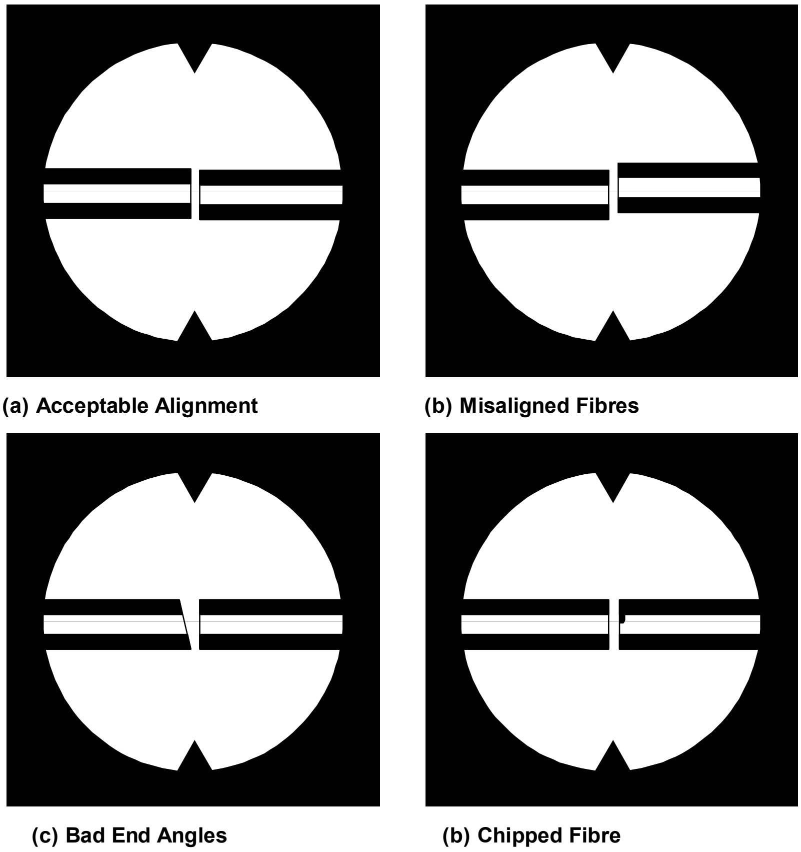


Figure 8: Checking the fibres

If one of the thumbwheels reaches an end-stop, it is usually possible to open the axial clamp and reverse the thumbwheel, leaving the fibre held by the V-clamp. Continue reversing the axial clamp until there is enough free movement, and then close it again.

Now check the fibres (see figure 8(a)-(d)).

Fibre Alignment

The splicer can tolerate a small amount of misalignment and still produce good splices because of the surface tension effect. Figure 8 compares acceptable and unacceptable misalignments.

Correcting Misalignment

The V-block is designed to accurately align the fibres. However if the fibres do not sit correctly in the V-groove this alignment will not be achieved.

Misalignment is nearly always due to contamination on:-

- the fibres
- the V-grooves
- the V-clamps

Before suspecting the V-grooves or V-clamps, make sure that there is no contamination on the fibres. This can be quickly checked by holding one of the axial clamps open and rotating the fibre between finger and thumb whilst looking down the microscope. If the fibre is dirty, it will move up and down in the microscope view. The fibre should be removed and carefully cleaned with a lint-free wipe soaked in isopropanol.

Take care not to damage the cleaved ends of the fibre whilst cleaning. If the fibre end appears chipped when it is replaced, remove it and cleave it again.

If there is still misalignment, clean the V-grooves and V-clamps, as described in section 4 on "Routine Maintenance".

The V-grooves should be cleaned regularly to ensure optimum alignment. It is possible that the fibres can be misaligned in the vertical plane, which could pass unnoticed under the microscope.

Chips on the ends of the fibres

Chips on the end of the fibres can be caused by faulty cleaving or by mishandling of the fibre. If the fibre is chipped, remove it and cleave it again.

End Angles

The end angle of each fibre should be less than 1° for an optimum splice. If the fibre has a bad end angle, remove it and cleave it again.

Dirty Fibres

If a fibre is dirty, press the ⚡ key to fire a short cleaning arc. If this does not remove the dirt, remove the fibre and clean it again using a tissue soaked in isopropanol.

Adjusting the focus to move the focal plane through the fibre can help to check for dirt across the entire face of the fibre.

Replace the fibre in the V-groove and inspect it again. If repeated cleaning does not remove the dirt, cleave the fibre again.

Fusing the Fibres

Use the thumbwheels to position the fibres about 125µm (a fibre width) apart between the electrodes, and press the ⚡ key to clean them.

Butt the fibres by bringing them together between the electrodes so that they almost touch. Use the ◀ and ▶ keys to gently bring the fibres together so that they just touch.

The cursor keys are used to drive a piezoelectric translator which is attached to the right-hand axial clamp. This provides fine movement of the fibre as well as the automatic movement during fusing.

Each press of the ◀ and ▶ keys moves the fibre about 1µm. Fine control is only available over 60µm, including the “stuff” and “gap” distances defined in the current splicing program. The splicer emits a warning beep when the limits of the fine movement have been reached. To reset the movement to its central position, lift the microscope and replace it. Bring the fibres closer to the correct position using the thumbwheels, and then butt them again using the ◀ and ▶ keys.

It is important to ensure that no bowing occurs when the fibres are butted together (this indicates they are over-butted).

Press the red ⚡ key to fire the fusion arc. The splicer beeps 3 times, the fibres are gapped and the arc is fired. The arc should strike cleanly with little noise. When the fibres are molten they are brought together. The fibres should fuse with no bubbling. The splicer beeps once to indicate the splice is complete.

Checking the Splice

When the fusion arc has finished, examine the fibres through the microscope. There should be no visible indication of the joint after fusing. If there is a line at the join, it is possible at this stage to fire an extra arc by pressing the red ⚡ key. If this fails to remove the line or there is a bubble in the fibre, remake the splice.

If the same problem occurs when remaking the splice, consult section 3 on "Splice Programs and Parameters" to adjust the program to the fibre type.

Removing and Protecting the Splice

Once you are satisfied with the quality of the splice, lift up the arc cover and microscope. Open both V-clamps and lift the fibre out of each axial clamp one at a time. You should now protect the splice, preferably by applying a heatshrink splice protection sleeve.

Repacking the Splicer

Switch the power off by pressing the ⏻ key. Fold the microscope so that it is positioned flat on the top plate, and screw the eyepiece lens fully into the microscope housing. Slide the case lid back on to its hinges and shut it.

3. SPLICE PROGRAMS AND PARAMETERS

Different fibre types have different thermal properties. To produce an optimum splice for every type of fibre, different splice programs are stored in the memory of the FASE II Splicer.

The Splice Parameters

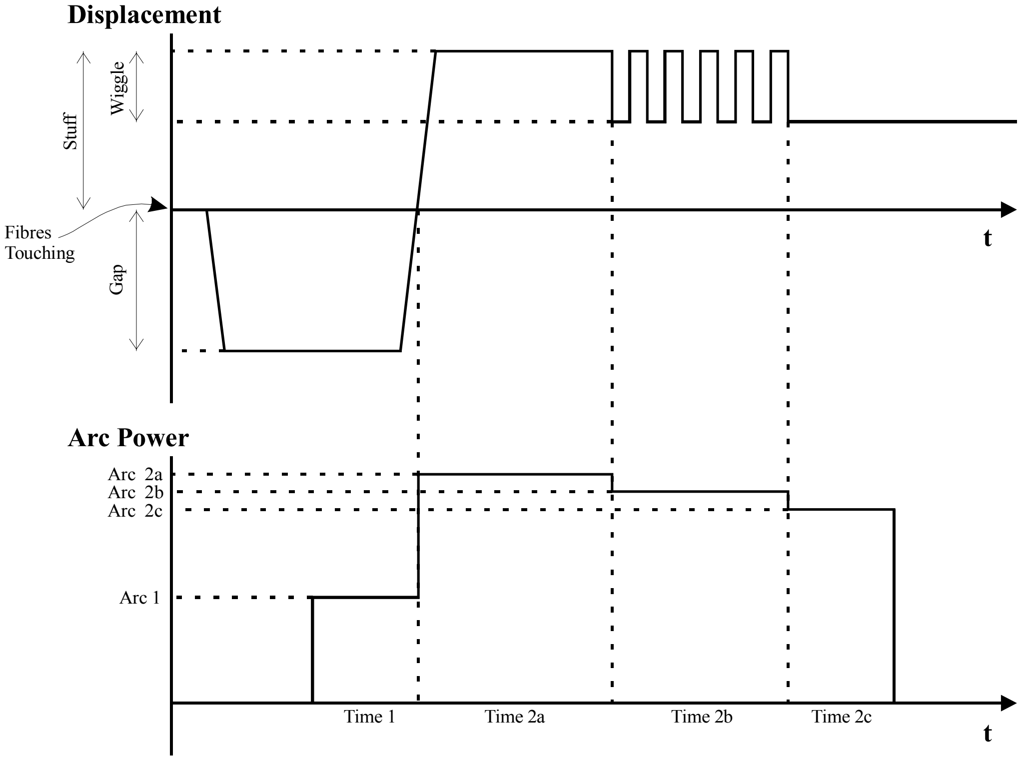


Figure 9: Splice timing with reciprocating action

Each of the programs consists of nine parameters (although Wiggle is ignored if Time2b is 0). A table showing the parameters for all the preset programs can be found on the program sheet provided with this manual.

Each of the eleven parameters is now described.

Gap is the distance (in µm) that the two fibres step apart before fusion begins. Its purpose is to allow Arc1 to soften the fibre ends before fusing.

Arc1 is the current (in mA) of the initial arc, which is fired as the fibres are gapped. Its purpose is to slightly soften the fibres before fusing. With some multimode fibres, it is necessary to heat the fibres enough to slightly round their ends, which then prevents bubbling during Arc2.

Time1 is the duration (in seconds) of Arc1. By adjusting both duration and current (Time1 and Arc1), the heating effect on the fibre can be optimised.

Arc2 (a, b & c) is the current profile (in mA) of the fusing arc, which is established as the fibres touch and continues for the rest of the splicing process. Its purpose is to thoroughly melt the fibres, allowing the surface tension effect to take place, without causing them to overheat and bubble.

Time2a is the time (in seconds) between the fibre coming together (and also Arc2 starting) and the start of reciprocation. It allows the fibre to travel its full stuffing distance and start the surface tension effect before reciprocation begins.

Time2b is the duration (in seconds) of the reciprocating action, during which one fibre is moved in and out relative to the other 5 times per second. During this period an accelerated surface tension effect takes place as well as a strengthening of the splice.
NB: By setting Time2b to zero, no reciprocation will take place, and Wiggle will not be displayed.

Time2c is the time (in seconds) between reciprocation finishing and Arc2 ending. This allows time for the spliced fibres to stabilise.

Stuff is the distance (in µm) that the two fibres merge during the splice. Its purpose is to stop necking in the joint. Too large a value could cause bulging and result in poor splice losses.

Wiggle or Reciprocating Amplitude (RA) is the amplitude (in µm) of reciprocation during Time2b. It is irrelevant if Time2b is zero.

Preset Programs

The following programs are supplied as presets, and should be selected as follows:-

ProgName	**Description of Use**
M'mode Warm	On multimode fibre where M'mode Standard leaves a cold line (some 50/125 fibres)
M'mode Cool	On multimode fibre where M'mode Standard gases
M'mode Standard	On most multimode fibre (62.5/125 and 50/125)
M'mode Hi Pref.	On multimode fibre where the core gases but the cladding leaves a cold line
M'mode Hi Stuff	On multimode fibre when fibre end quality cannot be achieved
S'mode Warm	On singlemode fibre where S'mode Standard leaves a cold line
S'mode Cool	On singlemode fibre where S'mode Standard gases
S'mode Standard	On most singlemode fibre
S'mode Hi Pref.	On singlemode fibre where S'mode Standard gases and S'mode Cool leaves a cold line
S'mode Short	On singlemode fibre where S'mode Standard has too long an arc

Choosing the Correct Splice Program

There are various effects which indicate that the incorrect splice program is being used.

1. Bubbles at the joint indicate that the fibres are too hot during fusion, and are gassing. Choose a program with a lower value for Arc2.
2. A line at the joint indicates that the fibres are too cold and not fully fusing. Choose a program with a higher value for Arc2.
3. Both a line and bubble at the joint is possible in some multimode fibres when the core and cladding have such different thermal properties that even though the core is gassing, the cladding is not fusing properly. It is possible to prevent the core gassing by slightly rounding the fibre end during Arc1. To do this, choose a program with a higher value for Arc1 and/or Time1, and a higher value for Arc2 to remove the cold line.
4. A stepped joint, causing a poor splice loss, is an indication that the surface tension effect has not taken place. Choose a program with a longer value for Time2, or a higher value for Arc2.

Adjusting Splice Parameters

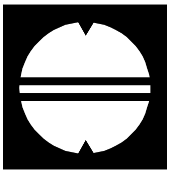
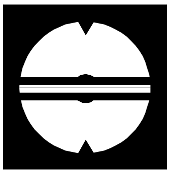
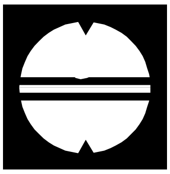
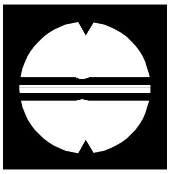
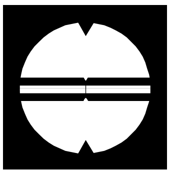
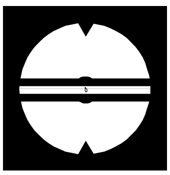
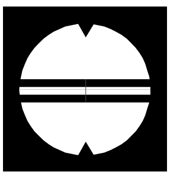
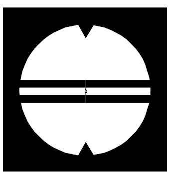
If none of the preset programs are suitable, one of the ten custom programs can be used. This facility gives you control over each of the eleven parameters individually.

The custom programs are initially set to be identical to the ten preset programs, so that one of these can be used as a basis for designing your own program.

It is normally desirable to develop a custom program under laboratory conditions, monitoring splice loss by a series of "Break and Make" tests (using a stabilised light source and optical power meter) on a sample of the fibre before installation is started.

Visual Inspection

Visual inspection can help develop a splice program, and the following table gives some guidelines.

View of Splice	Comment
	Good splice. A slight bulge is often visible in a good joint, caused by the "stuffed" material in the splice
	Unacceptable bulging. 1. Fibres have been over-butted (see "Operation") 2. Stuff parameter too large
	Bad cleaves. Splice performed on fibres with bad end-angles
	Necking. 1. Fibres have been under-butted (see "Operation") 2. Stuff parameter too small
	Bad Necking 1. Under-butting 2. Arc1 parameter too hot 3. Tim1 parameter too long
	Bubbling. 1. Dirt on fibre ends before splicing 2. Arc2 parameters too hot 3. Tim2 parameters too long
	Cold Line. 1. Arc2 parameters too cold 2. Tim2 parameters too short 3. Arc1 parameters too cold
	Bubble & Cold Line. Arc1 parameters too cold and Arc2 parameters too hot

Optimising Splice Loss

With singlemode fibre it is normally easy to achieve visually good splices. If it is possible to monitor the optical signal during some test splices, the splice program can be further optimised using the "break and make" technique.

Select a program that produces visually good splices as a starting point and monitor the signal as a splice is performed. As the fibres are butted together a loss less than 1dB indicates good alignment (although the FASE II can produce good splices from butt losses greater than 3dB).

As the fibres are fused the splice loss should rapidly decrease to less than 0.1dB reaching a minimum as the splice is complete. Adjust the arc current as indicated by the the table below until the splice loss is optimised.

If ARC 2b is too low	i) Loss decreases slowly ii) Loss increases after arc stops iii) Firing extra arcs reduces loss
If ARC 2b is too high	i) Loss decreases rapidly and increases again before splice is complete ii) Loss decreases after arc stops

If you have continued problems splicing a particular fibre type, TRITEC can provide an optimised program as a customer option, if samples of the fibre can be provided for research.

If you develop a particularly good splice program, please send it in to TRITEC for inclusion in the next User Group Newsletter, and possibly in the next release of the software.

4. ROUTINE MAINTENANCE

The FASE II fusion splicer has been designed so that it requires minimum maintenance. However, some important routine procedures should be observed to ensure optimum performance.

Cleaning the V-grooves and V-clamps

The V-grooves should be cleaned before the start of every splicing session. The cleanliness of the V-grooves is key to the performance of the splicer. In most cases it is possible to notice when the V-grooves have become contaminated by observing fibre misalignment.

The V-grooves can usually be cleaned using the camel hair brush provided. Brush along each V-groove away from the electrodes as shown in figure 10.

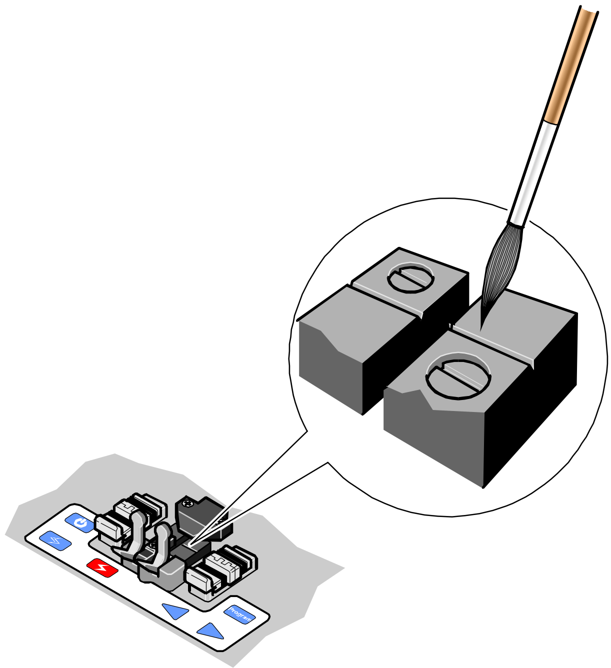


Figure 10: Cleaning the V-grooves

If the V-grooves are still contaminated, then try pushing a clean cleaved fibre along the V-groove, or use a cotton bud soaked in isopropanol.

Important: The V-clamp pads should be cleaned with a lint-free wipe every time the V-grooves are cleaned.

Checking and Cleaning the Electrodes

Prolonged use of the splicer causes wear and a build up of deposits on the electrodes. This can be seen through the microscope as "fur" or rounded ends on the electrode.

At the start of every splicing session use the microscope to inspect the condition of both electrodes. Check that the electrodes are free from contamination by firing a fusing arc. If the arc sputters, this can indicate that the electrodes are contaminated and should be cleaned.

WARNING!
Before cleaning or replacing the electrodes, always **Switch off the Splicer**

If repeatedly firing the arc without the fibres in the electrode gap does not clear the sputtering, the electrodes must be removed and cleaned. Following the instructions below for replacing electrodes, remove the earth electrode block, and clean it using the cleaner block provided. Take care to draw away from the electrode point so as not to make it blunt. Replace the block, and then fire the arc once or twice to remove any loose particles. If the arc still sputters, then repeat this process with the HV electrode block.

If an electrode is damaged or shows excessive wear, it must be replaced (see section on Replacing Electrodes).

Replacing Electrodes

FASE II has specially designed precision electrode blocks. These blocks ensure that the electrodes are easily replaced and are always correctly gapped.

The electrodes must be replaced if they are damaged or show excessive wear. This is normally indicated by degradation in the performance of the arc, despite cleaning the electrodes.

When deciding which electrode requires replacing remember that the image in the microscope is reversed.

Both the earth and high voltage electrode use the same type of electrode block.

WARNING!
Never fire the arc with either electrode block missing, as this would damage the splicer

Replacing the Earth Electrode

The earth electrode is at the front of the splicer. Remove the electrode cover using the screw-driver provided to reveal the electrode block (see figure 11), and carefully lift it out. Remove any packing or protective coating from the replacement electrode and place it into the V-block so that the dowel pin is inserted into the hole provided. Check the block is seated properly and replace the earth electrode cover.

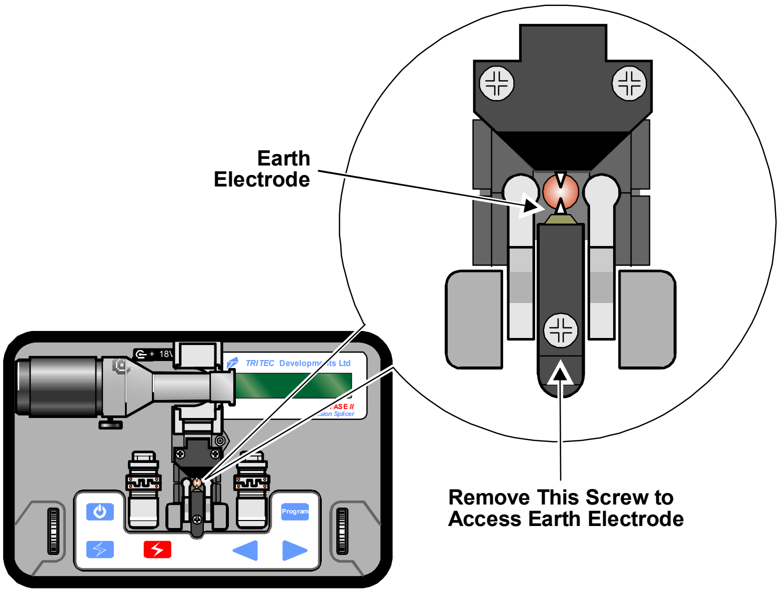


Figure 11: Replacing the earth electrode

Replacing the High Voltage Electrode

The high voltage electrode is at the rear of the V-block. It is protected by an insulating cover. Check that you have switched off the unit, and then remove this plastic cover using the screw-driver provided (see figure 12) and carefully lift out the electrode block. A spring plunger which is used to make electrical connection with the dowel pin of the HV electrode will tend to lift the electrode block. Remove any packing or protective coating from the replacement electrode and place it into the V-block so that the dowel pin is inserted into the hole provided. Replacing the HV electrode cover, carefully tighten the retaining screws whilst pushing it down to locate the electrode block correctly.

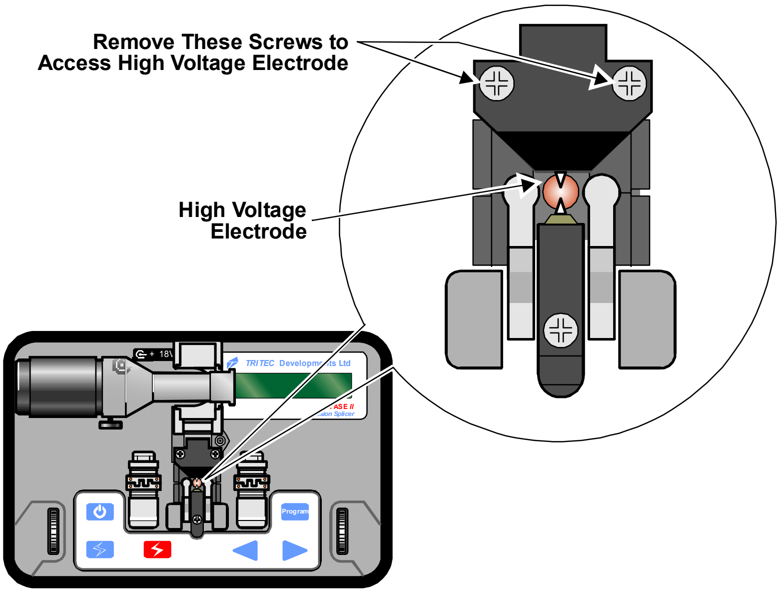


Figure 12: Replacing the HV electrode

5. TROUBLESHOOTING

Turn to this section if you encounter problems operating your splicer. If, after reading it, you still have problems, call Technical Support at TRITEC or your dealer.

If the Fibres do not Align in the V-Groove

This is nearly always due to contamination of either the fibre or the V-groove itself. Make sure the full stripped length of the fibre is clean, not just the section you can see down the microscope. If misalignment still occurs regularly, make sure the V-grooves are clean, following the procedure set out in the section on Maintenance.

If the Battery does not Hold Charge

When the charger unit is plugged in, the battery will take 10 hours to charge fully *if the unit is switched off*. If the unit is switched on and used for splicing, the battery will only be receiving minimal charge, and may still need charging.

If the battery has discharged so fully that the Battery Low Warning has been displayed, the charger should be plugged in *and the unit switched off* for at least 10 minutes before trying to run the unit from its charger supply. The charging time from this discharged state is 10 hours with the splicer switched off.

If Custom Parameters have been lost

The battery-backed RAM inside the splicer has failed. Return the unit for service.

If the Splicer will not Switch On

The battery may simply require charging. Plug in the charger for at least 10 minutes, and then try to switch on again.

If this does not cure the problem, either the battery is in deep discharge or the battery-backed RAM has failed. Return the unit for service.

If the Arc is Noisy

The battery may require charging. Plug in the charger and continue.

The earth electrode clamp may not have been tightened fully.

The electrodes may simply require cleaning.

One or both of the electrodes may require replacing.

Remember to switch off the unit before adjusting, cleaning or replacing the electrodes.

If the Arc will not Fire

Make sure that the arc cover has been fully closed to ensure that the interlock is deactivated.

Make sure that both electrode blocks are in place.

The battery may require charging. Plug in the charger and try again.

If there is no Illumination

Make sure that the arc cover has been fully closed to ensure that the interlock is deactivated.

6. Specification

Physical

Dimensions:	178 x 127 x 125 mm
Weight:	2.5 kg

Environmental

Operating temperature:	-5°C to 40°C
Storage temperature:	-40°C to 70°C

Performance

Fibre types:	All standard 125µm OD fibre
Av. splice loss (singlemode):	Typical 0.06dB
Av. splice loss (multimode):	Typical 0.05dB

Features

Fibre Alignment:	Fixed V-groove
Fibre viewing:	X75 filtered microscope
Fibre Translation (coarse):	5 mm on both fibres (via thumbwheels)
Fibre Translation (fine):	60µm on one fibre only (via piezo)
Safety:	Dual software/hardware interlock on microscope
Display:	16 character x 2 line super-twist LCD

Programmability

No. of preset programs:	10
No. of custom programs:	10
Arc current range:	3.5 - 22.0 mA (0.1 mA resolution)
Arc time range:	0.0 - 9.9 s (0.1 s resolution)
Stuff:	0 - 30µm (1µm resolution)
Reciprocating Amplitude:	0 - 30µm (1µm resolution)
Gap:	0 - 30µm (1µm resolution)

Power Supply

Internal supply:	12 V sealed lead-acid battery
Splices per charge:	>100 during 8 hour operation
Power management:	Automatic power-off and battery low indication
External supply:	18V DC @ 150 mA (a universal mains charger is supplied, 90-250V, 50-60Hz)

Due to continuing development TRITEC Developments Ltd. reserve the right to change this specification

7. Technical Support

By filling in the Registration Card and returning it to TRITEC Developments Ltd., you are joining the User Support Group. This means that you will be informed by TRITEC of any new releases of the FASE II software, and of any new splicing parameters for new and unusual fibre types.

There are no user serviceable parts within the FASE II Fusion Splicer. The unit should only be removed from its case by authorised and trained service engineers. Should you have any problems with your splicer, first read the section on Troubleshooting and Tips. If you require further assistance, contact the dealer from whom you purchased the machine.

If your dealer is unable to assist, then contact Technical Support at TRITEC. Please make a note of the serial number of your unit, and of the software release (displayed on the LCD when the unit is powered on) before contacting us:-

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