

Televes®



Ref. 232105
OSSGT

EN Electric-arc fusion splicer

Operating instructions

Table of contents

1. General Information	5
2. Fusion splicer	6
3. Keyboard	7
4. Start-up and menu description	7
4.1 System Setting	7
4.2 Splice Mode	8
4.2.1 Edit splice program	8
4.3 Heating Mode	8
4.4 History Records	9
4.5 Maintenance	9
4.5.1 Arc Calibration	9
4.5.2 Clean electrodes	9
4.5.3 Replace electrode	10
4.5.4 Self-Diagnosis Test	10
4.5.5 Optical correction	10
4.5.6 USB Mode	10
4.6 System Setting	10
4.6.1 ECO Mode	11
5. Splice process	11
5.1 Electrode and element inspection	11
5.2 Fiber preparation	11
5.3 Fiber type	12
5.4 Fiber introduction into the fusion splicer and splicing process	12
5.5 Heat-shrink protection	12
6. Maintenance	13
6.1 V-Groove	13
6.2 Cameras or lenses	13
6.3 Changing the cleaver's cutting blade position	13
6.4 Adjusting the cleaver's cutting blade height	14
6.5 Replacing the cleaver's cutting blade	14
6.6 Stripper	14
6.7 Battery	14
6.7.1 Battery extraction	14
7. Technical specifications	15

Important safety instructions

General conditions for installation

1. Read this manual before operating or connecting the equipment.
2. Keep these operating instructions in a safe place.
3. Pay attention to all the warnings.
4. Follow all instructions.
5. Do not use this equipment near water.
6. Clean the outside with a dry cloth only.
7. Only use attachments/accessories specified by the manufacturer.
8. Do not step on or pinch the network cable of the power supply unit; pay special attention to plugs, power connections, and the spots where they leave the equipment.
9. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Warning

- Equipment shall not be immersed in any kind of liquid. It is recommended to avoid placing the device next to objects filled with liquids, such as glasses.
- Ambient temperature should not be higher than 50 °C.
- Do not place the equipment near heat sources or in a highly humid environment.
- Do not place the equipment in a place where it can suffer vibrations or shocks.
- Please allow air circulation around the equipment.
- Do not place naked flames, such as lighted candles on or near the product.

How to charge the equipment safely

- Power requirements for the power supply unit should be: 100-240V~ 50/60Hz.
- To disconnect the power supply from the mains pull the plug never the cable.
- It is strongly recommended not to connect the power supply unit to the mains until all connections have been done.
- Reduce the risk of fire or electric shock, do not expose this power supply unit to rain or moisture.

Fusion splicer precautions

- 1 The charging voltage of this fusion splicer is limited. Always use the power supply unit provided with the equipment to charge the internal battery.
- 2 Should the fusion splicer show any of the following anomalies at some point:
 - Weird smoke, smell or noise.
 - Extreme heat.
 - Weird liquid or matter inside the equipment.
 - Breakdown or damage caused by falling or crashing.
 You must switch off the equipment and immediately remove the battery. Then, contact the Technical Support department of Televés to proceed with its inspection or repair.
- 3 Internal manipulation of the fusion splicer involves losing the product warranty (do not take the equipment apart).

- 4 Any errors in the equipment's external maintenance could damage the fusion splicer or result in injury to the operator (carefully follow the maintenance instructions).
- 5 Never use the fusion splicer in the presence of flammable gases or liquids. Otherwise, it may lead to fires, explosions or other serious consequences.
- 6 This fusion splicer is only used for optical fibre fusion, and should not be used for any other purposes.
- 7 Do not expose the fusion splicer to high temperature or humidity.
- 8 Avoid working in environments that are dusty or contain airborne particles. This situation may cause failure in the fusion operations or damage to the equipment.
- 9 Using the fusion splicer under different climatic conditions (going from a cold to a warm environment, for instance) may generate condensation in the equipment. Wait for the condensation to completely disappear before working with it.
- 10 To keep the appropriate performance of the fusion splicer (based on the use that is made of it) we recommend cleaning the equipment periodically.
- 11 The fusion splicer is calibrated in factory. Avoid strong vibrations or impacts, and use its own case for transport and storage.
- 12 Due to the high complexity of this equipment, it should only be repaired by Televés.

Notes

- Be aware that ignoring these warnings or using the fusion splicer inappropriately may result in serious injuries; please follow the recommended safety standards for this equipment.
- Always use safety goggles when working with optical fibre.

Symbology



The power supply unit is designed for indoor use.



The power supply unit meets the safety requirements for class II equipment.



The equipment can not be treated as regular household waste, and should be handed over to the appropriate collection point for waste electrical and electronics equipment (WEEE).



The equipment includes a recyclable battery; prior to handing it over at the WEEE collection premises, the battery should be removed from the equipment and separately delivered for appropriate management.



The equipment complies with the CE mark requirements.

1. General Information

This professional fusion splicer includes 6 alignment engines to work on the different axes (X, Y, Z), and thus automatically achieve an electric arc fusion in as little as 8 seconds. Manufactured in high-resistance ABS, its transport case not only provides for the equipment transport, but also for the operator's work desk.

Light and compact, it includes all the required accessories. Its dimensions, weight and 360° protective dome (high-density bumper), make this fusion splicer the appropriate equipment for any type of installations.

Designed for use in hostile environments, it withstands high-speed winds and other adverse environmental conditions, is water-resistant, and ensures an unparalleled quality throughout the splicing process.

Its user interface is simple and intuitive. Capable of measuring the cutting angle (identifying potential bad adjustments of the cutter) and detecting fiber errors (usually dirt), it allows the detection of problems before the fusion takes place.

Thanks to a traction process for the verification of the spliced fiber and to the calculation of optical loss, it helps the operator ensure the fusion was performed correctly.

Thanks to its battery (interchangeable from the outside), it allows working in places lacking VAC power supply. This is complemented with a feature that allows working with the fusion splicer while the battery is charging.

Types of fiber the fusion splicer can work with:

- SM (Single-mode): Single mode (G .652 / G .657)
- MM (Multi-mode): Multimode (G .651)
- DS (Dispersion): (G .653)
- NZDS (non- zero dispersion): (G .655)
- BIF/UBIF SM
- Standard working diameter: 80 to 150µm.
- External coating diameter: desde 100 to 1000µm.
- Fiber cleaved length: 5 to 20 mm (standard :16mm).

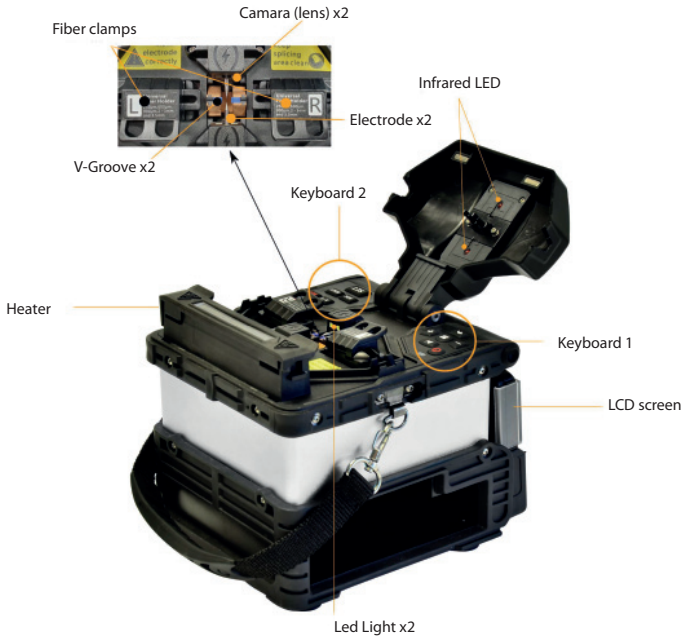
Accessories included with the fusion splicer

- Carrying case.
- Handle for the fusion splicer and carrying strap for the case.
- CD with user manual and software for data download.
- Optical fiber cleaver with removable pick-up feature, and blade for up to 16.000 cuts.
- Precision stripper, pre-calibrated for 125, 250 and 900µm
- Power cord, power supply and car adapter (the latter in cludes USB output to feed other devices).
- User-removable lithium battery with charge level visual indicator.
- Isopropyl alcohol tank with dispenser.
- Plastic tweezers.
- Mount for fiber protection cooling.
- Solid plastic screen protector.

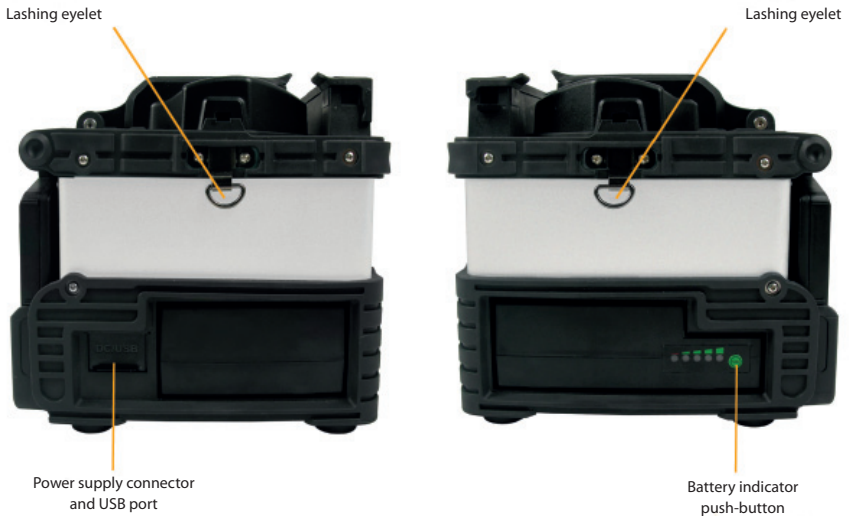


2. Splicer:

Front view



Side views



3. Keyboard

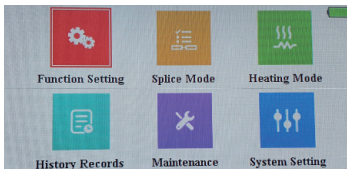
The keyboard operation will depend on the current working mode. See the table below:

Button	Main functions
	Switch On / Switch Off the device (press and hold).
	Change the view displayed on the screen (X/Y).
	Perform a test arc or re-arc.
	Access menu, sub-menus and saves parameters.
	Oven start-up.
	Exit the menu and get the engines back to their initial position.
	Perform splicing (when fibers are positioned).
	Next.
	Back.
	More.
	Less.

4. Start-up and menu description

To switch the fusion splicer on or off, press and hold the key .

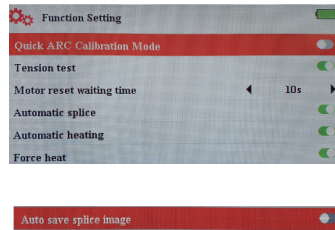
Once switched on, press to access the "Main Menu". Once there, the different modes of the splicer will be accessible.



Options	Description
Function Setting	Fast adjustments related with the use of the device.
Splice Mode	Allows the selection of the fiber type and the work mode.
Heating Mode	Allows the selection of the heat-shrink protector type.
History Records	Displays the splice date and the images recorded.
Maintenance	Menu for use-based maintenance.
Sistema	System configuration: language, screen, power, ...

4.1 Function Setting

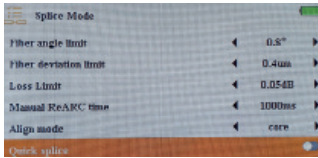
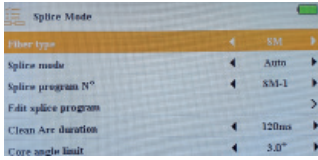
In this option, the parameters shown below will be configurable:



Parameter	Description
Quick ARC Calibration Mode	With this option activated, a quick calibration arc will be performed before the splicing process begins.
Tension test	With this option activated, a tension test of 2N will be performed after the splicing process has ended to check the splice's resistance.
Motor reset waiting time	Waiting time for the engines to go back to initial position once raised the cover after the splicing process is completed.
Automatic splice	With this option activated, the splicing process will begin once the cover is closed, without the help of any key.
Automatic heating	With this option activated, the heating process will begin once the cover is closed, without the help of any key.
Force heat	With this option activated, the device will force the heating process in case this one does not begin.
Auto save splice image	With this option activated, the images with the results of the last 20 splices performed will be automatically saved.

4.2 Splice Mode

In this mode, all the parameters related to the splicing process can be modified:

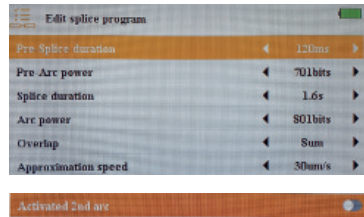


Parameter	Description
Fiber type	Allows to select between 8 different types of fiber. By default, the "SM" option is configured.
Splice Mode	Allows to select between 5 different types of splicing modes. By default, the "Auto" option is configured.
Splice program N°	Allows to choose between the different splice programs.
Edit splice program	Allows to modify the parameters of the selected splice program (see section 4.2.1)
Clean Arc duration	The splicer makes a "pre-arc" that erases any possible defects present on the fiber before splicing. This option allows to modify the duration of the cleaning operation (by default the value is 120ms).
Core angle limit	By default 3°, allows to configure the maximum angular limit between cores to perform the splicing process.
Fiber angle limit	By default 0.8°, allows to configure the maximum angular limit of the fiber to perform the splicing process.
Fiber deviation limit	By default 0.4um, allows to configure the maximum limit of deviation between fibers to perform the splice.
Loss limit	Maximum loss value acceptable. Values higher than selected will be identified as inadequate. By default is configured with a value of 0.05dB.
Manual ReARC time	This parameter allows the modification of the enhanced duration of the arc (usual value: 1000ms). It can be increased in case that after splicing, there is narrowing detected on the fiber at the splicing spot. If the fiber is thicker on that spot (forms a bulge), it can be reduced. These values are seldom modified.

Align mode	Method used by the splicer to align the fibers (core or cladding). Always should be configured by "Core" mode.
Quick splice	If this option is activated, the splicer will perform a splice in less time.
Force splice	Forces the splice process to begin if the option is activated.

4.2.1 Edit splice program

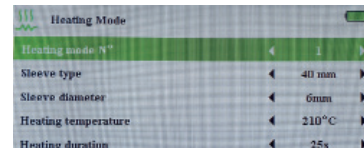
In this option, the parameters of the splice program previously selected can be modified by the user.



Parameter	Description
Pre-splice duration	Duration of the process previous to splicing. By default 120ms.
Pre-Arc power	Pre-arc discharge power (in bits).
Splice duration	Time pulse (us). Never modify this value.
Arc power	By default 801 bits. Never modify this value.
Overlap	Mounting or pushing a fiber on top of another when splicing (in μm). It controls the thickness of the fiber at the splicing spot, once the splicing process is complete.
Approximation speed	Approximation speed of the fibers. By default the value is set in 30μm/s.
Activate 2nd arc	If this option is activated, the device will launch a second arc after the splicing process is complete to erase dirt.

4.3 Heating mode

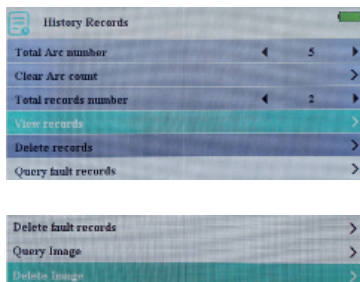
In this option, the heating parameters can be modified by the user, as well as the heat-shrink protectors, heating temperature and the duration of the same.



Parameter	Description
Heating mode N°	Program selected to perform the heating process.
Sleeve type	Length of the heat-shrink protector for adjusting the heater of the device to that measure.
Sleeve diameter	Diameter of the heat-shrink protector for adjusting the heater of the device to that measure.
Heating temperature	Adjust the maximum heating temperature. Configurable between 100°C and 240°C.
Heating duration	Time (in seconds) that the heating will be working. Despite its working range is adjustable between 10 and 250 seconds, it is not recomendable to choose times higher of 100 seconds of continued work (considerably decreases the heater life cycle).

4.4 History records

In this section we can access and view all the logs that the device has.

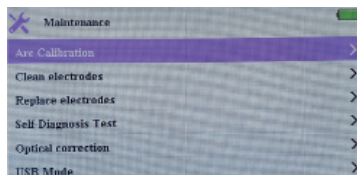


Parameter	Description
Total Arc Number	Displays the total number of arcs that the device has launched.
Clear Arc count	Erases the count of the arcs performed by the device.
Total records number	Displays the total number of records that the device has registered.
View records	After pressing the "Menu" key a new section in which all the records registered by the device are shown will be displayed.
Delete records	Erases all the records that the device has registered.
Query fault records	Displays the records of all the failed splices.
Delete fault records	Erases all the records of the failed splices that the device has registered.

Query image	Displays the images of the 20 last splices that the device has performed, as long as the saving picture option is activated (see section 4.1)
Delete image	Erases all the images present in the memory of the device.

4.5 Maintenance

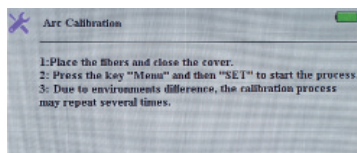
In this section, adjustments regarding to the maintenance of the device can be applied.



Parameters	Description
Arc Calibration	An arc calibration launched by the device is performed (see section 4.5.1).
Clean electrodes	A cleaning discharge is performed to erase possible dirt present in the electrodes (see section 4.5.2).
Replace electrodes	To substitute the electrodes due to possible worn out of the same is mandatory to select this option and follow the steps indicated (see section 4.5.3).
Self-diagnosis Test	A test is performed to verify the system status (see section 4.5.4).
Optical correction	An optical test is performed to verify the lenses status (see section 4.5.5)
USB Mode	Connection mode to a PC for the records download and the software update(see section 4.5.6)

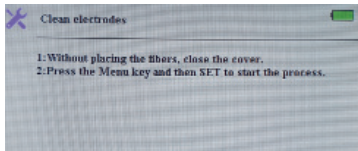
4.5.1 Arc Calibration

Press the "Menu" key and follow the steps displayed on the device:



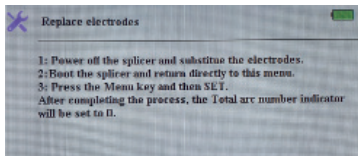
4.5.2 Clean electrodes

Press the “Menu” key and follow the steps displayed on the device:



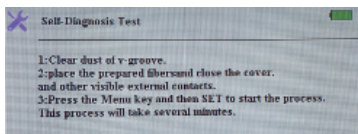
4.5.3 Replace electrodes

Press the “Menu” key and follow the steps displayed on the device:



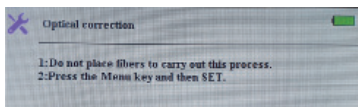
4.5.4 Self-Diagnosis Test:

Press the “Menu” key and follow the steps displayed on the device:



4.5.5 Optical correction

Press the “Menu” key and follow the steps displayed on the device:



4.5.6 USB Mode

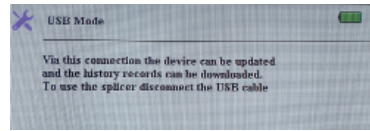
Connect the USB cable, included with the splicer, to the PC to access this mode.

Once connected, you can proceed to do the following options:

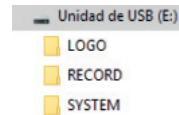
- Update the software of the device.
- Download the records of the unit.

When connected to PC, the following message will be

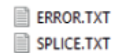
displayed on the screen:



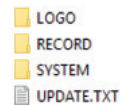
The PC will show a new disc unit containing the folders below:



For downloading the records, you must access the folder “RECORD”, within the same, “SPLICE.TXT” is the file that contains the records of the splices correctly performed, while, “ERROR.TXT”, contains the failed records.



To update the software version of the unit, you simply have to introduce the update file in the root folder of the device, just as shown below:

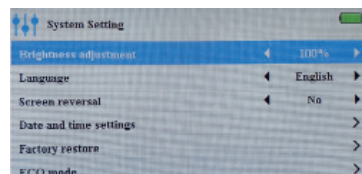


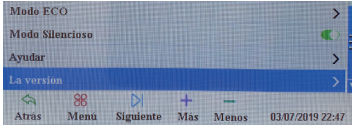
Once the file is introduced, unplug the device and reboot the splicer so the update process is able to begin, when switched on again a progress bar regarding to the installation of the update will be displayed.

To confirm that the update has been successfully installed, access to **Main Menu → System Setting → Version**.

4.6 System Setting

In this section, the parameters regarding to the main use of the device can be modified.

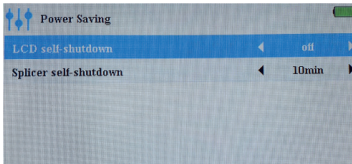




Parameter	Description
Brightness adjustment	Allows to adjust the brightness of the screen.
Language	Allows to select the language displayed by the device.
Screen reversal	Allows to select the displaying mode of the screen, by default or inverted (180°).
Date and time settings	Allows to modify the date and time settings.
Factory restore	Return the device to the values by default.
ECO Mode	Allows to select the energy parameters of the device (see section 4.6.1).
Silent mode	With this option activated, the device will not emit any kind of noise.
Help Info	Help indications regarding to the use of the keys that the device has.
Version	Indications about the software version of the device.

4.6.1 ECO Mode

Pressing the "Menu" key, a new section for the modification of the energy settings be displayed:



Parameters	Description
LCD self-shutdown	Allows to select the time that the screen will remain active.
Splicer self-shutdown	Allows to select the the time that the device will remain powered on.

5. Splicing process

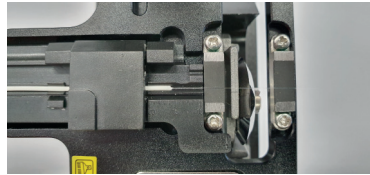
5.1 Electrode and element inspection

Make sure there is no trace of fibers/dirt on the electrodes, V-groove, lenses or mirrors. Check the correct alignment of the electrodes and make sure their ends are in good

shape. Should you find any impurities, take them away with a wipe/swab dampened with isopropyl alcohol .

5.2 Fiber preparation

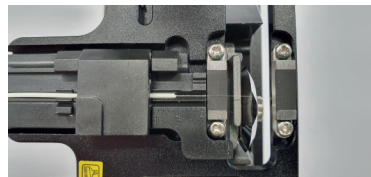
- Strip the fiber with the help of a stripper. The stripped length should be 30 mm to 40 mm. With isopropyl alcohol, clean any protection residues that may have remained on the fiber and put it on the cleaver (make sure the fiber is as straight as possible between both rubbers).



Depending on the fiber type you will be using, you will need to place the fiber in a specific rail, as shown below:

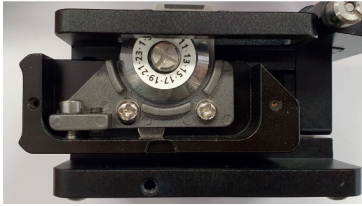
Rail	Tipo de uso
Upper rail	For single-fiber tubes (3mm thick) or BIF tubes
Intermediate rail	For fibers with an initial thickness of 900 μm (see example on the image below) .
Lower rail	For fibers with an initial thickness of 250μm.

- Proceed to cut the fiber with the cleaver. Leave approximately 16mm of fiber uncovered after cleaving (see the picture below) .



In case impossibility to perform the cleaving, check and make sure that:

- 1 Both fiber protections are correctly removed (900 and 250 μm) .
- 2 The cutting blade is neither worn out nor marked.
- 3 The cutting blade's height is correct (the blade should slightly protrude over the fiber-holding rubbers). If not, the height can be modified by the means of the screw shown in the picture below:

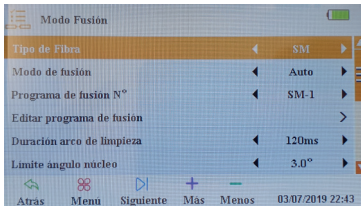


Make sure that the fiber placed on the cleaver does not form an angle between both holding rubbers, since it could cause problems for splicing (higher cutting angle). Fiber should be placed on both rubbers, always forming a straight line between them. The following example illustrates how NOT to place the fiber.



5.3 Fiber type

Switch on the fusion splicer and select the fusion program based on your fiber type. For single-mode fibers, the SM-auto mode is pre-set by default.



5.4 Fiber introduction into the fusion splicer and splicing process.

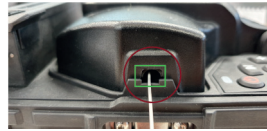
- Open the protective cover to place the fiber .
- Lift the fiber clamps .
- Put the cleaved fibers on the V-grooves. Insert them from top to bottom (avoid fiber contact with other elements present in the fusion splicer).
- Check that fibers stick out from the V-groove, and that they are placed half-way between the V-grooves and the electrodes (too close to the electrodes will produce a processing error). Before closing the cover, make sure that no fiber is seen on the screen. This would mean that the fibers are too close to the electrodes.
- Check that the fibers on the V-groove are not misaligned, since they may be slightly bent .

- Lower the fiber clamps and the protective cover; the equipment will start the splicing process*.

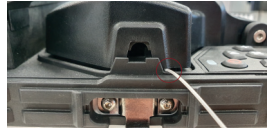
* If the option "automatic start" is disabled, you will have to press the "SET" key .

Either way, you should have previously entered the "Start" menu with the "Menu" key. The fusion splicer will not work unless you are on that menu.

Check the fibers hanging from the fusion splicer are not blocked by the cover or held by the installation (fiber should be loose enough to allow the equipment to move it) .



Correct positioning



Incorrect positioning

The splicing process consists on the following steps:

- Fiber positioning.
- Fiber cleaning.
- Adjustment of the distance between fibers .
- Fiber-core alignment.
- Electric arc fusion.
- Loss estimation and tensile test .

If any error is displayed on the screen, the process will stop until the anomaly is fixed .

In case the splicing process fails to complete:

- 1) Check the adjustment of the distance between fibers:** Despite the fusion splicer automatically bringing the fibers together, it has a minimum and a maximum range. If the fibers are not close enough to each other, the equipment will not be able to bring them together.
- 2) Check the fibers are not dirty:** Clean both, fibers and V-groove if necessary .
- 3) Check the lenses are free of dirt:** Lenses need to be kept clean, since the equipment uses them to align the fibers. Some of the splicing fusion errors are due to the presence of dirt on the lenses. In addition, there are two complementary mirrors on the fusion splicer cover (over the lenses) that also need to be kept in good condition (clean). See section 7 (Maintenance) .

5.5 Heat-shrink protection

Before you proceed with the process preparation, you need to introduce a heat-shrink protection on one of the fibers to protect the operation .

After the fusion has taken place, slip the heat-shrink

protection along the fiber until it fully covers the splice area. The process final step will be to introduce this heat-shrink protector into the "HEATER" of the equipment by pressing the "HEAT" key, as long as the automatic heating option is not activated.



Bear in mind that while the heater's red LED is on, the heater is near its maximum operating temperature. When this LED turns off (a beep will be produced), the temperature will have reached its maximum value, but the process will still be on-going. Wait until you hear a second beep (indicating the oven has reached its minimum temperature), to take the tube out of the heater and place it on the cooler tray.

It is likely that the equipment's internal fans turn on while the heater is being used.

This process manages the temperature of the heater's components to enhance durability.

6. Maintenance

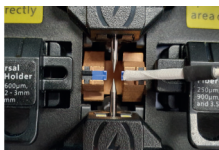
6.1 V-groove

Clean the V-groove.

In most cases, splice fusion high losses are caused by the presence of contamination (residues/dirt) on the V-groove. Therefore, you will need to clean both by following the steps below:

- 1 Open the protective cover.
- 2 Clean the V-grooves using specific cleaning swabs (Ref. 232710), dampened with isopropyl alcohol.
- 3 Should the dirt be adhered, you can use a stripped clean fibre to push it out (put the fiber and V-groove forming a 45o angle with each other).

Note: Apply a controlled force for the cleaning of the V-groove. It is a sensitive precision element.



6.2 Cameras or lenses

Clean the lenses regularly.

Presence of dirt on the lenses will result in splicing fusion problems. Therefore, you should periodically inspect the

lenses and clean them if necessary, by following the steps below:

- 1 Open the protective cover.
- 2 Clean both lenses using a specific swab (Ref. 232710) dampened with isopropyl alcohol, by drawing circles progressively increasing in diameter (start from the center outwards).
- 3 Use a dry swab to get rid of possible residues and have the lenses fully dried.
- 4 Make sure no residues are left on the surface of the lenses after cleaning.

Note: During the cleaning, be careful not to push or hit the electrodes. Apply a controlled force (lenses are very sensitive elements). Excessive pressure could result in scratches, that would make the lenses unusable.



6.3 Changing the cleaver's cutting blade position

The cleaver's cutting blade has 23 positions. Each position can execute 1,000 cutting operations, which means 23,000 cuts per blade.



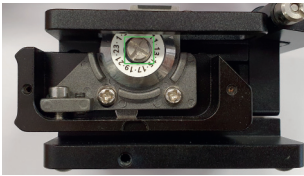
As long as the cleaver operates correctly, do not modify the blade's position, even if more than 1,000 cuts have been performed. You should only modify the blade's position if you observe that despite its height being correct, the blade is not able to cut.

Follow the steps below to modify the blade's position:

- 1 Remove the fibers deposit loosening the screw indicated in the picture below:



- 2 Rotate the cutting blade around its axis. To do this:
- Loose the screw indicated in the picture below.
 - Turn the blade by pushing it from the side (not from the edge) using a tool to avoid getting hurt.
 - Tighten the screw.



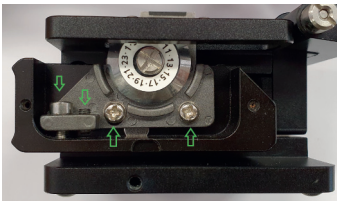
6.4 Adjusting the cleaver's cutting blade height

By means of a flat screwdriver, work on the screw shown in the previous image. Turning the screw to the left will lower the blade. Turning the screw to the right will raise the blade. Upon a blade replacement or a position modification, you may need to readjust its height. Bear in mind that an excessive blade height may produce splintering or lack of cut.

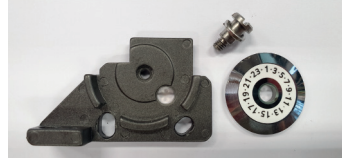
6.5 Replacing the cleaver's cutting blade

After 23.000 cuts, you may have to replace the cutting blade. To do this, proceed as follows:

- 1 Once the fibers deposit is removed, pull out the screws indicated in the picture below:



- 2 Remove the piece that contains the cutting blade and, by the means of a screwdriver, pull out the screw:



- 3 Replace the cutting blade and re-assemble, following the steps described above in reverse order.

6.6 Stripper

You should occasionally lubricate the stripper's axis to allow a smooth sliding between both cutting areas. Once lubricated, remove the excess oil and leave the tool dry .



The stripper has four working zones, as described below:

Position	Description
4	Designed for cutting through 900/250 or 125µm.
3	Designed to remove the protection layer between 3 and 1.6mm, reaching 900µm.
2	Designed to remove the protection layer on 900 micras, reaching 250µm.
1	Designed to remove the protection layer on 250 µm, reaching 125µm.

All positions are factory pre-set for a precise operation; therefore, any problems you may find with the stripping mean the stripper is worn out and you should replace it . Remember that for a correct stripping, the tool should be tilted 45% in relation to the fibre.

6.7 Battery

The equipment comes with an 11,1V= y 7800 mAh battery from factory.

6.7.1 Battery extraction

To remove the battery, push the side button shown on the image



Battery extraction

Note: The battery should only be replaced with a battery of the same type or equivalent. It should not be exposed to excessive heat, such as heat from the sun, fire or similar.

Recycling: Prior to depositing the appliance at the collection facility, the user should remove the battery and deposit it in the specific collection facility for this kind of waste.

7. Technical specifications

Compatible fiber	SM, MM, DS, NZDS, BIF
Typical loss	0.02dB(SM), 0.01 dB(MM), 0.04dB(DS), 0.04dB(NZDS), 0.02dB (BIF/UBIF)
Splicing average duration	9s / 7s (fast mode)
Heating average duration	19s
Alignment method	Core and cladding alignment in 3 axis X-Y-Z .
Splice programmes	90 free y 10 predefined by default.
Heating programmes	96 free y 4 predefined by default.
Languages	English, German, Portuguese & Spanish
Lens magnification	X axis + Y axis = 180x magnification X axis or Y axis (separately)= 360 magnification.
Screen	4,3" high performance LCD.
Tensile test	2N standar
Heat-shrink protectors	60,50,45,40,30 and 25mm.
Electrode duration	3,000 approx . (6,000 with the spare supplied) .
Battery duration	300 fusion/baking cycles, and 1000 load cycles approx.
LED light	Double led light that eases the work in dark areas.
External interface	Mini USB (Up to 10,000 records download and software update).
Power supply unit	Input:100-240V~ 50/60Hz Output:13.5V /5A
Battery type	11,1V \approx 7800 mAh lithium battery.
Working environment	Temperature: -20°C... +55°C Humidity: 95% HR at 40°C non- condensing. Altitude: 0... 5000m
Dimensions	W x H x D: 166 x 159 x 146mm
Weight	1.5 Kg w/o battery & 2 Kg with battery (6.5Kg with case & accessories) .

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