

# Televes®



**Ref. 232103**  
**Art. Nr. OSSGN**

**EN** Electric-arc fusion splicer

**Operating instructions**



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## 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 exposed to dripping or splashing and no objects filled with liquids, such as glasses, shall be placed on the equipment.
- 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.

### Simbology



The power supply unit is designed for indoor use.



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



The equipment cannot 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 fibre 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 fibre 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.

### 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 fibre cleaver with removable pick-up feature, and ES blade for up to 16.000 cuts.
- Precision stripper, pre-calibrated for 125, 250 and 900 µm.
- Power cord, power supply and car adapter (the latter includes USB output to feed other devices).
- User-removable lithium battery with charge level visual indicator.
- Isopropyl alcohol tank with dispenser.
- Plastic tweezers.
- Mount for fibre protection cooling.
- One spare electrode set (2 items).
- One spare pusher set (2 items).
- One extra head for preconfigured connector splicing.

ES

### Types of fibre the fusion splicer can work with:

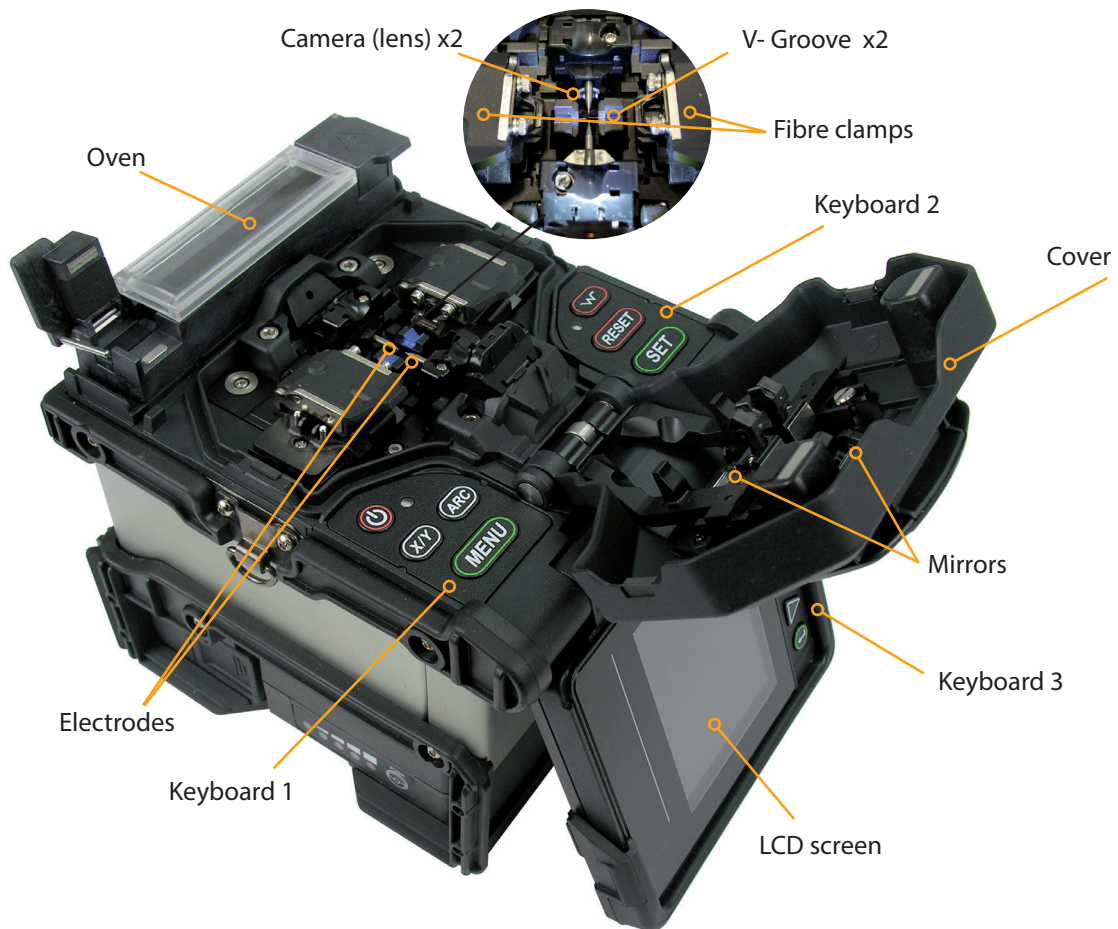
- SM (Single-mode): Single mode (G .652 / G .657)
- MM (Multi-mode): Multimode (G .651)
- DS (Dispersion): (G .653)
- NZDS (non- zero dispersion): (G.655)
- BIF/UBIF SM
- Standard working diameter: 80 to 150 microns.
- External coating diameter: 100 to 1000 microns.
- Fibre cleaved length: 5 to 20 mm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



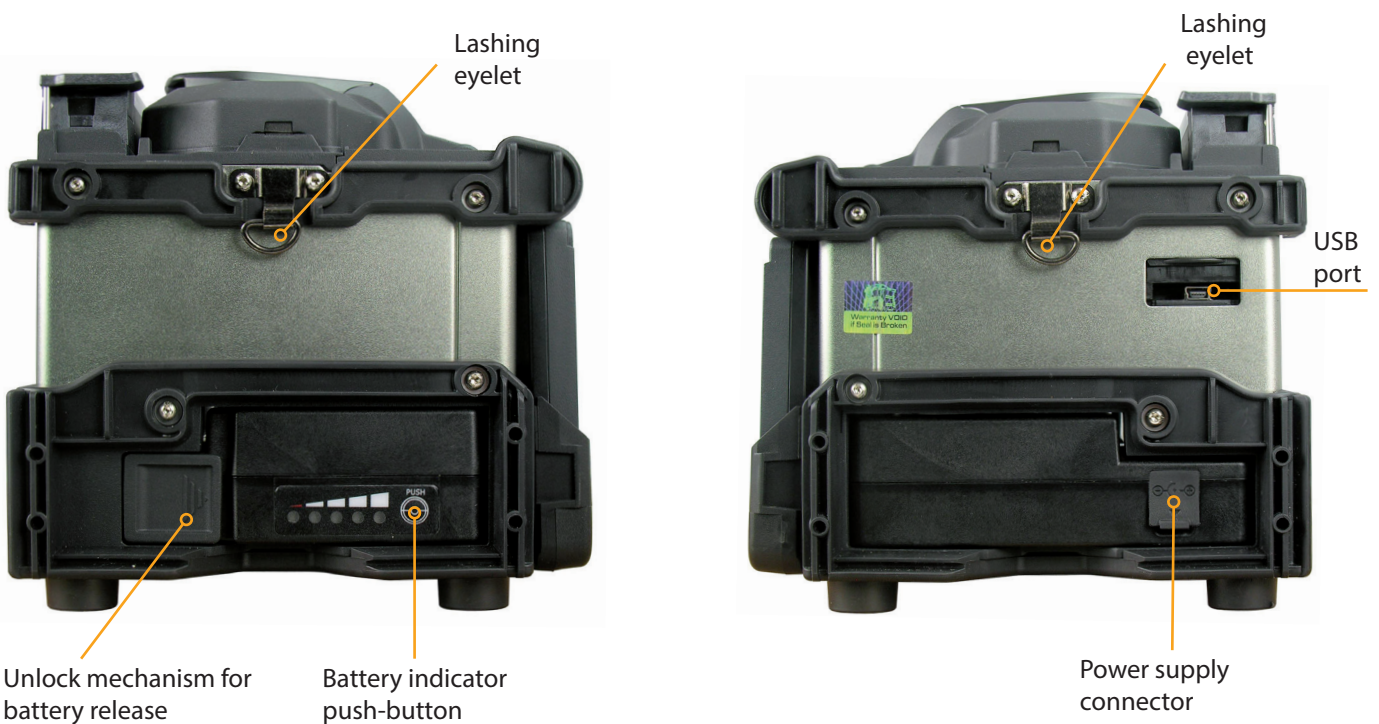


## 2. 2. Fusion splicer

### Front view:
















### Side views:





### 3. keyboard

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

Button	Main functions
	Equipment Switch on / Switch off (press and hold).
	Change the plane displayed on the screen (X/Y).
	Perform test arc or re-arc.
	Access menu and sub-menus.
	Oven start-up.
	Exit the menu and get the engines back to their initial position.
	Perform splicing (when fibres are positioned).
	Perform splicing (when fibres are positioned).
	Move up.
	Move down.
	Move left.
	Move right.
	Confirm and access sub-menus.

### 4. Commissioning 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, you will be able to access the different configurations.




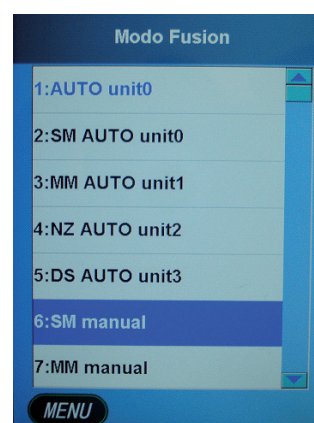
Options	Description
<b>Start</b>	You need to access this menu to perform the splicing.
<b>Splicing mode</b>	Selection of fibre type and working mode.
<b>Oven mode</b>	Selection of fibre type and working mode.
<b>Settings</b>	Equipment configuration: language, screen, power. . .
<b>Memory</b>	Displays fusion data and images.
<b>Maintenance</b>	Menu for use-based maintenance.

#### 4.1 Start

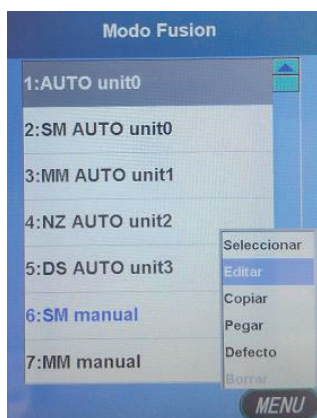
For the equipment to perform the fusion, you need to select this option.

#### 4.2 Splicing mode

Scroll through the main menu until you reach the "Fusion mode" option and press the  button to access it.



You can select the desired fusion option among the pre-defined options. To do this, move to the desired option and push the button **MENU**. The screen will display the following options:



Parameter	Description
<b>Select</b>	Sets the selected splicing mode.
<b>Edit</b>	Edits the parameters for the selected Splicing Mode.
<b>Copy</b>	Copies the selected Splicing Mode configuration.
<b>Paste</b>	Pastes the previously saved configuration (Copy) on a new register.
<b>Default</b>	Restores the default configuration for the selected Splicing Mode.
<b>Delete</b>	Deletes the selected Splicing Mode. (Deleting the factory pre-set modes is not allowed).

To modify the "Splicing mode" parameters, you should select the **"Edit"** option on one of the splicing modes, which will give you access to the following parameters:

Modo Fusion	
Tipo de Fibra	SM
Modo Titulo 1	SM
Modo Titulo 2	manual
Limite de Corte	3.0
Limite de Perdida	0.20
Potencia Arco	33
Duracion Arco	1800ms
Arco de Limpieza	80ms
Duracion de Re-Arco	2000ms

Modo Fusion	
Modo Alin.	Nucleo
Inter.corte	10
Centrar Arco	0
Desfase de Centro	0
Test de Prueba	Apagado
Potencia PreArco	26
Tiempo PreArco	257
Superponer	26
Potencia de Arco 2	40

Modo Fusion	
Test de Prueba	Apagado
Potencia PreArco	26
Tiempo PreArco	257
Superponer	26
Potencia de Arco 2	40
Tiempo de Arco 2	0
Arco Secundario Enc600	
Arco Secundario Apa20	

To edit any of the parameters you will have to select it with the buttons and then push the button to access the adjustments. You can change the value by means of the buttons and then push the button again to save the changes.


Parameter description:

Parameter	Description
<b>Fibre type</b>	Allows you to select 11 different types of fibre/splicing. If you are not working with any of the pre-defined options, you should copy one of them and paste it into an empty register; you can then modify the different parameters as you wish. The equipment is factory-configured with the "Manual" option.
<b>Title 1 Mode</b>	Edits the first title, with up to 9 characters.
<b>Title 2 Mode</b>	Edits the second title, with up to 8 characters.
<b>Cutting angle limit</b>	Maximum fibre angle error accepted by the fusion splicer. The factory pre-set value is 3°.
<b>Loss limit</b>	Acceptable loss value. Values above the set value will be considered unsuitable. The factory pre-set value is 0.10dB.
<b>Electric arc power</b>	Default value is 40. (Only configurable in Manual modes).
<b>Electric arc duration</b>	Default value is 1500-1800ms. (Only configurable in Manual modes).
<b>Cleaning arc</b>	Prior to the splicing operation, the fusion splicer does a "pre-arc" to eliminate any impurities that could be present on the fibre. With this option, you can modify the duration of the cleaning operation (default value: 80ms).



<b>Enhanced arc duration</b>	With this function, the enhanced duration of the arc can be modified (usual value: 2000ms). This value can be increased in case a narrowing is detected on the fibre at the splicing spot. If the fibre is thicker on that spot (forms a bulge), the value can be reduced. These values are seldom modified.
<b>Align. mode</b>	This is the method used by the fusion splicer to align the fibres (core or coating). Always configured with "Core" mode.
<b>Cutting Inter.</b>	Space that exists between both fibres at the alignment and pre-fusion moment (in $\mu\text{m}$ ).
<b>Centre arc</b>	This option is used to move the arc spot. Default value is 0.
<b>Centre offset</b>	Sets the relative position of the fusion spot, taking the electrode centre as a reference. It can be "Centred", if the value remains 0, or moved to the right (+ value) or to the left (- value) of the electrode position.
<b>Test</b>	Once the fusion completed, the fusion splicer applies a 2N strain on the spliced fibre to ensure the result of the fusion is robust and firm.
<b>Pre-arc power</b>	Pre-arc discharge duration (in ms).
<b>Pre-arc duration</b>	Pre-arc discharge power (in ms).
<b>Overlap</b>	Mounting or pushing a fibre on top of another at fusion time (in $\mu\text{m}$ ). It controls the thickness of the fibre at the fusion spot, once the splicing is done.
<b>Power Arc 2</b>	Discharge power of the backup arc or 2nd arc.
<b>Duration Arc 2</b>	Discharge duration for the backup arc or 2nd arc.
<b>Secondary arc Switch on</b>	Pulse ( $\mu\text{s}$ ). Never modify its value.
<b>Secondary arc Switch off.</b>	Switch off pulse ( $\mu\text{s}$ ). Never modify its value.




### 4.3 Oven mode.


This mode allows you to select of the type of tube or heat-shrink sleeve you will be working with. To do this, push the  button once you reached the "Oven mode" menu.

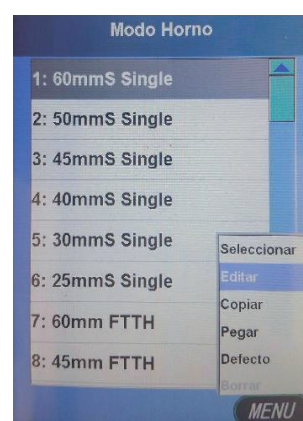


You will access the following sub-menu:



Using the   keys, scroll to select the tube type you wish to work with. Once over the desired option, push the  key to display the option drop-down menu. Check the "Select" option to set it. Most common tubes are "60mmS" and "45mmS Single". All options on the menu Single are factory pre-configured; however, you will always be able to adjust them to meet your specific needs or create new options.

To modify the options, follow the steps below: Go to the tube you wish to modify and push the  button. A drop-down sub-menu will be displayed, showing the different options. Select the "Edit" option:



The following sub-menu will be displayed:



To modify the required parameter, go to the desired option with and push the key. A window will pop-up for you to enter the desired value using the buttons. Push the save button again and exit. Push the button to exit the menu.

Below you will find a list of the editable parameters:

Parameters	Description
<b>Protection type</b>	Type of tube for which the oven is set (up to 6 characters).
<b>Title mode</b>	Edits the fibre type (up to 10 characters).
<b>Heating type</b>	Programming the number of seconds the oven will be on. Despite the operation range being adjustable in a 10 to 250 second range, programming operation durations over 100 seconds is not recommended (it considerably reduces the oven's operating lifetime).
<b>Heating temp.</b>	Sets the maximum heating temperature. Configurable between 100°C and 240°C.
<b>Final temperature</b>	Sets the minimum oven switch-off temperature, once the heating time is over. Configurable between 60° and 140°.

You are advised not to perform manual programming of the oven without appropriate technical support. A combination of excessive temperature and excessive time could result in oven damage after just a few operations. Keeping the internal fan "on" (automatic operation) prevents the oven from reaching excessive temperatures.

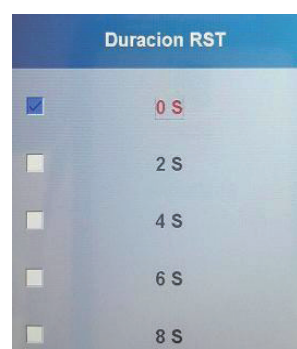
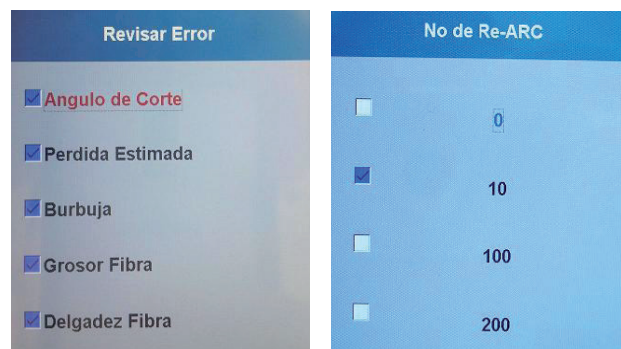
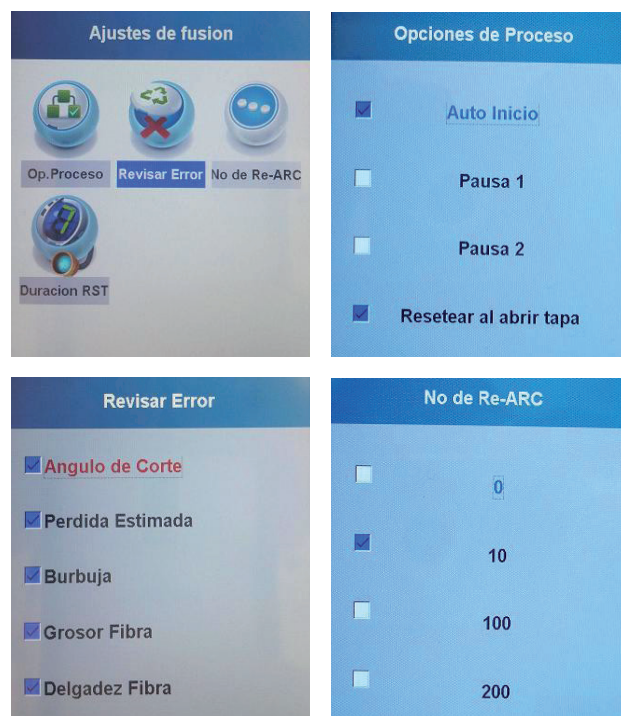
## 4.4 Settings

This option allows you to configure the equipment main settings.



### 4.4.1 Splicing settings

This option allows you to configure the machine's behaviour during the splicing process.

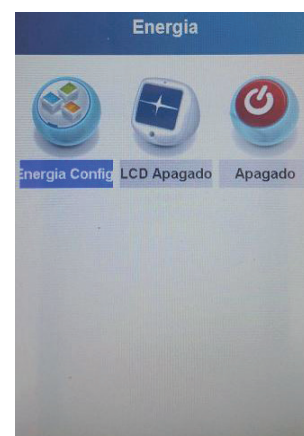


Settings	Description
<b>Self-start</b>	With this option enabled, the equipment will start splicing as soon as the cover is closed. With this option disabled, you will need to push the <b>SET</b> button to perform the splicing process.
<b>Pause 1</b>	With this option checked, the equipment will pause after the first time fibres are brought together.
<b>Pause 2</b>	During the splicing process, the equipment will pause again after the fibres are correctly aligned and before the arc for the fusion is activated.
<b>Reset on cover opening</b>	With this option enabled, the equipment will bring the heads back to their initial position once the splicing has been carried out and after the cover has been opened. With this option disabled, you will need to press the <b>RESET</b> button.
<b>Cutting angle</b>	With this option enabled, the fusion splicer checks the fibre's cutting angle to verify whether the value exceeds the factory-set acceptable value (3°).
<b>Pérdida estimada</b>	Si tiene esta opción activada, la fusionadora revisa si el valor de pérdida tras la fusión es menor o mayor al programado como aceptable (valor de fábrica 0,10 dB).
<b>Estimated loss</b>	With this option enabled, the fusion splicer checks whether the value of the loss after splicing is lower or higher than the factory-set acceptable value (0.10 dB).

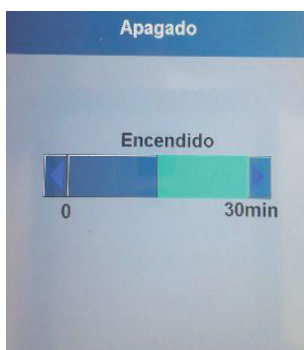
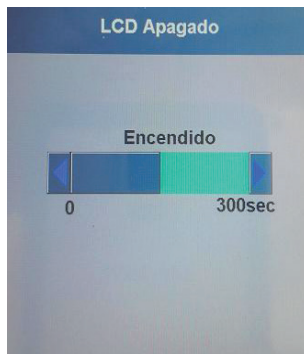
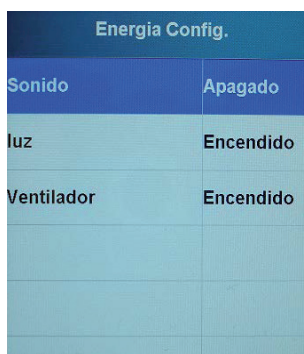
<b>Blister</b>	With this option enabled, the fusion splicer will display an error whenever blisters are detected in the fusion area, either due to external elements or to a bad adjustment of the arc discharge.
<b>Fibre thickness</b>	With this option enabled, the fusion splicer will display an error whenever the thickness of the spliced fibre exceeds the standard thickness.
<b>No. of Re-arcs</b>	Sets the number of repeated arcs that can be carried out for a single splicing after the first arc. This repeated arc is usually carried out manually by pushing the <b>ARC</b> button.
<b>RST duration</b>	Sets the delay for engine restoration and tensile test. The value "0" indicates the engines are restored immediately after the cover is opened. The value "2" indicates the engines will be restored 2 seconds after the cover is opened.

#### 4.4.2 Power settings

This option allows you to configure the equipment power values in order to manage power and optimize battery use. You will be able to enable/disable the keyboard sound, the inner light and the fan, and delay both the LCD screen and the splicer switch off.

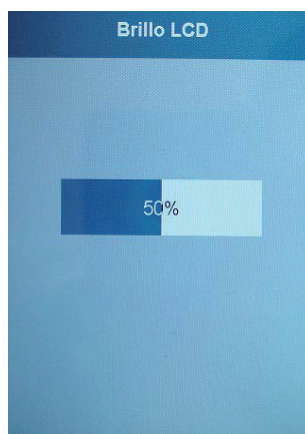
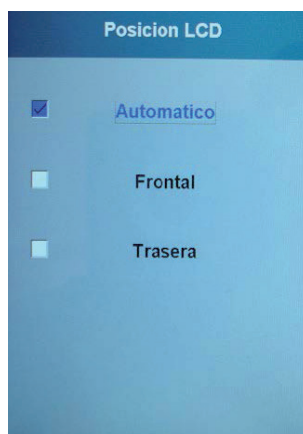






#### 4.4.3 Screen settings

It allows you to configure the LCD screen orientation and brightness.



If the LCD position is left on automatic mode, whenever the screen is tilted the image orientation will adapt automatically.

#### 4.4.4 Access and communication settings

Parameters	Description
User set-up	This option allows you to access the "User" menu. Factory-set password is "AAAAAAA".
Configure COM	This option allows you to configure the Baud rate value. Factory-set value is 11,500.

#### 4.4.5 Language

This option allows you to configure the language. Available languages are Spanish and English.

#### 4.4.6 Schedule

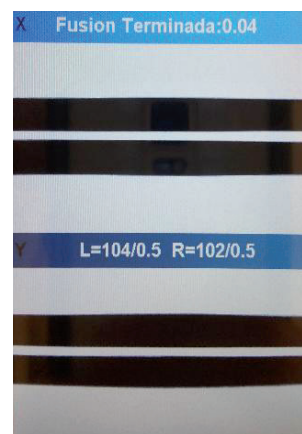
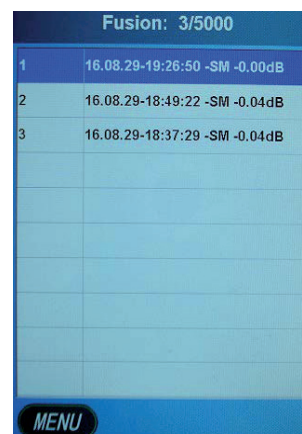
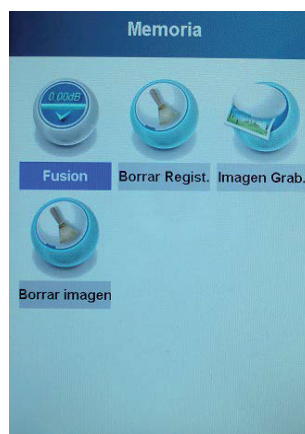
This option allows you to configure the equipment's date and time (they will be displayed at data download).

#### 4.4.7 Factory settings

This option allows you to go back to the factory-set values for all the parameters of the fusion splicer. In case you perform an equipment update, you need to go back to the factory-set values on this menu. Use the password AAAAAAAA to access the menu.

#### 4.5 Memory

This option allows you to register and manage the splicing operations' data and pictures saved on the equipment.





Setting	Description
<b>Splicing</b>	This option allows you to access the splicing register to check the values of each splicing operation. The fusion splicer allows registering up to 5,000 splicing operations. You can download the data with the "OptionFiberFusing .exe" programme.
<b>Delete Reg.</b>	This option allows you to delete all the existing registers.
<b>Saved Images</b>	This option allows you to access the register containing the saved fusion images. You can download these images with the "OptionFiberFusing .exe"
<b>Delete image</b>	This option allows you to delete all the existing fusion images.




## 4.5 Maintenance

This option allows you to tune the fusion splicer, adjusting the values shown in the image below:



### 4.6.1 Electrode stabilisation.

This menu should be executed whenever the electrodes are replaced or cleaned. The fusion arc produced by the equipment will thus be stable and constant.

To carry out this process you only need to access the "Electr. Stab." menu, push the  button, wait until the equipment completes at least 5 test arcs, and push the button  again to stop the process. To quit this menu, push the  button.

### 4.6.2 Sensor values

This menu allows you to display the values of the sensors included in the equipment.

- Internal temperature
- Pressure
- Oven temperature
- DC Voltage
- Elevation
- Time


### 4.6.3 Dust test

This menu allows you to check whether cleaning the lenses is required

### 4.6.4 Arc calibration.

You should perform an arc calibration whenever you detect that splicing operations result in an incorrect finish or were not actually performed. This action will help the fusion splicer automatically adjust the arc power, based on the environmental variables (temperature, atmospheric pressure, etc.) and the type of fibre used (despite all fibre types being manufactured to a standard, you must take the tolerances into account).





Arc calibration procedure:

- 1 To perform the arc calibration, you need to have previously selected on "Splicing mode" the fibre type you wish to calibrate the splicer for.
- 2 Once the fibre selected, access the "ARC Calibr." menu.
- 3 Strip, clean and cut 2 fibres, just as if you were going to perform a fusion, and introduce them into the splicer.
- 4 Close the splicer cover and push .
- 5 Fibres will align and the calibration process will start.
- 6 Once the process completed, the splicer will display "Correct Cal." if the calibration was successful. Conversely, if the splicer displays "Cal. Failed", you will have to repeat the process until the splicer displays "Correct Cal."

### 4.6.5 Engine

This menu allows you to readjust the 6 splicer engines to provide correct fibre alignment and focus (core). You should always execute this function if you find any of the following problems when introducing the fibres into the fusion splicer:

- Fibres with different heights on the LCD screen (not aligned).
- Incorrect thickness of the fibre core (too thick).

After accessing the menu, you need to enter the "AA- AAA- AAA" password to get the process started. Once there, you will have to select the different engines one by one (  button) to perform the different adjustments (    buttons) until you achieve a perfect alignment and focus.

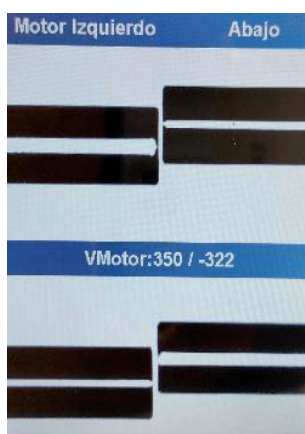
Engines	Description
<b>Left engine</b>	This option allows you to modify the position of the left fibre (from left to right for the X and Y axes, and from top to bottom for the Y axis).
<b>Right engine</b>	This option allows you to modify the position of the right fibre (from right to left for the X and Y axes, and from top to bottom for the X axis).
<b>Focus engine-A</b>	This option allows you to adjust the vision of the fibre (core) on the X axis.
<b>Focus engine-B</b>	This option allows you to adjust the vision of the fibre (core) on the Y axis.

Engine adjustment procedure:

After inserting two clean and cleaved fibres into the splicer, start with:

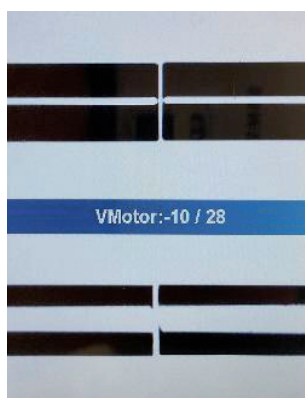
**Left engine:** Take the fibre close to the centre of the screen, with the ► key. Push the ◀ button to switch to the right engine.

**Right engine:** Then push the ◀ button until the right fibre gets near the centre of the screen, as shown in the following image:

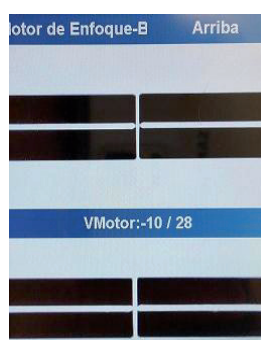


Position the fibres in such a way that they almost touch each other, but not quite.

With the buttons ▲ ▼ adjust the height of the fibres to achieve a perfect alignment. You should obtain the following result:



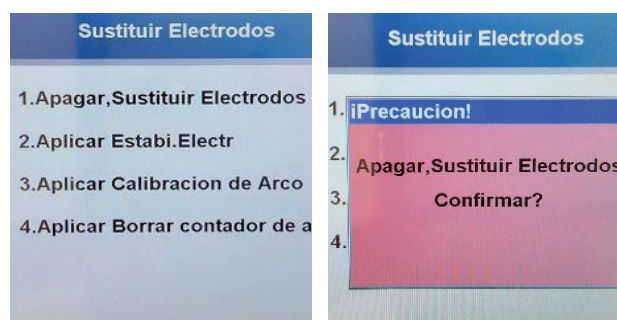
Push the ◀ button again to access "focus engine A /B". Once there, with the help of the ▲ ▼ buttons you need to achieve the lowest fibre-core thickness possible; the result should look like this:



Once done, push the ESC button to complete the procedure.

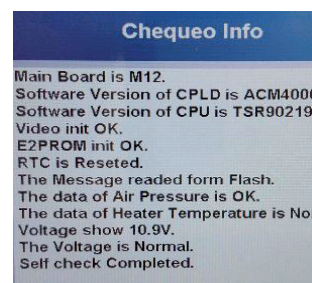
#### 4.6.6 Change electrodes.

The electrode replacement procedure should be carried out whenever you detect wearing of the electrodes or any fusion problems associated with the discharge arc. The average lifetime of the electrodes is around 3,000 splicing operations (depending on the working conditions). When your electrodes are worn out, follow the steps of the following menu:



#### 4.6.7 Self-test

This menu performs an equipment self-test, displaying the existing firmware versions and the product and sensors' general status.



#### 4.6.8 Electrode limit

This menu allows you to know the number of fusions the splicer has performed so far, as well as the maximum value for the electrodes (the latter is programmable by the user). When changing the electrodes, you will need to reset the arc counter on this menu.

#### 4.6.9 Maintenance information

This menu displays the splicer's serial number, as well as its time and date.

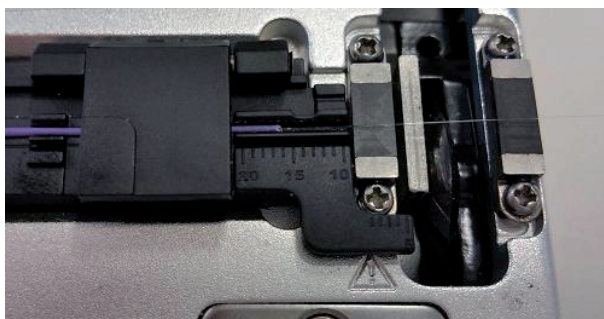
## 5. Splicing process

### 5.1 Electrode and element inspection

Make sure there is no trace of fibres/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 Fibre preparation

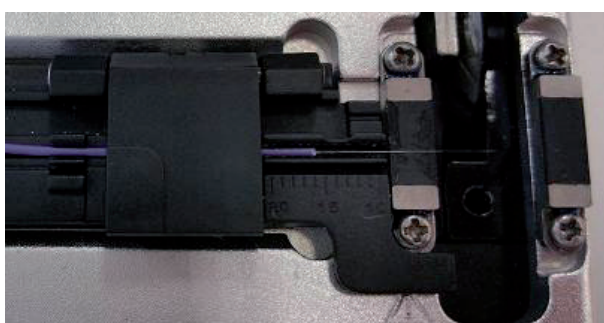
- Strip the fibre with the help of a stripper. The stripped length should be 30 mm to 40 mm. With isopropyl alcohol, clean any protection residues that may have remained on the fibre and put it on the cleaver (make sure the fibre is as straight as possible between both rubbers).



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

Rail	Type of use
<b>Upper rail</b>	For single-fibre tubes (3mm thick) or BIF tubes.
<b>Intermediate rail</b>	For fibres with an initial thickness of 900 microns (see example on the image below).
<b>Lower rail</b>	For fibres with an initial thickness of 250 microns.

- Proceed to cutting the fibre with the cleaver. Leave approximately 16mm of fibre uncovered after cleavage (see picture).



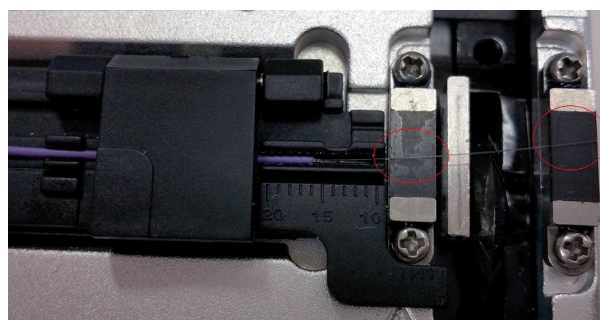
In case you were not able to perform the cleaving, check and make sure that:

- 1 Both fibre protections are correctly removed (900 and 250 microns).
- 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 fibre-holding rubbers). Should this height be incorrectly set, you can modify it with the screw.

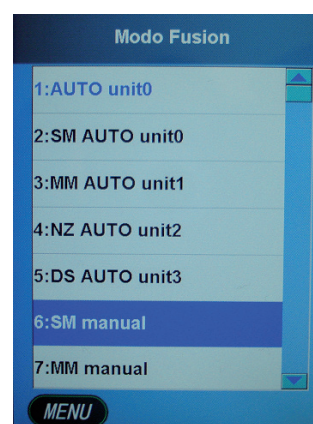


Make sure that the fibre sitting on the cleaver do not form an angle between both holding rubbers, since it could cause problems for the fusion (higher cutting angle). Fibre should sit on both runners, always forming a straight line between both. The following example illustrates how NOT to place the fibre.



### 5.3 Fibre type

Switch on the fusion splicer and select the fusion programme based on your fibre type. For single-mode fibres, the manual SM mode is pre-set by default.





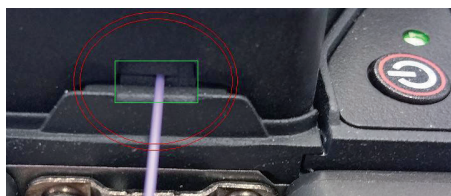
## 5.4 Fibre introduction into the fusion splicer and splicing process

- Open the protective cover to place the fibre.
- Lift the fibre clamps.
- Put the cleaved fibres on the V-grooves. Insert them from top to bottom (avoid fibre contact with other elements present in the fusion splicer).
- Check that fibres stick out from the V-groove, and that they sit 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 fibre is seen on the screen. This would mean that the fibres are too close to the electrodes.
- Check that the fibres on the V-groove are not misaligned, since they may be slightly bent.
- Lower the fibre clamps and the protective cover; the equipment will start the splicing process.

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

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

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



Correct positioning



Incorrect positioning

The splicing process consists on the following steps:

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

Should any error display on the screen, the process will stop until the anomaly is fixed.

Should the fusion fail to complete:

**1) 1) Check the adjustment of the distance between fibres:** Despite the fusion splicer automatically bringing the fibres together, it has a minimum and a maximum range. If the fibres are not close enough to each other, the equip-

ment will not be able to bring them together.

**2) Check the fibres are not dirty:** Clean both, fibres 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 fibres. Some of the 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 fibres to protect the operation.

After the fusion has taken place, slip the heat-shrink protection along the fibre until it fully covers the fusion area. The process final step will be to introduce this heat-shrink protection into the equipment's "OVEN" and hit the **W** key.



Keep in mind that while the oven's red LED is on, the oven 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 oven and place it on the cooler.

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

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



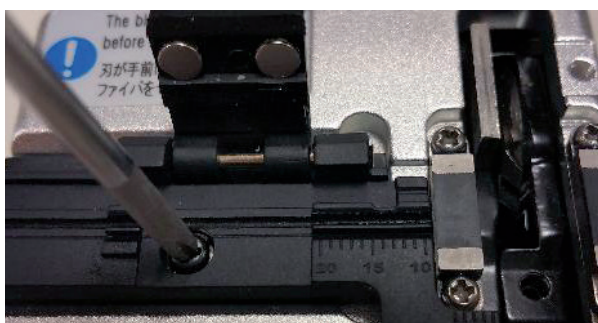
## 6. Annexes

### 6.1 Annex A (separate head):

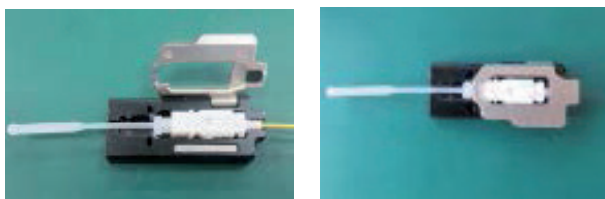
Among the fusion splicer's accessories, you will find a specific head that will allow you to introduce a connector for direct fusion (these connectors hide the fusion spot under a cap they have on their rear).

It is conceived to be interchanged with the head coming on the cleaver and subsequently with one of the fibre clamps existing on the fusion splicer. Follow these steps:

- 1 Extract the head in the cleaver.



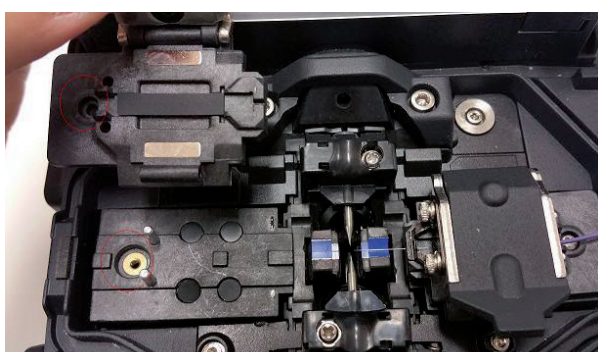
- 2 Insert the connector on the head.



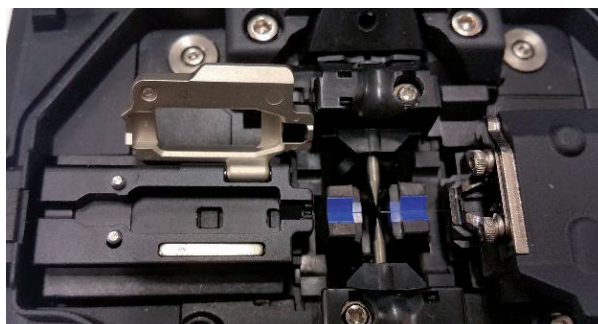
- 3 Install the new head on the cleaver (without screw) and proceed with the cleaving.



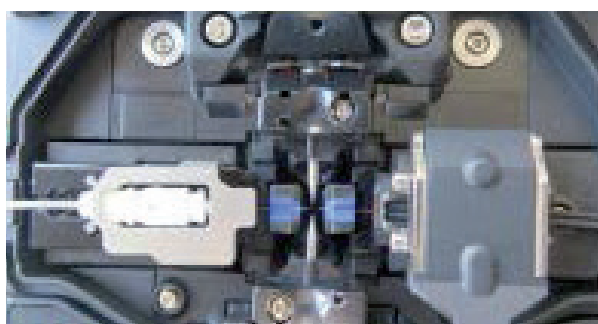
- 4 Exchange the fibre clamp of the splicer with the new head. To do this, extract the fibre clamp's screw and remove the clamp, as shown in the image.



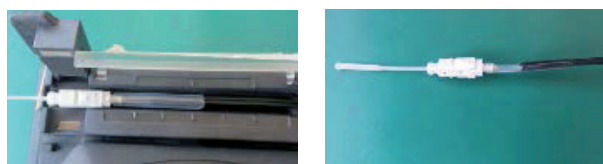
- 5 Install the new head (without screw).



- 6 Place the fibre on the right fibre clamp and proceed with the splicing.

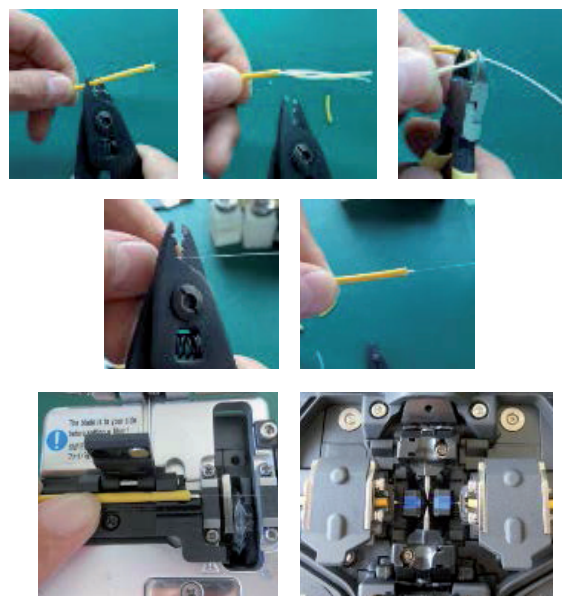


- 7 Proceed with the baking and mount the connector.



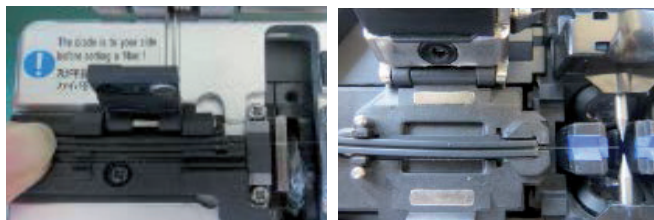
### 6.2 Annex B (Single-fibre tube):

In case you use a single-fibre tube (containing only one fibre), you can strip it and directly insert it into the cleaver and the splicer, as shown below:



### 6.3 Annex C (BIF-fibre tube):

In case you use a BIF-fibre tube, you will need to strip it using a special stripping tool and then insert it into the cleaver and the splicer, as shown below:



## 7. Maintenance

### 7.1 V-groove

Clean the V-groove.

In most cases, 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 fibre and V-groove forming a 45° angle with each other).

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



### 7.2 Fibre pushers

The equipment includes 2 pushers for fibre alignment on the V-groove. In case of impurities, the risk will increase of higher losses on the fusion. You should pay special attention to its cleaning and maintenance. As above, use a specific cleaning swab (Ref .232710) dampened with isopropyl alcohol.



### 7.3 Reflecting mirrors

Clean both mirrors regularly.

Presence of contamination (dirt) on any of them will result in fusion problems or losses higher than usual. For the cleaning, use a specific cleaning swab (Ref .232710) dampened with isopropyl alcohol. A clean mirror will not have any trace of dirt or fingerprints.



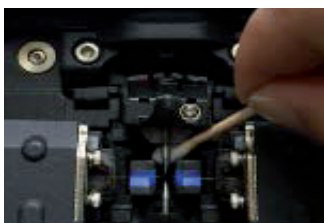
## 7.4 Cameras or lenses

Clean the lenses regularly.

Presence of dirt on the lenses will result in 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 centre 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.

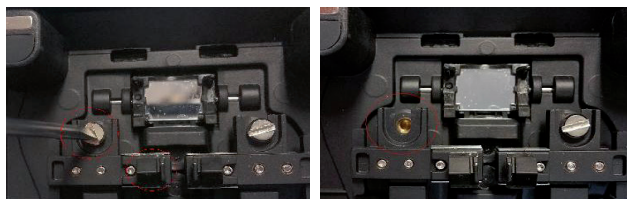
**Note.** During the cleaning, be careful not to push or hit the electrodes. Apply a controlled force (lenses are very sensitive elements). Excessive pressure could result in scratches, that would make the lenses unusable.



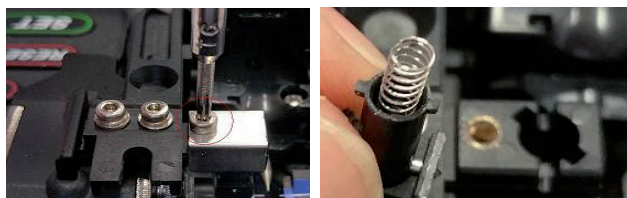
## 7.5 Pusher substitution

In case a pusher is deteriorated (unusual), you can replace it with the included spare element. To do this, proceed as follows:

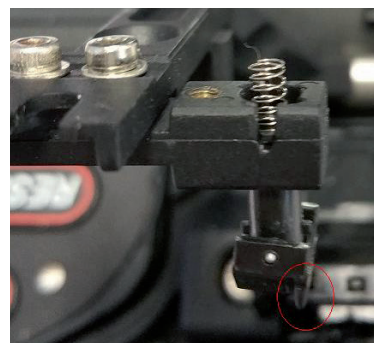
- 1 Unscrew and remove the screw securing the pusher's body.



- 2 Extract the screw securing the pusher (take care not to release the spring underneath).



- 3 Replace the pusher. Bear in mind that it has a mounting direction (right or left side) defined by the protrusion shown in the following image:



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Finally, proceed with the assembly, going through the previous steps in reverse order.

## 7.6 Changing the cleaver's cutting blade position.

The cleaver's cutting blade has 16 positions. Each position can execute 1,000 cutting operations, which means 16,000 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 Loosen Allen screws 1 and 3 as shown in the following figure:



- 2 Rotate the cutting blade around its axis. To do this:
  - Turn the blade by pushing it from the side (not from the edge) using a tool to avoid being hurt.
  - Access it from the top.
  - Tighten screws 1 and 3.



### 7.7 Adjusting the cleaver's cutting blade height.

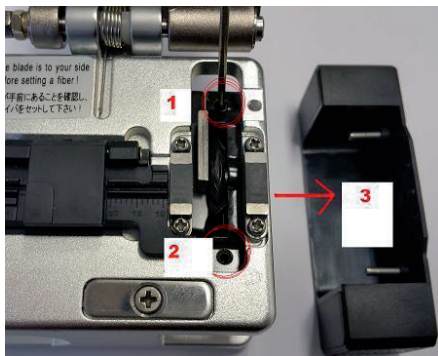
By means of a flat screwdriver, work on screw no. 2 (shown in the previous image). Turning the screw to the left will lower the blade. Turning the screw to the right will raise the blade.

Upon a blade replacement or a position modification, you may need to readjust its height. Bear in mind that an excessive blade's height may produce splintering or prevent the cut.

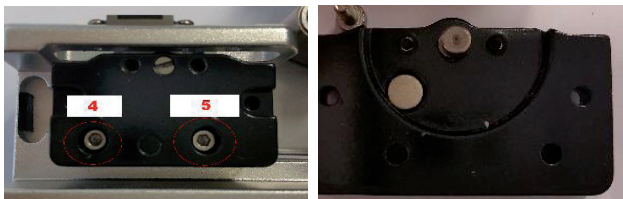
### 7.8 Replacing the cleaver's cutting blade.

After 16,000 cuts, you may have to replace the cutting blade. To do this, proceed as follows:

- 1 Loosen screws 1 and 2 using an Allen wrench. Next, remove lateral protection 3.



- 2 Remove screws 4 and 5 and extract the blade container.



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

### 7.9 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 125-micron fibres.
3	Designed to remove the protection layer between 3 and 1.6mm, reaching 900 microns.
2	Designed to remove the protection layer on 900 microns, reaching 250 microns.
1	Designed to remove the protection layer on 250 microns, reaching 125 microns.

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.

### 7.10 Battery

The equipment comes with an 11.1V, 7,800 mAh battery from factory.

#### 7.10.1 Battery extraction

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



**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.



## 8. Technical specifications

Compatible fibre	SM, MM,DS,NZDS, BIF.
Typical loss	0,02dB(SM), 0,01dB(MM), 0,04dB(DS), 0,04dB(NZDS), 0,02dB (BIF/UBIF).
Fusion average duration	9s
Baking average duration	28s
Alignment method	Core alignment in 3 X-Y-Z axes.
Fusion programmes	11 (SM, MM, NZ, DS and BIF) pre-configured, 89 free.
Oven programmes	10 pre-configured, 40 free.
Languages	Spanish, English.
Lens magnification	X axis + Y axis = 155x magnification ///X axis or Y axis (separately) = 310x magnification.
Screen	3,7" colour LCD, 640x480.
Tensile test	2N standard.
Tubes heat-shrink	60,50,45,40,30 y 25mm.
Electrode duration	3,000 approx. (6,000 with the spare supplied).
Battery duration	250 fusion/baking cycles, and 300 to 500 load cycles approx.
Internal sensors	Internal temperature, atmospheric pressure, elevation and oven temperature.
External interface	Mini USB (Up to 5000 Log update and download).
Power supply unit	Input:100-240V~ 50/60Hz
	Output: 13.5V== /5A
Battery type	11.1V 7800 mAh lithium battery.
Working environment	Temperature: -10°C... +50°C Humidity: 95% HR a 40°C RH at 40°C non-condensing. Altitude: 0... 5000m
Dimensions	W x H x D in mm: 136x160x164.
Weight	1.8 Kg without battery, and 2.3 Kg with battery (6.8Kg with case and accessories).





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