# EasySplicer PRO

# USERS MANUAL

# Table of Contents

# Introduction

The EasySplicer PRO incorporates all the best a Swedish designed Fusion splicer can offer.
NOTE: EasySplicer PRO is a high precision instrument and should always be handled with care!

# Disclaimer

SB Scandinavia AB reserves the right to modify the product in any way without prior customer notification or any other form of notice.

In no event shall SB Scandinavia AB be liable for any damages of any type, incidental, indirect, consequential or other, originating from or relating to this manual or the information contained herein. While SB Scandinavia AB tries to make the user manual complete and accurate, it may contain mistakes, and the user uses it solely at his or her own risk.

# Application

Splicing and protection of most common types of SMF and MMF.

# EasySplicer PRO components

The following components are included and standard for splicing in the field:

| Item | Description | Quantity |
|------|-------------|----------|
| 1 | EasySplicer  PRO | 1 |
| 2 | Power supply | 1 |
| 3 | Fiber cleaver | 1 |
| 4 | Fiber holders 250µm (**black**) | 1 pair |
| 5 | Fiber holders 900µm (**blue**) | 1 pair |
| 6 | Fiber holders Loose tube (**red**) | 1 pair |
| 7 | Stripper | 1 |
| 8 | Carrying bag | 1 |

# Basics

NOTE: The EasySplicer is a rugged field instrument designed to withstand field environment. However, to ensure best performance, it is important to keep maintenance as described later in this manual.

## Quick Start !

## Turn On the EasySplicer PRO

Make sure that that unit is properly charged if operated by the internal battery-pack. Charge the unit at least 6-8 hours before using it the first time.

- Turn on the EasySplicer PRO by pressing down the "ON"-symbol

The splicer "beeps" and starts in "ready-mode" after a few seconds.

## Automatic Calibration !

When starting up the unit calibrates itself automatically in regards to air-pressure and temperature.

Should You encounter problems when splicing (i.e. bad splice and/or no splice) then calibrate the unit manually (see chapter 4.2 Calibration).

## Electrodes !

* Before beginning to splice You should verify that the electrodes are in good (operational) condition.
Check the electrodes as the splicer probably has been stored for a while and lately been in transport.
If needed clean the electrodes as described in section X by using the "CLEAN ELECTRODES" function (see page 21).

## Singlemode or Multimode?

It´s very important to setup the correct fiber-type in the splicer before doing the calibration. For ex. Select Singlemode fiber in the "Menu" if You are using a Singlemode fiber.

- Press the "Menu-button" (step with the arrows to the "Menu-button" and select it)

- Move with the arrow-buttons around in the display and select the "Para-function" with the "Enter-button"



-   Select the "Para-mode" and chose the suitable Cable-type/program (select with the "Enter-button").
    For simplicity we recommend You to use the following programmes only:
    **Prog 0    Auto/SM-SM        For Singlemode**
    **Prog 1    Auto/MM-MM        For Multimode**



There are a total of 40 programmes in the list but most are to be used with special settings and special cables.
There is no need to use most of them unless You are sure of the purpose of the individual programmes. Please contact our support if You have any questions/comments.

## Time to splice!

Place 250 fiber in the **black holders** ,900 fiber/pigtail in the **blue holders** and the 900 loose coat/loose tube in the **red holders**.The fiber should "stick-out" some 3-4cm (as seen in the pictures).

- Don´t forget to put on a shrink-tube (sleeve) over one of the fiber-ends before You start!
**\* Strip and clean the fiber (for detailed instructions see page 15)**
**\* Place the fiberholders in the cleaver and cleave the fiber.**

**\* Place the fiber holders in the splicer.** Make sure that the fiber ends are being placed in the V-Grove (both left, right).
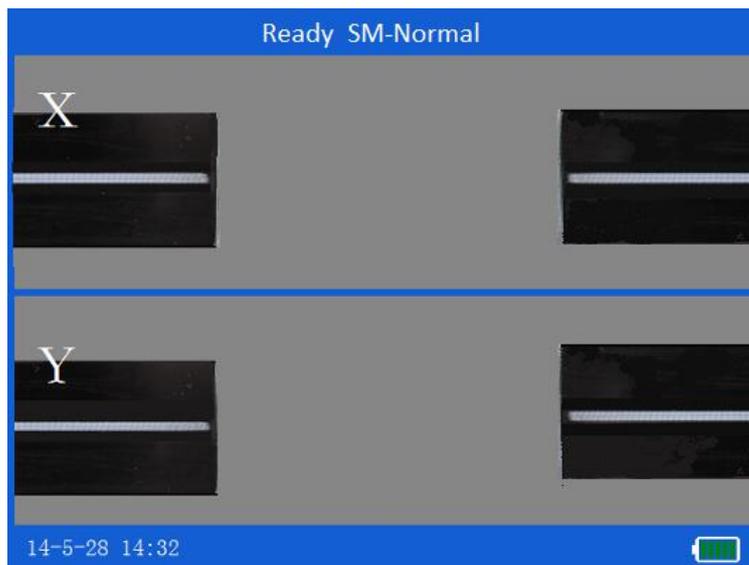


Close the lid of the Splicer and the EasySplicer PRO will move together the fibers and splice them together automatically. The whole process will be shown in the display (live video from both X/Y cameras) and take less than 10 sec. An automatic pull-test will be performed after the splicing. Finally, the splicer will show the estimated splice loss (in dB) or, if the process failed, "Bad splice" (if so, re-do the operation from "strip and cleave" above).

## Oven operation – sleeve protection!

Open up the oven (with the lifting arms –left/right on the lid).
Open the main lid and open the lids of the fiberholders. The newly spliced fiber is ready to be moved.

Lift out the fiber gently and move the shrink-tube (sleeve) in place over the spliced area. Place the shrink-tube in the oven according to its size.

Close the oven lid and the oven operation will start automatically.
The oven is default set for 30 seconds.

The splicer is ready for another splice while the oven is in operation (simply start the above process again).

# Basic Operation

The EasySplicer PRO is handled and controlled with the keypad. All selected parameters will be shown on the Display.

# KeyPad
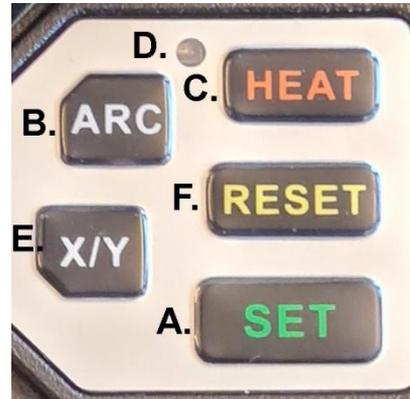




| | |
|---|---|
| 1. Power On/Off | A. Splice |
| 2. Power LED | B. Arc |
| 3. Enter | C. Heat (oven) |
| 4. Menu/back | D. Oven On |
| 5. Left | E. Swap cameras (video) |
| 6. Up | F. Reset |
| 7. Right | |
| 8. Down | |

Enter the Menu-system with Menu-button (nr 4).
Step up/down with the arrow-keys and select Your choice with the Enter-button.
Go back with the Menu-button (nr 4).
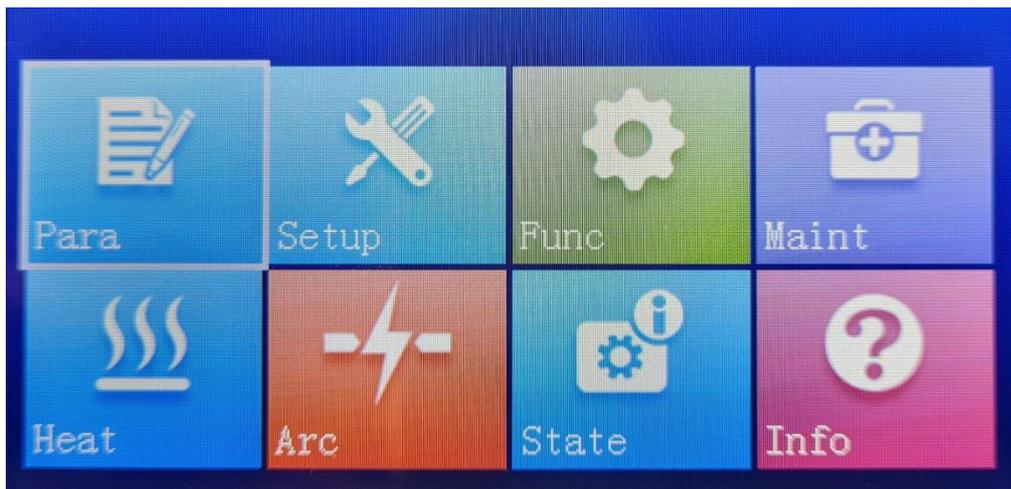


Select immediate, manual, operations on the keypad on the right hand side, for ex. force splicing and oven operation.
Switch between the cameras with the X/Y-button.

## Clean electrodes

If You are getting continuous "bad splices" it might be a good idea to try to clean the electrodes (dirt is always in the air and for ex. moisture can oxidize the electrodes making the spark weaker so it can´t melt the fiber-glass properly).

- Open up the main lid and press the ARC-button one time to enable the "clean electrodes function (takes a few second for the splicer to adjust). Then press the ARC-button repeatedly 3-5 times.

The spark should be a straight fine line of light going between the electrodes and it should be barely soundless.

**NOTICE**, don´t try to touch or interfere with the spark as it can cause significant injuries which are very hard to heal/treat. Always operate the EasySplicer PRO with cautiousness !!!

## Calibrate

The EasySplicer PRO is continuously calibrating the strength of the spark in accordance with the surrounding environment (temperature and airpressure).

It can happen that the weather situation changes very fast (from for ex. sunny to rainy) and under such conditions it will be of good use to calibrate the unit manually before starting to splice.

Performing a **Calibration:**
-  Make sure You have the correct fiber-type selected (SM/MM). See below "Para"-setting, page 17.
- Strip, clean and cleave one fiber from each side (left/right) and place in their fiberholders. Then place them in the splicer.
- Always clean the fiber with alcohol, isopropyl or similar. Make sure not to touch  the fiber with anything after cleaning as it will become dirty.
Place the stripped and cleaned fiber across the v-groove (see picture below).

- Press the "Menu button" and select  "ARC".

- The unit will reset for this operation (Arc Calibration will be shown in top of the display).

- Press the "Enter button" and the unit will perform the calibration.

**Successful Calibration**



- Simply redo the above steps if the unit is unsuccessful with the operation.

You can see a full calibration video at:

# Oven operation

Use the HEAT function to manually run the oven program. Normally, when a splice is done the oven program will be executed automatically.
-But under some circumstances You might want to operate the oven manually.
If so, place a fiber with a shrink-tube (sleeve) in the oven compartment and press the HEAT-button. The oven will start and the red-LED will lit.
The oven will run for as long as the oven time is set (factory preset is 30 sec.)

Change oven-time (and other heating parameters) in the "Menu", in the section "Heat".
Use the "up/down" buttons to move around and the "left/right" buttons to change values. Step out from this menu with the "menu"-button.
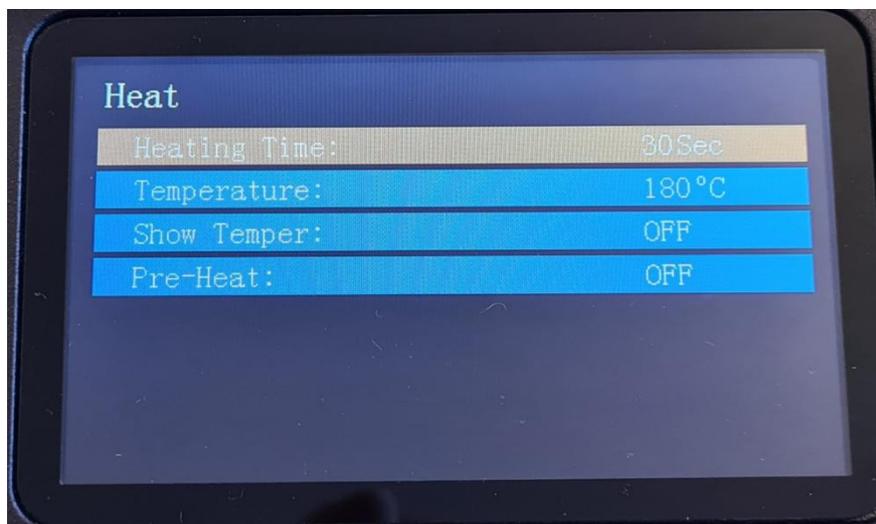
## Dedicated buttons

## RESET

Reset the splicer to start postion (Stand by). EasySplicer PRO is ready to start any operation.

## SET

After "Reset" press this button and the splicer will go to "Automatic"-mode. Stepping between; alignment, splicing, oven-operation, splice-information and back to alignment again.

## ARC

For testing and looking at the arc. Open up the main lid and press the button.

**NOTICE**, don´t try to touch or interfere with the spark as it can cause significant injuries which are very hard to heal/treat. Always operate the EasySplicer PRO with cautiousness !!!

## X/Y

In Standby, press X/Y to switch between camera modes:
X/Y    Standard view              x125
X/Y    Magnified view           x250
X      Camera magnified view   x250
Y      Camera magnified view   x250

- back to Standard view

## HEAT

Force oven-operation according to set parameters. See above P10, Oven-operation, for more info about settings.

# Setup – Menu system
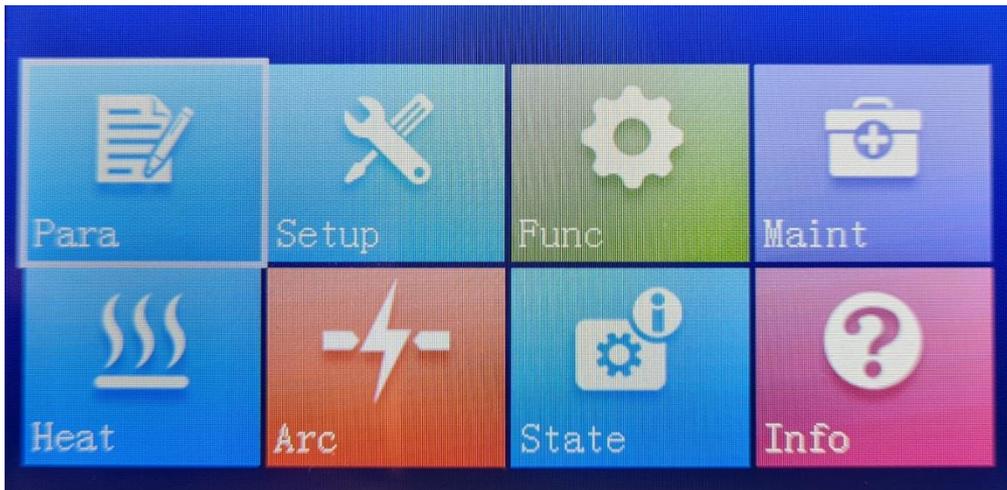


Press the "Menu"-button in Stand by mode to enter the Meny system. Chose the wanted sub-menu. Select the wanted sub-menu with the "Enter"-button.

**Para**

> For setting fiber-type and splice parameters. The EasySplicer PRO can handle Singlemode-, Multimode-, DS- (Dispersion shifted) and NZDS- (Non-zero dispersion shifted) cables.

> - Here You also set the correct fiber type BEFORE You calibrate the splicer.

> For simplicity we recommend You to use the following programmes only:
> | | | |
> |---|---|---|
> | **Prog 0** | **Auto/SM-SM** | **For Singlemode** |
> | **Prog 1** | **Auto/MM-MM** | **For Multimode** |
> | **Prog 2** | **Auto/DS-DS** | **For DS** |
> | **Prog 3** | **Auto/NZ-NZ** | **For NZDS** |



Select Paras Group

| No. | Name | Type | State |
|---|---|---|---|
| 0 | Auto/SM-SM | SM | ON |
| 1 | Auto/MM-MM | MM | OFF |
| 2 | Auto/DS-DS | DS | OFF |
| 3 | Auto/NZ-NZ | NZ | OFF |
| 4 | Calibrate/SM-SM | SM | OFF |
| 5 | Calibrate/MM-MM | MM | OFF |
| 6 | Calibrate/DS-DS | DS | OFF |
| 7 | Calibrate/NZ-NZ | NZ | OFF |

Move with the "up/down" buttons and change value with the "left/right"-buttons. Save and go back with the "menu"-button.

There are a total of 40 programmes in the list but most are to be used with special settings and special cables.
There is no need to use most of them unless You are sure of the purpose of the individual programmes. Please contact our support if You have any questions/comments.

## Setup
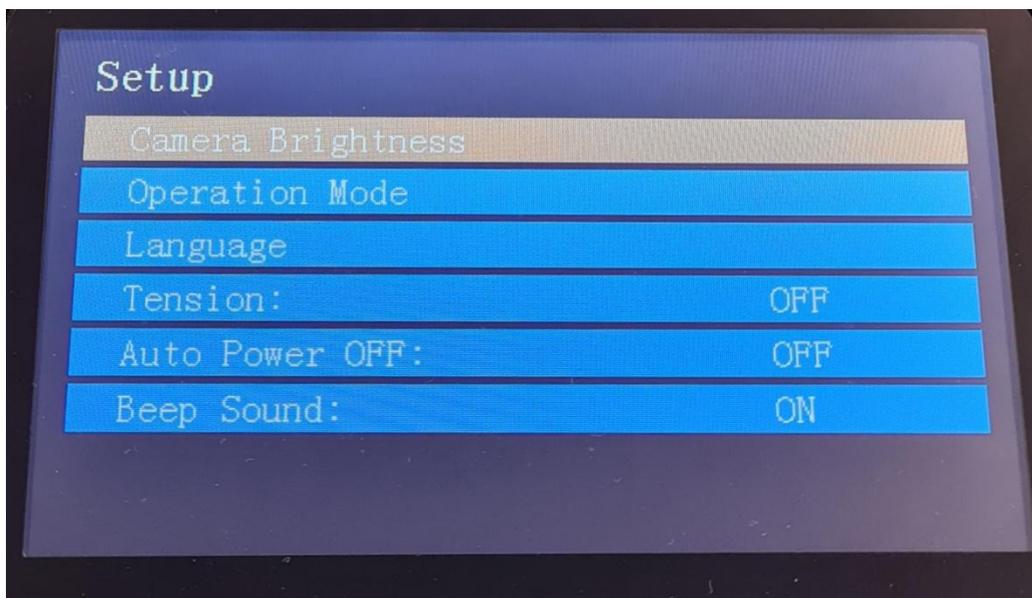


In this menu You can setup/change various parameters like "Camera Brightness" and "Menu Language".

Here You can also set "Auto Power Off" (default) to "Auto Power On" .

When being in "Auto Power On"-mode the machine will shut down itself after 10min inactivity.

"Tension On" (default) means that the machine will perform a 2 Newton's pulling on the fiber to test the quality of splicing (after a complete splice) . If the pull test fails, it means that the fusion failed.

**Func**
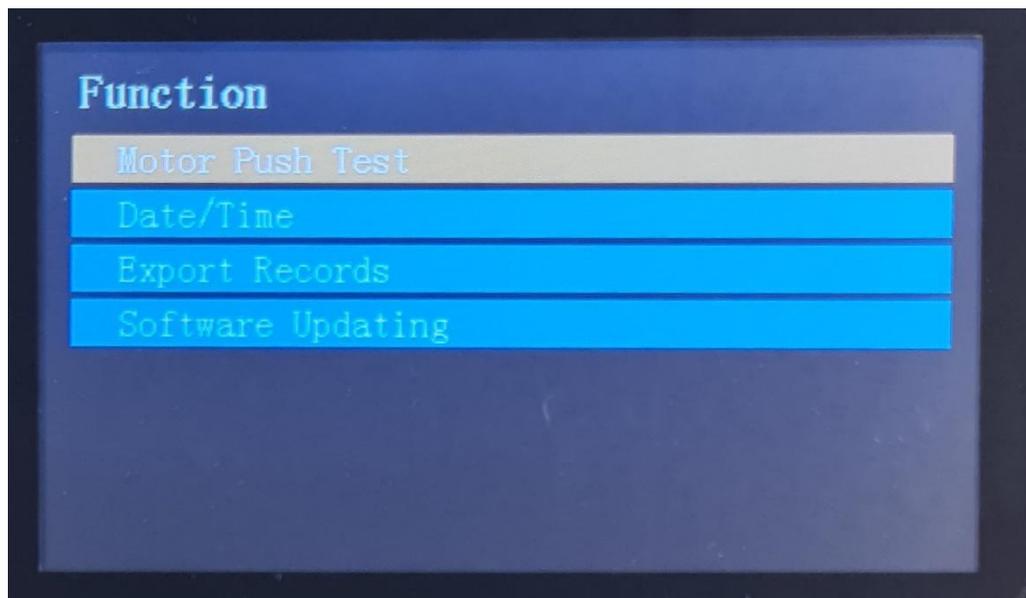


There are the following features to set/enable in the "Function"-mode:

### 8.1. Motor Push Test

For testing the motors when in Stand by mode (and no fiber in the splicer). Select the function and then press the "Enter"-button a second time to execute the operation. The motors will go in and out and place themselves in "Ready"-mode (Stand by).

### 2. Date/time

Set the proper date/time.

### 3. Export Records

If You want to make records and documentation of Your splice results then You can download the internal memory (up to 4000 memory positions) to a USB-stick.

Connect a USB-stick to the splicer and select this function. The splicer will transfer the memory-positions to the USB-stick and "beep" when ready.

### 4. Software Updating

Connect a USB-stick with the new firmware for the EasySplicer PRO and select this function. The splicer will "beep" when ready.

**Maint**
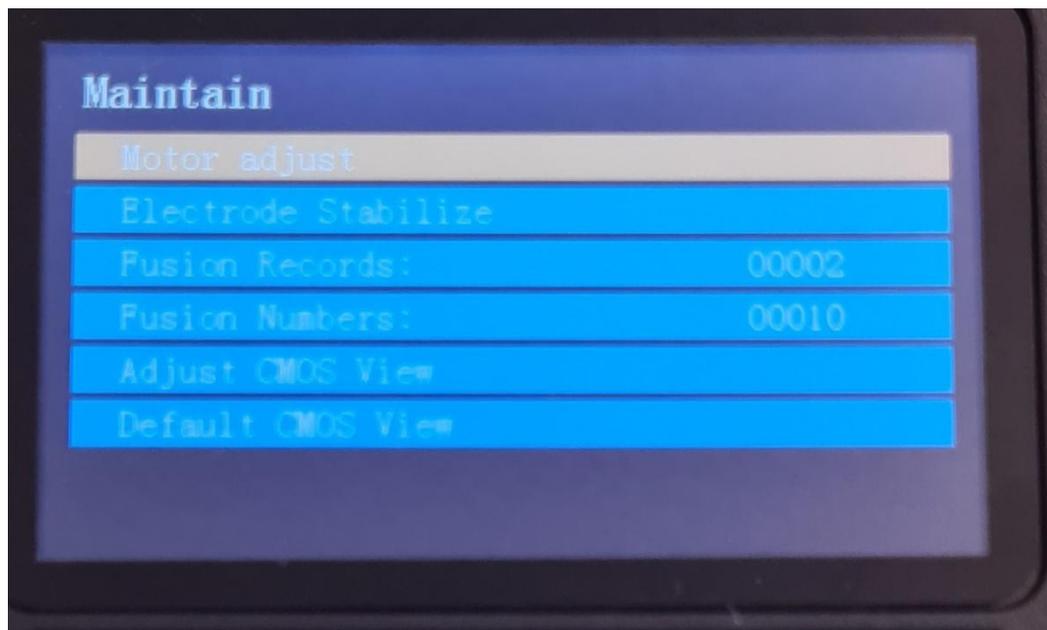


In the "Maintain" mode You can check/test the following:

1. **Motor adjust**

    You may run the motors manually left/right (with the "left/right arrow"-buttons).

    To get back in Stand by mode (Ready mode) press the "RESET"-button.

2. **Electrode Stabilize**

    Use this function when exchanging Your worn out electrodes with new ones. This function will burn away oxid which might have occurred on the electrodes during transport or longtime storing.

3. **Fusion Records**

    Enter this function to learn about the individual splices made. They are registrated in chronological order. Chose and memory position and press the "Enter"-button to learn more in depth details about that splice.

4. **Fusion Numbers**

    Telling about total number of splices made in machine.

## Heat
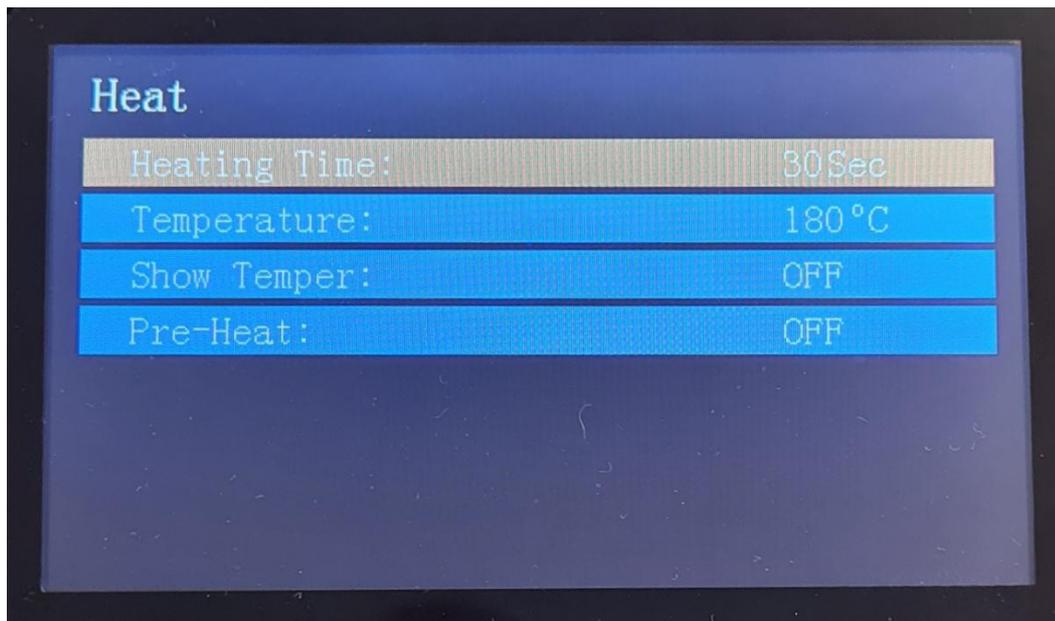


In the "Heat"-section You control the following oven-parameters:

1. **Heating time**

   Default heating time for the oven is set to 30 sec. Adjust it with "left/right"-arrows. The oven time can be set in steps of 1 sec. according to Your needs.

2. **Temperature**

   Default temperature for the oven is set to 180 degrees Celsius. Adjust the temperature with "left/right"-arrows. The temperature can be set in steps of +/- 5 degrees Celsius according to Your needs.

3. **Show Temper**

   Displays the oven temperature when in operation. Default setting is "Off". Change value with the "Enter"-button.

4. **Pre-Heat**

   For doing the oven procedure faster. When enabled it will keep the oven temperature at about 100 degrees C. Remember that this will reduce the operational time when running on battery.

16

# Arc
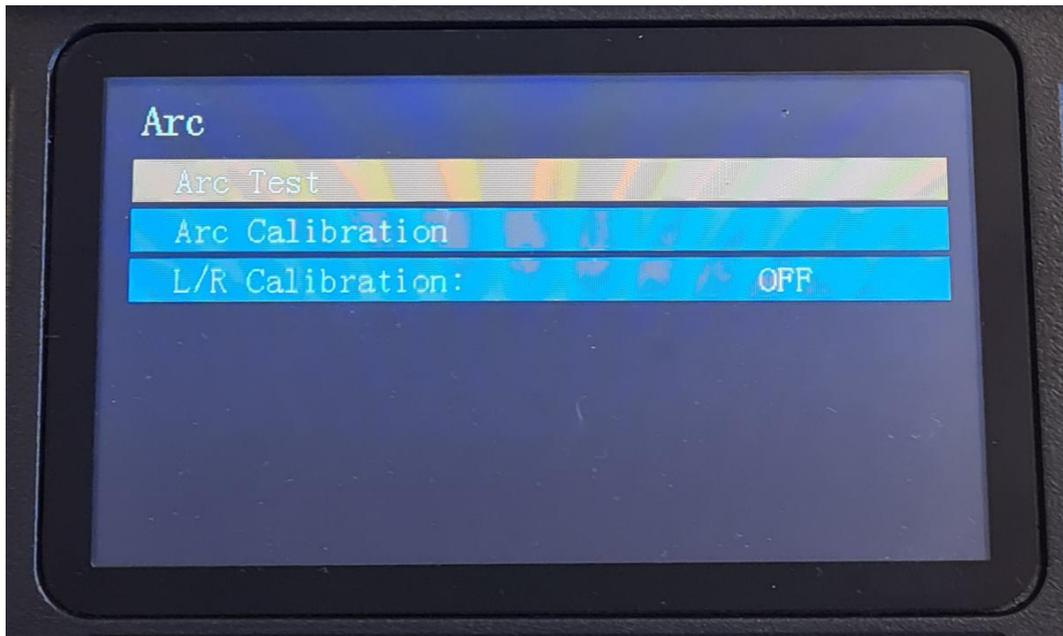


1. **Arc test**

   Strip, cleave, clean and place fibers int the fiberholders (left/right). Close the main lid and enable the function. The EasySplicer Pro will then check the Arc.

2. **Arc Calibration**

   - Make sure You have the correct fiber-type selected (SM/MM). See below "Para"-setting, page 12.
   - Strip, clean and cleave one fiber from each side (left/right) and place in their fiberholders. Then place them in the splicer.
   - Always clean the fiber with alcohol, isopropyl or similar. Make sure not to touch the fiber with anything after cleaning as it will become dirty.
   Place the stripped and cleaned fiber across the v-groove (see picture below).

   - Press the "Menu button" and select "ARC".

   - The unit will reset for this operation (Arc Calibration will be shown in top of the display).

   - Press the "Enter button" and the unit will perform the calibration.
   ## Successful Calibration

-   Simply redo the above steps if the unit is unsuccessful with the operation.

You can see a full calibration video at:

## State



This section will tell the status and about the surrounding environment of the unit.

1. **Pressure**

   Current air-pressure

2. **Outer Temperature**

   Last measured outdoor temperature in Celcius

3. **Inner Temperature**

   Last measured indoor temperature in Celcius

4. **Remaining Capacity**

   Remaining battery capacity in %

# Info
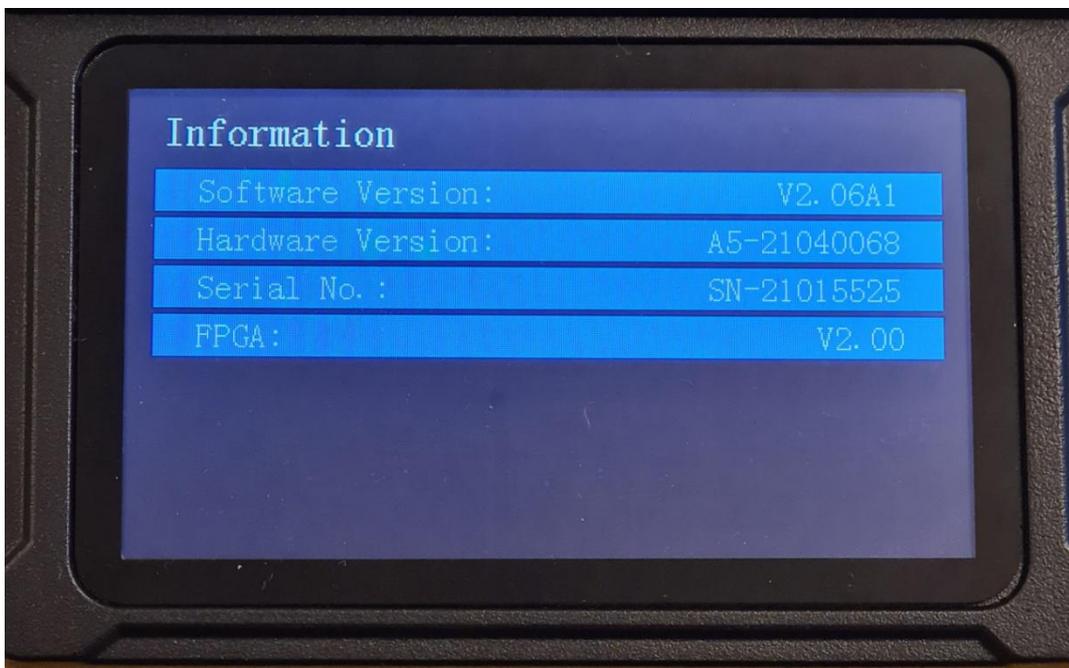


Information about Your EasySplicer PRO

1.　**Software Version**

Tells about the software version of Your EasySplicer PRO. Check at: www.easyplicer.com to find latest firmware.

2.　**Hardware Version**

Tells about Your units specific hardware.

3.　**Serial Nr**

**Serial nr of Your EasySplicer PRO**

4.　**FPGA**

Processor version of the splicer.

# Technical specification

| | |
|---|---|
| **Splicing method:** | Core positioning (X/Y). |
| **Fiber Types:** | SMF, MMF 50/125µm and 62.5/125µm fiber, 250µm primary and 900µm secondary coated fiber. |
| **Fiber Handling:** | Fiber holders, 3 pairs (250, 900 and loose tube). Optional for any cable-type (drop-cable, 2mm, 3mm, Splice on connectors and so on. |
| **Calibration:** | Automatic (temperature and air pressure) or manually. |
| **Splice Programs:** | 40 groups. |
| **Operation, modes:** | Automatic or Manual. |
| **Typical Splice Loss:** | 0.02dB SMF, 0.01dB MMF. |
| **Return loss:** | >60dB |
| **Tension test:** | Yes, 1.8-2.2N. |
| **Typical Cycle Time:** | 6s + 25s (splice + oven cycle 40/60mm). |
| **Sleeve Dimensions** | Max 64mm length, 2-7mm diameter supported by oven. |
| **Display:** | LCD, color, 4.3". |
| **Oven:** | Ceramic/teflon-type. 40/60mm sleeves in about 25 sec. |
| **Electrodes, life:** | >4000 splices. |
| **Magnification Cameras:** | x250 (X or Y)   x125 (X and Y together) |
| **Communication:** | USB 2.0 for uploading splice info and upgrade. |
| **Splice memory:** | 4000 results internally. |
| **Altitude Compensation:** | Automatic up to 4000 meters altitude with compensation for moisture and temperature. |
| **Operating Environment** | -10C  +50°C, max 95% RH, **non-condensing.** |
| **Size:** | 149x120x127mm. |
| **Weight:** | 1.9kg. |
| **Power Sources:** | External power supply, 13.5V, 100-240VAC (50-60Hz). Built in 5800mAh Li-Ion battery pack. |
| **Splicing Capacity:** | 200 splices with oven cycles. |
| **Additional Features:** | Loss estimation, Fiber fault detection, SD-card for logging etc. |

**Supplier**



**SB Scandinavia AB**

Ostmastargrand 12

120 40 Stockholm

Sweden

Tel: +46 8 5333 40 70

e-mail: info@easysplicer.com

**Support: support@easysplicer.com**

web: www,easysplicer.com

Org (VAT) nr: SE556410621801