



# PYROIS TECH

## Custom BRETON User Manual

Fiber coupled  
MultiLED light source with  
integrated spectrometer for  
reflection applications



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The specifications indicated in this manual are subject to change without prior notice.

### **Disclaimer**

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## 0. Introduction

Thank you for purchasing this custom BRETON light source from Pyroistech S.L. This document describes the custom BRETON light source and provides you with instructions for its correct operation. Please do not hesitate to contact us through [info@pyroistech.com](mailto:info@pyroistech.com) if you have any questions or doubts about this manual.

Custom BRETON is the broadband multiLED light source with different peak wavelengths in the UV-VIS-NIR range. The current through each LED can be controlled with 1% precision through a touch screen. The spectrometer USB650 is integrated in the equipment and can be controlled through USB and the Ocean View spectroscopy software.

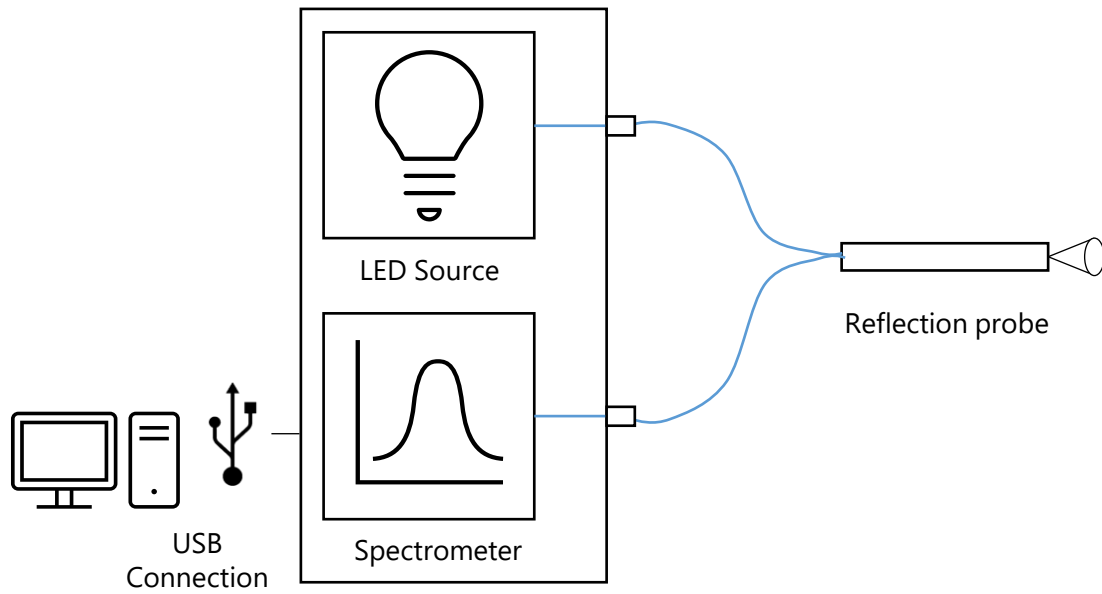
This light source has been designed to obtain a high coupling efficiency to optical fiber through a SMA connector. It has been conceived as a user friendly and silent tool, being ideal for fluorescence, spectroscopy and general fiber illumination applications.

## 1. Technical Specifications

### General characteristics

- Several peak wavelengths in the 310 - 660 nm range
- 1% precision current control through touch screen SMA output connector
- Stable throughout the working spectral range
- Ventilation system: fan
- Quality materials for a long life





## Characteristics

### Electrical characteristics

Power input	$V_{IN}$	12 V
	$I_{IN}$	5 A max
	Connector type	DC female 2.1mm

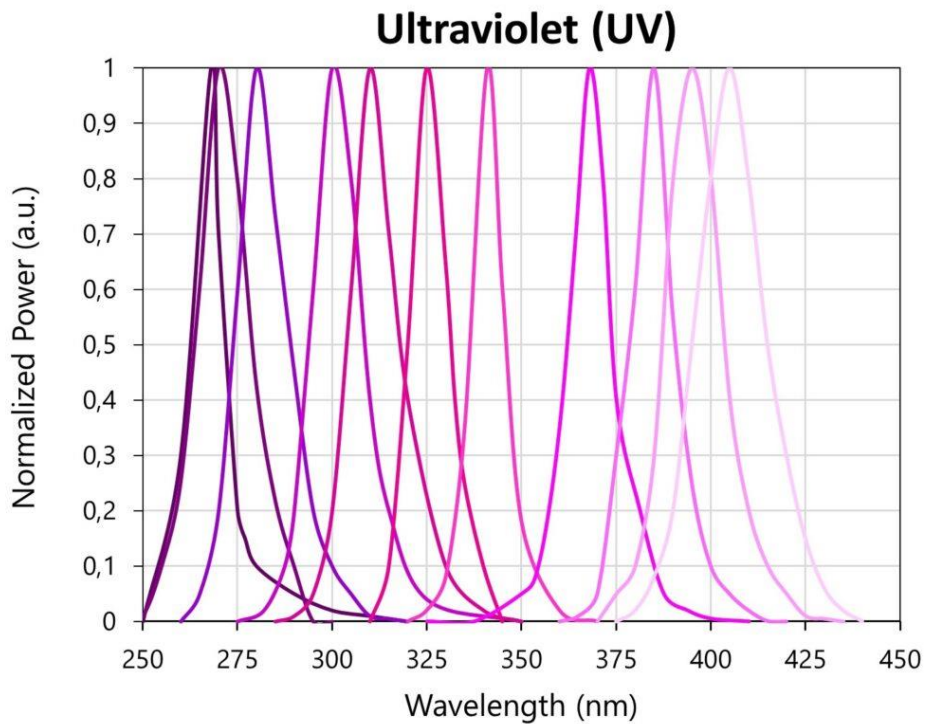
### Other characteristics

Output connector	SMA 905
Working T	<50 °C
Humidity	< 80% RH
Cooling	Fan
Stabilization time	20 min typ.
Size	177x320x450 mm
Weight	6 kg

## LED Ultraviolet (UV)

Name	Optical characteristics		Typical optical power output (2)
	Peak wavelength	Spectral range FWHM	
LED-265	265 nm	11 nm	TBD
LED-270	270 nm	15 nm	0.12 mW
LED-280	280 nm	15 nm	0.11 mW
LED-300	300 nm	20 nm	TBD
LED-310	310 nm	15 nm	0.50 mW
LED-325	325 nm	12 nm	TBD
LED-340	340 nm	10 nm	TBD
LED-365	365 nm	12 nm	11.8 mW
LED-385	385 nm	12.5 nm	10.6 mW
LED-395	395 nm	16 nm	11.0 mW
LED-405	405 nm	20 nm	11.4 mW

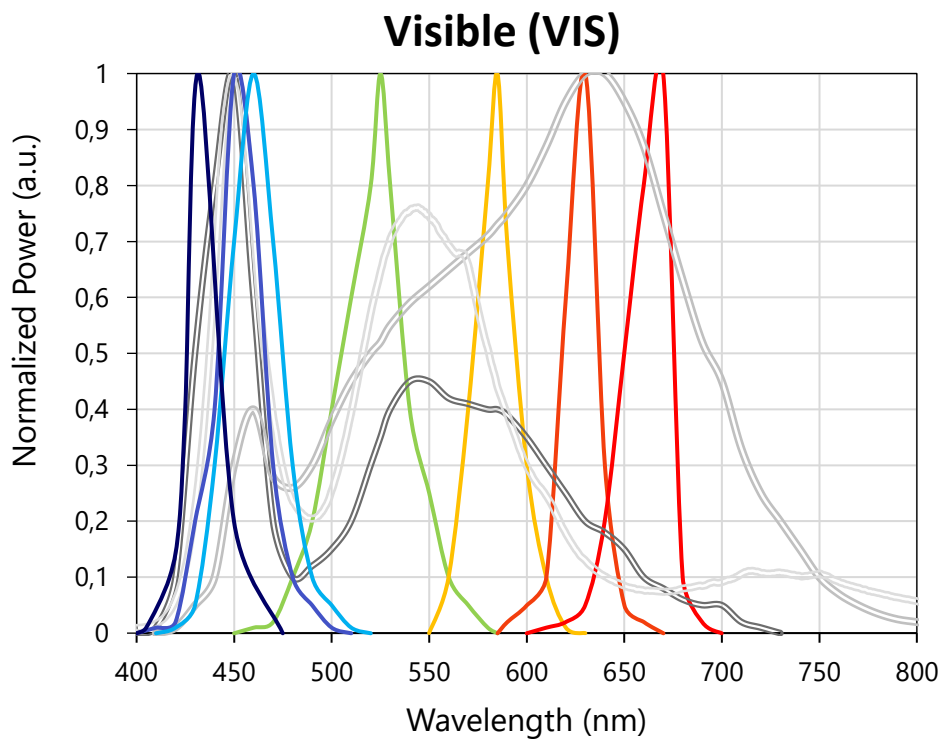
(\*) Measured with an optical fiber with a core diameter of 600  $\mu\text{m}$  and 0.22 NA



## LED Visible (VIS)

Optical characteristics			Typical optical power output (2) (*)
Name	Peak wavelength	Spectral range FWHM	
<b>LED-430</b>	430 nm	17 nm	TBD
<b>LED-457</b>	457 nm	20 nm	13.2 mW
<b>LED-460</b>	460 nm	24 nm	10.7 mW
<b>LED-523</b>	523 nm	36 nm	4.8 mW
<b>LED-590</b>	590 nm	15 nm	2.0 mW
<b>LED-623</b>	623 nm	17 nm	10.3 mW
<b>LED-660</b>	660 nm	18 nm	10.6 mW
<b>LED White</b>	EX White	TBD	0.75 mW
<b>LED 3000 White</b>	3000 White	TBD	2.4 mW
<b>LED 6500 White</b>	6500 White	TBD	16.5 mW

(\*) Measured with an optical fiber with a core diameter of 600  $\mu\text{m}$  and 0.22 NA



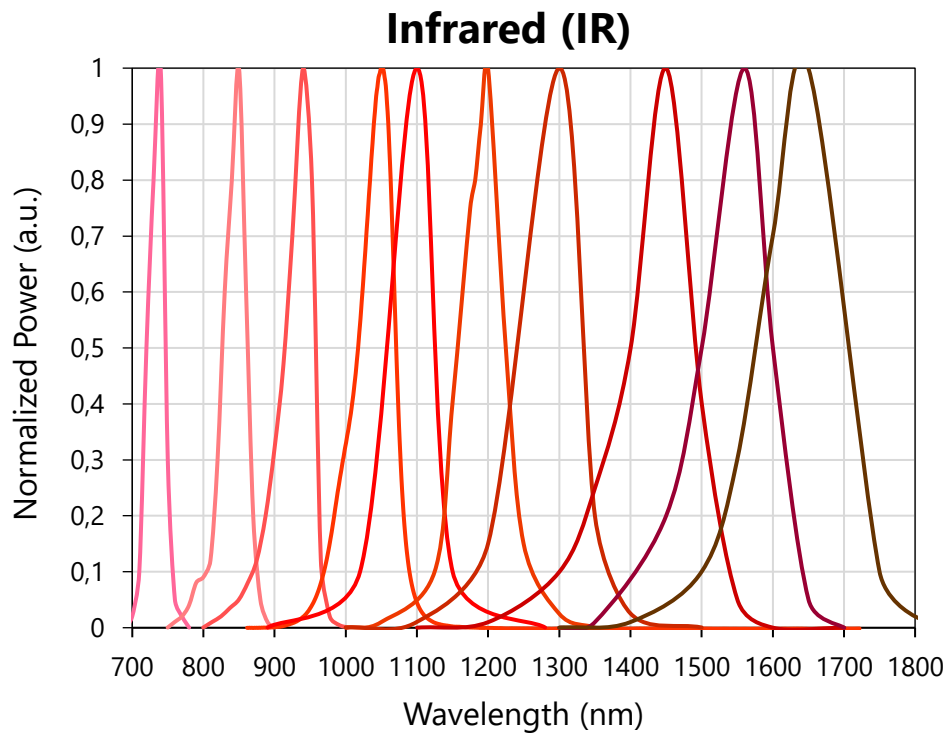


## LED Infrared (IR)

Name	Optical characteristics		Typical optical power output (2) (*)
	Peak wavelength	Spectral range FWHM	
LED-740	740 nm	18 nm	7.3 mW
LED-840	840 nm	33 nm	13.1 mW
LED-940	940 nm	40 nm	29.0 mW
LED-1050	1050 nm	55 nm	58.1 mW (**)
LED-1100	1100 nm	50 nm	TBD
LED-1200	1200 nm	65 nm	TBD
LED-1300	1300 nm	80 nm	TBD
LED-1450	1450 nm	95 nm	TBD
LED-1550	1550 nm	102 nm	TBD
LED-1650	1650 nm	120 nm	TBD

(\*) Measured with an optical fiber with a core diameter of 600  $\mu\text{m}$  and 0.22 NA

(\*\*) Measured with a VIS-NIR optical fiber with a core diameter of 1000  $\mu\text{m}$  and 0.5 NA.



## 2. Operation

### 2.1 Package Content

- Requested custom BRETON equipment
- Power source: input 100 - 240 V~, 50 - 60 Hz.
- Power cord
- User's manual

Inspect carefully the devices and make sure there is no damage. On the contrary, do not employ the light source and please contact us through [info@pyroistech.com](mailto:info@pyroistech.com) for repair or replacement information.

### 2.2 Before use

Insert the plug of the power cord into the power supply and connect the power cord to the power outlet. Then, introduce the plug of the power supply into the light source power input (DC female type).

Unscrew the cap of the SMA 905 connector on the front face of the light source ("OUT") and connect the illumination leg of the reflection probe. Always do this step before turning on the light source. Connect the spectrometer leg to the SMA 905 connector ("INPUT"). Attach the spectrometer to the computer through the USB cable.

Press the ON/OFF button to turn on the light source. The button will be lit up in green while the source is working. Press again the button to turn off the light source. Now, the BRETON light source is ready to be used.

### 2.3 During Use

The LEDs are turned on with a duty cycle set by the user and a switching frequency of 1KHz. Depending of the integration time of the acquisition system (few milliseconds), aliasing problems can appear. Please contact us through [info@pyroistech.com](mailto:info@pyroistech.com) if more information related to this issue is needed.

### 2.4 Maintenance

The output connectors of the light source and spectrometer should be periodically cleaned employing compressed air to remove the dust. It is recommended to have the output connector with the cap on it whenever the light source is not in use. The optical fibers connected to the equipment should be cleaned prior to the connection to ensure the best performance.

## 2.5 BRETON-series Diagrams

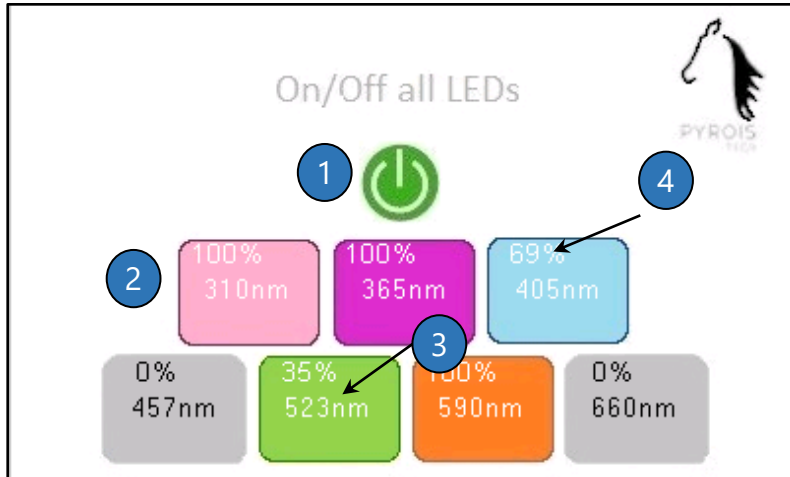
1	Switch (ON-OFF)
2	SMA 905 IN/OUT connectors
3	Touch screen
4	USB connector
5	Power input



## 2.6 Touch screen

The operation of the touch screen is explained in the manual with the model BRETON 12, but the operation for this equipment is analogous.

### 2.6.1 Initial screen



1	General ON/OFF button
2	LED identification box
3	LED wavelength
4	% of nominal $I_{OUT}$ operation

Figure 1. Initial screen

#### ➤ General ON/OFF button (1)

- If all the LEDs are **OFF**, the general ON/OFF button will be **OFF** (grey). By pressing it, the general button changes to the **ON** state (light green) and all the LEDs will be turned **ON** with the 100% of its power.
- If one or more LEDs are **ON**, whatever the output power, the general ON/OFF button will be **ON** (light green). By pressing it, the general button changes to the **OFF** state (grey) and all the LEDs will be turned **OFF**.

#### ➤ LEDs section

Each LED contained in the BRETON light source possesses a small box (2) in the initial screen with its wavelength (3) and the percentage of the nominal output current (4) from 0% to 100%.

If there are several LEDs that have the same wavelength, their current will be set to the same percentage. To adjust the current of each LED/LEDs with the same wavelength (see **Figure 2** on the [next page](#)), please touch the LED box.

### 2.6.2 Control of the output current of the LEDs

On the top left corner of the screen (1), see **Figure 2** on the [next page](#), the central wavelength of the LED is indicated. On the right, the percentage of the nominal output current of the LED can be adjusted from 0% to 100% with the following controls:

- **LED ON/OFF button (2):**
  - This button is **OFF** (grey) if the percentage is equal to 0%. By pressing it, it will change to the **ON** state (light green) and the output power will be set to 100%.
  - This button is **ON** (light green) if the percentage is higher than 0%. By pressing it, it will change to the **OFF** state (grey) and the output power will be set to 0%.

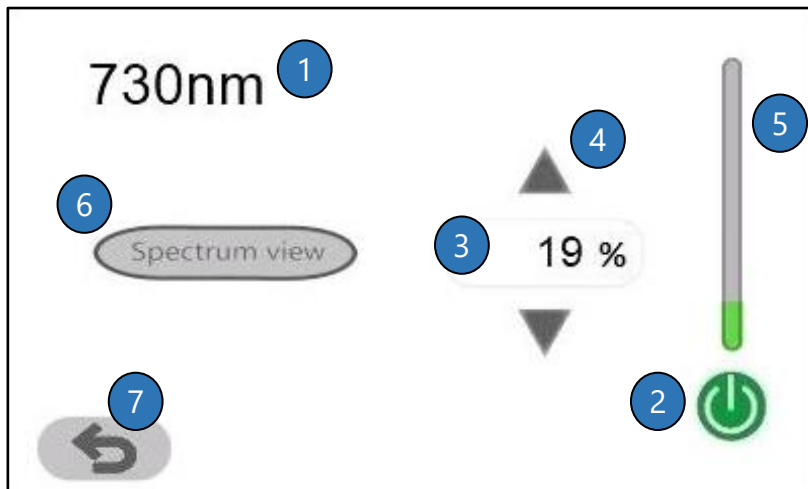


Figure 2. LED screen

1	LED wavelength
2	LED ON/OFF button
3	% of nominal $I_{OUT}$ operation
4	Arrows
5	Slide bar
6	Spectrum view button
7	Return arrow

- **Keypad (3)**: by clicking on the number, a keypad will appear (**Figure 3**). A percentage 0%-100% can be introduced by using it. You can erase a digit by pressing 'DEL'. Press 'OK' to confirm the percentage. If the value introduced is higher than 100%, it will be replaced by the previous valid percentage.

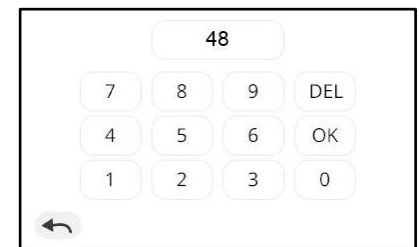


Figure 3. Keypad

- **Arrows (4)**: using the up/down arrows will increase/decrease the current percentage of the nominal output power by 1%.
- **Slide bar (5)**: it permits you to adjust the output power from 0% to 100%. Please press slightly on the right of the slide bar to control it. While dragging the slide bar, it will be in yellow, and it will change to green once a value has been selected.
- Clicking on "Spectrum view" (**6**), will show the spectral power distribution of the selected LED (see **Figure 4**).
- The arrow (**7**) at the bottom of the screen, enables to return to the initial screen.

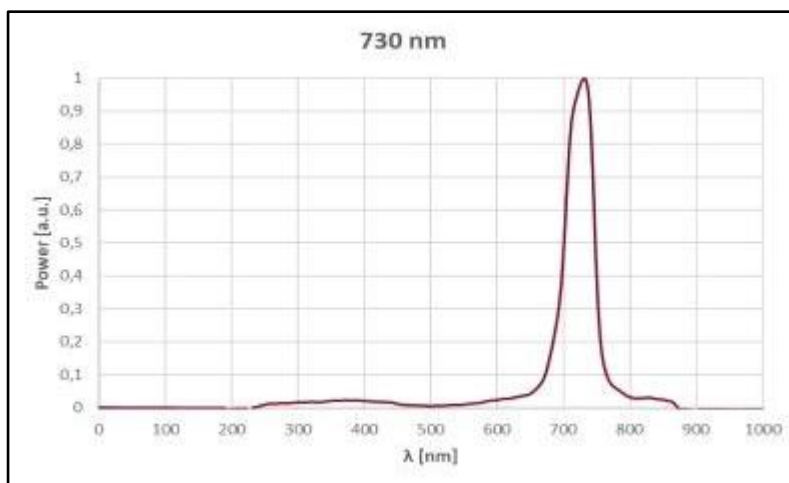


Figure 4. Spectrum view screen

The y axis is the output power of the LED in arbitrary units, where 1 corresponds to the maximum. The x axis is the wavelength in nm.

By pressing the screen, you will be returned to the LED screen (see **Figure 2**).

### 3. Important Notes

#### Before operation

- Do not remove or alter any installed safety device on this equipment. Doing so will cancel your warranty and create an unsafe operating environment.
- There are NO user serviceable parts inside. Dangerous currents are present in this device. Only allow qualified personnel to service this unit.
- Inspect this unit and its power supply before using it for the first time. Do not use the unit if it is damaged in any way. Contact us for repair or replacement information.

#### During operation

- Do not cover the source or obstruct the air flow for its refrigeration. Avoid exposure to direct sun light. A rise in the light source's temperature could affect its operation or even damage its components.
- The output connector of the light source may get hot during operation. After its employment, allow enough time to cool down before handling.
- The equipment should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the equipment should be observed to verify normal operation in the configuration in which it will be used.

#### Eye safety

- Optical radiation can damage your eyes. Do NOT stare directly at the light beam.



#### **CAUTION !**

Do NOT stare directly at the light beam

- Proper protective eyewear must be worn when using light sources that emit UV radiation. Avoid exposure to the beam. It is hazardous to skin and eyes ,and may cause cancer.



#### **WARNING ! UV LEDs**

Avoid eye and skin exposure to the emitted UV light

- Non visible infrared light, which can be hazardous depending on total system configuration (including, but not limited to optics, drive current and temperature). Observe safety precaution given in IEC 62471 when operating these light sources.

### Electromagnetic Compatibility

- Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of this equipment. Otherwise, degradation of the performance of this equipment could result.
- The use of cables, power supplies, transformers and accessories other than those specified by Pyroistech S.L., in addition to not being covered by the warranty, may lead to increased emissions and/or decreased electromagnetic compatibility.

## 4. Warranty

Pyroistech's general warranty for a product has a 1 year duration.

This warranty includes repairs and replacement of damaged parts due to a malfunction of the source, as long as said malfunction can be attributed to errors made in the manufacture of it by Pyroistech SL, not to a punctual misuse of the source or to a continued incorrect employment of it by the user, whether conscious or unconscious, due to not having followed the operation recommendations indicated by Pyroistech SL

There is the possibility of extending this guarantee. For more information, contact Pyroistech S.L.

## 5. Compliance

This device complies the following standards:



EMC 2014/30/EU  
RoHS-compliant



Federal  
Communications  
Commision

Contact Pyroistech S.L. if you require more information about the electromagnetic compatibility of the product.



WEEE  
Compliance

If you consider that the product has reached the end of its useful life and you want to dispose of it, you can contact Pyroistech S.L. so that it is in charge of its management.

<b>Version</b>	<b>Date</b>	<b>Description</b>
1.0	4 April 2023	First Document





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