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TECH

BRETON-series
User Manual

Fiber coupled
MultiLED light source
UV-VIS-NIR

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0. Introduction

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

BRETON is the broadband multiLED light source different peak wavelengths in the UV-VIS-NIR range. The current through each LED can be controlled with 1% precision through a touch screen or a USB connection to the computer.

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, compact and silent tool, being ideal for fluorescence, spectroscopy and general fiber illumination applications.

1. Technical Specifications

General characteristics

- Several peak wavelengths in the 400 - 800 nm range
- Fast stabilization time (1 min)
- 1% precision current control through touch screen or USB
- SMA output connector
- Stable throughout the working spectral range
- Compact size (15.2 x 15.2 x 13.5 cm)
- Ventilation system: fan
- Quality materials for a long life

Available models

- **BRETON 12**: 12 LEDs with 6 peak wavelengths: violet (400 nm), blue (3x450 nm), green (525 nm), amber (590 nm), deep red (4x665 nm), far red (2x730 nm)

- **BRETON 7**: 7 LEDs with 6 peak wavelengths: blue (450 nm), cyan (500 nm), green (520 nm), lime (2x540 nm), amber (590 nm), red (623 nm)

- **BRETON 4**: 12 LEDs with 4 peak wavelengths: blue (3x450 nm), green (3x520 nm), red (3x623 nm), white (3x6500 K)
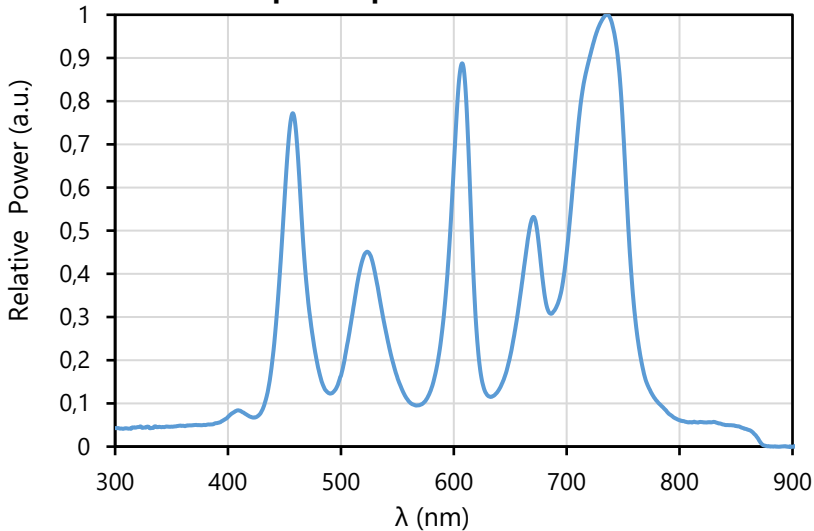
Optical characteristics Model BRETON 12 [1]

λ (nm)		Nº of LEDs	Power (mW) Ø 1 mm, NA 0.5	Power (mW) Ø 1.5 mm, NA 0.5
	400	1	1.25	3.47
	450	3	8.49	22.15
	525	1	2.10	4.27
	590	1	1.99	4.85
	665	4	6.50	18.68
	730	2	6.22	13.89

(1) Typical configuration of LEDs. Power measured with a Si photodiode (OPHIR™)

Spectra Model BRETON 12

Total spectral power distribution [2]

Spectral power distribution [3]

(2) Normalised spectrum measured with a spectrometer with all the LEDs at their maximum current
(3) Normalised spectrum of each of the LEDs contained in the BRETON 12 multiLED light source.
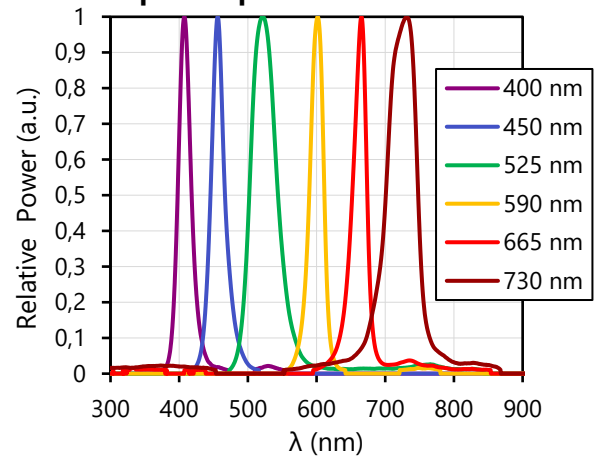
Electrical characteristics

Power input	V_{IN}	12 V
	I_{IN}	3 A max
	Connector type	DC female 2.1mm

Other characteristics

Output connector	SMA 905
Working T	<50 ºC
Humidity	< 80% RH
Cooling	Fan
Stabilization time	1 min typ.
Size	152x152x135 mm
Weight	1 kg

2. Operation

2.1 Package Content

• Requested BRETON light source

• 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** 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 and connect the fiber cable. Always do this step before turning on the light source. Connect the source 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** if more information related to this issue is needed.

2.4 Maintenance

The output connector of the light source 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 being used. The connector of the fiber used with the light source also has to be clean to ensure the best possible performance.

![PYROIS TECH logo]

2.5 BRETON-series Diagrams

1	**Switch** (ON-OFF)
2	**SMA 905 output connector**
3	Touch screen
4	USB connector
5	Power input

Front view

Side view

2.6 Touch screen

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

2.6.1 Initial screen

1	General ON/OFF button
2	LED rectangle
3	LED wavelength
4	% of nominal I_{OUT}

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**. A single LED can be turned OFF by keeping its rectangle (**2**) pressed several seconds.

➢ **LEDs section**

Each LED contained in the BRETON light source possesses a small rectangle (**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 rectangle.

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%.
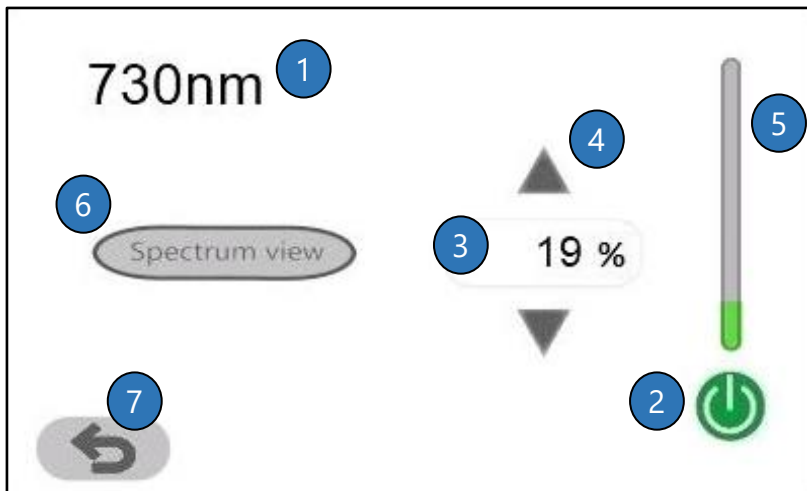
Figure 2. LED screen

1	LED wavelength
2	LED ON/OFF button
3	% of nominal I_{OUT}
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.
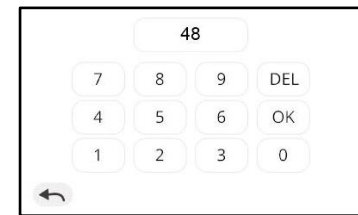

Figure 3. Keypad

- 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.

On the bottom of the screen, if we click on "Spectrum view" (**6**), we will see the spectral power distribution of the corresponding LED (see **Figure 4**). The arrow (**7**) enables to return to the initial screen.
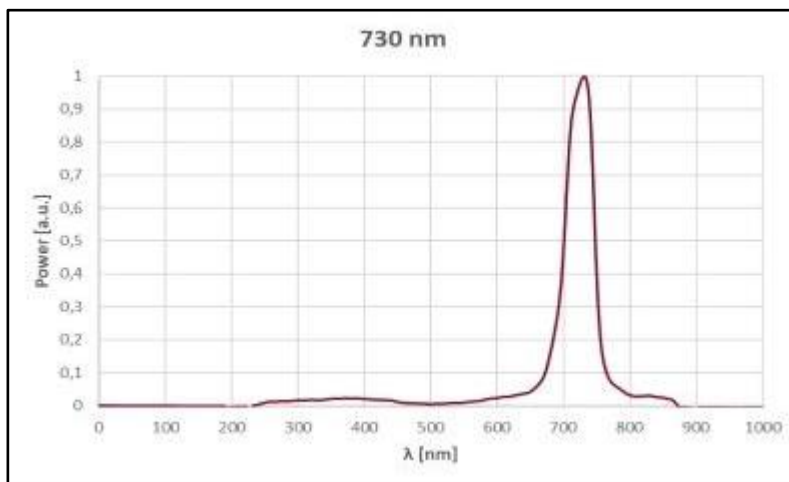

Figure 4. Spectrum view screen

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**).

2.7 USB connection

The aim of the USB connection is to allow the user to control the output current of each LED through the computer. This option permits to remotely command the source through a VPN connection, for instance; avoiding the inconvenience of physically going to the laboratory to check or adjust the equipment. An app is provided (contact us through **info@pyroistech.com** for more information) for this purpose.

2.7.1 App: Connection

Initially, only the buttons "UPDATE" and "CONNECT" are available. In order to effectively connect the BRETON light source to the computer, these steps must be followed:

- Click on the "UPDATE" button (**1**) to update the list of ports used by the devices connected to the computer.
- Select on the drop-down menu (**2**) to the right of the "UPDATE" button the port that corresponds to the BRETON multiLED light source.
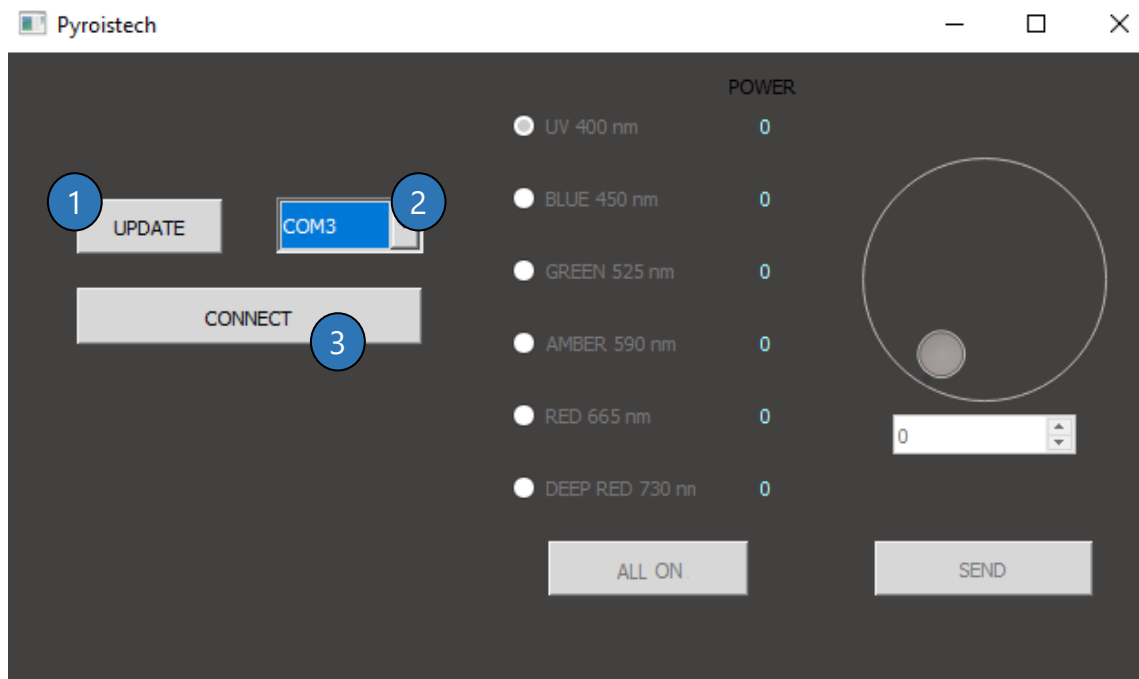- Click on the "CONNECT" button (**3**).

Figure 5. Main window of the app. Connection.

2.6.2 App: Control

Once the connection has been made, the rest of the menu, that enables to control the current through each LED, will be active. The connection between the computer and the BRETON light source can be closed at any time by clicking on "DISCONNECT" (**4**).

- In the LEDs list (**5**), each wavelength can be selected by clicking on the button located at its left.

- Once one wavelength has been selected, the current through the corresponding LED or LEDs can be varied from 0 to 100% of its nominal value by using the wheel (**6**), the arrows (**7**) or by directly introducing the desired value (**8**).

- After each change, the button "SEND" (**9**) has to be pressed to update the new value of the current of the corresponding LED in the BRETON light source. The selected percentage can be seen on the right of the LEDs list (**5**).

- All the LEDs can be turned ON with their maximum current by pressing the "ALL ON" button (**10**). If the button is clicked, it will change to "ALL OFF", enabling to turn off all the LEDs at the same time.
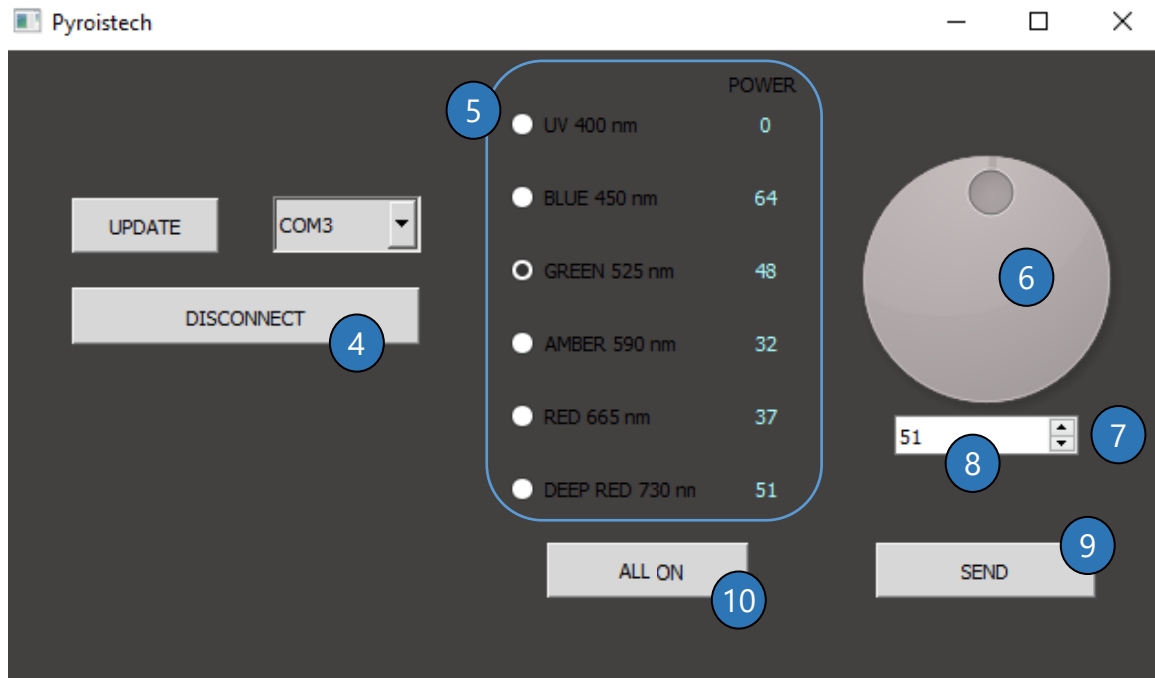

Figure 6. Main window of the app. Control.

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.

<u>Electromagnetic Compatibility</u>

• 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.

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.

WEEE
Compliance

Version	Date	Description
1.0	5th August 2021	First Document

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