PYROIS TECH

MUSTANG

Optical Interrogator

Nº serie: MT011021

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Disclaimer

Índice

0. Introduction

Thank you for purchasing the MUSTANG optical interrogator developed by Pyroistech S.L. This document describes the equipment and provides you with instructions for its correct operation. Feel free to contact us at **info@pyroistech.com** if you have any questions or concerns about this manual.

The equipment integrates an SLD light source, an optical circulator and a spectrometer to measure the power reflected by the sensor connected to the output of the device. The equipment also has a processor in charge of managing both the light source and the spectrometer as well as the graphical interface. The end user can connect a screen, a keyboard, a mouse and a USB memory to the equipment, as well as the desired sensor to the FC / APC output of the device and have the values measured by the spectrometer through the software.

1. Package content

The shipment contains the following items:

• MUSTANG Optical interrogator
• Power source
• Power cord
• Keyboard and mouse
• User manual

Carefully inspect the device and other items in the shipment and make sure there is no damage. Otherwise, do not use the equipment and contact us through **info@pyroistech.com** for information on repair or replacement.

2. Operation

2.1 Blocks diagram
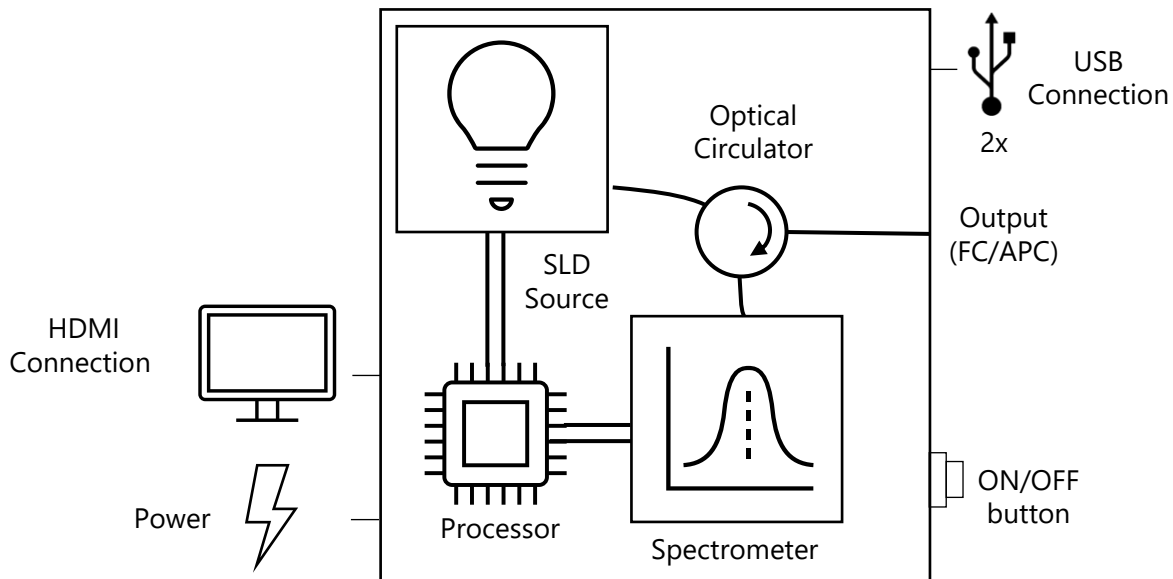
2.2 Instructions for use

Insert the power cord plug into the power source and connect the power cord to the outlet. Then insert the plug of the power source into the device's power connector (female type DC connector).

Insert the screen's HDMI connector into the device's HDMI input, as well as the provided keyboard and mouse into a USB connection.

Unscrew the protective cap from the FC/APC connector on the front face of the device and connect the fiber. Then press the button on the front of the device and wait a few seconds for the button indicator light to come on. The Pyrometer Spectroscopy Software program will launch on the screen. If you want to save files, connect a USB memory to the device.

IMPORTANT: To turn off the device, click on the off button on the screen, **wait at least 10 seconds**, and then press the same button used to turn on the device. **Wait at least another 10 seconds** before unplugging the power cord or turning the device on again.

If the device hangs, it is recommended to try turning the device off and on. If the blockage persists, repeat the same steps but also disconnecting the power.

2.3 Maintenance

The output connector of the device should be periodically cleaned using compressed air to remove dust. It is recommended to have the output connector with the dust cap on whenever the device is not in use. The fiber connector that connects to the output of the device must also be clean to ensure the best possible performance of the equipment.

2.4 Device parts

<u>Front face</u>
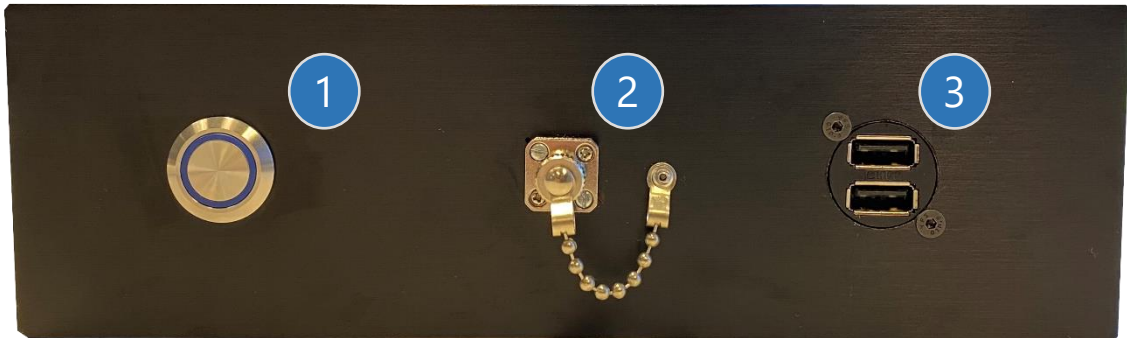
1. **ON/OFF button**: pressing the button turns the device on and starts the program. Similarly, it can be pressed again in order to turn off the device, having to wait 10 seconds before disconnecting the power or turning it on again.

2. **FC/APC output connector**: device optical fiber output

3. **USB connectors**: connectors for USB communication with the device, where the screen and the mouse are connected.

<u>Rear face</u>
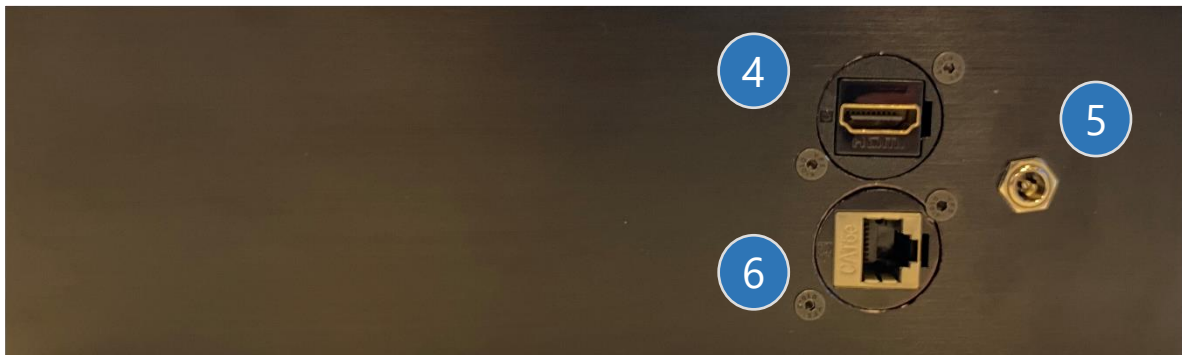
4. **HDMI female connector**: connector for connection with the screen.

5. **Female DC power connector**

6. **RJ45 female connector**: connector for ethernet communication with the device, it is currently disabled.

2.5 Pyrometer Spectroscopy Software

<u>2.5.1 Screen description</u>

1. Spectrometer control area

2. SLD control area

3. Chart control area

4. Chart

5. Off button: closes the application. Once closed, the device must be switched off with the button located on the front face.

Areas 1-3 are described in detail below
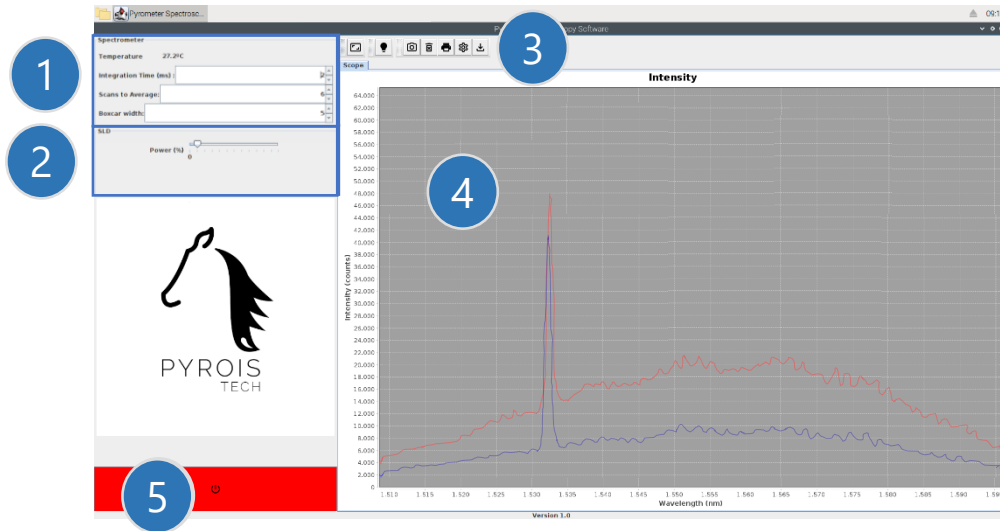
1. Spectrometer control area
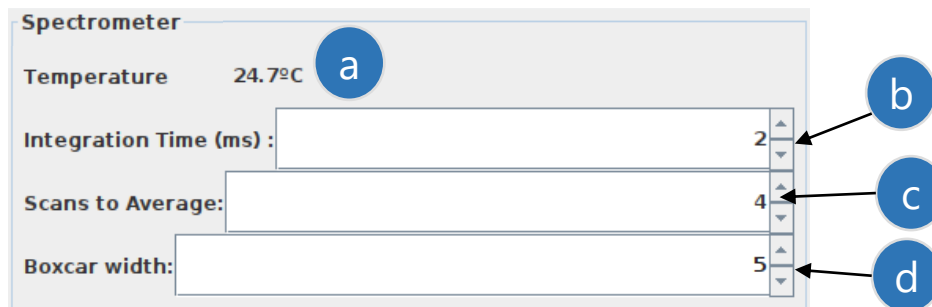
To modify the value of the parameters, the arrows can be used and the change will be made automatically, or a value can be entered with the keyboard. In the latter case, it is necessary to press enter for the change to be effective.

a) **Temperature:** spectrometer temperature in degrees Celsius (ºC).

b) **Integration Time (ms):** integration time of the spectrometer in ms. It can take a value between 1 and 65.536 ms.

c) **Scans to average:** number of spectra that are averaged.

d) **Boxcar width:** filter parameter. It can take odd values between 1 and 15. If an even value is entered, the program will replace it with the odd number immediately above it. If a value greater than 15 is entered, the value sent to the spectrometer will be 15.

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2. SLD control area
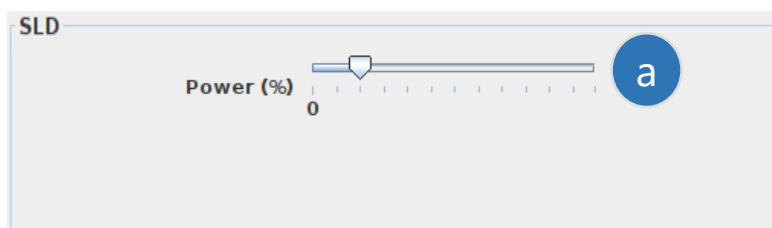
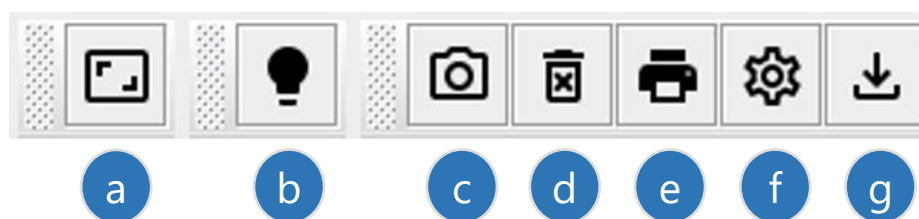a) **Slider:** control of the power of the SLD by means of a slider that allows selecting between 13 fixed positions, where the first corresponds to the SLD in off state and the last to the SLD in on state at 100%.

Note: The SLD is in ACC mode (Automatic Current Control).

3. Chart control area

a) **Full screen**: resets the y-axis between 0 and 65.536. To zoom, place the cursor on the graph and draw a rectangle over the area to be enlarged.

b) **Black spectrum:** enables/disables the black spectrum subtraction. When activated, the current spectrum is saved as the black spectrum and the button is highlighted in blue. Once the black spectrum is acquired, the spectrum displayed on the screen corresponds to the difference between the measured spectrum and the black spectrum.

c) **Capture spectrum**: freezes the current spectrum on the graph in blue.

d) **Remove capture:** removes the spectrum frozen with 'Capture spectrum'.

e) **Configure data acquisition**: opens the menu in which you configure the directory in which the spectra data are saved, the name of the files generated, as well as the frequency with which they are saved. For more details, see section 2.5.2 Spectra acquisition.

f) **Start/End data acquisition**: starts/ends the process of saving the data. When data acquisition is activated, the button will remain blue.

2.5.2 Spectra acquisition

To configure the spectra acquisition, press the button ⚙

The following menu will open:
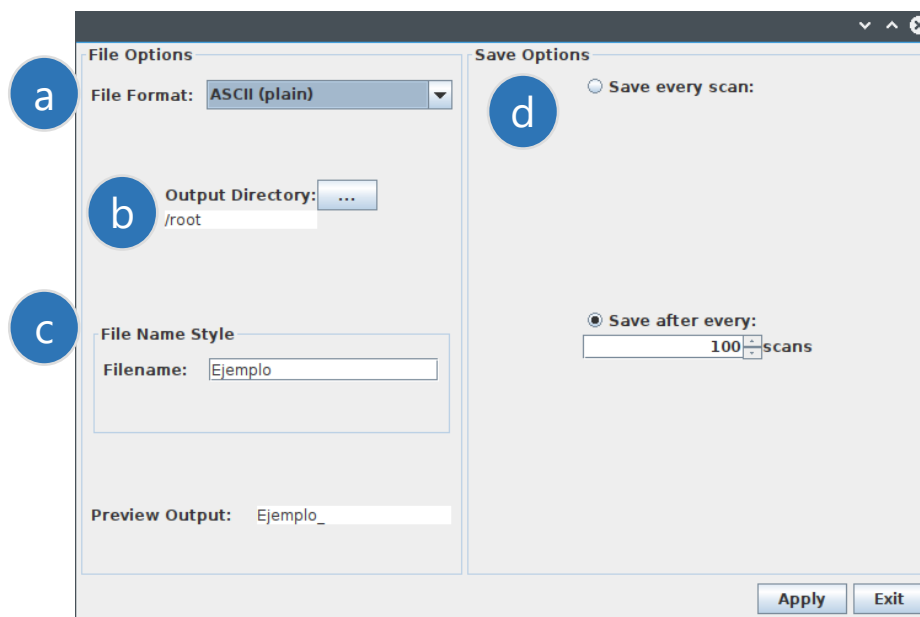
a) **File format**: ASCII without header ('ASCII (plain)') or ASCII with header ('ASCII (with header data)'). Each spectrum is saved in a .txt file. The header includes the date and time, user, device identity, spectrometer settings, graph units, start and end wavelengths (see example on next page).

b) **Output Directory**: enables to select the directory in which the spectra are saved. By default, when you click on [...] , the /home/pi directory will open, from where you can access the desktop ('Desktop' folder) or the 'USBs' folder. In the 'USBs' folder, folders will appear with the names of the USBs that are connected to the device (see example on the next page). The selected directory must be /home/pi, the desktop or the inserted USB.

c) **Filename**: enter the name you want for the files in which the spectra are saved, and press enter. The name entered must appear in 'Preview Output'. The full name with which each of the spectra is saved will be this name plus the timestamp (date plus time including min, s and ms).

d) **Save Options**: There is the option of saving each one of the spectra ('Save every scan') or saving one every certain number of spectra ('Save after every:'). If the latter option is selected, enter the desired number and press enter.

Once all the menu options have been configured, click on 'Apply' and then on 'Exit' or on the cross in the upper right corner to close the menu.

To start the spectra acquisition, press the button 📥

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Directory selection: when selecting the USBs folder, a folder appears with the name of the connected USB

Complete name

Timestamp

Ejemplo_2021-09-29 11-05-12-000512.txt - Mousepad

Archivo Editar Búsqueda Ver Documento Ayuda

```
time: 2021-10-06 09-04-10-000707
user: root
device_id: JETI_VersaPIC_RU60
integration_time: 2
scans_average: 6
boxcar_width: 5
npixels: 512
xunits: nm
yunits: counts
xfirst: 1508.5814289488635
xlast: 1596.0128132793227
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<Data begin>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
1508.5814289488635  58.333333333333336
1508.7864136849253  89.66666666666666
1508.9912602771378  148.5
1509.1959687681751  192.83333333333331
1509.4005392005263  237.5
1509.6049716164978  278.16666666666663
1509.8092660582138  301.33333333333337
1510.0134225676172  321.3333333333333
1510.2174411864692  369.50000000000006
1510.4213219563537  417.5
1510.6250649186738  465.6666666666667
1510.9286701111657  511.22222222222222
```

Header

Data
1st column: wavelengths
2nd column: intensity (counts)

Example spectrum saved in .txt file

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11

2.5.3 Other aspects about the software

In the upper bar you can find the tabs of all the windows that are currently open, which is useful if any of them have been minimized. In the upper left corner is located the file manager icon, which allows access to the /home/pi directory
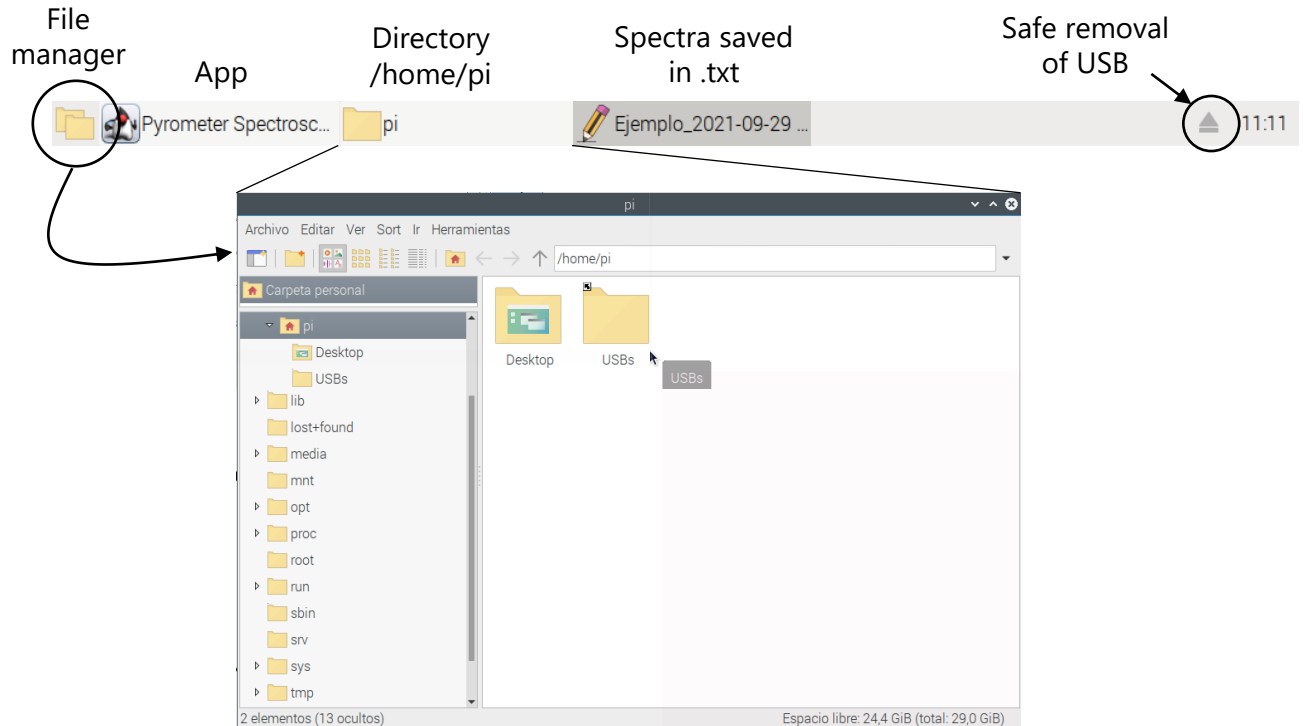
On the desktop you will find the application icon, the connected USBs and the bin.
If you want to open the application, double click on the icon and click on 'Run' in the menu that opens. Do not open the application if it is already open because an error will occur.
Regularly empty the recycle bin to prevent deleted files from saturating the processor memory.
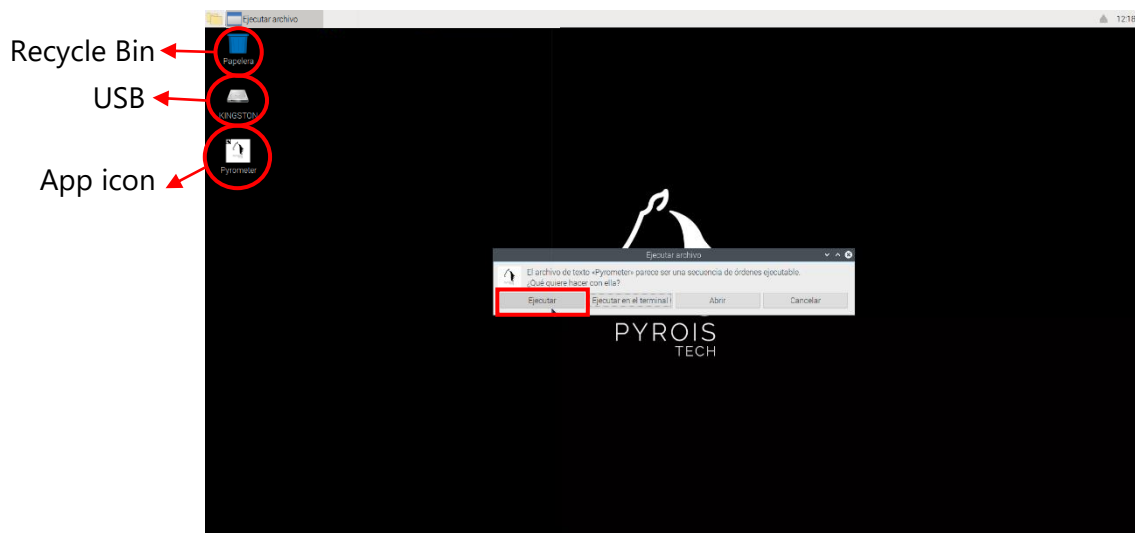
3. Important Notes

<u>Before operation</u>

• Please read carefully all the manual if you are using the equipment for the first time.

• 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.

<u>During operation</u>

• Do not cover the equipment. Avoid exposure to direct sun light. A rise in the light source's temperature could affect its operation or even damage its components.

• 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.

<u>Eye safety</u>

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

CAUTION !
Do NOT stare directly
at the light beam

• The equipment emits infrared light, not visible to the human eye, which can be dangerous depending on the mounting configuration (including, but not limited to, optics, current, and temperature). Follow the safety recommendations given in IEC 62471 when working with 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
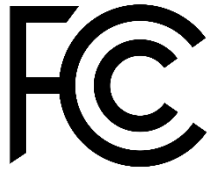
There is the possibility of extending this guarantee. For more information, contact Pyroistech S.L

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	1 December 2021	First Document

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