WE LASER
THE NEW INDUSTRY

FYLA ARCHE SERIES

User Manual

v00

2025

FYLA LASER SL

Ronda Guglielmo Marconi, 14

Parque Tecnológico Paterna

(46980), Valencia (Spain)

support@fyla.com

WARNING_____

USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

_____

IMPORTANT_____

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CONTENTS

GENERAL INFORMATION

Introduction

All the instructions in this User Manual must be followed before installation and operation. Damage to persons, material or **laser system** can be produced from not following the steps and indications of this Manual.

FYLA cannot be held responsible for any damages which results from using or working with the system described below. The laser must be only used by qualified personnel after reading this manual carefully.

Important Indicators

WARNING_____

CONTAINS SECURITY INSTRUCTIONS. NOT FOLLOWING THEM MAY RESULT IN IRREVERSIBLE DAMAGE.

_____

IMPORTANT_____

Contains important information.

_____

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fyla@fyla.com

Warranty

FYLA LASER S.L., standard warranty guarantees its lasers to be free of defects for one year from the date of shipment but could be extended. Detailed information regarding the warranty for our products can be obtained through our sales team. Please consult with them the specific terms and conditions that apply to your purchase. This warranty is in lieu of all other guarantees, expressed or implied, and does not cover incidental or consequential loss. Damaged caused by the user to the laser and/or its accessories because of misuse (voluntary or accidental) of the equipment, will void the warranty.

Information in this document is subject to change without notice.

All the information and technology aspects described within this manual are covered under the patent EU international code PCT/ES2014/070382

IMPORTANT_____

Save the shipping container and packing material for future shipping needs and keep the guarantee of your laser unit.

_____

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Laser Specifications

FYLA ARCHE SERIES SPECIFICATIONS*	
Central wavelength	1550 ± 5 nm
Spectral bandwidth	> 15 nm
Repetition rate	65 ± 2 MHz
Average output power	~ 25 mW
Pulse width	≤ 250 fs
Polarization	Linearly polarized
Output port	Single mode fibre. 0.30 m length (customizable)
Optical output	FC/APC connector
Synchronization / Connections	Optical signal (FC/APC patchcord), optical reference (FC/APC connector) and USB port
Pulse energy	300 - 600 pJ
Peak power	1 - 3 kW
Spatial mode quality (M^2)	< 1.2
Cooling	Air cooling
Power requirements	110 – 220 V, 50/60 Hz
Power requirements tolerance	± 10 %
Operating temperature	20 – 30 ºC
Storage temperature	0 – 60 ºC
Dimensions	200 x 120 x 53 mm (WxDxH)
Control	Only using UI via USB

*Specifications are subject to change without notice

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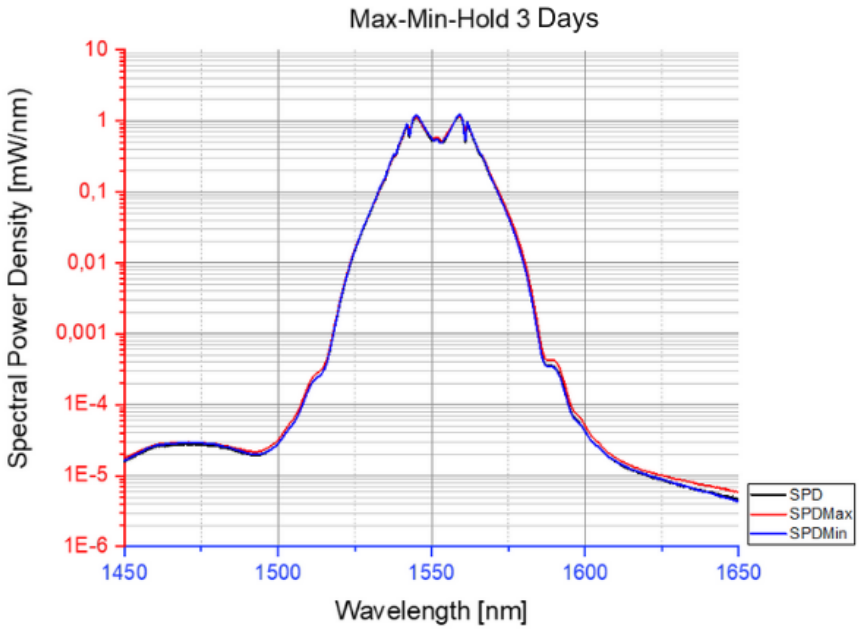
Arche

/ Additional information

Warranty:

12 months warranty or > 10,000h of continuous operation.



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Description of the laser system and its use

The acquired equipment, FYLA ARCHE series femtosecond laser, is a sealed laser product (Class 3B). Its purpose is to generate a high repetition rate (MHz range), and ultra-short pulse laser signal (femtosecond range). It can be operated remotely only via a PC with a standard serial connection. It can be coupled with other instruments/equipment allowing optical trigger output for synchronous measures.

FYLA ARCHE series is addressed mainly for research, laser telecommunication links, nonlinear optical applications, amplifier seeding and RF signal generation. It may also be used as a component by other manufacturers. FYLA ARCHE series assembly, adjustment, etc., are done by FYLA during manufacturing. The user, under no circumstances, will perform adjustments, realignments, repairs, component substitutions, etc. Any defect or failure will be reported to FYLA and the repair will be carried out at FYLA facilities.

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USER SAFETY

Introduction

Your safe and effective use of this product is of utmost importance to us at FYLA.

The product is safe within the following conditions according to electrical safety standards:

- Temperature range of 5 to 40 ºC.
- Overvoltage category: II
- Temporary overvoltage that occurs in the electric power network
- Relative humidity: max. 80% for temperatures until 31ºC.
- Altitude: < 2000m
- Pollution degree: 2

Please read the following laser safety information before attempting to operate the laser.

Laser Safety

The company FYLA LASER, S.L. has characterized the power that the ARCHE series laser emit.

Since the infrared wavelengths are damaging for both, eyes and skin, the class assigned to the products will be class 3B.

In all cases, the accessible emission, AE, exceeds the maximum permissible emission, MPE, the radiation limit that the tissue of the eye can withstand without suffering any damage. The excess of MPE is in all cases greater than unity; therefore, users must take protective measures to use the laser.

Nominal ocular hazard distance, NOHD, is defined as the distance from the output aperture beyond which the beam irradiance or radiant exposure remains below the appropriate corneal maximum permissible exposure (MPE).

If protective goggles are not found on the market for the working wavelengths, collective measures (enclosures) and administrative measures (working procedures) should be applied to properly ensure operator safety.

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WARNING_____

THE LASER RADIATION EMITTED FROM THIS UNIT MAY BE HARMFUL. ALWAYS FOLLOW THESE PRECAUTIONS:

- ALWAYS WEAR PROTECTIVE GOGGLES OR EYEGLASSES APPROPRIATE FOR WORKING WITH CLASS 3R LASER LIGHT.
- AVOID DIRECT EXPOSURE TO THE BEAM.
- AVOID LOOKING AT THE BEAM DIRECTLY.
- BE AWARE OF THE WARNINGS ON THE SAFETY LABELS STUCK ON THE EQUIPMENT.
- DO NOT OPEN THE LASER SYSTEM. THERE ARE NO USER-SERVICEABLE PARTS INSIDE THE UNIT.
- THE USER WILL NEVER NEED TO OPEN THE LASER SYSTEM. UNAUTHORISED OPENING OF THE LASER WILL VOID THE WARRANTY AND MAY RESULT IN UNDERPERFORMANCE OF THE LASER AND/OR IRREPARABLE DAMAGE TO THE INTERNAL COMPONENTS.

_____

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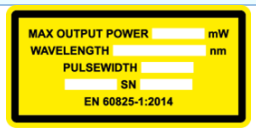
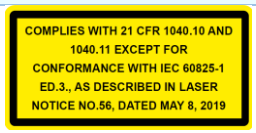
Labels and symbols identification

The following table explains the meaning of the different labels sticked to the laser equipment and the reference number to identify them in the following pictures. Please be aware of them and use caution when working with the laser. Please use the same labels to properly indicate the area where the laser product is used.

Labels	Explanation	Number
	Radiation warning	2
	Caution, possible risk	5
	Laser output	1
	Laser characteristics	3
	Explanation on laser radiation class and how to avoid damage	4
	Performance standard label	*

* Only used with equipment to be sent to EEUU.

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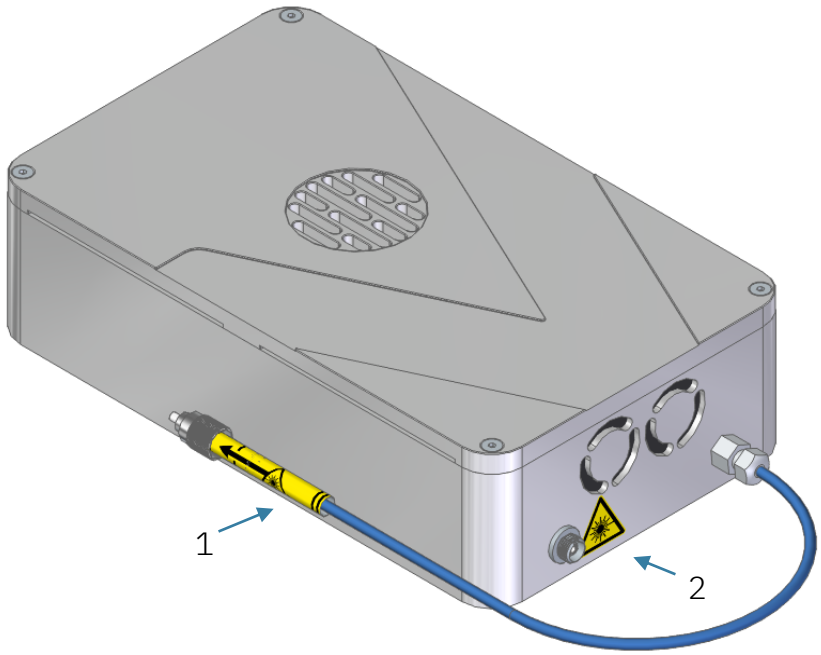

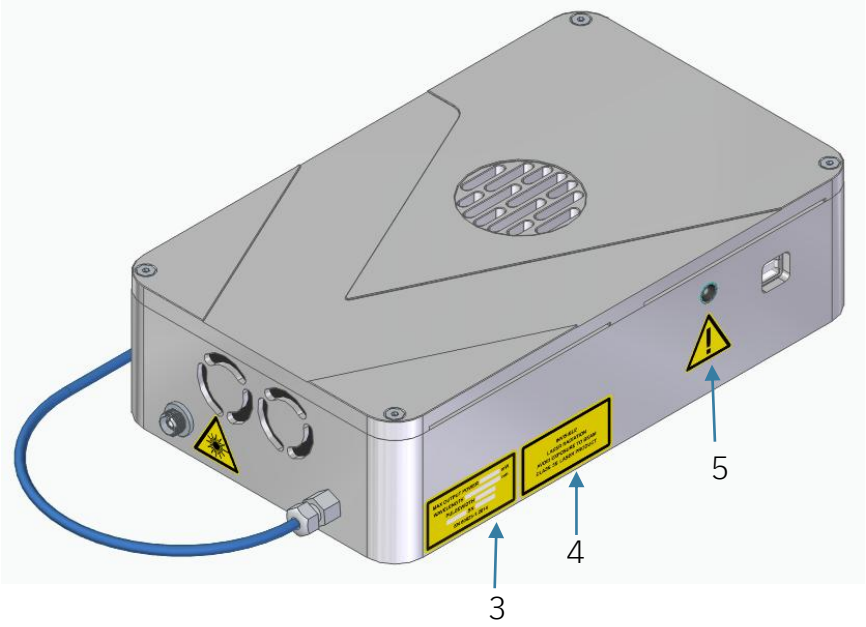

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Certification Standards

FYLA LASER, S.L declares that the device described below, due to its design and construction, as well as its manufacturing method, complies with the essential requirements of the applicable Directives, as well as the harmonized European standards of safety of laser products

Name of the series device:	ARCHE
Type:	Femtosecond Laser Source
CE Directives applied:	Directive on Electromagnetic Compatibility (2014/30/EU) Directive on Low Voltage (2014/35/EU) RoHS (2011/65/EU)
Harmonized Norms applied:	Safety of Laser Products EN 60825-1:2014

CE

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QUICK START

Unpacking the System

Carefully unpack the laser system and place it in horizontal position so that the laser system is supported on its rubber legs. Compare the contents against the list below and inspect them for any signs of damage. If parts are missing or you notice any signs of damage, please contact FYLA immediately.

IMPORTANT_____

Save the shipping container and packing material for future shipping needs and to keep the guarantee of your laser unit.

_____

IMPORTANT_____

To carry the laser system from one place to another make sure that the position remains horizontal at each moment.

_____

WARNING_____

DO NOT OPEN THE LASER SYSTEM. THERE ARE NO USER-SERVICEABLE PARTS INSIDE THE UNIT.

_____

WARNING_____

THE USER WILL NEVER NEED TO OPEN THE LASER SYSTEM. UNAUTHORISED OPENING OF THE LASER WILL VOID THE WARRANTY AND MAY RESULT IN UNDERPERFORMANCE OF THE LASER AND/OR IRREPARABLE DAMAGE TO THE INTERNAL COMPONENTS.

_____

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WARNING_____

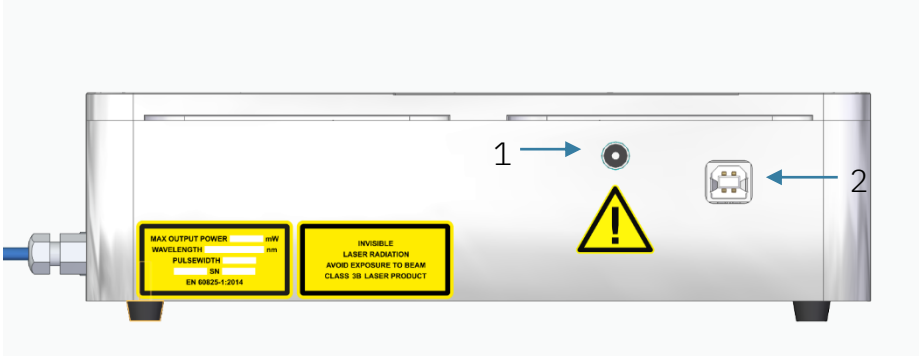
IF THE WARRANTY STICKERS OF THE EQUIPMENT SHOW SIGNS OF HAVING BEEN REMOVED OR DAMAGED IN ANY WAY, THIS WILL VOID THE WARRANTY

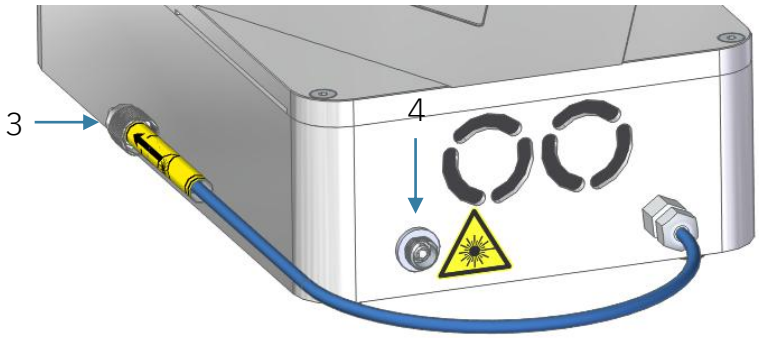
_____

Items within a FYLA ARCHE unit package:

- In-fiber laser unit and packaging box
- Power Supply
- USB A-B Cable
- Specifications inspection sheet

System parts





1. FEMALE POWER SUPPLY INPUT
2. USB B INPUT
3. FC/PC LASER OUTPUT
4. FC/PC OPTICAL REFERENCE CONNECTOR

Before installing the laser, please follow the next indications to select an appropriate location of operation:

WARNING_____

AVOID LOCATIONS WHERE THE LASER IS EXPOSED TO EXTREME TEMPERATURES AND HIGH HUMIDITY.

_____

WARNING_____

AVOID LOCATIONS WHERE THE LASER IS EXPOSED TO MECHANICAL VIBRATIONS.

_____

IMPORTANT_____

The product is designed to work properly in the temperature range of 20 °C to 30 °C. The humidity must not exceed 50%. Please select a location according to these specifications.

_____

Setting up

The laser is configured at the factory for the line voltage and frequency appropriate for your country. If you are unsure how your unit is configured please contact FYLA through sales@fyla.com or support@fyla.com.

Unpack the system

1. Make sure that all the safety measures (pages 6 – 10) are met.
2. Place the laser on a stable surface in horizontal position.
3. Remove the output protection and point the laser head of the fiber in a safe direction.
4. Connect the Power Supply male connector to the lateral female power supply input.

To start operating the laser move on to the next section.

Operation

WARNING_____

THE LASER RADIATION EMITTED FROM THIS UNIT MAY BE HARMFUL. PLEASE FOLLOW ALL THE SAFETY INSTRUCTIONS INDICATED IN THE SAFETY SECTION BEFORE OPERATING THE LASER.

_____

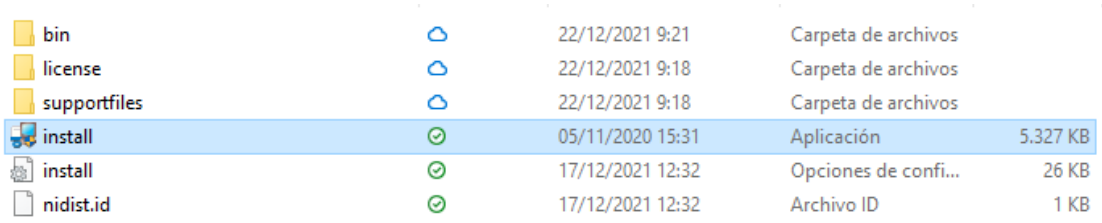
USING THE FYLA ARCHE

Software ON/OFF Switching

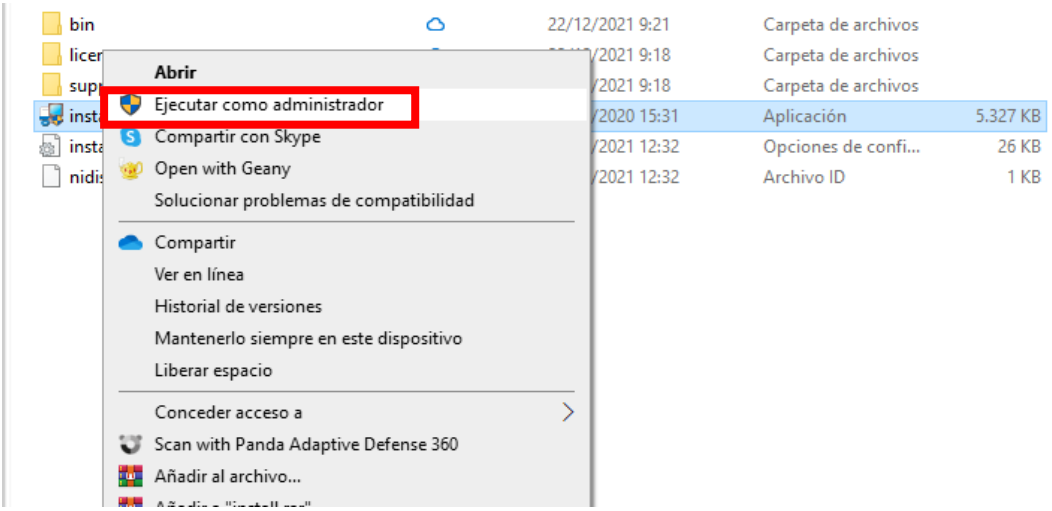
The FYLA ARCHE series laser can be controlled using the FYLA LASER's User Interface (UI) software. All laser functions can be controlled by the computer. The permanent communication between UI software and the laser provides you with real-time information.

To achieve correct communication between software and laser please follow the next steps:

1. Start Windows 7 or higher version.
2. Download the file sent by FYLA and copy the folder to your desktop.
3. Open "FYLA LASER - ARCHE\My Installer\Volume" folder.
4. Click once with left button over "install".

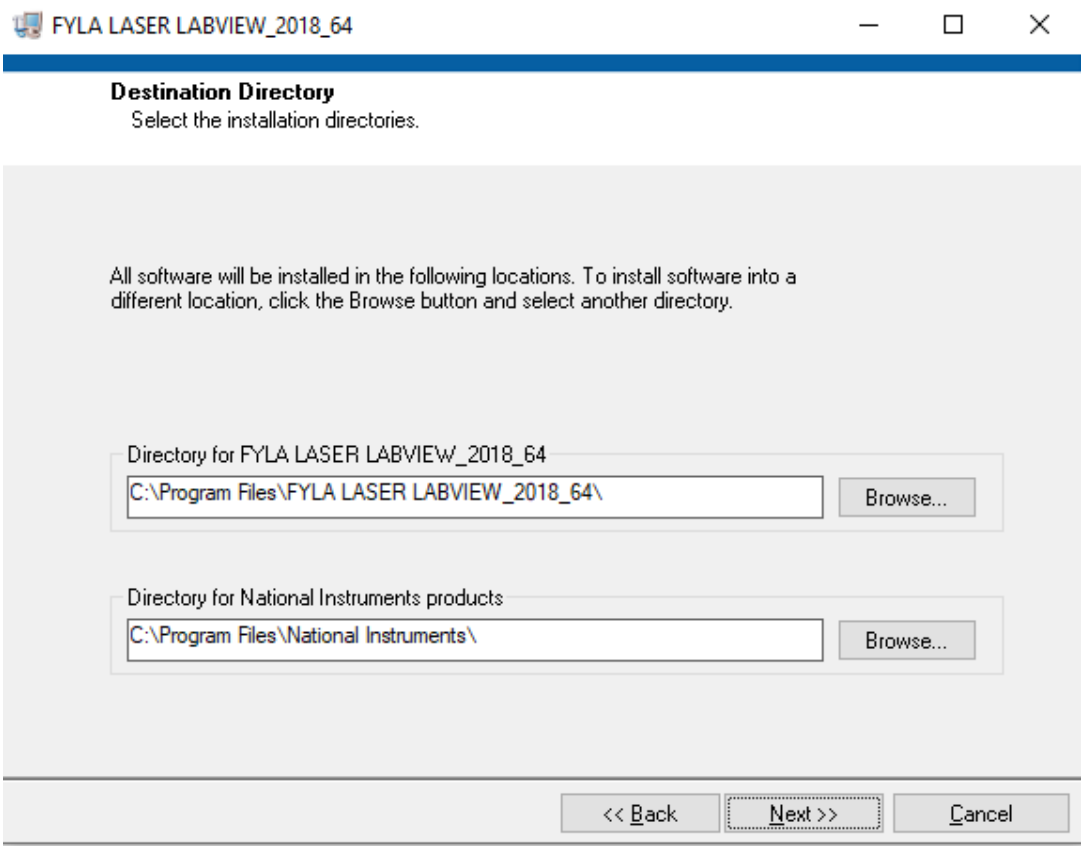


5. Click once with right button over "install" and the following submenu (see figure bellow) will appear. Click "Run as administrator" (marked in red bellow).

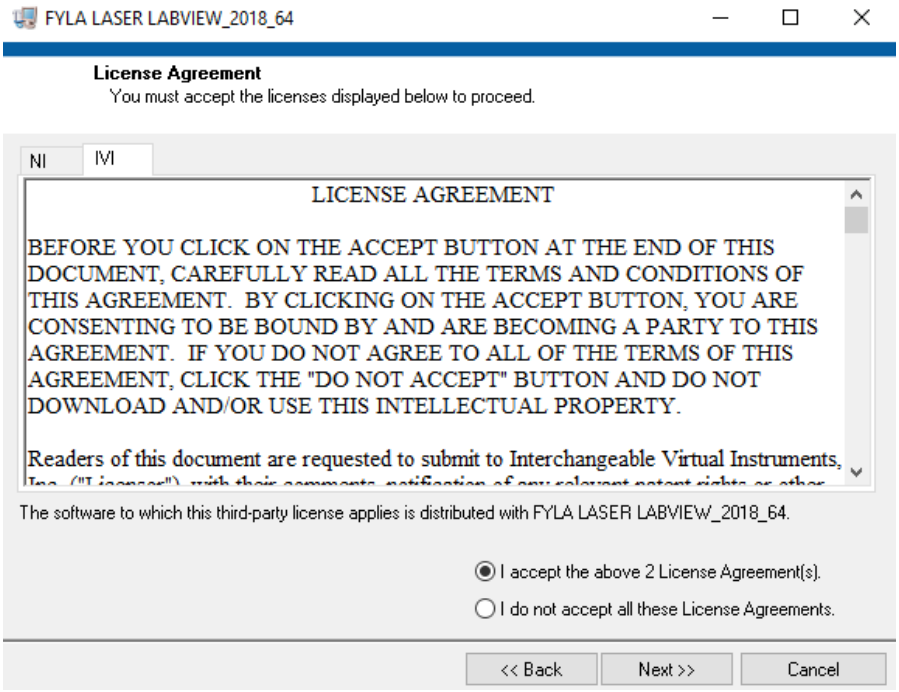


6. After that, it will appear a window. You will have to click the left option (where it says: YES).

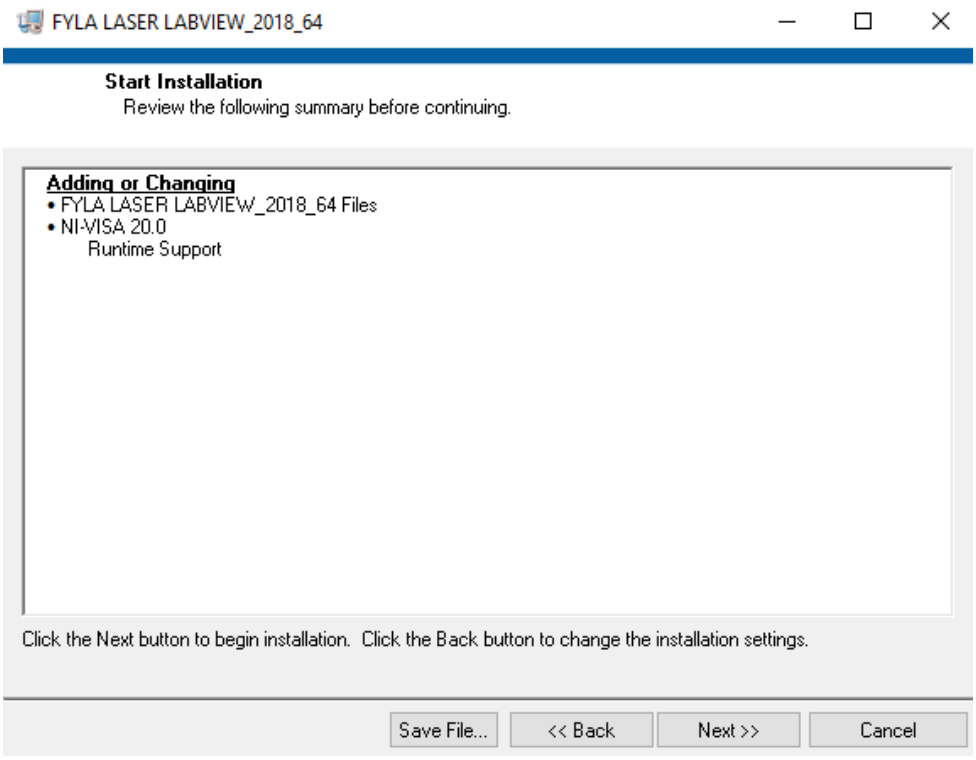
7. Then, select the destination directory and press “Next>>”



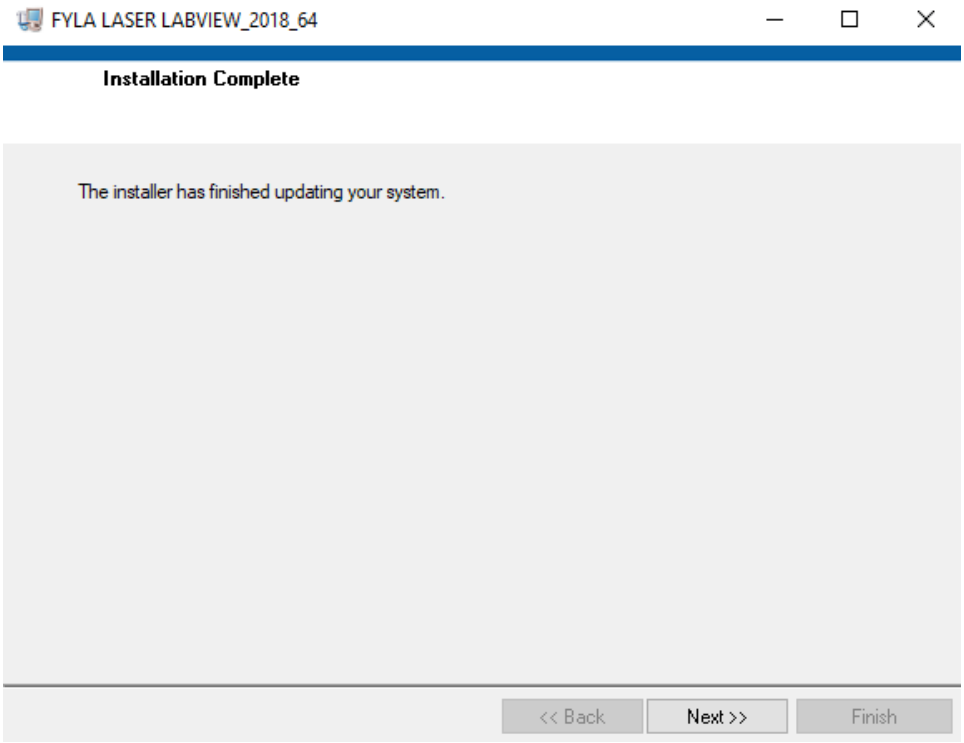
8. You will have to accept and click “Next”.



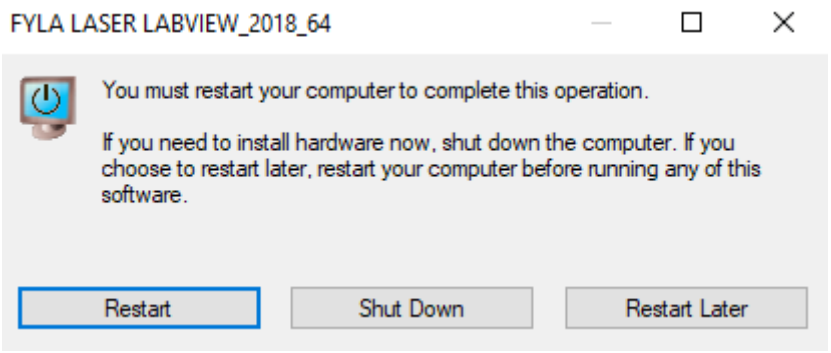
9. The installer window will look like this figure. Click “Next.



10. Finally, click “Next”.

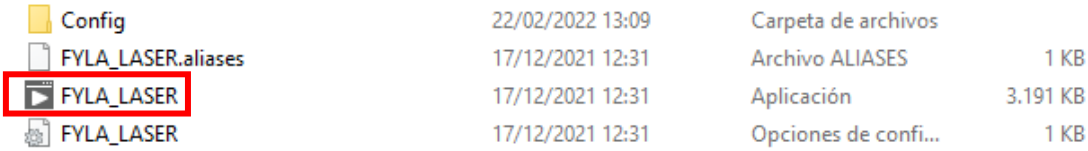


11. Choose one of the options below:



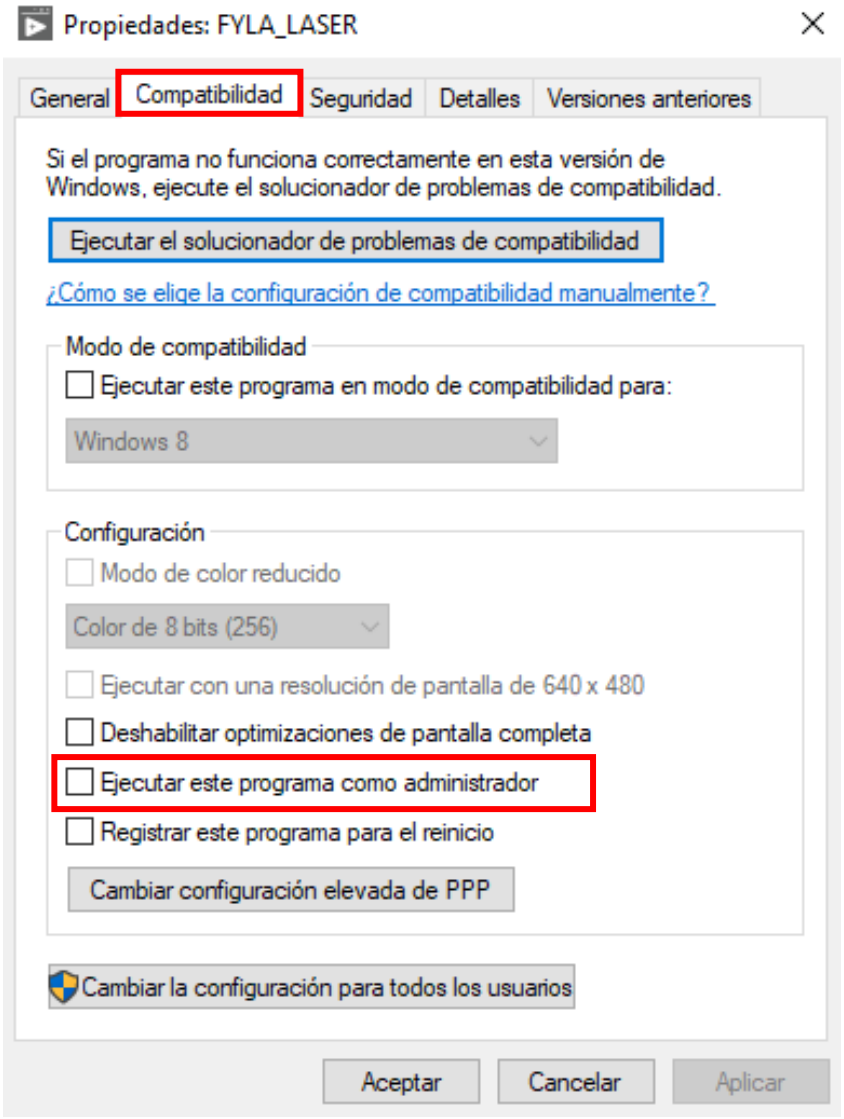
12. Now, ARCHEs User Interface is installed on your PC. When the computer has been restarted, open again “FYLA LASER LABVIEW_2018_64” folder and enter in the “FYLA LASER” folder.

13. Finally, you will have to open “FYLA LASER” and run it as administrator.



14. Do right-click on the "FYLA_LASER" file and select the last option "Properties"

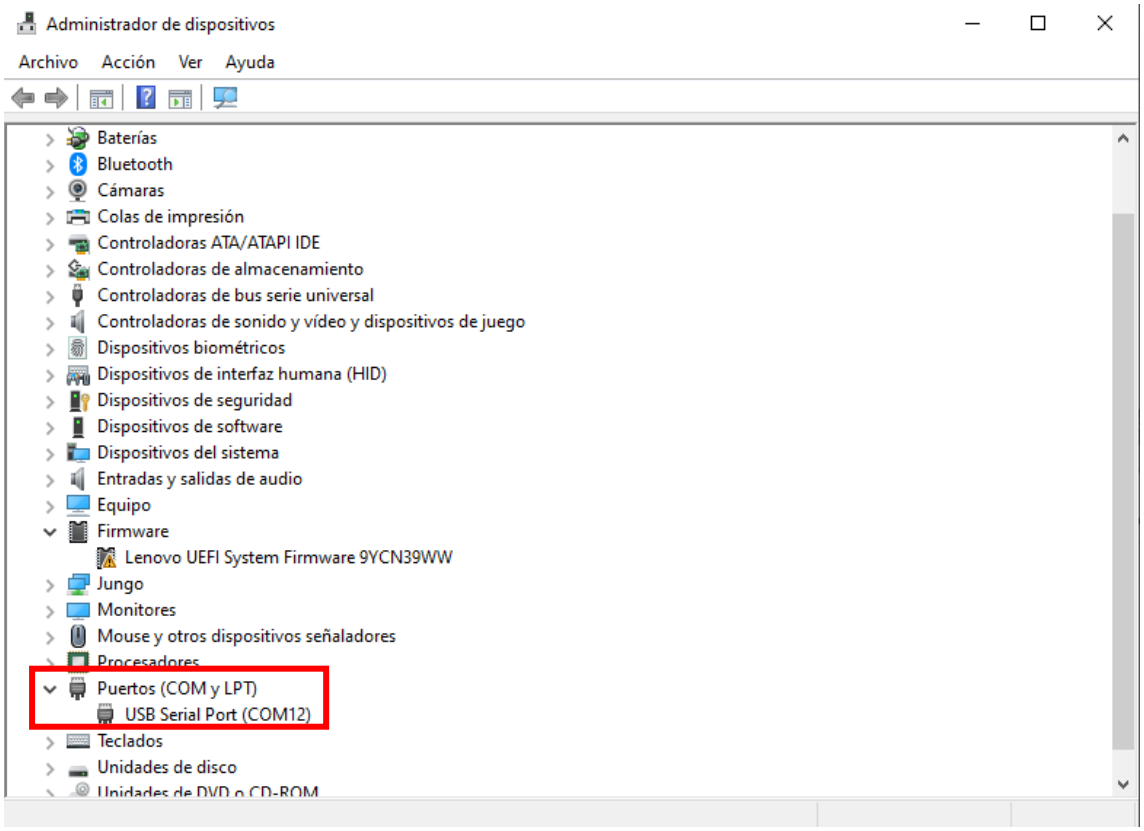
15. The next window will be displayed. Select "Compatibility" tab, then, click on "Run this program as an administrator"



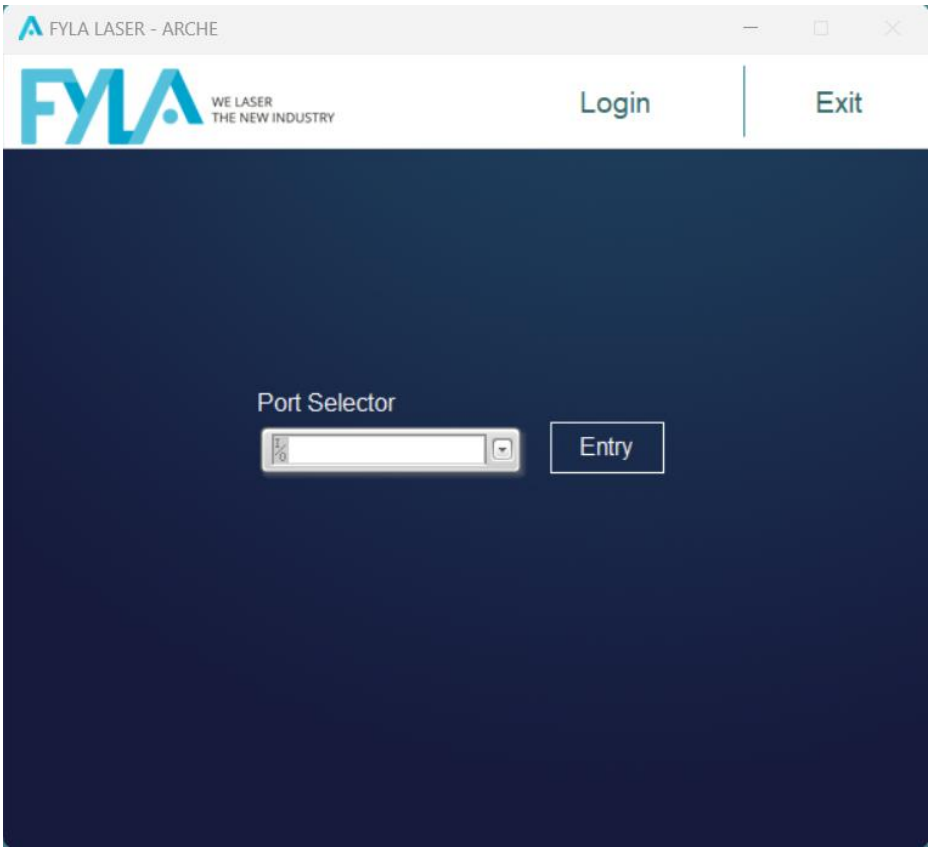
16. Connect the USB cable provided by FYLA to your PC and to the laser. The USB port works in VCP (Virtual COM Port) mode. If your computer does not recognize the device automatically, please install the drivers from the following link:

    http://www.ftdichip.com/Drivers/VCP.htm

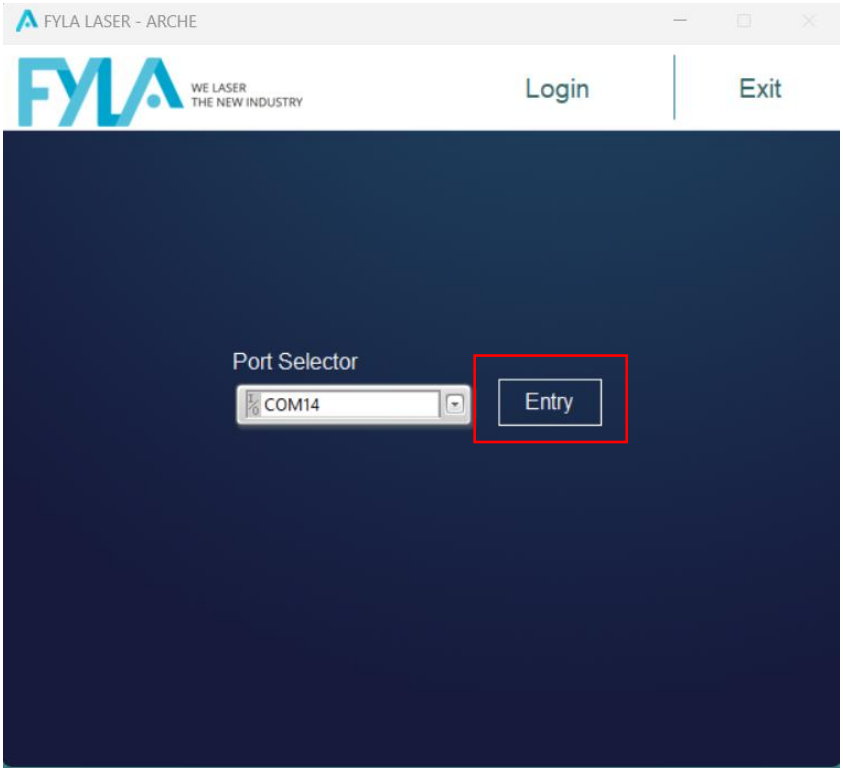
17. After the driver is installed, check the COM port number form: Device Manager / Ports (COM & LPT)



18. Next, double-click on the FYLA's UI executable icon and run it as administrator. Then, the User Interface window will appear.



19. Choose the right port through the Port selector and click “Entry”



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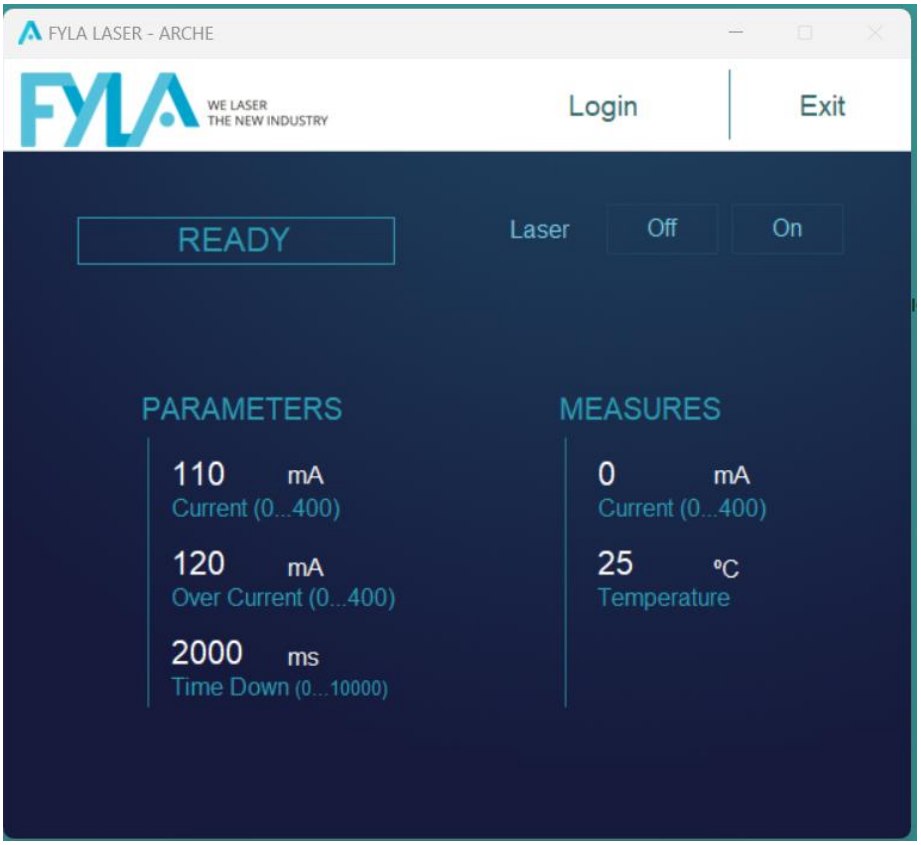
20. Next, a similar UI should appear on your screen:



The screen above, monitors different parameters of the laser system as operating current, operating temperature, or the time it takes to be switched on.

Switching ON

Once the software is running and the system COM port is detected, remove the tap of the laser output head and insert it in a proper holder. The output head of the FYLA ARCHE laser is an FC/APC connector.

IMPORTANT_____

The ARCHE laser is designed to be operated at the ambient temperature from +20 to +30°C. Before turning on the laser, allow it at least 30 minutes to reach room temperature.

_____

IMPORTANT_____

It is important to clean the laser output connector before using it.

_____

WARNING_____

TURNING ON A LASER THAT IS TOO COLD OR HOT MAY DAMAGE IT.

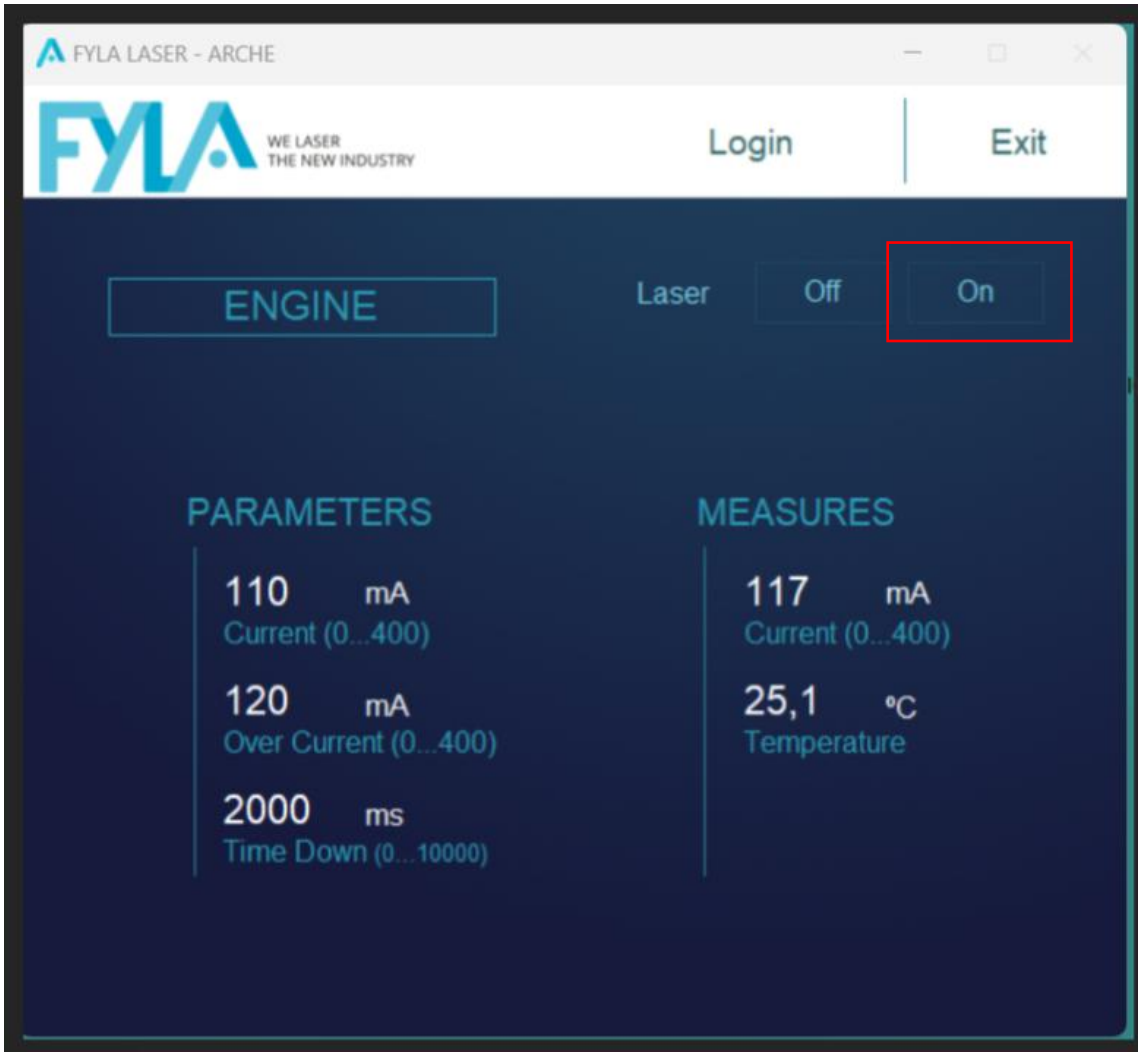
_____

WARNING_____

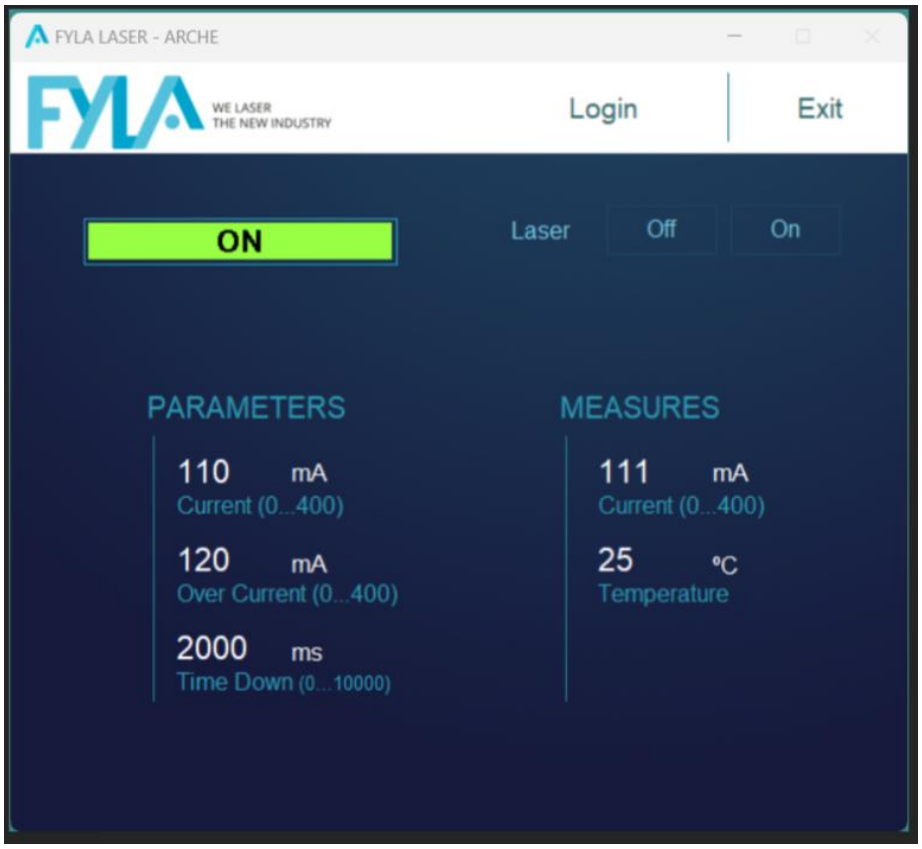
TURNING OFF THE LASER STRAIGHT FROM THE POWER SOURCE WITHOUT FOLLOWING THE INSTRUCTIONS FOR PREVIOUS STEPS MAY DAMAGE IT.

_____

To activate the laser, click the “ON” button near the “Laser” indicator in the UI General Box.



While the laser gets activated the message “ENGINE” will be displayed. Fixed green led near the “Laser Status” and a message “ON” indicates laser emission.



WARNING_____

IN CASE THERE IS NO LIGHT AT THE OUTPUT WHEN THE SOFTWARE INDICATES THAT THE LASER IS "ON" PLEASE TURN OFF IMMEDIATELY THE LASER AND CONTACT FYLA AT SALES@FYLA.COM/SUPPORT@FYLA.COM

_____

WARNING_____

THE LASER RADIATION EMITTED FROM THIS UNIT MAY BE HARMFUL. PLEASE FOLLOW ALL THE SAFETY INSTRUCTIONS FROM THE PAGES 6 – 10.

_____

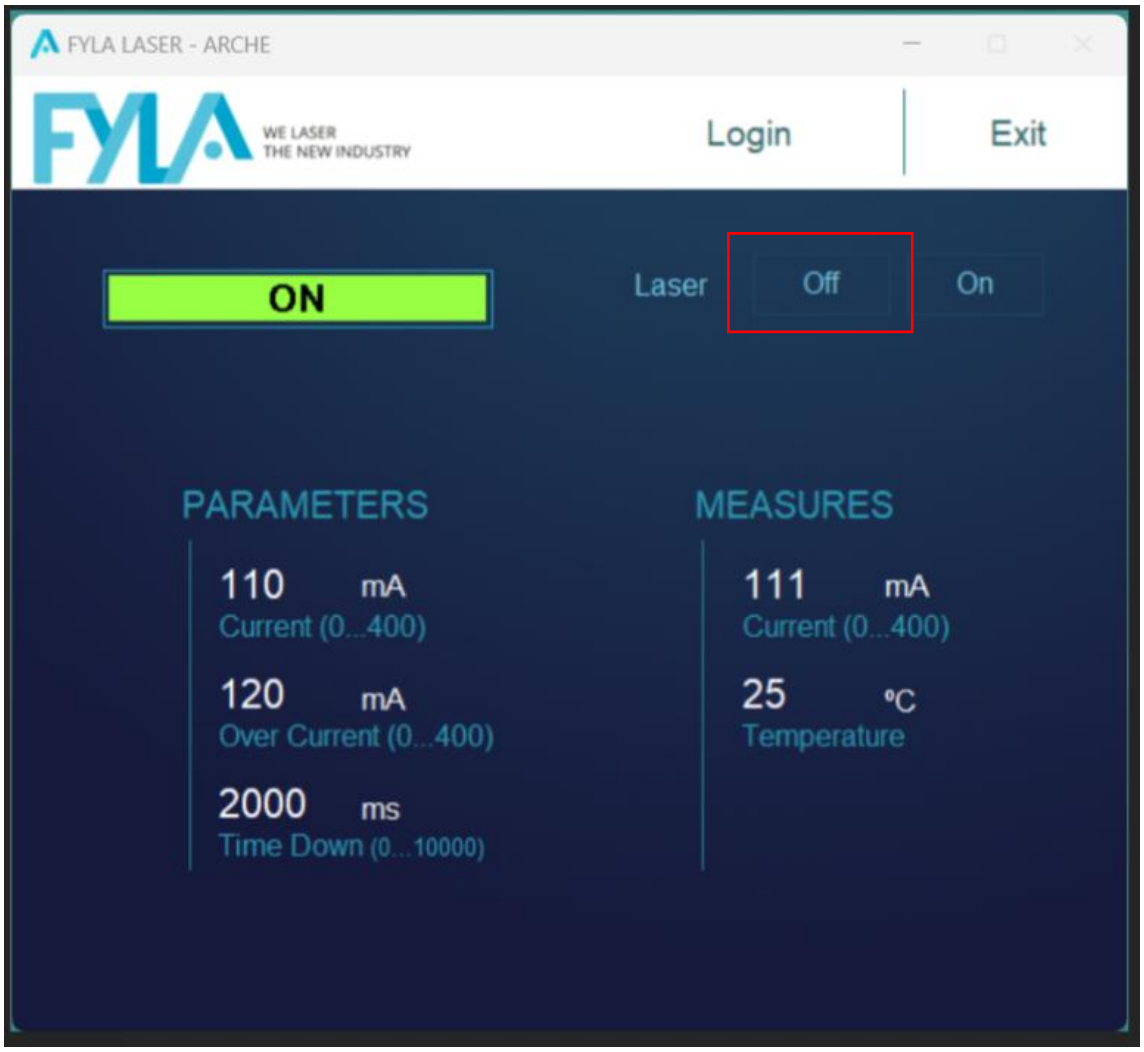
WARNING_____

TURNING OFF THE LASER STRAIGHT FROM THE POWER SOURCE WITHOUT FOLLOWING THE INSTRUCTIONS FOR PREVIOUS STEPS MAY DAMAGE IT.

_____

Switching OFF

To deactivate the laser, click the “OFF” button near the “Laser” indicator in the UI General Box.



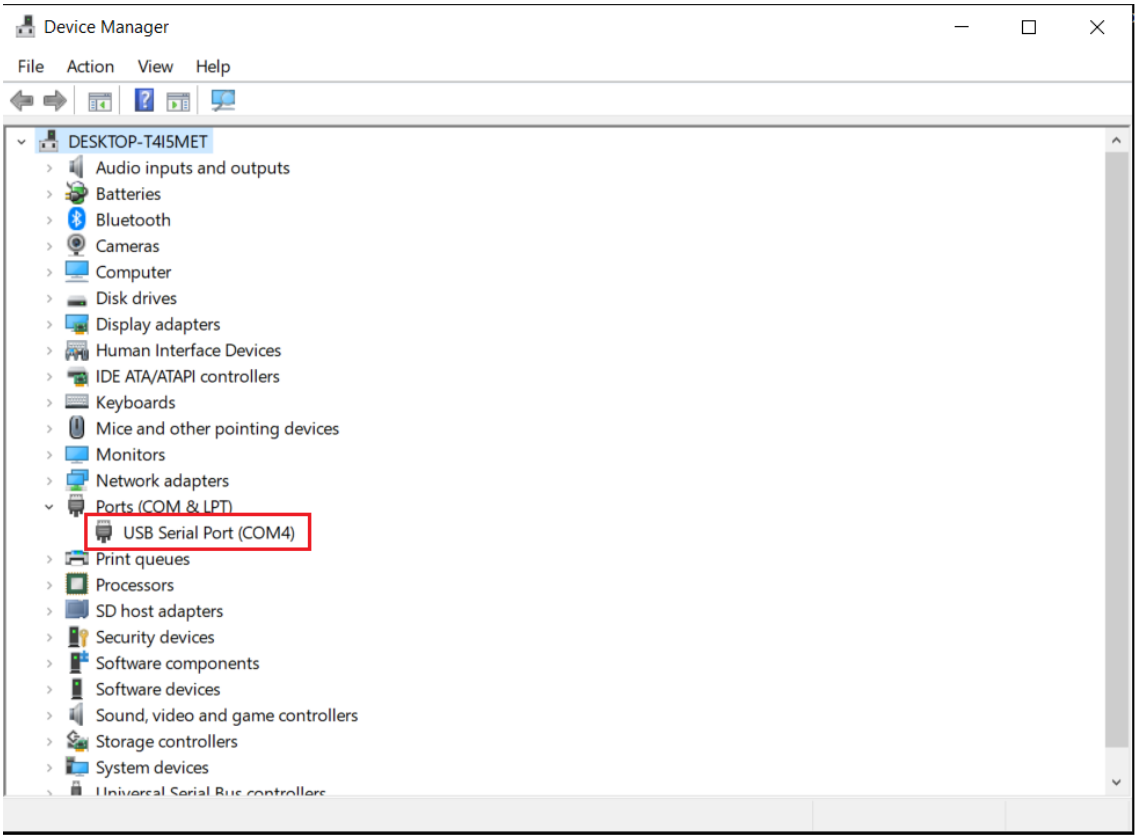
Switching ON/OFF via Serial Communication

The ARCHE Series laser can be controlled remotely via serial communication (RS232) communication, using the USB connector in the Lateral Panel. Please follow the next steps to achieve the communication:

1. Start Windows 7 or higher version.
2. Connect the USB AB cable between the PC and the equipment after the laser is ready to be used. The USB port works in VCP (Virtual COM Port) mode. If your computer does not recognize the device automatically, please install the drivers from the next link:

   http://www.ftdichip.com/Drivers/VCP.htm

3. Check the number of the COM port form: Control Panel / Device Manager



4. Open Windows Hyperterminal or similar software and create a new connection. Write a random name of the connection and press the button “Accept”:

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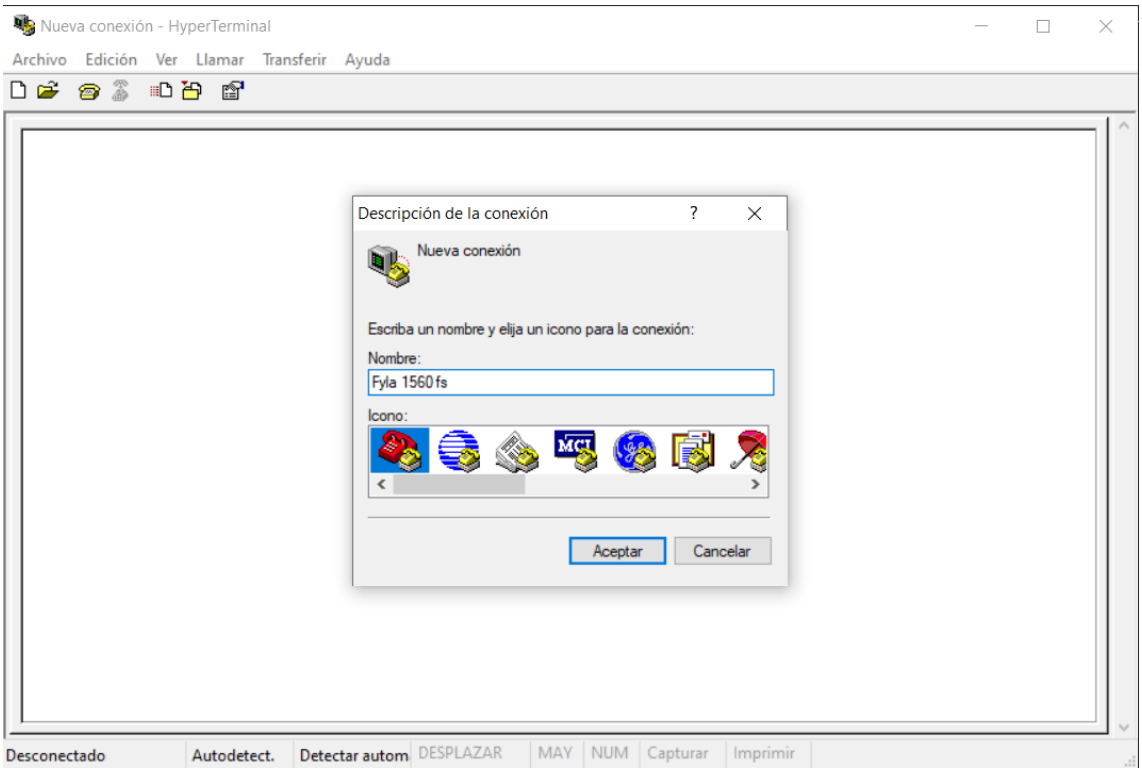
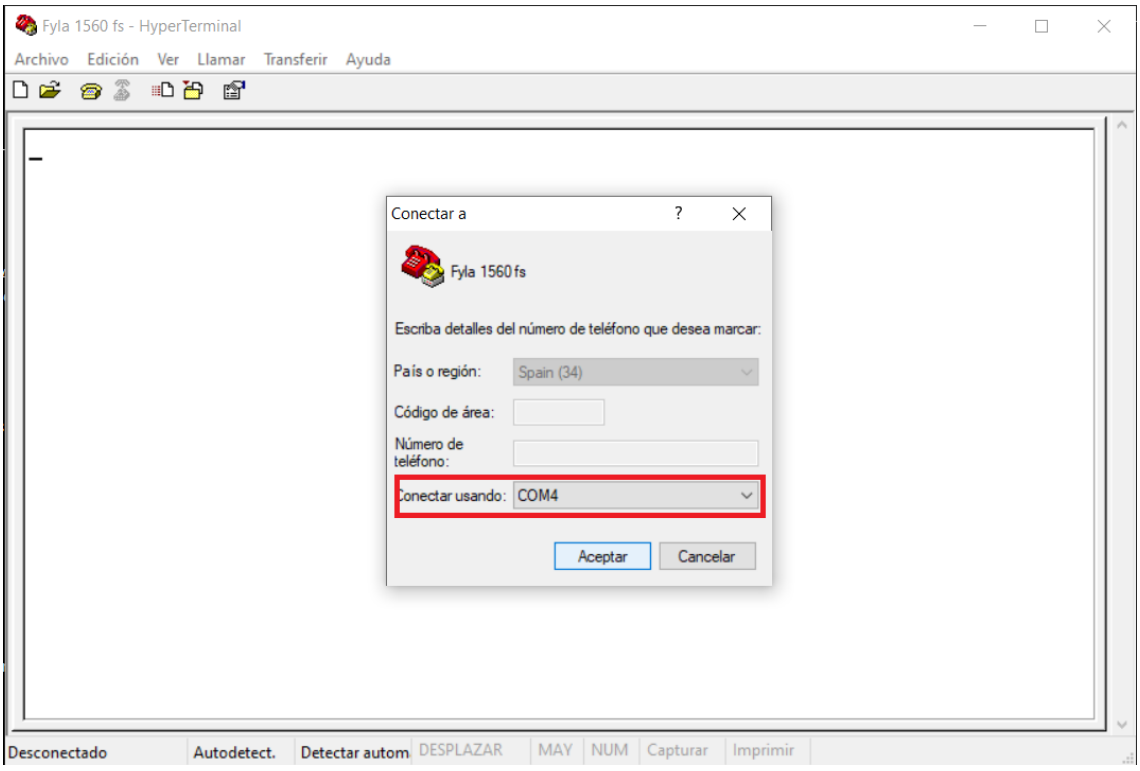
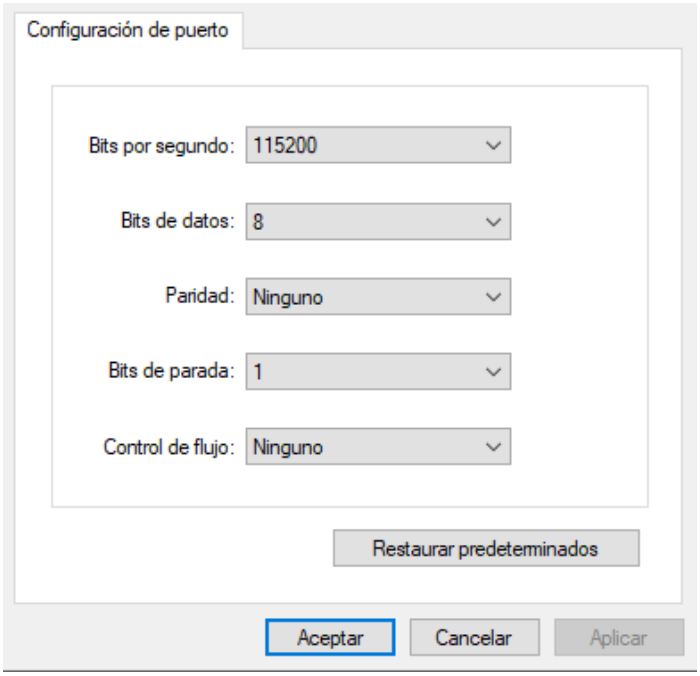
fyla@fyla.com



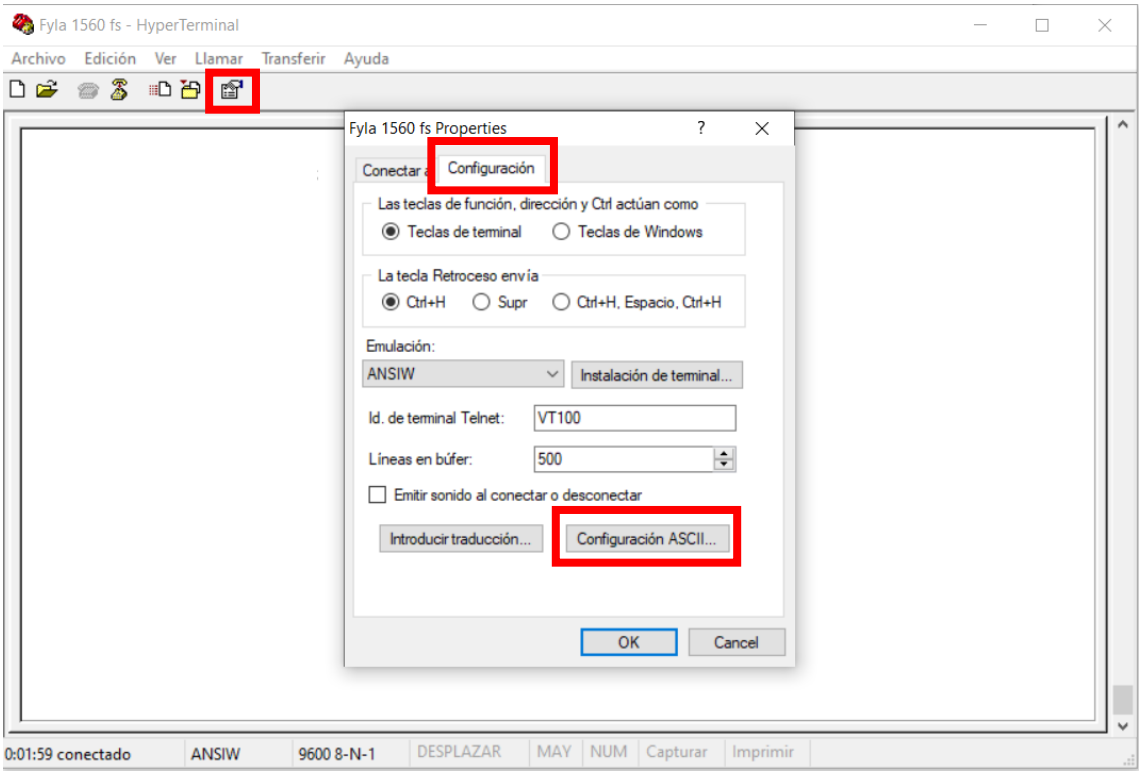
5. Next a new window will be displayed where the COM Port must be selected. Select the detected ARCHE COM port and press the button "Accept".



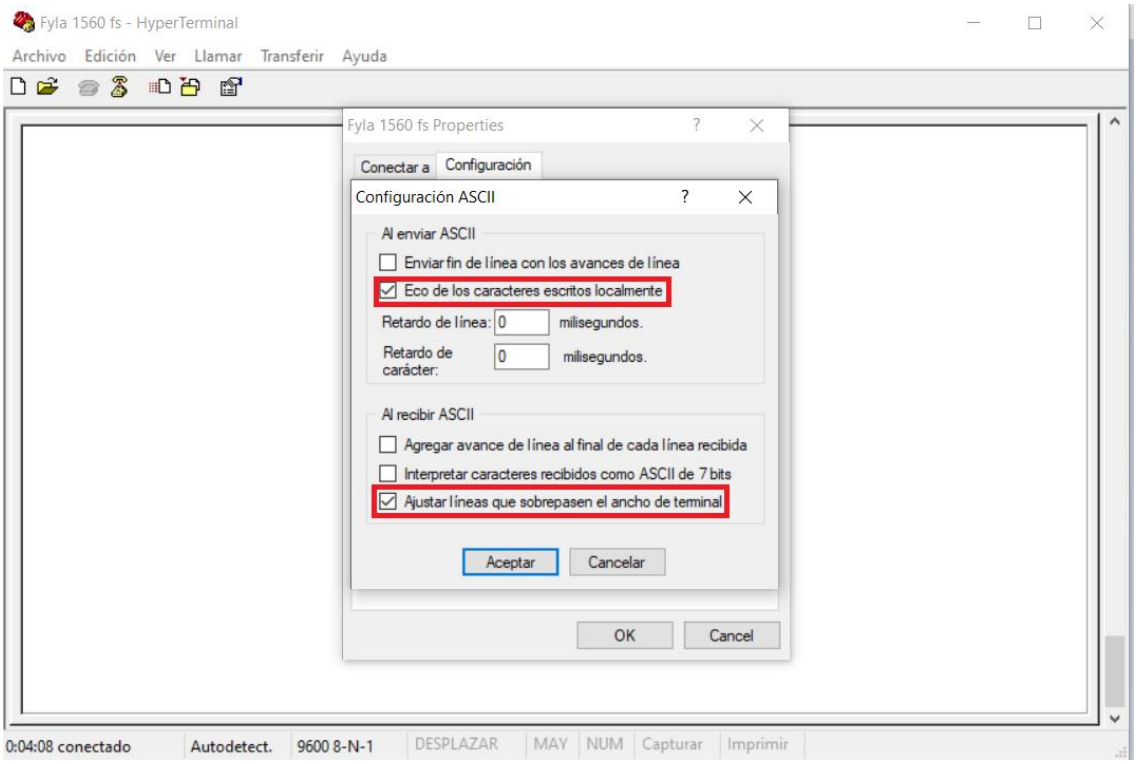
6. Next, a new window will be displayed with the Port Settings. Set the Port Configuration as in the image below and pulse the button “Accept”.



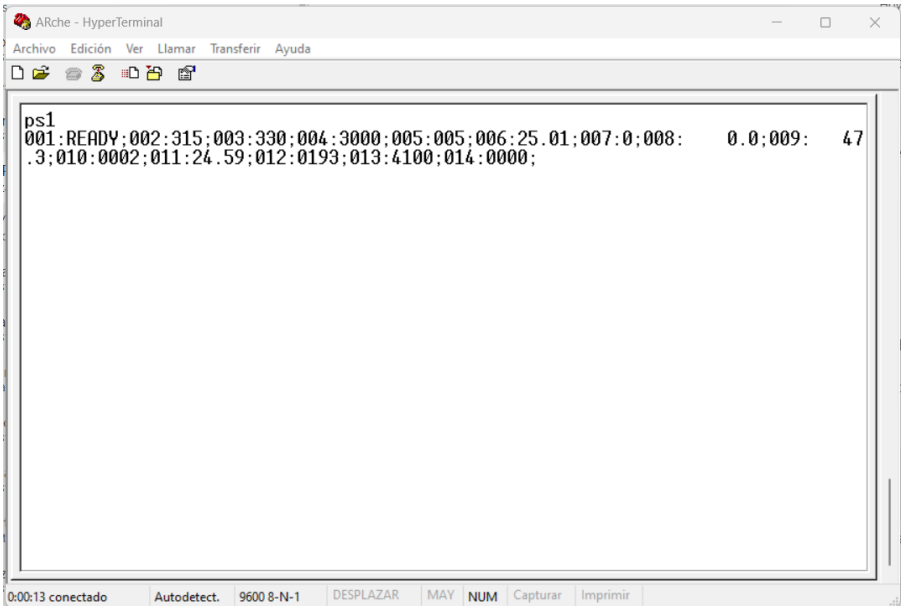
7. At this point we must be connected to the FYLA ARCHE. To visualize the introduced commands, press the button “Properties”. Next, a new window will be displayed, press the slide “Configuration” and finally press the button “ASCII Configuration” as shown in the image below:



8. Next a new window will be displayed. Mark the cases near “Eco of characters” and “Adjust the line” like in the image below:



9. Finally pulse the button “Accept” and “OK”.
10. Now the introduced commands must be visualized. Next, write a command and press enter. Example: <ps1 ><enter>. If the introduced command is accepted the FYLA ARCHE will answer a sequence of characters as sown in the image below.



Commands List

ARCHE model	Command	Description
Standard	laser on	Switch on the laser
	laser off	Switch off the laser
	ps1	Shows general information

Switching ON

Once the communication via HyperTerminal is achieved, remove the tap of the laser output head, and insert it in a proper holder. The output head of the FYLA ARCHE Series laser is an FC/APC connector, compatible with standard holders.

IMPORTANT_____

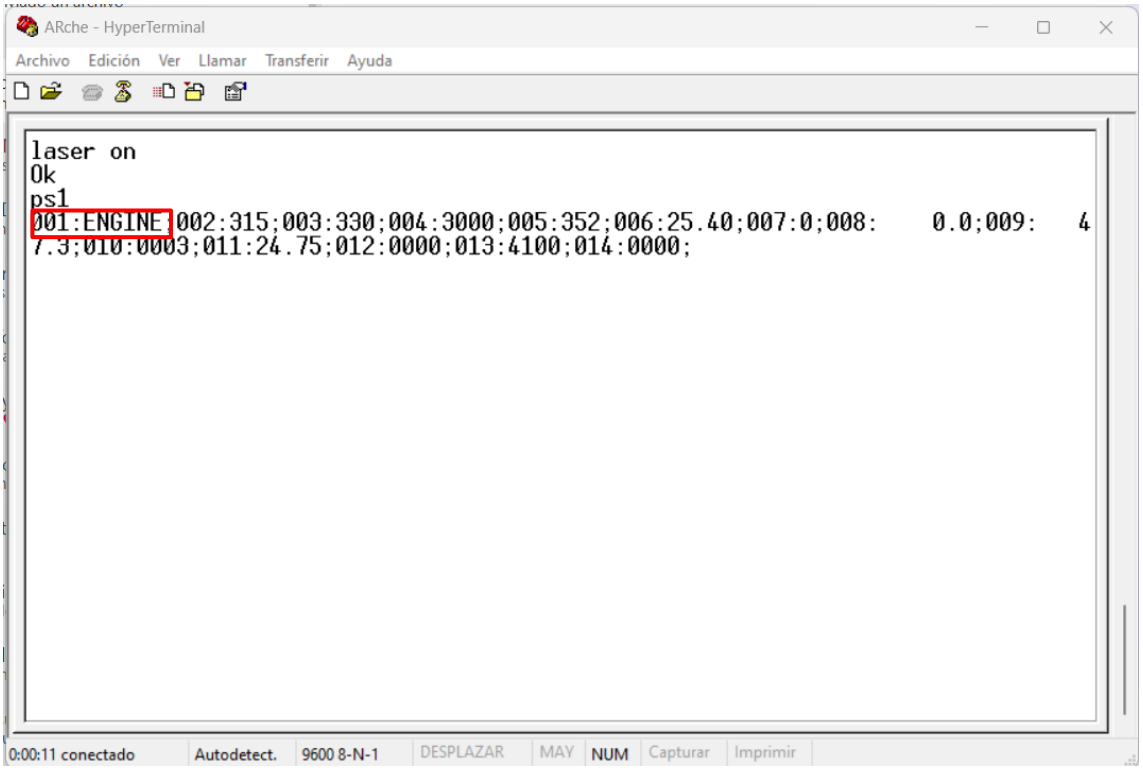
It is important to clean the laser output connector before using it.

_____

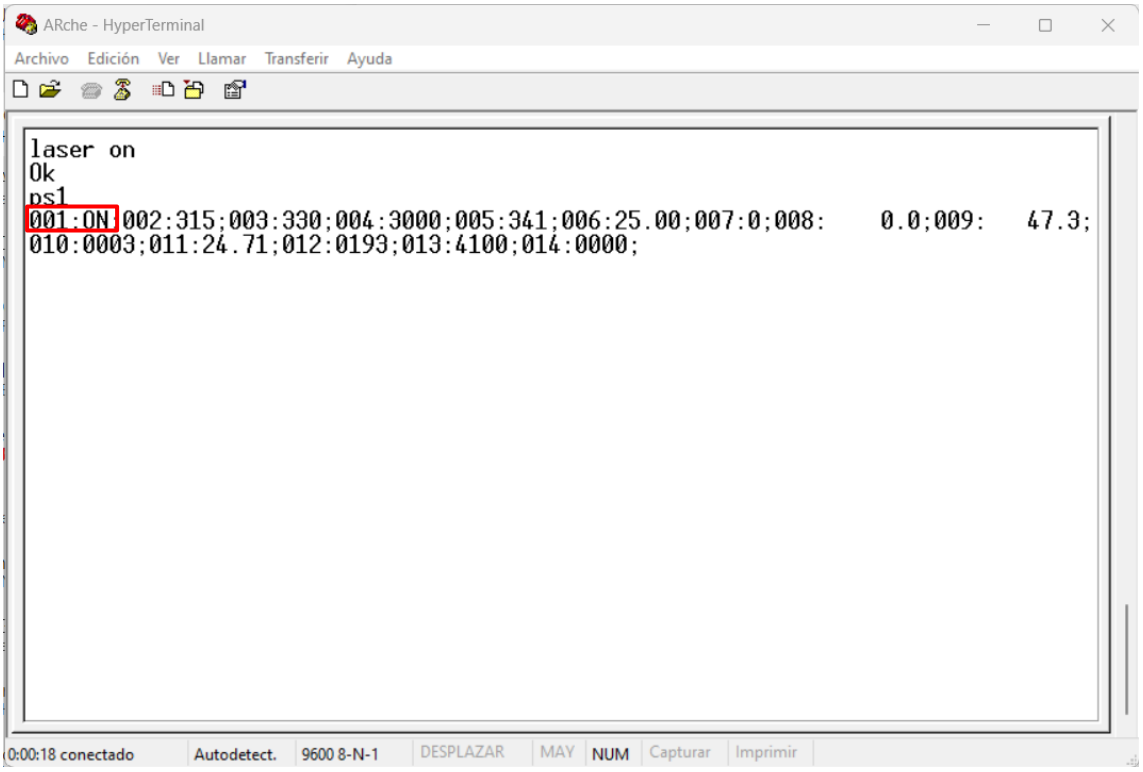
To activate the laser, introduce the command “Laser On” and press the button “Enter”. The device must answer the next character: “OK.”.

Next, introduce the command “ps1” to identify the laser status. If the first position of the vector says “ENGINE”, that means the laser is in the process of turning on. To update the values of the response vector, we need to rewrite the “ps1” command.

FYLA LASER S.L.
Ronda Guglielmo Marconi, 14, Parque Tecnológico 46980, Paterna, Valencia (Spain)
fyla@fyla.com



In the following image, we can already see that the laser is emitting, and its status has changed from ENGINE to ON.



WARNING_____

IN CASE THERE IS NO LIGHT AT THE OUTPUT WHEN THE HYPERTERMINAL INDICATES THAT THE LASER IS ON PLEASE TURN OFF IMMEDIATELY THE LASER AND CONTACT FYLA AT SUPPORT@FYLA.COM

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WARNING_____

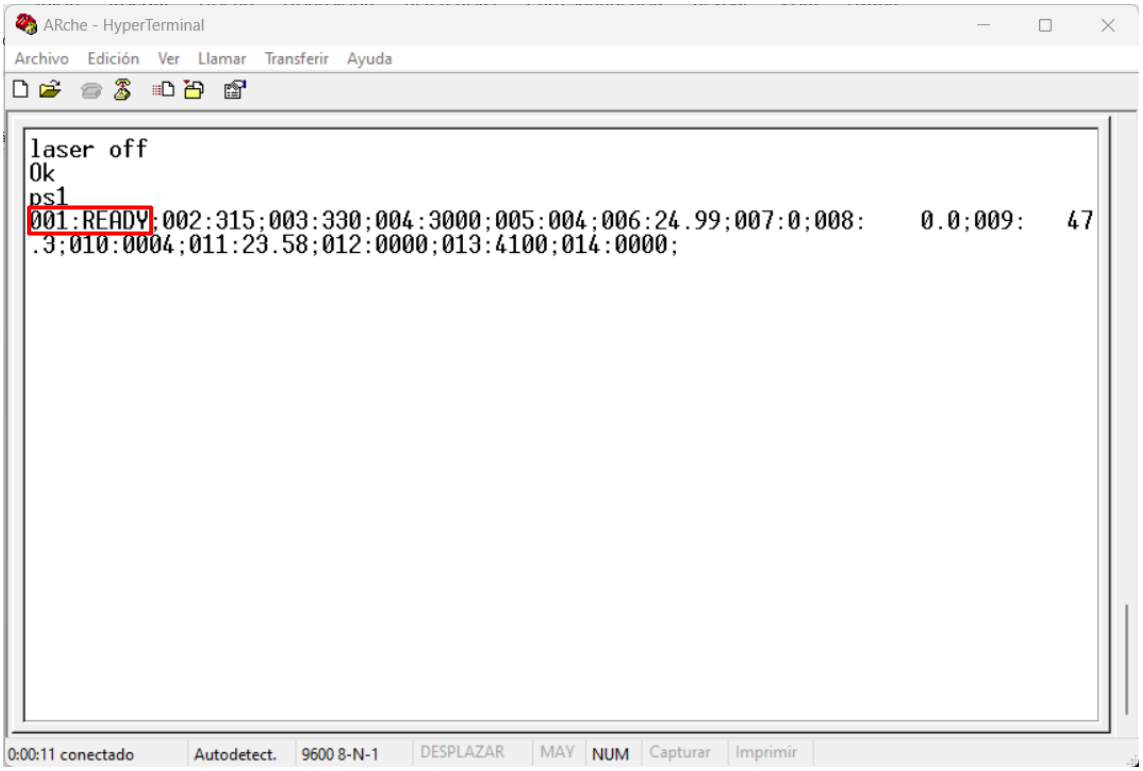
THE LASER RADIATION EMITTED FROM THIS UNIT MAY BE HARMFUL. PLEASE FOLLOW ALL THE SAFETY INSTRUCTIONS FROM THE PAGE 8.

_____

Switching OFF

To deactivate the laser, introduce the command “Laser Off” and press the button “Enter”. The device must answer the next character: “OK.”.

Next, introduce the command “ps1” to identify the laser status. Now the state of the laser is READY, which means the laser is not emitting; therefore, the shutdown process has been completed.



The power supply can be disconnected, if necessary, ONLY when these previous steps have been fulfilled.

WARNING_____

DO NOT DISCONECT THE POWER SUPPLY FROM THE LASER AS A MEANS TO TURN THE LASER OFF. FOLLOW THE INSTRUCTIONS TO TURN OFF THE LASER PROPERLY. OTHERWISE, THE LASER MAY BE DAMAGED FROM WRONG DEACTIVATION.

_____

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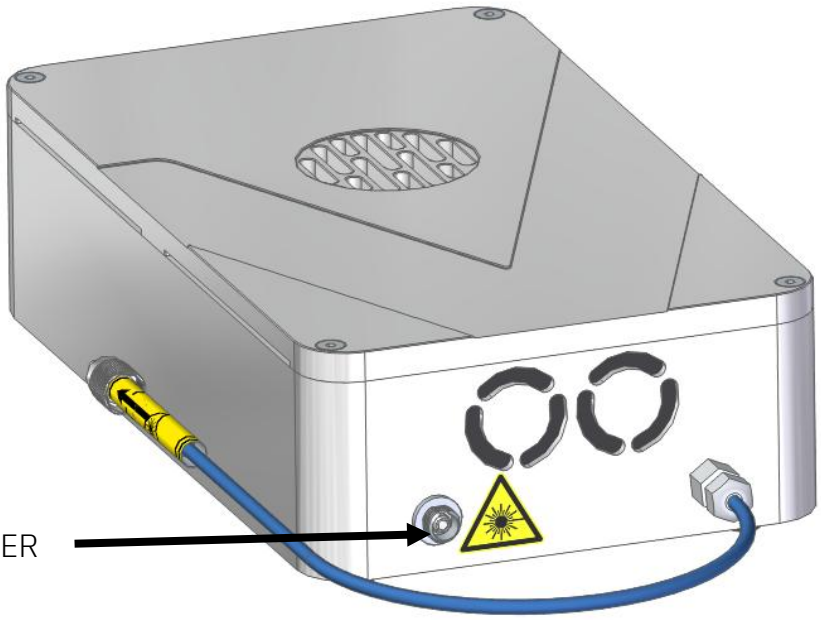
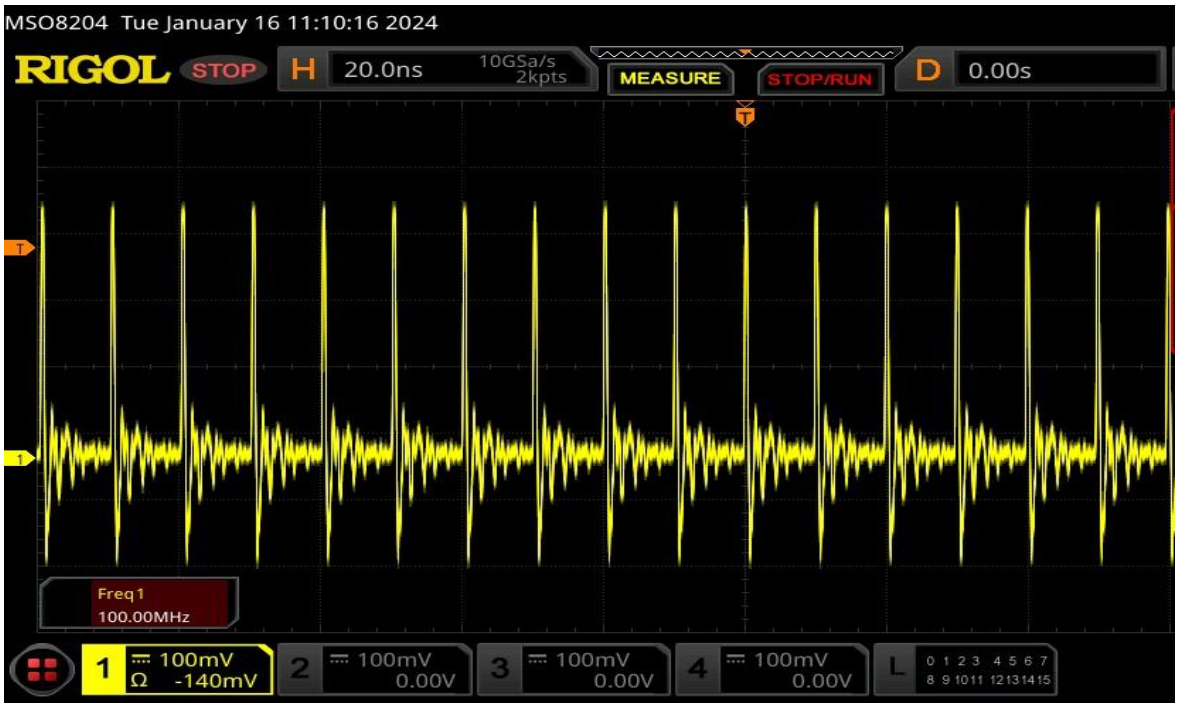
Trigger Output

The optical emission of the FYLA ARCHE series laser is a train of laser pulses with a typical pulse repetition rate (PRR) of around 65 MHz (customizable). Many applications require synchronous monitoring of an individual pulse with its corresponding measured effect. The FC/APC OPTICAL REFERENCE connector in the front Panel provides an optical reference pulsed signal generated from the oscillator of the ARCHE laser. Such signals can be converted to the electrical domain using fast photodetectors and utilized as a temporal reference for synchronous measurements (e.g., pump/probe experiments).



To obtain an electrical reference signal please follow the next steps:

1. Switch ON the laser.
2. Connect an FC/APC PM-1550 panda fiber to the Optical Reference Fiber Connector in the front panel and to your fast photodetector.
3. Connect the output of the photodetector to an Oscilloscope.
4. You should obtain a similar pulsed train signal as in the figure below:



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WARNINGS AND FAILURE TO FUNCTION

Warnings

WARNING_____

THE LASER RADIATION EMITTED FROM THIS UNIT MAY BE HARMFUL. PLEASE FOLLOW ALL THE SAFETY INSTRUCTIONS FROM THE PAGE 8 – 10 BEFORE OPERATING THE LASER.

_____

WARNING_____

WHEN USING YOUR ARCHE SERIES LASER, AVOID OPTICAL BACK REFLECTIONS TO THE SYSTEM. THE SYSTEM IS PROTECTED AGAINST INCIDENTAL LOW-POWER BACK REFLECTIONS. OPTICAL BACK REFLECTIONS MAY ALTER THE CORRECT OPERATION OF THE LASER, AND EVEN DAMAGE IT IRREVERSIBLY. TO AVOID THIS, SIMPLY TILT SLIGHTLY REFLECTIVE OPTICAL COMPONENTS IN YOUR SETUPS SO THAT DIRECT BACK REFLECTIONS ARE ELIMINATED.

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WARNING_____

DO NOT SET SIGNALS HIGHER THAN 24V AT THE POWER INPUT

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WARNING_____

TURNING ON A LASER THAT IS TOO COLD OR HOT MAY DAMAGE IT. THE LASER MUST BE OPERATED WHEN THE ROOM TEMPERATURE IS SET BETWEEN 5 AND 40 ºC

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WARNING_____

DO NOT DISCONECT THE POWER SUPPLY FROM THE LASER AS A MEANS TO TURN THE LASER OFF. FOLLOW THE INSTRUCTIONS TO TURN OFF THE LASER PROPERLY. OTHERWISE, THE LASER MAY BE DAMAGED FROM WRONG DEACTIVATION.

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WARNING_____

DO NOT FORCE THE FIBER TERMINATION ASSEMBLY.

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WARNING_____

AVOID LOCATIONS WHERE THE LASER IS EXPOSED TO EXTREME TEMPERATURES AND HIGH HUMIDITY.

_____

WARNING_____

AVOID LOCATIONS WHERE THE LASER IS EXPOSED TO MECHANICAL VIBRATIONS.

_____

WARNING_____

ANY KIND OF OPERATION OF MANTAINANCE MUST BE PERFORMED BY OUR QUALIFIED LASER TECHNICIANS OR UNDER THEIR GUIDANCE WHEN THEY SPECIFICALLY INDICATE SO.

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WARNING_____

DO NOT FORCE THE WARRANTY LABELS.

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CUSTOMER SERVICE

Technical Support

Information and advice about the operation of any FYLA product are available from our technical support engineers. For the quickest response, ask for "Technical Support" at support@fyla.com, votgon@fyla.com and ogarcia@fyla.com including the model and serial number of your product.

Hours: 9:00 to 14:00 and 14:30 to 17:30 , Monday to Thursday, Friday: 09:00 to 14:00 GMT +1 (excluding holidays).

Phone: (+34) 607971021

For e-mail inquiries, we typically respond within one business day.

Service

If your device malfunctions or becomes damaged, please contact FYLA for a return authorization number and instructions on shipping the unit back for evaluation and repair/replacement.