RealLight

北京杏林睿光科技有限公司

NLM Series

Multi-mode Narrow Linewidth Laser

Applied model: NLM Series

Version: V 1.0

Date: July, 2020

As products are constantly being updated, the right of final interpretation of technical specifications or illustrations in this manual belongs to RealLight.

CONTENT

1 Safety Instructions

1.1 Safety Symbols

The following symbols can be marked on the unit or used in this document. To ensure safe operation, please follow all safety instructions that are associated with the symbols.

CAUCTION!

Refers to a hazard. Ensure correct operation, or, could result in damage of the unit. Do not proceed beyond an attention until the indicated conditions are fully understood.

WARNING!

This symbol indicates that users should take care of the damage which is easily caused by visible and invisible laser radiation.

 CAUCTION ESD!

This symbol indicates that users should pay attention to the operation failure caused by ESD. Users should take actions for ESD protection.

1.2 Laser Safety

Laser poses safety hazards different than light from other sources, all laser users and persons near the laser must be aware of the hazards involved in laser operation.

In order to ensure the safe operation and optimal performance of the product, please follow these warnings and cautions in addition to the other information contained elsewhere in this document.

Warning:

Laser Output! Visible and/or invisible laser radiation is emitted from this aperture

Warning：

This is a Class 3B laser product! Avoid exposure to the beam!

Follow safety instructions!

⚠️ NOTES:

1. Do not allow untrained or not experienced personnel to handle this laser.

2. NEVER LOOK DIRECTLY INTO THE MAIN LASER BEAM! DO NOT REFLECT THE BEAM INTO LIGHT SOURCE!

3. Always avoid placing reflective objects in the laser beam. Laser light scattered from a reflective surface can be as damaging as the original beam.

4. Turn the laser power to a low level to minimize intensity of accidental stray reflections or refractions when aligning the optical system.

5. Ensure that the laser beam is not at eye level.

6. Post warning signs when laser is in operation, limit access to the laser area.

7. All personnel in working area must use laser safety eyewear when operating the laser.

8. Use appropriate laser safety eyewear when operating a higher power laser.

9. NEVER LEAVE THE LASER SYSTEM ON, OPEN, AND UNATTENDED!

10. Never open the protective housing of this laser without permission. Warranty void if seal broken or removed.

1.3 Electrical Safety

1.3.1 Notes for electrical safety:

⚠️ Although this laser system includes safety features in its design, the users still have to follow the safety precautions as below:

1. Ensure that the fiber is connected well to the fiber connector of laser system before laser operation.

2. For the sake of safety, make sure that all power is off before working on electrical connections of the laser system. Do not depend on the electrical safety device or interlock.

3. No electrical maintenance on the laser is allowed by anyone.

4. The Power Adapter connector may be used to disconnect the laser controller from the mains. It must remain accessible by the user at any time.

5. The mains cord must be plugged in a socket comprising the earth connection. Disconnection of the earth is forbidden as it may impair the electrical protection and renders the equipment dangerous.

1.3.2 Safety recommendations for using a laser

⚠️ Please review the following precautions before operating the laser system:

1. Safety key switch: please remove the key from key switch when the laser system is not in operation but still accessible to untrained personnel.

2. Do not allow untrained or not experienced personnel to handle this laser system.

3. Indicator light (LED): this is a safety feature. It must be clearly visible by operator when the laser system is operated or not.

4. NEVER LEAVE THE LASER SYSTEM ON, OPEN, AND UNATTENDED!

2 Electrical Instructions

2.1 Operating Modes

This system features two control modes.

1. Local mode: control the laser output power by using Current Adjusting Knob at the front panel.

2. Remote mode: control the laser output power remotely by PC or modulation signal through USB or BNC interface at the rear panel.

2.2 Operating Instructions for the Front Panel
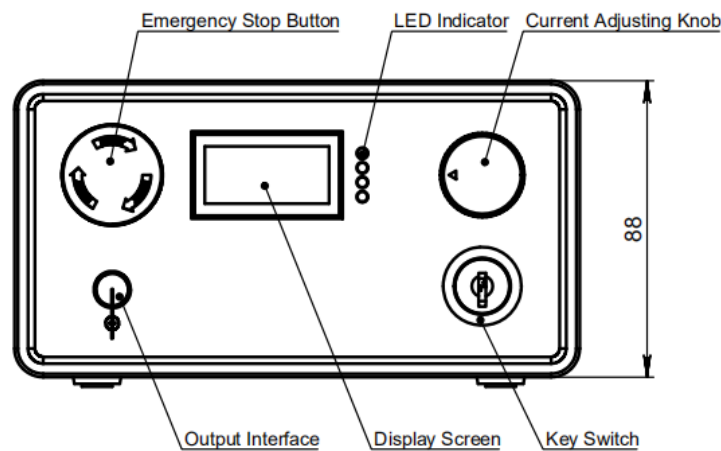
a. Emergency Stop Button

Press this button to stop laser emission when there is an emergency. Rotate it clockwise when the emergency is lifted, and the laser will return to its previous condition of operation before shutdown.

b. Display Screen

Operating current (A) is shown when the laser is in working mode.

c. LED Indicator

Power→this LED is lit when the laser is supplied with power.

Fault→ this LED is lit when there is an error.

Laser Enable → this LED is lit when the key switches on, indicating that the laser is enabled.

Ext Enable→ this LED is lit when the Modulation Enable Button at the rear panel is pressed, indicating that the laser can be modulated through signal input via BNC interface.

d. Current Adjusting Knob

When the laser is in operation, rotate this knob clockwise to increase the current and rotate it counterclockwise to decrease the current.

Notes:

➢ When the current is at its maximum, keep rotating this knob clockwise will not increase the current any more.

➢ For the sake of safety, rotate this knob counterclockwise to the end before starting the laser.

➢ Rotate this knob counterclockwise to the end, when turn the key and switch on, the driving current is lower than threshold current of the laser.

e. Key Switch

When the key switch is in "OFF" position, the laser is in standby mode, current is at zero. When the key switch is in "ON" position, laser is in enable status, and the Laser Enable indicator is lit.

f. Output Interface

This interface is for connection with fiber, and is compatible with RealLight's RL-RP Series Raman probes.

2.3 Operating Instructions for the Rear Panel
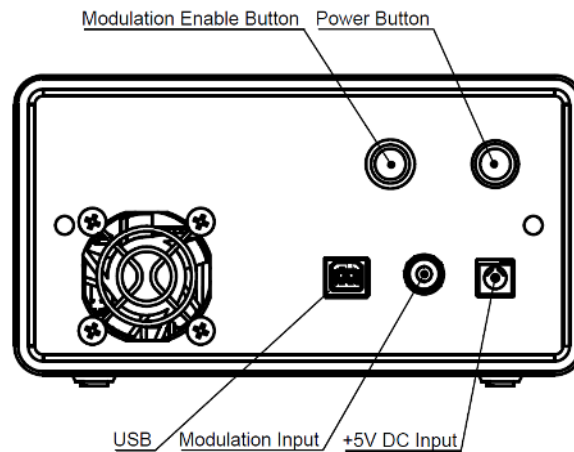
a. Modulation Enable Button

Release this button to disable the modulation input interface; press it to enable the modulation input interface.

b. Power Button

Release this button to stop supplying power, press it to start supplying power.

c. +5V DC Input Interface

Supply power to the laser through a +5V adapter.

d. Modulation Input Interface

When the laser is in Local Mode, press the Modulation Enable Button, input analog signal ranges from 0-5V to control the laser power via this BNC interface.

- Apply a 0V signal, the corresponding output power is 0mW.
- Apply a 5V signal, the corresponding output power is the maximum rated power.
- The bandwidth of this BNC interface is 1kHz.

Notes:

➢ Make sure that the input signal must not exceed 0-5V.

➢ When this interface is enabled, the Current Adjusting Knob at the front panel is disabled.

➢ Input sine signal or pulse modulation signal through BNC interface, the average value of driving current is shown on the display screen at front panel.

e. USB Interface

This USB interface is for connection between laser and a control PC. RealLight provides self-developed software for laser control, for details please see section 4 in this document!

3 Operating Instructions

3.1 Prepare Procedures

- Connect the +5V DC adapter to laser controller, make sure the connection is secure.

Note: Make sure that the adapter is appropriate before connection.

- Before connecting to the 220V power supply, please check and confirm the system is in the following status.

    A. Key switch is in the Position "OFF".

    B. Emergency Stop button is released.

    C. Modulation Enable button is released.

    D. Power button is released.

    E. The mains cord must be plugged in a socket comprising the earth connection.

    F. Take off the laser output interface cap and connect well to the fiber patch cord. Do not point at people or flammable materials with the output fiber when the system is working.

Attention: Need to protect the fiber well before connecting the fiber patch cord or in the process of use, make sure to keep the fiber end clean and avoid contamination. Otherwise, the power loss could be caused after connection, and laser output connector could be burnt.

3.2 Operating Steps for Local Mode

A. Connect the terminal of adapter to the corresponding port at the rear panel, press the Power button, then start supplying power to the laser. Current details is shown on the display screen. At the same time, the Power indicator is lit and the cooling fan starts working.

B. After working for about one minute, the internal temperature control of the laser is stable, turn on the key switch to enable the laser , then the LD ENABLE indicator is lit.

C. Rotate the Current Adjusting Knob to clockwise to increase the current.

D. Laser is in stable operation.

3.3 Operating Steps for Remote Mode

A. Connect the USB interface or BNC interface at the rear panel to an external signal source.

B. Press the Power button, start supplying power to the laser. Current details will be shown on the display screen. At the same time, the Power indicator will be lit and the cooling fan will start working.

C. Press the Modulation Enable button at the rear panel, the EXT ENABLE indicator is lit, and the external modulation is enabled.

D. Laser is operated by external control signal.

3.4 Laser Off

A. Before shutting down the laser, set the current to 0 or disconnect external control signal first.

B. Place the key switch in "OFF".

C. Release the Power button, disconnect power supply.

D. Remove the fiber patch cord, put the protection cap on the laser output port.

4 Laser Control Software

This laser can be set to Local Mode or Remote Mode via software. Factory default setting is Local Mode.

【Local Mode】：Enable/Disable laser emission and adjust output power via settings at th front panel.

【Remote Mode】：Enable/Disable laser emission and adjust output power by PC software through the USB interface at the rear panel.

4.1 Driver Installation

This laser system uses a highly-integrated USB-UART bridge chip CP2102, which can support different versions of operating system. Install the driver on system before the laser system can communicate with

a PC. Contact RealLight for the installation package or download it from the link below.

https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers

The power for communication part is supplied via a USB interface. Users can identify serial ports by connecting the laser system to a PC via a USB cable. When driver is installed, the [Device Manager] [Ports-COM-LPT] in Windows' operation system can detect the corresponding ports, then the installation is complete.

4.2 Interface Presentation
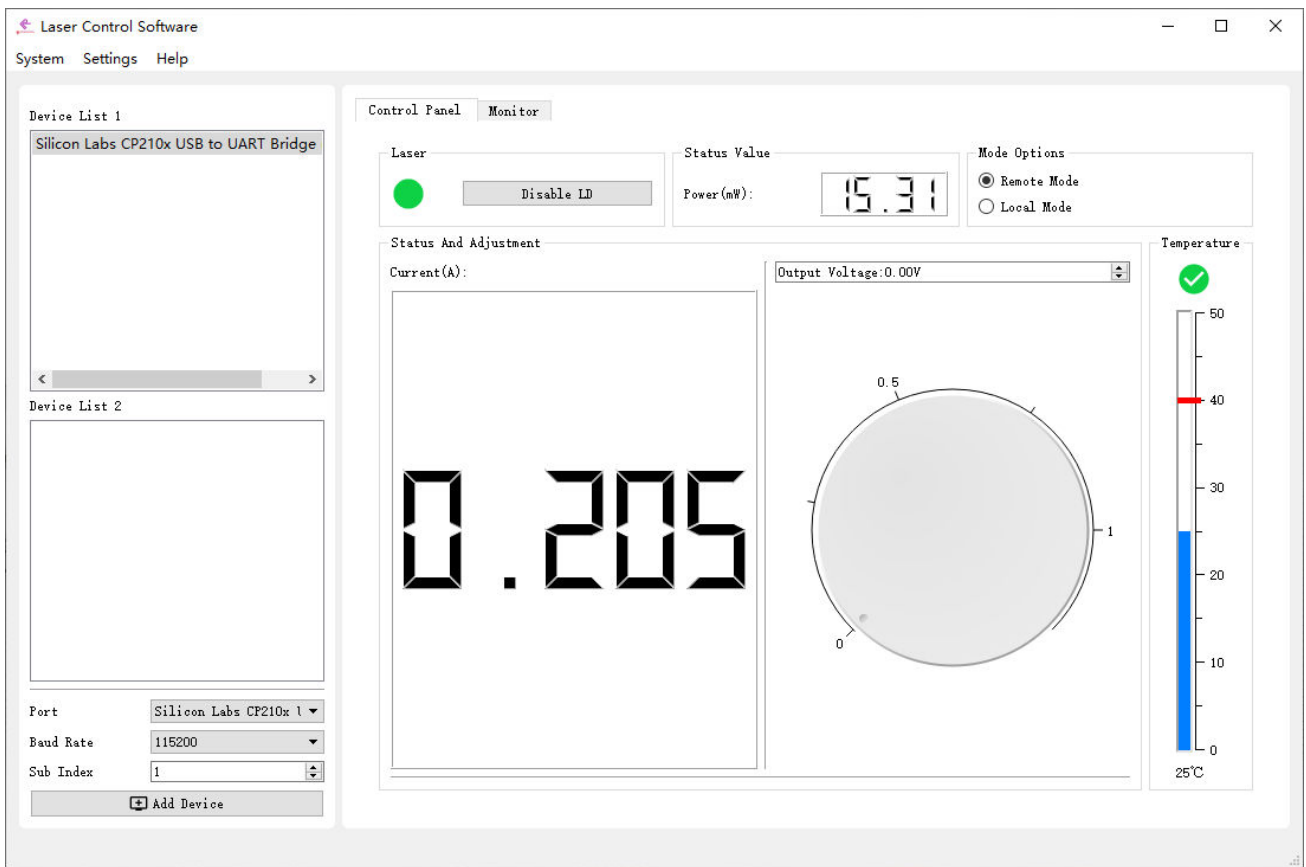
Software Interface

4.3 Software Details

Add Device：when the serial device is detected by PC, choose the corresponding serial number in "Port". Click "Add Device", PC software will display the control interface for NLM series laser, and you can find the port number of device in Device List.

Control Panel：click Enable LD or Disable LD to turn the laser on or off. Monitor the output power by the internal power sensor of laser.

Monitor：click here to switch the display interface, and to see the monitoring curves of working temperature and current.

Mode Options：select Local Mode or Remote Mode here. System will save the previous control mode when the software shuts down.

Status and Adjustment：monitor and display real-time working current value of the laser. Control the output power (0-100%) by setting output voltage (0-1.2V) or adjusting the spin control.

Temperature：the detected temperature of laser is displayed here.

5 Copyright

All trademarks and names of software and hardware mentioned in this manual belong to the corresponding companies.

Beijing RealLight Technology Co., Ltd

Address：Room 501, Building F, 139 Jinghai 3rd Road,

Beijing Development Area, Beijing 100176, China

Phone/Fax：010-59089508/886

Email：sales@real-light.com

Website: http://www.real-light.com