



Contents [[hide](#)]

- [1 THORLABS NPL Series Nanosecond Pulsed Lasers](#)
- [2 Product Usage Instructions](#)
- [3 Introduction](#)
- [4 TECHNICAL DATA](#)
- [5 Safety](#)
- [6 Installation](#)
- [7 Operation](#)
- [8 Maintenance and Cleaning](#)
- [9 Troubleshooting and Repair](#)
- [10 FAQ](#)
- [11 Documents / Resources](#)
 - [11.1 References](#)



THORLABS NPL Series Nanosecond Pulsed Lasers



Product Usage Instructions

Introduction

1. Intended Use: The NPL Series Nanosecond Pulsed Lasers are designed for...
2. Explanation of Safety Warnings: It is crucial to adhere to all safety warnings...
3. Description:
 - Series Overview: The NPL Series offers...
4. Technical Data: Detailed technical specifications...
5. Inputs and Controls: Instructions on how to utilize...

Safety

1. Laser Safety: Different safety measures for Laser Systems with Item # Ending in A, B, or C...

Installation

1. Packing List: Items included in the package for different Item # endings...
2. Quick Start Guide: Step-by-step guide to quickly set up and install the NPL Series...

Operation

1. Block Diagram: Visual representation of the components and connections...

2. Power: Instructions on powering on and off the NPL Series...

Introduction

Intended Use

These products are intended to be used as high-speed laser sources with nanosecond pulse widths and operated in a laboratory environment with controlled temperature and humidity.

The products may only be used in accordance with the instructions described in this manual. Any other use will invalidate the warranty.

Explanation of Safety Warnings

Indicates information considered important, but not hazard-related, such as possible damage to the product.



Laser Radiation Warning



ESD Component Caution

The CE/UKCA markings on the product are the manufacturer's declaration that the product complies with the essential requirements of the relevant European health, safety, and environmental protection legislation.



The wheelie bin symbol on the product, the accessories or packaging indicates that this device must not be treated as unsorted municipal waste but must be collected separately.



Description

The NPL series of pulsed diode lasers are designed to provide a convenient, turn-key source of nanosecond pulse trains. Model options are summarized in the table below

and include different typical emission wavelengths, output powers, repetition frequency range, and fixed or adjustable pulse widths.

Series Overview

Models with Item # suffix A provide fixed-duration 10 ns pulses in response to a user-supplied trigger input. Models with Item # suffix B offer variable pulse width control and internal oscillators that trigger the laser pulses at 1 MHz, 5 MHz, or 10 MHz in addition to user-triggered operation. Models with Item # suffix C offer higher pulse energies, variable pulse width control, and user trigger input at repetition frequencies up to 50 kHz. The optical output is a free-space beam with an integrated factory set collimated lens. Note that the shutter is permanently attached.

Item #	Typical Center Wave length	Pulse Width	Peak Out put Power	Internal T rigger	Max Rep. Rate
NPL64 A	640 ± 10 nm	10 ns	13 mW	No	10 MHz
NPL41 B	405 ± 10 nm	6 ns to 38 ns	38 mW		
NPL45 B	450 ± 10 nm	5 ns to 39 ns	75 mW		
NPL49 B	488 ± 10 nm	6 ns to 39 ns	50 mW		
NPL52 B	520 ± 10 nm	5 ns to 39 ns	30 mW		
NPL64 B	640 ± 10 nm	5 ns to 39 ns	50 mW		

NPL79 B	785 ± 10 nm	6 ns to 39 ns	88 mW	Yes	10 MHz
NPL82 B	820 ± 10 nm	6 ns to 39 ns	88 mW		
NPL91 B	905 ± 10 nm	6 ns to 39 ns	88 mW		
NPL98 B	980 ± 10 nm	6 ns to 39 ns	38 mW		
NPL41 C	405 ± 10 nm	6 ns to 129 ns	1000 mW	No	50 kHz
NPL45 C	450 ± 10 nm		1600 mW		
NPL52 C	520 ± 10 nm		1500 mW		
NPL64 C	640 ± 10 nm		1000 mW		
NPL81 C	808 ± 10 nm		1500 mW		
NPL94 C	940 ± 10 nm		1000 mW		

TECHNICAL DATA

OPTICAL SPECIFICATION

Item #	NPL64A	NPL41B	NPL45B	NPL49B	NPL52B
--------	--------	--------	--------	--------	--------

Center Wavelength (Typ.)		640 ± 10 nm	405 ± 10 nm	450 ± 10 nm	488 ± 10 nm	520 ± 10 nm
Pulse Width (FWHM)	Min _a	10 ± 1 ns _b	6 ± 1 ns	5 ± 1 ns	6 ± 1 ns	5 ± 1 ns
	Max _a		38 ± 3 ns	39 ± 3 ns	39 ± 3 ns	39 ± 3 ns
Internal Trigger		No	Yes (1, 5, or 10 MHz)			
Max Trigger Frequency ^c		10 MHz				
Pulse Energy (Typ. Max) ^d		0.12 nJ	1.5 nJ	3.0 nJ	2.0 nJ	1.2 nJ
Average Power (Max) _d		1.2 mW	15 mW	30 mW	20 mW	12 mW
Peak Power (Typ. Max) _e		13 mW	38 mW	75 mW	50 mW	30 mW
Beam Pointing Accuracy ^f		≤3°				
Beam Divergence (1/e ²), Typ. ^g	Major	1.5 mrad	0.5 mrad	0.5 mrad	0.5 mrad	1.5 mrad
	Minor	0.5 mrad	0.3 mrad	0.25 mrad	0.3 mrad	0.5 mrad
Beam Full Width (1/e ²) at 5.0 m _g	Major	5.3 mm	2.5 mm	3.3 mm	3.0 mm	3.2 mm
	Minor	2.1 mm	1.7 mm	1.6 mm	1.8 mm	2.0 mm

Collimating Lens	C340TM D-B	C610TMD-A
-------------------------	---------------	-----------

- The pulse widths of lasers with Item # suffix B or C are adjustable over 16 discrete settings, from the minimum to the maximum specified widths. Refer to the web presentation for plots of typical pulses as well as plots of typical pulse widths vs. the pulse width control setting.
- Pulse widths are of fixed duration. Refer to the web presentation for plots of typical pulses.
- The maximum supported edge transition time is 1 ms.
- These specifications are given for operation at the max repetition rate and with the greatest pulse width achievable by the laser.
- This specification is a typical maximum and is given for pulses that reach maximum output power. Some short duration pulses do not reach maximum output power and therefore have reduced average output powers.
- Relative to a beam axis normal to the plane of the front panel.
- The major axis of the ellipse is vertically oriented when the bottom surface of the laser head is in the horizontal plane.

Item #		NPL64B	NPL79B	NPL82B	NPL91B	NPL98B
Center Wavelength (Typ.)		640 ± 10 nm	785 ± 10 nm	820 ± 10 nm	905 ± 10 nm	980 ± 10 nm
Pulse Width (FWHM)	Min	5 ± 1 ns	6 ± 1 ns	6 ± 1 ns	6 ± 1 ns	6 ± 1 ns
	Max	39 ± 3 ns	39 ± 3 ns	39 ± 3 ns	39 ± 3 ns	39 ± 3 ns
Internal Trigger		Yes (1, 5, or 10 MHz)				
Max Trigger Frequency^c		10 MHz				

Pulse Energy (Typ. Max)^d		2.0 nJ	3.5 nJ	3.5 nJ	3.5 nJ	1.5 nJ
Average Power (Max)^d		20 mW	35 mW	35 mW	35 mW	15 mW
Peak Power (Typ. Max)^e		50 mW	88 mW	88 mW	88 mW	38 mW
Beam Pointing Accuracy^f		$\leq 3^\circ$				
Beam Divergence (1/e²), Typ.^g	Major	1.5 mrad	0.3 mrad	0.5 mrad	1.0 mrad	0.5 mrad
	Minor	0.5 mrad	0.15 mrad	0.6 mrad	0.5 mrad	0.5 mrad
Beam Full Width (1/e²) at 5.0 m^g	Major	4.8 mm	3.8 mm	2.9 mm	5.0 mm	2.6 mm
	Minor	2.7 mm	3.3 mm	1.4 mm	2.8 mm	1.3 mm
Collimating Lens		C340TMD-B		A375TM-B	C340TMD-B	A375TM-B

- The pulse widths of lasers with Item # suffix B or C are adjustable over 16 discrete settings, from the minimum to the maximum specified widths. Refer to the web presentation for plots of typical pulses as well as plots of typical pulse widths vs. the pulse width control setting.
- Pulse widths are of fixed duration. Refer to the web presentation for plots of typical pulses.
- The maximum supported edge transition time is 1 ms.
- These specifications are given for operation at the max repetition rate and with the greatest pulse width achievable by the laser.
- This specification is a typical maximum and is given for pulses that reach maximum

output power. Some short duration pulses do not reach maximum output power and therefore have reduced average output powers.

- Relative to a beam axis normal to the plane of the front panel.
- The major axis of the ellipse is vertically oriented when the bottom surface of the laser head is in the horizontal plane.

Item #		NPL41 C	NPL45 C	NPL52 C	NPL64 C	NPL81 C	NPL94C
Center Wavelength (Typ.)		405 ± 1 0 nm	450 ± 1 0 nm	520 ± 1 0 nm	640 ± 1 0 nm	808 ± 1 0 nm	940 ± 10 nm
Pulse Width (FWHM)	Min ^a	6 ± 1 ns					
	Max _a	129 ± 5 ns					
Internal Trigger		No					
Max Trigger Frequency ^c		50 kHz					
Pulse Energy (Typ. Max) ^d		128 nJ	204 nJ	186 nJ	126 nJ	186 nJ	129 nJ
Average Power (Max) ^d		6.4 mW	10.2 mW	9.3 mW	6.3 mW	9.3 mW	6.5 mW
Peak Power (Typ. Max) ^e		1000 mW	1600 mW	1500 mW	1000 mW	1500 mW	1000 mW
Beam Pointing Accuracy ^f		≤3°					
Beam Divergence (1/e ²), T	Maj or	4.9 mrad	2.4 mrad	3.7 mrad	10.2 mrad	9.5 mrad	7.2 mrad

yp.⁹	Min or	0.2 mrad	0.14 mrad	0.6 mrad	0.5 mrad	0.85 mrad	0.28 mrad
Beam Full Width (1/e²) at 5.0 m⁹	Maj or	21 mm	19.2 mm	16.5 mm	43 mm	49 mm	47 mm
	Min or	1.0 mm	1.3 mm	1.9 mm	1.2 mm	1.3 mm	1.6 mm
Collimating Lens		C610TMD-A			C610TMD-B	A397TM-B	

- The pulse widths of lasers with Item # suffix B or C are adjustable over 16 discrete settings, from the minimum to the maximum specified widths. Refer to the web presentation for plots of typical pulses as well as plots of typical pulse widths vs. the pulse width control setting.
- Pulse widths are of fixed duration. Refer to the web presentation for plots of typical pulses.
- The maximum supported edge transition time is 1 ms.
- This specification is given for operation at the max repetition rate and with the greatest pulse width achievable by the laser.
- These specifications are typical maxima and are given for pulses that reach maximum output power. Some short duration pulses do not reach maximum output power and therefore have reduced average output powers.
- Relative to a beam axis normal to the plane of the front panel.
- The major axis of the ellipse is vertically oriented when the bottom surface of the laser head is in the horizontal plane.

Trigger Specifications

Parameter		Specification
Coupling		AC Coupled
	Item # Suffix A or B	10 MHz

Max Input Frequency^a	Item # Suffix C	50 kHz
Input Voltage		200 mVpp to 2 Vpp
Input Impedance		5 kΩ
Output Voltage^b		900 mV (Hi-Z Load) 600 mV (50 Ω Load)
Max Jitter^c		20 ps RMS 100 ps Peak-to-Peak
Delay from External Trigger Input to Optical Output^d		35 ns ± 5 ns
Delay from Internal Trigger to Optical Output^b		28 ns ± 5 ns

- The maximum supported edge transition time is 1 ms.
- Available only on NPL series lasers with Item # suffix B.
- Applies to external triggering (all Item #s) and internal triggering (only models with Item # suffix B).
- External trigger delay is measured between the Trigger SMA connector and the optical output at the lens.

Power, Environmental, and Physical Specifications

Parameter	Specification
DC Input Voltage Range to Laser Head	14 V to 16 V
DC Input Current to Laser Head	800 mA Max
AC Input Frequency Range to DS15 Power Supply	50 Hz – 60 Hz

AC Input Voltage to DS15 Power Supply		100 V to 240 V
Operating Temperature Range		10 °C to 40 °C
Storage Temperature Range		0 °C to 50 °C
Humidity Range (RH)		5% to 85%
Dimensions (L x W x H)	Without ECM225 Clamps	139.6 mm x 61.5 mm x 48.7 mm (5.49" x 2.42" x 1.92")
	With ECM225 Clamps	139.6 mm x 61.5 mm x 54.7 mm (5.49" x 2.42" x 2.15")

Mechanical Drawings

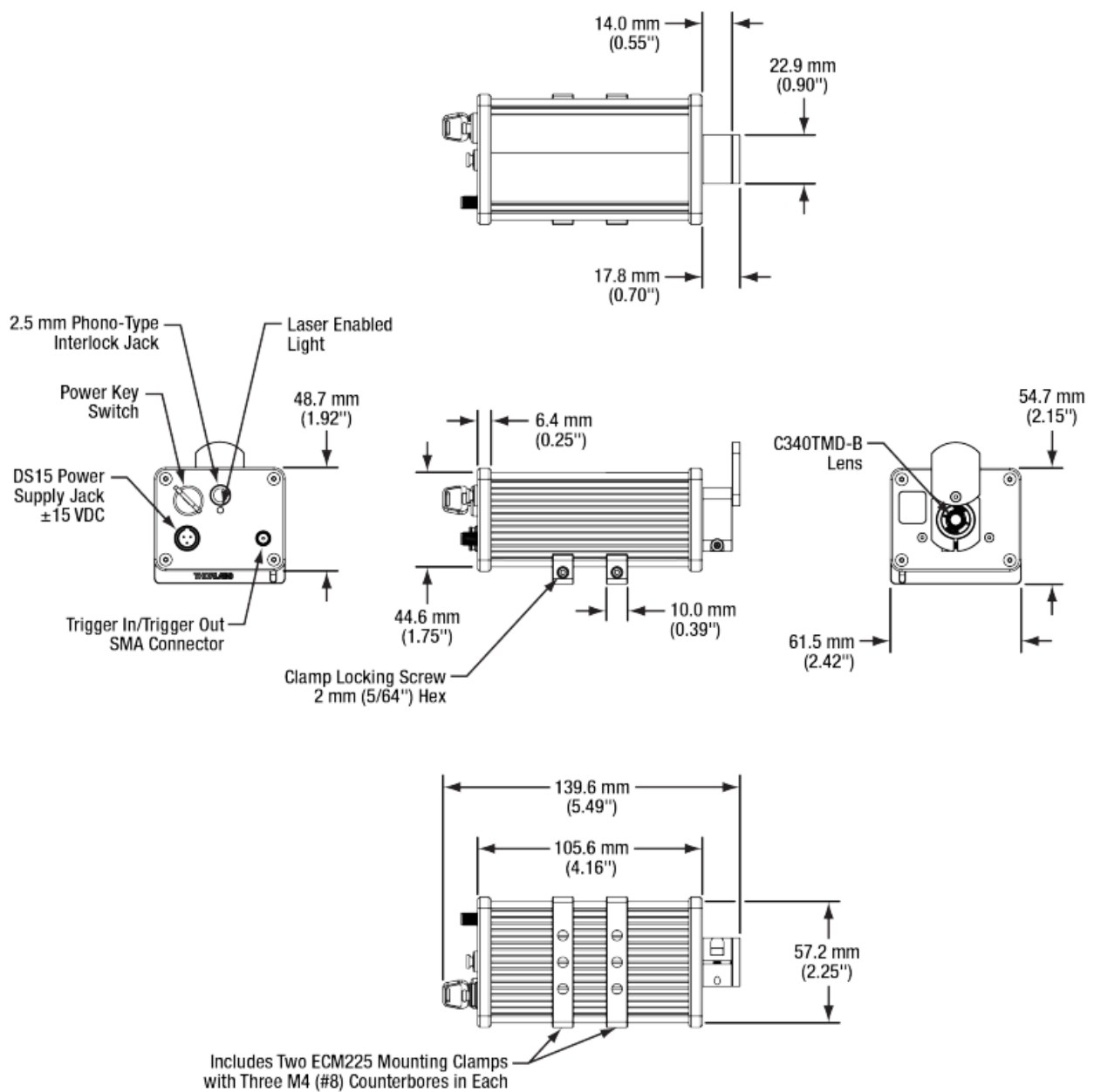


Figure 1 Mechanical Drawing of the NPL64A

*Accepts 2.5 mm Flathead Screwdriver
 **Included Lens Depends on Laser Model,
 See Specifications Table

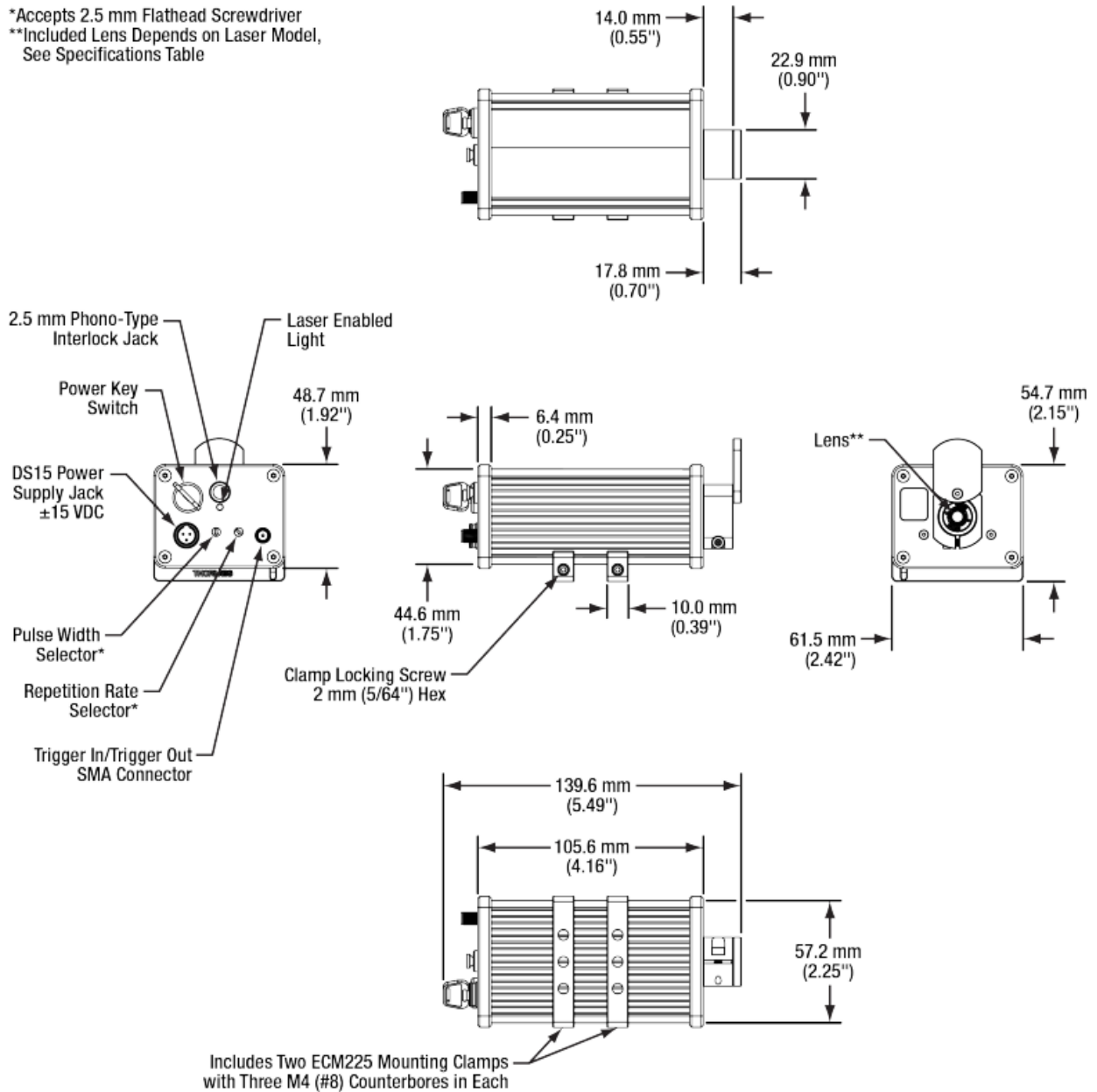


Figure 2 Mechanical Drawing for NPL Series Lasers with Item # Suffix B

*Accepts 2.5 mm Flathead Screwdriver
 **Included Lens Depends on Laser Model,
 See Specifications Table

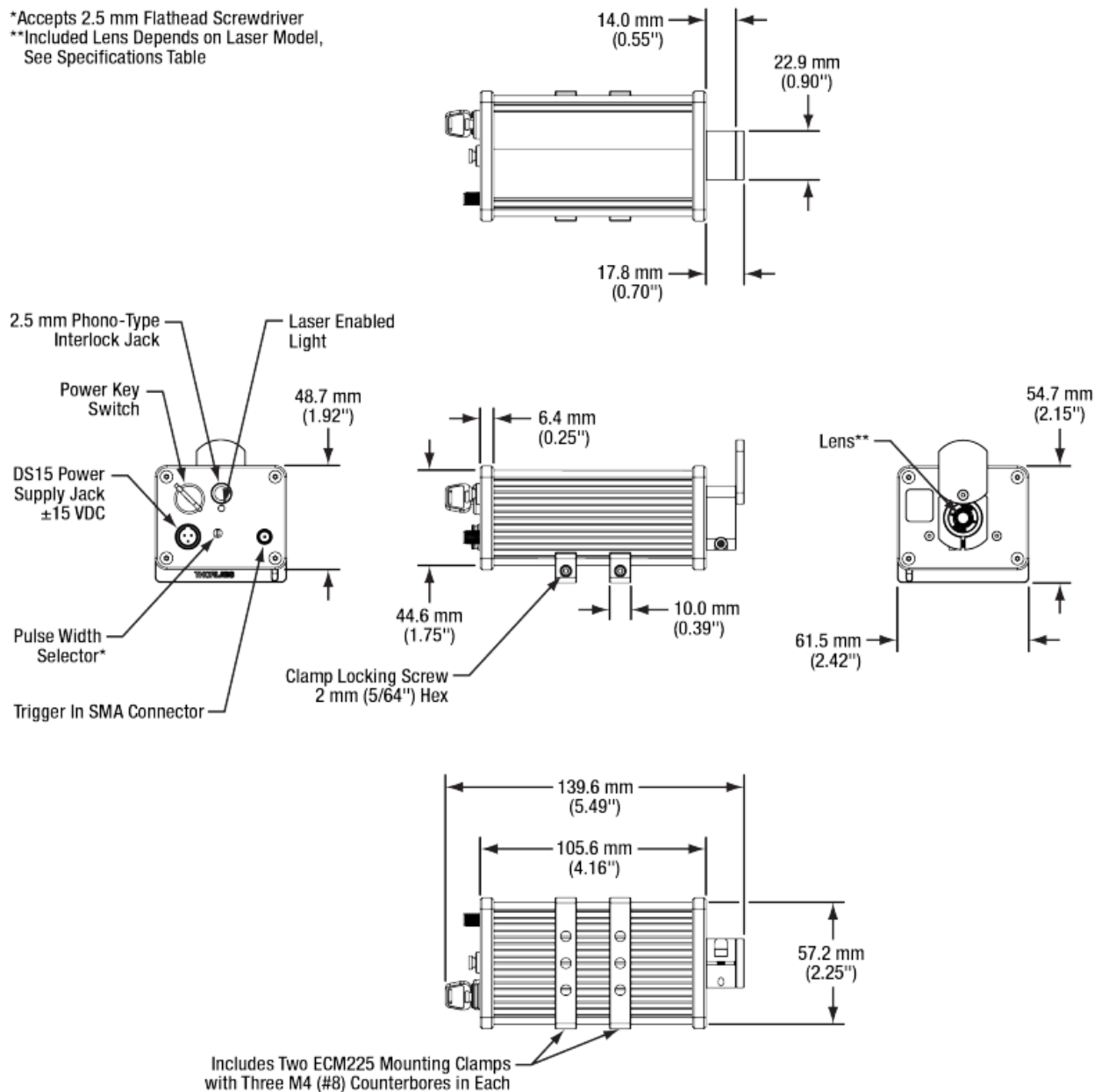


Figure 3 Mechanical Drawing for NPL Series Lasers with Item # Suffix C

Inputs and Controls

The only differences in the back panels of the A, B, and C versions, shown below, are the pulse width and repetition rate controls. Models with Item # suffix A have neither, suffix B models have both pulse width and repetition rate control, and suffix C models have only pulse width control. In these images, the shorting device (interlock pin) that ships installed in the interlock jack has been removed.



Figure 4 Back Panel of NPL64A Laser



Figure 5 Back Panel of NPL Series Lasers with Item # Suffix B



Figure 6 Back Panel of NPL Series Lasers with Item # Suffix C

Simplified Declaration of Conformity

The full text of the EU declaration of conformity is available at the following internet address: https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=10823

FCC Designation

The following statement applies to the products covered in this manual, unless otherwise specified herein. The statement for other products will appear in the accompanying documentation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules, and meets all requirements of the Canadian Interference Causing Equipment Standard ICES-003 for digital apparatus.

These limits are designed to provide reasonable protection against harmful interference in an industrial installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. Thorlabs is not responsible for any radio television interference caused by modifications of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by Thorlabs. The correction of interference caused by such unauthorized modification, substitution or attachment will be the responsibility of the user. The use of shielded I/O cables is required when connecting this equipment to all optional peripherals or host devices. Failure to do so may violate FCC and ICES rules.

This product has been tested and found to comply with the limits according to IEC 61326-1 for using connection cables shorter than 3 meters (9.8 feet).

Safety

All statements regarding safety of operation and technical data in this instruction manual will only apply when the unit is operated correctly. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. Only with written consent from Thorlabs may changes to single components be carried out or components not supplied by Thorlabs be used.

Caution: ESD Sensitive Component

The components inside this instrument are ESD sensitive. Take all appropriate precautions to discharge personnel and equipment before making any connections to the unit.

Components not Water Resistant

NOTICE This instrument should be kept clear of environments where liquid spills or condensing moisture are likely. It is not water resistant. To avoid damage to the instrument, do not expose it to spray, liquids, or solvents.

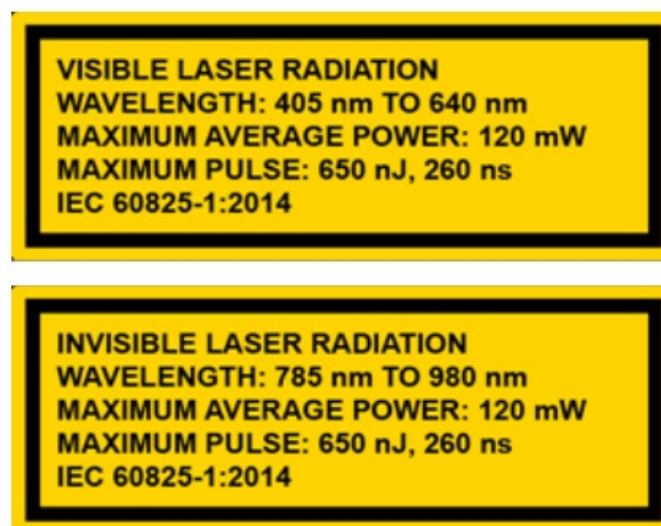
Caution: Follow Intended Usage Guidelines

NOTICE Inputs and outputs must only be connected with shielded connection cables. The safety of any system incorporating the equipment is the responsibility of the assembler of the system. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. Only with written consent from Thorlabs may changes to single components be carried out or components not supplied by Thorlabs be used. There are no user serviceable components inside this device

Laser Safety

Warning: Laser Radiation

This is a Class 3B laser system. Observe all safety precautions and wear protective eyewear appropriate for this type of device. Align system at lower output power if possible. Do not position device so that it is difficult to access the switch and interlock.



Caution – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.



Laser System with Item # Ending in A

VISIBLE LASER RADIATION
WAVELENGTH: 640 nm
MAXIMUM AVERAGE POWER: 6 mW
MAX PULSE: 0.5 nJ, 20 ns
IEC 60825-1:2014+A11:2021

Laser Systems with Item #s Ending in B

VISIBLE LASER RADIATION
WAVELENGTH: 405 nm
MAXIMUM AVERAGE POWER: 45 mW
MAX PULSE: 3 nJ, 60 ns
IEC 60825-1:2014+A11:2021

VISIBLE LASER RADIATION
WAVELENGTH: 450 nm
MAXIMUM AVERAGE POWER: 120 mW
MAX PULSE: 18 nJ, 150 ns
IEC 60825-1:2014+A11:2021

VISIBLE LASER RADIATION
WAVELENGTH: 488 nm
MAXIMUM AVERAGE POWER: 60 mW
MAX PULSE: 4 nJ, 60 ns
IEC 60825-1:2014+A11:2021

VISIBLE LASER RADIATION
WAVELENGTH: 520 nm
MAXIMUM AVERAGE POWER: 50 mW
MAX PULSE: 3 nJ, 60 ns
IEC 60825-1:2014+A11:2021

VISIBLE LASER RADIATION
WAVELENGTH: 640 nm
MAXIMUM AVERAGE POWER: 35 mW
MAX PULSE: 5 nJ, 60 ns
IEC 60825-1:2014+A11:2021

INVISIBLE LASER RADIATION
WAVELENGTH: 785 nm
MAXIMUM AVERAGE POWER: 60 mW
MAX PULSE: 5 nJ, 60 ns
IEC 60825-1:2014+A11:2021

INVISIBLE LASER RADIATION
WAVELENGTH: 808 nm
MAXIMUM AVERAGE POWER: 50 mW
MAX PULSE: 500 nJ, 260 ns
IEC 60825-1:2014

INVISIBLE LASER RADIATION
WAVELENGTH: 905 nm
MAXIMUM AVERAGE POWER: 60 mW
MAX PULSE: 5 nJ, 60 ns
IEC 60825-1:2014+A11:2021

INVISIBLE LASER RADIATION
WAVELENGTH: 980 nm
MAXIMUM AVERAGE POWER: 45 mW
MAX PULSE: 3 nJ, 60 ns
IEC 60825-1:2014

Laser Systems with Item #s Ending in C

VISIBLE LASER RADIATION
WAVELENGTH: 405 nm
MAXIMUM AVERAGE POWER: 40 mW
MAX PULSE: 400 nJ, 260 ns
IEC 60825-1:2014+A11:2021

VISIBLE LASER RADIATION
WAVELENGTH: 450 nm
MAXIMUM AVERAGE POWER: 65 mW
MAX PULSE: 650 nJ, 260 ns
IEC 60825-1:2014+A11:2021

VISIBLE LASER RADIATION
WAVELENGTH: 520 nm
MAXIMUM AVERAGE POWER: 50 mW
MAX PULSE: 500 nJ, 260 ns
IEC 60825-1:2014

VISIBLE LASER RADIATION
WAVELENGTH: 640 nm
MAXIMUM AVERAGE POWER: 40 mW
MAX PULSE: 400 nJ, 260 ns
IEC 60825-1:2014+A11:2021

INVISIBLE LASER RADIATION
WAVELENGTH: 808 nm
MAXIMUM AVERAGE POWER: 50 mW
MAX PULSE: 500 nJ, 260 ns
IEC 60825-1:2014

INVISIBLE LASER RADIATION
WAVELENGTH: 940 nm
MAXIMUM AVERAGE POWER: 40 mW
MAX PULSE: 400 nJ, 260 ns
IEC 60825-1:2014+A11:2021

Installation

Packing List

1. Laser System with Item # Ending in A
 - NPL64A Laser Head
 - DS15 +15 V Power Supply
 - Two ECM225 Aluminum Clamps
 - Interlock Pin Installed in Interlock Port

- Set of Keys for the Key Switch
 - Quick Start and Safety Guide
2. Laser Systems with Item #s Ending in B or C
- NPL Series Laser Head
 - DS15 +15 V Power Supply
 - Two ECM225 Aluminum Clamps
 - Flathead Screwdriver with 2.5 mm Edge
 - Interlock Pin Installed in Interlock Port
 - Set of Keys for the Key Switch
 - Quick Start and Safety Guide

Quick Start Guide

1. Mount the laser head as needed using the supplied ECM225 clamps and either imperial or metric screws. After screwing the ECM225 clamps to any convenient base or post, such as one of Thorlabs' TR series optical posts, snap the clamps on to the bottom side of the NPL housing. Firmly tighten the clamps using the locking screws. Figure 4 shows an example of an NPL laser head mounted on an optical table.
2. Orient the laser to ensure the output beam will be safely contained.
3. Connect the power supply cable to the head, and then plug the power supply into mains power.
4. Make sure the shutter has been rotated to the closed position and interlock pin is in place at this time. An external interlock circuit can be added later for more convenient integration of the interlock safety feature.
5. Put on laser safety goggles if your situation requires them.
6. Turn the power switch on using the key switch.
7. The dual color LED indicator (red/blue) will blink until the laser temperature has stabilized. Initial warm up can take 30 – 60 seconds. The indicator will then glow continuously when the laser output is enabled. Note there is a four second delay between the time the indicator glows solid and laser output is enabled. Note also that there will be no optical output unless the laser is triggered. The B versions are triggered either externally or via internal oscillator, and the A and C versions require an external trigger.
8. Ensure the laser is pointing in a safe direction, and then rotate the shutter to the open

position. For the B and C versions of the laser, note that adjusting the variable pulse width and/or repetition rate controls will change the average output power.

Note the beam shape is asymmetric as is typical of solid-state diode lasers that do not use anamorphic optical components to circularize the beam. Anamorphic elements, such as anamorphic prism pairs, are available from Thorlabs.



Figure 7 *Laser Head Mounted Using the Included ECM225 Clamps*

Operation

Block Diagram

The block diagram in Error! Reference source not found. depicts the internal architecture of the laser head, which contains all of the pulser drive electronics, safety interlocks, and trigger circuits, as well as the temperature stabilization system. The dual color LED indicator (red/blue) is designed to be visible through most laser safety glasses. It blinks during the 30 -60 s warm up and glows continuously while the laser is enabled.

Power is supplied by the included +15 V power supply. For the B versions of the laser, nothing else is required to produce stable trains of nanosecond laser pulses. The A and C versions require only the application of an external trigger. The elements unique to the B versions are noted in Figure 3 by the yellow blocks. The Repetition Rate Control and Oscillators provide internally-generated trigger signals, which make it possible for the B versions to produce stable trains of nanosecond pulses without an external trigger.

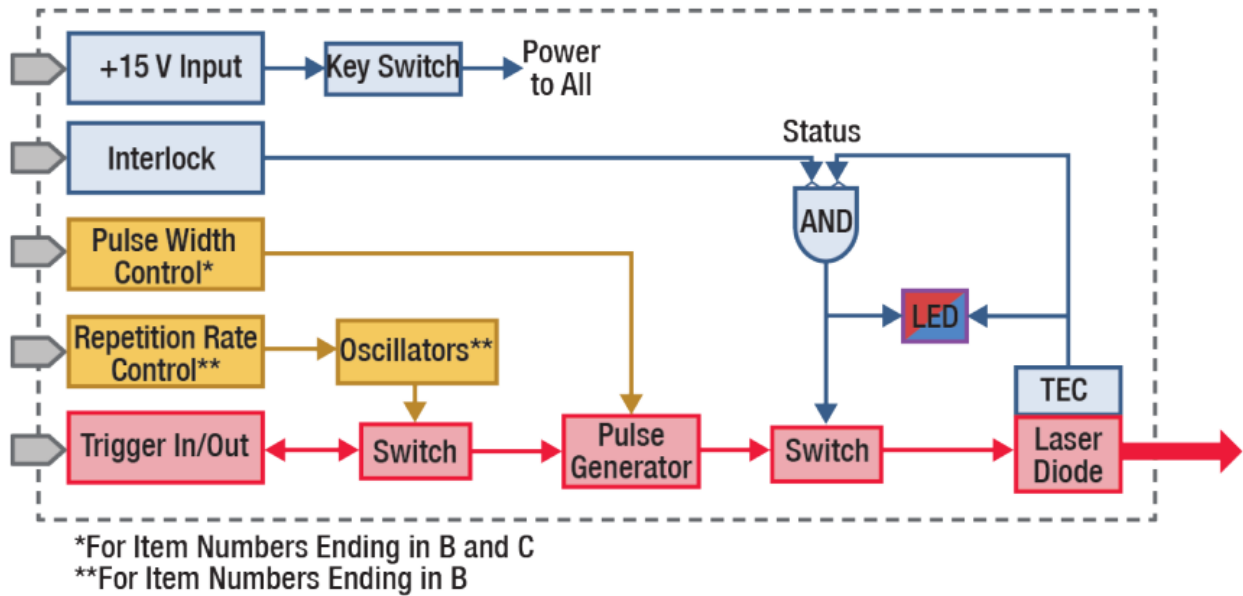


Figure 8 Block Diagram of the NPL Series Laser Head

Power

Power is supplied by the external, +15 V, wall-mounted DS15 Power Supply included with the unit and shown in the left image of Figure 9. The power supply includes a location-specific plug. The mini-XLR type connector, which uses a latching mechanism to prevent accidental pull-out, plugs into the laser head as shown in the right image of Figure 9.



Figure 9 The DS15 Power Supply (left) connects to the back panel of the laser head (right).

The key switch controls power to all internal components. When the key switch is turned on, the temperature stabilization system is activated. There is a 30 – 60 second warm up, during which time the LED indicator light blinks. When the LED stops blinking, there is an additional four second delay and then laser is enabled. Note there will not be any optical output until the interlock is satisfied, a trigger signal is supplied, and the shutter is opened.

Interlock Circuit

The laser is equipped with a phono-type interlock jack located on the back panel. To enable the laser source, a short circuit must be applied across the terminals of the interlock connector. The shorting device (interlock pin) installed in all units shipped from Thorlabs performs this function. Leave the shorting device installed unless using an external safety circuit or other type of remotely controlled switch to enable laser output.

Making use of the Interlock feature requires the appropriate 2.5 mm phono-type plug, which is shown in the left diagram of Figure 10 and is readily available through most electronics retailers. The plug should be wired to the external safety circuit or switch and then plugged into the back panel's interlock jack in place of the shorting device. The electrical specifications of the interlock jack are listed in the following table, and the circuit schematic describing how the interlock jack is connected inside the laser head is shown in the right diagram of Figure 10.

Parameter	Specification
Interlock Switch Requirements	Must be Normally Open Dry Contacts, Apply no External Voltages to the Interlock Input
Type of Mating Connector	2.5 mm Mono Phono Jack
Open Circuit Voltage	5 VDC (Center Pin is at 5 VDC, Ring is Ground)

The user's safety circuit must be attached to the phono plug and wired such that the ring and center pin are shorted when it is safe to enable the laser. The laser will be enabled when connection is closed. If it changes to an open state, the laser source will turn off.

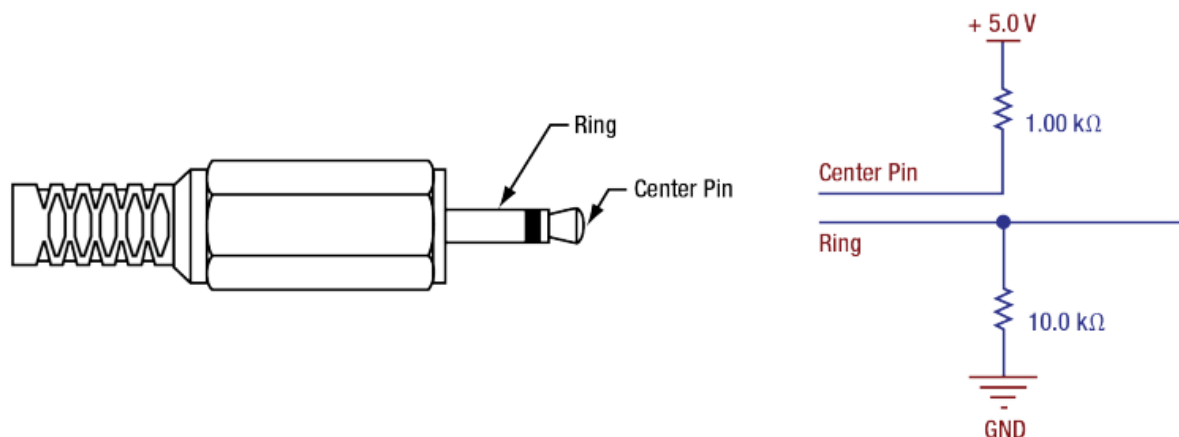


Figure 10 The interlock circuitry internal to the laser head (right) applies a 5 VDC bias across the ring and center pin of the phono-type plug (left). An external circuit that shorts the ring and center pin enables the laser.

Pulse Widths and Repetition Rates

NPL series lasers with Item # suffix A and C require a user trigger input to the SMA connector on the back panel. The NPL64A laser supports rates up to 10 MHz. The C version supports rates up to 50 kHz. The slowest supported edge transition time for the trigger signal is 1 ms. See the specifications in Section 1.4 for correct voltage levels.

Lasers with Item # suffix B offer additional controls for varying repetition rate using internal oscillators as well as selecting a user trigger. Use the included 2.5 mm flathead screwdriver to operate these controls. The photograph in Figure 11 shows three oscillator settings: A, B, and C. These positions provide repetition frequencies of 1 MHz, 5 MHz, and 10 MHz, respectively. Position D allows the user to apply an external signal to trigger the laser pulses. This control can be seen immediately to the right of the pulse width control in the photo and can be adjusted with the same small screwdriver.

Lasers with Item # suffix B and C offer controls for varying the pulse width. Use the included 2.5 mm flathead screwdriver to operate this control as shown in Figure 11. The range of pulse widths for each model are listed in the specifications tables in Section 1.4.1. The pulse width control directly programs the pulse generator and has 16 positions, which allows the pulse width to be adjusted in approximately 15 equal increments. Plots of typical pulses and of typical pulse width as a function of control setting are available in the web presentation.



Figure 11 Use the included 2.5 mm flathead screwdriver to adjust the pulse width and repetition rate controls.

Trigger Port

The Trigger In/Out port has dual function. If the internal oscillators are used (on B models), then the Trigger port provides an output signal that is synchronized with the pulse generation. In the user-triggered mode, the SMA port allows external trigger signals to drive the pulse generator. See the Specifications tables in Section 1.4 for the correct signal levels and port impedances.

Optical Output

The optical output is finally enabled by opening the safety shutter. This is done by rotating the flap through 180°. Magnets will hold the flap either in the open or closed position. Note that the shutter is permanently attached.

Maintenance and Cleaning

The NPL laser should not require regular maintenance. If necessary, the housing can be cleaned using a soft cloth moistened with a mild glass cleaner. Do not use acetone, chemical solvents, or harsh cleaning solutions, and do not spray cleaning solutions directly onto the unit. See Chapter 6 for advice on cleaning the lens.

The NPL does not contain any user-serviceable components. If malfunctions occur, please contact Thorlabs' technical support (techsupport@thorlabs.com). Do not disassemble the unit.

See the troubleshooting guide below for basic help.

Troubleshooting and Repair

Problem	Suggested Checks
No Output	<p>Check that power is supplied and connected properly. Check that key switch is turned on.</p> <p>Confirm that laser is warmed up (30 – 60 s). Confirm the interlock circuit is complete.</p> <p>Check that the indicator LED is glowing continuously. Check that a trigger signal is being provided.</p> <p>Check that the shutter is open.</p>
Beam is Distorted	<p>Check to see if the lens is dirty. If so, see the cleaning instructions in “Lens is Dirty.”</p>
Lens is Dirty	<p>Blow any loose dust off with dry air.</p> <p>If lens requires further cleaning, gently wipe with lens tissue that is moistened with either isopropyl or methyl alcohol. Do not apply drops of solvent directly to the lens. Do not use acetone or other aggressive solvents.</p>
Power is Low	<p>NPL64A: Check the trigger frequency.</p> <p>Item # Suffix B: Check the trigger frequency and settings of pulse width and repetition rate controls.</p> <p>Item # Suffix C: Check the trigger frequency and pulse width control settings.</p>

Disposal

Thorlabs verifies our compliance with the WEEE (Waste Electrical and Electronic Equipment) directive of the European Community and the corresponding national laws. Accordingly, all end users in the EC may return “end of life” Annex I category electrical and electronic equipment sold after August 13, 2005 to Thorlabs, without incurring disposal charges.

Eligible units are marked with the crossed out “wheelie bin” logo (see right), were sold to and are currently owned by a company or institute within the EC and are not disassembled or contaminated. Contact Thorlabs for more information. Waste treatment is your own responsibility. “End of life” units must be returned to Thorlabs or handed to a company specializing in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site. It is the user’s responsibility to delete all private data stored on the device prior to disposal.



Thorlabs Worldwide Contacts

For technical support or sales inquiries, please visit us at www.thorlabs.com/contact for our most up-to-date contact information.



Corporate Headquarters

Thorlabs, Inc.
43 Sparta Ave
Newton, New Jersey 07860
United States
sales@thorlabs.com
techsupport@thorlabs.com

Product Manufacturer

Thorlabs, Inc.
43 Sparta Ave
Newton, New Jersey 07860
United States
sales@thorlabs.com
techsupport@thorlabs.com

EU Importer

Thorlabs GmbH
Münchner Weg 1
D-85232 Bergkirchen
Germany
sales.de@thorlabs.com
europa@thorlabs.com

UK Importer

Thorlabs Ltd.
204 Lancaster Way Business Park
Ely CB6 3NX
United Kingdom
sales.uk@thorlabs.com
techsupport.uk@thorlabs.com

www.thorlabs.com

FAQ


Q: How do I adjust the laser intensity?

A: To adjust the laser intensity, refer to the controls section in the user manual...

Q: What is the recommended maintenance schedule?

A: The recommended maintenance schedule includes regular cleaning of optics and checking for any loose connections...

Documents / Resources

	<p>THORLABS NPL Series Nanosecond Pulsed Lasers [pdf] User Guide</p> <p>NPL94C, NPL Series Nanosecond Pulsed Lasers, NPL Series, Nanosecond Pulsed Lasers, Pulsed Lasers, Lasers</p>
---	--

References

- [User Manual](#)

THORLABS

Lasers, Nanosecond Pulsed Lasers, NPL Series, NPL Series Nanosecond Pulsed Lasers, NPL94C, Pulsed Lasers, THORLABS

Leave a comment

Your email address will not be published. Required fields are marked *

Comment *

Name

Email

Website

☐ Save my name, email, and website in this browser for the next time I comment.

Post Comment

Search:

e.g. whirlpool wrf535swhz

Search

[Manuals+](#) | [Upload](#) | [Deep Search](#) | [Privacy Policy](#) | [@manuals.plus](#) | [YouTube](#)

This website is an independent publication and is neither affiliated with nor endorsed by any of the trademark owners. The "Bluetooth®" word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. The "Wi-Fi®" word mark and logos are registered trademarks owned by the Wi-Fi Alliance. Any use of these marks on this website does not imply any affiliation with or endorsement.