NPL Series
Nanosecond Pulsed Lasers

User Guide



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Chapter 1 Introduction

1.1 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.

1.2 Explanation of Safety Warnings

NOTICE 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.

1.3 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.

1.3.1 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 Wavelength	Pulse Width	Peak Output Power	Internal Trigger	Max Rep. Rate
NPL64A	640 ± 10 nm	10 ns	13 mW	No	10 MHz
NPL41B	405 ± 10 nm	6 ns to 38 ns	38 mW	Yes	10 MHz
NPL45B	450 ± 10 nm	5 ns to 39 ns	75 mW		
NPL49B	488 ± 10 nm	6 ns to 39 ns	50 mW		
NPL52B	520 ± 10 nm	5 ns to 39 ns	30 mW		
NPL64B	640 ± 10 nm	5 ns to 39 ns	50 mW		
NPL79B	785 ± 10 nm	6 ns to 39 ns	88 mW		
NPL82B	820 ± 10 nm	6 ns to 39 ns	88 mW		
NPL91B	905 ± 10 nm	6 ns to 39 ns	88 mW		
NPL98B	980 ± 10 nm	6 ns to 39 ns	38 mW		
NPL41C	405 ± 10 nm	6 ns to 129 ns	1000 mW	No	50 kHz
NPL45C	450 ± 10 nm		1600 mW		
NPL52C	520 ± 10 nm		1500 mW		
NPL64C	640 ± 10 nm		1000 mW		
NPL81C	808 ± 10 nm		1500 mW		
NPL94C	940 ± 10 nm		1000 mW		

1.4 Technical Data

1.4.1 Optical Specifications

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		C340TMD-B	C610TMD-A			

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.
b. Pulse widths are of fixed duration. Refer to the web presentation for plots of typical pulses.
c. The maximum supported edge transition time is 1 ms.
d. These specifications are given for operation at the max repetition rate and with the greatest pulse width achievable by the laser.
e. 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.
f. Relative to a beam axis normal to the plane of the front panel.
g. The major axis of the ellipse is vertically oriented when the bottom surface of the laser head is in the horizontal plane. This specification refers to the half-angle divergence.

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[a]	5 ± 1 ns	6 ± 1 ns	6 ± 1 ns	6 ± 1 ns	6 ± 1 ns
	Max[a]	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]		≤3°				
Beam Divergence ($1/e^2$), 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 ($1/e^2$) 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

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.
b. Pulse widths are of fixed duration. Refer to the web presentation for plots of typical pulses.
c. The maximum supported edge transition time is 1 ms.
d. These specifications are given for operation at the max repetition rate and with the greatest pulse width achievable by the laser.
e. 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.
f. Relative to a beam axis normal to the plane of the front panel.
g. The major axis of the ellipse is vertically oriented when the bottom surface of the laser head is in the horizontal plane. This specification refers to the half-angle divergence.

Item #		NPL41C	NPL45C	NPL52C	NPL64C	NPL81C	NPL94C
Center Wavelength (Typ.)		405 ± 10 nm	450 ± 10 nm	520 ± 10 nm	640 ± 10 nm	808 ± 10 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 ($1/e^2$), Typ.[g]	Major	4.9 mrad	2.4 mrad	3.7 mrad	10.2 mrad	9.5 mrad	7.2 mrad
	Minor	0.2 mrad	0.14 mrad	0.6 mrad	0.5 mrad	0.85 mrad	0.28 mrad
Beam Full Width ($1/e^2$) at 5.0 m[g]	Major	21 mm	19.2 mm	16.5 mm	43 mm	49 mm	47 mm
	Minor	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	

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.
b. Pulse widths are of fixed duration. Refer to the web presentation for plots of typical pulses.
c. The maximum supported edge transition time is 1 ms.
d. This specification is given for operation at the max repetition rate and with the greatest pulse width achievable by the laser.
e. 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.
f. Relative to a beam axis normal to the plane of the front panel.
g. The major axis of the ellipse is vertically oriented when the bottom surface of the laser head is in the horizontal plane. This specification refers to the half-angle divergence.

1.4.2 Trigger Specifications

Parameter		Specification
Coupling		AC Coupled
Max Input Frequency[a]	**Item # Suffix A or B**	10 MHz
	Item # Suffix C	50 kHz
Input Voltage		200 mV_{pp} to 2 V_{pp}
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

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

1.4.3 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")

1.4.4 Mechanical Drawings

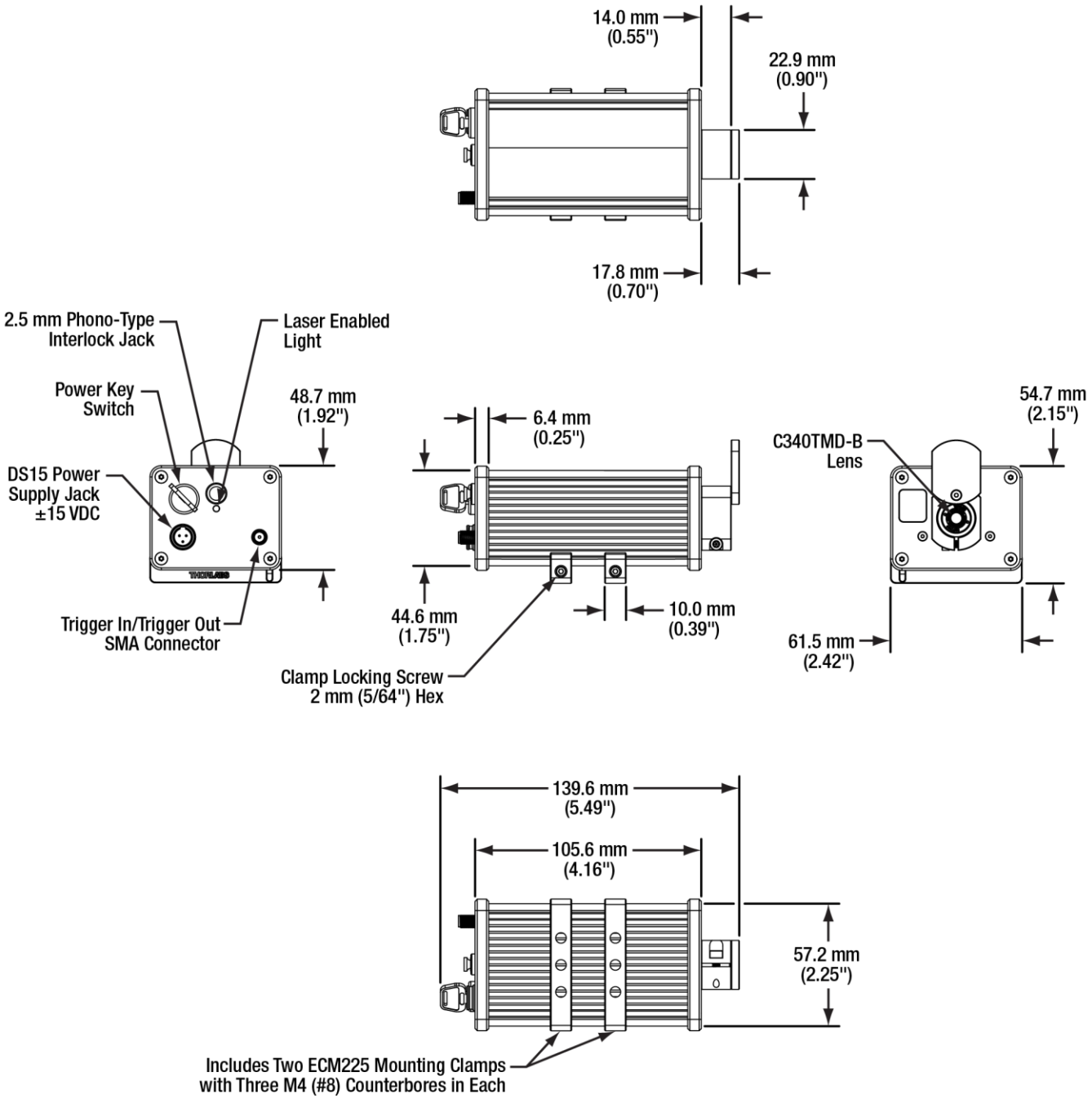


Figure 1 Mechanical Drawing of the NPL64A

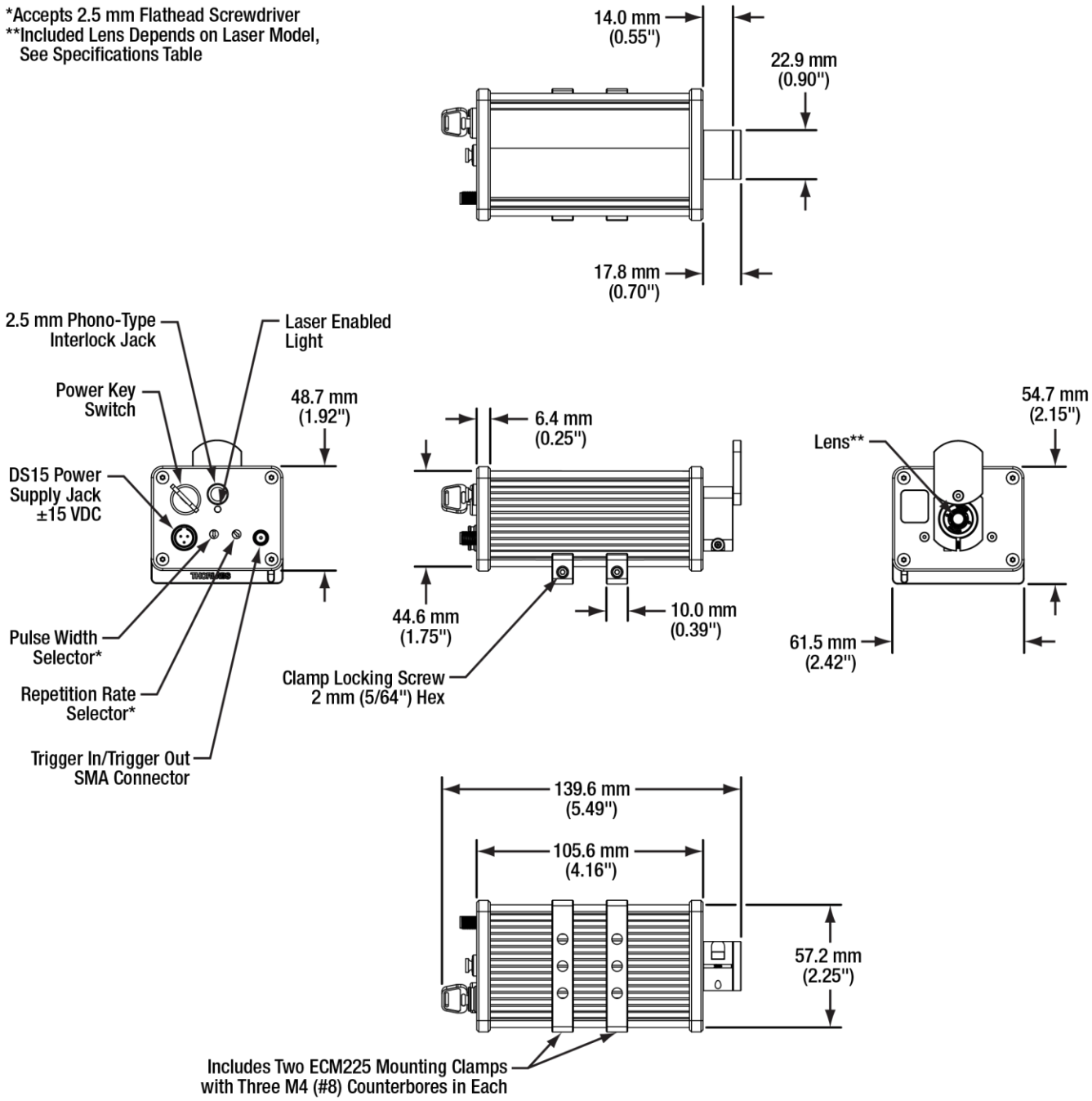


Figure 2 Mechanical Drawing for NPL Series Lasers with Item # Suffix B

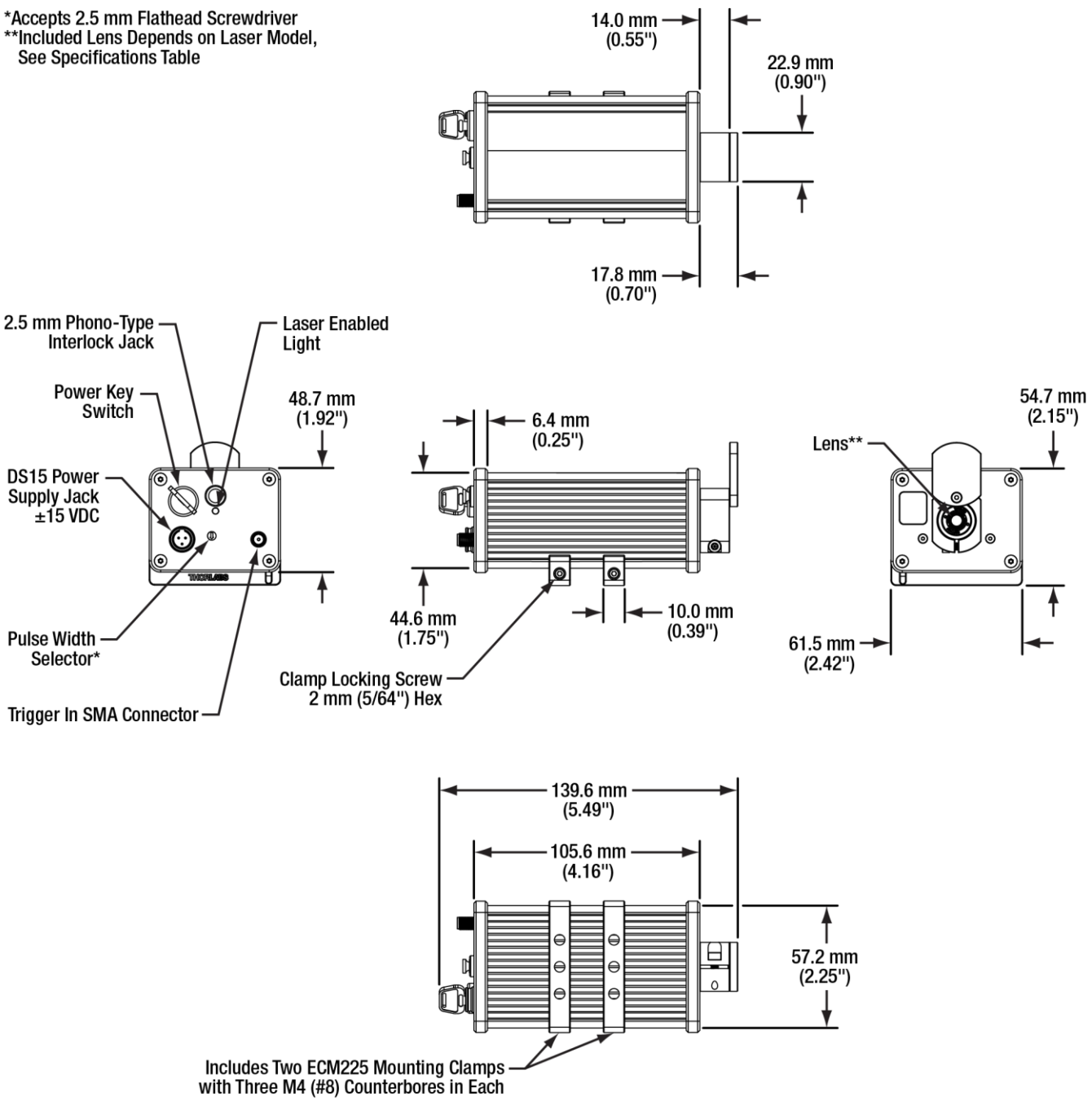


Figure 3 Mechanical Drawing for NPL Series Lasers with Item # Suffix C

1.5 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

1.6 Simplified Declaration of Conformity

The full text of the EU declaration of conformity is available at the following internet address: https://www.thorlabs.com/manuals

1.7 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).

Chapter 2 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.

NOTICE

Components not Water Resistant
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.

NOTICE

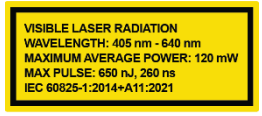
Caution: Follow Intended Usage Guidelines
Inputs and outputs must only be connected with shielded connection cables.

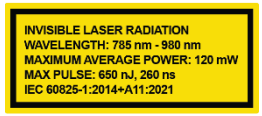
The safety of any system incorporating the equipment is the responsibility of the assembler of the system. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. Only with written consent from Thorlabs may changes to single components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

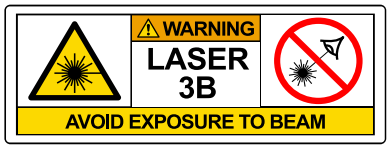
2.1 Laser Safety

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.

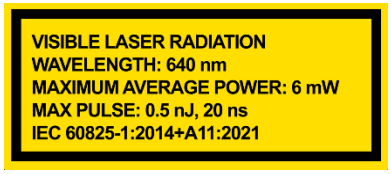
Caution - Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.



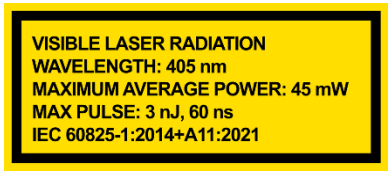


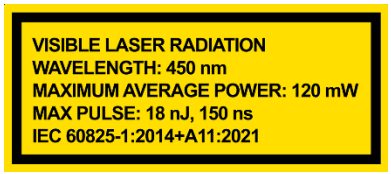


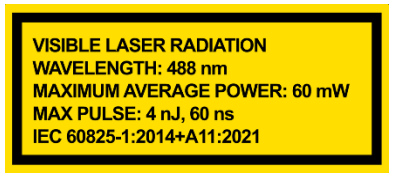
2.1.1 Laser System with Item # Ending in A

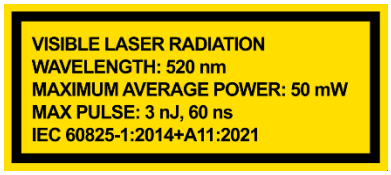


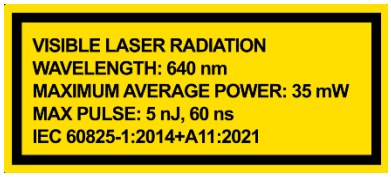
2.1.2 Laser Systems with Item #s Ending in B

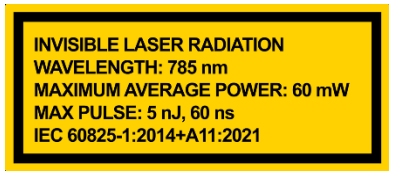


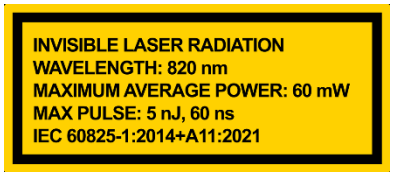


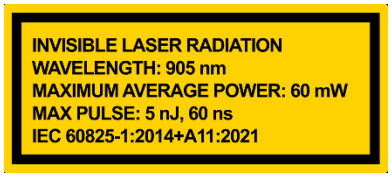


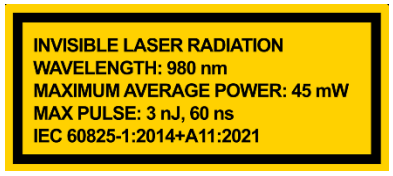




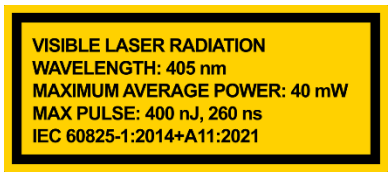


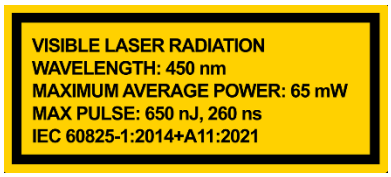


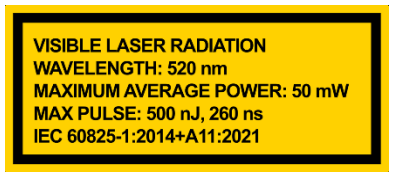


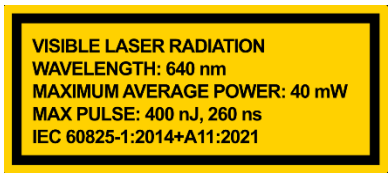


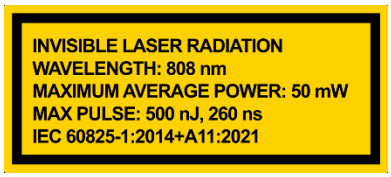
2.1.3 Laser Systems with Item #s Ending in C

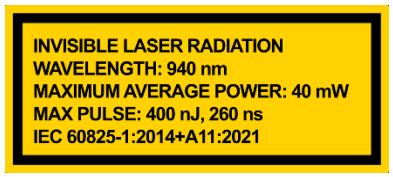












Chapter 3 Installation

3.1 Packing List

3.1.1 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

3.1.2 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

3.2 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 7 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

Chapter 4 Operation

4.1 Block Diagram

The block diagram in Figure 8 depicts the internal architecture of the laser head, which contains the pulser drive electronics, safety interlocks, trigger circuits, and 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 second warm up time 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 8 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.

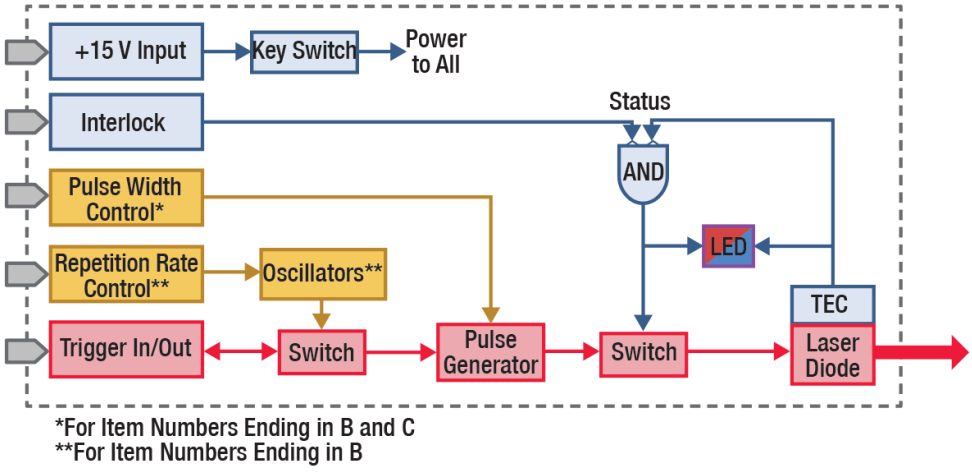


Figure 8 Block Diagram of the NPL Series Laser Head

4.2 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 time, during which the LED indicator blinks. When the LED stops blinking, there is an additional four second delay before the laser is enabled. There will not be any optical output until the interlock is satisfied, a trigger signal is supplied, and the shutter is opened.

4.3 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 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.

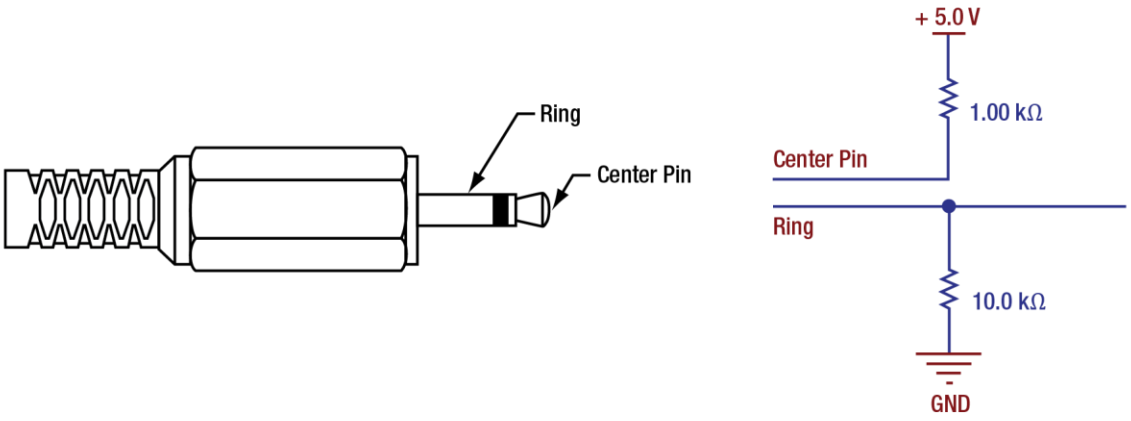


Figure 10 The interlock circuitry internal to the laser head (right) applies a 5 VDC bias across the ring and center pin of the phono-type plug (left). An external circuit that shorts the ring and center pin can enable the laser.

4.4 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 versions support 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 or a user-provided 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.

4.5 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. To ensure proper operation, do not apply an external trigger signal when operating in an internally triggered mode. 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.

4.6 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.

Chapter 5 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.

Chapter 6 Troubleshooting and Repair

Problem	Suggested Checks
No Output	Check that power is supplied and connected properly. Check that the key switch is turned on. Confirm that the laser is warmed up (30 - 60 s). Confirm that the interlock circuit is complete. Check that the indicator LED is glowing continuously. Check that a trigger signal is being provided. Check that the shutter is open.
Beam is Distorted	Check to see if the lens is dirty. If so, see the cleaning instructions in "Lens is Dirty."
Lens is Dirty	Blow any loose dust off with dry air. 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.
Power is Low	NPL64A: Check the trigger frequency. Item # Suffix B: Check the trigger frequency and settings of pulse width and repetition rate controls. Item # Suffix C: Check the trigger frequency and pulse width control settings.

Chapter 7 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 dissembled 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.

Chapter 8 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.



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