



LDM405, LDM635, LDM670, LDM785, LDM850, LDM1550 Laser Diode Modules

User Guide



















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Chapter 1 Warning Symbol Definitions

Below is a list of warning symbols you may encounter in this manual or on your device.

Symbol	Description
	Direct Current
	Alternating Current
	Both Direct and Alternating Current
	Earth Ground Terminal
	Protective Conductor Terminal
	Frame or Chassis Terminal
	Equipotentiality
	On (Supply)
	Off (Supply)
	In Position of a Bi-Stable Push Control
	Out Position of a Bi-Stable Push Control
	Caution: Risk of Electric Shock
	Caution: Hot Surface
	Caution: Risk of Danger
	Warning: Laser Radiation
	Caution: Spinning Blades May Cause Harm

Chapter 2 Safety

Precautions of a general nature should be gathered here. Wherever possible, however, safety warnings, cautions, and notes should only appear immediately before the instructions to which they apply (versus being listed in this section).



WARNING



This unit must not be operated in explosive environments. Do not operate in wet or damp conditions. Do not obstruct the air-ventilation slots in the housing!



WARNING



Avoid Exposure – Laser Radiation Emitted from apertures.



WARNING



Mobile telephones, cellular phones or other radio transmitters should not be used within the range of three meters of this unit since the electromagnetic field intensity may exceed the maximum allowed disturbance values according to EN50082-1.

This device can only be returned when packed into the complete original packaging, including all packing inserts. If necessary, ask for a replacement package.

The maximum USB and BNC cable length is 3 meters in order to avoid a susceptibility to RF interference according to IEC61000-4-3.

Note: If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice no. 50, dated 5/27/01.

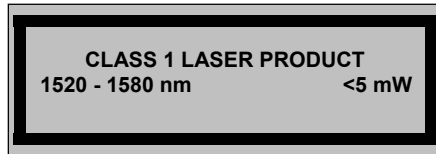
2.1. Laser Safety

The LDM series of lasers are rated in the 1, 3R, and 3B Laser Safety Class. According to Laser Institute of America: A Class 3B laser is hazardous if the eye is exposed directly, but diffuse reflection such as from paper or other matte surfaces are not harmful. Class 3R levels of laser radiation are considered to be, depending upon the irradiance, either an acute intrabeam viewing hazard or chronic viewing hazard, and an acute viewing hazard if viewed directly with optical instruments. Class 1 lasers are very low risk and "safe under reasonably foreseeable use". Protective eyewear is typically required where direct viewing of a class 3R and 3B laser beam may occur. Class 3B lasers must be equipped with a key switch and a safety interlock.

According to the revised ANSI Z136.1 Safe Use of Lasers, laser area warning signs should be posted around Class 3 laser areas and are required to be posted around all Class 3B and 4 laser areas. NOTICE signs are required for Class 3B and Class 4 lasers during maintenance, servicing, and similar situations.



LASER RADIATION



Chapter 3 Description

The LDM Series of compact laser sources are well suited to benchtop optical experiments. The LDM Series modules come in six wavelength versions: 405, 635, 670, 785, 850, and 1550 nm. The Ø1.40" by 5.8" housing contains a laser diode, collimating lens, and automatic power control circuit.

Each LDM module includes a built in shutter and SM1 internal thread for mounting with an extensive range of opt mechanical devices from lens tubes to lens mounts. The LDM module can easily be mounted to any optical table using one of our C1502, C1503, or VC3 V-groove mounts.

Besides the mechanical shutter, the module also features a remote interlock connection and key-lock power switch. The laser module has an enable/disable toggle switch, laser on indicator LED, and power adjustment pot on the top for easy access. The power can be adjusted from 0 to full power (laser specific, see the specifications section for more information).

Chapter 4 Operation

CAUTION!

Always observe proper Laser safety when operating this unit.

4.1. Normal Operation and Use

The unit should be located on a solid, dry working surface. If preferred, the unit can be secured to a standard optical breadboard using Thorlabs C1502, C1503, or VC3 V-groove mounts. For best performance, the unit should be oriented with its vent holes and cooling slots facing up.

1. If not already done, move the output shutter lever to the CLOSED position.

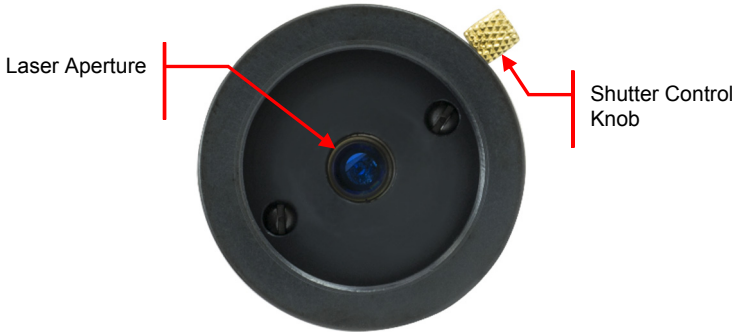


Figure 1 Front View of LDM

2. With the key-lock switch set to the 0 (Off) position, connect the power supply to the LDM by plugging the DC Jack into the DC IN socket on the end cap of the module. Plug the AC connector of the power supply into a suitable mains socket.
3. Make sure the interlock shorting screw is in place. If using a remote interlock, see the next section for instructions on how to set up the remote interlock.

4. Turn the key-lock switch to the I (ON) position. The green LED will blink slowly.

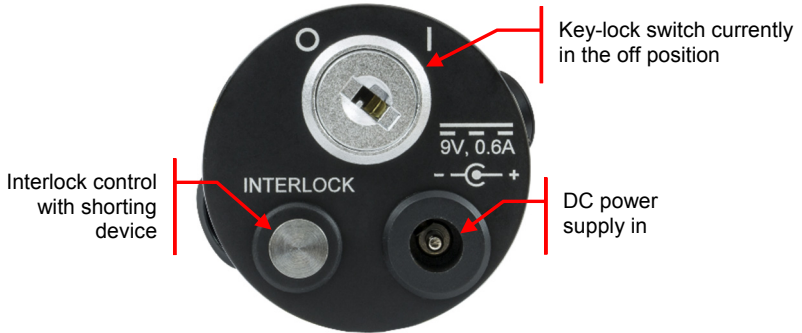


Figure 2 Rear Control View of LDM

5. Momentarily press the Enable switch. The green LED will blink more quickly for approximately 5 seconds and then remain on solid. At that point the laser will turn on.
6. Open the output shutter by moving the shutter lever to the OPEN position.
7. The output power can be adjusted from roughly the laser threshold current to the full output power of the laser module by turning the PWR ADJ screw using a small screwdriver. Clockwise rotation increases the output power.

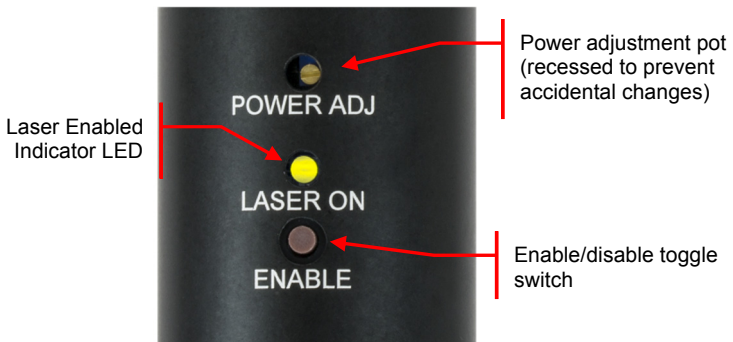


Figure 3 Top View, Close Up of Controls

8. Pressing the Enable switch will turn off the laser.
9. Turning the Key-lock switch to the 0 (Off) position will also turn off the laser output. The enable button will need to be pressed to enable the laser after the Key-lock is returned to the I (ON) position.
10. Disconnecting the Interlock pin will also turn off the laser.

4.2. Making the Safety Interlock Connections

The LDM Series is equipped with a remote interlock connector located on the end cap. In order to enable the laser driver, a short circuit must be applied across the terminals of the remote interlock connector. In practice this connection is made available to allow the user to connect a remote actuated switch to the connector (i.e. an open door indicator). The switch (which must be normally open) has to be closed in order for the unit to be enabled. Once the switch is in an open state, the laser diode must automatically shutdown.

All units shipped from Thorlabs are configured with a shorting device installed in the Interlock connector. If you are not going to use this feature then you can leave the shorting device installed and the unit will operate normally as described in the procedures in this manual. If you wish to make use of the Interlock feature you will need to acquire the appropriate connector mate and wire it your remote interlock switch. Next, remove the shorting device by unscrewing it from the output and install the connector into the Interlock output.

The Interlock output only accepts a 2.5 mm mono phono jack. This connector is readily available at most electronic supply stores.

The electrical specifications for the Interlock output are as follows:

- Type of Mating Connector: 2.5 mm mono phono jack
- Connector Polarity: Tip is positive, barrel is ground
- Interlock Switch Requirements: Must be N.O. dry contacts



Figure 4 Remote Interlock Connector

CAUTION!

Under no circumstances should any external voltages be applied to the Interlock output

Chapter 5 Specifications

Item #	LDM405	LDM635	LDM670
Wavelength, Typical	405 nm	635 nm	670 nm
Wavelength, Min/Max	395 - 415 nm	625 - 645 nm	660 - 678 nm
Beam Diameter ^a	3.0 mm x 5.0 mm	3.0 mm x 5.0 mm	3.2 mm x 3.4 mm
Power, Adjustable ^b	4.0 mW	4.0 mW	5.5 mW

Item #	LDM785	LDM850	LDM1550
Wavelength, Typical	785 nm	850 nm	1550 nm
Wavelength, Min/Max	776 - 800 nm	840 - 860 nm	1520 - 1580 nm
Beam Diameter ^a	2.4 mm x 3.4 mm	3.5 mm x 4.4 mm	2.6 mm x 3.0 mm
Power, Adjustable ^b	20 mW	20 mW	4.5 mW

Common Specifications	
Stability, Short Term Drift (30 min)	0.01 dB
Stability, Long Term Drift (24 hrs)	0.1 dB
Operating Temperature	10 to 40 °C
Storage Temperature	5 to 50 °C
Power Supply @ ±10% (Included)	100 – 240 VAC, 0.48 A 50 – 60 Hz Output: 9 VDC @ 2.2 A

^a Measured 3 m from module. Beam shape is elliptical

^b The maximum power is given for an operating temperature of 25 °C. When operated at a temperature other than this, the maximum output will vary.

5.1. Drawing

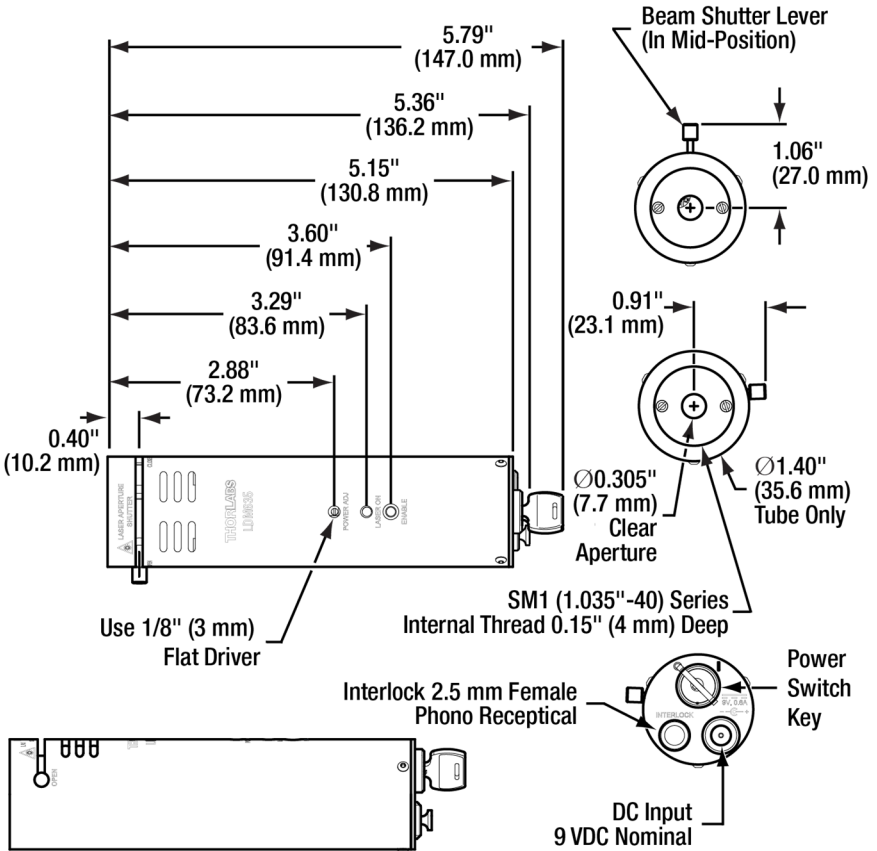



Figure 5 LDM Drawing

Chapter 6 Declaration of Conformity



EU Declaration of Conformity
in accordance with EN ISO 17050-1:2010

We: Thorlabs Inc.
 Of: 56 Sparta Avenue, Newton, New Jersey, 07860, USA

In accordance with the following Directive(s):

2014/35/EU	Low Voltage Directive (LVD)
2014/30/EU	Electromagnetic Compatibility (EMC) Directive
2011/65/EU	Restriction of Use of Certain Hazardous Substances (RoHS)

hereby declare that:
 Model: **LDM405,LDM635,LDM670,LDM785,LDM850,LDM1550**

Equipment: **Laser Module**

is in conformity with the applicable requirements of the following documents:

EN 61010-1	Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.	2010
EN 61326-1	Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements	2013
EN 60825-1	Safety of laser products	2014 3rd...

and which, issued under the sole responsibility of Thorlabs, is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8th June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, for the reason stated below:

does not contain substances in excess of the maximum concentration values tolerated by weight in homogenous materials as listed in Annex II of the Directive

I hereby declare that the equipment named has been designed to comply with the relevant sections of the above referenced specifications, and complies with all applicable Essential Requirements of the Directives.

Signed:  On: 01 December 2016

Name: Ann Strachan
 Position: Compliance Manager

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Chapter 7 Regulatory

As required by the WEEE (Waste Electrical and Electronic Equipment Directive) of the European Community and the corresponding national laws, Thorlabs offers all end users in the EC the possibility to return “end of life” units without incurring disposal charges.

- This offer is valid for Thorlabs electrical and electronic equipment:
- Sold after August 13, 2005
- Marked correspondingly with the crossed out “wheelie bin” logo (see right)
- Sold to a company or institute within the EC
- Currently owned by a company or institute within the EC
- Still complete, not disassembled and not contaminated



Wheelie Bin Logo

As the WEEE directive applies to self contained operational electrical and electronic products, this end of life take back service does not refer to other Thorlabs products, such as:

- Pure OEM products, that means assemblies to be built into a unit by the user (e.g. OEM laser driver cards)
- Components
- Mechanics and optics
- Left over parts of units disassembled by the user (PCB’s, housings etc.).

If you wish to return a Thorlabs unit for waste recovery, please contact Thorlabs or your nearest dealer for further information.

Waste Treatment is Your Own Responsibility

If you do not return an “end of life” unit to Thorlabs, you must hand it to a company specialized in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site.

Ecological Background

It is well known that WEEE pollutes the environment by releasing toxic products during decomposition. The aim of the European RoHS directive is to reduce the content of toxic substances in electronic products in the future.

The intent of the WEEE directive is to enforce the recycling of WEEE. A controlled recycling of end of life products will thereby avoid negative impacts on the environment.

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