



LDM145 Userguide

Product Overview

The LDM45 is a CW laser diode module capable of emitting lines of different lengths and a variety of shapes and patterns using interchangeable projection optics. It emits an optional circular or elliptical beam that can be converted into lines, crosses, circles, grids, viewfinders, dot arrays, and more.

An innovative approach to structured illumination, you can easily interchange line-generating optics (LGO) and diffractive optical elements (DOE) by hand. The resulting projections can be used to align, position, and target objects of different shapes and surface profiles.

Wavelengths of green (520nm), red (635, 650, 670nm), and infrared (780, 850nm) are available with output powers up to 5mW. The green model emits light that appears more than 2X brighter to the human eye than the equivalent power in 635nm. As a result, you're more likely to see these projections against dark materials, in high ambient light levels, or from long distances.

Housed in an electrically-isolated and ruggedised metallic body measuring 16mm in diameter, the LDM145 is recommended for industrial environments and integration with OEM equipment.

If you have any problems or require help when using the LDM145 please call us on +44 (0)1495 212213 or contact your local representative.



Product Operation

The LDM145 is offered in three variants: a CW model with two input wires, a TTL enabled model with three wires, and a Linear Control model also fitted with three wires.

A. CW Model

To operate laser in CW mode the Red & Black leads should be connected to the following:

	Green Models	Red & IR Models
Red Lead	+10Vdc \pm 5%	+3.5 to 5 Vdc
Black Lead	0 Vdc	0 Vdc

B: LDM145 with TTL Modulation

A common requirement for applications which use photo detectors, cameras and other non-visual sensing is the ability to rapidly switch the laser output ON and OFF. Simply applying and removing the supply voltage is rarely satisfactory and in certain cases can result in diode failure. This is because laser diodes are very sensitive to voltage spikes and surges that are often the result of uncontrolled supply switching.

To overcome this limitation the LDM145 can be installed with a third input wire that enables reliable and predictable laser TTL modulation. A logic LOW level turns the output completely OFF. However, applying logic HIGH turns the laser ON after a control input delay. This sets the maximum rate at which the module can switch fully ON and OFF. Typical bandwidth is 10kHz for Green and 300kHz for red and IR models.

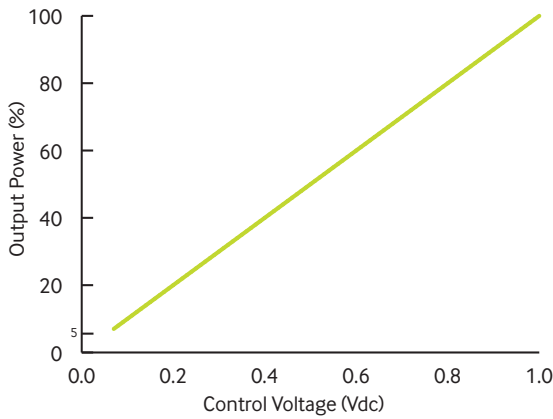
To operate the laser in TTL mode connect the input wires in the below configuration:

	Green Models	Red & IR Models
Red Lead	+10Vdc \pm 5%	+5 Vdc
Black Lead	0 Vdc	0 Vdc
Yellow Lead	TTL Input (Connect to supply if using is CW Mode)	

C. Linear Control Function

Alternatively the yellow lead can be used for a linear power control function. In this situation, the laser power is denoted by a voltage applied to the yellow lead, 0V turning the laser off and +1Vdc giving maximum power, with linear trend between. (See linear intensity graph below).

	Green Models	Red & IR Models
Red Lead	+10Vdc	+5 Vdc
Black Lead	0 Vdc	0 Vdc
Yellow Lead	Input Modulation Signal 0 to +1 Vdc	Input Modulation Signal 0 to +1 Vdc



D. Setting the Output Power Via a Resistor

The control wire has a 10k Ohm input impedance connected to an internal 1V source which is used as the reference for the factory set power. Measuring the voltage between the Yellow and Black wires with a high (>10M Ohm) impedance voltmeter, will give a reading of 1 V ± 2%. Connecting a 10k Ohm resistance between the Yellow and Black wires will result in the reading falling to 0.5V and the light output falling to half the factory set power. Other outputs between 0 and the factory set power can be achieved with a single resistor Rx by using the formula:

Where P_o is the required power output
as P_f is the factory set power

$$R_X = \frac{P_o * 10K}{P_f - P_o}$$

Focus Adjustment

The focus of the LDM145 can adjusted using the following method.

1. Remove the LGO if fitted.
2. Insert focus key (see drawing C) into laser barrel and align with focus control grooves.
3. Turn the focus key until desired focus is achieved.
4. Re-fit the LGO if fitted.

Fitting the LGO/DOE

Optional line-generating optics (LGO) and diffractive optical elements (DOE) simply fit over the aperture end of the LDM145 and convert the output beam into a line, shape, or pattern. LGOs are available with fan angles from 15° to 120°. DOEs that produce circles, concentric rings, dotted patterns, crosses, multiple parallel lines, grids, viewfinders, and other patterns are also available.

Please follow the below instructions to install the LDM145 with an LGO/DOE:

1. Focus the laser at the required distance.
2. Using the supplied Allen key, ensure that the two grub screws in the LGO/DOE are flush with the inner bore.
3. Slide the LGO/DOE over the aperture side of the laser and rotate until the brightest & thinnest lines or dots are achieved.
4. Tighten the two grub screws with the Allen key to lock the LGO/DOE into position.

For more information please see the Projection Lens Datasheet.

Mounting & Heatsinking

The lifetime and stability of your laser can be optimised when mounted on a suitable heat sink. This allows the case temperature to be kept within its specified range. Failure to properly heat sink your laser device could result in shortened lifetime or failure of the diode. As a general guideline, the lifetime of a laser diode decreases by a factor of two (approx.) for every 10°C increase in operating temperature.

There is one mounting clamp available for the LDM145 which is the heavy duty clamp (with/without magnetic base).

Mounting the LDM145 in the Heavy Duty Clamp (See drawing D)

1. Secure the clamp to a surface. There are two methods:
 - a. Screw an M5 stud to the bottom of the base, or
 - b. Remove the base by removing 2 x grub screw B with the supplied Allen key, then thread an M5 cap screw through the top of the base. Then re-attach the base to the body of the clamp.
2. Loosen Allen screw A with the supplied Allen key.
3. Slide your laser into the mounting hole and then tighten Allen screw A.
4. Loosen grub screw A.
5. Adjust the vertical angle of your laser and then tighten grub screw A.
6. Loosen 2 x grub screw B. This will allow the main body of the mount to be rotated independently of the base.
7. Adjust the horizontal angle of your laser and then tighten 2 x grub screw B.

Mounting the LDM145 in the Heavy Duty Clamp with Magnetic Base (See drawing D & E)

1. Secure the magnetic base to the Heavy Duty Clamp.
 - a. Screw the stud on the top of the magnetic base into the centre hole at the bottom of the Heavy Duty Clamp.
2. Remove the keeper from the magnetic base and place on a ferrous surface.
3. Loosen Allen screw A with the supplied Allen key.
4. Slide your laser into the mounting hole and then tighten Allen screw A.
5. Loosen grub screw A.
6. Adjust the vertical angle of your laser and then tighten grub screw A.
7. Loosen 2 x grub screw B. This will allow the main body of the mount to be rotated independently of the base.
8. Adjust the horizontal angle of your laser and then tighten 2 x grub screw B.

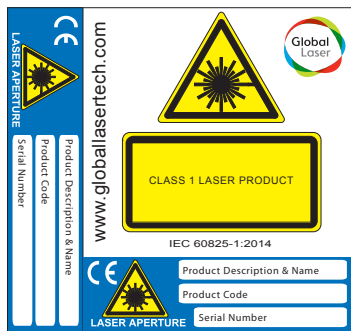
Cleaning the Optics

Please place the protective cap over the aperture when the laser is not in use to reduce optical contamination. If the laser pattern becomes fuzzy or unclear, please check the following:

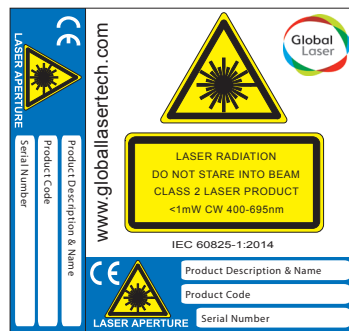
1. Remove LGO/DOE.
 - a. LGOs can be cleaned with an optical cloth, lens cleaning kit, or sterile dry air/nitrogen.
 - b. DOEs should only be cleaned with sterile dry air or nitrogen. The use of any other cleaning methods will damage the grating.
2. Check the laser is in focus.
3. The collimating lens inside the laser barrel can be cleaned with dry air.

Safety & Classification

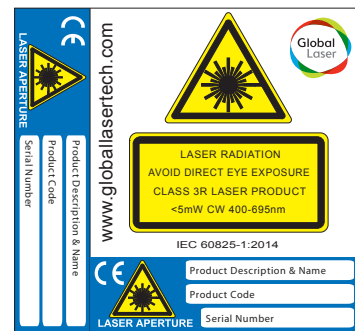
These modules are intended for incorporation into customer equipment. They are classified in accordance with IEC60825-1: 2014, which should be consulted prior to designing or using any laser product. The following labels are supplied for attachment to the customer's equipment, but responsibility for compliance with the standard remains with the user.



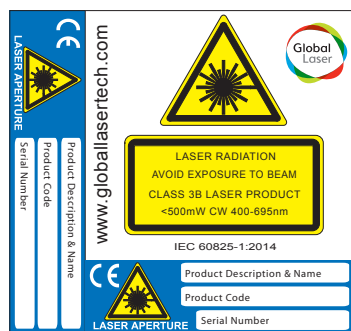
Class 1 Label



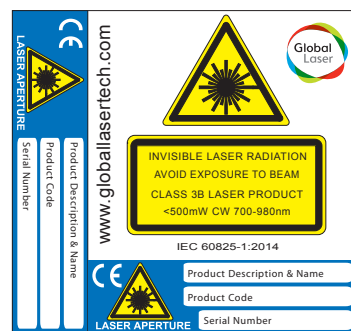
Class 2 Laser Label



Class 3R Laser Label



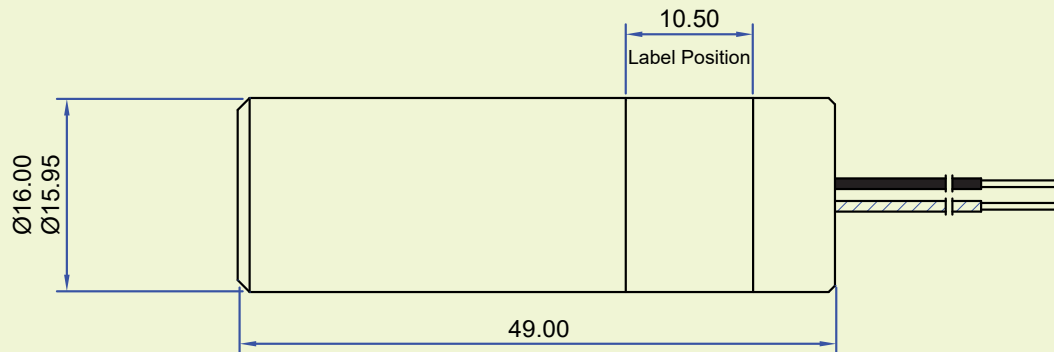
Class 3B Laser Label



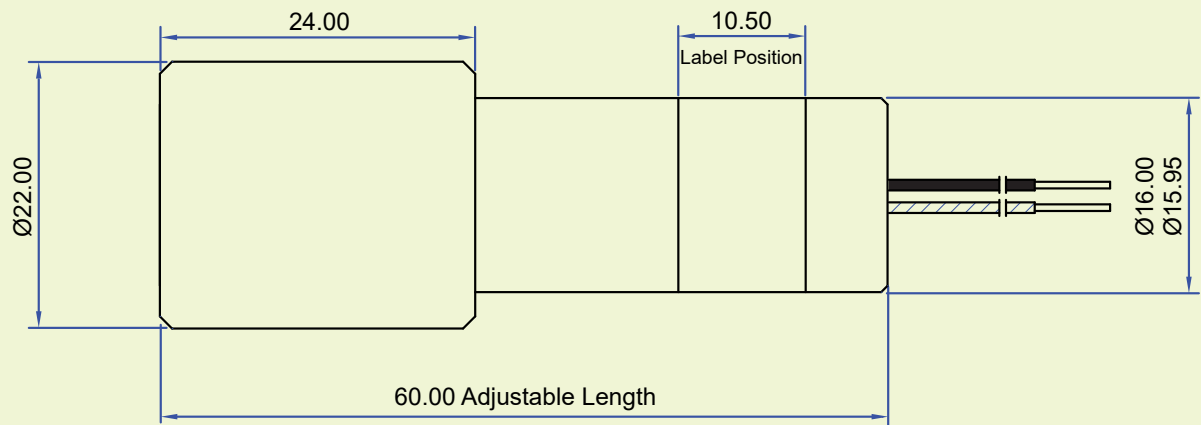
Class 3B IR Laser Label

Diagrams

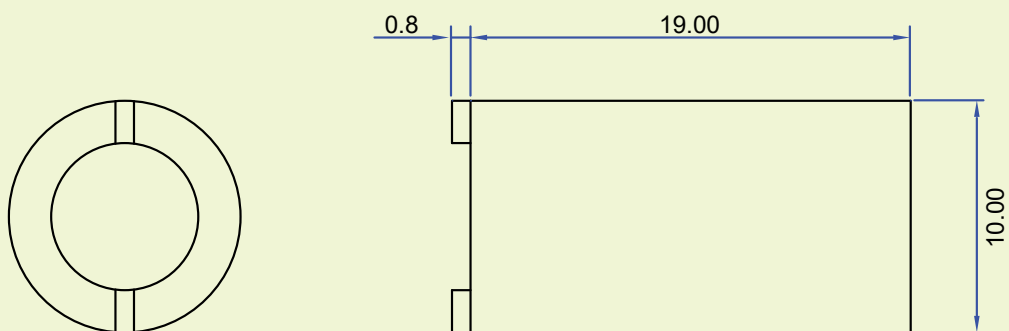
A) LDM145 Outline



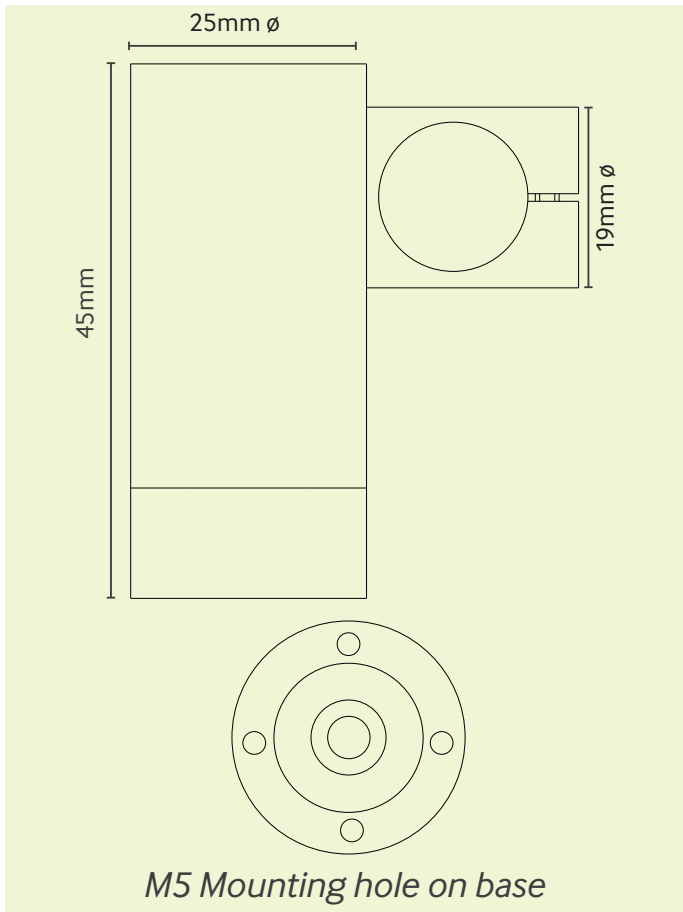
B) LDM145 Fitted With LGO/DOE Outline



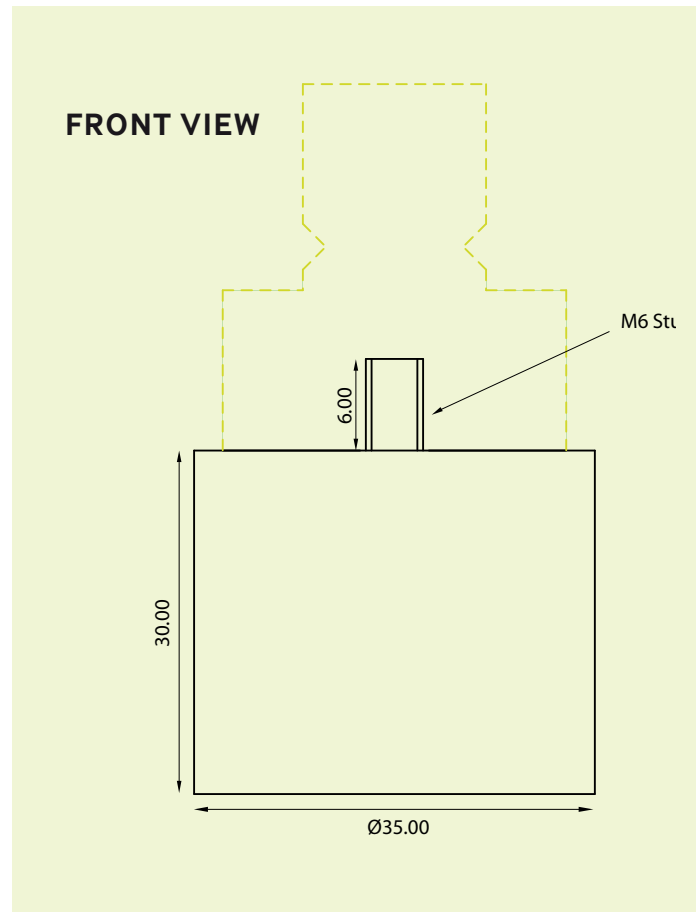
C) Focus Key



D) Heavy Duty Mounting Clamp



E) Magnetic Base



Drawings not to scale

For further information about any of our products please contact your local distributor or you can contact Global Laser in the UK.
Your Local Distributor Is:

Please Note: Global Laser reserve the right to change descriptions and specifications without notice.



9090-02-060 Rev 4 18/04/2024

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