



LDM115 Userguide

Product Overview

Thanks for purchasing the LDM115, a 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.

An optional TTL modulation input is available allowing you to drive your laser using a digital voltage signal. You can then change the mark-to-space ratio to control the mean intensity of the output beam, modulate the laser with coded information, or synchronise the laser with an external measurement device such as a photodetector or camera.

Housed in an electrically-isolated and ruggedised metallic body measuring 11mm in diameter, the LDM150 is recommended for industrial environments and integration with OEM equipment.

If you have any problems or require help when using the LDM115 please contact us through sales@globallasertech.com or call your local representative.



Product Operation

The LDM115 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 Models
Red Lead	+10Vdc \pm 5%	+3.5 to 5 Vdc
Black Lead	0 Vdc	0 Vdc

B: LDM115 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 LDM115 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 300kHz.

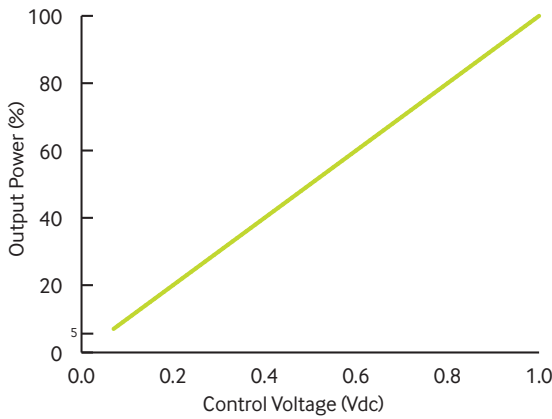
To operate the laser in TTL mode connect the input wires in the below configuration:

	Green Models	Red 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 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 \pm 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_{fs} is the factory set power

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

Focus Adjustment

The focus of the LDM115 can adjusted by one of two method depending on model.

If you have an LDM115G Model (see drawing A) follow the method below:

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

If you have an LDM115P Model (see drawing B) follow the method below:

1. Taking care not to touch the lens itself, grip the forward section of the laser
2. Turn until the beam is the desired size

Fitting the LGO

Optional line-generating optics (LGO) and diffractive optical elements (DOE) simply fit over the aperture end of the LDM115 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 LDM115 with an LGO or 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.

Cleaning The Optics

If the laser pattern becomes fuzzy or unclear, please check the following:

1. Check the laser is in focus.
2. Remove contaminants with a compressed air duster.
3. Contact Global Laser or your local representative if you still have issues.

Note: Handle optics with care using powder-free latex or nitrile gloves. These prevent the transfer of oils and debris from hands to optics.

Mounting

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 are three mounting clamps available for the LDM115: heavy duty clamp (with/without magnetic base), MK1 Mounting Kit, and swivel clamp.

Mounting the LDM115 in the Heavy Duty Clamp (See drawing E)

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 LDM115 in the Heavy Duty Clamp with Magnetic Base (See drawing E & F)

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

Mounting the LDM115 in the MK1 Mounting Kit (See Drawing G)

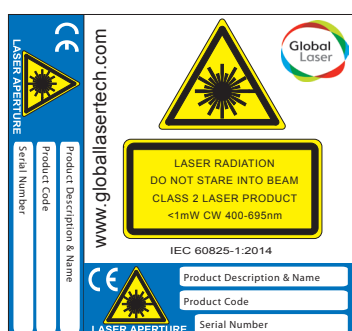
1. Attach components as in drawing D
2. Loosen machine screw A with M3 Allen key
3. Set the length of the mounting post
4. Secure the clamp to a surface using machine screw A (M5 x 25 & M5 x 35 machine screws Mounting two M5 hex nuts & washers are supplied)
5. Tighten machine screw A with an M3 Allen key
6. Loosen Phillips screw A with a Phillips head screwdriver
7. Slide the laser into the mounting hole
8. Rotate the mounting clamp to the desired position and then tighten Phillips screw A

Mounting the LDM115 in the Swivel Mounting Clamp (See drawing H)

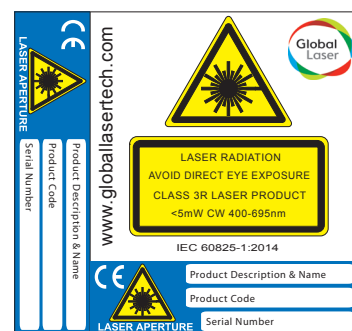
1. Secure the mounting base to a surface
 - a. You can use 2 x Ø9 mm slots, 4 x Ø4.5 mm holes, and/or 2 x Ø3.5 mm countersunk holes to achieve this. If mounting via Ø3.5mm countersunk holes, the swivel bracket must be removed from the base and then reattached after mounting.
2. Loosen Allen screw A (M3)
3. Slide your laser into the mounting hole and then tighten Allen screw A
4. Loosen Allen screw B (M5)
5. Adjust tilt angle and then tighten Allen screw B
6. Loosen 2 x M4 screws attaching swivel bracket to base
7. Adjust swivel angle and then tighten 2 x M4 screws

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.



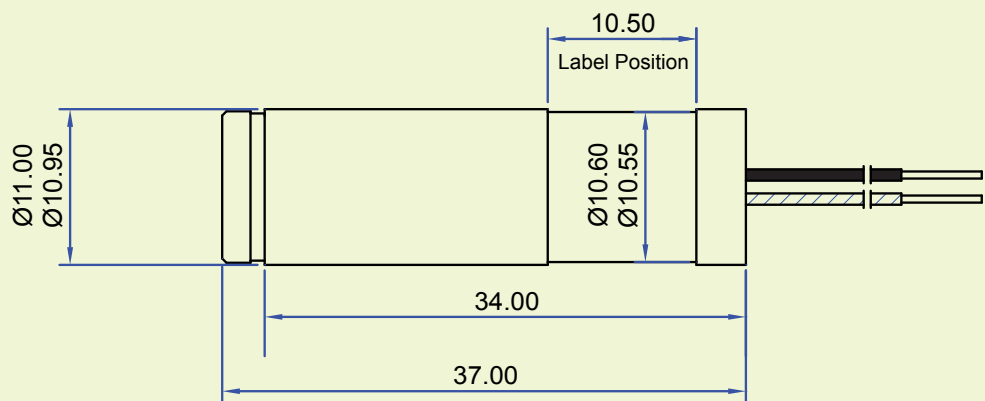
Class 2 Laser Label



Class 3R Laser Label

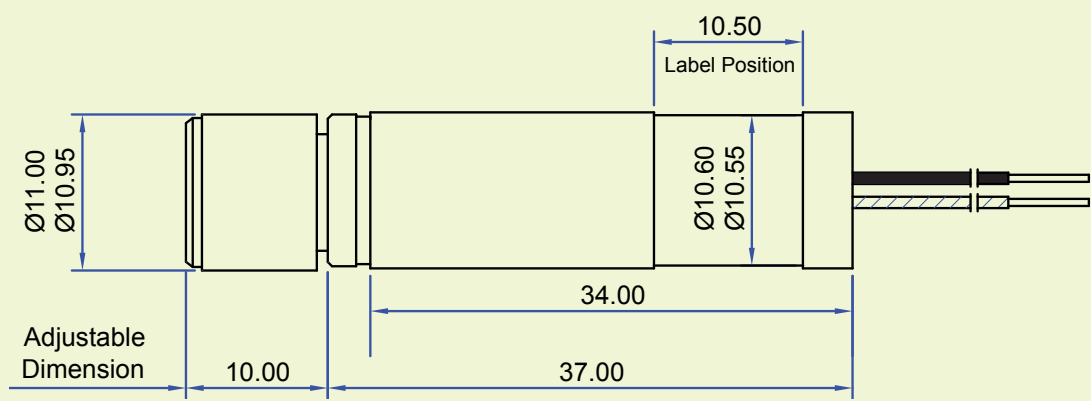
Diagrams

A) LDM115 fitted with G Lens



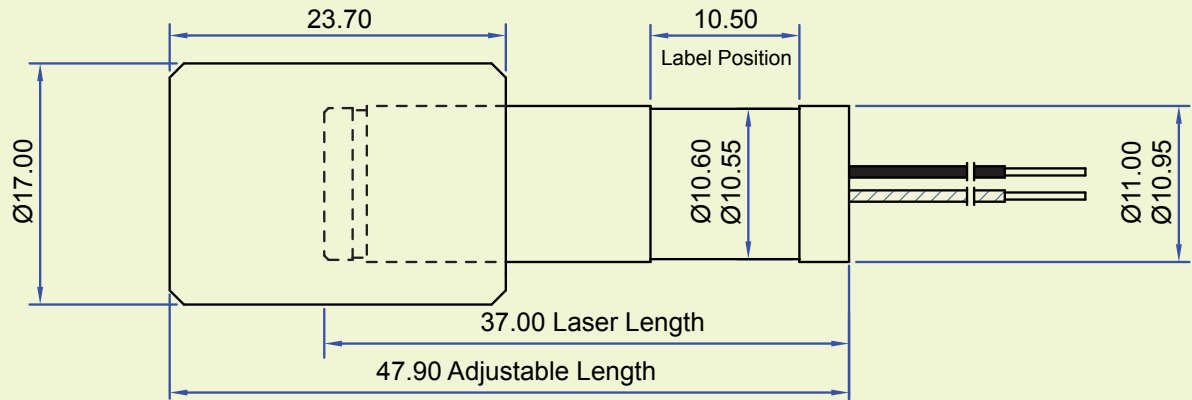
LCG115 with TTL Enable Input or Linear Control will have 3 wires

B) LDM115 fitted with P Lens



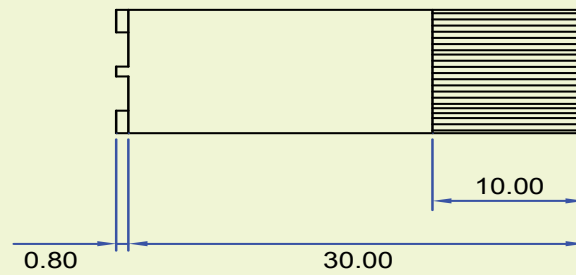
LCG115 with TTL Enable Input or Linear Control will have 3 wires

C) LDM115 fitted with LGO

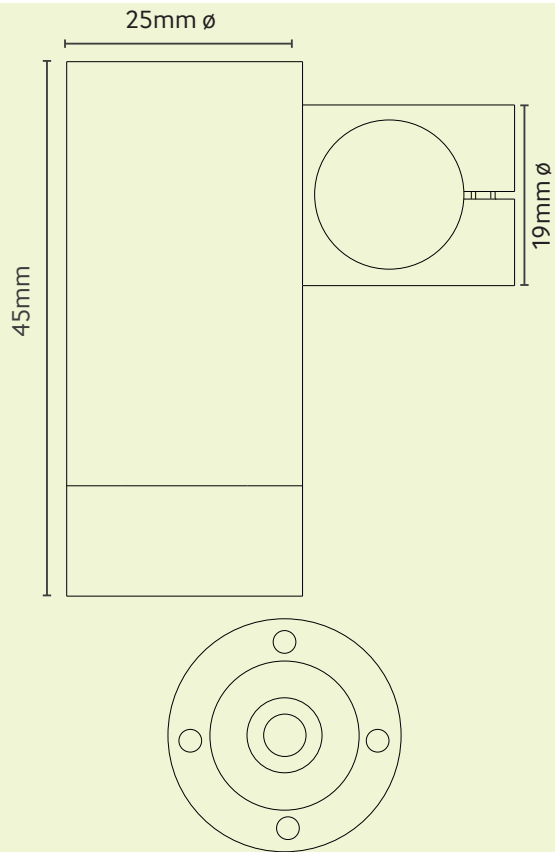


LCG115 with TTL Enable Input or Linear Control will have 3 wires

D) Focus Key



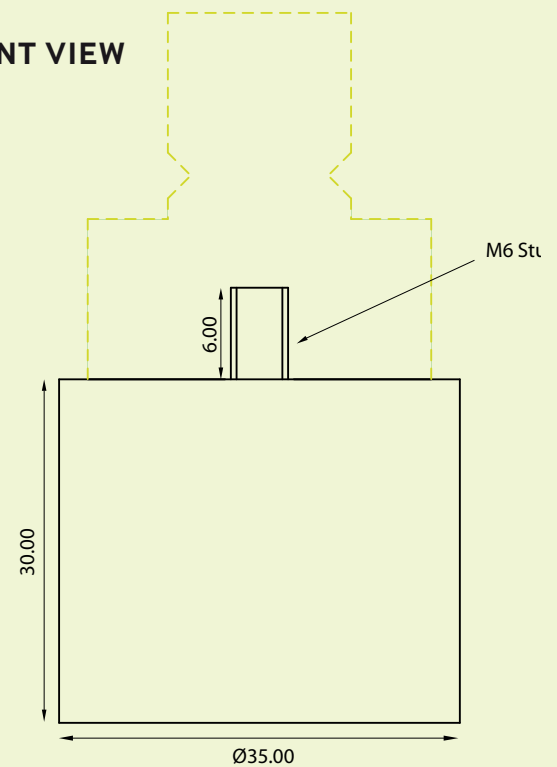
E) Heavy Duty Mounting Clamp



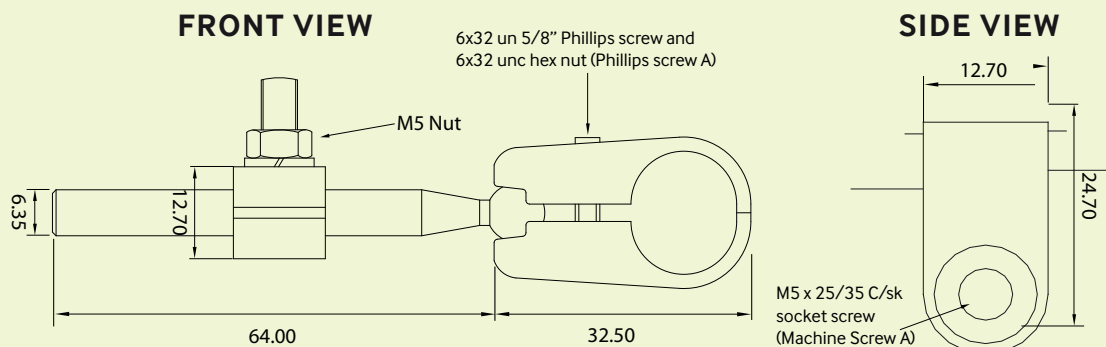
M5 Mounting hole on base

F) Magnetic Base

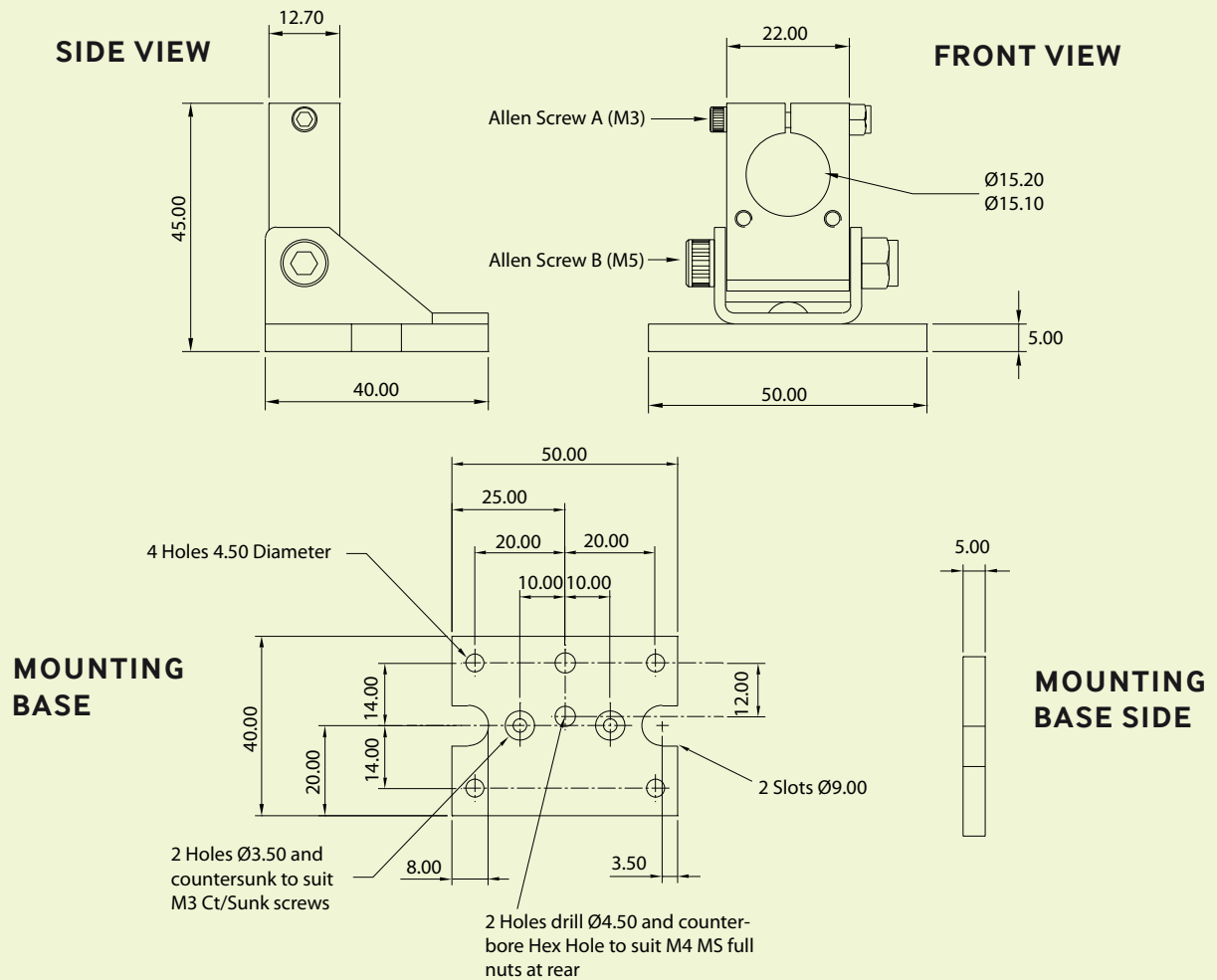
FRONT VIEW



G) MK1 Mounting Clamp



H) Swivel Mount



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



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