Laser Diode Mounting Kits

For Ø5.6mm and Ø9mm Laser Diodes — Complete Mounting System with Collimating Lens

If your work involves laser diodes, you'll appreciate the benefits of Optima's laser diode mounting systems. Components in the system facilitate mounting a laser diode, collimating or focusing the beam, and aligning the beam with other optics or electro-optical components. Optima's laser diode mounting kits offer a quick and cost effective solution for mounting a Ø5.6mm or Ø9mm laser diode. All of the mounting kits (except the LDM 1100) include the collimating lens, a black anodized aluminum housing, and the hardware required to mount your laser (the laser diode is not included). All of the collimating lenses are intended for use with laser diodes in the 635nm to 830nm range.

Model Comparison and Specifications:

PART NUMBER	FEATURES AND ATTRIBUTES	X-Y ADJUST	COLLIMATING LENS TYPE	COLLIMATING LENS P/N	LASER DIODE BASE DIMENSION	HOUSING DIMENSIONS	PRICE
LDM 1100 KIT	Optical bench mount, no optics	no	Optics not included, use ADP 9056 KIT listed below		Ø5.6 & Ø9.0 mm	Ø25.3 x 10.4mm	$52.60
ADP 9056 KIT (1,4)	Optics kit for LDM 1100 KIT	no	Lenses noted below (4), no laser diode mount included use LDM 1100 KIT listed above		Ø5.6 & Ø9.0 mm	Ø25.3 x 14.9mm	163.00
LDM 3300 KIT (3)	Small collimated beam	no	Glass Asphere	305-0464-780	Ø5.6 & Ø9.0 mm	Ø11 x 17mm	57.00
LDM 3400 KIT (1,2,3)	Aperture for beam shaping	no	Multi-element	336-1027-xxx	Ø5.6 & Ø9.0 mm	Ø12.7 x 18.5mm	77.40
LDM 3406 KIT (1,2,3)	Interchangeable apertures for beam shaping	no	Multi-element	336-1027-xxx	Ø5.6 & Ø9.0 mm	Ø12.7 x 18.5mm	93.25
LDM 3500 KIT (3)	Long FL lens for small beam at long distance	no	Glass Asphere	305-8045-780	Ø5.6 & Ø9.0 mm	Ø11 x 17mm	72.40
LDM 3700 KIT (1,3)	Best beam quality	no	Multi-element	336-1027-xxx	Ø5.6 & Ø9.0 mm	Ø11 x 17mm	70.30
LDM 3800 KIT (1,3)	Best beam quality	no	Multi-element	336-1027-xxx	Ø9.0 mm	Ø11 x 18mm	70.30
LDM 3900 KIT (3)	Good beam quality, smaller focused beam	no	Glass Asphere	305-0066-780	Ø5.6 & Ø9.0 mm	Ø11 x 17mm	57.10
LDM 4000 KIT (3)	Lowest cost	no	Plastic Asphere	300-0360-780	Ø5.6 & Ø9.0 mm	Ø11 x 17mm	45.70
LDM 4200 KIT (3)	Low cost, long FL lens for smallest beam at long distance	no	Plastic Asphere	300-0395-780	Ø5.6 & Ø9.0 mm	Ø11 x 25.5mm	52.60
LDM 4500 KIT (3)	Low cost, small collimated beam	no	Plastic Asphere	305-0380-780	Ø5.6 & Ø9.0 mm	Ø11 x 17mm	45.70
LDM 5000 KIT	Excellent beam quality, large dia collimated beam	yes	Multi-element	336-0965-780	Ø9.0 mm	Ø25.4 x 27mm	291.00

Notes: 1) Please specify collimating lens 336-1027-660 (for visible diodes) or 336-1027-785 (for near-infrared diodes).
2) The LDM 3400 KIT includes one aperture; the LDM 3406 includes 6 interchangeable apertures.
3) These kits are also available for Ø5.6mm laser diodes – the P/N changes to LDM 3356, 3456, 3556, 3756, 3956, 405,6 4256, and 4556.
4) The ADP 9056 KIT must be used with the LDM 1100 KIT. The ADP 9056 KIT includes the lens housing for both Ø5.6mm and Ø9.0mm laser diodes, mounting hardware, and three collimating lenses: 336-1027-660 or 336-1027-785; 305-0066-780; and 305-8045-780.

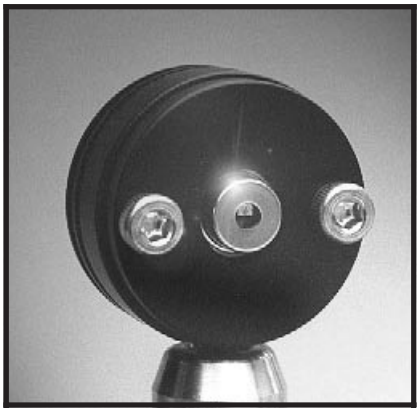
Laser Diode Mounting Kits – Detailed Description and Specifications:

LDM 1100 KIT – Laser Diode Mount for Ø5.6mm and Ø9.0mm Diodes

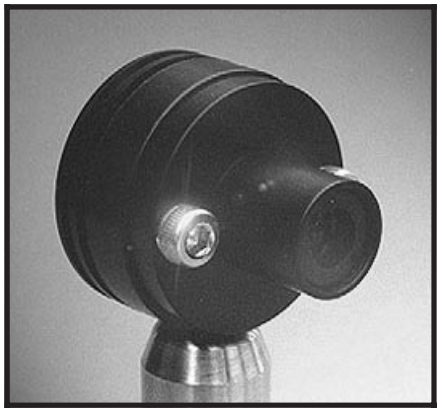
The LDM 1100 Laser Diode Mount is shown below in the left frame. This convenient mount facilitates mounting the popular Ø5.6mm and Ø9.0mm laser diodes on a standard optical bench post with a #8-32 thread (the post is not included in the kit).

Often when we're working in the lab with various laser diodes and evaluating different optical assemblies, we find it very desirable to have the diode mounted in a heat sink/mount that provides direct access to the front of the diode. With unobstructed access to the diode's output, it's possible to position lenses or other optical components using a separate component holder and/or translation stage. Using the LDM 1100, the diode's base is firmly clamped against the heat sink surface and the diode's pins are accessible from the back side of the mount. A clearance hole on the back side of the mount permits using our laser diode socket (P/N 900-8060-000) which greatly improves reliability in connecting the diode with a drive cable.

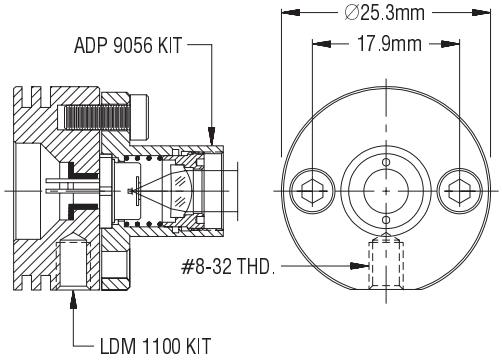
Note: The LDM 1100 KIT includes the heat sink/mount and mounting hardware for both Ø5.6mm and Ø9.0mm laser diodes. There are no optics included in the LDM 1100 KIT — the ADP 9056 Optics Kit shown below in the right frame is designed to be used with the LDM 1100 — the ADP 9056 is described in the next section and should be ordered with the LDM 1100 KIT.



LDM 1100 KIT Laser Diode Mount



ADP 9056 KIT Optics Kit shown attached to the LDM 1100 Laser Diode Mount



Cross-section of the ADP 9056 KIT Optics Kit shown attached to the LDM 1100 Laser Diode Mount

ADP 9056 KIT – Optics Kit for LDM 1100 KIT

The ADP 9056 is shown above in the right frame. This kit is specifically designed to compliment the LDM 1100 diode mount described above. Each kit includes two optics holders; one for use with Ø5.6mm diodes and a second holder for Ø9.0mm laser diodes. These black anodized, aluminum holders clamp the laser diode to the laser diode mount/heat sink and provide the precision thread for mounting and adjusting the collimating lens. Three Optima collimating lens are supplied with each kit – the lens part numbers are listed in the table below with a brief listing of the specifications. These high quality collimating lenses provide the user with a practical range of focal lengths for many experiments with laser diodes ranging from 635nm to 830nm.

The ADP 9056 KIT includes the lens housing for both Ø5.6mm and Ø9.0mm laser diodes, mounting hardware, and three collimating lenses; part numbers 336-1027-660 or 336-1027-785; 305-0066-780; and 305-8045-780. The lens specifications are briefly listed below:

PART NUMBER	LENS TYPE	FOCAL LENGTH	NUMERICAL APERTURE	CLEAR APERTURE	FIELD DIAMETER	F#	CONJUGATE DISTANCE
336-1027-xxx **	Multi-element	4.516mm	0.476	4.30mm	0.156mm	1.05	Infinite
305-0066-780	Molded Asphere	5.25mm	0.4	5.00mm	0.100mm	1.25	
305-8045-780		8.00mm	0.25	4.80mm	0.200mm	1.97	

Laser Diode Mounting Kits – Detailed Description and Specifications:

LDM 3300 KIT – Glass Asphere Lens with Large NA and Small Collimated Beam

The LDM 3300 KIT is the newest addition to Optima's Laser Diode Mounting System. The compact cylindrical housing provides the essential heat sink for the laser diode and a fine-pitch thread for adjusting the collimating lens position in the z-axis – allowing the user to either collimate or focus the laser diode beam.

The collimating lens used in the LDM 3300 kit is a diffraction limited, molded glass asphere with a large numerical aperture, Optima P/N 305-0464-780. With an NA of 0.5 the collimating lens will efficiently couple the output from most laser diodes. Also, this lens has a focal length that's slightly shorter than most of the Optima glass lenses – with a 4mm focal length, this lens creates a smaller collimated beam.

The minimum working distance is approximately 6 mm from the front surface of the LDM housing. Using a Hitachi HL6312G laser diode as an example, a beam focused at the minimum working distance is approximately 20 x 9.6 microns ($1/e^2$, with 20 microns being the parallel axis); a collimated beam 100 mm from the front surface of the housing is ~0.85 mm x 3.73 mm.

When ordering this mounting kit for use with Ø5.6mm diodes, the part number changes to LDM 3356 KIT.

LDM 3400 KIT – Interchangeable Apertures to Circularize an Elliptical Beam

The LDM 3400 Laser Diode Mount is a unique design with a few features not found in the other Optima laser diode mounts. The 1/2-inch diameter cylindrical housing is essentially split into two sections; the back section holds the laser diode and the collimating lens. The front section holds a changeable aperture and provides the adjustment mechanism for positioning the collimating lens. The front section has a diamond knurl pattern on the outside diameter – to adjust the collimating lens position, just rotate the front section and the collimating lens moves precisely in the z-axis. The laser diode is firmly held in place by a threaded ring that sits on the back surface of the diode – increasing the metal-to-metal contact area and improving heat transfer.

Multi-element collimating lens – The lens included with the LDM 3400 mount is the Optima P/N 336-1027-660 or 336-1027-785. This is possibly one of the best general purpose collimating lens ever designed for visible or near-infrared diodes. When combined with the LDM 3400 mount, the assembly is simple and lens adjustment provides exceptional control.

Interchangeable apertures – One technique used to "cleanup" or "circularize" a laser diodes elliptical beam is to pass the collimated beam through a small circular aperture. If the size of the aperture is small enough, the beam exiting the aperture will be circular – an obvious problem with this technique is a loss in optical power. However, most applications don't require a perfectly circular beam – somewhere between the diodes elliptical beam and a circular beam, there's usually an acceptable solution.

The LDM 3406 KIT includes 6 circular apertures in the following sizes – 1.14, 1.52, 2.03, 2.54, 3.05, and 4.83mm. The 4.83mm aperture is larger than the clear aperture of the collimating lens, and consequently, has no clipping effect on the beam. The smallest aperture (1.14mm) is approximately equal to the dimension of the collimated beam in the parallel axis (the minor axis of the elliptical beam). When the smallest aperture is imposed on the collimated beam, the output beam will be very close to circular (this depends on the diodes parallel axis divergence angle). The loss in power, as compared with the 4.83mm aperture, is approximately 50%. The larger diameter apertures may be used to cleanup a beam by removing side lobes and other artifacts without causing a significant loss in power. In any case, the range of aperture sizes supplied with the LDM 3406 kit allows the user to evaluate the tradeoffs between beam size and power loss.

Ready for Production – The LDM 3400 KIT includes one aperture – once you've determined the optimum size for the aperture, the kit is available in a lower cost production version with only one aperture. Special aperture sizes are available in production quantities; please contact the factory for a quote.

When ordering this mounting kit for use with Ø5.6mm diodes; the part number changes to LDM 3456 KIT or LDM 3457 KIT. The LDM 3456 KIT has one aperture; LDM 3457 KIT includes 6 apertures.

Laser Diode Mounting Kits – Detailed Description and Specifications:

LDM 3500 KIT – Smaller Beam for Long Distance Applications

The LDM 3500 KIT is similar to other laser diode mounts in the Optima product line – the housing provides a heat sink for the laser diode and a fine-pitch thread for adjusting the collimating lens position in the z-axis – allowing the user to either collimate or focus the laser diode beam.

However, the collimating lens included in the LDM 3500 kit is a very high quality molded glass asphere with a long focal of 8mm, Optima P/N 305-8045-780. This lens creates a very good quality beam in applications where a smaller beam is required at longer distances. It can be used in bar code readers that need a longer depth-of-field and/or work at greater stand-off distances than the typical hand-held device. It's probably most useful in alignment systems and laser levels that project a beam in excess of a hundred feet.

The minimum working distance is approximately 90 mm from the front surface of the LDM housing. Using a Hitachi HL6312G laser diode as an example, a beam focused at the minimum working distance is approximately 50 x 23 microns ($1/e^2$, with 50 microns being the parallel axis); a collimated beam 100 mm from the front surface of the housing is ~1.68 mm x 5.30 mm.

When ordering this mounting kit for use with Ø5.6mm diodes, the part number changes to LDM 3556 KIT.

LDM 3700 KIT and LDM 3800 KIT – Easy to Assemble without X-Y Alignment

The LDM 3700 and LDM 3800 assemblies are similar to other laser diode mounts in the Optima product line – the housing provides a heat sink for the laser diode and a fine-pitch thread for adjusting the collimating lens position in the z-axis – allowing the user to either collimate or focus the laser diode beam.

The difference between the LDM 3700 KIT and LDM 3800 KIT is as follows: the mechanical details of the lens holder are slightly different and the LDM 3700 housing is 17mm in length, whereas the LDM 3800 housing is 18mm long. The same collimating lens is included with either mounting kit; it's a high quality, multi-element lens with a relatively large numerical aperture – Optima P/N 336-1027-660 for visible diodes, or the 336-1027-785 for near-infrared diodes.

The minimum working distance is approximately 16 mm from the front surface of the LDM housing. Using a Hitachi HL6312G laser diode as an example, a beam focused at the minimum working distance is approximately 27 x 21 microns ($1/e^2$, with 27 microns being the parallel axis); a collimated beam 100 mm from the front surface of the housing is ~0.98 mm x 4.06 mm.

Quantities of the LDM 3800 are limited and it is only available for Ø9mm diodes – the LDM 3700 KIT should be used in any new designs.

When ordering a mounting kit for use with Ø5.6mm diodes, the part number changes to LDM 3756 KIT. Also, please specify which AR coating is required, -660 for visible diodes; or -785 for near-IR diodes.

LDM 3900 KIT – Molded Glass Aspheric Lens without X-Y alignment

Similar to the LDM 3700 except the collimating lens provided is a molded glass asphere – Optima P/N 305-0066-780. This kit provides an excellent compromise between cost and performance — something in between an assembly using the higher cost multi-element lens and a kit with a lower cost plastic lens. The optical performance of the lens is very good — it creates a collimated beam which is slightly larger than a beam from the 336-1027 lens, resulting in a beam with less divergence and, consequently, a smaller beam at greater distances. Conversely, due to the longer focal length and larger clear aperture, this lens creates a smaller focused beam.

The minimum working distance is approximately 21 mm from the front surface of the LDM housing. Using a Hitachi HL6312G laser diode as an example, a beam focused at the minimum working distance is approximately 24 x 10.5 microns ($1/e^2$, with 24 microns being the parallel axis); a collimated beam 100 mm from the front surface of the housing is ~1.37 mm x 5.12 mm.

When ordering this mounting kit for use with Ø5.6mm diodes, the part number changes to LDM 3956 KIT.

Laser Diode Mounting Kits – Detailed Description and Specifications:

LDM 4000 KIT – Low Cost Plastic Bi-Aspheric Lens without X-Y Alignment

This low cost mounting kit is similar to the LDM 3900 except the collimating lens provided is an molded plastic asphere – Optima P/N 300-0360-780.

The minimum working distance is approximately 8 mm from the front surface of the LDM housing. Using a Hitachi HL6312G laser diode, a beam focused at the minimum working distance is approximately 19.5 x 8.6 microns (1/e2, with 19.5 microns being the parallel axis); a collimated beam 100 mm from the front surface of the housing is ~0.92 mm x 3.17 mm.

When ordering this mounting kit for use with Ø5.6mm diodes, the part number changes to LDM 4056 KIT.

LDM 4200 KIT – Bi-aspheric Plastic Lens for Long Distance Applications

This laser diode mounting kit is specifically designed to accept the Optima 300-0395-780 plastic aspheric collimating lens. Due to the relatively long focal length of the collimating lens, the housing is longer than most of the Optima laser diode mounts. With a long focal length (16mm) and small numerical aperture (NA=.14) this lens creates a relatively large diameter beam that's more circular than the output from a typical laser diode collimating lens. Also, the 300-0395-780 lens is a very high-quality injection molded plastic lens – this lens has been used in digital laser communication systems which are extremely sensitive to lens aberrations and diffraction patterns that can be misread as data when a beam sweeps across a detector. The only negative aspect of the lens might be the small NA – the coupling efficiency (or total transmission) for most visible laser diodes is just under 50%.

Due to the long focal length, the minimum working distance is approximately 153 mm (6 inches) from the front surface of the LDM housing. If the application requires focusing at shorter distances, it would be best to collimate the output from the diode and then use a simple lens like a plano-convex to focus the beam. However, for reference we have measured the beam from the LDM 4200 kit using a Hitachi HL6312G laser diode; a beam focused at the minimum working distance is approximately 51.0 x 36.1 microns (1/e2, with 51.0 microns being the parallel axis); a collimated beam 100 mm from the front surface of the housing is ~3.38 mm x 4.65 mm.

When ordering this mounting kit for use with Ø5.6mm diodes, the part number changes to LDM 4256 KIT.

LDM 4500 KIT – Low Cost Plastic Bi-Aspheric Lens, Small Collimated Beam

Similar to the LDM 4000 except the collimating lens provided is a molded plastic asphere, P/N 300-0380-780. With a short focal length of 3.4mm, this lens provides at relatively small collimated beam. A large numerical aperture (NA) of 0.47 provides excellent coupling efficiency with most laser diodes.

The minimum working distance is approximately 4 mm from the front surface of the LDM housing. Using a Hitachi HL6312G laser diode as an example, a beam focused at the minimum working distance is approximately 26.5 x 7.3 microns (1/e2, with 26.5 microns being the parallel axis); a collimated beam 100 mm from the front surface of the housing is ~0.74 mm x 2.89 mm.

When ordering this mounting kit for use with Ø5.6mm diodes, the part number changes to LDM 4556 KIT.

Laser Diode Mounting Kits – Detailed Description and Specifications:

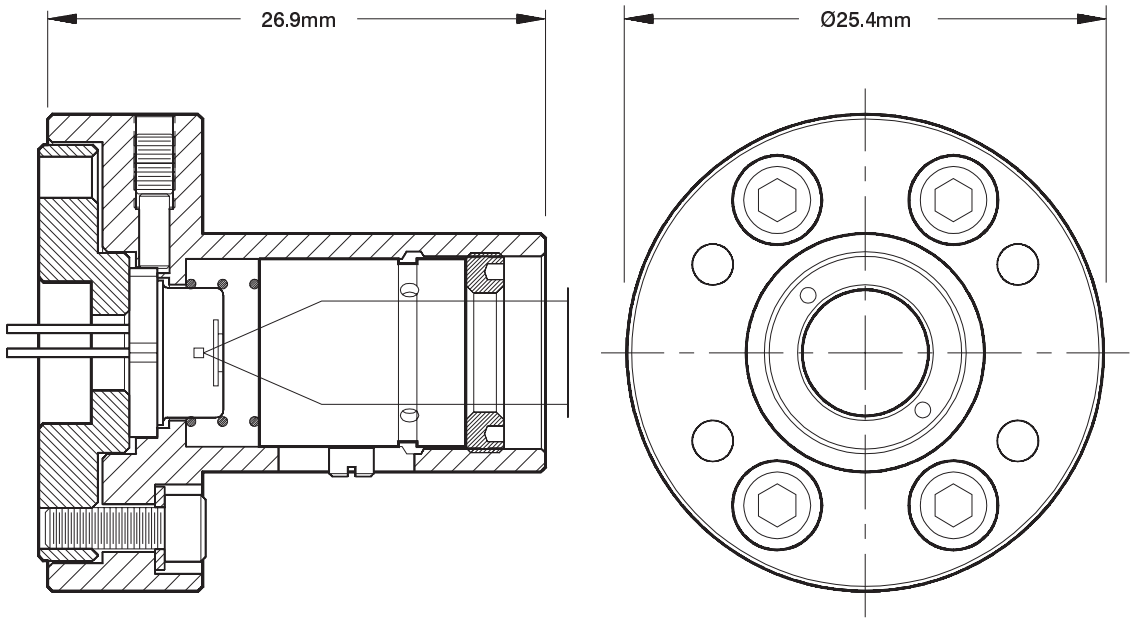
LDM 5000 KIT – Low Wavefront Aberration, Larger Collimated Beam

Unique housing design – This housing has a flat mounting surface perpendicular to the optical axis, ideal for attachment to a printed circuit board or thermal electric cooler. Four #2-56 threaded holes in the base facilitate mounting, alignment, and aiming – if the base is attached to a "soft" mount like a rubber o-ring or wave washer, the beam can be "pointed" by selectively adjusting the four mounting screws attached to the base.

X-Y alignment – The laser emission point may be aligned with the lens optical axis by translating the diode in the x-y axis. While the lens is free to move in the z axis (controlling focus or collimation) the lens does not rotate, minimizing lateral shift in the focused beam during the lens adjustment process. The collimating lens provided is a very high quality, diffraction-limited, multi-element lens with a large clear aperture and medium NA, Optima P/N 336-0965-780. With the larger clear aperture and excellent wavefront quality, this lens is intended for more demanding applications; such as laser diode instrumentation and/or long distance measurement applications.

Broad range of lens adjustment – The minimum working distance is approximately 12 mm from the front surface of the LDM housing. Using a Hitachi HL6312G laser diode as an example, a beam focused at the minimum working distance is approximately 30 x 15.5 microns (1/e2, with 30 microns being the parallel axis); a collimated beam 100 mm from the front surface of the housing is ~1.52 mm x 5.71 mm.

The LDM 5000 KIT is available in limited quantities and only for Ø9.0mm diodes.



LDM 5000 KIT