

**M405L2-C1 - May 31, 2016**

Item # M405L2-C1 was discontinued on May 31, 2016. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

**COLLIMATED LED LIGHT SOURCES FOR MICROSCOPY**

- ▶ UV, Visible, and IR LEDs
- ▶ Mounted LED with Adjustable Collimation Optic
- ▶ Compatible with Epi-Illumination Port on Olympus, Leica, Nikon, and Zeiss Microscopes



[Hide Overview](#)

OVERVIEW

**Features**

- Illumination Source for Microscope Epi-Illumination Ports, Projectors, and Custom Imaging Systems
- Optimized Thermal Management Provides Output Intensity Stability
- Adjustable Aspheric Collimation Optic with Low f/# (Approximately 0.8)
- Integrated Identification Chip (EEPROM) Stores LED Operating Parameters
- Higher Power LEDs Mounted to Larger Heat Sink with Ø57.0 mm Plastic Housing (See the Table to the Right for Details)
- 4-Pin Female Mating Connector for Custom Power Supplies can be Purchased Separately
- Custom Adapters Available - Contact Tech Support for Details

Thorlabs' collimated LED assemblies can be easily connected to standard and epi-illumination ports on most readily available commercial microscopes, including Olympus\*, Leica, Nikon, and Zeiss. Each collimated LED consists of a mounted LED and a lamphouse-port-compatible

Item # Prefix	Color <sup>a</sup>	Spectrum <sup>a</sup> (Click for Details)	Nominal Wavelength <sup>a,b</sup>
M365L2 <sup>c</sup>	UV		365 nm
M365LP1 <sup>c,d</sup>	UV		365 nm
M385L2 <sup>c</sup>	UV		385 nm
M385LP1 <sup>c,d</sup>	UV		385 nm
M405L2 <sup>c</sup>	UV		405 nm
M405LP1 <sup>c,d</sup>	UV		405 nm
M455L3	Royal Blue		455 nm
M470L3	Blue		470 nm
M505L3	Cyan		505 nm
M530L3	Green		530 nm
M590L3	Amber		590 nm
M617L3	Orange		617 nm
M625L3	Red		625 nm
M660L4	Deep Red		660 nm
M730L4	Far Red		730 nm
M780L3	IR		780 nm
M810L3	IR		810 nm
M850L3	IR		850 nm

housing that contains an AR-coated aspheric collimation optic (see the *Specs* tab for details). If the wavelength or output power you require is not sold on this page, our mounted LEDs and Solis™ high-power LEDs are available in additional wavelengths and output powers.

The collimation of the beam can be adjusted by changing the position of the aspheric lens with respect to the LED. Interchanging LEDs is easy; simply unscrew one LED from the housing and replace it with a different mounted LED (purchased separately). We also offer collimation packages, which can be purchased separately from these LEDs.

The approximate total beam power through the collimation adapter is given in the tables below and on the *Specs* tab. The actual power at the sample plane will be lower due to losses specific to the optical set up of the microscope. If you wish to measure the power at the sample plane for your particular microscope setup, Thorlabs also offers a microscope slide power meter sensor.



Like our mounted LEDs, the package of these collimated LEDs is in direct contact with the heat sink to provide excellent thermal management. This minimizes the degradation of optical output power caused by increased LED temperatures. Please see the *Stability* tab for information on the stable output intensity of these collimated LEDs. Additionally, our M365LP1, M385LP1, and M405LP1 LEDs feature a higher power output and are mounted to a larger Ø57.0 mm heat sink to increase heat dissipation and thermal stability.

If compatibility with SM1 (1.035"-40) threading is preferable to compatibility with a microscope for your application, our mounted LEDs (purchased separately) can be collimated using a Ø1" lens and lens tubes. This collimation method also allows for a smaller beam size than the collimators on this page. Please see the *Collimation* tab on our Mounted LEDs presentation for a detailed item list and instructions.

#### Compatible Controllers

Information concerning compatible controllers is provided on the *LED Drivers* tab. If the LED is driven with a DC2200, DC4100, or DC4104 controller, the integrated EEPROM chip will identify the LED and allow the controller to automatically set the proper current limit to protect the LED from being overdriven. The DC4100 and DC4104 require the DC4100-HUB when used with these LEDs.

\*Due to the optical design of the transmitted lamphouse port of the BX and IX microscopes, it may be necessary to purchase a separate adapter available from Olympus.

M940L3	IR		Raw Data	940 nm
MCWHL5	Cold White		Raw Data	6500 K <sup>e</sup>

- Due to variations in the manufacturing process and operating parameters such as temperature and current, the actual spectral output of any given LED will vary. Output plots and center wavelength specs are only intended to be used as a guideline. See the tables below for the output power through the collimation package for each LED.
- For LEDs in the visible spectrum, the nominal wavelength indicates the wavelength at which the LED appears brightest to the human eye. For UV and IR LEDs, the nominal wavelength corresponds to the peak wavelength. The nominal wavelength for visible LEDs may not correspond to the peak wavelength as measured by a spectrograph.
- Our 365 nm to 405 nm LEDs radiate intense UV light during operation. Precautions must be taken to prevent looking directly at the UV light and UV light protective glasses must be worn to avoid eye damage. Exposure of the skin and other body parts to the UV light should be avoided.
- These LEDs have a higher output power (see tables below or the *Specs* tab for total beam power) and are mounted to a larger heatsink with a Ø57.0 mm plastic housing for increased heat dissipation.
- Correlated color temperature.

[Hide Specs](#)

## S P E C S

### Common LED Specifications<sup>a</sup>

Legend										
LED Mounted to a Heat Sink in a Ø57.0 mm Red Housing					LED Mounted to a Heat Sink in a Ø30.5 mm Black Housing					

The section of the housing that holds the collimation optics is the same size for all LEDs that share the same item # suffix, regardless of the size of the heat sink.

Item # Prefix	Nominal Wavelength <sup>b,c</sup>	Color <sup>b</sup>	Spectrum <sup>b</sup> (Click for Details)	Min LED Power <sup>b,d</sup>	Typ. LED Power <sup>b,d</sup>	Max Drive Current (CW)	Irradiance (Typical) <sup>d</sup>	Electrical Power	Typical Lifetime	Emitter Size
M365L2 <sup>e</sup>	365 nm	UV	Raw Data	190 mW	360 mW	700 mA	8.9 µW/mm <sup>2</sup>	3.080 W	>10 000 h	1 mm x 1 mm
M365LP1 <sup>e,f</sup>	365 nm	UV	Raw Data	1150 mW	1400 mW	1400 mA	17.6 µW/mm <sup>2</sup>	5.250 W	>10 000 h	1.4 mm x 1.4 mm
M385L2 <sup>e</sup>	385 nm	UV	Raw Data	270 mW	430 mW	700 mA	11.8 µW/mm <sup>2</sup>	3.010 W	>10 000 h	1 mm x 1 mm
M385LP1 <sup>e,f</sup>	385 nm	UV	Raw Data	1650 mW	1830 mW	1400 mA	23.3 µW/mm <sup>2</sup>	5.110 W	>10 000 h	1.4 mm x 1.4 mm

M405L2 <sup>e</sup>	405 nm	UV	Raw Data	410 mW	760 mW	1000 mA	37.1 $\mu\text{W}/\text{mm}^2$	3.800 W	100 000 h	1 mm x 1 mm
M405LP1 <sup>e,f</sup>	405 nm	UV	Raw Data	1500 mW	1700 mW	1400 mA	24.6 $\mu\text{W}/\text{mm}^2$	4.830 W	>10 000 h	1.4 mm x 1.4 mm
M455L3	455 nm	Royal Blue	Raw Data	900 mW	1020 mW	1000 mA	31.2 $\mu\text{W}/\text{mm}^2$	3.200 W	100 000 h	1 mm x 1 mm
M470L3	470 nm	Blue	Raw Data	650 mW	710 mW	1000 mA	21.9 $\mu\text{W}/\text{mm}^2$	3.200 W	100 000 h	1 mm x 1 mm
M505L3	505 nm	Cyan	Raw Data	400 mW	440 mW	1000 mA	11.1 $\mu\text{W}/\text{mm}^2$	3.300 W	100 000 h	1 mm x 1 mm
M530L3	530 nm	Green	Raw Data	350 mW	370 mW	1000 mA	9.5 $\mu\text{W}/\text{mm}^2$	3.200 W	100 000 h	1 mm x 1 mm
M590L3	590 nm	Amber	Raw Data	160 mW	170 mW	1000 mA	5.3 $\mu\text{W}/\text{mm}^2$	2.200 W	100 000 h	1 mm x 1 mm
M617L3	617 nm	Orange	Raw Data	600 mW	650 mW	1000 mA	15.7 $\mu\text{W}/\text{mm}^2$	2.200 W	100 000 h	1 mm x 1 mm
M625L3	625 nm	Red	Raw Data	700 mW	770 mW	1000 mA	18.0 $\mu\text{W}/\text{mm}^2$	2.200 W	100 000 h	1 mm x 1 mm
M660L4	660 nm	Deep Red	Raw Data	940 mW	1050 mW	1200 mA	20.88 $\mu\text{W}/\text{mm}^2$	3.120 W	>10 000 h	1.5 mm x 1.5 mm
M730L4	730 nm	Far Red	Raw Data	515 mW	595 mW	1000 mA	13.2 $\mu\text{W}/\text{mm}^2$	2.300 W	>10 000 h	1 mm x 1 mm
M780L3	780 nm	IR	Raw Data	200 mW	300 mW	800 mA	47.3 $\mu\text{W}/\text{mm}^2$	1.600 W	>10 000 h	1 mm x 1 mm
M810L3	810 nm	IR	Raw Data	325 mW	375 mW	500 mA	61.8 $\mu\text{W}/\text{mm}^2$	1.800 W	>10 000 h	1 mm x 1 mm
M850L3	850 nm	IR	Raw Data	900 mW	1100 mW	1000 mA	22.9 $\mu\text{W}/\text{mm}^2$	2.900 W	100 000 h	1 mm x 1 mm
M940L3	940 nm	IR	Raw Data	800 mW	1000 mW	1000 mA	19.1 $\mu\text{W}/\text{mm}^2$	2.750 W	100 000 h	1 mm x 1 mm
MCWHL5 <sup>g</sup>	6500 K <sup>h</sup>	Cold White	Raw Data	800 mW	840 mW	1000 mA	24.8 $\mu\text{W}/\text{mm}^2$	3.200 W	100 000 h	1 mm x 1 mm

- Specifications for the LEDs without collimating adapters are given in this table. Please see the second table on this tab for specifications pertaining to the LED with the collimating adapter attached.
- Due to variations in the manufacturing process and operating parameters such as temperature and current, the actual spectral output of any given LED will vary. Output plots and center wavelength specs are only intended to be used as a guideline.
- For LEDs in the visible spectrum, the nominal wavelength indicates the wavelength at which the LED appears brightest to the human eye. For UV and IR LEDs, the nominal wavelength corresponds to the peak wavelength. The nominal wavelength for visible LEDs may not correspond to the peak wavelength as measured by a spectrograph.
- For the bare LED. See the table below for total beam power with the collimation package.
- Our 365 nm to 405 nm LEDs radiate intense UV light during operation. Precautions must be taken to prevent looking directly at the UV light and UV light protective glasses must be worn to avoid eye damage. Exposure of the skin and other body parts to the UV light should be avoided.
- These LEDs have a higher output power (see tables below for total beam power) and are mounted to a Ø57.0 mm heat sink for increased heat dissipation.
- The MCWHL5-C LEDs may not turn off completely when modulated at frequencies above 5 kHz, as the white light is produced by optically stimulating emission from phosphor.
- Correlated color temperature. The wavelength range corresponding to >10% power is approximately 435 - 675 nm.

### Specifications for LED with Collimating Microscope Adapter Attached

Legend	
LED Mounted to a Heat Sink in a Ø57.0 mm Red Housing	LED Mounted to a Heat Sink in a Ø30.5 mm Black Housing

The section of the housing that holds the collimation optics is the same size for all LEDs that share the same item # suffix, regardless of the size of the heat sink.

Item # Suffix	-C1	-C2	-C4	-C5
Compatible Microscope <sup>a</sup>	Olympus BX and IX	Leica DMI	Zeiss Axioskop	Nikon Eclipse (Bayonet Mount)
Beam Diameter <sup>b,c</sup>	50 mm	37 mm	44 mm	43 mm
Beam Area <sup>b</sup>	1960 mm <sup>2</sup>	1080 mm <sup>2</sup>	1520 mm <sup>2</sup>	1450 mm <sup>2</sup>
Item #	Included	b		

Prefix	Collimation Lens	Total Beam Power			
M365L2	ACL5040U-A	120 mW	60 mW	80 mW	80 mW
M365LP1	ACL5040U-A	505 mW	350 mW	415 mW	400 mW
M385L2	ACL5040U-A	170 mW	90 mW	110 mW	120 mW
M385LP1	ACL5040U-A	795 mW	520 mW	660 mW	630 mW
M405L2	ACL5040U-A	440 mW	260 mW	360 mW	360 mW
M405LP1	ACL5040U-A	750 mW	450 mW	580 mW	570 mW
M455L3	ACL5040U-A	500 mW	360 mW	430 mW	400 mW
M470L3	ACL5040U-A	350 mW	250 mW	310 mW	300 mW
M505L3	ACL5040U-A	210 mW	150 mW	180 mW	170 mW
M530L3	ACL5040U-A	170 mW	130 mW	150 mW	150 mW
M590L3	ACL5040U-A	80 mW	60 mW	70 mW	70 mW
M617L3	ACL5040U-A	320 mW	230 mW	280 mW	260 mW
M625L3	ACL5040U-A	380 mW	270 mW	330 mW	300 mW
M660L4	ACL5040U-A	590 mW	400 mW	570 mW	520 mW
M730L4	ACL5040U-B	240 mW	165 mW	195 mW	208 mW
M780L3	ACL5040U-B	210 mW	130 mW	180 mW	170 mW
M810L3	ACL5040U-B	245 mW	210 mW	230 mW	225 mW
M850L3	ACL5040U-B	480 mW	330 mW	400 mW	370 mW
M940L3	ACL5040U-B	430 mW	320 mW	380 mW	340 mW
MCWHL5	ACL5040U-A	440 mW	320 mW	380 mW	340 mW

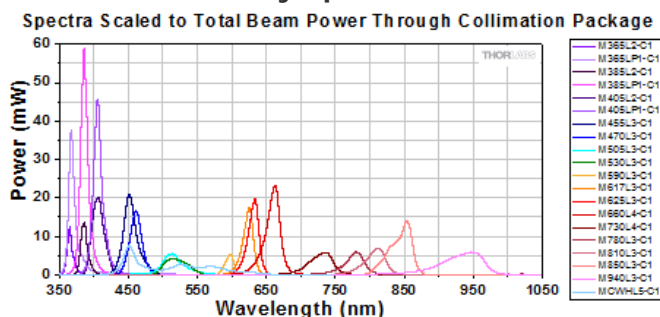
- Standard or Epi-Illumination Port Required.
- Due to variations in the manufacturing process and operating parameters such as temperature and current, the total beam power, beam diameter, and beam area of any given LED will vary.
- At the output aperture of the collimation package.

[Hide Relative Power](#)

## RELATIVE POWER

The actual spectral output and total output power of any given LED will vary due to variations in the manufacturing process and operating parameters, such as temperature and current. The typical total beam power of each collimated LED is specified to help you select an LED that suits your needs. In order to provide a point of comparison for the relative powers of LEDs with different nominal wavelengths, the spectra in the plots below have been scaled to the typical total beam power of each collimated LED. An Excel file containing the normalized and scaled spectra for each collimation package can be downloaded using the link below each plot.

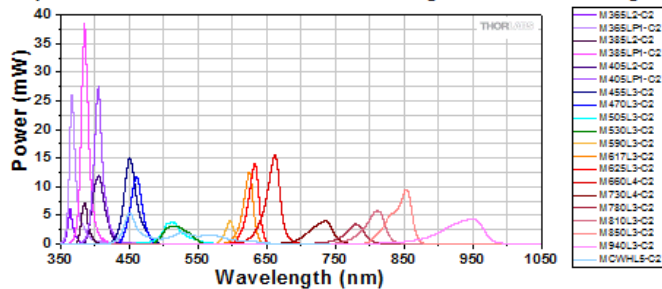
### Collimated LEDs for Olympus BX and IX Microscopes



An Excel file containing the data shown in the plot above may be found [here](#).

### Collimated LEDs for Leica DMI Microscopes

Spectra Scaled to Total Beam Power Through Collimation Package

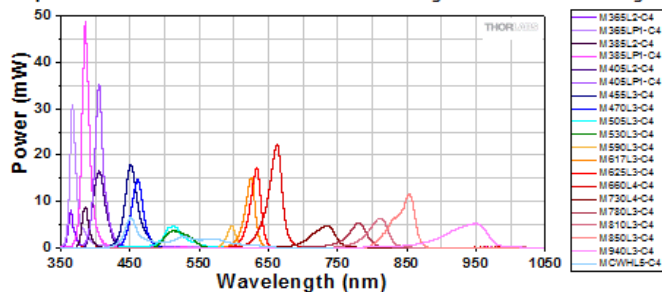


Click to Enlarge

An Excel file containing the data shown in the plot above may be found here.

### Collimated LEDs for Zeiss Axioskop Microscopes

Spectra Scaled to Total Beam Power Through Collimation Package

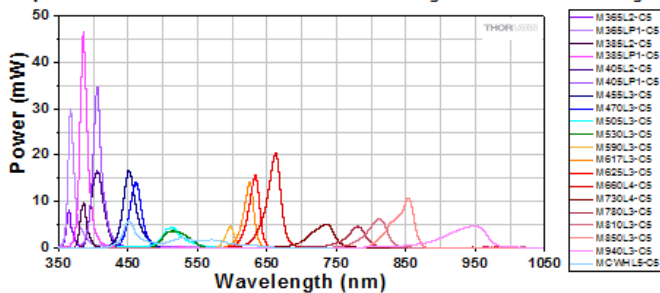


Click to Enlarge

An Excel file containing the data shown in the plot above may be found here.

### Collimated LEDs for Nikon Eclipse Microscopes

Spectra Scaled to Total Beam Power Through Collimation Package



Click to Enlarge

An Excel file containing the data shown in the plot above may be found here.

Hide Stability

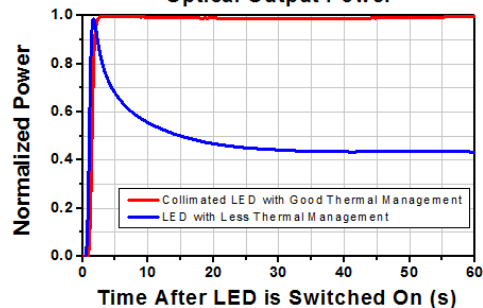
## STABILITY

### LED Lifetime and Long-Term Power Stability

One characteristic of LEDs is that they naturally exhibit power degradation with time. Often this power degradation is slow, but there are also instances where large, rapid drops in power, or even complete LED failure, occur. LED lifetimes are defined as the time it takes a specified percentage of a type of LED to fall below some power level. The parameters for the lifetime measurement can be written using the notation  $B_{XX}/L_{YY}$ , where XX is the percentage of that type of LED that will provide less than YY percent of the specified output power after the lifetime has elapsed. Thorlabs defines the lifetime of our LEDs as  $B_{50}/L_{50}$ , meaning that 50% of the LEDs with a given Item # will fall below 50% of the initial optical power at the end of the specified lifetime. For example, if a batch of 100 LEDs is rated for 150 mW of output power, 50 of these LEDs can be expected to produce an output power of  $\leq 75$  mW after the specified LED lifetime has elapsed.

### Optimized Thermal Management

Optical Output Power



Click to Enlarge

The thermal dissipation performance of these collimated LEDs has been optimized for stable power output. The heat sink is directly mounted to the LED mount so as to provide optimal thermal contact. By doing so, the degradation of optical output power that can be attributed to increased LED junction temperature is minimized (see the graph to the right).

[Hide Pin Diagram](#)

## PIN DIAGRAM

### Pin Connection - Male

The diagram to the right shows the male connector of the collimated LED assembly. It is a standard M8 x 1 sensor circular connector. Pins 1 and 2 are the connection to the LED. Pin 3 and 4 are used for the internal EEPROM in these LEDs. If using an LED driver that was not purchased from Thorlabs, be careful that the appropriate connections are made to Pin 1 and Pin 2 and that you do not attempt to drive the LED through the EEPROM pins.



Pin	Specification	Color
1	LED Anode	Brown
2	LED Cathode	White
3	EEPROM GND	Black
4	EEPROM IO	Blue

[Hide LED Drivers](#)

## LED DRIVERS

Compatible Drivers	LEDD1B	DC2200 <sup>a</sup>	DC4100 <sup>a,b</sup>	DC4104 <sup>a,b</sup>
Click Photos to Enlarge				
LED Driver Current Output (Max)	1.2 A	LED1 Terminal: 10.0 A LED2 Terminal: 2.0 A <sup>c</sup>	1.0 A per Channel	1.0 A per Channel
LED Driver Forward Voltage (Max)	12 V	50 V	5 V	5 V
Modulation Frequency Using External Input (Max)	5 kHz	250 kHz <sup>d,e</sup>	100 kHz <sup>e</sup> (Simultaneous Across all Channels)	100 kHz <sup>e</sup> (Independently Controlled Channels)
External Control Interface(s)	Analog (BNC)	USB 2.0 and Analog (BNC)	USB 2.0 and Analog (BNC)	USB 2.0 and Analog (8-Pin)
Main Driver Features	Very Compact Footprint 60 mm x 73 mm x 104 mm (W x H x D)	Touchscreen Interface with Internal and External Options for Pulsed and Modulated LED Operation	4 Channels <sup>b</sup>	4 Channels <sup>b</sup>
EEPROM Compatible: Reads Out LED Data for LED Settings	-	✓	✓	✓
LCD Display	-	✓	✓	✓










- Automatically limits to LED's max current via EEPROM readout.
- The DC4100 or DC4104 can power and control up to four LEDs simultaneously when used with the DC4100-HUB. The LEDs on this page all require the DC4100-HUB when used with the DC4100 or DC4104.
- The collimated LEDs sold below are compatible with the LED2 Terminal.
- Small Signal Bandwidth: Modulation not exceeding 20% of full scale current. The driver accepts other waveforms, but the maximum frequency will be reduced.
- The MCWHL5-C LEDs may not turn off completely when modulated at frequencies above 5 kHz, as the white light is produced by optically stimulating emission from phosphor.

Note: The LEDs on this page are not compatible with the DC3100 drivers sold with our Modulated LEDs for FLIM Microscopy kits.

[Hide LED Selection Guide](#)

## LED SELECTION GUIDE

**Light Emitting Diode (LED) Selection Guide**

(Click Representative Photo to Enlarge; Not to Scale)									
Type	Unmounted LEDs	PCB-Mounted LEDs	Heatsink-Mounted LEDs	Collimated LEDs for Microscopy (Item # Prefix <sup>a</sup> )	Fiber-Coupled LEDs <sup>b</sup>	High-Power LEDs for Microscopy	4-Wavelength LED Source Options <sup>c</sup>	Modulated LEDs for FLIM Microscopy	LED Arrays
Wavelength									
245 nm	LED245W (0.07 mW)	-	-	-	-	-	-	-	-
250 nm	LED250J (1 mW Min)	-	-	-	-	-	-	-	-
255 nm	LED255J (1 mW Min)	-	-	-	-	-	-	-	-
260 nm	LED260W (0.3 mW) LED260J (1 mW Min)	-	-	-	-	-	-	-	-
265 nm	LED265W (0.3 mW)	M265D2 (10 mW Min)	M265L3 (10 mW Min)	-	-	-	-	-	-
275 nm	LED275W (0.8 mW) LED275J (1 mW Min)	-	-	-	-	-	-	-	-
280 nm	LED280J (1 mW Min)	M280D2 (25 mW Min)	M280L3 (25 mW Min)	-	M280F2 (323 μW)	-	-	-	-
285 nm	LED285W (0.8 mW)	-	-	-	-	-	-	-	-
290 nm	LED290W (0.8 mW)	-	-	-	-	-	-	-	-
300 nm	LED300W (0.5 mW)	M300D3 (40 mW Min)	M300L4 (40 mW Min)	-	M300F2 (320 μW)	-	-	-	-
315 nm	LED315W (0.6 mW)	-	-	-	-	-	-	-	-
340 nm	LED341W (0.33 mW)	M340D3 (53 mW Min)	M340L4 (53 mW Min)	-	M340F3 (1.06 mW)	-	-	-	-
365 nm	-	M365D1 (190 mW Min)	M365L2 (190 mW Min)	M365L2 (60 mW) <sup>d</sup>	M365F1 (4.1 mW)	SOLIS-365A(/M) (850 mW) <sup>e</sup>	Available (85 mW)	DC3100-365	LIU365A (31 mW)
		M365D2 (1150 mW Min)	M365LP1 (1150 mW Min)	M365LP1 (350 mW) <sup>d</sup>	M365FP1 (15.5 mW)				
375 nm	LED375L (1 mW) LED370E (2.5 mW)	M375D2 (387 mW Min)	M375L3 (387 mW Min)	-	M375F2 (4.23 mW)	-	-	-	-
385 nm	LED385L (5 mW)	M385D1 (270 mW Min)	M385L2 (270 mW Min)	M385L2 (90 mW) <sup>d</sup>	M385F1 (10.7 mW)	SOLIS-385A(/M) (1300 mW) <sup>e</sup>	Available (95 mW)	-	-
		M385D2 (1650 mW Min)	M385LP1 (1650 mW Min)	M385LP1 (520 mW) <sup>d</sup>	M385FP1 (23.2 mW)				

395 nm	LED395L (6 mW)	M395D3 (400 mW Min)	M395L4 (400 mW Min)	-	M395F3 (6.8 mW)	-	-	-	-
405 nm	LED405L (6 mW)	M405D1 (410 mW Min)	M405L2 (410 mW Min)	M405L2 (260 mW) <sup>d</sup>	M405F1 (3.7 mW)	SOLIS- 405A(/M) (1800 mW) <sup>e</sup>	Available (95 mW)	DC3100-405	-
	LED405E (10 mW)	M405D2 (1500 mW Min)	M405LP1 (1500 mW Min)	M405LP1 (450 mW) <sup>d</sup>	M405FP1 (24.3 mW)				
420 nm	-	M420D2 (750 mW Min)	M420L3 (750 mW Min)	-	M420F2 (16.2 mW)	-	Available (290 mW)	-	-
430 nm	LED430L (8 mW)	-	-	-	-	-	-	-	-
445 nm	-	-	-	-	-	SOLIS- 445B(/M) (2900 mW) <sup>e</sup>	-	-	-
450 nm	LED450L (7 mW)	M450D3 (1850 mW Min)	M450LP1 (1850 mW Min)	-	-	-	-	-	-
455 nm	-	M455D2 (900 mW Min)	M455L3 (900 mW Min)	M455L3 (360 mW) <sup>d</sup>	M455F1 (11.0 mW)	-	Available (310 mW)	-	-
465 nm	LED465E (20 mW)	-	-	-	-	-	-	-	-
470 nm	LED470L (170 mW)	M470D2 (650 mW Min)	M470L3 (650 mW Min)	M470L3 (250 mW) <sup>d</sup>	M470F3 (17.2 mW)	-	Available (250 mW)	DC3100-470	LIU470A (253 mW)
490 nm	LED490L (3 mW)	M490D2 (200 mW Min)	M490L3 (200 mW Min)	-	M490F2 (2.0 mW)	-	Available (50 mW)	-	-
505 nm	LED505L (4 mW)	M505D2 (400 mW Min)	M505L3 (400 mW Min)	M505L3 (150 mW) <sup>d</sup>	M505F1 (8.0 mW)	-	Available (170 mW)	-	-
525 nm	LED525E (2.6 mW Max)	-	-	-	-	SOLIS- 525B(/M) (1650 mW) <sup>e</sup>	-	-	LIU525A (111 mW)
	LED525L (4 mW)								
	LED528EHP (7 mW)								
530 nm	-	M530D2 (350 mW Min)	M530L3 (350 mW Min)	M530L3 (130 mW) <sup>d</sup>	M530F2 (6.8 mW)	-	Available (100 mW)	-	-
555 nm	LED555L (1 mW)	-	-	-	-	-	-	-	-
565 nm	-	M565D2 (880 mW Min)	M565L3 (880 mW Min)	-	M565F1 (2.0 mW)	-	Available (106 mW)	-	-
570 nm	LED570L (0.35 mW)	-	-	-	-	-	-	-	-
590 nm	LED590L (2 mW)	M590D2 (160 mW Min)	M590L3 (160 mW Min)	M590L3 (60 mW) <sup>d</sup>	M590F2 (1.85 mW)	-	Available (65 mW)	-	LIU590A (109 mW)
	LED591E (2 mW)								
595 nm	-	M595D2 (445 mW Min)	M595L3 (445 mW Min)	-	M595F2 (8.7 mW)	-	-	-	-
600 nm	LED600L (3 mW)	-	-	-	-	-	-	-	-
610 nm	LED610L (8 mW)	-	-	-	-	-	-	-	-



617 nm	-	M617D2 (600 mW Min)	M617L3 (600 mW Min)	M617L3 (230 mW) <sup>d</sup>	M617F2 (10.2 mW)	-	Available (210 mW)	-	-
623 nm	-	-	-	-	-	SOLIS- 623A(/M) (2530 mW) <sup>e</sup>	-	-	-
625 nm	LED625L (12 mW)	M625D2 (700 mW Min)	M625L3 (700 mW Min)	M625L3 (270 mW) <sup>d</sup>	M625F1 (13.2 mW)	-	Available (240 mW)	-	-
630 nm	LED630L (16 mW)	-	-	-	-	-	-	DC3100-630	LIU630A (208 mW)
635 nm	LED631E (4 mW)	-	-	-	-	-	-	-	-
	LED635L (170 mW)								
639 nm	LED630E (7.2 mW)	-	-	-	-	-	-	-	-
645 nm	LED645L (16 mW)	-	-	-	-	-	-	-	-
660 nm	LED660L (13 mW)	M660D2 (940 mW Min)	M660L4 (940 mW Min)	M660L4 (400 mW) <sup>d</sup>	M660F1 (14.5 mW)	-	Available (210 mW)	-	-
670 nm	LED670L (12 mW)	-	-	-	-	-	-	-	-
680 nm	LED680L (8 mW)	-	-	-	-	-	-	-	-
730 nm	-	M730D2 (515 mW Min)	M730L4 (515 mW Min)	M730L4 (165 mW) <sup>d</sup>	-	-	-	-	-
740 nm	-	-	-	-	M740F2 (6.0 mW)	-	-	-	-
780 nm	LED780E (18 mW)	M780D2 (200 mW Min)	M780L3 (200 mW Min)	M780L3 (130 mW) <sup>d</sup>	M780F2 (7.5 mW)	-	-	-	LIU780A (315 mW)
		M780D3 (800 mW Min)	M850LP1 (800 mW Min)						
810 nm	-	M810D2 (325 mW Min)	M810L3 (325 mW Min)	M810L3 (210 mW) <sup>d</sup>	M810F2 (6.5 mW)	-	-	-	-
850 nm	LED851W (8 mW)	M850D2 (900 mW Min)	M850L3 (900 mW Min)	M850L3 (330 mW) <sup>d</sup>	M850F2 (13.4 mW)	SOLIS- 850A(/M) (1700 mW) <sup>e</sup>	-	-	LIU850A (322 mW)
	LED851L (13 mW)	M850D3 (1400 mW)	M850LP1 (1400 mW)						
870 nm	LED870E (22 mW)	-	-	-	-	-	-	-	-
880 nm	-	M880D2 (300 mW Min)	M880L3 (300 mW Min)	-	M880F2 (3.4 mW)	-	-	-	-
910 nm	LED910E (12 mW)	-	-	-	-	-	-	-	-
940 nm	LED940E (18 mW)	M940D2 (800 mW Min)	M940L3 (800 mW Min)	M940L3 (320 mW) <sup>d</sup>	M940F1 (6.5 mW)	-	-	-	-
970 nm	-	M970D2 (35 mW Min)	M970L3 (35 mW Min)	-	M970F2 (0.3 mW)	-	-	-	-
1050 nm	LED1050E (2.5 mW)	M1050D1 (50 mW)	M1050L2 (50 mW)	-	M1050F1	-	-	-	-



	mW)								
467.5 nm, 525 nm, and 627.5 nm	LEDRGBE (5.8 mW, 6.2 mW, and 3.1 mW)	-	-	-	-	-	-	-	-
440 - 660 nm (White)	LEDWE-15 (13 mW)	-	-	-	-	-	-	-	-
470 - 850 nm (Broadband)	-	MBB1D1 (70 mW Min)	MBB1L3 (70 mW Min)	-	MBB1F1 (1.2 mW)	-	-	-	-
6500 K (Cold White)	-	MCWHD2 (800 mW Min)	MCWHL5 (800 mW Min)	MCWHL5 (320 mW) <sup>d</sup>	-	SOLIS-1A(/M) (3070 mW) <sup>e</sup>	-	-	-
		MCWHD3 (2350 mW Min)	MCWHL1 (2350 mW Min)						
6200 K (Cold White)	-	-	-	-	MCWHF2 (21.5 mW)	-	-	-	-
4600 - 9000 K (Cold White)	-	-	-	-	-	-	-	-	LIUCWHA (250 mW)
4000 K (Warm White)	-	-	-	-	MWWHF2 (16.3 mW)	-	-	-	-
3000 K (Warm White)	-	MWWHD1 (500 mW Min)	MWWHL3 (500 mW Min)	-	-	SOLIS-2A(/M) (2000 mW) <sup>e</sup>	-	-	-
		MWWHD3 (2000 mW Min)	MWWHL1 (2000 mW Min)						

- These Collimated LEDs are compatible with the standard and epi-illumination ports on the following microscopes: Olympus BX/IX (Item # Suffix: -C1), Leica DMI (Item # Suffix: -C2), Zeiss Axioskop (Item # Suffix: -C4), and Nikon Eclipse (Bayonet Mount, Item # Suffix: -C5).
- Typical power when used with MM Fiber with Ø400 µm core, 0.39 NA.
- Our LED4D 4-Wavelength LED Source is available with select combinations of the LEDs at these wavelengths.
- Typical power for LEDs with the Leica DMI collimation package (Item # Suffix: -C2).
- Minimum power for the collimated output of these LEDs. The collimation lens is installed with each LED.

[Hide Collimated LED Light Sources for Olympus BX and IX Microscopes](#)

### Collimated LED Light Sources for Olympus BX and IX Microscopes



- ▶ Approximate Beam Diameter: 50 mm
- ▶ Approximate Beam Area: 1960 mm<sup>2</sup>
- ▶ AR-Coated Aspheric Collimation Lens (EFL: 40 mm)
- ▶ See the *Specs* Tab for a Complete List of Specifications
- ▶ Cable Length: 2 m

Please note: Due to the optical design of the transmitted lamphouse port of the BX and IX microscopes, it may be necessary to purchase a separate adapter that is available from Olympus.

Item #	Housing	Total Beam Power <sup>a</sup>	Item #	Housing	Total Beam Power <sup>a</sup>
M365L2-C1		120 mW	M590L3-C1		80 mW
M365LP1-C1		505 mW	M617L3-C1		320 mW
M385L2-C1		170 mW	M625L3-C1		380 mW
M385LP1-C1		795 mW	M660L4-C1		590 mW
M405L2-C1		440 mW	M730L4-C1		240 mW
M405LP1-C1		750 mW	M780L3-C1		210 mW
M455L3-C1		500 mW	M810L3-C1		245 mW
M470L3-C1		350 mW	M850L3-C1		480 mW
M505L3-C1		210 mW	M940L3-C1		430 mW
M530L3-C1		170 mW	MCWHL5-C1		440 mW

- After collimation package. Due to variations in the manufacturing process and operating parameters such as temperature and current, the total beam power of any given LED will vary.



Click to Enlarge

Part Number	Description	Price	Availability
M365L2-C1	UV (365 nm) Collimated LED for Olympus BX & IX, 700 mA	\$724.00	Today
M365LP1-C1	UV (365 nm) Collimated LED for Olympus BX & IX, 1400 mA	\$533.33	Today
M385L2-C1	UV (385 nm) Collimated LED for Olympus BX & IX, 700 mA	\$724.00	Today
M385LP1-C1	UV (385 nm) Collimated LED for Olympus BX & IX, 1400 mA	\$533.33	Today
M405L2-C1	UV (405 nm) Collimated LED for Olympus BX & IX, 1000 mA	\$724.00	Today
M405LP1-C1	UV (405 nm) Collimated LED for Olympus BX & IX, 1400 mA	\$533.33	Today
M455L3-C1	Royal Blue (455 nm) Collimated LED for Olympus BX & IX, 1000 mA	\$523.00	Today
M470L3-C1	Blue (470 nm) Collimated LED for Olympus BX & IX, 1000 mA	\$523.00	Today
M505L3-C1	Cyan (505 nm) Collimated LED for Olympus BX & IX, 1000 mA	\$523.00	Today
M530L3-C1	Green (530 nm) Collimated LED for Olympus BX & IX, 1000 mA	\$523.00	Today
M590L3-C1	Amber (590 nm) Collimated LED for Olympus BX & IX, 1000 mA	\$449.00	Today
M617L3-C1	Orange (617 nm) Collimated LED for Olympus BX & IX, 1000 mA	\$449.00	Today
M625L3-C1	Red (625 nm) Collimated LED for Olympus BX & IX, 1000 mA	\$449.00	Today
M660L4-C1	Deep Red (660 nm) Collimated LED for Olympus BX & IX, 1200 mA	\$448.89	Today
M730L4-C1	Far Red (730 nm) Collimated LED for Olympus BX & IX, 1000 mA	\$497.00	Today
M780L3-C1	IR (780 nm) Collimated LED for Olympus BX & IX, 800 mA	\$497.00	Today
M810L3-C1	IR (810 nm) Collimated LED for Olympus BX & IX, 500 mA	\$497.00	Today
M850L3-C1	IR (850 nm) Collimated LED for Olympus BX & IX, 1000 mA	\$497.00	Today
M940L3-C1	IR (940 nm) Collimated LED for Olympus BX & IX, 1000 mA	\$497.00	Today
MCWHL5-C1	Cold White Collimated LED for Olympus BX & IX, 1000 mA	\$479.00	Today

[Hide Collimated LED Light Sources for Leica DMI Microscopes](#)

### Collimated LED Light Sources for Leica DMI Microscopes



- ▶ Approximate Beam Diameter: 37 mm
- ▶ Approximate Beam Area: 1080 mm<sup>2</sup>
- ▶ AR-Coated Aspheric Collimation Lens (EFL = 40 mm)
- ▶ See the *Specs* Tab for a Complete List of Specifications
- ▶ Cable Length: 2 m

Item #	Housing	Total Beam Power <sup>a</sup>	Item #	Housing	Total Beam Power <sup>a</sup>
M365L2-C2		60 mW	M590L3-C2		60 mW
M365LP1-C2		350 mW	M617L3-C2		230 mW
M385L2-C2		90 mW	M625L3-C2		270 mW
M385LP1-C2		520 mW	M660L4-C2		400 mW
M405L2-C2		260 mW	M730L4-C2		165 mW
M405LP1-C2		450 mW	M780L3-C2		130 mW
M455L3-C2		360 mW	M810L3-C2		210 mW
M470L3-C2		250 mW	M850L3-C2		330 mW
M505L3-C2		150 mW	M940L3-C2		320 mW
M530L3-C2		130 mW	MCWHL5-C2		320 mW

- After collimation package. Due to variations in the manufacturing process and operating parameters such as temperature and current, the total beam power of any given LED will vary.



Click to Enlarge

Part Number	Description	Price	Availability
M365L2-C2	UV (365 nm) Collimated LED for Leica DMI, 700 mA	\$724.00	Today
M365LP1-C2	UV (365 nm) Collimated LED for Leica DMI, 1400 mA	\$555.56	Today
M385L2-C2	UV (385 nm) Collimated LED for Leica DMI, 700 mA	\$724.00	Today
M385LP1-C2	UV (385 nm) Collimated LED for Leica DMI, 1400 mA	\$555.56	Today
M405L2-C2	UV (405 nm) Collimated LED for Leica DMI, 1000 mA	\$724.00	Lead Time
M405LP1-C2	UV (405 nm) Collimated LED for Leica DMI, 1400 mA	\$555.56	Today
M455L3-C2	Royal Blue (455 nm) Collimated LED for Leica DMI, 1000 mA	\$523.00	Today
M470L3-C2	Blue (470 nm) Collimated LED for Leica DMI, 1000 mA	\$523.00	Today
M505L3-C2	Cyan (505 nm) Collimated LED for Leica DMI, 1000 mA	\$523.00	Today
M530L3-C2	Green (530 nm) Collimated LED for Leica DMI, 1000 mA	\$523.00	Today
M590L3-C2	Amber (590 nm) Collimated LED for Leica DMI, 1000 mA	\$449.00	Today
M617L3-C2	Orange (617 nm) Collimated LED for Leica DMI, 1000 mA	\$449.00	Today
M625L3-C2	Red (625 nm) Collimated LED for Leica DMI, 1000 mA	\$449.00	Today
M660L4-C2	Deep Red (660 nm) Collimated LED for Leica DMI, 1200 mA	\$448.89	Today
M730L4-C2	Far Red (730 nm) Collimated LED for Leica DMI, 1000 mA	\$497.00	Today
M780L3-C2	IR (780 nm) Collimated LED for Leica DMI, 800 mA	\$497.00	Today
M810L3-C2	IR (660 nm) Collimated LED for Leica DMI, 500 mA	\$497.00	Today
M850L3-C2	IR (850 nm) Collimated LED for Leica DMI, 1000 mA	\$497.00	Today
M940L3-C2	IR (940 nm) Collimated LED for Leica DMI, 1000 mA	\$497.00	Today
MCWHL5-C2	Cold White Collimated LED for Leica DMI, 1000 mA	\$479.00	Today

[Hide Collimated LED Light Sources for Nikon Eclipse \(Bayonet Mount\) Microscopes](#)

### Collimated LED Light Sources for Nikon Eclipse (Bayonet Mount) Microscopes



- ▶ Approximate Beam Diameter: 43 mm
- ▶ Approximate Beam Area: 1450 mm<sup>2</sup>
- ▶ AR-Coated Aspheric Collimation Lens (EFL: 40 mm)
- ▶ See the *Specs* Tab for a Complete List of Specifications
- ▶ Cable Length: 2 m

Item #	Housing	Total Beam Power <sup>a</sup>	Item #	Housing	Total Beam Power <sup>a</sup>
M365L2-C5		80 mW	M590L3-C5		70 mW
M365LP1-C5		415 mW	M617L3-C5		260 mW
M385L2-C5		120 mW	M625L3-C5		300 mW
M385LP1-C5		660 mW	M660L4-C5		520 mW
M405L2-C5		360 mW	M730L4-C5		208 mW
M405LP1-C5		580 mW	M780L3-C5		170 mW
M455L3-C5		400 mW	M810L3-C5		225 mW
M470L3-C5		300 mW	M850L3-C5		370 mW
M505L3-C5		170 mW	M940L3-C5		340 mW
M530L3-C5		150 mW	MCWHL5-C5		340 mW

- After collimation package. Due to variations in the manufacturing process and operating parameters such as temperature and current, the total beam power of any given LED will vary.



Click to Enlarge

Part Number	Description	Price	Availability
M365L2-C5	UV (365 nm) Collimated LED for Nikon Eclipse, 700 mA	\$757.00	Today
M365LP1-C5	UV (365 nm) Collimated LED for Nikon Eclipse, 1400 mA	\$600.00	Today
M385L2-C5	UV (385 nm) Collimated LED for Nikon Eclipse, 700 mA	\$757.00	Today
M385LP1-C5	UV (385 nm) Collimated LED for Nikon Eclipse, 1400 mA	\$600.00	Today
M405L2-C5	UV (405 nm) Collimated LED for Nikon Eclipse, 1000 mA	\$757.00	Today
M405LP1-C5	UV (405 nm) Collimated LED for Nikon Eclipse, 1400 mA	\$600.00	Today
M455L3-C5	Royal Blue (455 nm) Collimated LED for Nikon Eclipse, 1000 mA	\$556.00	Today
M470L3-C5	Blue (470 nm) Collimated LED for Nikon Eclipse, 1000 mA	\$556.00	Today
M505L3-C5	Cyan (505 nm) Collimated LED for Nikon Eclipse, 1000 mA	\$556.00	Today
M530L3-C5	Green (530 nm) Collimated LED for Nikon Eclipse, 1000 mA	\$556.00	Today
M590L3-C5	Amber (590 nm) Collimated LED for Nikon Eclipse, 1000 mA	\$482.00	Today
M617L3-C5	Orange (617 nm) Collimated LED for Nikon Eclipse, 1000 mA	\$482.00	Today
M625L3-C5	Red (625 nm) Collimated LED for Nikon Eclipse, 1000 mA	\$482.00	Today
M660L4-C5	Deep Red (660 nm) Collimated LED for Nikon Eclipse, 1200 mA	\$448.89	Today
M730L4-C5	Far Red (730 nm) Collimated LED for Nikon Eclipse, 1000 mA	\$497.00	Today
M780L3-C5	IR (780 nm) Collimated LED for Nikon Eclipse, 800 mA	\$535.00	Today
M810L3-C5	IR (810 nm) Collimated LED for Nikon Eclipse, 500 mA	\$497.00	Today
M850L3-C5	IR (850 nm) Collimated LED for Nikon Eclipse, 1000 mA	\$535.00	Today
M940L3-C5	IR (940 nm) Collimated LED for Nikon Eclipse, 1000 mA	\$535.00	Today
MCWHL5-C5	Cold White Collimated LED for Nikon Eclipse, 1000 mA	\$516.00	Today

[Hide Collimated LED Light Sources for Zeiss Axioskop Microscopes](#)

### Collimated LED Light Sources for Zeiss Axioskop Microscopes



- ▶ Approximate Beam Diameter: 44 mm
- ▶ Approximate Beam Area: 1520 mm<sup>2</sup>
- ▶ AR-Coated Aspheric Collimation Lens (EFL: 40 mm)
- ▶ See the Specs Tab for a Complete List of Specifications
- ▶ Cable Length: 2 m

Item #	Housing	Total Beam Power <sup>a</sup>	Item #	Housing	Total Beam Power <sup>a</sup>
M365L2-C4		80 mW	M590L3-C4		70 mW
M365LP1-C4		400 mW	M617L3-C4		280 mW
M385L2-C4		110 mW	M625L3-C4		330 mW
M385LP1-C4		630 mW	M660L4-C4		570 mW
M405L2-C4		360 mW	M730L4-C4		195 mW
M405LP1-C4		570 mW	M780L3-C4		180 mW
M455L3-C4		430 mW	M810L3-C4		230 mW
M470L3-C4		310 mW	M850L3-C4		400 mW
M505L3-C4		180 mW	M940L3-C4		380 mW
M530L3-C4		150 mW	MCWHL5-C4		380 mW

- After collimation package. Due to variations in the manufacturing process and operating parameters such as temperature and current, the total beam power of any given LED will vary.



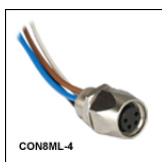
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Part Number	Description	Price	Availability
M365L2-C4	UV (365 nm) Collimated LED for Zeiss Axioskop, 700 mA	\$724.00	Today
M365LP1-C4	UV (365 nm) Collimated LED for Zeiss Axioskop, 1400 mA	\$555.56	Today
M385L2-C4	UV (385 nm) Collimated LED for Zeiss Axioskop, 700 mA	\$724.00	Today

M385LP1-C4	UV (385 nm) Collimated LED for Zeiss Axioskop, 1400 mA	\$555.56	Today
M405L2-C4	UV (405 nm) Collimated LED for Zeiss Axioskop, 1000 mA	\$724.00	Lead Time
M405LP1-C4	UV (405 nm) Collimated LED for Zeiss Axioskop, 1400 mA	\$555.56	Today
M455L3-C4	Royal Blue (455 nm) Collimated LED for Zeiss Axioskop, 1000 mA	\$523.00	Today
M470L3-C4	Blue (470 nm) Collimated LED for Zeiss Axioskop, 1000 mA	\$523.00	Lead Time
M505L3-C4	Cyan (505 nm) Collimated LED for Zeiss Axioskop, 1000 mA	\$523.00	Today
M530L3-C4	Green (530 nm) Collimated LED for Zeiss Axioskop, 1000 mA	\$523.00	Today
M590L3-C4	Amber (590 nm) Collimated LED for Zeiss Axioskop, 1000 mA	\$449.00	Today
M617L3-C4	Orange (617 nm) Collimated LED for Zeiss Axioskop, 1000 mA	\$449.00	Today
M625L3-C4	Red (625 nm) Collimated LED for Zeiss Axioskop, 1000 mA	\$449.00	Today
M660L4-C4	Deep Red (660 nm) Collimated LED for Zeiss Axioskop, 1200 mA	\$482.00	Today
M730L4-C4	Far Red (730 nm) Collimated LED for Zeiss Axioskop, 1000 mA	\$535.00	Today
M780L3-C4	IR (780 nm) Collimated LED for Zeiss Axioskop, 800 mA	\$497.00	Today
M810L3-C4	IR (810 nm) Collimated LED for Zeiss Axioskop, 500 mA	\$535.00	Today
M850L3-C4	IR (850 nm) Collimated LED for Zeiss Axioskop, 1000 mA	\$497.00	Today
M940L3-C4	IR (940 nm) Collimated LED for Zeiss Axioskop, 1000 mA	\$497.00	Today
MCWHL5-C4	Cold White Collimated LED for Zeiss Axioskop, 1000 mA	\$479.00	Today

### Hide Mounted LED Mating Connector

#### Mounted LED Mating Connector



- ▶ Pico (M8) Receptacle
- ▶ Female 4-Pin for Front Mounting
- ▶ 0.5 m Long, 24 AWG Wires
- ▶ M8 x 0.5 Panel Mount Thread
- ▶ IP 67 and NEMA 6P Rated

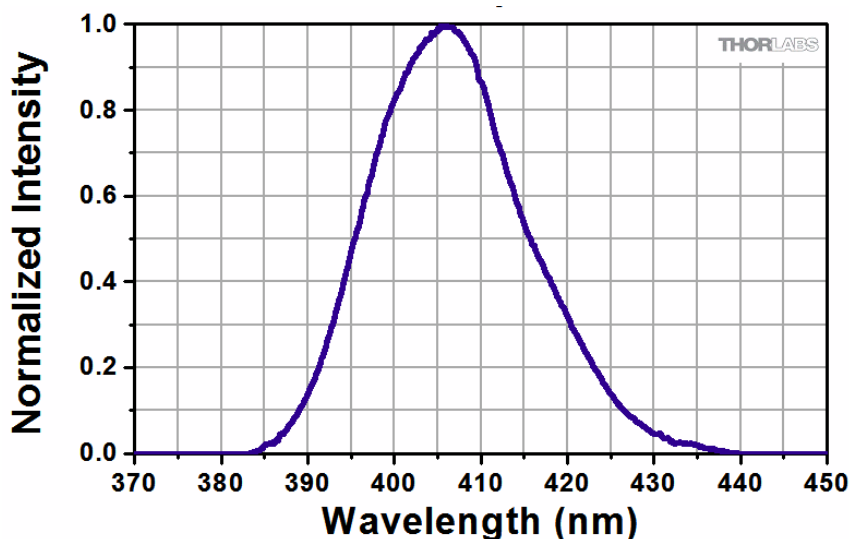
The CON8ML-4 connector can be used to mate mounted LEDs featured on this page to user-supplied power supplies. We also offer a male 4-Pin M8 connector cable (Item # CAB-LEDD1).

Pin	Color	Specification
1	Brown	LED Anode
2	White	LED Cathode
3	Black	EEPROM GND
4	Blue	EEPROM IO



CON8ML-4 Shown Connected to the 4-Pin M8 Plug of Mounted LED

Part Number	Description	Price	Availability
CON8ML-4	4-Pin Female Mating Connector for Mounted LEDs	\$30.00	Today



The M405L2-C Collimated LEDs use an M405L2 Mounted High-Power LED attached to a microscope-port-compatible collimation package. The spectrum shown here is for the bare (uncollimated) LED.