

# Prizmatix

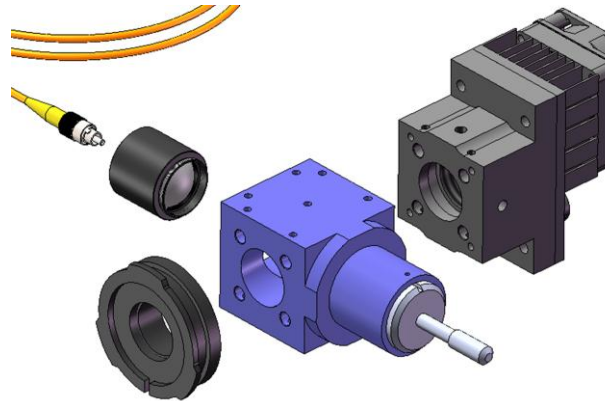
## Beam Switcher

### Versatile Accessory for Microscopy and Optogenetics Applications

#### Introduction

The Beam Switcher accessory allows Prizmatix LEDs installed on the microscope to be used either for the microscope epi-fluorescence illumination or for illuminating via a fiberoptic probe. Especially useful for in situ Optogenetics studies, the Beam switcher saves cost and space, yet enables maximum flexibility in experiment design.

Alternatively, the Beam Switcher is useful for assembling White LED and single color LED at fluorescence microscopes. Please see below for application examples.



#### Key Features

- Assembles directly on the microscope epi-fluorescence illumination port.
- Modular adapters for all major microscopes brands.
- Accepts all types of Prizmatix UHP-Mic-LED, VHP-Mic-LED, Mic-LED products.
- Accepts all types of multimode optical fibers.

#### Applications

- Fluorescence microscopy
- Optogenetics

#### Specifications

Wavelength range	nm	350 – 1100
Connector for Optical fiber		SMA / FC / ST
Adaptors to Microscope epi-fluorescence illumination port		Olympus, Nikon, Zeiss or Leica
Connection to Prizmatix LED heads		By 4 pin connection system
Connection to other systems		SM1 thread

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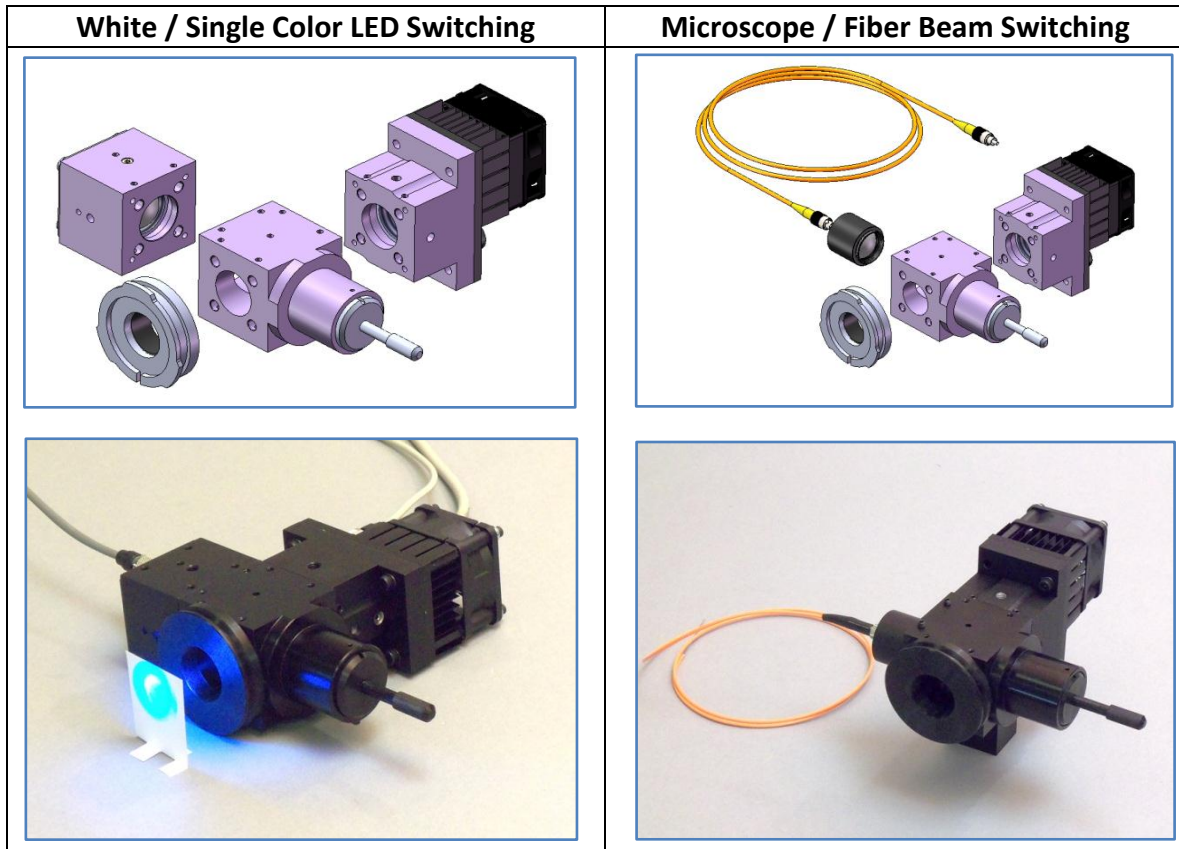
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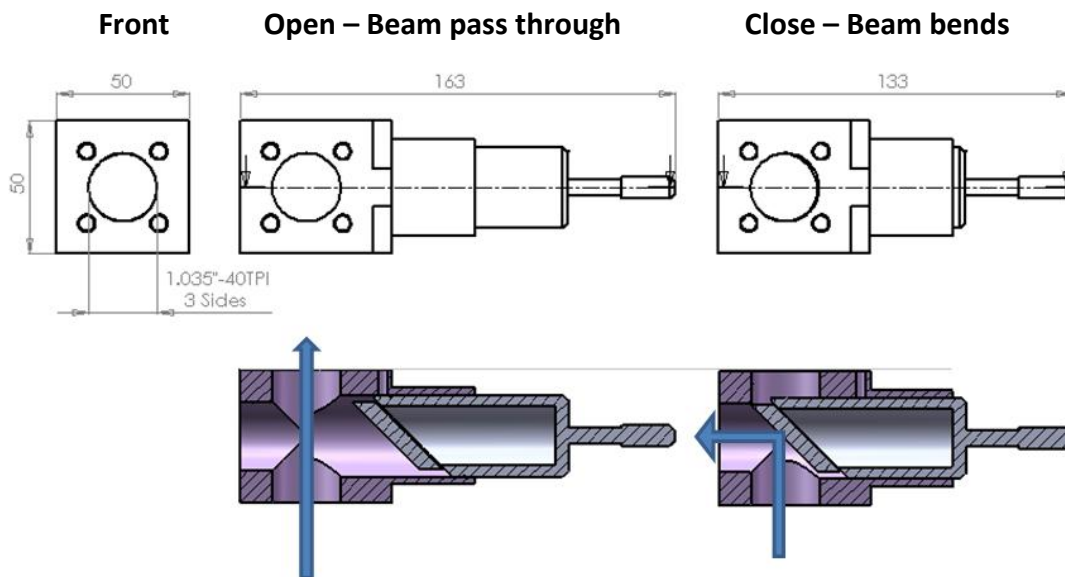
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## Application Examples



## Mechanical Drawings



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## Optional Accessories

### Filter Wheel:

The UHP-Mic-LED can be equipped with a 6 positions filter wheel at the beam output. This accessory is especially useful for UHP-Mic-LED-White light source. Please see video clip <http://www.youtube.com/watch?v=iv7dlwLHaUE&feature=plcp> at time 1:58 for details.

### Fiber Coupler Adaptor:

The UHP-Mic-LED can be easily changed from direct microscope coupling to fiber coupled LED configuration by means of Fiber Coupler Adaptor (SMA, CF or ST connector). This adaptor can be easily assembled by a user on the Mic-LED output.

Please see video clip <http://www.youtube.com/watch?v=iv7dlwLHaUE> for more details.

### Liquid Light Guide Adaptor:

The Microscope-LED can be easily changed from direct microscope coupling to Liquid Light Guide coupled LED configuration by means of LLGA Adaptor. This adaptor can be easily assembled by a user on the Mic-LED output. Please see video clip

<http://www.youtube.com/watch?v=iv7dlwLHaUE> for more details.

### Collimator:

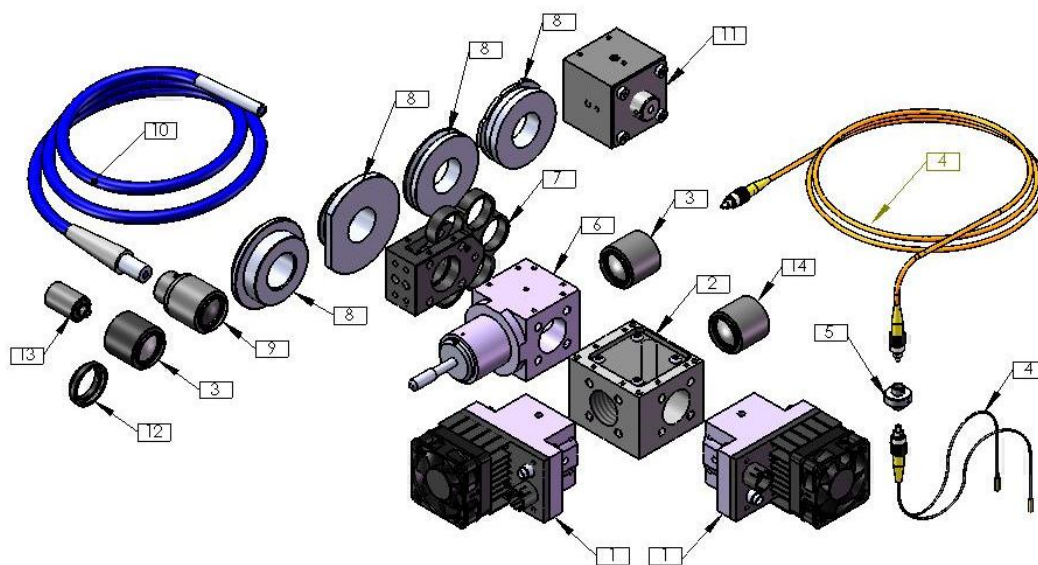
The output from optical fiber is divergent according to fiber NA. In order to reduce the divergence angle a collimator module can be used. Prizmatix collimator was especially designed to fit thick core high NA Polymer Optical Fibers. See more info at

<http://prizmatix.com/docs/collimator.cfm>

### Fiber Bundles:

To combine outputs of multiple LEDs a Y-shaped fiber bundle with two or more input branches can be used. Prizmatix can help to configure and build custom fiber bundles for specific applications. See more info at:

<http://prizmatix.com/docs/Custom Fiber Optic Assemblies.cfm>



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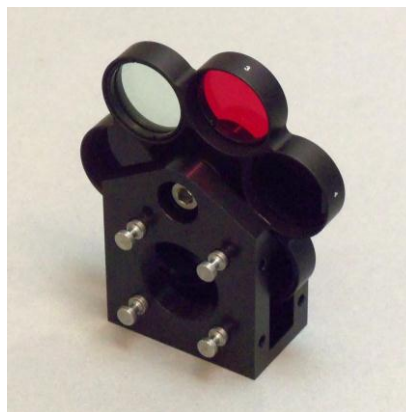
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# Prizmatix

## Filter Wheel for Microscopy and Fiber-Coupled LEDs

### Introduction

The Filter wheel accessory is used to narrow the spectral emission of Prizmatix Ultra High Power (UHP) LED light sources in microscopy or via fiber optic probes. Holding up to six filters, the Filter wheel is especially useful for Prizmatix's UHP White LED for precise wavelength selection. In color LEDs the filter wheel can be used to define precise excitation wavelength profile and required band-pass spectral width. A unique locking pins system allows for easy yet secure installation to all set of Prizmatix OptiBlocks items.



### Key Features

- Accommodates up to six standard  $\varnothing 1"$  (25.4mm) filters
- Includes six retaining rings
- Fits filters up to 0.25" (6.35mm) thick
- Threaded SM1 Ports (1.035"-40TPI) on front and rear
- Four lock pins on front and rear enables easy installation and compatibility with all of Prizmatix's LED light sources and OptiBlocks
- M6 mounting hole below

### Applications

- UHP-Mic-LED-White light filtering
- Spectroscopy
- Fluorescence microscopy

### Specifications

Connector for optional optical fiber	SMA / FC / ST
Adaptors for microscope epi-fluorescence illumination port	Olympus, Nikon, Zeiss or Leica
Connection to Prizmatix LED heads	4-pin connection system
Connection to other systems	SM1 thread

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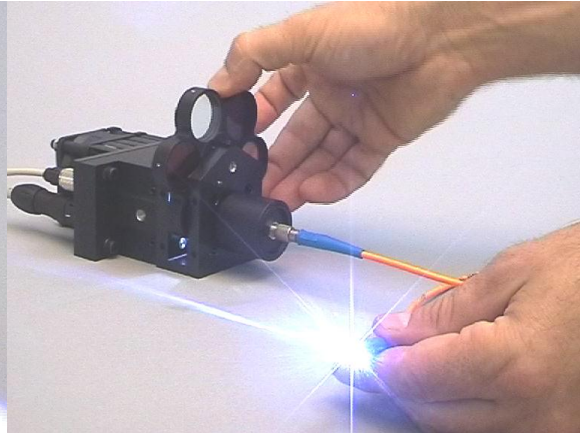
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## Application Examples

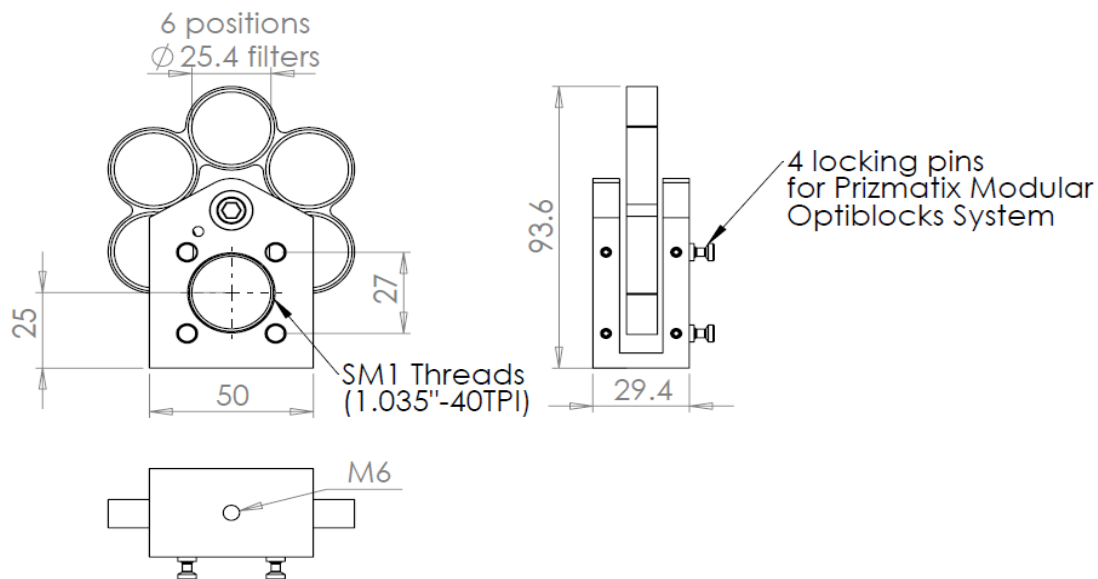


Filter Wheel installed on a UHP-Mic-LED-White



With SMA Fiber Coupler

## Mechanical Drawings



## Optional Accessories

### Microscope adaptors

Standard epi-fluorescence microscope adaptors for Olympus, Nikon, Zeiss or Leica, as well as custom adaptors on request are available.

### Beam Switcher

The Beam Switcher enables virtually instant switching from microscope to fiber output illumination for Prizmatix LEDs installed on a microscope. See the Beam Switcher in action in this video (starting at 1:40): <http://www.youtube.com/watch?v=iv7dlwLHaUE>

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## Fiber Coupler Adaptor:

Transform a Prizmatix microscope LED into a fiber coupled light source by adding a Fiber Coupler Adaptor (SMA, CF or ST connector) by simply screwing the adaptor into the front of the LED head. See the Fiber Coupler in action in this video (starting at 1:18):

<http://www.youtube.com/watch?v=iv7dlwLHaUE>

## Liquid Light Guide Adaptor:

A Prizmatix Microscope-LED can be easily changed from direct microscope coupling to a liquid light guide coupled LED with the LLGA adaptor, which simply screws into the front of the LED head as shown

in this video (starting at 2:31): <http://www.youtube.com/watch?v=iv7dlwLHaUE>

## Fiber Bundles:

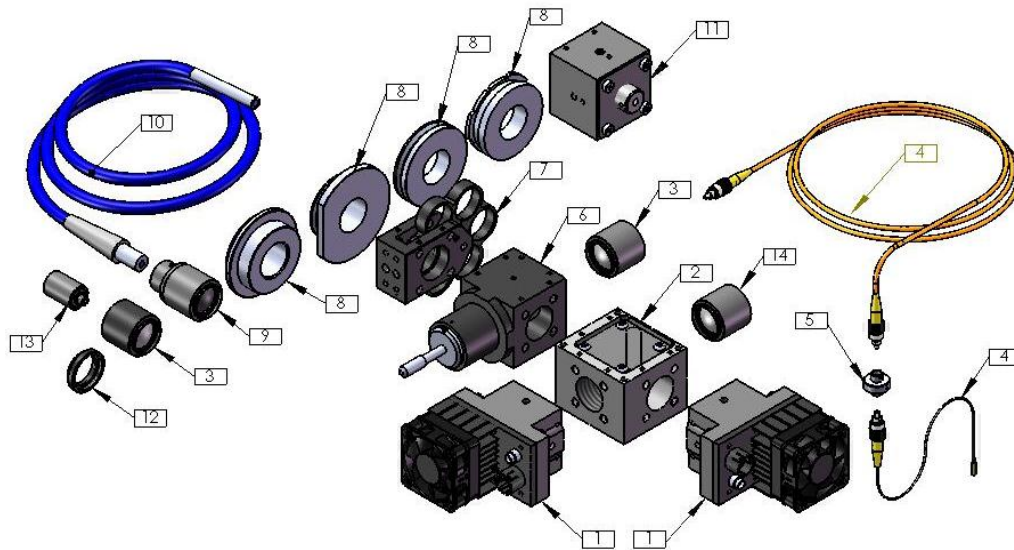
Prizmatix can configure and build custom fiber bundles for specific applications. For example: combining outputs of multiple LEDs into

a Y-shaped fiber bundle with two or more input branches.

Further information can be found here:

[http://prizmatix.com/docs/Custom\\_Fiber\\_Optic\\_Assemblies.cfm](http://prizmatix.com/docs/Custom_Fiber_Optic_Assemblies.cfm)

## Overview of Prizmatix Microscope LEDs and Accessories



- |                          |                                      |
|--------------------------|--------------------------------------|
| 1 Ultra High Power LED   | 8 Microscope Adaptors                |
| 2 Beam Combiner          | 9 Liquid Light Guide Adaptor         |
| 3 Fiber Coupling Adaptor | 10 Liquid Light Guide                |
| 4 Fiberoptics            | 11 Liquid Light Guide XYZ Collimator |
| 5 Rotary Joint           | 12 C-Mount Adaptor                   |
| 6 Beam Switcher          | 13 Fiberoptic Collimator             |
| 7 Filter Wheel           | 14 Photodiode                        |

Further information can be found here:

<http://www.prizmatix.com/docs/Optogenetics-LED-Light-Sources-and-Fiber-Optics.cfm>

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# Prizmatix

## Liquid Lightguide

### Light delivery system for microscopy Applications

Ver. 1

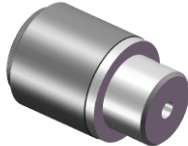
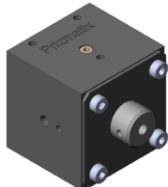
#### Introduction

The liquid lightguide is a flexible tube with a liquid core that is used as an alternative to silica optical fibers and provide excellent light transmission. They're highly flexible and do not break. The lightguide has the cross-section of a pipe, and thus has no packing losses like in silica fiber bundles, which have spaces between them where no light goes through.

#### Specifications

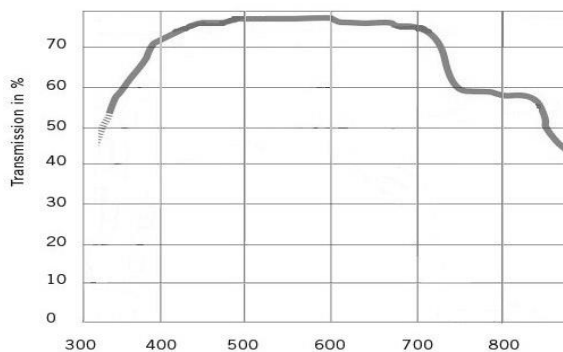
LLG-3	Liquid Light Guide Core 3 mm, Numerical aperture (NA): 0.6, Length 1.5m
LLG-5	Liquid Light Guide Core 5 mm, Numerical aperture (NA): 0.6, Length 1.5m

#### Accessories

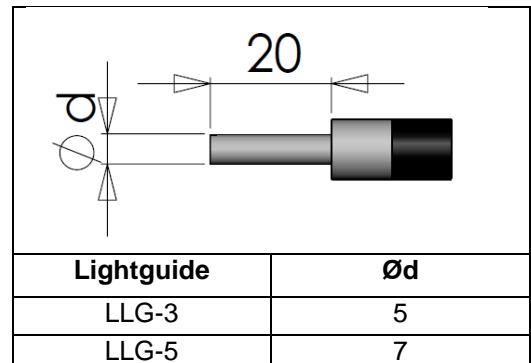
LLG-A	Liquid Light Guide Adaptor enabling coupling of UHP-Mic, UHP-T or Mic-LED into LLG	
LLG-C (Type = N / O / Z / L)	XYZ adjustable Collimator for LLG Light Guide. Nikon, Olympus, Zeiss and Leica adaptors available.	

#### Spectral Transmission and Tip Dimensions

Spectral Transmission



Tip dimensions



Dimensions in mm

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# Prizmatix

## Mic-LED Light Source Series Collimated LED Light Sources for Microscopy

Ver. 2

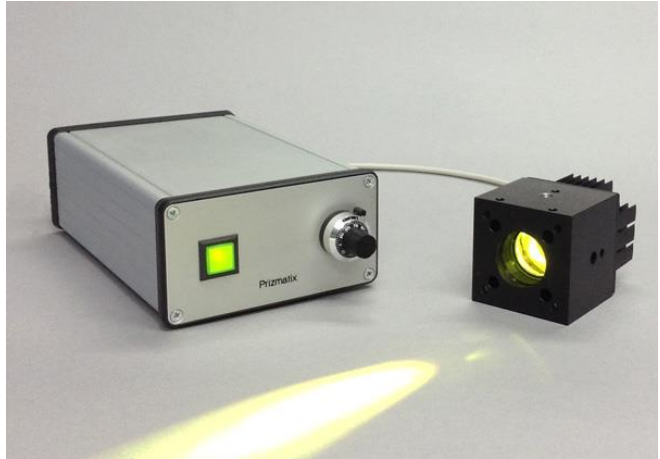
### Introduction

Prizmatix Modular Mic-LED Light Source products series provides an affordable and expandable solution for fluorescence excitation in upright and inverted fluorescence microscopes. Mic-LEDs are available in a wide range of a specific excitation wavelengths (please see full list below).

The Mic-LED head comprises a High Power single chip LED and built-in adjustable AR coated aspheric lens collimator to provide collimated beam suitable for direct connection to epi-fluorescence port of microscope. The XY adjust screws enable precise alignment of the LED system to microscope light path. The LED has excellent thermal coupling to the body of Mic-LED or heat sink providing excellent thermal management. Each Mic-LED is shipped with specific test report providing information on total beam power and emission spectrum.

Mic-LED modules can be easily combined by dichroic Beam Combiner OptiBlocks to create various multi wavelength excitation system. The multi wavelength system can mix all Prizmatix collimated LEDs: Mic-LED, UHP-LEDs and UHP-T.

The Mic-LED current controller BLCC-04 can drive in either continuous or pulsed modes.



### Key Features

- High Power LED at numerous wavelengths
- Long life, no lamp replacement required
- Adaptors to epi-fluorescent ports of Olympus, Nikon, Zeiss and Leica. Also compatible with standard SM1 (1.035"-40) thread
- No excessive heat, no speckles, no vibrating or moving parts
- Expandable system – user can add excitation wavelengths to create multi-wavelength system
- Precisely adjustable power by 10 turns potentiometer or Analog Input (0-5Vdc)
- Low optical noise (<0.02% rms)
- Fast triggering via TTL input (Rise / Fall time <3  $\mu$ s)
- Opto-Isolated TTL and Analog Inputs to eliminate ground-loop
- USB control (optional)

### Optical Output Power Specifications:

Mic-LED power output is dependent on specific LED wavelength used in the product. Please contact us for power data for specific wavelength and fiber. Following table shows few examples for collimated Mic-LED as used in microscopy and for Mic-LED equipped with Fiber Couple Adaptor (FCA), for full table of standard available wavelengths and power levels please see: <http://www.prizmatix.com/micled/Mic-LEDs.aspx>

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# Prizmatix


Product	Collimated Output Power	Fiber output Power*
Mic-LED-365	300 mW	100 mW
Mic-LED-385	600 mW	130 mW
Mic-LED-460	400 mW	130 mW
Mic-LED-630	300 mW	100 mW

(\* ) Fiber output power is for Polymer Optical Fiber, core 1500um, NA 0.5, length 1m connected to FCA adaptor connected to Mic-LED head.

## Electrical Specifications:

Typical Optical RMS Noise (DC-1MHz)	%	< 0.05
Modulation inputs (TTL and Analog Input)		Optically isolated BNC connectors
Digital modulation frequency	Hz	DC-40000
Rise / Fall time (10% - 90%)	µs	<5 / <3
Analog input voltage range	V	0-5
Analog modulation frequency	Hz	DC-150
BLCC-04 Input Voltage	V	12
Power Adaptor Input		100-240 VAC, 50/60Hz, 0.7A

## General Specifications

Operation temperature range	°C	10 - 35
Storage temperature range	°C	-10 - 55
Operating relative humidity (Non-condensing)	%	<90
Mic-LED dimensions		See drawing below
Mic-LED weight	g	350
BLCC-04 Dimensions		See drawing below
BLCC-04 Weight	g	430
Power adaptor dimensions (L x W x H)	mm	90 x 53 x 35
Power adaptor weight	g	190
Power Adaptor Safety		

## Optional Accessories

For more details on optional accessories please see:

<http://www.prizmatix.com/optogenetics/Optogenetics-LED-Light-Sources-and-Fiber-Optics.htm>

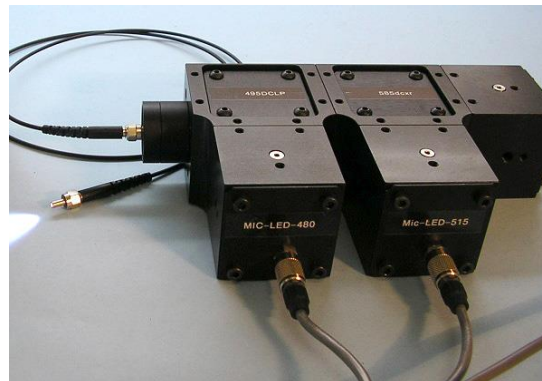


Fig. 2: Multi-wavelength light source assembled by 3 x Mic-LED, 2 x Beam Combiners, 1 x Fiber Coupled Adaptor.

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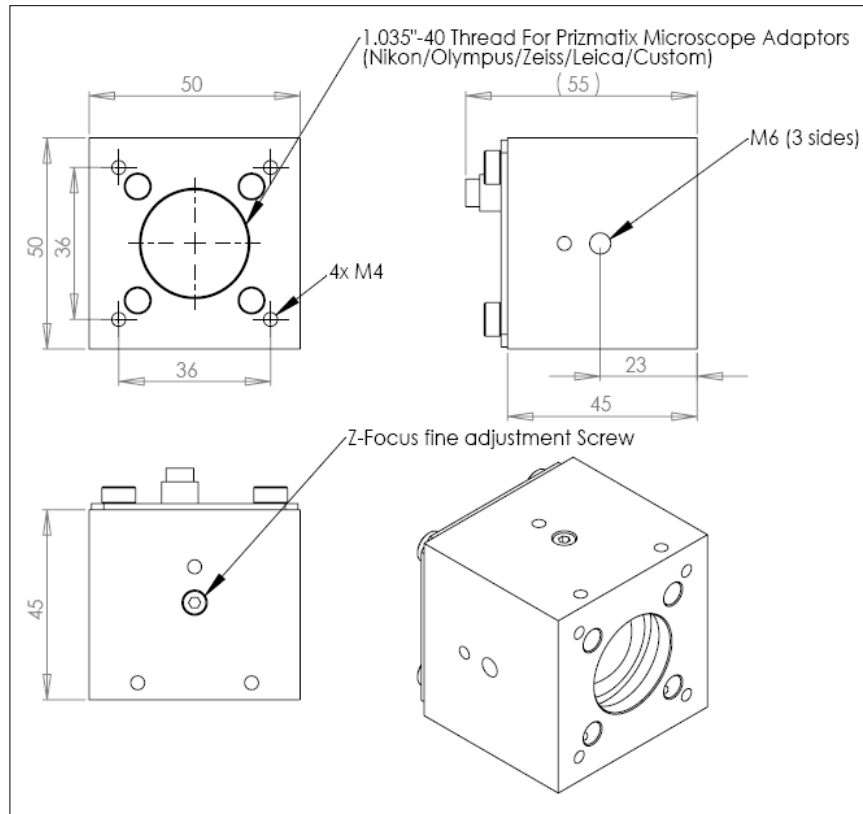
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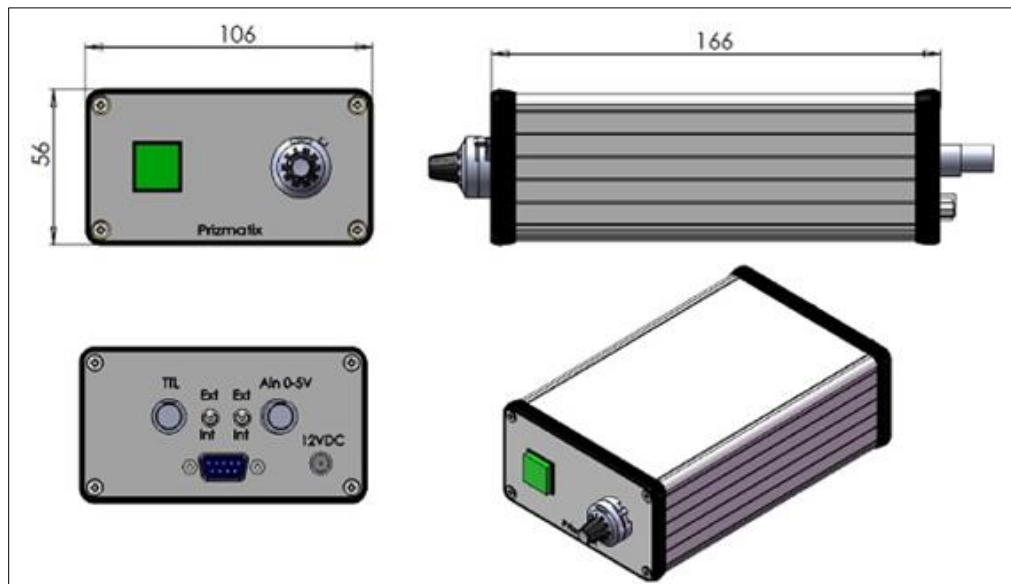
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# Prizmatix

## Mic-LED Head Mechanical Drawings



## BLCC-04 LED Current Controller Mechanical Drawings



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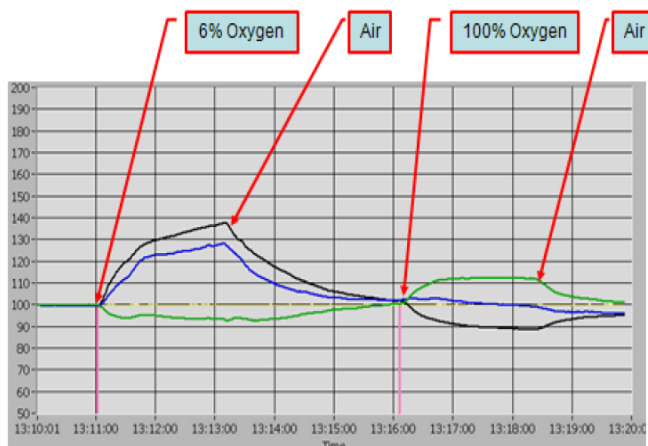
# MitoViewer MV-2

## Real-time assessment of mitochondrial function by NADH fluorescence in-vivo



**NADH** is a control marker in the energy generation by the respiratory chain located in the mitochondria.

**NADH** redox state is sensitive to the intracellular oxygen levels and to energy consumption by the tissue.



### MitoViewer Applications:

- Ischemia, Hypoxia, Anoxia, Heperoxia or hypercapnia in various organs.
- Activation of the brain by Cortical Spreading depression or Seizures.
- Changing of heart metabolism by isotropic and chronotropic drugs.
- Drug safety and efficacy monitored In Vivo in various organs.

### MitoViewer Main Features:

- Could be used in various experimental animal models and various organs under In Vivo and In Vitro conditions.
- Calculates corrected NADH (independent of hemodynamic changes in the tissue).
- Measurement via flexible fiberoptic probe.
- Custom types of probes can be supplied to best fit specific experimental setup.
- Possible integration of the MitoViewer probe with other probes (for example Laser Doppler Flowmeter probe).

#### For additional information contact:

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