

Multispectral LED Illuminator

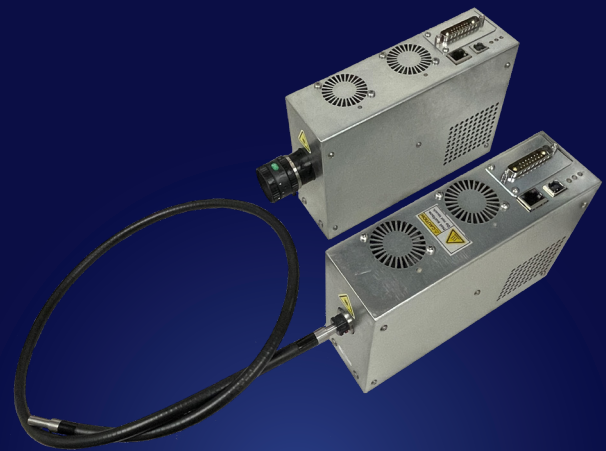
# LumiSpectra™

## Features

- Two options:
  - Optical fiber for up to 6mm diameter
  - Direct illumination by lens
- Radiant power output  $> 0.30\text{mW}/(\text{nm}\cdot\text{mm}^2\cdot\text{sr})$
- Contiguous spectrum 400nm - 990nm
  - Extendable to 1700nm
- 12 Individually controllable wavelengths
- Highly uniform far field
- Near field uniformity  $>90\%$  all  $\lambda$
- Pulsed or CW
- External trigger

The innovative LumiSpectra™ provides a continuous broadband spectrum and high CRI  $> 95$  with individually controllable wavelengths ranging from visible to near IR. IOI's robust, patented design enables extreme radiance, stability, and long lifetime. Thermal management is handled by proprietary heat sink, board design, and air-cooling to maintain low junction temperatures, allowing higher drive currents and densely packed die arrays.

Two user-friendly options can be operated in CW or Pulsed modes with external trigger and fast rise time. Thus, wavelengths can be turned on one at a time in quick succession. In addition, the LED wavelength distribution can be customized to suit the application.



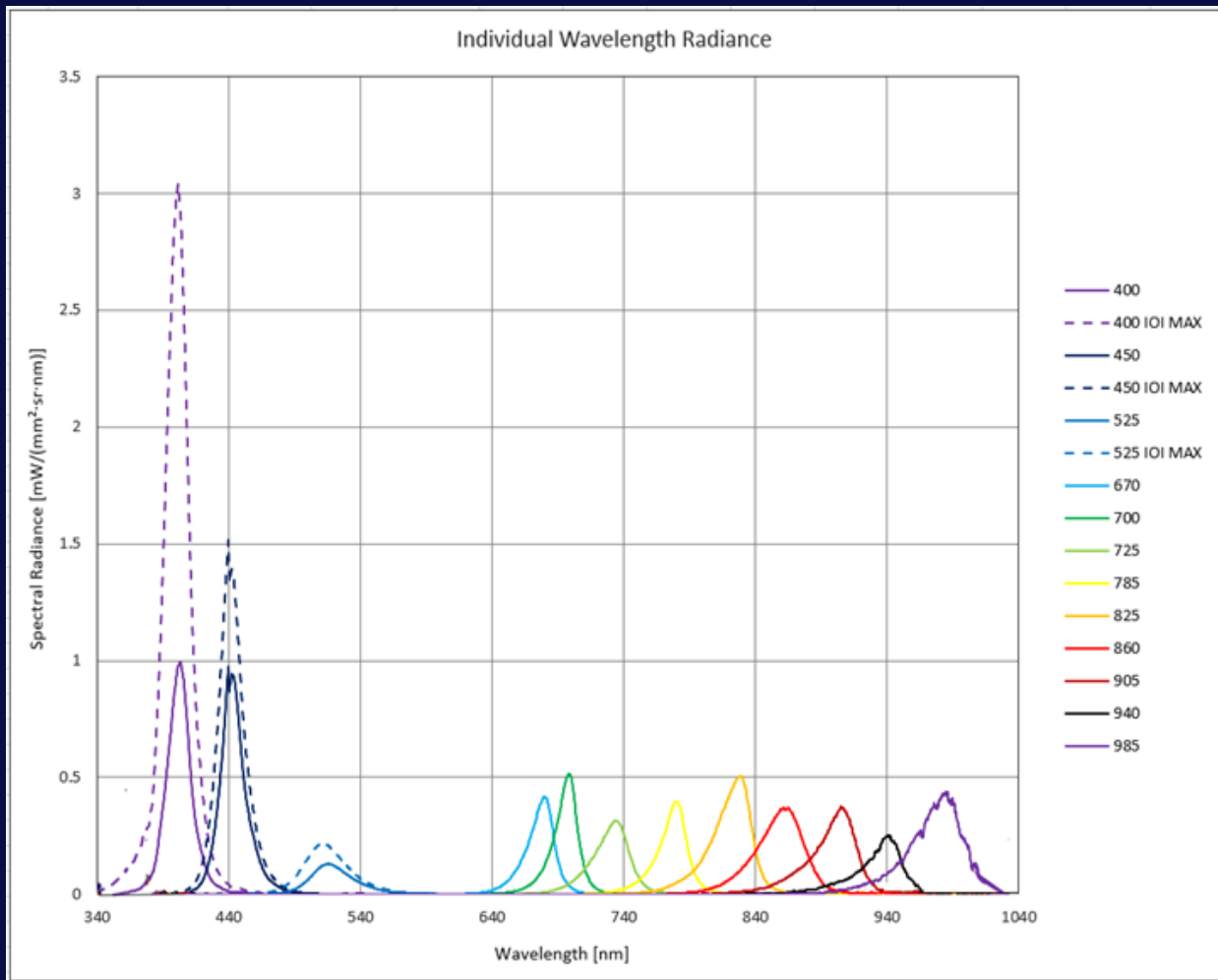
## Applications

- Multispectral imaging
- Hyperspectral illumination
- Endoscopy and diagnostic imaging
- Xenon or Tungsten-Halogen lamp replacement
- Inspection:
  - Medical
  - Industrial

The output of the fiber coupled option is designed to a standard endoscopic NA of 0.66 and can accept up to 6mm diameter fiber bundles. Remote digital control is enabled by RS-485 interface with Modbus RTU communication protocol.

The versatile and powerful LumiSpectra™ LED device is ideal for numerous applications as a more efficient alternative to Xenon and Tungsten-Halogen lamps. Where maximum photon delivery, illumination uniformity, wavelength selection, and stable optical power are important, LumiSpectra™ is an excellent choice.

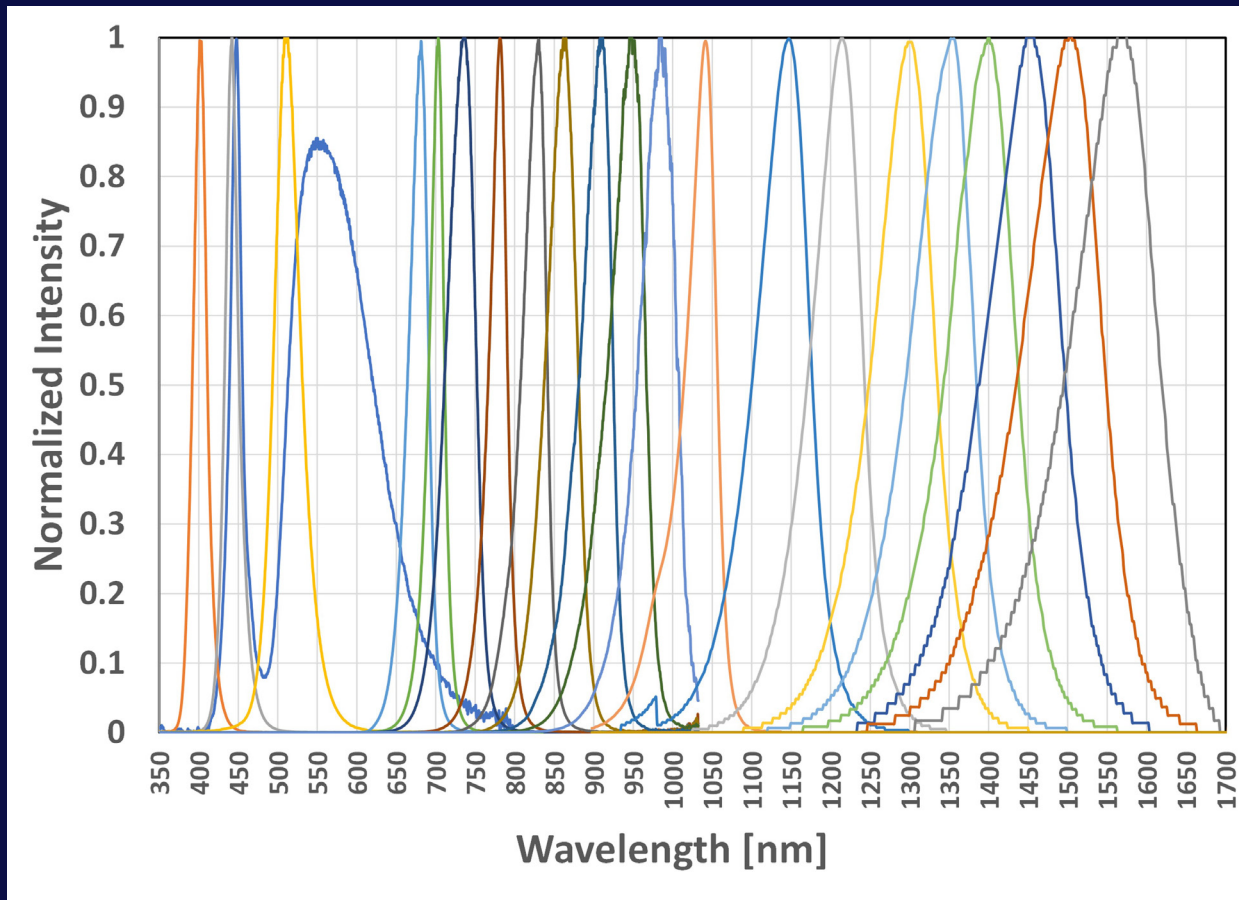
# LumiSpectra™ Individual Wavelength Radiance



Note: Data represent one possible spectral output. Other LED die are available and relative power output for each wavelength can be customized.

As an example, dashed lines represent full power for those wavelengths.

# LumiSpectra™ Individual Wavelength Radiance



Representative LED Spectra 400 - 1700nm. Most LED wavelengths are available. Output may vary.

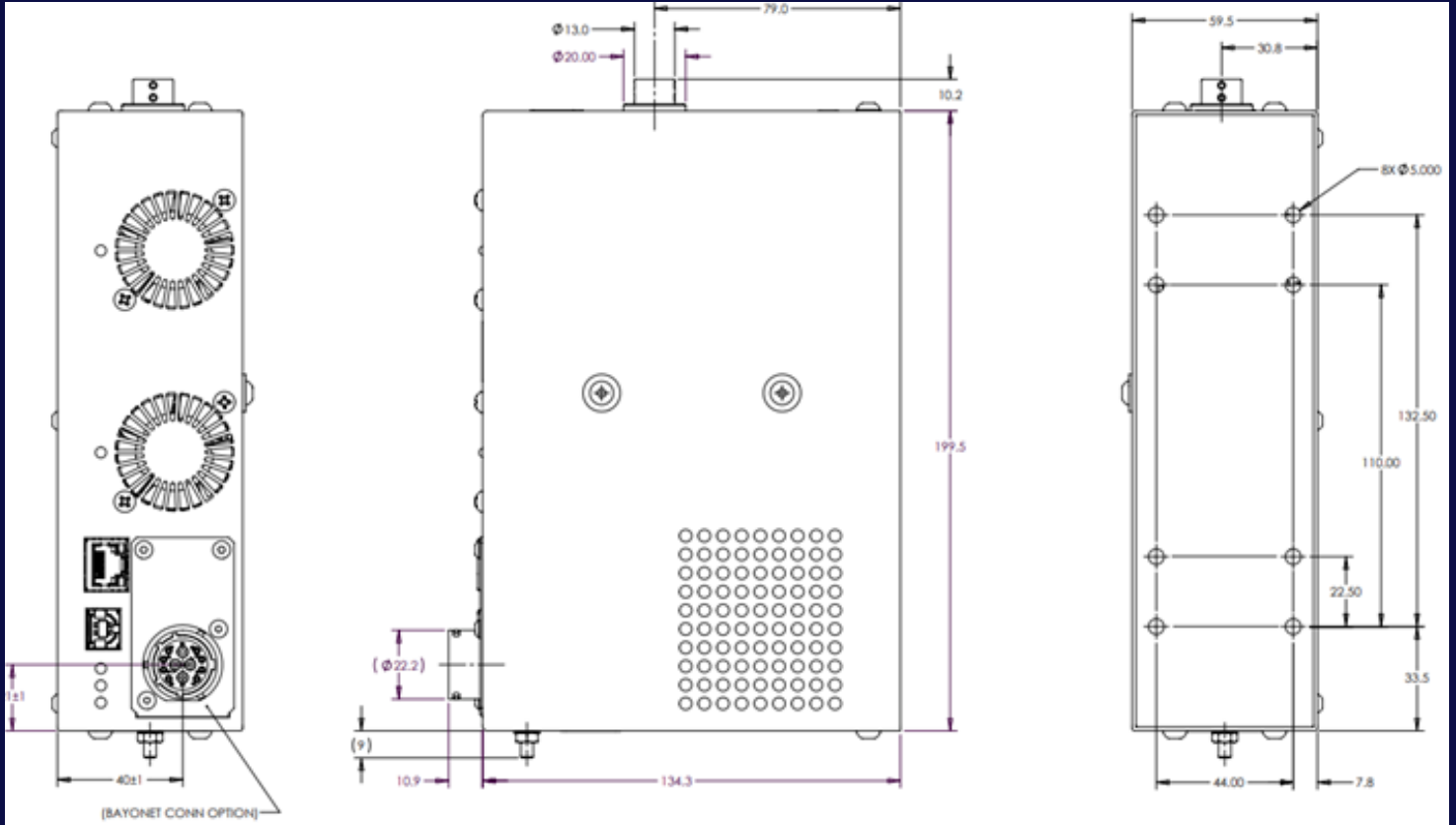
# LumiSpectra™ Specifications

Parameter	Specification	Comments
Number of Individually Controllable Wavelengths	12 @ $\lambda_p$ shown in graphs. Up to 14 wavelengths possible.	Individual peaks may vary depending on spectral bin size and operating junction temperature to within the order of 5 nm.
Wavelength range	400 nm in UV to 990nm in NIR. Extendable to 1700 nm.	Drive current compliance voltage
Spectral Variation	<3:1 (450 - 970 nm).	P-V
Output Aperture Size Fiber Optic Configuration	Up to 6.0 mm, nominally designed for 5.0mm.	To suit a range of fiberoptic bundle diameters for fiber version.
Pulsed Optical Output	Average of > 0.30 nW/(nm-mm <sup>2</sup> -sr) All channels on simultaneously.	Higher radiance achievable with subset of wavelengths.
Continuous Optical Output	> 0.10 nW/(nm-mm <sup>2</sup> -sr) for all channels on at 20°C LED Control Temperature. > 0.30 nW/(nm-mm <sup>2</sup> -sr) for all channels on at 50°C LED Control Temperature.	Higher radiance achievable with subset of wavelengths.
Lifetime	# pulses > $3 \times 10^7$ @ <20% loss in initial nominal radiance. CW mode > 10,000 hrs. to 80% initial radiance.	CW lifetime depends upon LED temperature set point, drive current, & number of LEDs activated.
Near Field (Optical Fiber) or Illumination Plane Uniformity	>90% for all wavelengths.	Depends on properties of specific lens used for lens-based configuration.
Input Voltage	+12 to 14 VDC +/- 5%	Nominally 10A input current.
Rise Time	< 50 $\mu$ sec	
Fall Time	< 2 $\mu$ sec	Full off, no light output.
Dimming	Digital	Via Modbus command set.

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Short Term Instability	< 1%	P-V over 4 hours
Long Term Instability	< 20%	Over operational lifetime due to long term changes in LED output.
Modes of Operation	CW or pulsed	Pulsed at < 50% Duty Factor at 0.30.
Temperature Control	Peltier thermoelectric cooler and fans for forced air cooling.	
Warm Up Time	< 2 minutes from cold start, depending on difference between ambient and LED Control Temperature set point.	
External Trigger	3.3 VTTL 50 µsec min pulsed width 250 Hz - 2 kHz switching frequency	User enabled.
LED Module I/O	Thermistor in LED module Fan power (12VDC) and PWM	Monitor Cooling, intelligent control.
Fault Detection	Yes, via 3 bi-color LEDs on controller and 1 each for 2 cooling fans.	
Connectivity	RS-485 and Ethernet (Modbus Protocol)	
Operational Temperature Range	10 - 40°C Noncondensing	
Size and Weight	200 (W) x 60 (D) x 135 (H) mm, 1.5 kg.	

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LumiSpectra dimensions in mm.

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