

pE-4000

Universal
Illumination
System



- Powerful
- Efficient
- Compact

All wavelengths included



CoolLED
Simply Better Control



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pE-4000

Universal Illumination System



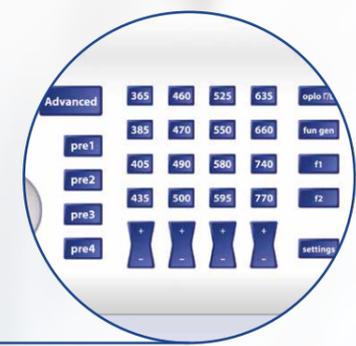
The pE-4000 sets the standard as the universal illumination system for fluorescence microscopy.

The system has 16 selectable LED wavelengths that can be matched to the filters and fluorophores of almost any microscope, making it the broadest spectrum of illumination available. For the user who wants consistency and ease of use with simple on/off and intensity buttons, the pE-4000 can be operated as a 'White' illumination system. For the user who wants total control over the excitation source to improve imaging, individual wavelengths settings can be selected and controlled in "Advanced" mode.

CoolLED's innovation comes from recognizing that all the stains used in multi-band work can have their absorption bands divided into four separate groups across the spectrum. This has allowed the development of a patent-pending, wavelength-grouping concept which makes it possible to deliver more power in an efficient four channel system.



White
for Simplicity



Advanced
for Control

Ideal for Multi-User and Core Facilities

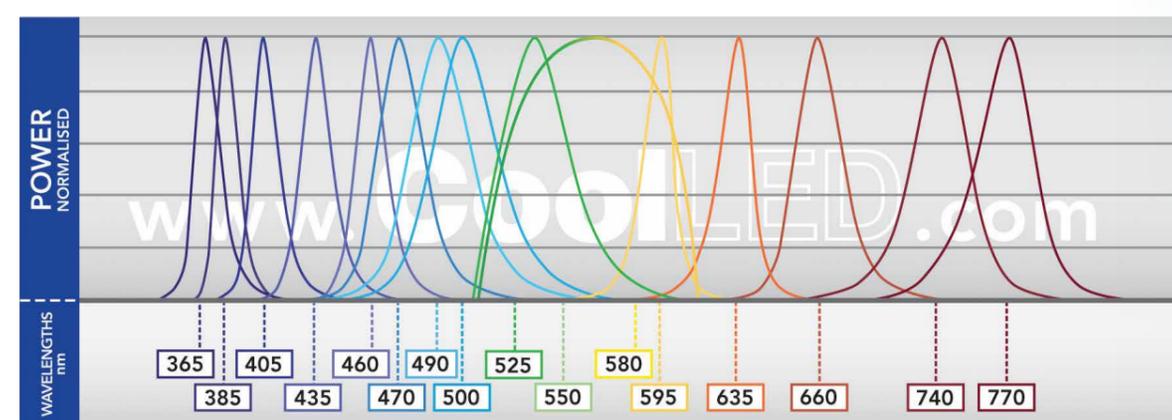
- **Instant** on/off
- **Precise** intensity control in 1% steps (0-100%)
- **Simple to fit**, simple to use
- **Pre-sets** allowing lab manager to match white spectrum to existing filter cubes
- **Higher contrast images** from matched white spectrum

pE-4000 LED System

- Excellent field uniformity at sample
- No mercury
- Long Life: 25,000 hours
- No bulb changing, bulb alignment or warm up process
- Quiet operation
- High efficiency
- Wide range of microscope adaptors

16 Selectable Wavelengths

No modularity • Compatible with all filter sets



Broadest Spectrum • Brightest LEDs

Ideal for Advanced Research

- **Individual LED wavelength selection**
- **Rapid switching** between LED wavelengths enables capture of high speed events
- **TTL & USB** interfaces with imaging packages
- **Excitation filters** can be fitted in optical path for controlled switching with no moving parts
- **Analogue** inputs for dynamic intensity control
- **Optical feedback** for applications requiring higher stability
- **Internal function generator** for electrophysiology and optogenetics applications
- **Compatible** with all single and multi-band filter sets

Specification

- pE-4000 illumination system:** Light source with complete set of wavelengths, manual control pod, and power supply
Light delivery: Single liquid light guide or fiber options
Collimating optics: Universal collimator for use with a single liquid light guide. Requires additional microscope adaptor
LED wavelengths: LED wavelengths are divided across 4 channels with each channel having individual control

Channel 1			Channel 2			Channel 3			Channel 4		
Wavelength (nm)	Power (mW)	FWHM (nm)	Wavelength (nm)	Power (mW)	FWHM (nm)	Wavelength (nm)	Power (mW)	FWHM (nm)	Wavelength (nm)	Power (mW)	FWHM (nm)
365	30	10	460	241	20	525	35	31	635	136	16
385	101	10	470	167	20	550	245	85	660	193	19
405	188	18	490	87	31	580	236	85	740	76	39
435	170	17	500	58	29	595	37	15	770	18	53

Powers measured at sample plane of research grade microscope using 100% mirror in cube and 10X objectives. (Figures are typical values). Note wavelength settings 550nm and 580nm use single broad, high intensity peak (see spectrum on pages 2-3)
Due to a programme of continual development, performance values may change. Correct at time of print.

Control & Interface

- Manual:** Dual function remote manual control pod for White mode or Advanced mode
Remote: Via USB for independent on/off and intensity control of each channel. Triggering speed <1ms
Via 4 TTL inputs for independent on/off control of each channel. Triggering speed <20us
Via single TTL for on/off control of manual or software selected channels
Via 4 analogue inputs 0-10V, 0-300kHz for dynamic control of intensity from external analogue signals
Synch Out: 4 TTL outputs for each channel – active high
1 TTL output for any channel – active high
Programmable interface: 4 TTL outputs for on/off control of peripherals (transmitted illuminators, stages etc.).
Function Generator: Internally generated sine, pulse and ramps for each channel programmed via control pod
Connectivity: USB (B type) for PC connection. All other TTL and Analogue inputs/outputs via 25way 'D-type' female connector (optional rear mounting pE-Expansion Box available for BNC connectivity).
Imaging Software: Recognised as a CoolLED pE-2 peripheral under common software e.g. Micromanager, MetaMorph, cellSens, NIS Elements, ImagePro, etc.

Power

- Power requirements:** 110-240V a.c. 50/60Hz, 2.5A
Power consumption: Standby (i.e. no LEDs on) Max 7W
Single wavelength operation Max 41W
Dual wavelength operation Max 75W
Triple wavelength operation Max 93W
Quad wavelength operation Max 112W

Dimensions

- pE-4000 light source:** 150mm(w) x 220mm(d) x 260mm(h) Weight 3.5kg
pE-4000 control pod: 154mm(w) x 135mm(d) x 40mm(h) Weight 0.95kg
pE-4000 power supply: 164mm(w) x 64mm(d) x 35mm(h) Weight 0.58kg
pE-Expansion Box: 151mm(w) x 18mm(d) x 95mm(h) Weight 0.34kg

To Order

- pE-4000-L-SYS-ZZ:** pE-4000 Light Source with manual control pod, and power supply for liquid light guide delivery
pE-4000-F-SYS-ZZ: pE-4000 Light Source with manual control pod and power supply for fiber delivery
pE-4000-EB25D: Rear mounting pE-Expansion Box for 25-way D-type to BNC connectivity
pE-4000-EFH-4: Excitation filter holders (4 off) to accept 25mm diameter filters
pE-1904: 1m long, 3mm diameter liquid light guide
pE-1908: 3m long, 3mm diameter liquid light guide
pE-10400: Universal Collimator for use with a liquid light guide. Requires additional microscope adaptor
pE-ADAPTOR-YYY: Microscope Adaptor to customer-specified microscope

A range of fibers is available from CoolLED, see Accessories (<http://www.coolled.com/product-detail/accessories/>)

To specify microscope adaptor (YYY), see Adaptors (<http://www.coolled.com/product-detail/adaptors-2/>)

To specify Power Cable (ZZ): 10 = Australia, 20 = Europe, 30 = UK, 40 = USA

Warranty: System = 12 months, LEDs = 36 months.

For more information on how CoolLED products can help you, contact us now:

t: +44 (0)1264 323040 (Worldwide) 1-800-877-0128 (USA/Canada)

w: www.CoolLED.com

e: info@CoolLED.com

Environment & Safety

LED products are more sustainable and energy efficient than conventional illuminators. CoolLED's products have the following benefits:

- Mercury-free
- Energy Efficient: 80% less power
- Long lifetime (25,000 operating hours)
- No bulb replacements
- Reduced risk of eye damage
- Quiet operation
- No special disposal regulations or issues



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