InSight® X3™

WIDELY TUNABLE ULTRAFAST LASER SYSTEM FOR MULTIPHOTON IMAGING

The InSight X3 Advantage

- *Field proven with largest installed base*
- *Broadest tuning range: 680 nm to 1300 nm for deepest imaging*
- *High power across tuning range: >2 W at 900 nm, >1.4 W at 1200 nm*
- *Dual output at 1045 nm with optional pre-compensation for two-color imaging*
- *Short pulse width and highest peak power for maximum fluorescence*
- *Integrated DeepSee to deliver short pulses to the sample*
- *Ideal beam characteristics optimized for multiphoton imaging*

The new InSight® X3™ is the third generation of Spectra-Physics' industry leading InSight platform, specifically designed for advanced multiphoton microscopy applications.

Based on patented technology[1], InSight X3 features a broad 680 nm to 1300 nm continuous, gap free tuning from a single source, nearly double the tuning range of legacy Ti:Sapphire ultrafast lasers. InSight X3 delivers high average and peak power levels across the tuning range, including critical near infrared wavelengths above 900 nm for deepest penetration in-vivo.

With Spectra-Physics' integrated patented DeepSee™, the industry standard dispersion pre-compensator, the short pulses are optimally delivered through a microscope to the sample for maximum fluorescence and penetration depth. InSight X3 also has exceptional beam pointing stability, beam quality and output power stability, as well as fast wavelength tuning, making it ideal for microscopy.

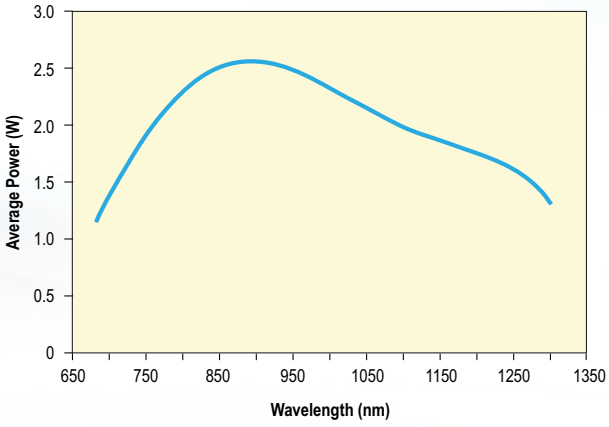
When equipped with the fixed 1045 nm dual beam option, InSight X3 fully supports the diverse needs of multimodal imaging. The two synchronized output beams enable easy simultaneous imaging of various fluorescence proteins (for example GFP and mCherry) and genetically encoded calcium indicators (GCaMP6 and jRGECO1a), SHG/THG imaging, and advanced imaging techniques such as CARS and SRS.

InSight X3 is designed, manufactured and tested according to the same stringent quality standards as for our industrial lasers used in 24/7 manufacturing environments. Robust and fully automated, InSight X3 provides hands-off operation, freeing users to focus on their critical research.

Applications

- *Multiphoton microscopy*
- *Multimodal imaging including CARS, SRS, SHG, THG*
- *Optogenetics*
- *Time-resolved photoluminescence*
- *Non-linear spectroscopy*
- *Optical computed tomography*
- *Surface second harmonic generation*
- *Terahertz imaging*
- *Semiconductor metrology*

Typical Tuning Curve*



* Typically measured performance; not a guaranteed or warranted specification.

Spectra-Physics®
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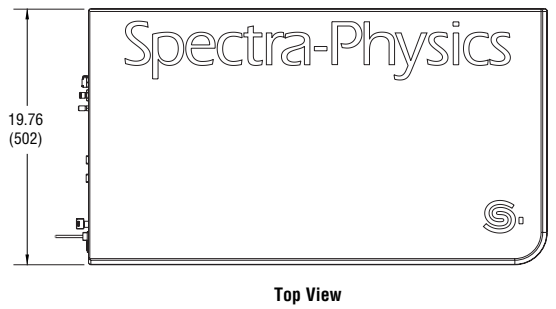
1. The InSight X3 technology is protected by US patents 7,962,046 and 8,902,939.

InSight® X3™

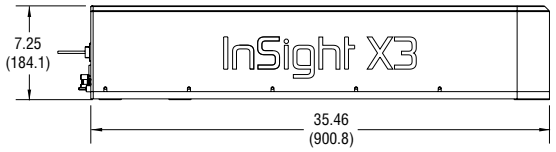
Specifications[1, 8]

Output Characteristics	InSight X3	Dual Option
Tuning Range	680 nm–1300 nm	1045 nm (fixed)
Average Power[2]	>1.0 W at 700 nm >1.6 W at 800 nm >2.0 W at 900 nm >1.8 W at 1000 nm >1.6 W at 1100 nm >1.4 W at 1200 nm >1.0 W at 1300 nm	>2.0 W at 1045 nm
Pulse Width[3, 6]	<120 fs	<200 fs
Repetition Rate	80 MHz ±0.5 MHz	
Noise[3, 4]	<0.5%	
Stability[5]	<±1%	
Spatial Mode	TEM_{00}, M^2 <1.2	
Polarization[3]	>500:1 horizontal	
Beam Divergence, full angle[3]	<1.5 mrad	
Beam Diameter ($1/e^2$)[3]	1.1 ±0.2 mm	
Beam Roundness[3]	0.8–1.2	
Beam Pointing Stability	<350 µrad full range	
Tuning Speed	>50 nm/sec full range	
Pre-compensation Dispersion Range[2]	680 nm: -12,000 fs^2 to -40,000 fs^2 800 nm: 0 fs^2 to -25,000 fs^2 1050 nm: 0 fs^2 to -10,000 fs^2 1300 nm: -3,000 fs^2 to -8,000 fs^2	Optional 1045 nm: – 15,000 fs^2 fixed
Environmental Requirements		
Altitude	Up to 2000 m	
Temperature, Operating	20–25°C	
Relative Humidity, Operating	Maximum 75% non-condensing up to 25°C	
Temperature, Storage	15–35°C	
Relative Humidity, Storage	<65% for 15–35°C	
Cooled Water Temperature in Closed-loop Chiller	21°C typical[7]	

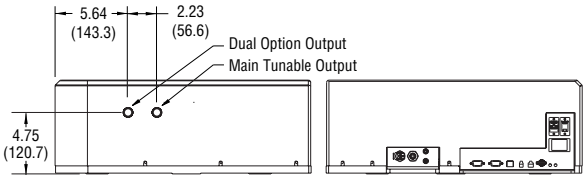
InSight X3 Dimensions



Top View



Side View



Front View Back View

Dimensions in inch (mm)

1. Due to our continuous improvement program, specifications may change without notice.
2. Specifications only apply to the wavelength noted.
3. Specification applies only to 900 nm (tunable) or 1045 nm (fixed), respectively.
4. Specification represents rms noise measured in a 10 Hz to 10 MHz bandwidth.
5. Percent power drift in any 2-hour period with less than ±1°C temperature change after a 1-hour warm up.
6. A $sech^2$ pulse shape is used to determine the pulse width as measured with a Newport PulseScout® autocorrelator.
7. Avoid obstructing the air exhaust grills which will result in the recirculation of hot exhaust air. Cooling air enters through the front panel and exits through the rear fan apertures.
8. InSight X3 is a Class IV – High-Power Laser, whose beam is, by definition, a safety and fire hazard. Take precautions to prevent exposure to direct and reflected beams. Diffuse as well as specular reflections can cause severe skin or eye damage.

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