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photonics. our passion!
35 YEARS
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System Datasheet

IsoPlane® 81

Spectrometer & Accessories

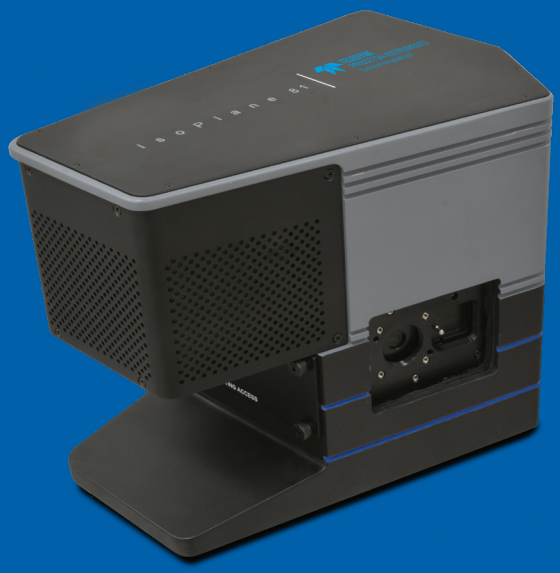
The Best Imaging Spectrograph on the Market

» **Broad spectral range, high spectral resolution, and best quality data**
- 200 – 1100 nm
- Up to 0.05 nm resolution
- eXcelon™ technology for etaloning suppression

» **Superior signal-to-noise ratio and dynamic range**
- Back-illuminated CCDs with >95% peak QE
- Deep depletion for enhanced QE in NIR range
- Deep cooling and low dark noise

» **Fast spectral rates**
- Dual-port readout up to 4.55 MHz
- Frame-transfer technology
- Spectral kinetics mode

» **Revolutionary optical design**
- Zero aberrations at all wavelengths over entire focal plane
- Perfect for multichannel and hyperspectral imaging



Changing the Landscape of Spectroscopic Research

When the first aberration-free IsoPlane 320 was introduced in 2013, it immediately became the gold standard for imaging spectrographs. Today, IsoPlane instruments remain the only aberration-free spectrographs on the market.

Paired with Teledyne Princeton Instruments' extensive selection of scientific cameras, our patented and revolutionary IsoPlane design enables leading-edge research and application development in numerous laboratories around the world.

The new IsoPlane 81 system seamlessly integrates an aberration-free spectrograph and a deep-cooled scientific CCD camera in a footprint smaller than a typical laptop computer — all while providing performance far superior to that of conventional spectrometers twice the size.

Furthermore, we offer a complete ecosystem of IsoPlane 81 accessories that not only facilitate today's critical measurements but support tomorrow's most ambitious experiments.

www.princetoninstruments.com
info@princetoninstruments.com
tel: +1 609.587.9797

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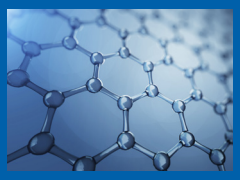
PRINCETON INSTRUMENTS
Everywhereyoulook™

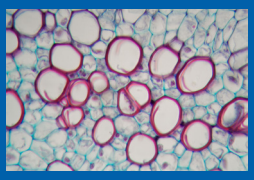
PRIMARY APPLICATIONS

- Raman spectroscopy and imaging
- Fluorescence, emission, absorption
- Microspectroscopy
- Hyperspectral imaging

HIGHLIGHTED RESEARCH AREAS



Materials Science: 2D, nano, LED



Bio and Life Science: cancer diagnostics, cytometry, pathogens, microbiology

Pharmaceutical: process analytical technology, drug manufacturing, drug design

Environmental Science: droplet characteristics, pollutant analysis, microplastics

SPECIFICATIONS

Spectrograph		
Focal length	80.8 mm	
Aperture ratio	f/4	
Spectral resolution (FWHM)†	0.13 nm	
Spectrograph optics and spectral range	Protected silver coating, 400 – 1100 nm	Aluminum coating, 200 – 1100 nm
Spatial resolution	38.5 lp/mm @ 50% contrast over entire focal plane (Nyquist limited)	
Grating	150 g/mm up to 4320 g/mm; user-changeable, rotatable, single-grating turret	
Astigmatism / coma aberration	Zero at all wavelengths and grating angles over entire focal plane	
Slits	Slit width: 10 µm up to 500 µm; 3.3 mm tall; interchangeable, laser-cut slits	
Wavelength accuracy	0.13 nm	
Wavelength repeatability	0.015 nm	

Operation	
Software	LightField® scientific imaging and spectroscopy software
Operating system	Microsoft® Windows® 8 or 10
Data interface	USB 3.0 (3 m interface cable provided)
I/O signals	Three MCX coaxial connectors: two trigger out, one trigger in; built-in programmable pulse generator
Operating environment	+5°C to +30°C non-condensing
Certification	CE
Dimensions L x W x H	26.8 cm x 18.0 cm x 21.0 cm (11" x 7" x 8")
Weight	8.84 kg (19.5 lbs)

Specifications are typical except where noted otherwise. All specifications are subject to change.

† with a 2400 g/mm grating measured at 500 nm; contact our sales and technical support team for other configurations

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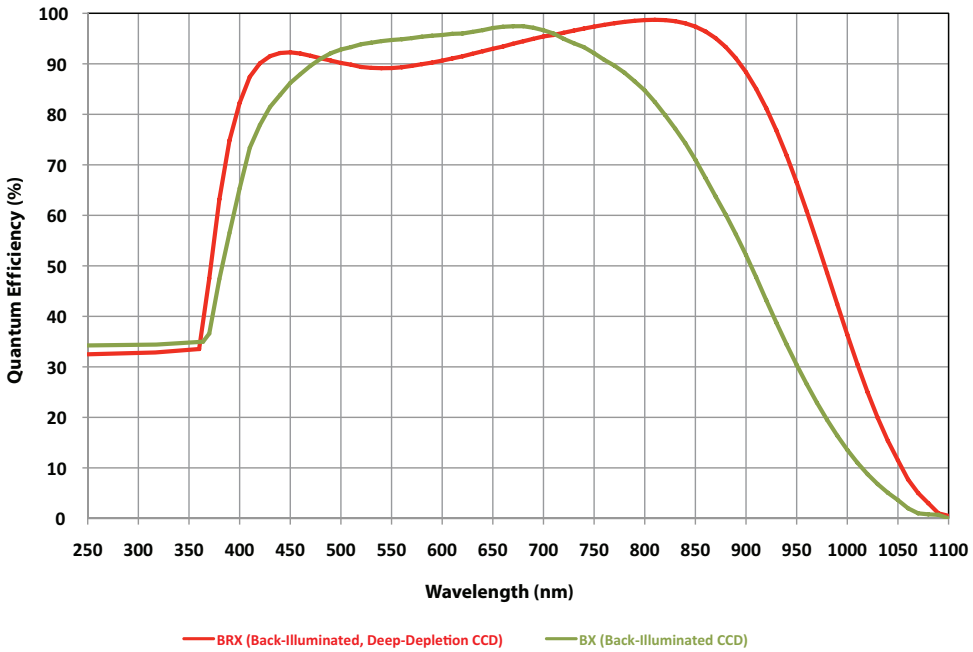
CCD Camera		
Model	**BRX**	**BX**
Sensor type	TPI proprietary, back-illuminated, deep-depletion, frame-transfer CCD with eXcelon™ technology and UV coating	TPI proprietary, back-illuminated, frame-transfer CCD with eXcelon™ technology and UV coating
Sensor benefit	Enhanced NIR response with >97% peak QE	Ultralow dark current for long-exposure experiments
Sensor format	1024 x 256 (1024 x 512 including frame-transfer storage area)	
Deepest cooling temperature	-55°C guaranteed; -60°C typical	
System read noise	4 e- rms @ 200 kHz; 7 e- rms @ 1 MHz; 20 e- rms @ 4.55 MHz	
Dark current*	3 e-/pixel/sec	0.03 e-/pixel/sec
Stray light **	$<10^{-4}$	
Vertical shift rate	5.6 µsec/row to 35 µsec/row (programmable)	15.2 µsec/row to 95 µsec/row (programmable)
Spectral rate (continuous)	292 spectra/sec (full vertical bin)	124 spectra/sec (full vertical bin)
Spectral rate (burst mode)	>10,000 spectra/sec (spectral kinetics mode with 10 rows binned)	>5,000 spectra/sec (spectral kinetics mode with 10 rows binned)
Nonlinearity	<1% @ all ADC rates	
Software-selectable gains	1.5 e-/ADU (high gain); 3 e-/ADU (low gain); available at all ADC rates	

Specifications are typical except where noted otherwise. All specifications are subject to change.

* measured at -55°C
** measured with 532 nm single-mode laser 10 nm away from the laser center wavelength

QUANTUM EFFICIENCY



Note: Quantum efficiency curves for eXcelon CCDs with UV coatings. (All IsoPlane 81 models feature eXcelon CCDs with UV coatings included.)

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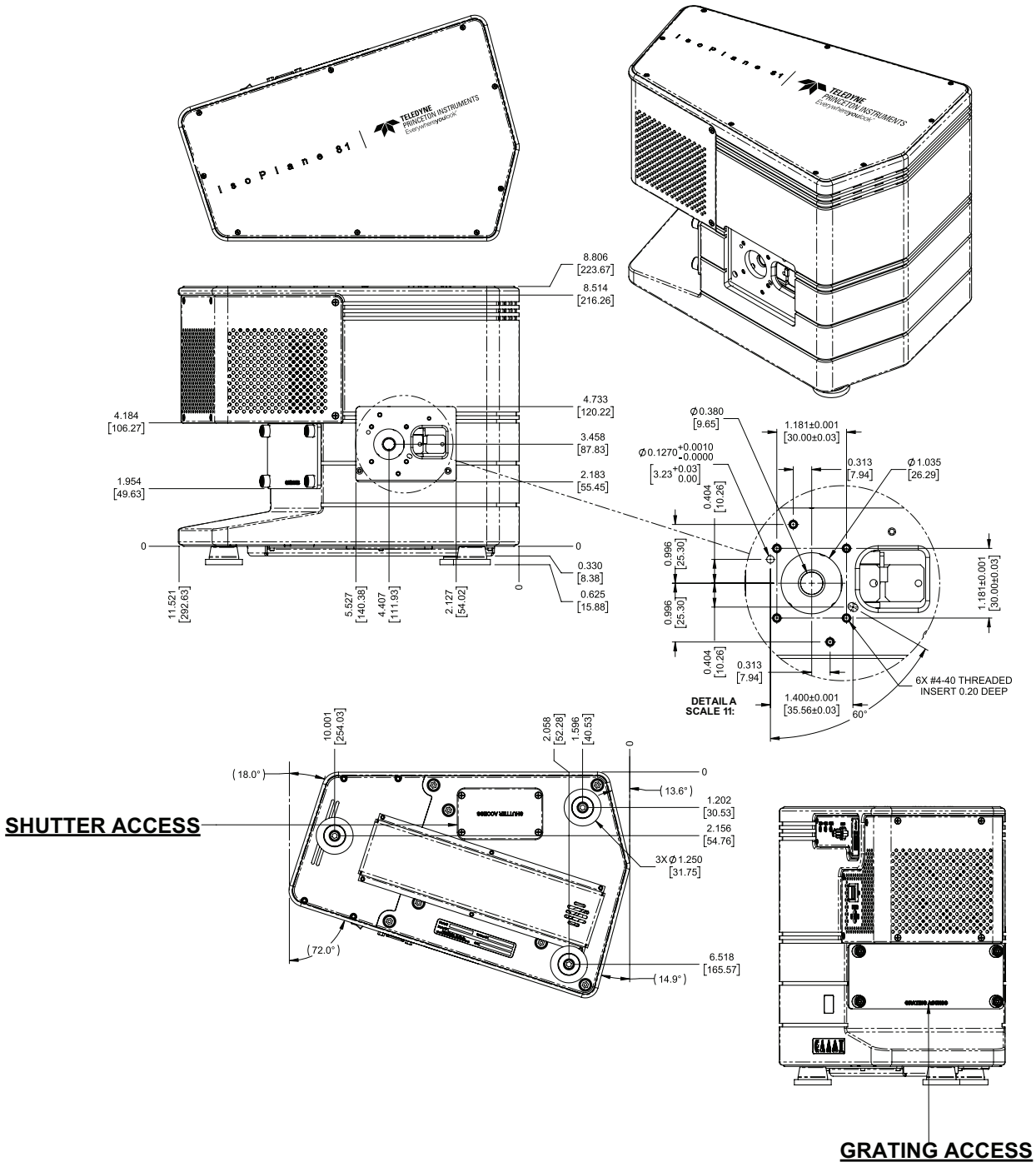
ISOPLANE® 81 OUTLINE DRAWINGS



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