

## InSight:2K



Princeton Instruments, the foremost innovator in CCD camera technology has teamed up with Acton Research Corporation, the world's leading designer of spectroscopic instrumentation, to create the InSight Integrated Spectroscopy System.

The InSight is a complete "out-of the box" solution that was designed to suit many applications. The system incorporates proprietary CCDs with an image corrected spectrograph that comes pre-aligned and focused allowing for effortless integration into your experiment. The InSight comes standard with a kinematic dual interchangeable grating turret and a deeply cooled CCD. The USB interface further enables true "plug-and-play" operation with the industry standard WinSpec software. There are a wide range of accessories available for use with the InSight, including fiber adapters, filter wheels and notch filter chambers.

**InSIGHT™**

**Applications:** Visible and UV Raman, Fluorescence, Luminescence, Multistripe Emission Spectroscopy

Features	Benefits
Permanent vacuum	Maintenance free operation for the life of the system
Deep thermoelectric cooling	Operate without the need for circulating liquid or an additional power supply
Compact design	Ideal for integration into applications where space is at a premium
Internal mounted shutter	Permits changing shutter later without removing slit and losing calibration
Software-selectable readout mode	Exclusive feature provides choice of superior sensitivity or superior SNR
Pre-aligned and focused digital spectroscopy solution	Quick and easy integration into your experimental setup
Image corrected optics	Offers the best spatial resolution for multi-stripe spectroscopy
USB 2.0 and RS 232 interface	Seamless, plug-n-play connection to PC notebooks and desktops No need for external control box or installing PCI cards
Renowned WinSpec software	Offers easy, yet sophisticated Windows® GUI controls Automates data acquisition, analysis and display
PICAM for VB, C, C++ and Scientific Toolkit for LabVIEW™	Respected application program interface provides a universal interface to all Princeton Instruments hardware
Wide range of accessories available	Including fiber adapters, filter wheels, sample chambers, and light sources
Manual or motorized slits	Provides the user the choice of either high accuracy slit mechanism
Two position detector mount	One flange with the ability to select best spectral or best spatial position
Acton Research high efficiency optical coatings	ARC #2000 Al + MgF <sub>2</sub> coatings deliver the highest throughput in the industry, guaranteeing 88 - 90% reflectance at 200 nm

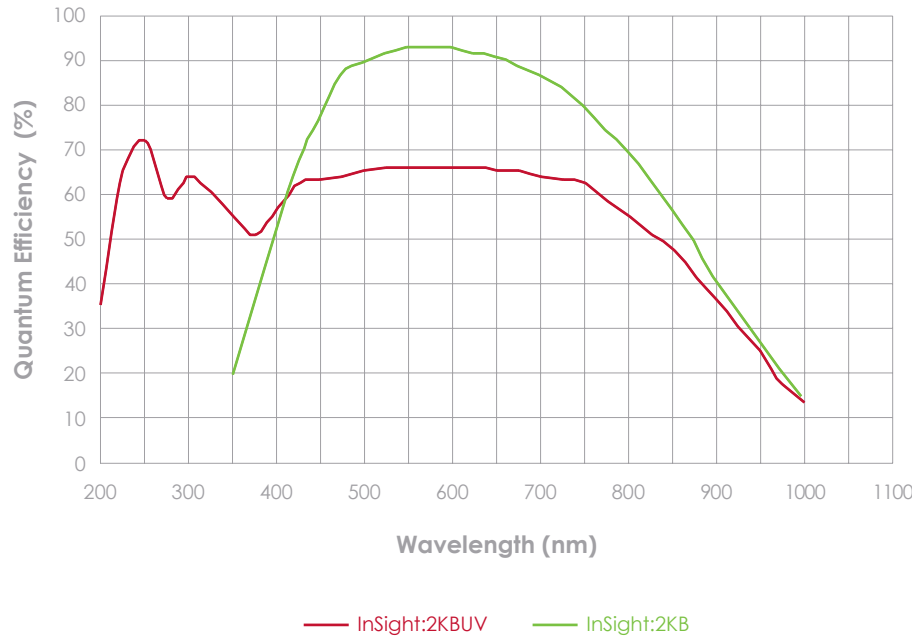
<b>CAMERA</b>			
	<b>InSight:2KB</b>		<b>InSight:2KBUV</b>
<b>CCD image sensor</b>	back-illuminated		back-illuminated; enhanced UV
	All InSight 2Ks		
<b>CCD image sensor</b>	e2v CCD42-10, scientific grade 1, MPP device		
<b>CCD format</b>	2048 x 512, 13.5 x 13.5 $\mu\text{m}$ pixels, 27.6 x 6.9 mm imaging area		
	<b>Typical</b>		<b>Maximum</b>
<b>Dark current @ -75°C (e-/p/s)</b>	0.001 e-/p/s		0.005 e-/p/s
<b>System read noise</b>			
@ 100 kHz readout	7 e- rms		10 e- rms
@ 2 MHz readout	15 e- rms		20 e- rms
<b>Vertical shift rate</b>	30 $\mu\text{sec}/\text{row}$		
<b>Spectral rate*</b>			
@ 100 kHz readout	35 spectra/sec		
@ 2 MHz readout	74 spectra/sec		
	<b>Minimum</b>		<b>Typical</b>
<b>Spectrometric well capacity</b>			
High sensitivity	150 ke-		250 ke-
High capacity	600 ke-		800 ke-
<b>Deepest cooling temperature</b>	-70°C		-75°C
<b>Thermostating precision</b>	$\pm 0.05^\circ\text{C}$ across entire temperature range		
	<b>High</b>	<b>Mid</b>	<b>Low</b>
<b>Software-selectable gains</b>			
High sensitivity	1.5 e-/ct	3 e-/ct	6 e-/ct
High capacity	6 e-/ct	12 e-/ct	24 e-/ct
<b>Dynamic range</b>	16 bits		
<b>Nonlinearity</b>			
@ 100 kHz readout			< 1%
@ 2 MHz readout			< 2%

<b>SPECTROMETER</b>	
<b>Focal length</b>	300 mm
<b>Aperture ratio</b>	f/3.9
<b>Dispersion (RLD)</b>	2.43 nm/mm with 1200 g/mm grating at 500 nm (nominal)
<b>Spectral resolution</b> (10 $\mu\text{m}$ slit x 4 mm high, 20 $\mu\text{m}$ CCD pixel size)	0.10 nm with 1200 g/mm grating
<b>Spatial performance</b> (Astigmatism)	60 $\mu\text{m}$
<b>Wavelength accuracy</b>	$\pm 0.2$ nm
<b>Wavelength repeatability</b>	$\pm 0.05$ nm
<b>Drive step size</b>	0.0025 nm
<b>Focal plane size</b>	27 mm wide x 14 mm high
<b>Grating size</b>	68 mm x 68 mm
<b>Grating mount</b>	Interchangeable, dual grating turret
<b>Computer interface</b>	USB and RS232

\* Spectral rates have been measured with all rows vertically binned.

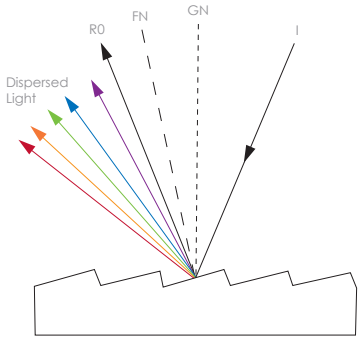
All specifications subject to change without notice.

InSight is a trademark of Roper Scientific, Inc. LabVIEW is a trademark of National Instruments Corporation. Windows is a registered trademark of Microsoft Corporation in the United States and other countries. Other brand and product names are the trademarks or registered trademarks of their respective owners and manufacturers.

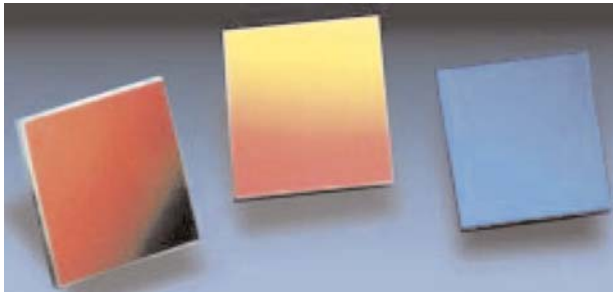


Diffraction Gratings

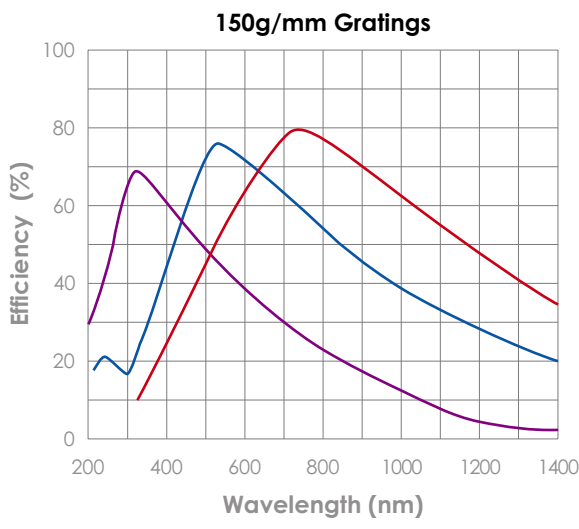
P/N	Groove Density	Blaze Wavelength	Range of Operation	Dispersion	Wavelength Coverage for 100 and 400 CCDs (26.8 mm)	Wavelength Coverage for 256 and 2K CCDs (27.6 mm)
1-05-600	50 g/mm	600 nm	400 - 800 nm	65.2 nm/mm	1748 nm	1800 nm
1-015-300	150 g/mm	300 nm	200 - 450 nm	21.6 nm/mm	579 nm	596 nm
1-015-500		500nm	335 - 750 nm			
1-015-800		800 nm	535 nm - 1.2 μm			
1-030-500	300 g/mm	500 nm	335 - 750 nm	10.7 nm/mm	287 nm	295 nm
1-030-750		750 nm	500 nm - 1.1 μm			
1-030-1		1 μm	650 nm - 1.5 μm			
1-060-300	600 g/mm	300 nm	200 - 450 nm	5.2 nm/mm	140 nm	144 nm
1-060-500		500 nm	335 - 750 nm			
1-060-750		750 nm	500 nm - 1.1 μm			
1-060-1		1 μm	650 nm - 1.5 μm			
1-120-300	1200 g/mm	300 nm	200 - 450 nm	2.4 nm/mm	65 nm	67 nm
1-120-500		500 nm	335 - 750 nm			
1-120-750		750 nm	500 nm - 1.1 μm			
1-120-HUV		Holographic, UV	185 - 375 nm			
1-120-HVIS		Holographic, VIS	300 - 800 nm			
1-180-500	1800 g/mm	500 nm	335 - 750 nm	1.7 nm/mm	44 nm	46 nm
1-180-HUV		Holographic, UV	185 - 375 nm			
1-240-240	2400 g/mm	240 nm	185 - 375 nm	1.2 nm/mm	31 nm	32 nm
1-240-HUV		Holographic,UV	185 - 375 nm			
1-240-HVIS		Holographic, VIS	300 - 800 nm			
1-360-240	3600 g/mm	240 nm	185 - 375 nm	0.7 nm/mm	18 nm	18 nm
1-360-HUV		Holographic, UV	185 - 375 nm			



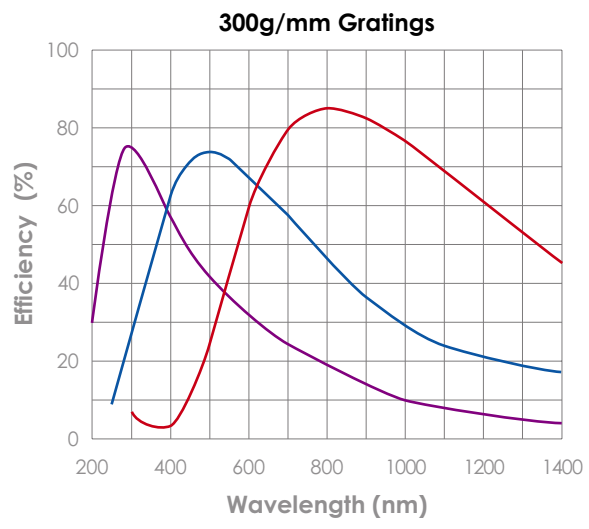
**Diffraction Grating**  
 GN: Grating Normal  
 FN: Facet Normal  
 I: Incident Light  
 RO : 0-Order Reflection



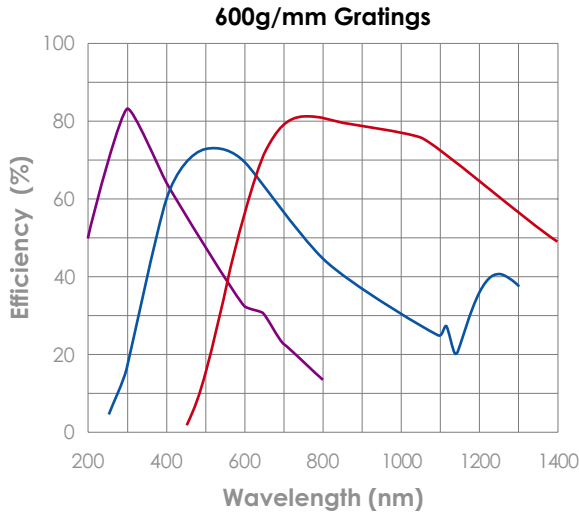
Grating Efficiency Curves



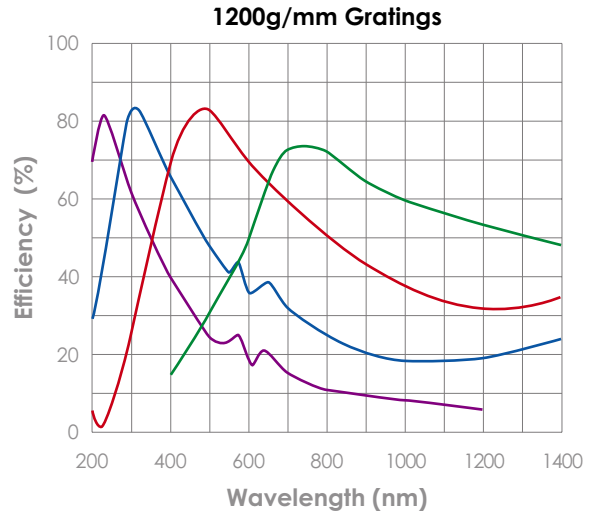
— 300 nm blaze — 500 nm blaze — 800 nm blaze



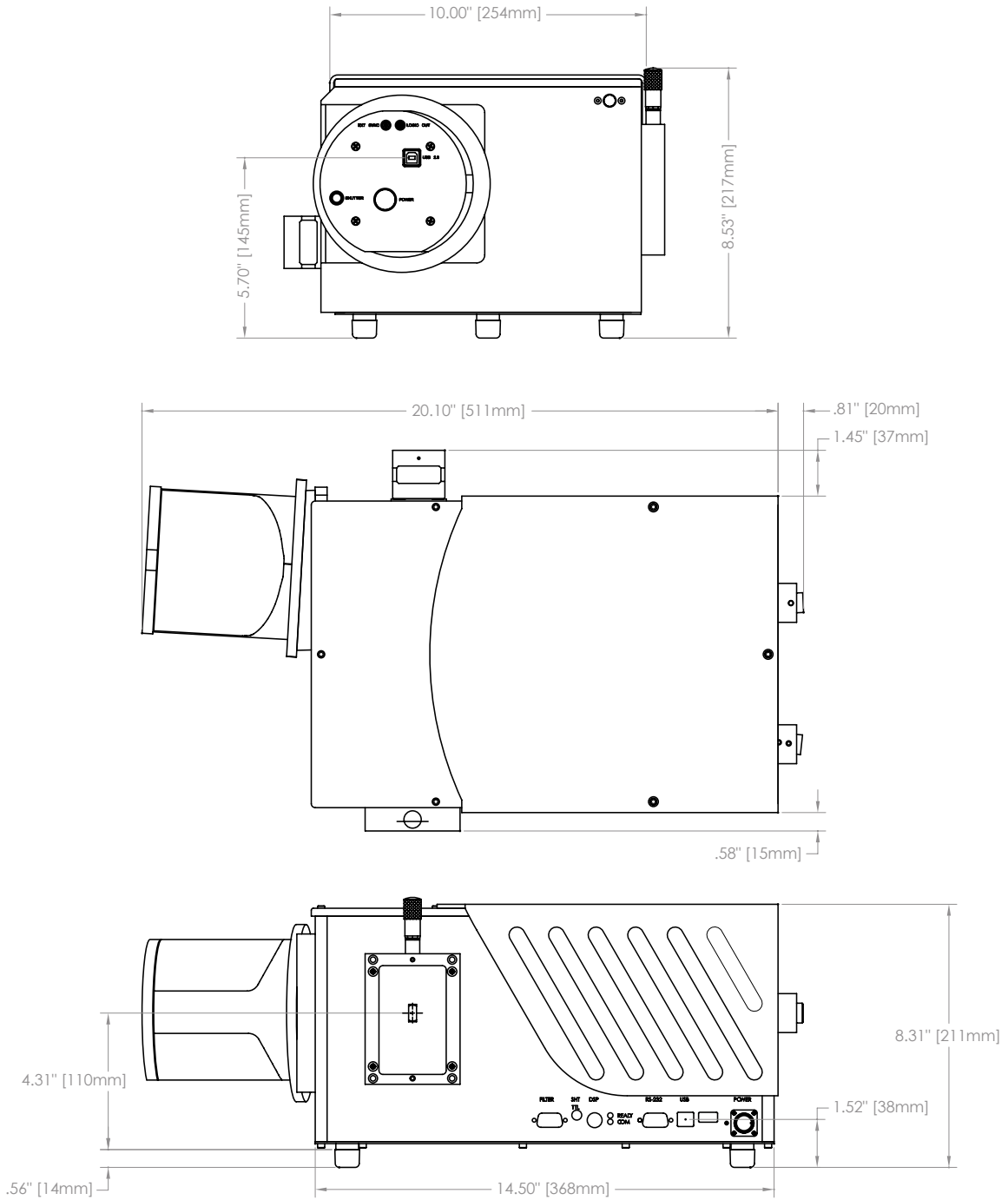
— 300 nm blaze — 500 nm blaze — 800 nm blaze



— 300 nm blaze — 500 nm blaze — 800 nm blaze



— 240 nm blaze — 300 nm blaze  
 — 500 nm blaze — 750 nm blaze



All Dimensions Nominal  
Measurements in Inches.

Princeton Instruments



[www.piaction.com](http://www.piaction.com)

email: [moreinfo@piaction.com](mailto:moreinfo@piaction.com)

USA +1.609.587.9797 | Benelux +31 (347) 324989

France +33 (1) 60.86.03.65 | Germany +49 (0) 89.660.779.3

Japan +81.3.5639.2741 | UK +44 (0) 28.383101.71