Princeton Instruments

PIXIS-XO: 1024B

1024 x 1024 imaging array | 13 x 13 µm pixels

The PIXIS-XO series of fully integrated imaging cameras utilizes back-illuminated (BI) and back-illuminated, deep-depletion CCDs without AR coating, for direct detection of the widest range of X-rays between ~ 10 eV and 30 keV (AR coated devices are not useful for X-ray energies < 500 eV). With a 1024 x 1024 imaging array, 13 µm pixels, 100% fill factor, low noise electronics and -70° C thermoelectric cooling with either air or water, this system is ideal for worry-free operation in research and OEM environments. The rotatable conflat flange with high-vacuum-seal design, software selectable gains and readout speeds make these cameras well suited for ultra-high vacuum applications.

FEATURES	BENEFITS
Back-illuminated, deep-depletion and back-illuminated CCD, with no AR coating	Provides high sensitivity, high resolution imaging of very low flux X-rays
2 Mhz / 16-bit readout 100 kHz / 16-bit readout	High speed readout for rapid image acquisition; Slow speed readout for high sensitivity with wide dynamic range, high signal-to-noise ratio (SNR) and excellent energy resolution
Software selectable gains for each digitization speed	Allows optimization of system performance for lowest noise to highest SNR
1024 x 1024 image area, 13 x 13 µm pixels	Imaging format designed for high frame rate imaging
Ultra low noise electronics	Best possible system performance
Flexible user-selectable binning & readout	Total flexibility to optimize experiments and SNR
Kinetics	Custom readout mode offers microsecond resolution
Deep, thermoelectric air cooling	Maintenance-free operation - No need for a liquid circulator or additional power supply
Deep, thermoelectric water cooling	Vibration-free operation
Conflat vacuum interface	Industry-standard, high-vacuum compatibility
TTL input and output	External Trigger input with programmable polarity; TTL output with exposure or readout monitor
USB 2.0 interface	Seamless, plug-and-play connection to PC notebooks & desktops; Easy OEM integration
Optional: LightField® (for Windows 10/8/7, 64-bit) **Or WinView/Spec** (for Windows 8/7/XP, 32-bit)	Flexible software packages for data acquisition, display and analysis with built in math engine; LightField offers intuitive, cutting edge user interface and more.
PICAM (64-bit) / PVCAM (32-bit) software development kits (SDKs)	Compatible with Windows 10/8/7 (64-bit), and Linux (contact factory for an update) Universal programming interfaces for easy custom programming.
LabView® Scientific Imaging ToolKit (SITK™)	Predefined VIs for easy integration of camera controls into large experiment

Applications:

X-ray Imaging, X-ray Microscopy, EUV Lithography and X-ray Plasma Diagnostics

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SPECIFICATIONS

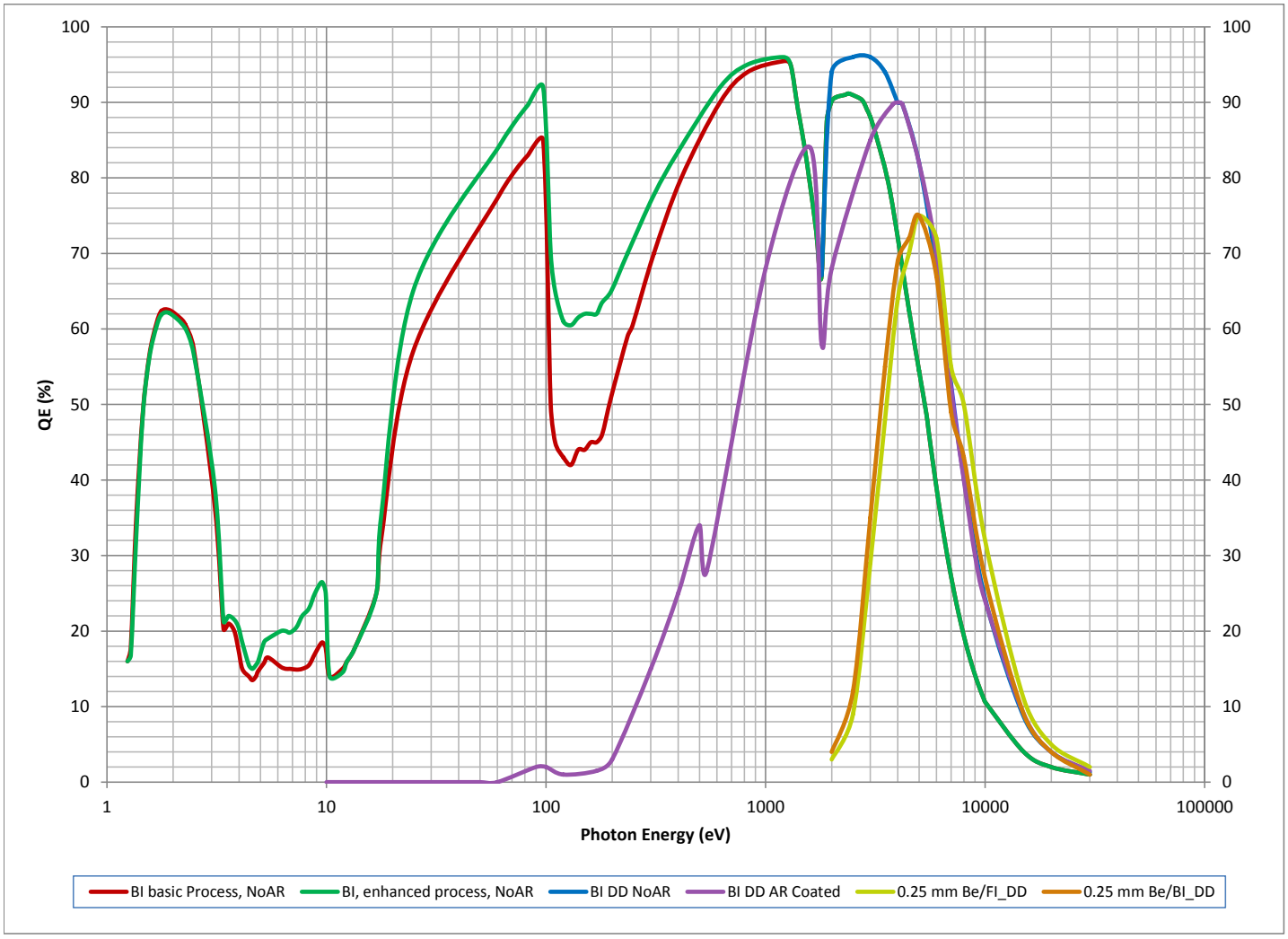
	PIXIS-XO: 1024B/BUV	PIXIS-XO: 1024BR
CCD Image Sensor	e2v CCD47-10; scientific grade 1; MPP; BI-basic process (B); BI-enhanced process (BUV), no AR coating, for sensitivitybetween ~10 eV to 20 keV	e2v CCD47-10; scientific grade 1; NIMO; BI-deep depletion (BR); no AR coating, for sensitivity for sensitivity between ~ 10eV to 30 keV.
Dark current @ -70° C (with ambient air @ +20° C)	0.0004 e-/p/sec (typical) 0.001 e-/p/sec (max)	0.02 e-/p/sec (typical) 0.07 e-/p/sec (max)
CCD format	1024 x 1024 imaging pixels; 13 x 13 μm pixels; 100% fill factor; 13.3 x 13.3 mm (optically centered)	
Deepest cooling temperature, TE air cooling* (with ambient air @ +20° C)	-70° C typical; -65° C guaranteed	
Thermostating precision	±0.05° C	
Cooling method	Thermoelectric air or liquid cooling (CoolCUBE II required)	
Full well	Single pixel: 100 ke- (typical), 60 ke- (minimum) Output node: 250 ke- (typical), 220 ke- (minimum)	
ADC speed/bits	100 kHz/16-bit and 2 MHz/16-bit	
System read noise @100 kHz @2 MHz	3.1 e- rms (typical), 5 e- rms (max) 9 e- rms (typical), 15 e- rms (max)	
Vertical shift speed	< 3.2 μsec/row to18 μsec/row (programmable)	
Non-linearity	<1% @ 100 kHz	
Software selectable gains	1, 2, 4 e-/ADU; available at all speeds	
Data interface	USB2.0 (5m interface cable provided); Optional Fiberoptic interface is available for remote operation	
I/O signals	Two MCX connectors for programmable frame readout, shutter, trigger in	
Operating environment	+5° C to +30° C non-condensing	
Bakeout temperature	70° C (maximum)	
Vacuum Compatibility	10^{-8} Torr	
Certification	CE	

NOTES: All specifications subject to change

* The minimum temperature attainable is dependent on the vacuum condition - temp can be lowered w/lower vacuum

Readout Rates

Binning	@ 2 MHz	@100 kHz
1 x 1	583 msec	10.05 sec
2 x 2	282.3 msec	2.8 sec
4 x 4	138.4 msec	0.85 sec



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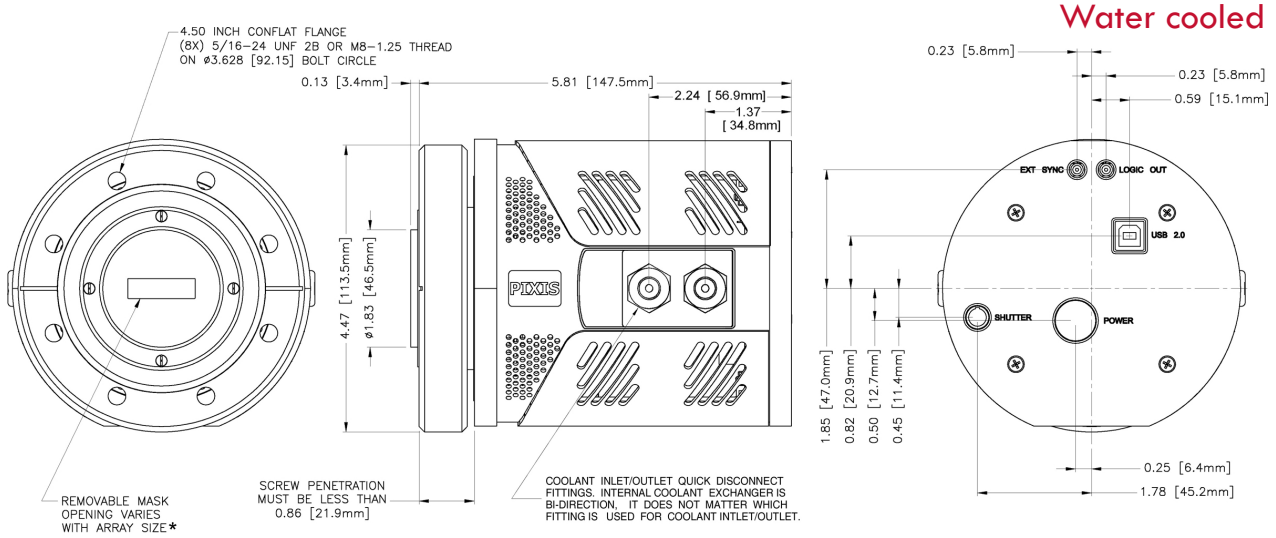
4.5" Conflat

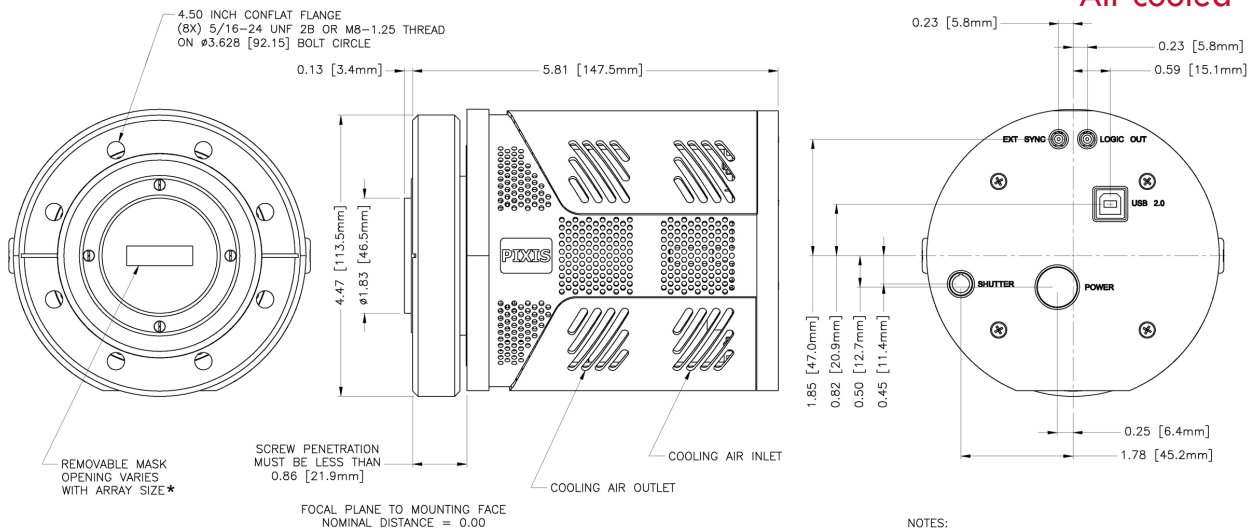
Water cooled



NOTES:

1. WEIGHT: 7.0 LBS. (ESTIMATED)
2. POWER DISSIPATION: 80 WATTS AT FULL POWER.

Air cooled



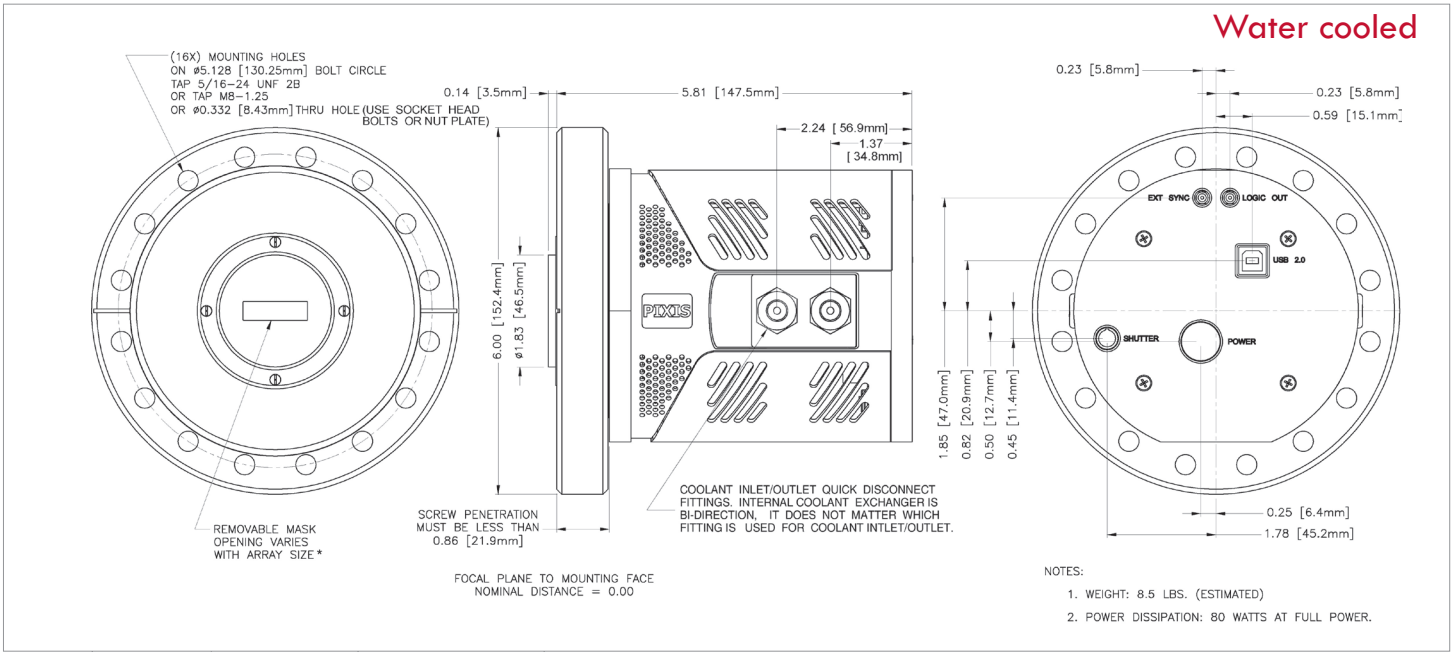
NOTES:

1. WEIGHT: 6.5 LBS. (ESTIMATED)
2. POWER DISSIPATION: 80 WATTS AT FULL POWER.
3. AIRFLOW: 24 CFM FAN CAPACITY AT FULL POWER.

CCD Array	CCD Image Area inches (mm)	Mask Opening ± .001 inches (± .0254 mm)
1024 x 1024	0.524 x 0.524 (13.3 x 13.3)	0.520 x 0.520 (13.208 x 13.208)

6" Conflat

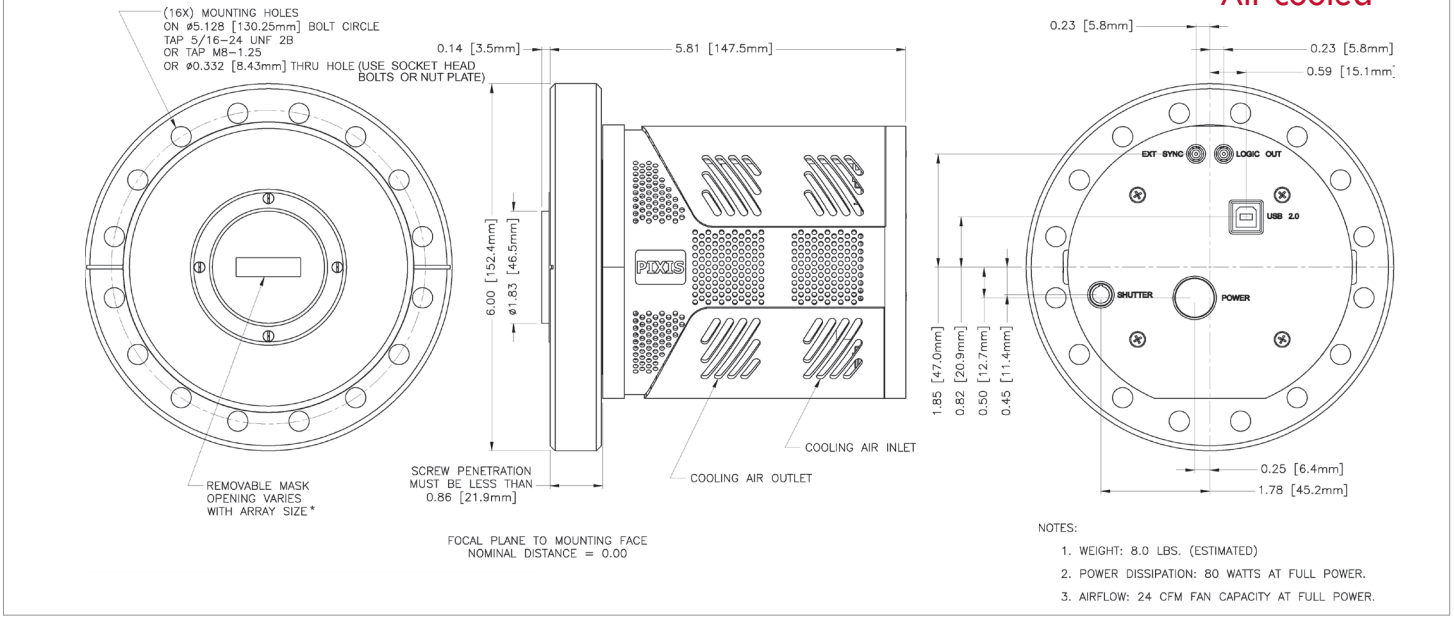
Water cooled



NOTES:

1. WEIGHT: 8.5 LBS. (ESTIMATED)
2. POWER DISSIPATION: 80 WATTS AT FULL POWER.

Air cooled



NOTES:

1. WEIGHT: 8.0 LBS. (ESTIMATED)
2. POWER DISSIPATION: 80 WATTS AT FULL POWER.
3. AIRFLOW: 24 CFM FAN CAPACITY AT FULL POWER.

CCD Array	CCD Image Area inches (mm)	Mask Opening ± .001 inches (± .0254 mm)
1024 x 1024	0.524 x 0.524 (13.3 x 13.3)	0.520 x 0.520 (13.208 x 13.208)