

iKon-XL 230

CCD

VERY LARGE AREA ASTRONOMY CCD

NEW

- ✓ -100 °C TE Cooling (ColdSpace™)
- ✓ NO liquid nitrogen or cryo-cooler
- ✓ 18-bit Extended Dynamic Range

Key Specifications

- 16.8 Megapixel sensor (CCD230-84)
- -100 °C TE cooled
- 4.5 e- read noise
- 150,000 well depth
- Up to 4 MHz readout (quad port)



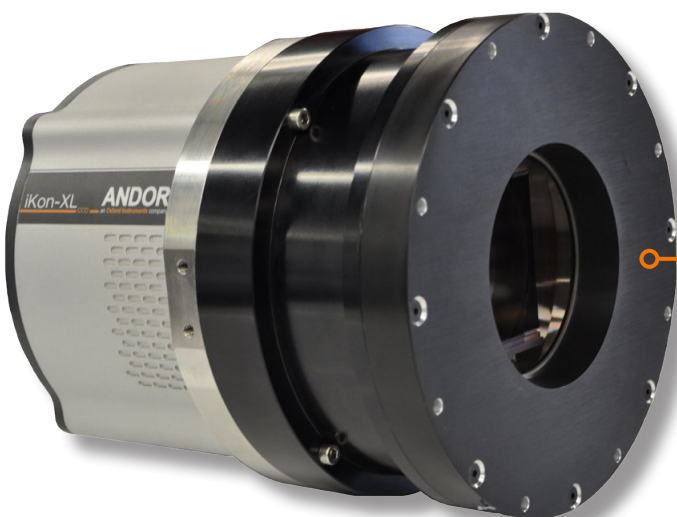
INTRODUCING IKON-XL 230

Extreme performance, no hassle...

Andor's iKon-XL is a TE-cooled, very large area CCD camera platform, accommodating big field of view sensors that are ideally suited to long exposure astronomy applications. Patent-pending **ColdSpace™ technology** thermoelectrically cools a **back-illuminated 16.8 Megapixel** sensor (e2v) down to **-100 °C**, avoiding the requirement for liquid nitrogen or unreliable cryo coolers.

Extended Dynamic Range technology is complemented by up to **18-bit digitization**. Flexible connectivity is standard through either **USB 3.0** or a long distance **direct fibre optic** interface. iKon-XL is a **high quality, robust** and '**hassle-free**' detector solution, designed to operate with **low maintenance** and exceptional longevity in remote observing sites around the globe.

The iKon-XL 230 model uses the e2v **CCD230-84** back-illuminated sensor, offering a very large **61.4 x 61.4 mm** imaging area from a 4096 x 4112 array format and 15 µm pixel size, ideal for applications such as Astronomy or X-ray/Neutron radiography.



Low Maintenance Advantage

- ✓ **NO liquid nitrogen (LN₂)** – LN₂ cooled cameras require ready access to LN₂ supply and routine top up of LN₂ levels in order to hold temperature, as well as carrying an additional safety concern. Many observatories are in remote locations and in some cases unmanned, making LN₂ at best impractical, at worst impossible.
- ✓ **NO cryo cooler** – as many are already painfully aware, cryo coolers are cumbersome and notoriously unreliable. iKon-XL can reach typical cryo-cooled temperatures using only TE cooling and water flow.
- ✓ **No vacuum re-pumping** – the iKon-XL sensor enclosure design is based on Andor's proven, proprietary UltraVac™ process, which carries a Mean Time Between Failure (MTBF) value of > 100 years! Where other very large area CCD cameras require routine re-pumping, expect the iKon-XL to hold firm!
- ✓ **Field replaceable shutter** – No shutter is designed or specified for infinite usage! When it finally fails in a remote observing location, the shutter mounting of the iKon-XL has been purposefully designed such that the shutter can be easily replaced by the user on site.

FEATURES & BENEFITS

Feature	Benefit
Thermoelectric Cooling to -100°C (Liquid/Water)	Patent-pending ColdSpace™ very large area TE cooling technology avoids need for liquid nitrogen or unreliable cryo coolers. Minimization of darkcurrent to below the zodiacal background.
61.4 x 61.4 mm sensor	Very large field of view from 16.8 Megapixel, 15 µm pixel pitch sensor
Extended Dynamic Range (18-bit)	Unique method to achieve lowest noise and maximum well depth within one scan. Supplemented by up to 18-bit digitization.
Peak QE over 95%*5	High photon collection efficiency for maximising SNR.
Low noise readout	Intelligent low-noise electronics offer the most 'silent' system noise available from the 230-84 sensor.
Ultravac™*1	Critical for sustained vacuum integrity and to maintain unequalled cooling and QE performance, year after year (5 year vacuum warranty).
'Deep Cooled' and 'Flexi' versions	'Deep Cooled' for -100°C water/liquid (no air cooling). 'Flexi' for combined -75°C water liquid; -55°C air cooled.
Fibre-optic or USB 3.0 interface flexibility	Built-in robust plug and play interface options as standard. Fibre optic for long distance solution.
Balanced Quad-port readout	Tracking stability to ensure all readout circuits experience same temperature and operating conditions.
Multiple readout speeds, up to 4 MHz	Slower readout for lowest noise, faster speeds for more rapid readout and focusing.
Field replaceable shutter	No shutter is designed or specified for infinite usage! When it finally fails in a remote observing location, it can be easily replaced on site.
iRig-B GPS timestamp	Image GPS timestamp with 10ms resolution for network integration.
Fully Enclosed Casing (Deep Cooled model)	Reduced thermal bloom; minimal effect on nearby optics
Easy reference column access	Easy and flexible software access to dark (shielded) reference columns
Windows, Linux & Labview	Andor's user-friendly SDK supports both Windows and Linux OS. LabView VI package available.

Extended Dynamic Range Technology

CCD cameras always require software selection of amplifier gain to optimize either for low noise (weak signal) OR max well depth (bright signal). **Not both...**

...until now. iKon-XL utilizes proprietary Andor CCD know-how to offer **lowest read noise AND maximum well depth in one image**, with only one gain setting.

TECHNICAL DATA

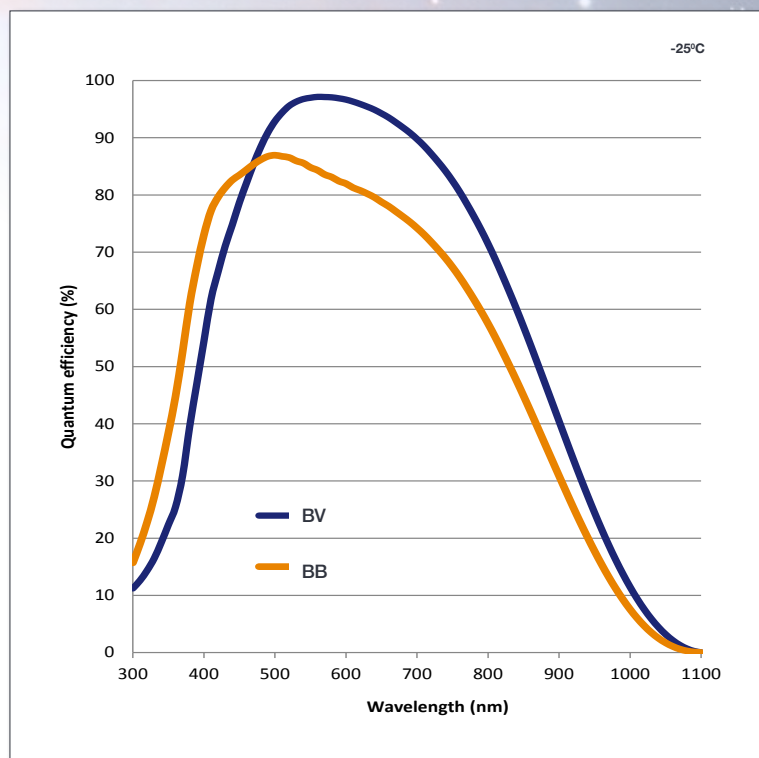
System Specifications ^{•2}

Sensor Options	BV: CCD230-84 sensor, mid band AR coating BB: CCD230-84 sensor, broad band AR coating (blue optimized)	
Pixels	4096 (H) x 4112 (V)	
Pixel size	15 x 15 μm	
Image area	61.4 x 61.4 mm with 100% fill factor	
Minimum temperatures ^{•3} @ coolant temperature of 10°C @ coolant temperature of 16°C air cooled	Deep Cooled Model -100°C -95°C N/A	Flexi Model -75°C -70°C -55°C
Blemish specification	Grade 1 or higher, as per manufacturers definition	
System window type	Single AR coated UV grade fused silica window (>98% transmission)	

Advanced Performance Specifications ^{•2}

Dark Current, $\text{e}^-/\text{pixel}/\text{sec}$ ^{•4} @ -55°C @ -75°C @ -100°C (Deep Cooled Model only)	0.001 0.0001 0.00006			
Active area pixel well depth (typical)	150,000 e^-			
Pixel readout rates	0.1, 1, 2, 4 MHz			
Read Noise (e^-)	100 kHz 4.5	1 MHz 8.5	2 MHz 14.0	4 MHz 23
Peak QE ^{•5}	>95% for BV models >87% for BB models			
Binning	User definable			
Region of Interest (windowing mode)	User definable (centred in 4-output mode)			
Linearity	Better than 99%			
Digitization	16-bit (all speeds) 18-bit (100kHz and 1 MHz)			
Outputs	Quad or Single			
Timestamp	iRig-B GPS with 10 ms resolution			

Quantum Efficiency Curve *5



The iKon-XL 230 is available with 2 sensor options:

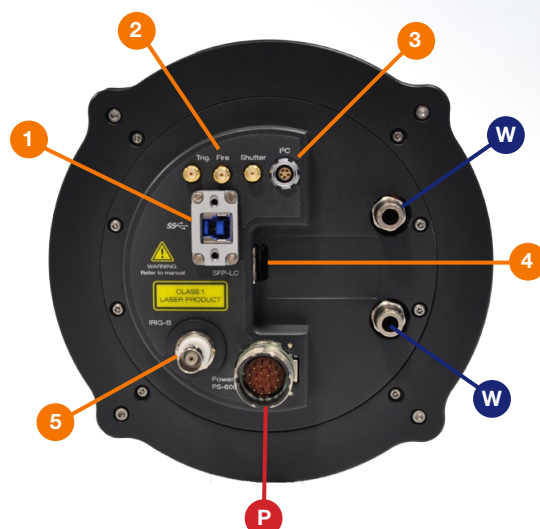
- **BV**: mid band AR coating (providing exceptionally high QE in the visible range)
- **BB**: broad band AR coating (providing enhanced sensitivity in the blue region)

Flexible Connectivity

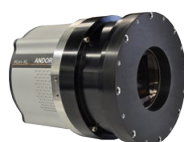
- 1 USB 3.0**
USB 3.0 offers a robust high speed plug and play data interface
- 2 TTL / Logic**
Connector type: SMB, provided with SMB - BNC cable
Fire (Output), External Trigger (Input), Shutter (Output)
- 3 I²C**
Compatible with Fischer SC102A054-130
Shutter (TTL), I²C Clock, I²C Data, +5 Vdc, Ground
- 4 Fibre Optic**
Long distance connection via LC Fibre-optic I/O connection
- 5 IRIG-B**
Compatible with IRIG-B standard (GPS with 10 ms resolution)
- W Water Cooling**
Connection to recirculator or other water/liquid cooling system
- P Power**
Connection to external PSU (supplied) refer to power requirements on page 6

Notes:

Minimum cable clearance required at rear of camera 100mm



CREATING THE OPTIMUM PRODUCT FOR YOU



XL- EA01 - D S

example shown

Step 1. Choose the sensor type option



Sensor
Type

Description	Code
16.8 Megapixel CCD230-84 Back Illuminated Sensor. BV: midband AR coating	EA01
16.8 Megapixel CCD230-84 Back Illuminated Sensor. BB: Broadband AR coating	EA02

Step 2. Choose the cooling option



Cooling

Description	Code
Flexi Cooling model (max. cooling -75°C @ coolant temp of 10°C; -55°C max. air cooling)	C
Deep Cooled model (max. cooling -100°C @ coolant temp of 10°C)	D

Step 3. Select with or without shutter



Shutter

Description	Code
With Shutter	S
Without Shutter	O

Step 4. Select the required accessories



Accessories

Please contact your local sales representative regarding other options such as different mounting types, camera window options or other customizations you may require for system integration or your specific application.

Step 5. Select the required software



Software

The iKon-XL requires at least one of the following software options:

Solis for Imaging A 32-bit and fully 64-bit enabled application for Windows (XP, Vista, 7 and 8) Linux and Labview, offering rich functionality for data acquisition and processing. AndorBasic provides macro language control of data acquisition, processing, display and export.

Andor SDK A software development kit that allows you to control the Andor range of cameras from your own application. Available as 32 and 64-bit libraries for Windows (XP, Vista, 7 and 8), compatible with C/C++, C#, Delphi, VB6, VB.NET, LabVIEW and Matlab. Linux SDK compatible with C/C++.

Third party software compatibility Drivers are available so that the iKon-XL can be operated through a large variety of third party imaging packages. See Andor web site for detail: <http://www.andor.com/software/>

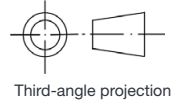
Have you found what you are looking for?

Need a larger dynamic range? The iKon-XL 231 with CCD 231-84 sensor offers down to $2e^-$ read noise and 350,000 e^- well depth.

Need improved sensitivity in the Near IR region? The iKon-XL 231 with CCD 231-84 sensor offers a deep-depletion option that provides optimal sensitivity in the Near IR.

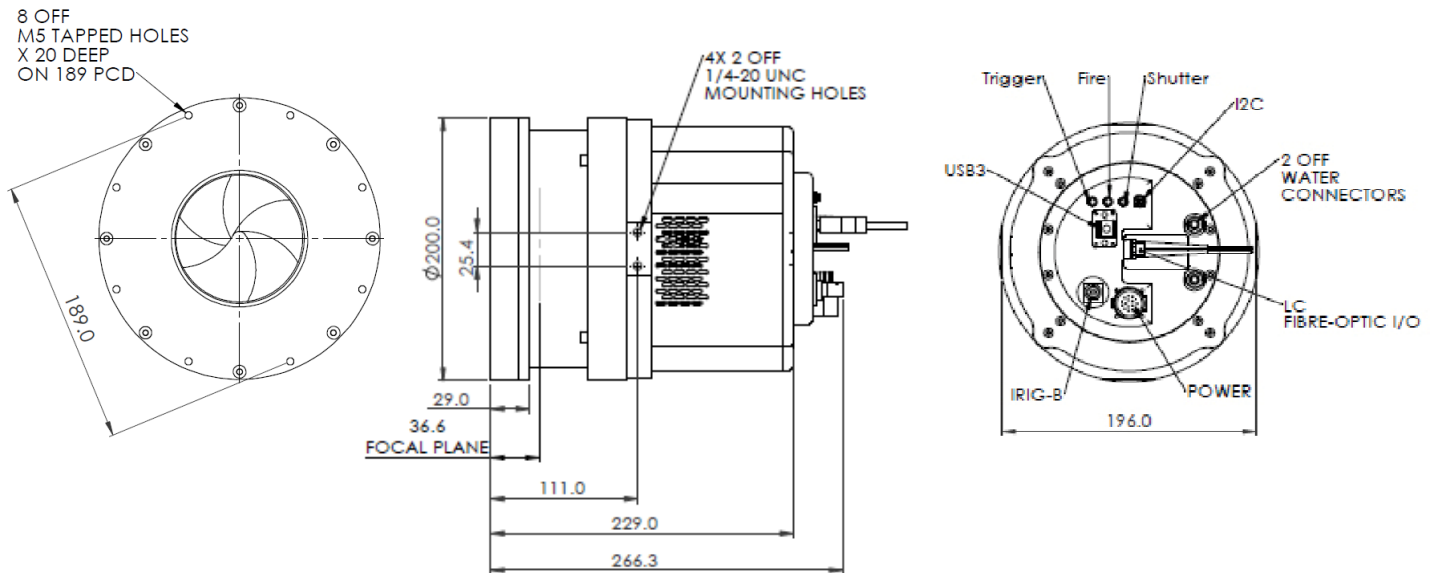
Need a customized version? Please contact us to discuss our Customer Special Request options.

MECHANICAL DRAWINGS



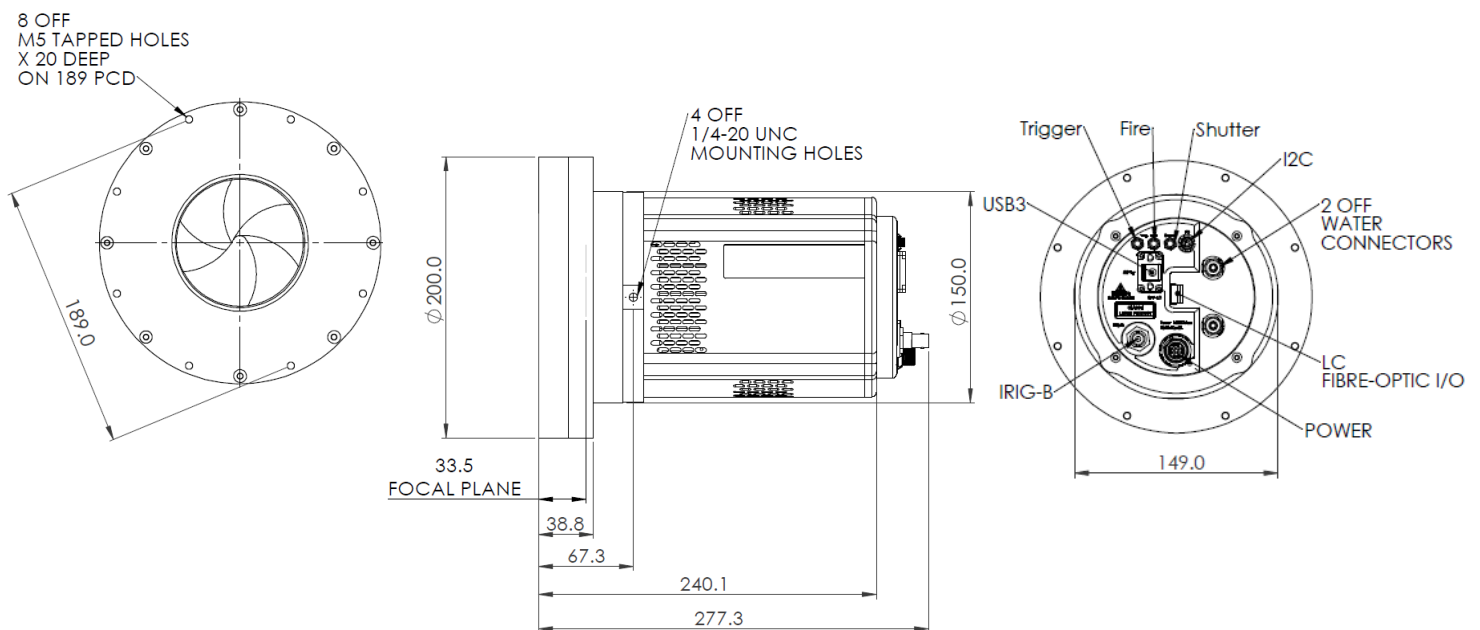
Dimensions in mm

Deep Cooled Model



Weight (approx): 12 Kg [26 lbs 7]

Flexi Model



Weight (approx): 8.25 Kg [18lbs 3oz]

Note: Product drawings of models without shutter can be found at <http://www.andor.com/xl-product-drawings>



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Need more information? At Andor we are committed to finding the correct solution for you. With a dedicated team of technical advisors, we are able to offer you one-to-one guidance and technical support on all Andor products. For a full listing of our regional sales offices, please see: andor.com/contact

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Fax +86 (10) 8271 9055

Items shipped with your camera

- 1x Fibre Optic PCIe Card (note: PC requires 1x slot for installation of the Fibre Optic PCIe Card)
- 1x iKon-XL Power Supply
- 1x Country specific power Cord (5 M)
- 1x Camera power lead
- 1x BNC-SMA Cable
- 1x USB 3.0 Cable
- 1x Fibre Optic Patch Lead LC-LC OM3 (5 M)

Footnotes

1. Assembled in a state-of-the-art facility, Andor's UltraVac™ vacuum process combines a permanent hermetic vacuum seal (no o-rings), with a stringent protocol and proprietary materials to minimize outgassing. Outgassing is the release of trapped gases that would otherwise degrade cooling performance and potentially cause sensor failure.
2. Figures are typical unless otherwise stated.
3. Specified minimum temperature with coolant assumes coolant temperature of 10°C, measured at camera head. Note that cooling performance may be affected by distance between camera head and cooler.
4. Dark current measurement is averaged over the CCD area excluding any regions of blemishes.
5. Quantum efficiency as supplied by the sensor manufacturer.



Minimum Computer Requirements:

- 3.0 GHz single core or 2.4 GHz dual or quad core processor
- 2 GB RAM
- 100 MB free hard disc to install software (at least 1 GB recommended for data spooling)
- USB 3.0 High Speed host Controller capable of sustained rate of 60 MB/s
- Windows (7 and 8) or Linux

Operating & Storage Conditions:

- Operating Temperature: 0°C to +30°C ambient (-30°C to +30°C ambient on request)
- Operating Altitude: up to 6000m
- Relative Humidity: <70% (non-condensing)
- Storage Temperature: -30°C to 50°C

Power Requirements:

- 100 - 240 VAC, 50 - 60 Hz
- Power consumption: 500W max



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Labview is a registered trademark of National Instruments.
Matlab is a registered trademark of The MathWorks Inc.