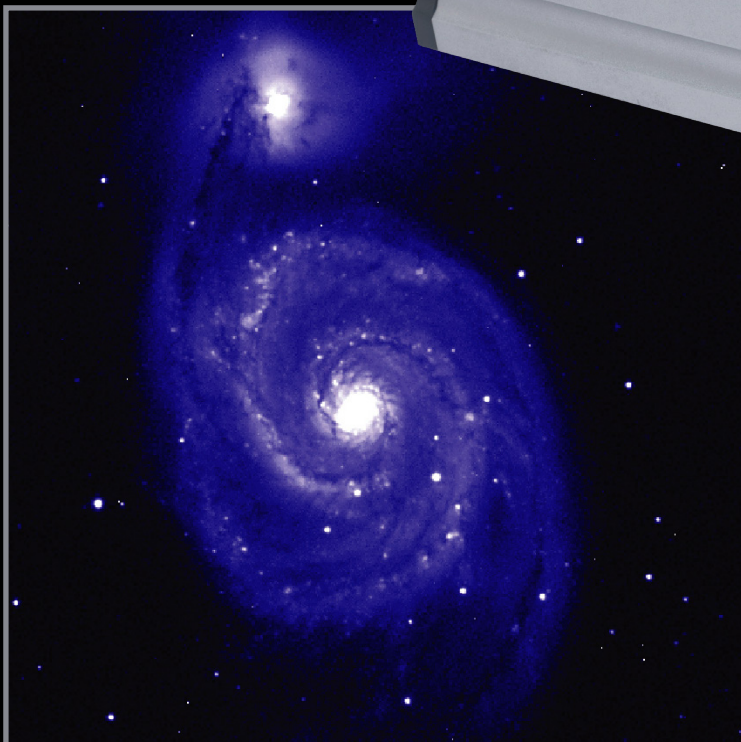
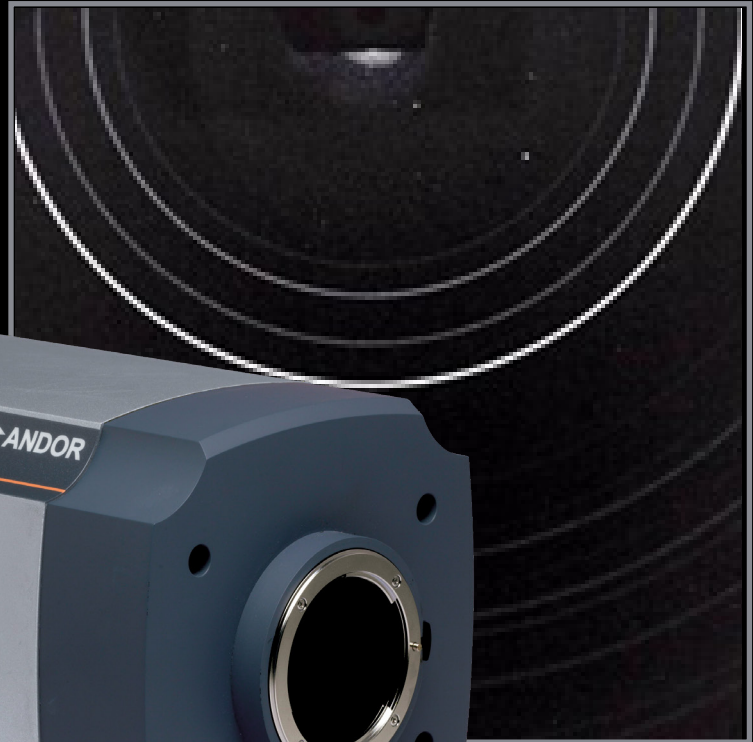


iKon-L Hardware Guide

Version 1.4 rev 23 Apr 2019



Covering models:

- iKon-L 936
- iKon-L SO
- iKon-L SY
- iKon-L HF

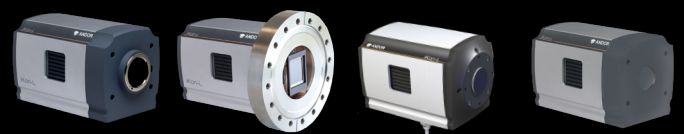


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REVISION HISTORY

Version	Released	Description
1.0	Apr 2008	Initial release
1.1	Aug 2009	–
1.2	Aug 2009	–
1.3	07 Nov 2017	Fully revised (all sections). Updated to include iKon-L model variations. Additional information added regarding cooling and power requirements. Solis information removed- this is available from Solis in-built help.
1.4	23 Apr 2019	Updated US and Japan addresses.

UPDATES TO THIS MANUAL

Changes are periodically made to the product and these will be incorporated into new editions of the manual. Please check for new releases of the manual in MyAndor: <http://my.andor.com/login.aspx>. If you find an issue in this manual please contact your customer support representative (Section 1.1) with a description of the issue.

SAFETY AND WARNING INFORMATION

**READ THIS INFORMATION FIRST**

1. If the equipment is used in a manner not specified by Andor, the protection provided by the equipment may be impaired.
2. Before using the system, please follow and adhere to all warnings, safety, manual handling and operating instructions located either on the product or in this Hardware Guide.
3. Users must be authorised and trained personnel only; otherwise this may result in personal injury, and/ or equipment damage and impaired system performance.
4. There are no user-serviceable parts inside the product and the enclosure must not be opened. Only authorised service personnel may service this equipment.
5. Do not position this product so that it is difficult to operate the Mains disconnecting device. See SECTION 4.1, “Emergency Mains Disconnection”.
6. Protective earth is an integral part of the protection against electric shock in this product, and is provided via the earth pin of the external power supply. Ensure that this is plugged into the building earth system via the mains socket. Do not tamper with any of the earthing measures.
7. Only the correctly specified mains supply should be used.
8. Only the AC/DC external power supply provided with the product should be used.
9. Only the power supply cord provided with the product should be used. Should this not be correct for your geographical area, contact your local Andor representative.
10. Make sure the power supply cord is located so that it will not be subject to damage. If replacement of the detachable power supply cord is required, ensure replacement is of same type and rating.
11. Performance of the system may be adversely affected by rapidly changing environmental conditions or operation outside of the operating conditions specified in “TECHNICAL SPECIFICATIONS”
12. While running an experiment, try to keep temperature as stable as possible.
13. This equipment has not been designed and manufactured for the medical diagnosis of patients.
14. Electromagnetic Compatibility: This is a Class A product. In a domestic environment this product may cause electromagnetic interference, in which case the user may be required to take adequate measures.
15. This product has been designed and tested to perform successfully in a normal (basic) electromagnetic environment, e.g. a typical life science test laboratory, as per the EU EMC Directive. It is not designed to operate in a harsh electromagnetic environment, e.g. close to the following equipment: EMI/RFI generators, electrostatic field generators, electromagnetic or radioactive devices, plasma sources, arc welders, x-ray instruments, intense pulsed sources, or other similar sources of high energy fields whose emissions are not within the normal range expected under the EU EMC Directive.
16. Please note that this product is not designed to provide protection from ionising radiation. Any customer using this product in such an application should provide their own protection.
17. Your product is a precision scientific instrument containing fragile components. Always handle it with care.
18. Do not wet or spill liquids on the product, and do not store or place liquids on the product.
19. If spillage occurs on the product, switch off power immediately, and wipe off with a dry, lint-free cloth.

20. If any ingress of liquids has occurred or is suspected, unplug the mains cables, do not use, and contact Andor Customer Support.
21. When using a liquid cooling system it is recommended that an overpressure device is fitted to avoid leaks that may find their way to the mains electricity supply and create a hazard. Refer to the information in SECTION 3.7 for general guidelines on the correct installation and use of a liquid cooling system.
22. See SECTION 6.3, “Cleaning and Decontamination”.
23. Do not expose the product to extreme hot or cold temperatures.
24. Do not expose the product to open flames.
25. Do not allow objects to fall on the product.
26. Keep this Hardware Guide in a safe place for future reference.

WARNING AND SAFETY LABELS

PSUs contains hazardous voltages (100-240 VAC). Do not attempt to open the enclosure. There are no user serviceable components inside.



UNPACKING INFORMATION

Carefully unpack the unit and retain the packaging materials to transport or return equipment if required:

- If the equipment appears damaged in any way, return it to sales outlet in its original packaging.
- No responsibility for damage arising from the use of non-approved packaging will be accepted.
- Ensure all items and accessories specified at the time of ordering and as detailed on the packing list are present: if any items are missing, please contact your sales representative.

SECTION 1: INTRODUCTION

This manual provides an overview of the iKon-L camera series. The iKon-L is available in different configurations to suit demanding applications such as Astronomy, Life Sciences and high energy applications. This manual includes a description of the main features of the iKon-L, installation, routine operation and troubleshooting. It also provides a summary of some of the technical features of the iKon-L series. For further information on operation and control of the iKon-L refer to the relevant software guide e.g. Solis, and to the andor website for further technical information to help you get the best from your camera.



Figure 1: The iKon-L (936 model shown)

1.1 TECHNICAL SUPPORT

If you have any questions regarding the use of this equipment, please contact the representative* from whom your system was purchased, or:

Europe

Andor Technology Ltd.
7 Millennium Way
Springvale Business Park
Belfast
BT12 7AL
Northern Ireland
Tel. +44 (0) 28 9023 7126
Fax. +44 (0) 28 9031 0792

USA

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Suite # 150
Concord
MA 01742
USA
Tel. +1 (860) 290-9211
Fax. +1 (860) 290-9566

Asia-Pacific

Andor Technology (Japan)
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3-32-42 Higashi-Shinagawa
Tokyo 140-0002
Japan
Tel: +81 (0)3 6732 8968
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China

Andor Technology
Unit 1, Building A,
66 Zhufang Rd, Haidian Dist.
Beijing 100085
China
Tel: +86 (0)10 8271 9066
Fax. +86(0)10 8271 9055

* The latest contact details for your local representative can be found on the [Contact and Support](#) page of our website.

1.2 DISCLAIMER

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IN NO EVENT SHALL ANDOR BE LIABLE FOR ANY LOSS OR DAMAGE, WHETHER DIRECT, INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR OTHERWISE HOWSOEVER CAUSED WHETHER ARISING IN CONTRACT, TORT OR OTHERWISE, ARISING OUT OF OR IN CONNECTION WITH THE USE OF THE INFORMATION PROVIDED HEREIN.

1.3 COPYRIGHT AND PROTECTIVE NOTICES

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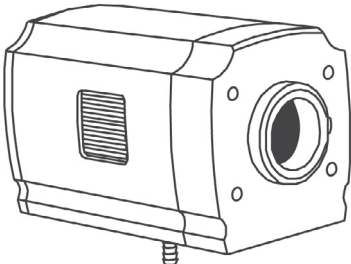
The publication of information in this documentation does not imply freedom from any patent or proprietary right of Andor Technology Ltd. or any third party.









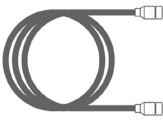

1.4 TRADEMARKS AND PATENT INFORMATION

Andor and the Andor logo are trademarks of Andor Technology Ltd. Andor Technology Ltd. is an Oxford Instruments company. All other marks are property of their owners.

iKon-L Series Manufacturers Information
Andor Technology Ltd., Belfast, BT12 7AL, UK.

1.5 SUPPLIED COMPONENTS

Description		Quantity
	<p>iKon-L CCD Camera (model as ordered: refer to Specification sheet for full model information as options vary with each model).</p>	1

	<p>Software CD (Solis and SDK are ordered separately)</p>	-		<p>Hardware Guide in electronic format</p>	1
	<p>Performance Booklet</p>	1		<p>BNC-SMB Cable (2m)</p>	1
	<p>USB 2.0 Cable (3m)</p>	1		<p>Power Supply (PS-40)</p>	1
	<p>ESD Wristband</p>	1		<p>Power Supply (PS-29)</p>	1
	<p>PS-40 to camera cable ASE-01957</p>	1		<p>Country Specific Power Lead</p>	1

1.5.1 IKON-L MODEL OPTIONS

There are a number of models of iKon-L, see table below. Refer to the specification sheet for model specific information.

	iKon-L 936		iKon-L HF	iKon-L SO		iKon-L SY
Model code	DUx936N-xx		DF934N-FB-T2	DO936N-x0x-xx		DY936N-xx
Active pixels	2024 x 2024		2024 x 2024	2024 x 2024		2024 x 2024
Pixel size	13.5 µm		13.5 µm	13.5 µm		13.5 µm
Max Cooling	-100°C		-35°C	-100°C		-55°C
Air/Water cooling	•/•		•/•	•/•		•/•
Sensor options	BV BU2 FI	BR-DD BEX2-DD	FB	BN BEN	BR-DD FI	BN BR-DD FI
In-built shutter	•/option on EF		-	-		-
Mounting Options (See mechanical drawings for details)	F-mount Mounting Posts 1/4-20 UNC (x3)		Refer to Specifications Sheet Mounting Posts 1/4-20 UNC (x3)	Flange Options: Imperial thread (5/16 UNC), No thread (ø 8 mm through hole), No thread (ø 8 mm through hole)		Front face M4 Mounting holes (x4) Mounting Posts (x3)
Notes	-		High resolution scintillator options and fibre optic plate coupling.	Open fronted "High Energy" model		250 µm Beryllium foil window "High Energy" model

1.5.2 OPTIONAL ACCESSORIES

A range of accessories is available (see table below). The iKon-L is intended only for use with accessories recommended and supplied by Andor. Please contact your local Andor representative if further information is required.

Description	Code	iKon-L 934	iKon-L HF	iKon-L SO	iKon-L SY
C-mount to Cannon FD adapter	OA-CCFM	•	-	-	-
C-mount to Nikon AF adapter	OA-CNAF	•	-	-	-
C-mount to Olympus F-mount adapter	OA-COFM	•	-	-	-
C-mount to T-mount adapter	OA-CTOT	•	-	-	-
Auto extension tubes (set of 3) for Canon AF	OA-ECAF	•	-	-	-
Auto extension tubes (set of 3) for C-mount	OA-ECMT	•	-	-	-
Auto extension tubes (set of 3) for Nikon AF	OA-ENAF	•	-	-	-
USB Extender: Icron USB 2.0 Ranger 2201 (100 m) - EU/UK/US	ACC-USBX-EU ACC-USBX-UK ACC-USBX-US	•	•	•	•
Re-circulator for enhanced cooling performance	XW-RECR	•	-	•	•
Oasis 160 Ultra compact chiller unit	ACC-XW-CHIL-160	•	-	•	•
Copper gasket for DN100CF / 6" CF open-front camera knife-edge vacuum seal	ACC-FLG-SO-GSKT-CU	-	-	•	-
Beryllium filter for iKon-L, Ø60 mm, 250 µm thick	ACC-OPT-03838	-	-	•	-
Optional filter holder for iKon-L	SO-FILTER-MNT-IKONL	-	-	•	-
SO-SY adapter for iKon-L, Ø60 mm filter	FLG-SO-SY-CONVERT-60	-	-	•	-
Ø 60 mm filter and Ø45 x 3 mm scintillator holder for iKon-L HF	SCT-FLT_HLD-C045IKL	-	•	-	-
Ø 60 mm filter and 50 x 50 x 3 mm scintillator holder for iKon-L HF	SCT-FLT_HLD-H050IKL	-	•	-	-
1:1.9 Taper housing – excludes the fibre-optic taper.	ACC-MEC-08169	-	•	-	-

• compatible, - not applicable

SECTION 2: PRODUCT OVERVIEW

This section provides an overview of the external features and the power and signal connections of the iKon-L. Note that this section outlines the 936 model. Refer to model specific variations highlighted, see Section 5 for HF, SO and SY models.

2.1 EXTERNAL FEATURES OF THE IKON-L



Figure 2: iKon-L (936 model shown)

Mounting Flange

The mounting flange has 4 off mounting holes to clear M4 x 5 deep (see Appendix B).

Sensor

The iKon-L features high resolution CCD sensors with coatings depending on the model. Andor's unique UltraVac™ vacuum technology has been applied to the iKon-L. UltraVac provides a permanent hermetically sealed enclosure for maximum QE and cooling performance over many years operation.

Camera Window

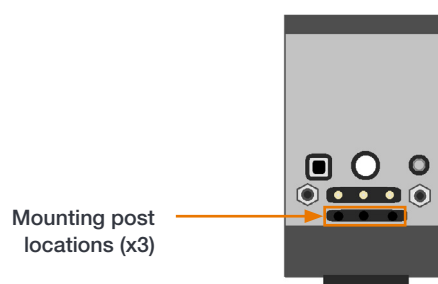
The iKon-L features a Single AR coated UV grade silica window for optimum transmission. For more information on camera windows please see <http://www.andor.com/learning-academy/camera-windows-optimizing-for-different-spectral-regions>.

Shutter

An F-mount integrated shutter is standard on the 936 with F-mount model and optional on EF-mount models.

Mounting Post Locations

There are three holes for the 1/4"-20 UNC tapped 7.0 deep mounting posts with 1" spacing located on the underside of the camera.



2.2 CONNECTIONS PANEL

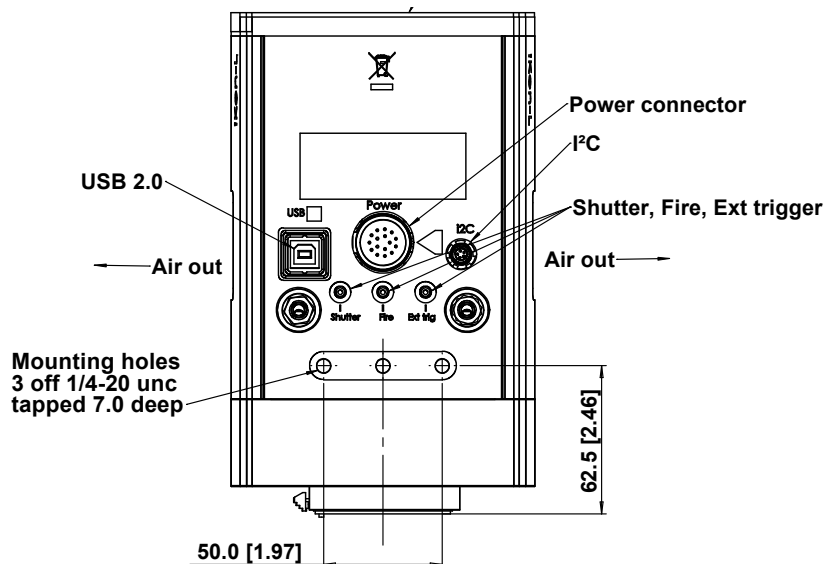


Figure 3: Connections Panel

USB 2.0

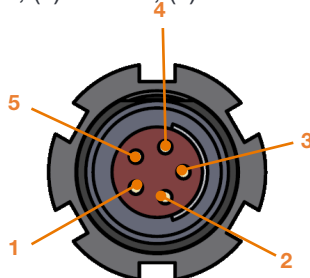
Connects the iKon-L to the control PC via a USB 2.0 connection.

TTL / Logic (Shutter, Fire, Ext trigger)

The TTL/Logic connection permit connection to other devices for synchronisation and control of fire, trigger and shutter operations. Connector type: SMA, provided with SMA - BNC cable Fire (Output), External Trigger (Input), Shutter (Output). The SMB outputs (Fire & Shutter) are CMOS compatible & Series terminated at source (i.e. in the camera head) for 50Ω cable. NOTE: The termination at the customer end should be high impedance (not 50Ω) as an incorrect impedance match could cause errors with timing and triggering. The SMB Ext Trig input is TTL level & CMOS compatible and has 470Ω impedance.

I²C

The I²C provides a connection option via the I²C interface. Compatible with Fischer type SC102A054-130 connector. (1) Shutter (TTL), (2) I²C Clock, (3) I²C Data, (4) +5 Vdc, (5) Ground.



Power Connector

Power input connection for connection to the PSU. Refer to **Section 2.3**.

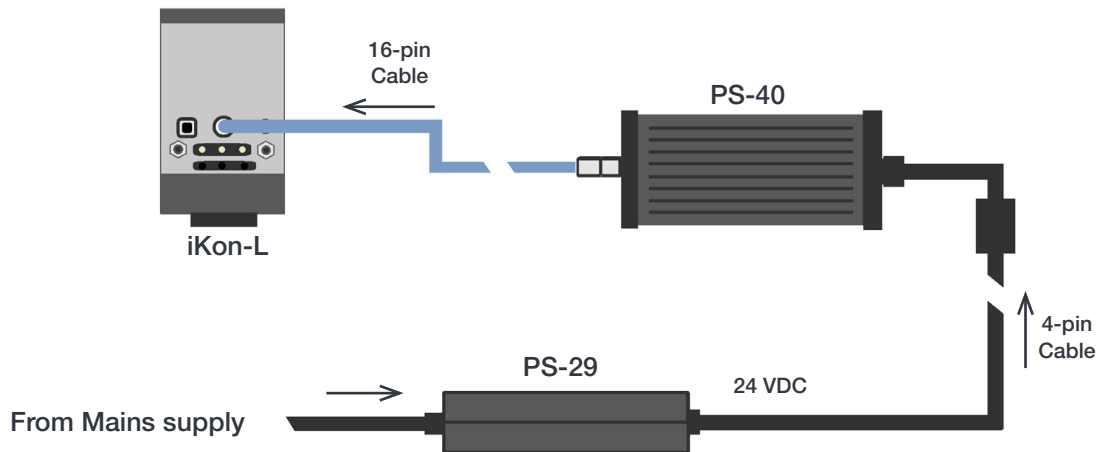
Notes:

Minimum cable clearance required at rear of camera 90 mm.

Liquid cooling connections provide the facility for connection to re-circulator or other water/liquid cooling system. Refer to **Section 3.7**.

2.3 POWER SUPPLY UNIT AND POWER REQUIREMENTS

The iKon-L uses a dual PSU setup comprised of a PS-40 and a PS-29. The PS-29 (or equivalent user supplied unit) is connected to the mains electrical supply via an IEC lead and performs AC-DC conversion. The PS-40 takes the 24 VDC output of the PS-29 and supplies the various DC voltages required by the camera. The PS-40 is connected to the iKon-L via a 16 pin cable. Connection of the power supplies during installation is outlined in **Section 3.6**.

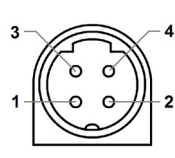


PS-29

Input: 100-240 VAC, 47-63 Hz, 2.2 A max. Cable input is IEC, connection at mains to match regional requirements.

Output: 24 VDC @ 150 Watts/6.6 A max, 4 pin cable (see below).

Pin	Description
1	24 VDC (+ve)
2	24 VDC (+ve)
3	(-ve)
4	(-ve)
Shell	GND



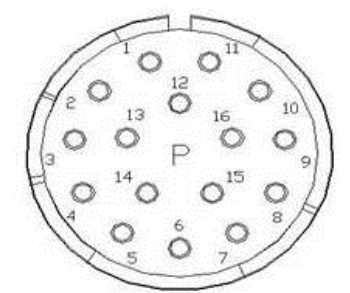
PS-40

Input: 24 VDC, 13 A max. Power on/off switch on input panel.

Output: See below

Aux Output: 24 VDC 1A max. May be used to power other devices.

Pin	ID	Pin	ID	Pin	ID	Pin	ID
1	+8V	5	GND	9	COOLER-	13	-70V
2	-8V	6	COOLER+	10	+5V	14	DIFF_GND
3	-15V	7	COOLER+	11	GND	15	DIAL-A-TEMP
4	+15V	8	COOLER-	12	Spare 1	16	+54V



Notes:

- If users use any other power supply they do so at their own risk.
- Do not obstruct ventilation holes. Unit may become hot during operation.

SECTION 3: INSTALLATION

WARNINGS:

- **PRIOR TO COMMENCING INSTALLATION, THE USER SHOULD REFER TO THE SAFETY AND WARNING INFORMATION AND UNPACKING INSTRUCTIONS AT THE BEGINNING OF THIS MANUAL.**
- **CABLES SHOULD BE ROUTED TO PREVENT ACCIDENTS, DAMAGE AND ACCIDENTAL UNPLUGGING WHILE AVOIDING BEND RADII OF LESS THAN 30 MM.**
- **TEMPERATURE AND HUMIDITY MUST MEET THE SPECIFICATIONS DEFINED IN TECHNICAL SPECIFICATIONS.**
- **FOR HF, SO AND SY MODELS REFER ALSO TO SECTION 5 FOR MODEL SPECIFIC INFORMATION.**

3.1 TRANSPORT AND STORAGE INFORMATION

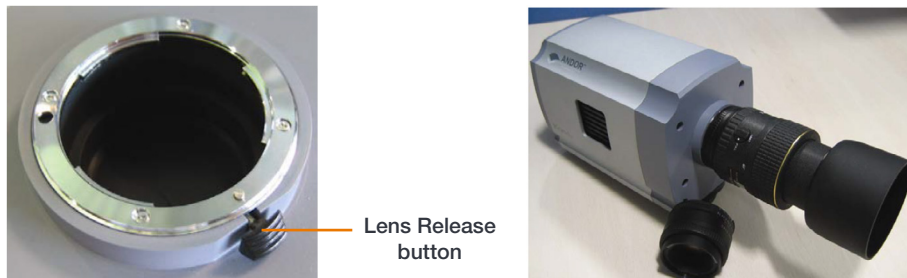
- Storage Temperature: -30°C to 50°C.
- If it is to be stored after use at a temperature below the coolant freezing point, ensure that all liquid coolant has been expelled from the camera.

3.2 F-MOUNT

The standard iKon-L 936 model features a F-mount for easy attachment to a wide range of compatible lenses. Adapters are also available for other lens fitments, refer to **Section 1.5.2**.

To Attach an F-mount Lens

1. Insert the lens into the mounting aperture, then rotate the lens counter-clockwise (~1/4 turn) until it clicks into place, being careful to NOT press the lens release button.



2. Lock in place by rotating the secondary locking ring (if present) on the lens clockwise.

To Remove an F-mount Lens

1. Rotate the secondary locking ring (if present) counter-clockwise to unlock.
2. Press and hold the lens release button. While holding the lens release button, turn the lens clockwise (~1/4 turn) until it stops. Then remove the lens.
3. As with all optical components handle them carefully and ensure they are protected from dust and other contaminants that may impair performance.



3.3 MOUNTING THE iKON-L USING THE MOUNTING FLANGE

The standard iKon-L mounting flange has mounting holes to clear 4x M4 fittings. For further information, refer to the mechanical drawings in **Appendix B**. For SO models refer to **Section 5**.

3.4 ATTACHING TO MOUNTING POSTS

There are three holes that can be used if required with the 1/4 - UNC mounting posts with 1" spacing.



For further information, refer to the mechanical drawings in **Appendix B**.

3.5 CONNECTING THE iKON-L TO THE PC

The appropriate PCIe card should be available in the control PC.

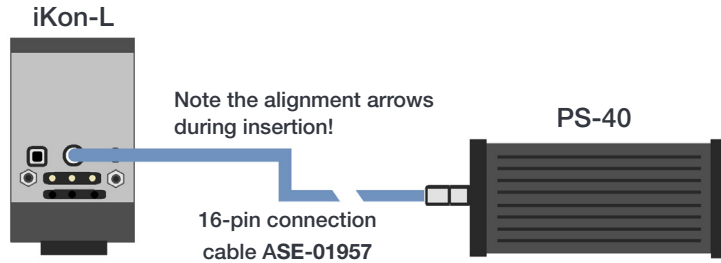
USB 2.0

- Connect the USB 2.0 cable from the iKon-L to a suitable USB 2.0 slot on the control PC.

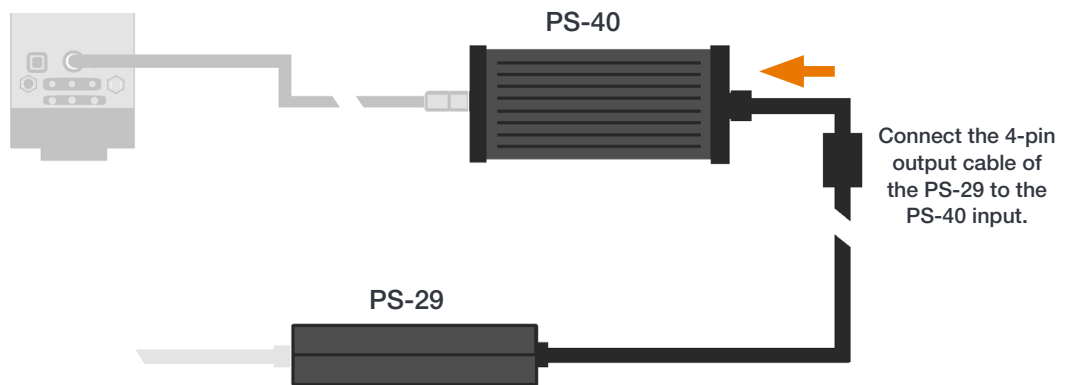


3.6 CONNECTING THE iKON-L TO THE POWER SUPPLY

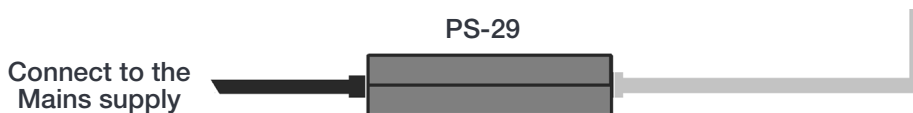
1. Connect the power cable between the camera power input and the PS-40, ensuring it is threaded correctly and tightened fully.



2. Ensure the PS-40 is switched off and then connect the power cable of the PS-40 to the PS-29.



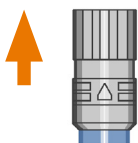
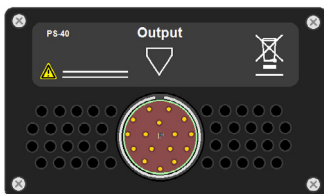
3. Connect the PS-29 to the mains supply.



4. To connect a water/liquid cooling system proceed to **Section 3.7**. For air cooling applications proceed to **Section 3.10** to install the software.

Notes

- Ensure that the power connectors for the iKon-L camera are inserted securely. The connectors are keyed to aid correct orientation.
- The ◁ symbols on the power cable, the PS-40 and the camera must be aligned correctly:



▽ Note the alignment arrows during insertion!



- If a replacement 16-pin cable (Andor part No.: ASE-01957) is required please contact your nearest Andor representative.
- The electrical mains lead should be certified for use in your country and in applicable countries the plug must be fitted with a 240V 5A fuse.

3.7 CONNECTING A COOLING SYSTEM

The iKon-L can use either air cooling, or optional liquid cooling for deeper cooling.

3.7.1 IMPORTANT CONSIDERATIONS WHEN USING LIQUID COOLING SYSTEMS

- Before attempting to remove the coolant hose connections, ensure that all coolant has been drained from the hoses and integral coolant channel within the camera head.
- Care must be taken to avoid permanent damage to the camera system resulting from either leakage of coolant during connection/removal of hoses or spillage of any residual coolant contained within the camera head once the hoses have been removed.
- Always ensure that the temperature of the liquid coolant circulated through the camera head is above the dew point of the camera ambient temperature and humidity conditions. Refer to the Dew Point graph in **Appendix C** for guidance.
- Use of coolant at or below the dew point can result in permanent damage to the camera head, due to formation of condensation on internal components.
- When using a liquid cooling system it is recommended that an overpressure device is fitted to avoid leaks that may find their way to the mains electricity supply and create a hazard.
- Never use damaged, split or worn hoses.
- The coolant connectors are factory fitted and sealed, they cannot be removed.
- Always remove residual coolant from the camera head if the camera is to be stored after operation- especially if the storage conditions are below the freezing point of the coolant.

3.7.2 COOLING HOSE CONNECTORS

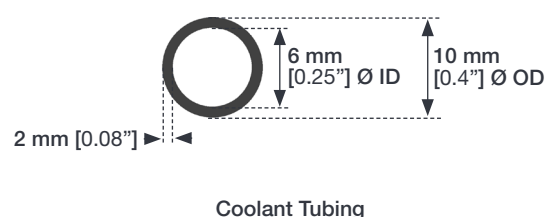
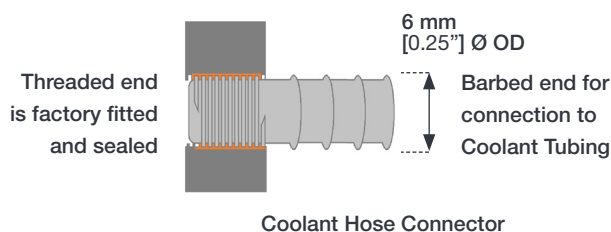
There are two cooling hose connectors that are located on the base plate (connections panel) of the camera for connection of the iKon-L to a water cooler, or re-circulator system. One end is fixed into the camera body, the other end is barbed for push-fit connection to suitable tubing.



Coolant hose connectors for connection to the cooling system



- **Coolant Hose Connectors:** Two push-fit hose connectors are factory fitted and sealed, suitable for connection to 6 mm [0.25"] internal diameter soft PVC tubing / hose
- **Recommended tubing:** 10 mm [0.4"] outside diameter, i.e. a wall thickness of 2 mm [0.08"]. Alternative hose dimensions and materials should be thoroughly tested to ensure a leak tight seal is achieved with the barbed connectors.



3.8 COOLANT RECOMMENDATIONS

- **Coolant temperature:** Refer to the temperatures specified in Technical Specifications for the specific model. Note that cooling performance may be affected by distance between camera head and cooler.
- **Recommended coolant:** water or water/glycol mix depending on the ambient environmental temperature during operation.

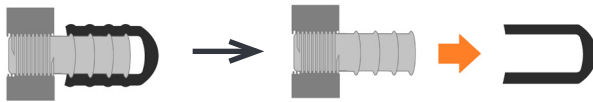
De-ionized water (without additives) may be used as the coolant. Some mains supply water is heavily mineralized (i.e. “Hard”) which could cause deposits in the water circuit inside the camera. This can reduce the flow-rate and cooling efficiency. The specified cooling performance of the camera can be achieved with coolant flow rates of 2 litres per minute, the maximum recommended pressure of coolant circulating through the camera head is 2 bar (30 PSI).

3.9 CONNECTING THE LIQUID COOLING SYSTEM

An overview for connecting a liquid cooling system is outlined below- please refer to the information supplied with your cooling system for further information.

3.9.1 CONNECTING THE COOLANT HOSES

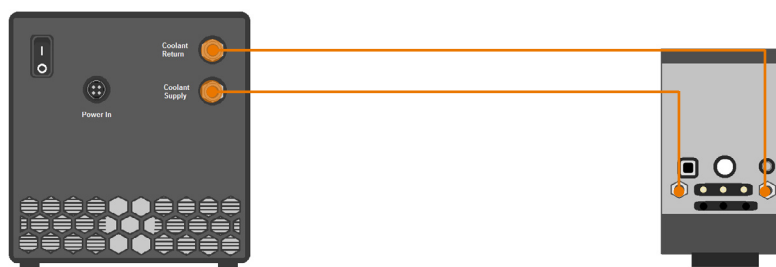
1. Remove the black rubber protective caps (x2) if fitted.
2. Press the hoses onto the connectors on the camera.



3. Confirm the hoses are connected securely.



4. Connect the other ends of the coolant hoses to the cooling system- refer to the cooling system manual.



3.9.2 DISCONNECTING THE COOLANT HOSES

Notes:

- **Push-fit, barbed fittings are not intended for repeated disconnection/connection.**
 - **Fittings are sealed during production and should not be removed from the camera body.**
1. Apply pressure and remove the tubing with a twisting motion, while holding the camera body.
 2. Once disconnected, the tubing should be inspected for cracks or stretching. It may be necessary to cut the end section of tubing so that a tight seal can be obtained.

3.10 INSTALLING SOFTWARE AND USB DRIVERS

3.10.1 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
- Windows (7, 8, 8.1 and 10) or Linux

3.10.2 INSTALLING SOLIS SOFTWARE AND USB DRIVERS

1. Terminate & exit any applications which are running on the PC.
2. Insert the Andor Solis CD. The InstallShield Wizard should now start. If it does not start automatically, run the file setup.exe directly from the CD.
3. Select appropriate location for installation of software and drivers on your computer / network.
4. When prompted, select **iKon-L**.
5. Continue installation and restart your computer - when prompted - to successfully complete the installation.
6. The shortcut icon for Solis will appear on the desktop on re-start.
7. The iKon-L is now ready to be connected to a PC / laptop and powered on.

3.10.3 NEW HARDWARE WIZARD

When the iKon-L camera is connected to a PC for the first time, the **New Hardware Wizard** screen will appear.

1. Select the '**No, not this time only**' option then click **Next>**.
2. Select the '**Install from a list or specified location (Advanced)**' option then click **Next>**.
3. Navigate to the directory where the Andor Solis software was installed to on the PC, then click **Next>** so that **the Installation Wizard can start**.
4. Click the **Finish** button to complete the installation.


Note: If the camera is connected to a different USB port, steps 1 – 4 will have to be repeated on the first connection only.

5. A system message will appear to indicate that the device has been successfully installed.

Note: You can check that the iKon-L is correctly recognized and installed by opening the Device Manager (Devices and printers) in Windows, Control Panel. The iKon-L will show under the Devices list.

3.11 INSTALLING A USB 2.0 CARD (IF NOT PRESENT)

USB 2.0 slots (USB 3 is backwards compatible) are found on most PCs. If a USB card needs to be installed please refer to the guidelines below and instructions supplied with your Card/PC.

 **Ensure your PC is powered off. Ensure anti-static precautions using anti-static strap provided. Keep all screws safe.**

1. Unplug all cables from the rear of the computer.
2. Open the PC enclosure to gain access to the expansion slots.
3. Locate a suitable PCIe slot for a **USB 2.0** cards:
4. *If you are unsure which slot is correct, please consult the PC user manual.*
5. Remove the filler bracket corresponding to the slot you intend to use.
6. Remove the PCIe card carefully from its protective ESD packaging and insert the card connector fully into the expansion slot.
7. Ensure the card's mounting bracket is flush with any other mounting or filler brackets to either side of it, then secure the controller card in place.
8. Fit the computer panels and any accessories that you were using previously.

SECTION 4: OPERATION

WARNINGS:

- **IF THE EQUIPMENT IS USED IN A MANNER NOT SPECIFIED BY ANDOR OR ITS DISTRIBUTORS, THE PROTECTION PROVIDED BY THE EQUIPMENT MAY BE IMPAIRED.**
- **PLEASE READ THE USER GUIDES SUPPLIED WITH YOUR SYSTEM COMPONENTS AND CAMERA CONTROL SOFTWARE PRIOR TO USE.**

4.1 EMERGENCY MAINS DISCONNECTION

In case of emergency, the disconnecting point of the equipment is the mains power cord connected to the external power supply, or the mains socket switch.

WARNING: SWITCH OFF THE POWER AT THE MAINS SOCKET AND REMOVE THE MAINS LEAD FROM THE EXTERNAL POWER SUPPLY.

4.2 POWER-UP SEQUENCE

1. Ensure that the iKon-L is powered on at the mains power supply (Note there is also a power switch on the PS-40).
2. Ensure that the USB 2.0 cable is connected between the camera and the PC.
3. Start up the PC.
4. Launch your camera control software e.g. Solis or SDK2.
5. The camera will now start up under control of the software and you are ready to use the camera.
6. Refer to your software manual for set-up and image acquisition information.

4.3 POWER-DOWN SEQUENCE

1. Exit the camera control software.
2. The camera will automatically turn off.
3. Switch off power to the camera and if not using for some time, disconnect from the mains power socket.

4.4 USING THE IKON-L

Once set-up the iKon-L is controlled through the camera control software. Please refer to the information supplied with the camera control software (available separately) for further details e.g. **Andor Solis** or **SDK2**. For information on the features available with the iKon-L please refer to the **Appendix D Reference Information**.

4.4.1 ADJUSTING THE COOLING FAN SPEED.

1. Select Fan Control from the Hardware drop-down menu.
2. Select the speed you require as necessary (this may affect the cooling ability of the CCD).

NOTE: After changing from High to Low, it may be necessary for the camera temperature to stabilize before acquiring data. However for optimum performance it is recommended to leave the fan setting at High.

4.4.2 PREVENTING OVERHEATING

Care should be taken to ensure that the camera does not overheat, as this can cause system failure. Overheating may occur if either of the following occur:

- The air vents on the sides of the head are accidentally blocked or there is insufficient or no water flow.
- You are using air cooling with the camera in ambient air >35 °C.

To protect the detector from overheating, a thermal switch has been attached to the heat sink. If the temperature of the heat sink rises above 47°C, the current supply to the cooler will cut out and a buzzer will sound. Once the head has cooled, the cut-out will automatically reset.

See **Section 3.7** for further information on Cooling.

SECTION 5: ADDITIONAL INFORMATION FOR SO, SY AND HF MODELS

5.1 iKon-L SO

- iKon-L and iKon-M SO models have an “open” CCD sensor which is exposed to the external environment instead of being sealed behind a window as would be typical of normal models.
- An ICF flange is built onto the front of the camera for attachment to the customer’s vacuum chamber.
- Note: SO models were previously referred to as “DO” models and have part codes beginning with DO.

5.1.1 BEST PRACTICE GUIDELINES

Condensation

- It is strongly advised that the camera should not be used in a condensing atmosphere.
- If used in a condensing atmosphere the sensor **MUST** be protected, and the use of a cold finger is strongly recommended.

Contamination & Damage

- When not in use, the sensor chamber should be covered and sealed.
- Due to the exposed nature of the sensor, extreme care should be taken with the camera, as damage can easily occur through mishandling or by contamination.
- If the sensor becomes contaminated, due to accident or misuse, please contact Andor immediately for advice on cleaning.

Vacuum Operations

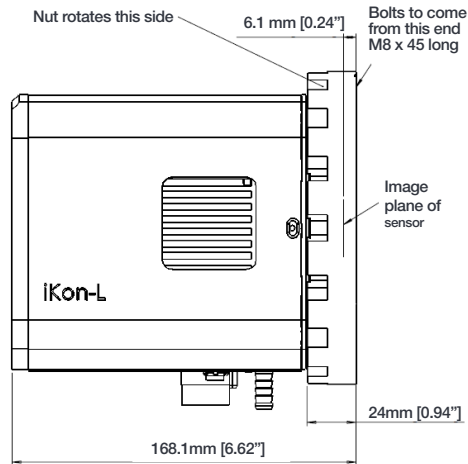
- NOTE: Do not operate the iKon-L SO in a vacuum that exceeds (i.e. lower pressure) 1.33×10^{-8} mb (10^{-8} Torr)
- Ensure that the vacuum environment to which the camera is fitted is free of water vapour and other contaminants.
- Care should also be taken to control pressure change, as sudden pressure changes can potentially cause damage to the sensor assembly.

Please refer to the Andor Technical Note: [Open-front camera flanges](#) for further details.

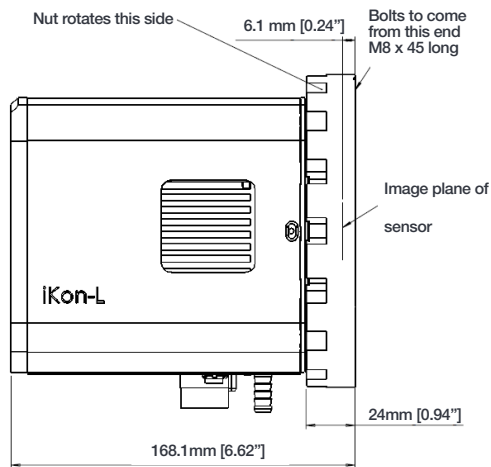
5.1.2 MOUNTING THE CAMERA ON THE VACUUM CHAMBER FLANGE

The iKon-L has a range of mounting options:

- 0** No thread, captive nuts
e.g. D0936N-00Z-BEN

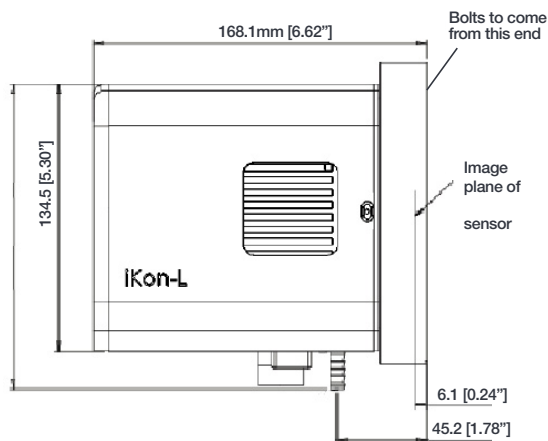


- 0** No thread, captive nuts
e.g. D0936N-00Z-BEN



- M** Metric attachment
e.g. D0936N-M0Z-BR-DD

- I** Imperial attachment
e.g. D0936N-I0W-#FI



5.2 IKON-L SY

- SY models (DY model code) have a Beryllium foil window as opposed to a standard window. This enables direct “soft” X-ray detection

5.2.1 BEST PRACTICE GUIDELINES

- When not in use the window should be covered and protected.
- Not suitable for mounting to vacuum chamber.
- Due to the exposed nature of the window, care should be taken with the camera, as damage can easily occur through mishandling or by contamination.
- If due to accident or misuse the window becomes contaminated, please contact Andor immediately for advice on cleaning.
- The beryllium foil window is very brittle therefore extreme care should be taken to avoid shock damage. If the foil is broken there is a health risk. Please contact Andor for further information if required.

5.3 iKON-L HF

- The iKon-L HF model (DF model code) features fibre optic plate (FOP) coupling to the CCD sensor, and scintillator options for indirect X-ray detection.

5.3.1 BEST PRACTICE GUIDELINES

- Camera is susceptible to shock damage. Protective plate should always be fitted when camera is not in use.
- Other fibre optic surfaces can be coupled to the camera FOP, both surfaces must be free of contamination to avoid damage.
- Dust or contamination can be removed by drop and drag optical cleaning technique. For cleaning use lens tissue with a suitable solvent e.g. spectroscopic grade solvent.
- Do not use abrasives, corrosive solvents, avoid impact or point contact.
- For models that have the beryllium foil as an accessory: Beryllium foil is very brittle in nature therefore extreme care should be taken to avoid shock damage. If the foil is broken there is a health risk. Please contact Andor for further information if required

SECTION 6: MAINTENANCE



THERE ARE NO USER-SERVICEABLE PARTS INSIDE THE CAMERA. DAMAGE CAUSED BY UNAUTHORISED MAINTENANCE OR PROCEDURES WILL INVALIDATE THE WARRANTY.

6.1 REGULAR CHECKS

- The state of the product should be checked regularly, especially the integrity of the PSUs and the mains cable.
- Do not use equipment that is damaged.

6.2 ANNUAL ELECTRICAL SAFETY CHECKS

- It is advisable to check the integrity of the insulation and protective earth on an annual basis, e.g. U.K. PAT testing.
- Do not use equipment that is damaged.

6.3 GENERAL CLEANING & DECONTAMINATION INFORMATION

- The camera body can be cleaned with a soft cloth and dampened by water or glass cleaner.
- Never spray liquids directly on the camera; apply cleaning solution to the cloth, then wipe the camera body with the dampened cloth.
- Do not use abrasive or other detergents to clean the camera.

6.4 CLEANING THE CAMERA WINDOW



At some point, it may become necessary to clean debris that may have settled on the CCD imaging sensor window. Cleaning the camera window can provide effective results providing you carefully follow these step-by-step directions.

WARNINGS

- **Only open the shutter (if present) using camera control software.**
- **Do not attempt to manually open the shutter with your fingers or other objects.**
- **Scratching the window may require the window to be replaced. Replacement of a vacuum camera window requires significant camera rework in the factory.**
- **Cleaning the window is done entirely at the customers risk, window replacement is not covered under the warranty. It's better to under-clean than to over-clean.**

6.4.1 TOOLS REQUIRED

- Compressed Air Can (or source of clean compressed air)
- Optics Brush

6.4.2 WINDOW CLEANING PROCEDURE

1. Remove the camera from your telescope (or other optical equipment) and place it on a clean dry surface.
2. Use the camera control software to open the shutter (if fitted).

TIP: If your program does not have this feature, try starting a long exposure. Over exposing the CCD to room light will not damage the CCD.

Guidelines for using Compressed Air

- **If you are using a compressed air can always test-blast away from window before blowing air on the window. When you test-blast, you'll notice a spray of condensation shoot out from the can.**
 - **If condensation does form on the window, do not wipe it off. Allow it to fully dry before proceeding.**
 - **Always orient the compressed air can in an upright position before spraying.**
 - **A clean source of compressed air such as an air can is recommended- do not use a compressor that may spray fine droplets of oil, or an unfiltered air supply that may spray dust particles onto the camera window.**
3. With the shutter open, turn the camera on its side making it easier for particles to fall out of the camera head Face the window toward you at the edge of a table.
 4. Give the window short blasts of compressed air to work dust particles out of the camera head.
 5. If there are still particles stuck on the window use an optics brush to very carefully dislodge them from the window surface. Then spray the dust particles out of the camera head with compressed air.
 6. Make sure to use compressed air to clean your adapter tubes and focal reducers as well so you don't get more dust once everything's assembled.

6.5 FUSE REPLACEMENT

In the U.K, Ireland and some other countries, the supplied mains cable has a BS 1363 (or Type G) plug that includes an integrated fuse. Only replace with fuse of the same type and rating for continued protection. The characteristics of a replacement fuse are as follows:

- **Rating:** 5A 240 VAC
- **Type:** BS 1362, size: ¼ × 1" (6.3 × 25.4 mm) cartridge

6.6 COOLING HOSES AND CONNECTIONS

The user should routinely check all cooling hoses and connections for signs of leakage, damage or wear. All seals must be intact before powering on camera system and any worn/damaged items must be replaced immediately.

SECTION 7: TROUBLESHOOTING

7.1 PREVENTING CONDENSATION

NEVER USE WATER THAT HAS BEEN CHILLED BELOW THE DEW POINT OF THE AMBIENT ENVIRONMENT TO COOL THE CAMERA.

You may see condensation on the outside of the camera body if the cooling water is at too low a temperature or if the water flow is too high. The first signs of condensation will usually be visible around the connectors where the water tubes are attached. If this occurs carry out the following actions:

1. Switch off the system.
2. Wipe the camera with a soft, dry cloth.

NOTE: It is likely there will already be condensation on the cooling block and cooling fins inside the camera.

3. Set the camera aside to dry for several hours before you attempt reuse.
4. Before reuse blow dry gas through the cooling slits on the side of the camera to remove any residual moisture.

Use warmer water or reduce the flow of water when you start using the device again.

NOTE: This is not an issue when using a Re-circulator which eliminates the dew point problem.

Refer to **Appendix C** for a Dew Point Graph.

APPENDIX A: TECHNICAL SPECIFICATIONS

(Note information given for iKon-L 936, refer to specific product specification sheet for model variations)

General Specifications

Weight	4.6 kg [10 lb 2 oz], PS-29 = 0.7 kg [1 lb 6 oz] approx
Dimensions mm [inches] W x H x D	128.0 x 153.7 x 209.5 mm [5.04 x 6.05 x 8.29 inches]

Environmental Specifications

Usage	Indoor use only
Operating Temperature	0°C to 30 °C ambient
Storage Temperature	-25°C to 50 °C
Operating Relative Humidity	<70% (non-condensing)
Ingress Protection	IP20
Overvoltage Category	CAT II. An overvoltage category of CAT II means that the equipment is designed to cope with transient voltages above the rated supply that would be experienced by any product connected to a mains socket in a building.
Rated Pollution	Pollution Degree 2. Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.
Cooling vent clearance	100 mm minimum

Power Requirements

Mains Input	100-240 V AC 50/60 Hz
Cable pin-outs	(see Section 2.3)
Power Consumption	iKon-L 936 with 4 stage cooler (W) 60W max iKon-L 936 with 5 stage cooler (Z) 120W max iKon-L HF with 2 stage cooler (F) – 142W Max

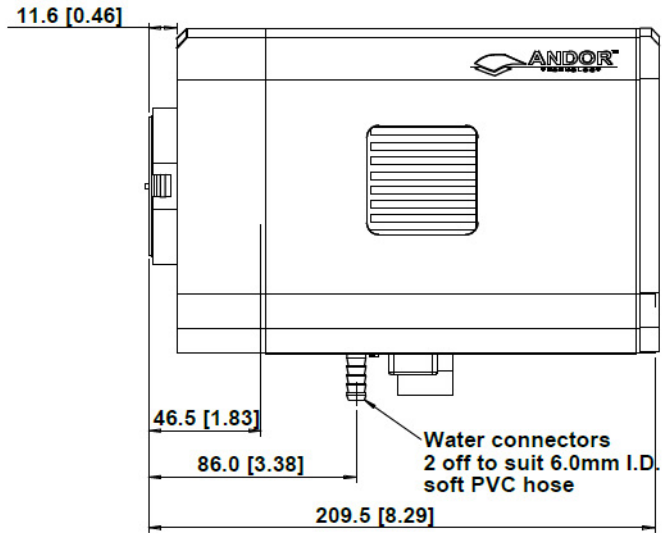
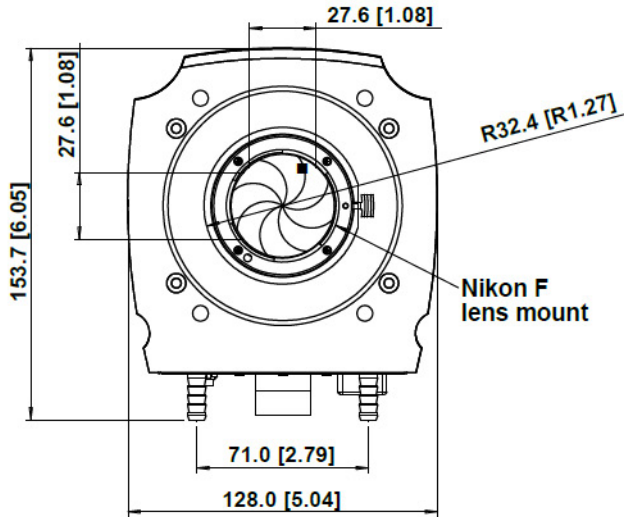
Model Specific Information

Refer to the specification sheet for further technical and performance information required model:

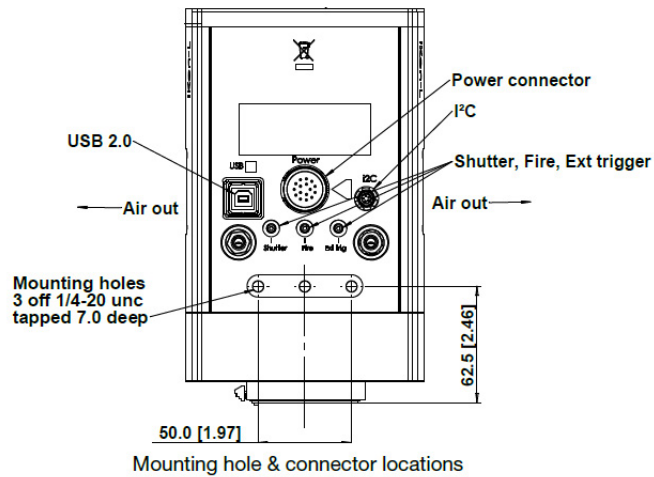
- [iKon-L 936](#)
- [iKon-L HF](#)
- [iKon-L SO](#)
- [iKon-L SY](#)

APPENDIX B: MECHANICAL DRAWINGS

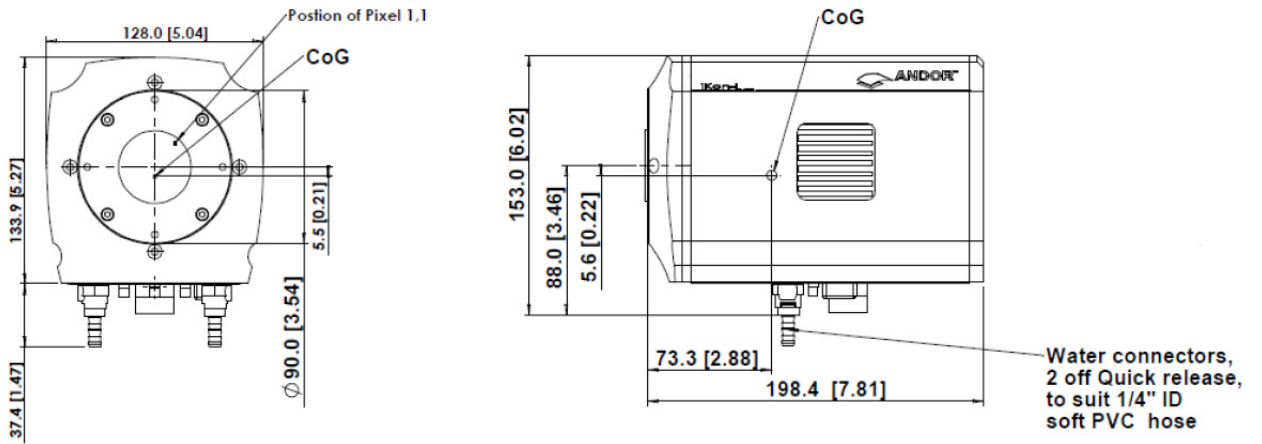
iKon-L 936



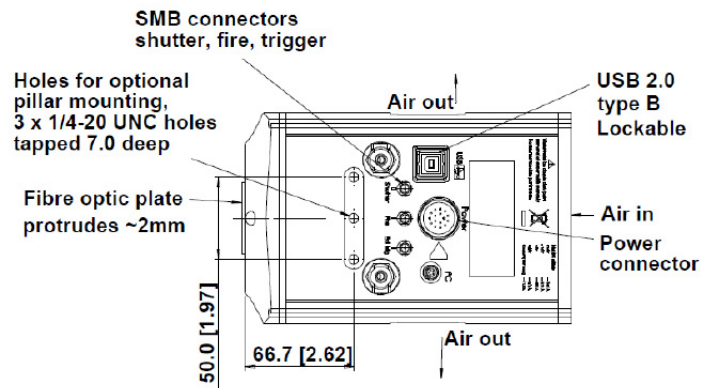
■ = position of pixel 1,1
Weight: 4.6 kg [10.2 lb]



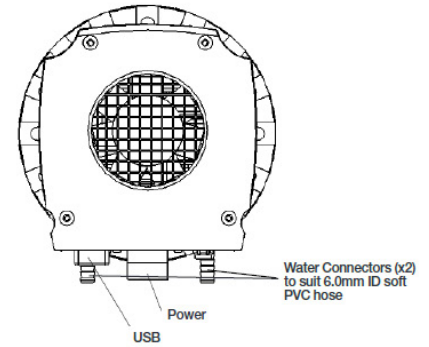
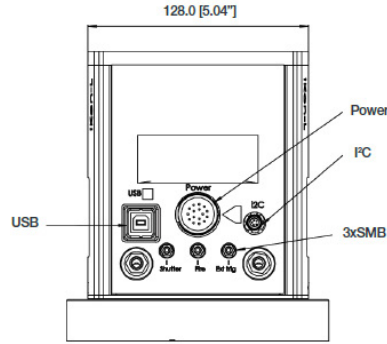
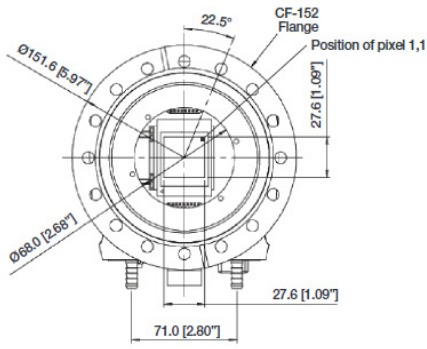
iKon-L HF



Weight: ~4.5 kg [9 lb 15 oz]



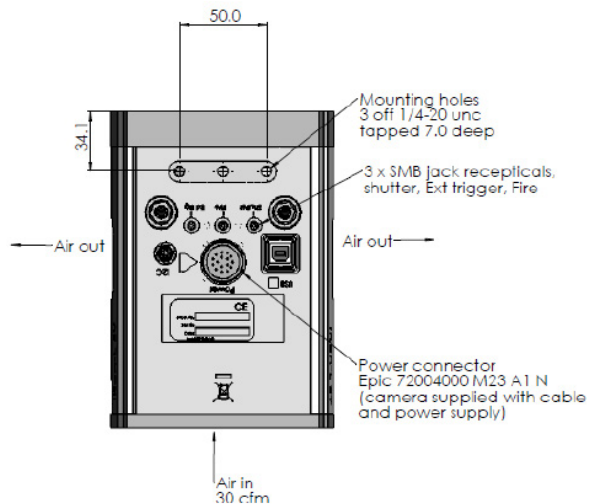
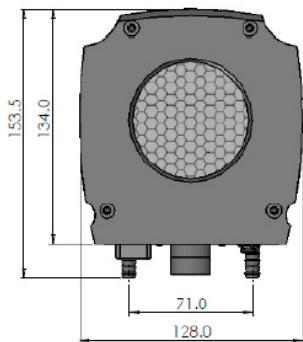
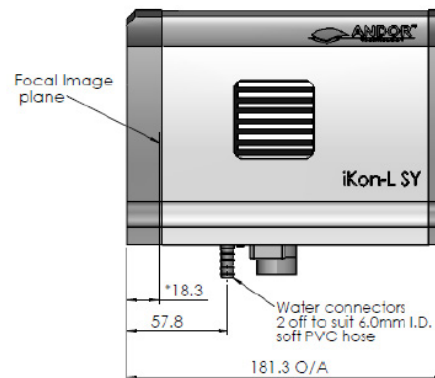
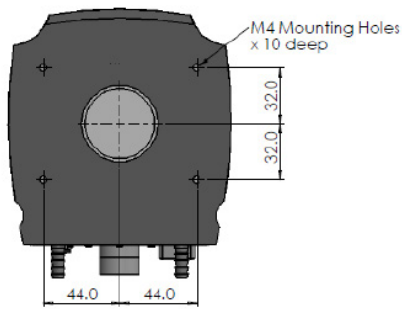
iKon-L SO



Weight: 5.5 kg [12 lb 2 oz]

For attachment options refer to section 5.1.2.

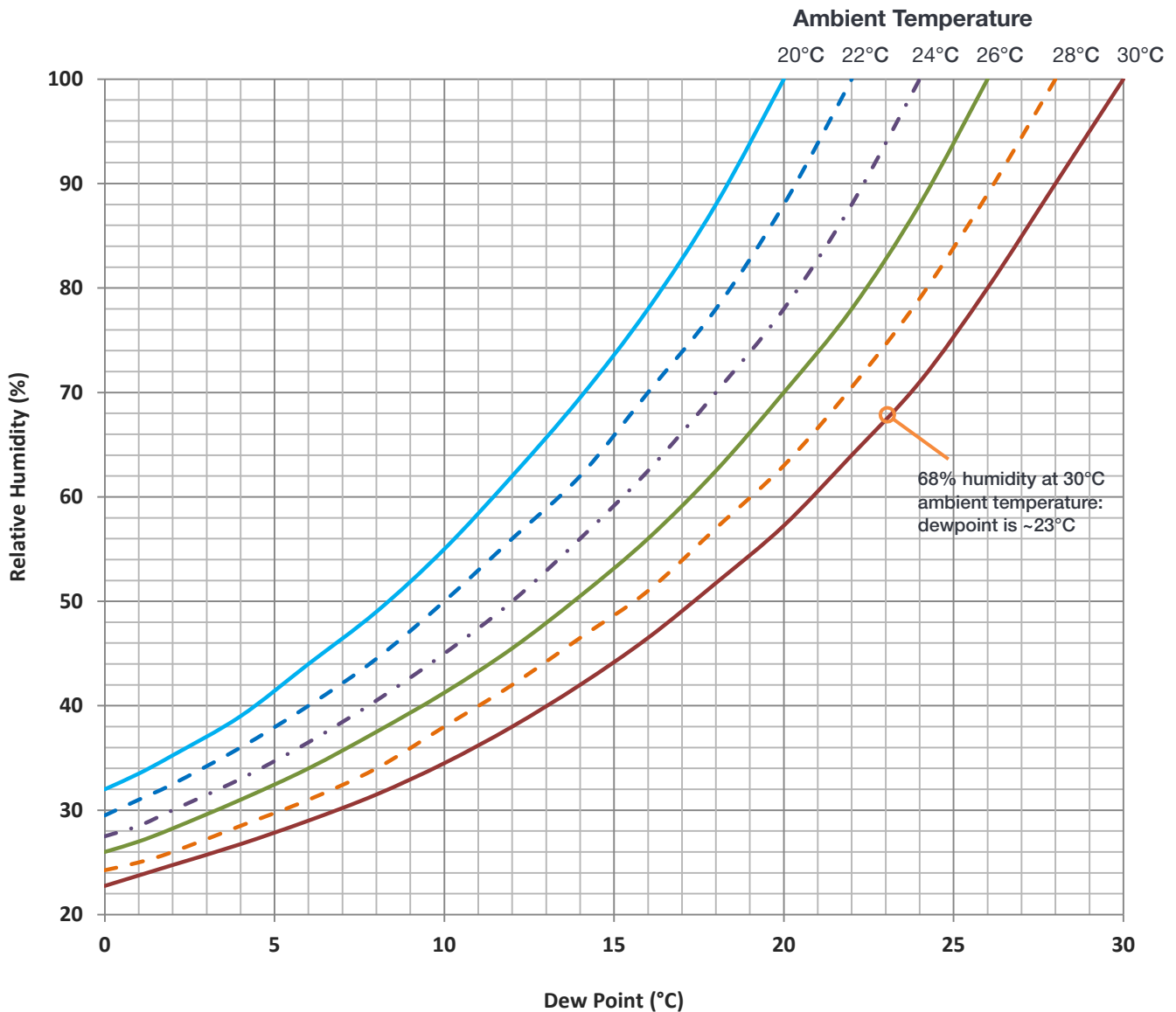
iKon-L SY



Weight: 5.5 kg [12 lb 2 oz]

APPENDIX C: DEWPOINT INFORMATION

To avoid issues with condensation, the coolant temperature must be set above the dewpoint- the temperature at which condensation (dew) will form. In the relatively dry conditions of an air conditioned lab, or a cool dry climate, use of a coolant temperature of 10°C should not cause any problems. As relative humidity or ambient temperature increase however, the dewpoint temperature will also increase so that the minimum coolant temperature that can be used will have to increase accordingly. This will therefore limit the maximum cooling performance that can be achieved.

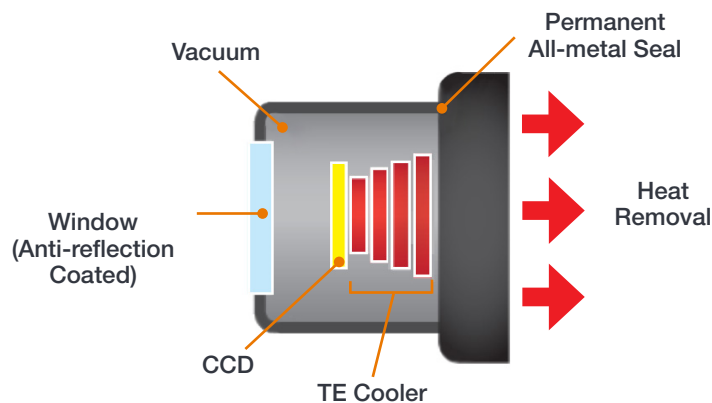


The first signs that condensation is forming will be on the coolant connections entering and exiting the camera. Use of coolant at or below the dewpoint can result in permanent damage to the camera head due to formation of condensation on internal components. It is therefore very important to ensure that coolant temperature is above the dewpoint. Further guidelines are provided in **Section 7.1**. The relationship between Relative Humidity and Dew Point at varying Ambient Temperature is shown below. There is a dewpoint calculator in Solis, as well as on-line, that you can enter ambient temperature and relative humidity to calculate the dewpoint for your conditions.

APPENDIX D: REFERENCE INFORMATION

ULTRAVAC™ TECHNOLOGY

UltraVac is Andor's proprietary vacuum technology that provides a permanent, hermetically sealed enclosure (without O-rings) for the sensor. This ensures maximum cooling performance, with a reliability proven through years of use in Andor cameras such as the iXon EMCCD, iKon and Newton series- the Mean Time Between Failure (MTBF) value is > 100 years.

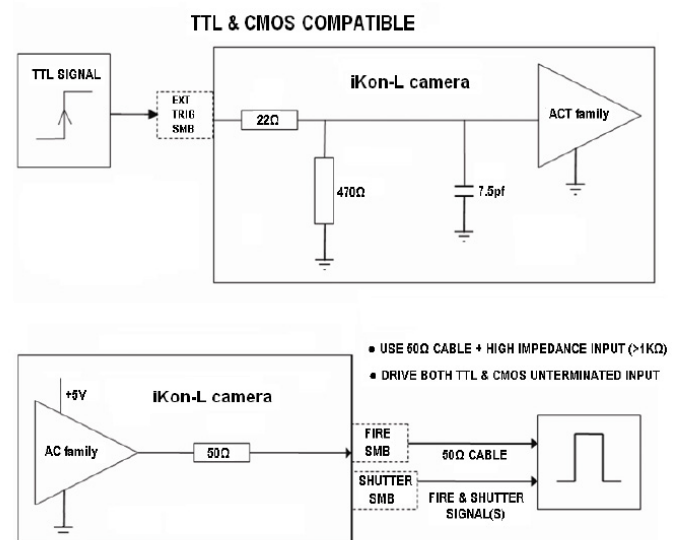


Outgassing is minimized through assembly in a state of the art facility, with a stringent protocol and use of proprietary materials (Outgassing is the release of trapped gasses that would otherwise degrade cooling performance and potentially cause sensor failure). UltraVac also features a single camera window for the best optical performance. For more information about our UltraVac technology, please visit our website and view the technical article on [UltraVac](#).

SHUTTER AND TRIGGERING INFORMATION

1. The documentation supplied by the shutter manufacturer will show whether your shutter opens at a High or a Low TTL level.
2. If a shutter is fitted but not required for the experiment then set it to Permanently OPEN and Time To Close = 0. This will allow the system to operate at its optimum rate. If a background is required then close the shutter using Permanently Closed, Take Background and reopen.
3. The shutter pulse is not capable of driving a shutter. It is only a 5V pulse designed to trigger TTL & CMOS compatible shutter drivers. Also there is no shutter pulse during the Take Signal and Take Reference data acquisitions.

For further shutter and trigger mode operation information please refer to your camera control software e.g. Solis or SDK2.



NOTE: The shutter pulse is fed from the Shutter SMB on the back of the camera.

APPENDIX E: OTHER INFORMATION

TERMS AND CONDITIONS OF SALE AND WARRANTY INFORMATION

The terms and conditions of sale, including warranty conditions, will have been made available during the ordering process. The current version may be viewed at: www.andor.com/pdfs/literature/Andor_Standard_Warranty.pdf

WASTE ELECTRONIC AND ELECTRICAL EQUIPMENT REGULATIONS 2006 (WEEE)

The company's statement on the disposal of WEEE can be found in the Terms and Conditions found on the Andor website, [WEEE Policy](#).



Notes
