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OPTEM ZOOM 70XL

7:1 LENS SYSTEM

EXCEPTIONAL RELIABILITY
250,000 Zoom Cycles Guaranteed



Qioptiq Imaging Solutions

Table of Contents

- New Features2
- How to Specify3
- Upper Zoom Modules3
- Lower Function Modules3
- Illumination Options4
- Motorization Options.....4
- Magnification Options4
- Coaxial Performance5
- System Diagram.....6
- Oblique Performance8



ZOOM 70XL



ZOOM 70XL NEW FEATURES

OPTOMECHANICAL RELIABILITY

The Zoom 70XL is specifically designed to stand up to the grueling conditions of today's automated imaging.

"XL" Stands For Xtended Life

Backed by superior engineering and only the highest-quality components and materials, the Optem™ Zoom 70XL delivers a guaranteed 250,000 cycles without mechanical failure! This robust reliability makes the Zoom 70XL the ideal solution for demanding and mission critical applications.



Zoom 70XL Specs

Zoom Range	7:1
Magnification Range.....	0.75 – 5.25X
Resolution.....	72 – 240 lp/mm
Numerical Aperture.....	0.0240 – 0.080
Depth-of-Field.....	0.98 – 0.09 mm
Field-of-View (Low-Mag.)	6.40 x 8.53 mm
Field-of-View (High-Mag.).....	0.91 x 1.22 mm
Working Distance89 mm

Nominal 1X/1X Configuration with 1/2" Camera

NEW FOR ZOOM 70XL

NEW LED Coaxial Illuminators

Programmable 1-Watt white-light Coaxial LED Illuminators feature compact design and lightweight cable for streamlined OEM integration. [PAGE 4](#)

NEW Dual-Magnification Accessory

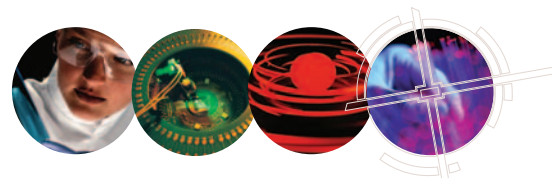
Now you can simultaneously integrate two upper lens modules with independent cameras over the same subject. Mix and match Zoom 70XL and FMOS upper modules for added versatility. [PAGE 4](#)

NEW Long-Working Right Angle Module

Integrate a 90° turn in the optical path above the Lower Function Module. Unlike the below system right-angle adapter, this unique accessory affords configuration flexibility to integrate all lower functions without sacrificing any working distance. [PAGE 4](#)

NEW Optem M-Plan APO Objectives

Get the most from your high magnification imaging. Specify the newly expanded line of Optem Long-Working Distance Objectives, including the new M-Plan APO family for exceptional color accuracy and field-flatness. [PAGE 4](#)



HOW TO SPECIFY YOUR ZOOM 70XL LENS SYSTEM

Follow the seven easy steps below to configure the Zoom 70XL Lens System that meets your optical, functional and physical configuration needs.

- Referring to the **Optical Performance Matrix for Substage or Oblique Illumination** on the back cover, locate your desired performance parameters (*typically field-of-view at high- and low-end zoom as relates to your intended camera format 1/4" – 1"*). If you desire coaxial illumination, work from the **Coaxial Illumination Optical Performance Matrix**. **PAGE 5**

		1.0X TV Tube	
		Low Mag	High Mag
NA	0.07	0.0240	0.080
LP/mm	72	240	240
Mag	0.75	5.25	5.25
DOP	0.98	0.09	0.09
FOV	3.68 x 4.91	0.53 x 0.70	0.53 x 0.70
WD: 89 mm	1/4"	4.80 x 6.40	0.69 x 0.91
Cam Format	1/2"	6.40 x 8.53	0.91 x 1.22
	2/3"	8.80 x 11.73	1.26 x 1.68
	1"	12.80 x 17.07	1.83 x 2.44

- Cross reference your desired performance block and note the **TV Tube magnification (TOP axis)** and **Auxiliary Lens magnification (LEFT axis)** to arrive at the combination of magnification components needed to yield your desired field-of-view [FOV]... consider the varying resolution, depth-of-field and/or working distance factors that are dictated by the magnification components.

- Once you have determined the **TV Tube** and **Auxiliary Lens magnifications** required, navigate down through the System Diagram (**PAGE 6-7**) starting from the camera. Select the physical shape of TV Tube and/or camera mount type desired.

- Select the **Upper Zoom Module** with the functional features you require... Manual, Iris, Detent and DC or Stepper Motorized Zoom options are available.

- Combine the Upper Zoom Module with one of the **Lower Function Modules** that incorporates manual or motorized fine focus and/or coaxial illumination options. If you have chosen both motorized zoom and focus, the compact frame constraints of Zoom 70XL require that you order a Dual-Motorized Non-Modular Zoom 70XL (see System Diagram) **PAGE 6-7**

- Now specify the correct **Auxiliary Lens magnification** to complete the optical components of your Zoom 70XL Lens System as dictated in step 1 above. By default, the Zoom 70XL yields a 1.0X configuration without an Auxiliary Lens.

- Finally outfit your Zoom 70XL Lens System with the appropriate **Coaxial or Ringlight Illumination Accessories**. If you chose motorized zoom or focus functions, select the appropriate **DC or Stepper Controller and Power Supply**. You may also wish to specify **mounting hardware** to ease integration.

Components of Functional Zoom 70XL

- TV Tube (Top Magnification)
- Upper Zoom Module
- Lower Function Module
- Auxiliary Lens (Bottom Magnification)

UPPER ZOOM MODULES

The specific Upper Zoom Module selected will determine the type of zoom operation for your Zoom 70XL System.



Manual Module - Provides basic hand-driven 7:1 zoom function.



Iris Diaphragm Module - Provides manual 7:1 zoom while also allowing better illumination control. With Iris, you can increase depth-of-field and/or maintain more consistent image brightness across your entire field.

Detent Module - Obtain specific and repeatable magnification stops throughout the 7:1 zoom range without the complexity and cost of motorization. Detents are ideal for metrology applications where each position can be calibrated.



Motorized Zoom Module - Provides programmable automated zoom in either DC or Stepper Motorized Versions. All Stepper Motorized Models come complete with programmable homing sensors.



LOWER FUNCTION MODULES

When configuring your Zoom 70XL Lens System, you may choose between the following manual or motorized Lower Function Module options:

- Standard Module
- Internal Focus Module
- Coaxial Illumination Module
- Internal Focus with Coaxial Module

Variable Working Distance Auxiliary Lens - Intended for applications requiring working distances between 127mm (5") and 432mm (17"). Covers magnification factors 0.288X at 127mm, and 0.109X at 432mm. See "Variable Working Distance Auxiliary Lens" Chart available as a download at www.qioptiqimaging.com.



Objective Modules - Incorporate Infinity-Corrected Objectives utilizing one of four Objective Lower Function Modules. All are equipped with M26 x 36T threads to accept Optem and Mitutoyo Objectives. An RMS thread adapter is available for use with Nikon and Olympus Objectives.

DUAL MOTORIZED NON-MODULAR MODELS

With it's extremely space efficient design, the Zoom 70XL must be ordered in a non-modular configuration when both motorized zoom and focus functions are desired. Select from four single-bodied Dual-Motorized Zoom 70XLs in either DC or Stepper motorization with various illumination options.



ILLUMINATION OPTIONS



The Zoom 70XL Lens System offers a variety of illumination options to meet a variety of imaging requirements.

LED Coaxial Illuminators -

Compatible with all Zoom 70XL Coaxial Lower Function Modules, new Programmable 1-Watt LED Coaxial Illuminators offer reduced power requirement and heat generation with substantial service life gains.



Available in straight and right-angle configurations, Optem Coaxial LEDs feature compact designs and simplified cable management. Driven by a compact single-channel programmable controller, Optem Coaxial LEDs emit brilliant cool light in the visible spectrum and deliver virtually identical optical performance to our traditional Fiber Optic Coaxial Illuminator.

Fiber Optic Coaxial Illuminators - Available with 40 and 60-inch flexible fiber bundles powered by 110V or 220V Optem VSI Fiber Optic Illuminators.

Polarized Light - When imaging highly reflective subjects, Polarizer Modules with built-in Analyzers are available to introduce polarization to both LED and Fiber Optic Coaxial Illumination paths.

Fiber Optic Ring Lights - Oblique Ringlight Illumination is ideal to better define features of dimension-rich subjects. Driven with the same VSI Fiber Optic Illuminator as conventional coaxial systems, Optem Ringlights feature optional horizontal, vertical and Objective configurations.

CONFIGURATION ACCESSORIES

Extend the versatility of your Zoom 70XL Lens System with two new innovations in form and function.

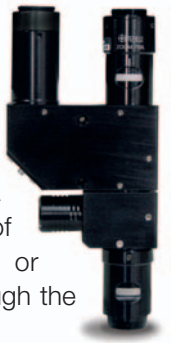
Long-Working, Right-Angle Module -

This accessory allows the introduction of a 90° of your optical axis at the mid-body point of your Zoom 70XL Lens System. Users can now integrate any Zoom 70XL Lower Function Module below the right-angle turn maintaining full working distance and affording greater configuration flexibility.



NEW Dual-Magnification Module -

Simultaneously integrate two Zoom 70 or Optem FMOS upper modules over one subject. Mix and match fixed and zoom magnifications, camera types/formats. Choose from the full range of Zoom 70XL Lower Function Modules or integrate compact coaxial illumination through the coaxial block.



MOTORIZING ZOOM 70XL



The Zoom 70XL Optical System can be specified with motorized zoom and/or focus functions.

Stepper Motor Models - Stepper Motors feature Hall-Effect Sensors to ensure pinpoint mechanical accuracy and repeatability. Control and power are easily integrated through RS232 serial port interface with a Rocker Switch controller and Windows GUI. An OEM Board is available for more streamlined OEM integration and a Stepper Motor VI library is available for LabVIEW users.



DC Motor Models



DC Motors allow continuous movement throughout either the zoom or focus range. Two RS232 Serial ports in the back of the joystick DC Motor Controller accept both zoom and focus motorized functions.

OPTEM LONG-WORKING DISTANCE OBJECTIVES

NEW Achieve significantly higher magnifications and increased resolution. Combine your Zoom 70XL with the expanded line of Optem Infinity-Corrected Objectives.



Optem M-Plan APO - Eliminate chromatic aberration across exceptionally flat fields for the ultimate in high-magnification accuracy. Select from 2X, 5X, 10X, 20X and 50X Long-Working Distance Objectives. These objectives are exact replacements for Mitutoyo 378 series objectives and are ideal for metrology applications.

Optem High-Resolution -

Specifically designed to capture maximum resolution at the high-end magnifications of Optem Zoom Lenses, the 5X, 10X and 20X Optem HR Objectives are ideal for applications where distinguishing every finite detail is critical.



Coaxial Illumination Zoom 70XL Optical Performance Matrix

		0.375X TV Tube		0.5X TV Tube		0.67X TV Tube		1.0X TV Tube		1.5X TV Tube		2.0X TV Tube		
		Low Mag	High Mag	Low Mag	High Mag	Low Mag	High Mag	Low Mag	High Mag	Low Mag	High Mag	Low Mag	High Mag	
0.75X 29-20-39-000 WD: 114 mm	NA	0.018	0.060	0.018	0.060	0.018	0.060	0.018	0.060	0.018	0.060	0.018	0.060	
	LP/mm	54	180	54	180	54	180	54	180	54	180	54	180	
	Mag	0.21	1.47	0.28	1.96	0.38	2.66	0.56	3.92	0.85	5.95	1.10	7.70	
	DOF	1.75	0.16	1.75	0.16	1.75	0.16	1.75	0.16	1.75	0.16	1.75	0.16	
	FOV	7.70 x 10.26	1.88 x 2.50	7.01 x 9.35	1.41 x 1.88	6.10 x 8.14	1.04 x 1.38	4.91 x 6.54	0.70 x 0.94	3.27 x 4.36	0.46 x 0.62	2.45 x 3.27	0.36 x 0.48	
	Cam Format	1/4"	7.76 x 10.34	2.45 x 3.27	8.00 x 10.67	1.84 x 2.45	6.82 x 9.10	1.35 x 1.80	5.82 x 7.76	0.92 x 1.22	4.27 x 5.69	0.61 x 0.81	3.20 x 4.27	0.47 x 0.62
	1/2"	--	--	--	--	7.96 x 10.61	1.80 x 2.41	6.56 x 8.75	1.22 x 1.63	5.17 x 6.90	0.81 x 1.08	4.27 x 5.69	0.62 x 0.83	
	2/3"	--	--	--	--	7.96 x 10.61	2.48 x 3.31	7.82 x 10.43	1.68 x 2.24	6.52 x 8.69	1.11 x 1.48	5.33 x 7.11	0.86 x 1.14	
	1"	--	--	--	--	--	--	7.76 x 10.34	2.45 x 3.27	7.59 x 10.11	1.61 x 2.15	6.56 x 8.75	1.25 x 1.66	
	1"	--	--	--	--	--	--	--	--	--	--	--	--	
1.0X NO LENS REQ'D WD: 89 mm	NA	0.024	0.080	0.024	0.080	0.024	0.080	0.024	0.080	0.024	0.080	0.024	0.080	
	LP/mm	72	240	72	240	72	240	72	240	72	240	72	240	
	Mag	0.29	2.03	0.38	2.66	0.50	3.50	0.75	5.25	1.10	7.70	1.50	10.50	
	DOF	0.98	0.089	0.98	0.089	0.98	0.089	0.98	0.089	0.98	0.089	0.98	0.089	
	FOV	8.18 x 10.90	1.36 x 1.81	7.36 x 9.81	1.04 x 1.38	5.49 x 7.32	0.79 x 1.05	3.68 x 4.91	0.53 x 0.70	2.45 x 3.27	0.36 x 0.48	1.84 x 2.45	0.26 x 0.35	
	Cam Format	1/4"	6.74 x 8.98	1.77 x 2.36	8.73 x 11.64	1.35 x 1.80	7.16 x 9.55	1.03 x 1.37	4.80 x 6.40	0.69 x 0.91	3.20 x 4.27	0.47 x 0.62	2.40 x 3.20	0.34 x 0.46
	1/2"	--	--	6.74 x 8.98	1.80 x 2.41	8.68 x 11.58	1.37 x 1.83	6.40 x 8.53	0.91 x 1.22	4.27 x 5.69	0.62 x 0.83	3.20 x 4.27	0.46 x 0.61	
	2/3"	--	--	--	--	6.57 x 8.76	1.89 x 2.51	8.80 x 11.73	1.26 x 1.68	5.87 x 7.82	0.86 x 1.14	4.40 x 5.87	0.63 x 0.84	
	1"	--	--	--	--	--	--	6.74 x 8.98	1.83 x 2.44	8.53 x 11.38	1.25 x 1.66	6.40 x 8.53	0.91 x 1.22	
	1"	--	--	--	--	--	--	--	--	--	--	--	--	
1.5X 29-20-40-000 WD: 52 mm	NA	0.036	0.12	0.036	0.12	0.036	0.12	0.036	0.12	0.036	0.12	0.036	0.12	
	LP/mm	108	360	108	360	108	360	108	360	108	360	108	360	
	Mag	0.43	3.00	0.56	3.90	0.75	5.25	1.10	7.70	1.70	11.90	2.30	16.10	
	DOF	0.44	0.039	0.44	0.039	0.44	0.039	0.44	0.039	0.44	0.039	0.44	0.039	
	FOV	5.03 x 6.71	0.92 x 1.23	4.91 x 6.54	0.71 x 0.94	3.66 x 4.88	0.53 x 0.70	2.45 x 3.27	0.36 x 0.48	1.64 x 2.18	0.23 x 0.31	1.23 x 1.64	0.17 x 0.23	
	Cam Format	1/4"	4.06 x 5.42	1.20 x 1.60	4.92 x 6.56	0.92 x 1.23	4.78 x 6.37	0.69 x 0.91	3.20 x 4.27	0.47 x 0.62	2.13 x 2.84	0.30 x 0.40	1.60 x 2.13	0.22 x 0.30
	1/2"	--	--	4.06 x 5.42	1.23 x 1.64	4.90 x 6.53	0.91 x 1.22	4.27 x 5.69	0.62 x 0.83	2.84 x 3.79	0.40 x 0.54	2.13 x 2.84	0.30 x 0.40	
	2/3"	--	--	--	--	3.98 x 5.31	1.26 x 1.68	5.33 x 7.11	0.86 x 1.14	3.91 x 5.21	0.55 x 0.74	2.93 x 3.91	0.41 x 0.55	
	1"	--	--	--	--	--	--	4.06 x 5.42	1.25 x 1.66	5.69 x 7.59	0.81 x 1.08	4.27 x 5.69	0.60 x 0.80	
	1"	--	--	--	--	--	--	--	--	--	--	--	--	
2.0X 29-20-41-000 WD: 32 mm	NA	0.048	0.16	0.048	0.16	0.048	0.16	0.048	0.16	0.048	0.16	0.048	0.16	
	LP/mm	144	480	144	480	144	480	144	480	144	480	144	480	
	Mag	0.57	3.99	0.75	5.25	1.00	7.00	1.50	10.50	2.30	16.10	3.00	21.00	
	DOF	0.25	0.022	0.25	0.022	0.25	0.022	0.25	0.022	0.25	0.022	0.25	0.022	
	FOV	2.34 x 3.12	0.69 x 0.92	2.45 x 3.27	0.53 x 0.70	2.50 x 3.33	0.39 x 0.53	1.84 x 2.45	0.26 x 0.35	1.23 x 1.64	0.17 x 0.23	0.92 x 1.23	0.13 x 0.18	
	Cam Format	1/4"	2.04 x 2.75	0.90 x 1.20	2.29 x 3.05	0.69 x 0.91	2.39 x 3.18	0.51 x 0.69	2.40 x 3.20	0.34 x 0.46	1.60 x 2.13	0.22 x 0.30	1.20 x 1.60	0.17 x 0.23
	1/2"	--	--	--	--	2.27 x 3.03	0.69 x 0.91	2.46 x 3.28	0.46 x 0.61	2.13 x 2.84	0.30 x 0.40	1.60 x 2.13	0.23 x 0.30	
	2/3"	--	--	--	--	--	--	2.32 x 3.09	0.63 x 0.84	2.67 x 3.56	0.41 x 0.55	2.20 x 2.93	0.31 x 0.42	
	1"	--	--	--	--	--	--	--	--	2.37 x 3.16	0.60 x 0.80	2.46 x 3.28	0.46 x 0.61	
	1"	--	--	--	--	--	--	--	--	--	--	--	--	

OPTEM Long-Working Distance Objectives

		0.020		0.060		0.020		0.060		0.020		0.060		0.020		0.060		
		Low Mag	High Mag	Low Mag	High Mag	Low Mag	High Mag	Low Mag	High Mag	Low Mag	High Mag	Low Mag	High Mag	Low Mag	High Mag	Low Mag	High Mag	
OPTEM 2X M Plan Apo 28-21-02-000 WD: 34 mm	NA	0.020	0.060	0.020	0.060	0.020	0.060	0.020	0.060	0.020	0.060	0.020	0.060	0.020	0.060	0.020	0.060	
	LP/mm	60	180	60	180	60	180	60	180	60	180	60	180	60	180	60	180	
	Mag	0.27	1.89	0.36	2.52	0.48	3.38	0.72	5.04	1.08	7.56	1.44	10.08	1.01	7.07	1.44	10.08	
	DOF	1.01	0.19	1.01	0.19	1.01	0.19	1.01	0.19	1.01	0.19	1.01	0.19	1.01	0.19	1.01	0.19	
	FOV	3.88 x 5.17	1.46 x 1.95	4.26 x 5.68	1.10 x 1.46	4.20 x 6.94	0.82 x 1.09	3.83 x 5.11	0.55 x 0.73	2.56 x 3.41	0.37 x 0.49	1.92 x 2.55	0.27 x 0.37	3.33 x 4.44	0.48 x 0.63	2.22 x 2.96	0.36 x 0.48	
	Cam Format	1/4"	--	--	3.85 x 5.13	1.43 x 1.90	5.39 x 5.85	1.07 x 1.42	5.00 x 6.67	0.71 x 0.95	4.44 x 5.93	0.63 x 0.85	3.33 x 4.44	0.48 x 0.63	4.70 x 6.27	0.87 x 1.16	4.58 x 6.11	0.65 x 0.87
	1/2"	--	--	--	--	3.83 x 5.10	1.42 x 1.90	4.44 x 5.93	0.95 x 1.27	4.44 x 5.93	0.63 x 0.85	3.33 x 4.44	0.48 x 0.63	4.70 x 6.27	0.87 x 1.16	4.58 x 6.11	0.65 x 0.87	
	2/3"	--	--	--	--	--	--	3.99 x 5.31	1.31 x 1.75	4.04 x 5.39	1.27 x 1.69	4.44 x 5.93	0.95 x 1.27	4.44 x 5.93	0.95 x 1.27	4.44 x 5.93	0.95 x 1.27	
	1"	--	--	--	--	--	--	--	--	4.04 x 5.39	1.27 x 1.69	4.44 x 5.93	0.95 x 1.27	4.44 x 5.93	0.95 x 1.27	4.44 x 5.93	0.95 x 1.27	
	1"	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
OPTEM 5X M Plan Apo 28-21-05-000 WD: 32 mm	NA	0.06	0.14	0.06	0.14	0.06	0.14	0.06	0.14	0.06	0.14	0.06	0.14	0.06	0.14	0.06	0.14	
	LP/mm	180	420	180	420	180	420	180	420	180	420	180	420	180	420	180	420	
	Mag	0.68	4.88	0.89	6.41	1.19	8.60	1.78	12.83	2.66	19.24	3.55	25.66	2.24	15.97	3.55	25.66	
	DOF	0.16	0.029	0.16	0.03	0.16	0.029	0.16	0.029	0.16	0.029	0.16	0.029	0.16	0.029	0.16	0.029	
	FOV	2.24 x 2.99	0.57 x 0.75	2.56 x 3.41	0.43 x 0.57	2.29 x 3.05	0.32 x 0.43	1.53 x 2.04	0.22 x 0.29	1.02 x 1.36	0.14 x 0.19	0.77 x 1.02	0.11 x 0.14	1.33 x 1.78	0.19 x 0.25	0.89 x 1.19	0.14 x 0.19	
	Cam Format	1/4"	1.88 x 2.51	0.74 x 0.98	2.22 x 2.96	0.56 x 0.75	2.71 x 3.62	0.42 x 0.56	2.00 x 2.67	0.28 x 0.37	1.33 x 1.78	0.19 x 0.25	0.89 x 1.19	0.14 x 0.19	1.78 x 2.37	0.25 x 0.33	1.33 x 1.78	0.19 x 0.25
	1/2"	--	--	1.84 x 2.45	0.75 x 1.00	2.34 x 3.12	0.56 x 0.74	2.05 x 2.74	0.37 x 0.50	1.33 x 1.78	0.19 x 0.25	0.89 x 1.19	0.14 x 0.19	2.44 x 3.26	0.34 x 0.46	1.83 x 2.44	0.26 x 0.34	
	2/3"	--	--	--	--	--	--	1.75 x 2.33	0.51 x 0.69	2.37 x 3.16	0.50 x 0.67	1.83 x 2.44	0.26 x 0.34	2.67 x 3.56	0.41 x 0.55	2.20 x 2.93	0.31 x 0.42	
	1"	--	--	--	--	--	--	--	--	2.37 x 3.16	0.50 x 0.67	2.67 x 3.56	0.41 x 0.55	2.67 x 3.56	0.41 x 0.55	2.67 x 3.56	0.41 x 0.55	
	1"	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
OPTEM 10X M Plan Apo 28-21-10-000 WD: 33 mm	NA	0.12	0.30	0.12	0.30	0.12	0.30	0.12	0.30	0.12	0.30	0.12	0.30	0.12	0.30	0.12	0.30	
	LP/mm	343	867	343	867	343	867	343	867	343	867	343	867	343	867	343	867	
	Mag	1.35	9.75	1.78	12.83	2.38	17.19	3.55	25.66	5.33	38.49	7.11	49.74	0.40	2.86	7.11	49.74	
	DOF	0.040	0.0063	0.040	0.0063	0.040	0.0063	0.040	0.0063	0.040	0.0063	0.040	0.0063	0.040	0.0063	0.040	0.0063	
	FOV	1.06 x 1.42	0.28 x 0.38	1.18 x 1.57	0.22 x 0.29	1.14 x 1.53	0.16 x 0.21	0.77 x 1.02	0.11 x 0.14	0.51 x 0.68	0.07 x 0.10	0.38 x 0.51	0.06 x 0.07	0.67 x 0.89	0.09 x 0.12	0.80 x 1.07	0.07 x 0.10	
	Cam Format	1/4"	--	--	1.05 x 1.40	0.28 x 0.37	1.24 x 1.66	0.21 x 0.28	1.00 x 1.33	0.14 x 0.19	0.67 x 0.89	0.09 x 0.12	0.80 x 1.07	0.07 x 0.10	1.03 x 1.37	0.19 x 0.25	0.89 x 1.19	0.10 x 0.13
	1/2"	--																

Tube Clamp Mounts

29-50-10-000
UNIVERSAL CLAMP
(top view)



39-15-34-000
FLAT MOUNT
(for Motorized versions)



30-25-76-000
76mm O.D. TUBE CLAMP
(OLYMPUS, NIKON, LEICA)

30-25-82-000
82mm O.D. TUBE CLAMP
(UNITRON)

30-25-83-000
83mm O.D. TUBE CLAMP
(GENERIC)

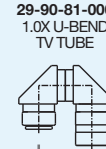
30-25-84-000
84mm O.D. TUBE CLAMP
(MEIJI)

Mini TV Tubes

Right-Angle TV Tubes

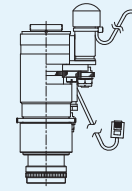
- 29-90-86-000 – 0.5X RA
- 29-90-87-000 – 0.67X RA
- 29-90-74-000 – 1.0X RA
- 29-90-88-000 – 1.5X RA
- 29-90-89-000 – 2.0X RA

U-Bend TV Tube

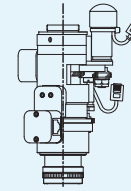


Non-Modular Dual-Motorized Zooms

39-26-20-000
70XL 12mm FOCUS
DC MOTORIZED BOTH



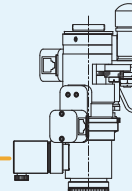
39-26-37-000
70XL 12mm FOCUS
STEPPING MOTOR BOTH
HALL EFFECT SENSOR



39-28-20-000
70XL 3mm COAX. DC
MOTORIZED BOTH



39-28-37-000
70XL 3mm COAX.
STEPPING MOTOR BOTH
HALL EFFECT SENSOR



Illumination

396010-810
SINGLE-CHANNEL
PROGRAMMABLE
LED CONTROLLER



39-60-10-000
STRAIGHT
1-WATT COAXIAL LED



39-60-20-000
FMOS RIGHT-ANGLE
1-WATT COAXIAL LED



27-60-07-000
110/6 VOLT VARIABLE

27-60-17-000
220/6 VOLT VARIABLE

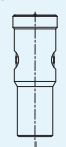


29-60-09-000
10 WATT
HALOGEN LAMP

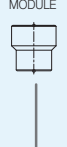


Lower Function Modules

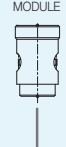
29-25-15-000
ZOOM 70XL VARIABLE
AUXILIARY LENS



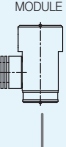
299510-310
BASIC FUNCTION
MODULE



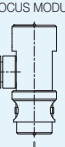
299591-310
INTERNAL FOCUS
MODULE



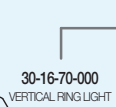
296515-310
VERTICAL ILLUM.
MODULE



296591-310
VERTICAL ILLUM &
FOCUS MODULE

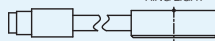


33-03-03-000
RING LIGHT ADAPTER



30-16-70-000
VERTICAL RING LIGHT

29-60-81-000
HORIZONTAL
RING LIGHT



29-60-31-000
MINI-ANNULAR
RING PROBE



29-20-09-000
0.18X / 0.25X
CONVERTIBLE
AUX LENS



29-20-38-000
AUX LENS



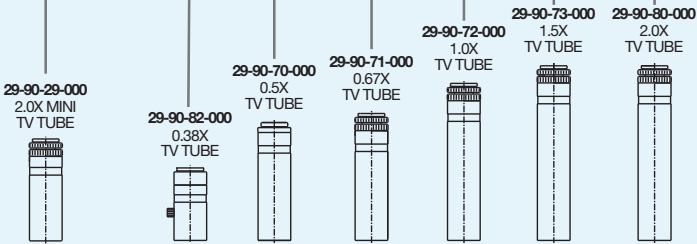
29-20-39-000
AUX LENS



29-20-40-000
AUX LENS

CAMERA

Standard TV Tubes



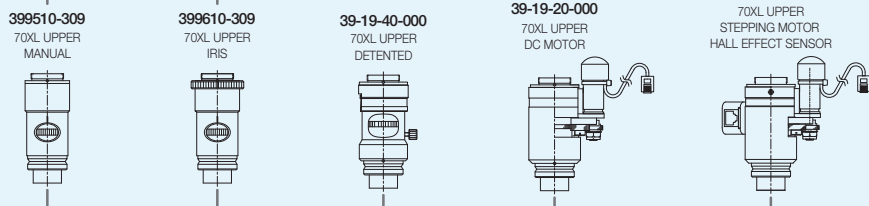
Non-Inverting Right-Angle TV Tubes

- 29-90-92-000 - 0.5X NIRA
- 29-90-93-000 - 0.67X NIRA
- 29-90-94-000 - 1.0X NIRA
- 29-90-95-000 - 1.5X NIRA
- 29-90-96-000 - 2.0X NIRA

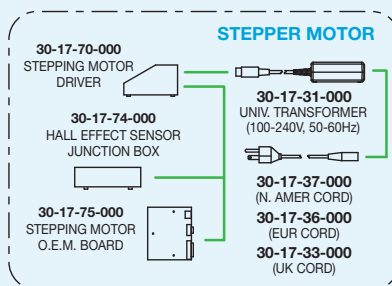
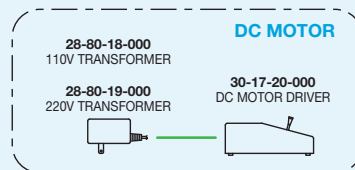
Bayonet TV Tubes

- 29-77-04-000 - 1.0X F-MOUNT BAYONET
- 29-77-02-000 - 1.0X 1/2" ENG BAYONET
- 29-77-03-000 - 1.0X 2/3" ENG BAYONET
- 29-77-01-000 - 1.0X 1/2" SONY BAYONET

Upper Zoom Modules



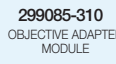
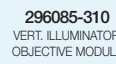
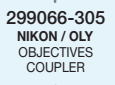
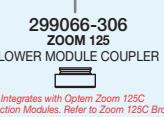
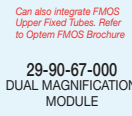
Motorization Control & Power Supply



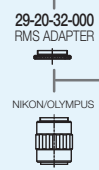
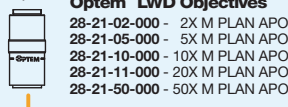
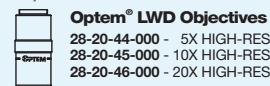
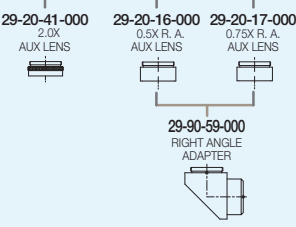
29-90-66-000 LONG WORKING RIGHT-ANGLE MODULE



NEW X2



Auxiliary Lenses



- = optomechanical path
- = illumination path
- = power/controls path

For an online archive of nominal component dimensions, downloadable schematics, and optical performance specifications, visit the Zoom 70XL Section of our web site.

Substage/Ringlight Illumination Zoom 70XL Optical Performance Matrix

		0.375X TV Tube		0.5X TV Tube		0.67X TV Tube		1.0X TV Tube		1.5X TV Tube		2.0X TV Tube		
		Low Mag	High Mag	Low Mag	High Mag	Low Mag	High Mag	Low Mag	High Mag	Low Mag	High Mag	Low Mag	High Mag	
0.18X Aux Lens 29-20-09-000	NA	0.0043	0.015	0.0043	0.015	0.0043	0.015	0.0043	0.015	0.0043	0.015	0.0043	0.015	
	LP/mm	13	45	13	45	13	45	13	45	13	45	13	45	
	Mag	0.05	0.36	0.07	0.47	0.09	0.63	0.14	0.94	0.20	1.40	0.27	1.90	
	DOF	30.67	2.52	30.67	2.52	30.67	2.52	30.67	2.52	30.67	2.52	30.67	2.52	
	FOV WD: 468 mm	1/4"	54.52 x 72.69	7.67 x 10.22	40.89 x 54.52	5.87 x 7.83	30.51 x 40.69	4.38 x 5.84	20.44 x 27.26	2.94 x 3.91	13.63 x 18.17	1.97 x 2.63	10.22 x 13.63	1.45 x 1.94
		1/3"	71.11 x 94.81	10.00 x 13.33	53.33 x 71.11	7.66 x 10.21	39.80 x 53.07	5.71 x 7.62	26.67 x 35.56	3.83 x 5.11	17.78 x 23.70	2.57 x 3.43	13.33 x 17.78	1.89 x 2.53
		1/2"	49.90 x 66.54	13.33 x 17.78	71.11 x 94.81	10.21 x 13.62	53.07 x 70.76	7.62 x 10.16	35.56 x 47.41	5.11 x 6.81	23.70 x 31.60	3.43 x 4.57	17.78 x 23.70	2.53 x 3.37
		2/3"	- x -	- x -	48.89 x 65.19	14.04 x 18.72	72.97 x 97.29	10.48 x 13.97	48.89 x 65.19	7.02 x 9.36	32.59 x 43.46	4.71 x 6.29	24.44 x 32.59	3.47 x 4.63
		1"	- x -	- x -	- x -	- x -	46.15 x 61.53	15.24 x 20.32	71.11 x 94.81	10.21 x 13.62	47.41 x 63.21	6.86 x 9.14	35.56 x 47.41	5.05 x 6.74
	Cam Format	1/4"	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -
1/3"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
1/2"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
2/3"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
1"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
0.25X Aux Lens 29-20-09-000	NA	0.0060	0.020	0.0060	0.020	0.0060	0.020	0.0060	0.020	0.0060	0.020	0.0060	0.020	
	LP/mm	18	60	18	60	18	60	18	60	18	60	18	60	
	Mag	0.07	0.50	0.09	0.66	0.13	0.88	0.19	1.30	0.28	2.00	0.38	2.60	
	DOF	15.75	1.42	15.75	1.42	15.75	1.42	15.75	1.42	15.75	1.42	15.75	1.42	
	FOV WD: 310 mm	1/4"	39.25 x 52.34	5.52 x 7.36	29.44 x 39.25	4.18 x 5.58	21.97 x 29.29	3.14 x 4.18	14.72 x 19.63	2.12 x 2.83	9.81 x 13.08	1.38 x 1.84	7.36 x 9.81	1.06 x 1.42
		1/3"	51.20 x 68.27	7.20 x 9.60	38.40 x 51.20	5.45 x 7.27	28.66 x 38.21	4.09 x 5.45	19.20 x 25.60	2.77 x 3.69	12.80 x 17.07	1.80 x 2.40	9.60 x 12.80	1.38 x 1.85
		1/2"	37.93 x 50.57	9.60 x 12.80	51.20 x 68.27	7.27 x 9.70	38.21 x 50.95	5.45 x 7.27	25.60 x 34.13	3.69 x 4.92	17.07 x 22.76	2.40 x 3.20	12.80 x 17.07	1.85 x 2.46
		2/3"	- x -	- x -	35.20 x 46.93	10.00 x 13.33	52.54 x 70.05	7.50 x 10.00	35.20 x 46.93	5.08 x 6.77	23.47 x 31.29	3.30 x 4.40	17.60 x 23.47	2.54 x 3.38
		1"	- x -	- x -	- x -	- x -	31.84 x 42.45	10.91 x 14.55	51.20 x 68.27	7.38 x 9.85	34.13 x 45.21	4.80 x 6.40	25.60 x 34.13	3.69 x 4.92
	Cam Format	1/4"	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -
1/3"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
1/2"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
2/3"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
1"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
0.5X Aux Lens 29-20-38-000	NA	0.0120	0.040	0.0120	0.040	0.0120	0.040	0.0120	0.040	0.0120	0.040	0.0120	0.040	
	LP/mm	36	120	36	120	36	120	36	120	36	120	36	120	
	Mag	0.14	0.98	0.19	1.33	0.25	1.75	0.38	2.66	0.56	3.92	0.75	5.25	
	DOF	3.94	0.35	3.94	0.35	3.94	0.35	3.94	0.35	3.94	0.35	3.94	0.35	
	FOV WD: 178 mm	1/4"	19.63 x 26.17	2.82 x 3.76	14.72 x 19.63	2.08 x 2.77	10.99 x 14.65	1.58 x 2.10	7.36 x 9.81	1.04 x 1.38	4.91 x 6.54	0.70 x 0.94	3.68 x 4.91	0.53 x 0.70
		1/3"	25.60 x 34.13	3.67 x 4.90	19.20 x 25.60	2.71 x 3.61	14.33 x 19.10	2.06 x 2.74	9.60 x 12.80	1.35 x 1.80	6.40 x 8.53	0.92 x 1.22	4.80 x 6.40	0.69 x 0.91
		1/2"	17.07 x 22.76	4.90 x 6.53	25.60 x 34.13	3.61 x 4.81	19.10 x 25.47	2.74 x 3.66	12.80 x 17.07	1.80 x 2.41	8.53 x 11.38	1.22 x 1.63	6.40 x 8.53	0.91 x 1.22
		2/3"	- x -	- x -	16.00 x 21.33	4.96 x 6.62	26.27 x 35.02	3.77 x 5.03	17.60 x 23.47	2.48 x 3.31	11.73 x 15.64	1.68 x 2.24	8.80 x 11.73	1.26 x 1.68
		1"	- x -	- x -	- x -	- x -	14.70 x 19.59	5.49 x 7.31	25.60 x 34.13	3.61 x 4.81	17.07 x 22.76	2.45 x 3.27	12.80 x 17.07	1.83 x 2.44
	Cam Format	1/4"	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -
1/3"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
1/2"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
2/3"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
1"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
0.75X Aux Lens 29-20-39-000	NA	0.0180	0.060	0.0180	0.060	0.0180	0.060	0.0180	0.060	0.0180	0.060	0.0180	0.060	
	LP/mm	54	180	54	180	54	180	54	180	54	180	54	180	
	Mag	0.21	1.47	0.28	1.96	0.38	2.66	0.56	3.92	0.85	5.95	1.10	7.70	
	DOF	1.75	0.16	1.75	0.16	1.75	0.16	1.75	0.16	1.75	0.16	1.75	0.16	
	FOV WD: 114 mm	1/4"	13.08 x 17.45	1.88 x 2.50	9.81 x 13.08	1.41 x 1.88	7.32 x 9.76	1.04 x 1.38	4.91 x 6.54	0.70 x 0.94	3.27 x 4.36	0.46 x 0.62	2.45 x 3.27	0.36 x 0.48
		1/3"	17.07 x 22.76	2.45 x 3.27	12.80 x 17.07	1.84 x 2.45	9.55 x 12.74	1.35 x 1.80	6.40 x 8.53	0.92 x 1.22	4.27 x 5.69	0.61 x 0.81	3.20 x 4.27	0.47 x 0.62
		1/2"	10.84 x 14.45	3.27 x 4.35	17.07 x 22.76	2.45 x 3.27	12.74 x 16.98	1.80 x 2.41	8.53 x 11.38	1.22 x 1.63	5.69 x 7.59	0.81 x 1.08	4.27 x 5.69	0.62 x 0.83
		2/3"	- x -	- x -	10.67 x 14.22	3.37 x 4.49	17.51 x 23.35	2.48 x 3.31	11.73 x 15.64	1.68 x 2.24	7.82 x 10.43	1.11 x 1.48	5.87 x 7.82	0.86 x 1.14
		1"	- x -	- x -	- x -	- x -	7.96 x 10.61	3.61 x 4.81	17.07 x 22.76	2.45 x 3.27	11.38 x 15.17	1.61 x 2.15	8.53 x 11.38	1.25 x 1.66
	Cam Format	1/4"	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -
1/3"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
1/2"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
2/3"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
1"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
1.0X Config. NO LENS REQ'D WD: 89 mm	NA	0.0240	0.080	0.0240	0.080	0.0240	0.080	0.0240	0.080	0.0240	0.080	0.0240	0.080	
	LP/mm	72	240	72	240	72	240	72	240	72	240	72	240	
	Mag	0.29	2.03	0.38	2.66	0.50	3.50	0.75	5.25	1.10	7.70	1.50	10.50	
	DOF	0.98	0.09	0.98	0.09	0.98	0.09	0.98	0.09	0.98	0.09	0.98	0.09	
	FOV WD: 89 mm	1/4"	9.81 x 13.08	1.36 x 1.81	7.36 x 9.81	1.04 x 1.38	5.49 x 7.32	0.79 x 1.05	3.68 x 4.91	0.53 x 0.70	2.45 x 3.27	0.36 x 0.48	1.84 x 2.45	0.26 x 0.35
		1/3"	12.80 x 17.07	1.77 x 2.36	9.60 x 12.80	1.35 x 1.80	7.16 x 9.55	1.03 x 1.37	4.80 x 6.40	0.69 x 0.91	3.20 x 4.27	0.47 x 0.62	2.40 x 3.20	0.34 x 0.46
		1/2"	11.38 x 15.17	2.36 x 3.15	12.80 x 17.07	1.80 x 2.41	9.55 x 12.74	1.37 x 1.83	6.40 x 8.53	0.91 x 1.22	4.27 x 5.69	0.62 x 0.83	3.20 x 4.27	0.46 x 0.61
		2/3"	- x -	- x -	9.78 x 13.04	2.48 x 3.31	13.13 x 17.51	1.89 x 2.51	8.80 x 11.73	1.26 x 1.68	5.87 x 7.82	0.86 x 1.14	4.40 x 5.87	0.63 x 0.84
		1"	- x -	- x -	- x -	- x -	8.33 x 11.08	2.74 x 3.66	12.80 x 17.07	1.83 x 2.44	8.53 x 11.38	1.25 x 1.66	6.40 x 8.53	0.91 x 1.22
	Cam Format	1/4"	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -
1/3"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
1/2"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
2/3"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
1"		- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	- x -	
1.5X Aux Lens 29-20-40-000 WD: 52 mm	NA	0.0360	0.120	0.0360	0.120	0.0360	0.120	0.0360	0.120	0.0360	0.120	0.0360	0.120	
	LP/mm	108	360	108	360	108	360	108	360	108	360	108	360	
	Mag	0.43	3.00	0.56	3.90	0.75	5.25	1.10	7.70	1.70	11.90	2.30	16.10	
	DOF	0.44	0.04	0.44	0.04	0.44	0.04	0.44	0.04	0.44	0.04	0.44	0.04	
	FOV WD: 52 mm	1/4"	6.54 x 8.72	0.92 x 1.23	4.91 x 6.54	0.71 x 0.94	3.66 x 4.88	0.53 x 0.70	2.45 x 3.27	0.36 x 0.48	1.64 x 2.18	0.23 x 0.31	1.23 x 1.64	0.17 x 0.23
		1/3"	8.53 x 11.38	1.20 x 1.60	6.40 x 8.53	0.92 x 1.23	4.78 x 6.37	0.69 x 0.91	3.20 x 4.27	0.47 x 0				