LASER COMPONENTS®

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beyond borders

06/25 / V2 / CA-IF / navitar/zoom-resolv4k-lens-series

RESOLV4K
LENS SERIES

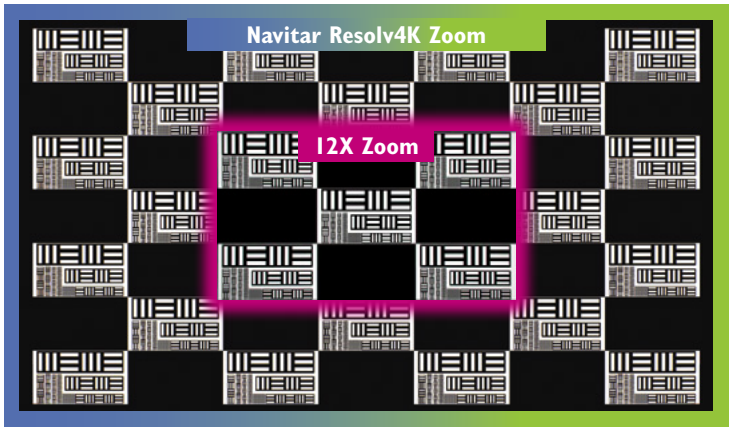
Greater Throughput

The Resolv4K Lens Series was designed from first order principles to maximize the usage of a sensors with higher pixel densities. Numerous adapter options allow users to employ a range of sensors from 1/2" through APS formats and beyond. On the front end of the zoom lens attachments give users the best of both worlds; the low mag end of zoom gives wide fields of view with no sacrifice in MTF or loss of illumination, while the high mag end delivers microscope objective like resolution at extremely long working distances.

The Resolv4K lens has been designed not only for superior visible wavelength axial color correction, but dramatically increased wavelength focusing ability with Visible through Near Infrared (Vis-NIR) and SWIR options. Larger aperture lens attachments significantly increase the usable FOV for coaxial lighting options.

Larger Field of View

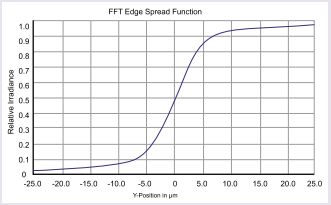
Navitar's Resolv4K Series offers so much more resolving power, that a 400- 600% larger field of view is possible when compared to traditional zoom imaging, without any loss of detail. No need to stitch together multiple images from multiple captures.



12X Zoom at Low Mag with 2/3" 2MP sensor
18.4mm

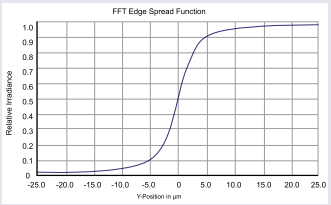
Resolv4K Zoom at Low Mag with 0.5X Lens Attachment and 8.9MP sensor.
Resolv4K has 2.4X horizontal FOV for 476% more total FOV area covered
44.2mm

12X Zoom



13.6µm wide transition from full off to full on.

Navitar Resolv4K Zoom



9.6µm wide transition from full off to full on, a 30% improvement even at a significantly larger FOV and a longer working distance.

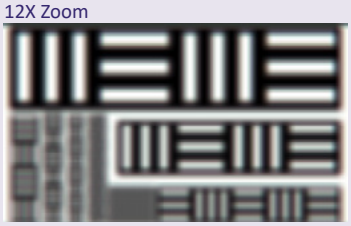
Note: Edge spread functions indicate the lens performance of a system by showing how quickly a black to white edge transition is detected by a lens. A 10% to 90% grey level value at the sensor is shown here as indicating a full off to full on.

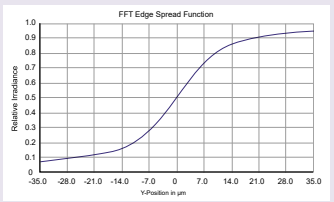
& Larger Field of View

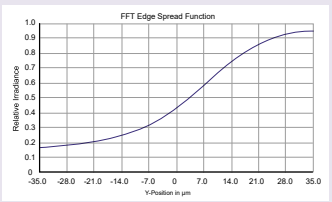
Higher Resolution

Resolv4K's higher NA, along with its superior aberration correction, gives more precise measurement capabilities than ever. Even comparing a 4.5X zoom point to a 7X mag system, the exceptional quality of the Resolv4K design delivers superior performance, as shown in the black to white transitions in the edge spread functions below. System performance holds up all the way to the corner of the sensor, so multiple regions of interest can be set regardless of their location in your FOV. Your edge detection software will notice the difference.

12X Zoom

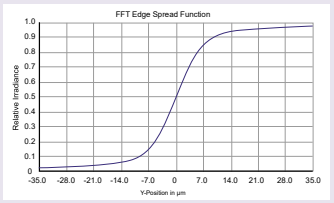


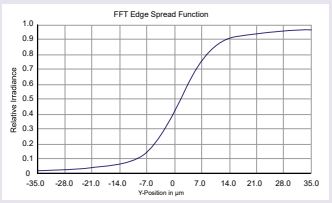




12X Zoom @ 7X High Mag | 2MP Sensor - 0.79µm / pixel | 1.55mm FOV - 1.28 mm² Area

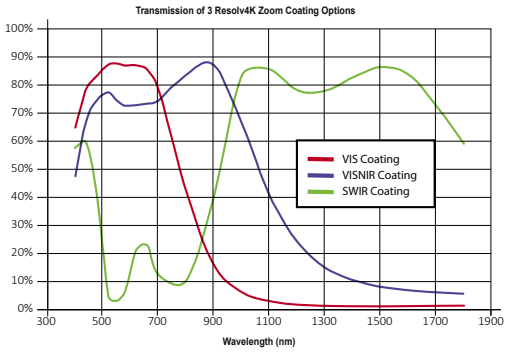
Navitar Resolv4K Zoom





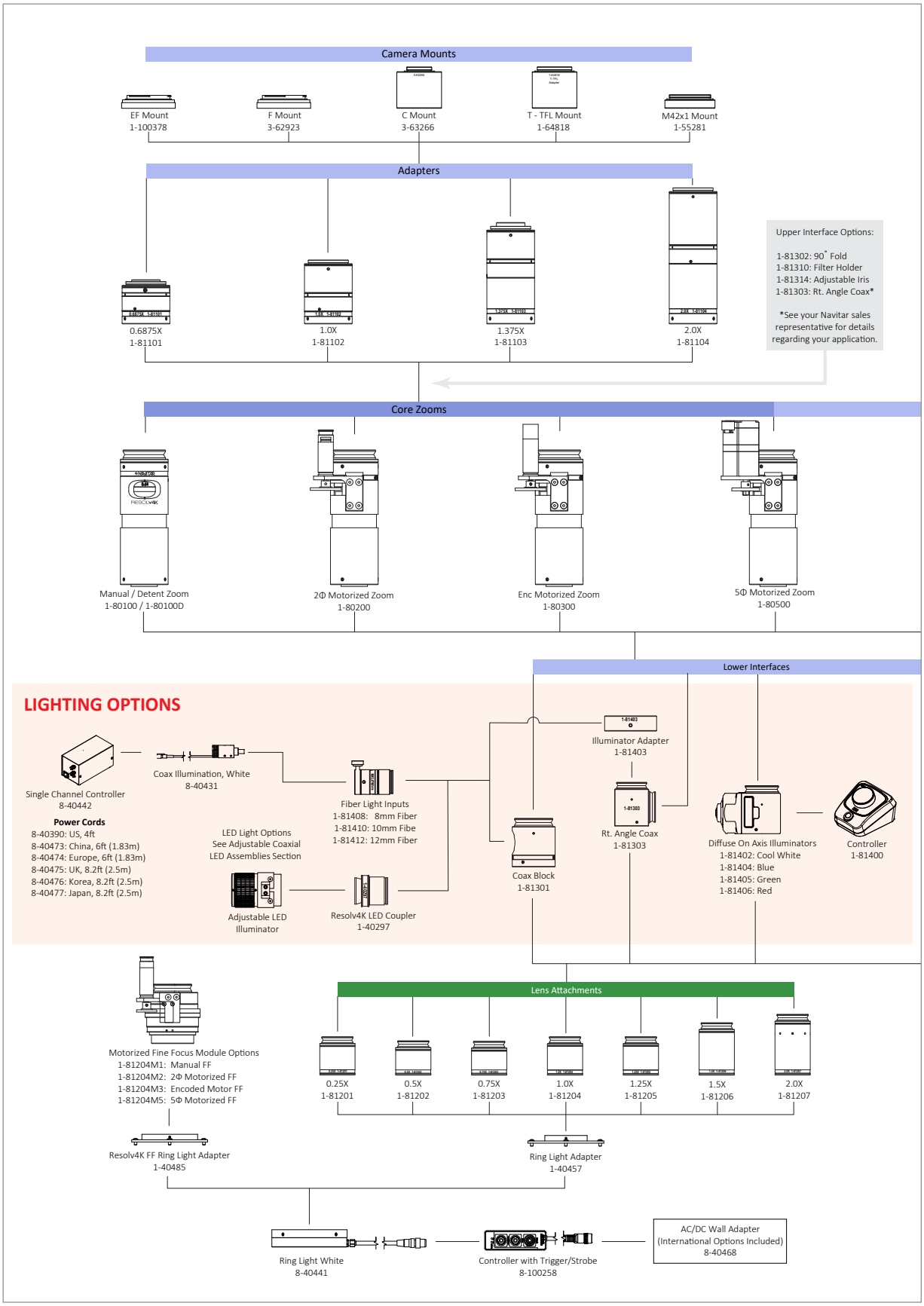
Resolv4K Zoom @ 4.5X High Mag | 8.9MP Sensor - 0.76µm / pixel | 3.56mm FOV - 5.20 mm² Area (3.25X more)

Left: Zoomed in inset of resolution lines, 0.5µm, 1µm, 2µm, 3µm, 4µm, 6µm, 9µm patterns **Center:** Edge spread function, on axis **Right:** Edge spread function, corner of the sensor



Expanded Wavelengths

The Resolv4K lens series comes in visible, Vis-NIR and SWIR coating options. The visible options produce superior axial color correction to existing zoom lenses. The Vis-NIR option allows precision surface inspection in the deep blue, while performing sub-surface inspection at 1100nm without refocusing or loss of transmission. Using the SWIR goes even further beneath the surface to see damage and defects in food and silicon wafer inspection, among other applications. SWIR and Vis-NIR options are available for the following part numbers:


Camera Mounts
EF Mount
1-100378
F Mount
3-62923
C Mount
3-63266
T - TFL Mount
1-64818
M42x1 Mount
1-55281
Adapters
0.6875X
1-81101
1.0X
1-81102
1.375X
1-81103
2.0X
1-81104
Upper Interface Options:
1-81302: 90° Fold
1-81310: Filter Holder
1-81314: Adjustable Iris
1-81303: Rt. Angle Coax*
*See your Navitar sales representative for details regarding your application.
Core Zooms
Manual / Detent Zoom
1-80100 / 1-80100D
2Φ Motorized Zoom
1-80200
Enc Motorized Zoom
1-80300
5Φ Motorized Zoom
1-80500
Lower Interfaces
LIGHTING OPTIONS
Single Channel Controller
8-40442
Power Cords
8-40390: US, 4ft
8-40473: China, 6ft (1.83m)
8-40474: Europe, 6ft (1.83m)
8-40475: UK, 8.2ft (2.5m)
8-40476: Korea, 8.2ft (2.5m)
8-40477: Japan, 8.2ft (2.5m)
Coax Illumination, White
8-40431
LED Light Options
See Adjustable Coaxial
LED Assemblies Section
Adjustable LED
Illuminator
Fiber Light Inputs
1-81408: 8mm Fiber
1-81410: 10mm Fibe
1-81412: 12mm Fiber
Resolv4K LED Coupler
1-40297
Illuminator Adapter
1-81403
Coax Block
1-81301
Rt. Angle Coax
1-81303
Diffuse On Axis Illuminators
1-81402: Cool White
1-81404: Blue
1-81405: Green
1-81406: Red
Controller
1-81400
Motorized Fine Focus Module Options
1-81204M1: Manual FF
1-81204M2: 2Φ Motorized FF
1-81204M3: Encoded Motor FF
1-81204M5: 5Φ Motorized FF
Lens Attachments
0.25X
1-81201
0.5X
1-81202
0.75X
1-81203
1.0X
1-81204
1.25X
1-81205
1.5X
1-81206
2.0X
1-81207
Resolv4K FF Ring Light Adapter
1-40485
Ring Light Adapter
1-40457
Ring Light White
8-40441
Controller with Trigger/Strobe
8-100258
AC/DC Wall Adapter
(International Options Included)
8-40468

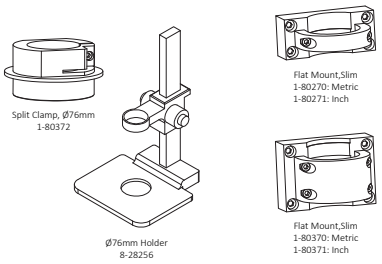
RESOLV4K System Diagram

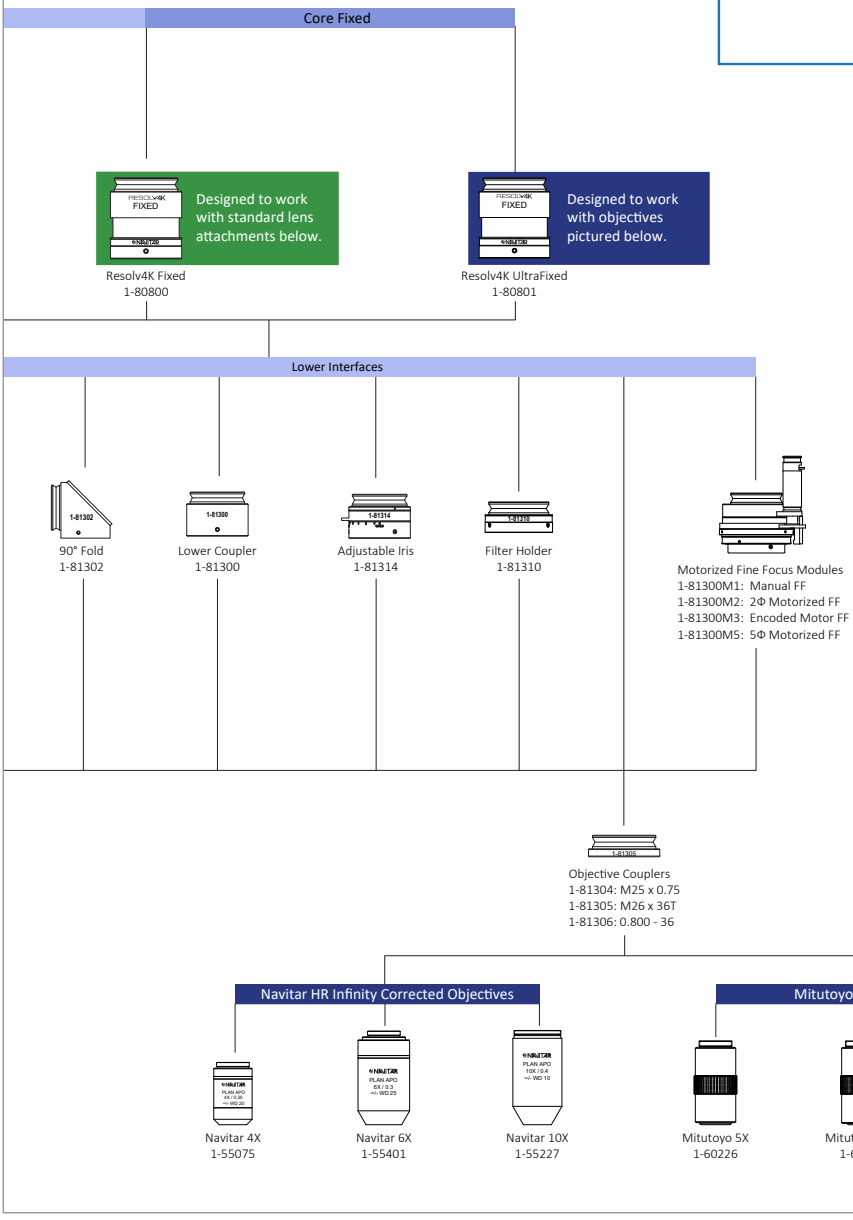
ZOOM • FIXED • ULTRAFIXED

Motor Options

Cable Length	2 Phase Motor Cable (for 1-80200)	Encoded Motor Cable (for 1-80300)	5 phase motorCable (for 1-80500)
24"	1-40283	1-40286	1-40290
48"	1-40282	1-40285	1-40289
72"	1-40281	1-40284	1-40170

Mounting Options





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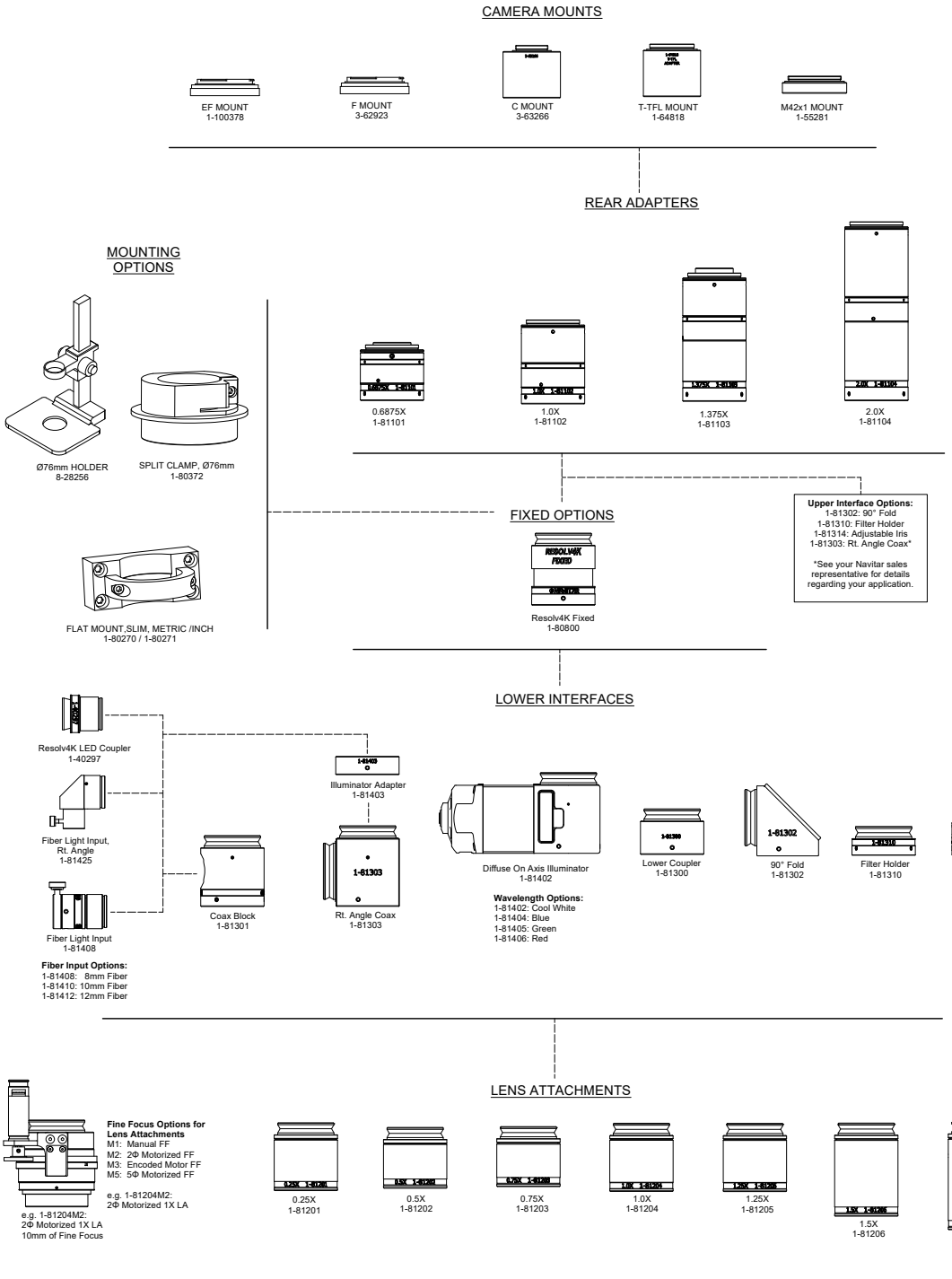
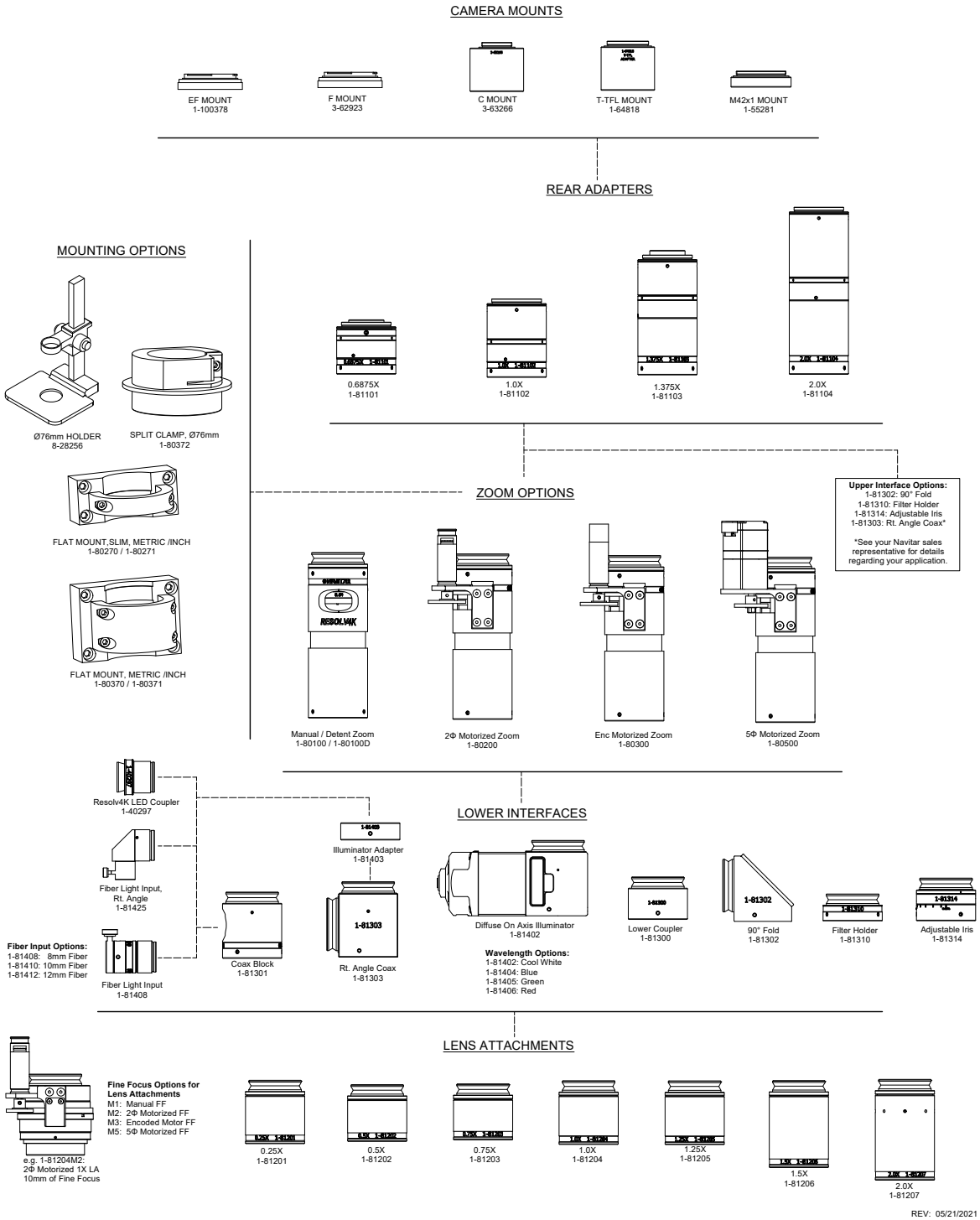
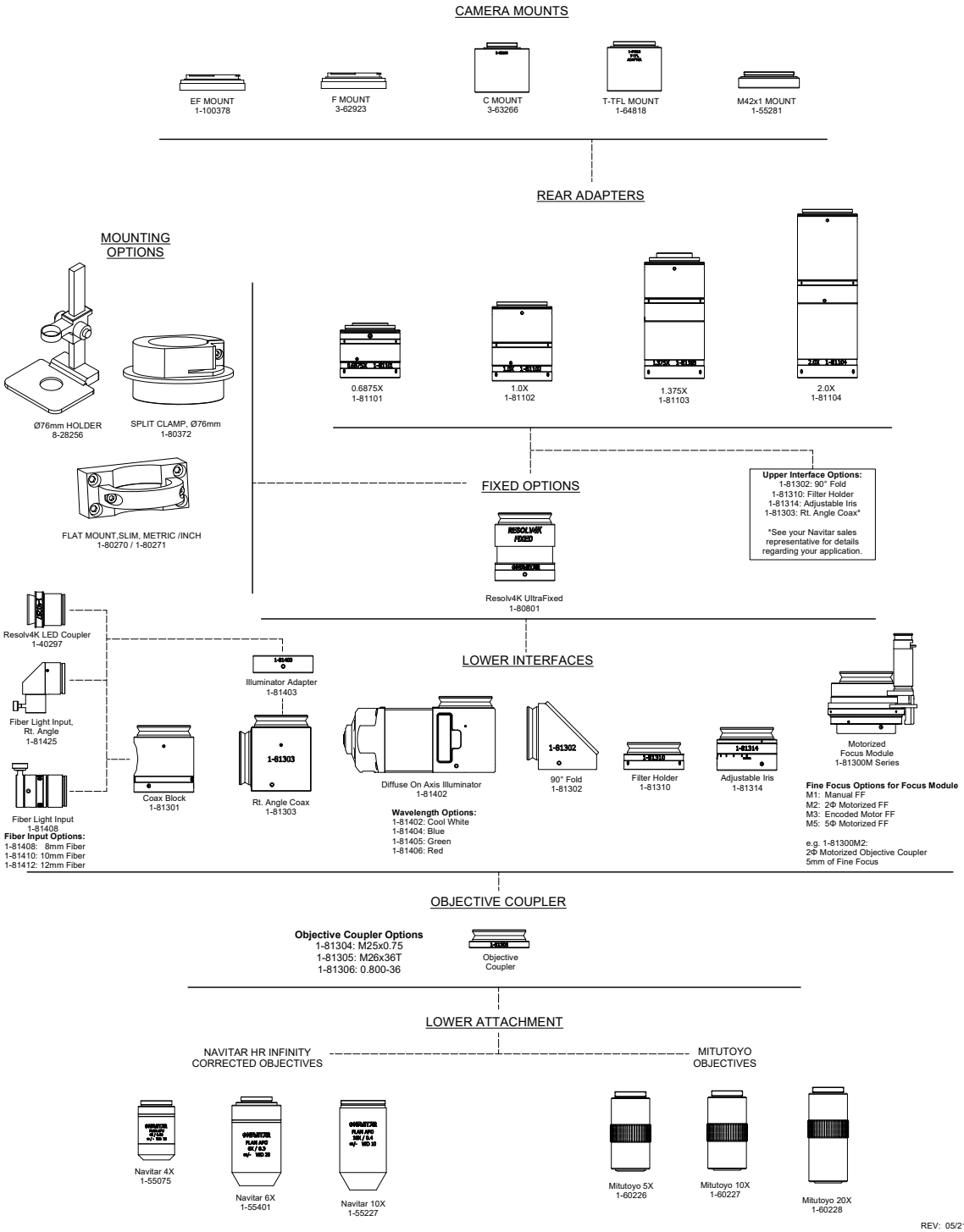
RESOLV4K FIXED SYSTEM DIAGRAM



RESOLV4K ZOOM SYSTEM DIAGRAM

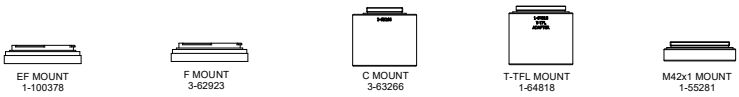


RESOLV4K ULTRAFIXED SYSTEM DIAGRAM



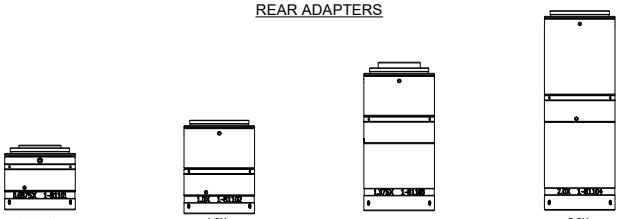
RESOLV4K ULTRAZOOM SYSTEM DIAGRAM

CAMERA MOUNTS



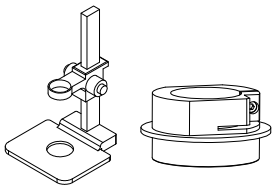
EF MOUNT 1-100378 | F MOUNT 3-62923 | C MOUNT 3-63266 | T-TFL MOUNT 1-64818 | M42x1 MOUNT 1-55281

REAR ADAPTERS

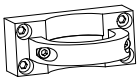


0.6875X 1-81101 | 1.0X 1-81102 | 1.375X 1-81103 | 2.0X 1-81104

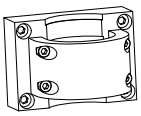
MOUNTING OPTIONS



Ø76mm HOLDER 8-28256 | SPLIT CLAMP, Ø76mm 1-80372

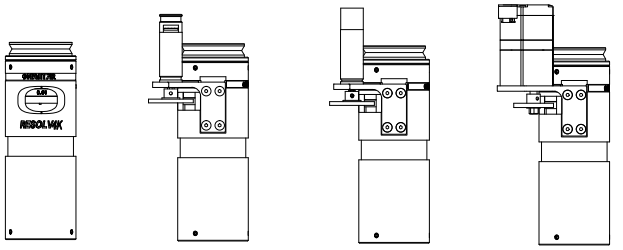


FLAT MOUNT,SLIM, METRIC /INCH 1-80270 / 1-80271



FLAT MOUNT, METRIC /INCH 1-80370 / 1-80371

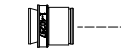
ZOOM OPTIONS



Manual / Detent Zoom 1-80100 / 1-80100D | 2Φ Motorized Zoom 1-80200 | Enc Motorized Zoom 1-80300 | 5Φ Motorized Zoom 1-80500

Upper Interface Options:
1-81302: 90° Fold
1-81310: Filter Holder
1-81314: Adjustable Iris
1-81303: Rt. Angle Coax*

*See your Navitar sales representative for details regarding your application.



Resolv4K LED Coupler 1-40297

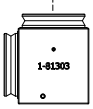
Fiber Light Input, Rt. Angle 1-81425

Fiber Light Input 1-81408

Fiber Input Options:
1-81408: 8mm Fiber
1-81410: 10mm Fiber
1-81412: 12mm Fiber

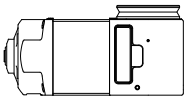
Coax Block 1-81301

Illuminator Adapter 1-81403



Rt. Angle Coax 1-81303

LOWER INTERFACES



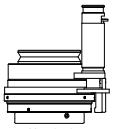
Diffuse On Axis Illuminator 1-81402

Wavelength Options:
1-81402: Cool White
1-81404: Blue
1-81405: Green
1-81406: Red

90° Fold 1-81302

Filter Holder 1-81310

Adjustable Iris 1-81314



Motorized Focus Module 1-81300M Series

Fine Focus Options for Focus Module
M1: Manual FF
M2: 2Φ Motorized FF
M3: Encoded Motor FF
M5: 5Φ Motorized FF

e.g. 1-81300M2:
2Φ Motorized Objective Coupler
5mm of Fine Focus

OBJECTIVE COUPLER

Objective Coupler Options
1-81304: M25x0.75
1-81305: M26x36T
1-81306: 0.800-36

Objective Coupler

LOWER ATTACHMENT

NAVITAR HR INFINITY CORRECTED OBJECTIVES

Navitar 4X 1-55075 | Navitar 6X 1-55401 | Navitar 10X 1-55227

MITUTOYO OBJECTIVES

Mitutoyo 5X 1-60226 | Mitutoyo 10X 1-60227 | Mitutoyo 20X 1-60228

REV: 05/21/2021

Resolv4K Zoom Field of View Matrix

Lens Attachment	Rear Adapter Magnification ⇨ / Ideal Camera Format ⇨ / Pixel Resolution ⇨		0.6875X 2/3" 2.24 - 5.47 µm	1X 1" 3.26 - 7.95 µm	1.375X 4/3" 4.48 - 10.93 µm	2X 32mm (APS) 6.51 - 15.90 µm	Resolve Limit	Depth of Field
	Working Distance	Format	Low - High	Low - High	Low - High	Low - High	Low - High	Low - High
0.25X	359.5 mm	Magnification ⇨	0.10X - 0.77X	0.16X - 1.13X	0.22X - 1.55X	0.32X - 2.25X	40.85 - 14.13 µm	7.41 - 0.89 mm
0.008 - 0.024 NA		2/3" Sensor	100.00 - 14.22 mm	68.75 - 9.78 mm	50.00 - 7.11 mm	34.38 - 5.17 mm		
1-81201		1" Sensor	-	100.00 - 14.22 mm	72.73 - 10.34 mm	50.00 - 7.11 mm		
		1.1" Sensor	-	110.00 - 15.64 mm	80.00 - 11.38 mm	55.00 - 7.82 mm		
		4/3" Sensor	-	-	100.00 - 14.22 mm	68.75 - 9.78 mm		
		32mm Sensor	-	-	-	100.00 - 14.22 mm		
0.5X	173 mm	Magnification ⇨	0.22X - 1.55X	032X - 2.25X	0.44X - 3.09X	0.64X - 4.50X	20.43 - 7.06 µm	1.85 - 0.22 mm
0.016 - 0.048 NA		2/3" Sensor	50.00 - 7.11 mm	34.38 - 4.89 mm	25.00 - 3.56 mm	17.19 - 2.44 mm		
1-81202		1" Sensor	-	50.00 - 7.11 mm	36.36 - 5.17 mm	25.00 - 3.56 mm		
		1.1" Sensor	-	55.00 - 7.82 mm	40.00 - 5.69 mm	27.50 - 3.91 mm		
		4/3" Sensor	-	-	50.00 - 7.11 mm	34.38 - 4.89 mm		
		32mm Sensor	-	-	-	50.00 - 7.11 mm		
0.75X	110 mm	Magnification ⇨	0.33X - 2.32X	0.48X - 3.38X	0.66X - 4.64X	0.96X - 6.75X	13.62 - 4.71 µm	0.82 - 0.10 mm
0.025 - 0.071 NA		2/3" Sensor	33.33 - 4.74 mm	22.92 - 3.26 mm	16.67 - 2.37 mm	11.46 - 1.63 mm		
1-81203		1" Sensor	-	33.33 - 4.74 mm	24.24 - 3.45 mm	16.67 - 2.37 mm		
		1.1" Sensor	-	36.67 - 5.21 mm	26.67 - 3.79 mm	18.33 - 2.61 mm		
		4/3" Sensor	-	-	33.33 - 4.74 mm	22.94 - 3.26 mm		
		32mm Sensor	-	-	-	33.33 - 4.74 mm		
1.0X	90 mm	Magnification ⇨	0.44X - 3.09X	0.64X - 4.50X	0.88X - 6.19X	1.28X - 9.00X	10.21 - 3.53 µm	0.46 - 0.055 mm
0.033 - 0.095 NA		2/3" Sensor	25.00 - 3.56 mm	17.19 - 2.44 mm	12.50 - 1.78 mm	8.59 - 1.22 mm		
1-81204		1" Sensor	-	25.00 - 3.56 mm	18.18 - 2.59 mm	12.50 - 1.78 mm		
		1.1" Sensor	-	27.50 - 3.91 mm	20.00 - 2.84 mm	13.75 - 1.96 mm		
		4/3" Sensor	-	-	25.00 - 3.56 mm	17.19 - 2.44 mm		
		32mm Sensor	-	-	-	25.00 - 3.56 mm		
1.25X	72 mm	Magnification ⇨	0.55X - 3.87X	0.80X- 5.63X	1.10X - 7.73X	1.60X - 11.25X	8.17 - 2.83 µm	0.30 - 0.035 mm
0.041 - 0.119 NA		2/3" Sensor	20.00 - 2.84 mm	13.75 -1.96 mm	10.00 - 1.42 mm	6.88 - 0.98 mm		
1-81205		1" Sensor	-	20.00 - 2.84 mm	14.55 - 2.07 mm	10.00 - 1.42 mm		
		1.1" Sensor	-	22.00- 3.13 mm	16.00 - 2.28 mm	11.00 - 1.56 mm		
		4/3" Sensor	-	-	20.00 - 2.84 mm	13.75 - 1.96 mm		
		32mm Sensor	-	-	-	20.00 - 2.84 mm		
1.5X	46.5 mm	Magnification ⇨	0.66X- 4.64X	0.96X- 6.75X	1.32X - 9.28X	1.92X - 13.50X	6.81 - 2.35 µm	0.206 - 0.025 mm
0.049 - 0.142 NA		2/3" Sensor	16.67- 2.37 mm	11.46- 1.63 mm	8.33 - 1.19 mm	5.73 - 0.81 mm		
1-81206		1" Sensor	-	16.67- 2.37 mm	12.12 - 1.72 mm	8.33 - 1.19 mm		
		1.1" Sensor	-	18.33- 2.61 mm	13.33 - 1.90 mm	9.17 - 1.30 mm		
		4/3" Sensor	-	-	16.67 - 2.37 mm	11.46 - 1.63 mm		
		32mm Sensor	-	-	-	16.67 - 2.37 mm		
2.0X	32.3 mm	Magnification ⇨	0.88X - 6.19X	1.28X - 9.00X	1.76X - 12.38X	2.56X - 18.00X	5.11 - 1.77 µm	0.116 - 0.014 mm
0.066 - 0.190 NA		2/3" Sensor	12.50 - 1.78 mm	8.59 - 1.22 mm	6.25 - 0.89 mm	4.30 - 0.61 mm		
1-81207		1" Sensor	-	12.50 - 1.78 mm	9.09 - 1.29 mm	6.25 - 0.89 mm		
		1.1" Sensor	-	13.75 - 1.96 mm	10.00 - 1.42 mm	6.88 - 0.98 mm		
		4/3" Sensor	-	-	12.50 - 1.78 mm	8.59 - 1.22 mm		
		32mm Sensor	-	-	-	12.50 - 1.78 mm		

NOTE: Coax and fine focus options all maintain same FOV, resolution, and working distance, subject to adequate lighting
The above fields of view are measured diagonally in millimeters (Horizontal = Diagonal x 0.8 and Vertical = Diagonal x 0.6) on a 4:3 aspect ratio sensor. Dark Gray box: Contact your Navitar sales representative for further guidance when selecting this option.

Resolv4K Fixed System

The new Resolv4K Fixed system is a combination of the superb optical performance of the Resolv4K Zoom and design principles of our Precise Eye Fixed that is ideal for fixed field of view applications with closer working distances. The Resolv4K Fixed lens offers higher magnification and resolving power than standard enlarging or SLR lenses in macro mode.

- High apertures improve resolving power by 30% at familiar working distances
- Available interface modules allow users to build their system specifically for their needs
- Standard large camera format options
- Compatible with 10MP cameras and beyond
- Built-in rear adapter fine manipulation focus
- Larger focus options with motorization available
- Compatible with Infinity Corrected Objectives

Resolv4K Fixed Field of View Matrix (in mm at nominal W.D.)

Lens Attachment				Camera Adapter ⇨	0.6875X	1X	1.375X	2X
				Pixel Resolution ⇨	1.85 µm	2.68 µm	3.69 µm	5.37 µm
	Working Distance	Depth of Field	Resolution Limit	Format	Diagonal	Diagonal	Diagonal	Diagonal
0.25X	359.5 mm	0.88 mm	13.42 µm	Magnification ⇨	0.275X	0.40X	0.55X	0.80X
				2/3" Sensor	40.00 mm	27.50 mm	20.00 mm	13.75 mm
0.025 NA				1" Sensor	-	40.00 mm	29.09 mm	20.00 mm
				1.1" Sensor	-	44.00 mm	32.00 mm	22.00 mm
1-81201				4/3" Sensor	-	-	40.00 mm	27.50 mm
				APS	-	-	-	40.00 mm
0.5X	173 mm	0.22 mm	6.71 µm	Magnification ⇨	0.55X	0.80X	1.10X	1.60X
				2/3" Sensor	20.00 mm	13.75 mm	10.00 mm	6.88 mm
0.05 NA				1" Sensor	-	20.00 mm	14.55 mm	10.00 mm
				1.1" Sensor	-	22.00 mm	16.00 mm	11.00 mm
1-81202				4/3" Sensor	-	-	20.00 mm	13.75 mm
				APS	-	-	-	20.00 mm
0.75X	110 mm	0.0978 mm	4.47 µm	Magnification ⇨	0.825X	1.20X	1.65X	2.40X
				2/3" Sensor	13.33 mm	9.17 mm	6.67 mm	4.58 mm
0.075 NA				1" Sensor	-	13.33 mm	9.70 mm	6.67 mm
				1.1" Sensor	-	14.67 mm	10.67 mm	7.33 mm
1-81203				4/3" Sensor	-	-	13.33 mm	9.17 mm
				APS	-	-	-	13.33 mm
1.0X	90 mm	0.055 mm	3.36 µm	Magnification ⇨	1.10X	1.60X	2.20X	3.20X
				2/3" Sensor	10.00 mm	6.88 mm	5.00 mm	3.44 mm
0.1 NA				1" Sensor	-	10.00 mm	7.27 mm	5.00 mm
				1.1" Sensor	-	11.00 mm	8.00 mm	5.50 mm
1-81204				4/3" Sensor	-	-	10.00 mm	6.88 mm
				APS	-	-	-	10.00 mm
1.25X	72 mm	0.0352 mm	2.68 µm	Magnification ⇨	1.375X	2.00X	2.750X	4.00X
				2/3" Sensor	8.00 mm	5.50 mm	4.00 mm	2.75 mm
0.125 NA				1" Sensor	-	8.00 mm	5.82 mm	4.00 mm
				1.1" Sensor	-	8.80 mm	6.40 mm	4.40 mm
1-81205				4/3" Sensor	-	-	8.00 mm	5.50 mm
				APS	-	-	-	8.00 mm
1.5X	46.5 mm	0.0244 mm	2.24 µm	Magnification ⇨	1.650X	2.40X	3.30X	4.80X
				2/3" Sensor	6.67 mm	4.58 mm	3.33 mm	2.29 mm
0.15 NA				1" Sensor	-	6.67 mm	4.85 mm	3.33 mm
				1.1" Sensor	-	7.33 mm	5.33 mm	3.67 mm
1-81206				4/3" Sensor	-	-	6.67 mm	4.58 mm
				APS	-	-	-	6.67 mm
2X	32.3 mm	0.0138 mm	1.68 µm	Magnification ⇨	2.20X	3.20X	4.40X	6.40X
				2/3" Sensor	5.00 mm	3.44 mm	2.50 mm	1.72 mm
0.20 NA				1" Sensor	-	5.00 mm	3.64 mm	2.50 mm
				1.1" Sensor	-	5.50 mm	4.00 mm	2.75 mm
1-81207				4/3" Sensor	-	-	5.00 mm	3.44 mm
				APS	-	-	-	5.00 mm

Dark Gray box: Contact your Navitar sales representative for further guidance when selecting this option.
For 4:3 aspect ratio sensor, Horizontal = Diagonal x 0.8, Vertical = Diagonal x 0.6 APS- 32mm image circle

Resolv4K Field of View Matrix with HR Objectives (mm)

	Objective Lens	Rear Adapter Magnification ⇨ / Ideal Camera Format ⇨ / Pixel Resolution ⇨		0.6875X 2/3" 2.24 - 5.47 µm	1X 1" 3.26 - 7.95 µm	1.375X 4/3" 4.48 - 10.93 µm	2X 32mm (APS) 6.51 - 15.90 µm	Resolve Limit	Depth of Field
		Working Distance	Format	Low - High	Low - High	Low - High	Low - High	Low - High	Low - High
UltraZoom	**Navitar 4X** 0.066 - 0.190 NA **1-55075**	20 mm	Magnification ⇨	0.88X- 6.19X	1.28X- 9.00X	1.76X- 12.38X	2.56X- 18.00X	5.11 - 1.77 µm	116 - 14 µm
			2/3" Sensor	8.10- 1.78 mm	8.10- 1.22 mm	6.25- 0.89 mm	4.30- 0.61 mm		
			1" Sensor	-	8.10- 1.78 mm	8.10- 1.29 mm	6.25- 0.89 mm		
			1.1" Sensor	-	8.10- 1.96 mm	8.10- 1.42 mm	6.88- 0.98 mm		
			4/3" Sensor	-	-	8.10- 1.78 mm	8.10- 1.22 mm		
			32mm Sensor	-	-	-	8.10- 1.78 mm		
	Navitar 6X 0.099 - 0.285 NA **1-55401**	25 mm	Magnification ⇨	1.32X- 9.28X	1.92X- 13.50X	2.64X-18.56X	3.84X- 27.00X	3.40 - 1.18 µm	51 - 6.2 µm
			2/3" Sensor	6.25- 1.19 mm	6.25- 0.81 mm	4.17- 0.59 mm	2.86- 0.41 mm		
			1" Sensor	-	6.25- 1.19 mm	6.25- 0.86 mm	4.17- 0.59 mm		
			1.1" Sensor	-	6.25- 1.30 mm	6.25- 0.95 mm	4.58- 0.65 mm		
			4/3" Sensor	-	-	6.25- 1.19 mm	6.25- 0.81 mm		
			32mm Sensor	-	-	-	6.25- 1.19 mm		
	Navitar 10X 0.164 - 0.400 NA **1-55227**	10 mm	Magnification ⇨	2.20X- 15.47X	3.20X- 22.50X	4.40X- 30.94X	6.40X- 45.00X	2.04 - 0.84 µm	19 - 3.1 µm
			2/3" Sensor	3.20- 0.71 mm	3.20- 0.49 mm	2.50- 0.36 mm	1.72- 0.24 mm		
			1" Sensor	-	3.20- 0.71 mm	3.20- 0.52 mm	2.50- 0.36 mm		
			1.1" Sensor	-	3.20- 0.78 mm	3.20- 0.57 mm	2.75- 0.39 mm		
			4/3" Sensor	-	-	3.20- 0.71 mm	3.20- 0.49 mm		
			32mm Sensor	-	-	-	3.20- 0.71 mm		
	Mitotoyo 5X 0.082 - 0.140 NA **1-60226**	34 mm	Magnification ⇨	1.10X- 7.73X	1.60X- 11.25X	2.20X- 15.47X	3.20X- 22.50X	4.09 - 2.40 µm	74.1 - 25.5 µm
			2/3" Sensor	4.80- 1.42 mm	4.80- 0.98 mm	4.80- 0.71 mm	3.44- 0.49 mm		
			1" Sensor	-	4.80- 1.42 mm	4.80- 1.03 mm	4.80- 0.71 mm		
			1.1" Sensor	-	4.80- 1.56 mm	4.80- 1.14 mm	4.80- 0.78 mm		
			4/3" Sensor	-	-	4.80- 1.42 mm	4.80- 0.98 mm		
			32mm Sensor	-	-	-	4.80- 1.42 mm		
	Mitotoyo 10X 0.164 - 0.280 NA **1-60227**	33 mm	Magnification ⇨	2.20X- 15.47X	3.20X- 22.50X	4.40X- 30.94X	6.40X- 45.00X	2.04 - 1.20 µm	18.5 - 6.4 µm
			2/3" Sensor	2.40- 0.71 mm	2.40- 0.49 mm	2.40- 0.36 mm	1.72- 0.24 mm		
			1" Sensor	-	2.40- 0.71 mm	2.40- 0.52 mm	2.40- 0.36 mm		
			1.1" Sensor	-	2.40- 0.78 mm	2.40- 0.57 mm	2.40- 0.39 mm		
			4/3" Sensor	-	-	2.40- 0.71 mm	2.40- 0.49 mm		
			32mm Sensor	-	-	-	2.40- 0.71 mm		
	Mitotoyo 20X 0.329 - 0.420 NA **1-60228**	20 mm	Magnification ⇨	4.40X- 30.94X	6.40X- 45.00X	8.80X- 61.88X	12.80X- 90.00X	1.02 - 0.80 µm	4.6 - 2.8 µm
			2/3" Sensor	1.20- 0.36 mm	1.20- 0.24 mm	1.20- 0.18 mm	0.86- 0.12 mm		
			1" Sensor	-	1.20- 0.36 mm	1.20- 0.26 mm	1.20- 0.18 mm		
			1.1" Sensor	-	1.20- 0.39 mm	1.20- 0.28 mm	1.20- 0.20 mm		
			4/3" Sensor	-	-	1.20- 0.36 mm	1.20- 0.24 mm		
			32mm Sensor	-	-	-	1.20- 0.36 mm		

	Navitar Objective Lens	Rear Adapter Magnification ⇨ / Pixel Resolution ⇨		0.6875X 1.85 µm	1X 2.68 µm	1.375X 3.69 µm	2X 5.37 µm	Resolve Limit	Depth of Field
		Working Distance	Format	Diagonal	Diagonal	Diagonal	Diagonal		
Fixed	**4X** 0.200 NA **1-55075**	20 mm	Magnification ⇨	2.20X	3.20X mm	4.40X mm	6.40X	1.77 µm	13.75 µm
			2/3" Sensor	5.00 mm	3.44 mm	2.50 mm	1.72 mm		
			1" Sensor	-	5.00 mm	3.64 mm	2.50 mm		
			1.1" Sensor	-	5.50 mm	4.00 mm	2.75 mm		
			4/3" Sensor	-	-	5.00 mm	3.44 mm		
			APS	-	-	-	5.00 mm		
	6X 0.300 NA **1-55401**	25 mm	Magnification ⇨	3.30X	4.80X	6.60X	9.60X	1.12 µm	6.11 µm
			2/3" Sensor	3.33 mm	2.29 mm	1.67 mm	1.15 mm		
			1" Sensor	-	3.33 mm	2.42 mm	1.67 mm		
			1.1" Sensor	-	3.67 mm	2.67 mm	1.83 mm		
			4/3" Sensor	-	-	3.33 mm	2.29 mm		
			APS	-	-	-	3.33 mm		
	10X 0.400 NA **1-55227**	10 mm	Magnification ⇨	5.50X	8.00X	11.00X	16.00X	0.70 µm	3.44 µm
			2/3" Sensor	2.00 mm	1.38 mm	1.00 mm	0.69 mm		
			1" Sensor	-	2.00 mm	1.45 mm	1.00 mm		
			1.1" Sensor	-	2.20 mm	1.60 mm	1.10 mm		
			4/3" Sensor	-	-	2.00 mm	1.38 mm		
			APS	-	-	-	2.00 mm		

Dark Gray box: Contact your Navitar sales representative for further guidance when selecting this option.

LASER COMPONENTS®

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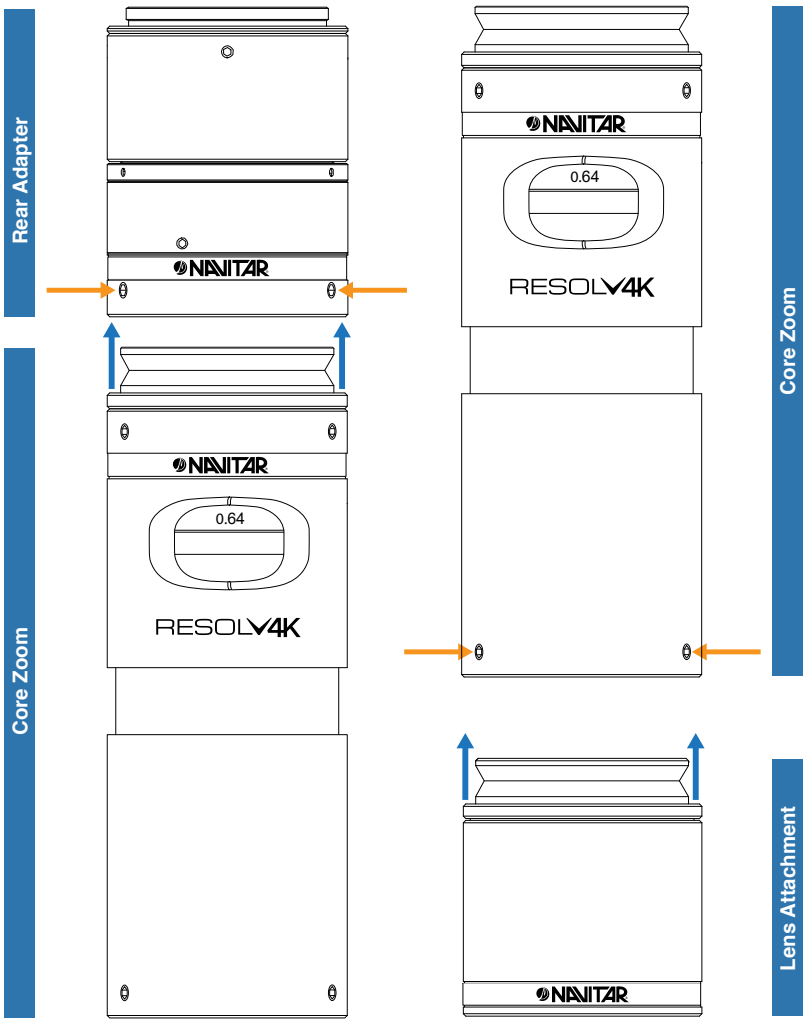
INSTALLATION OF LENS ATTACHMENTS & ACCESSORIES

All lens attachments, Resolv4K core Zooms and Resolv4K Fixed lenses have been designed with a standard dovetail size for ease of modularity across the product line. For installation of the zoom, simply insert the dovetail end of the zoom into the bottom of the rear adapter and secure it with the (3) M4 screws supplied with the rear adapter. Use the 2mm hex wrench supplied with your zoom to secure the screws.

For installation of the lens attachment, coax and other accessories simply insert the dovetail end of the lens attachment into the bottom of the Resolv4K Zoom and secure it with the (3) M4 screws supplied with the Resolv4K Zoom. Use the 2mm hex wrench supplied with your zoom to secure the screws.

Note: The nominal torque applied on the screw is 20 in-oz. (0.14 N m)
Do not overtighten, as you may damage the lens.

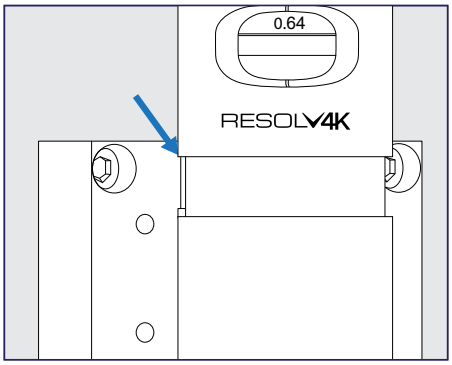


Left Drawing:
Rear adapter installed on top of zoom.

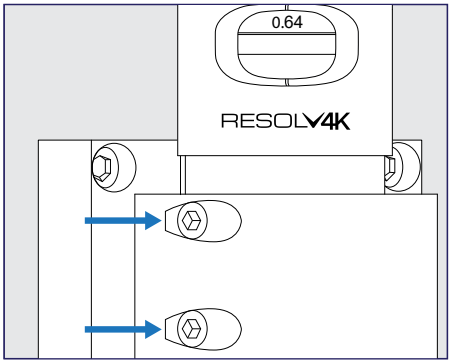
Right Drawing:
Lens attachment installed on bottom of zoom.

USING THE MOUNT WITH THE RESOLV4K SYSTEM

It is important that the Resolv4K Zoom be properly installed onto the mount. All flat mounts (1-80370, 1-80371, 1-80270, 1-80271) have a ledge on the backplate. This ledge is to sit within the notch located at the center of the Resolv4K Zoom or Fixed body tube (see diagram below). This provides a solid surface for which the system can be held. Install the saddle over the lens and secure with M5 screws using the 4mm hex wrench supplied with the mount.



Left: Location of ledge on mount and notch on body tube.



Right: Secure saddle with screws.

SET PARFOCALITY & BORESIGHT

To set parfocality zoom to high magnification. Adjust the “Z” axis to achieve best focus. Then zoom to low magnification, do not adjust “Z” axis to refocus. Unlock the screws and adjust the parfocality using the adjustment ring on the rear adapter. When the image is in optimal focus, you should be able to go through zoom without loss of focus. Lock the parfocality ring in two places (see Fig.1) using a 1.5mm hex wrench (supplied with your lens).

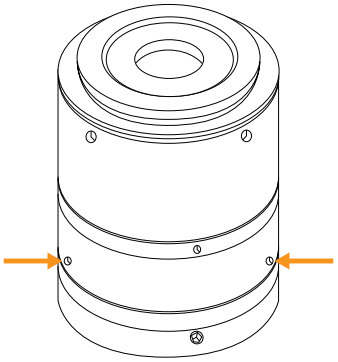


Figure 1: Location of parfocality adjustment. Secure with set screw.

All Resolv4K rear adapters have boresight adjustability. The adjustment is made by using a 1.5mm hex wrench to adjust the M3 set screws at the top of the adapter (see Fig. 2).

Tip: For easier boresight adjustment, first loosen the M3 screws and align the “X” axis of the sensor along the same “line” as one of the M3 screws. Next, use the (2) wrenches (supplied with your lens) in opposite positions along the “X” axis to adjust the boresight. This type of alignment enables the user to “push” the image in the direction being actuated.

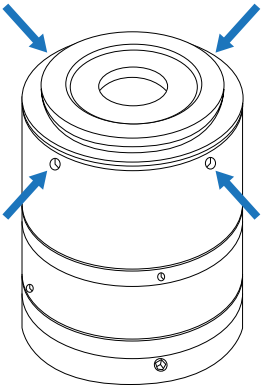


Figure 2: Location of set screws for boresight adjustment.

LASER COMPONENTS®

Pair a Navitar Resolv4K lens with a Pixelink PL-D CMOS USB 3 or PL-X 10 GigE machine vision camera for excellent image quality and outstanding value.

Pixelink® PL-D Camera Features:

- Various sensors for frame rate, resolution & pitch
- Fast frame rates
- Low noise images
- Available as enclosed & board level
- Color & monochrome

Pixelink® PL-X Camera Features:

- 10X faster than GigE, 2X faster than USB3
- High bandwidth for high-speed imaging
- 10GBase-T interface
- Power over Ethernet (PoE)
- Trigger over Ethernet (ToE)
- Enclosed and board level
- Fast, reliable and accurate

Camera Models for Resolv4K Core Lenses

Model	M/C	Sensor	MP	Sensor Size	FPS	Sensor Diagonal	Pixel Pitch
PL-D759	M/C	Sony IMX255	9.0	1”	45	16.1 mm	3.45 µm
PL-D7620	M/C	Sony IMX183	20.0	1”	20	15.86 mm	2.4 µm
PL-D757	M/C	Sony IMX420	7.0	1.1”	57	17.6 mm	4.5 µm
PL-D7512	M/C	Sony IMX253	12.0	1.1”	33	17.6 mm	3.45 µm
PL-X9520	M/C	Sony IMX531	20.0	1.1”	52	17.5 mm	2.74 µm
PL-X9524	M/C	Sony IMX530	24.0	1.2”	43	19.3 mm	2.74 µm