2-5x Variable Lens

• Features

- Variable magnification : 2 - 5x
- Prism optical optimization model available. (Coaxial vertical prism : Thickness up to 25mm) (Coaxial vertical prism not available at Tochigi Nikon)
- Large image size - ϕ 86.4mm - For high resolution, large-sized line sensor cameras.
- Recommendable line sensor cameras - 5 μ m x 16K / 5.2 μ m x 12K / 7 μ m x 8K
- Less difference in performance, securing performance in the whole range of magnification.
- Variable diaphragm, open aperture F2.5
- Diaphragm and floating ring setting lockable screws
- Gear on the diaphragm ring and the floating ring to have the mechanism be variable by external driving.
- Fixed magnification model : Choice of 3 types of magnification (2.5x・3.5x・5.0x)
- RoHs compliant

• Applications

- Inspection by high-resolution line censor cameras
- Flat panel inspection
- PCB inspection
- Wafer inspection

NikonRayfact2-5x Variable Lens

Specifications

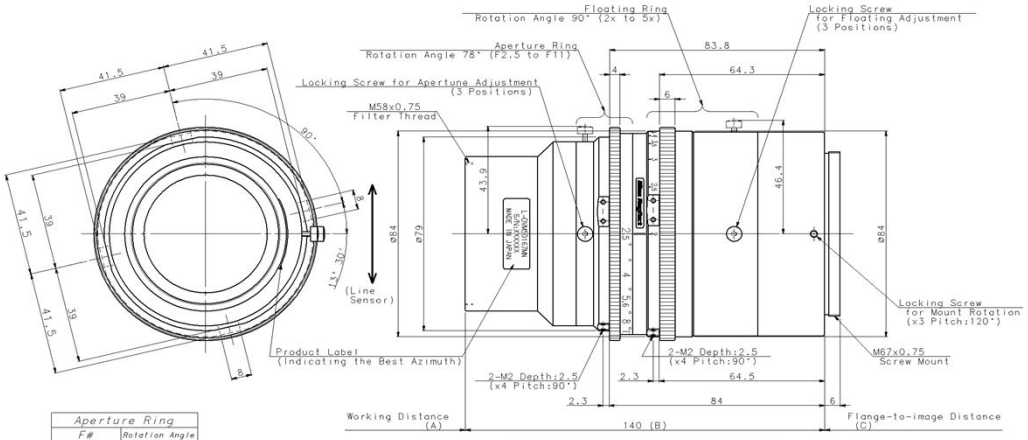
Model	L-OVM50167MN							
Magnification range	-2.0x～-5.0x							
Magnification	-2.0x	-2.5x	-3.0x	-3.5x	-4.0x	-4.5x	-5.0x	(-5.2x)※2
Focal length	116mm							
F Number (∞)	F2.5							
NA (Diaphragm open)	0.133	0.143	0.15	0.156	0.16	0.164	0.167	0.168
Reference wavelength	546.07nm (e-line)							
Wavelength range	400～700nm							
Image size	86.4mm ϕ							
Object size ※1	43.2mm ϕ	34.6mm ϕ	28.8mm ϕ	24.7mm ϕ	21.6mm ϕ	19.2mm ϕ	17.3mm ϕ	(16.6mm ϕ)
Distortion ※1	+0.08%	+0.01%	-0.02%	-0.03%	-0.03%	-0.03%	-0.03%	(-0.03%)
Relative illumination ※1	90.5%	95.4%	98.1%	99.2%	99.5%	99.6%	99.7%	(99.7%)
Aperture scale	2.5 2.8 4 5.6 8 11							
Object-to-image distance	503.6mm	550.4mm	601.0mm	653.8mm	707.9mm	763.0mm	818.7mm	(841.1mm)
Working distance	114.7mm	102.8mm	94.9mm	89.2mm	84.9mm	81.6mm	79.0mm	(78.1mm)
Mount size	M67(P=0.75)							
Flange-to image distance	248.8mm	307.5mm	366.1mm	424.6mm	483.0mm	541.4mm	599.8mm	(623.1mm)
Attachment size	M58 (P=0.75)							
Diameter/length	84mm ϕ ×140mm							
Weight	Approximately 1350g							

※1 Highest image height (Y'=43.2mm) at F2.5.

※2 -5.2x:To fix the magnification at -5.0x and move the lens outward up to the maximal point.

			-2.0x	-2.5x	-3.0x	-3.5x	-4.0x	-4.5x	-5.0x	(-5.2x)
Entrance pupil※3	d	[En.P]	60.75mm	60.75mm	60.75mm	60.75mm	60.75mm	60.75mm	60.75mm	(60.75mm)
	ϕ		47.2 ϕ mm	47.2 ϕ mm	47.3 ϕ mm	47.4 ϕ mm	47.4 ϕ mm	47.4 ϕ mm	47.4 ϕ mm	(47.4 ϕ mm)
Exit pupil ※3	d	[Ex.P]	98.57mm	98.55mm	98.52mm	98.49mm	98.46mm	98.43mm	98.41mm	(98.41mm)
	ϕ		46.4 ϕ mm	46.5 ϕ mm	46.6 ϕ mm	46.7 ϕ mm	46.8 ϕ mm	46.8 ϕ mm	46.9 ϕ mm	(46.9 ϕ mm)
Front Principal Point ※3		[Front.PP]	59.57mm	59.92mm	60.17mm	60.36mm	60.49mm	60.62mm	60.71mm	(60.71mm)
Rear Principal Point ※3		[Rear.PP]	99.74mm	99.37mm	99.10mm	98.88mm	98.72mm	98.57mm	98.45mm	(98.45mm)
Nodal Point Distance		[HH']	-19.3mm	-19.29mm	-19.27mm	-19.24mm	-19.21mm	-19.19mm	-19.16mm	(-19.16mm)

※3 Entrance pupil En.P and principal point H at the front tip point of the lens.
Exit pupil(Ex.P), Rear Principal Point(H') : at the mount point. Image side:「+」 Object side:「-」



Aperture Ring	
F#	Rotation Angle
2.5	0°
(2.8)	6°
(3.4)	15°
4	24°
(4.8)	33°
5.6	42°
(6.7)	51°
8	60°
(9.5)	69°
11	78°

Floating Ring					
8	Rotation Angle	(A)	(B)	(C)	(D)
-2.0	0°	114.72	140	248.84	503.56
-2.5	27°	102.84		307.52	550.36
-3.0	46°30'	94.89		366.09	600.98
-3.5	61°30'	89.21		424.58	653.79
-4.0	72°	84.94		483.00	707.94
-4.5	82°30'	81.60		541.43	763.03
-5.0	90°	78.95		599.79	818.74

	Aperture Ring	Floating Ring
Type	Spur Gear	
P.C.D.	ø86	
m	0.5	
z	172	

・Specifications unless any specific instructions are stated is at the standard magnification.
・Specifications are subject to change without prior notice.

NikonRayfact2-5x Variable Lens : Prism suitable model

Specifications

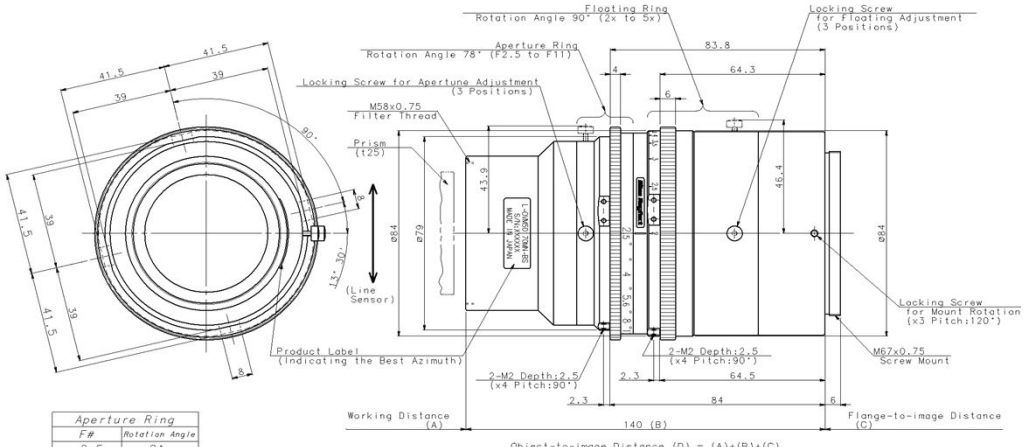
Model	L-OVM50170MN-BS							
Magnification range	-2.0x～-5.0x							
Magnification	-2.0x	-2.5x	-3.0x	-3.5x	-4.0x	-4.5x	-5.0x	(-5.2x)※2
Focal length	117mm							
F Number (∞)	F2.5							
NA (Diaphragm open)	0.133	0.144	0.151	0.157	0.162	0.166	0.17	0.171
Reference wavelength	546.07nm(e-line)							
Wavelength range	400～700nm							
Image size	86.4mm ϕ							
Object size ※1	43.2mm ϕ	34.6mm ϕ	28.8mm ϕ	24.7mm ϕ	21.6mm ϕ	19.2mm ϕ	17.3mm ϕ	(16.6mm ϕ)
Distortion ※1	+0.07%	-0.01%	-0.03%	-0.05%	-0.05%	-0.05%	-0.05%	(-0.04%)
Relative illumination ※1	88.2%	93.3%	96.2%	97.5%	98.1%	98.6%	99.0%	(99.1%)
Aperture scale	2.5 2.8 4 5.6 8 11							
Object-to-image distance	513.7mm	561mm	612.1mm	665.4mm	720.1mm	775.7mm	831.9mm	(854.5mm)
Working distance	119.8mm	107.8mm	99.8mm	94mm	89.7mm	86.35mm	83.7mm	(82.8mm)
Mount size	M67(P=0.75)							
Flange-to image distance	253.9mm	313.2mm	372.3mm	431.4mm	490.3mm	549.3mm	608.3mm	(631.8mm)
Attachment size	M58 (P=0.75)							
Diameter/length	84mm ϕ ×140mm							
Weight	Approximately 1350g							

※1 Highest image height (Y'=43.2mm) at F2.5 with prism (25mm thickness・material BK7 or equivalent) to put between an object and the lens.

※2 -5.2x:To fix the magnification at -5.0x and move the lens outward up to the maximal point.

			-2.0x	-2.5x	-3.0x	-3.5x	-4.0x	-4.5x	-5.0x	(-5.2x)
Entrance pupil※3	d	[En.P]	58.57mm	58.57mm	58.57mm	58.57mm	58.57mm	58.57mm	58.57mm	(58.57mm)
	ϕ		45.7 ϕ mm	45.8 ϕ mm	45.9 ϕ mm	45.9 ϕ mm	46.0 ϕ mm	46.0 ϕ mm	46.0 ϕ mm	(46.0 ϕ mm)
Exit pupil ※3	d	[Ex.P]	104.62mm	104.63mm	104.62mm	104.60mm	104.58mm	104.56mm	104.54mm	(104.54mm)
	ϕ		48.0 ϕ mm	48.1 ϕ mm	48.2 ϕ mm	48.3 ϕ mm	48.4 ϕ mm	48.4 ϕ mm	48.5 ϕ mm	(48.5 ϕ mm)
Front Principal Point ※3		[Front.PP]	64.76mm	65.11mm	65.35mm	65.54mm	65.66mm	65.79mm	65.88mm	(65.88mm)
Rear Principal Point ※3		[Rear.PP]	98.09mm	97.70mm	97.42mm	97.19mm	97.03mm	96.87mm	96.75mm	(96.75mm)
Nodal Point Distance		[HH']	-22.9mm	-22.8mm	-22.8mm	-22.7mm	-22.7mm	-22.7mm	-22.6mm	-22.6mm

※3 Entrance pupil En.P and principal point H at the front tip point of the lens.
Exit pupil(Ex.P), Rear Principal Point(H') : at the mount point. Image side:「+」 Object side:「-」



Aperture Ring	
F#	Rotation Angle
2.5	0°
(2.8)	6°
(3.4)	15°
4	24°
(4.8)	33°
5.6	42°
(6.7)	51°
8	60°
(9.5)	69°
11	78°

Floating Ring					
ß	Rotation Angle	(A)	(B)	(C)	(D)
-2.0	0°	119.79	140	253.92	513.71
-2.5	27°	107.78		313.18	560.96
-3.0	46°30'	99.76		372.31	612.07
-3.5	61°30'	94.02		431.37	665.39
-4.0	72°	89.72		490.34	720.06
-4.5	82°30'	86.35		549.33	775.68
-5.0	90°	83.66		608.26	831.92

	Aperture Ring	Floating Ring
Type	Spur Gear	
P.C.D.	ø86	
m	0.5	
z	172	

・Specifications unless any specific instructions are stated is at the standard magnification.
・Specifications are subject to change without prior notice.

Specifications

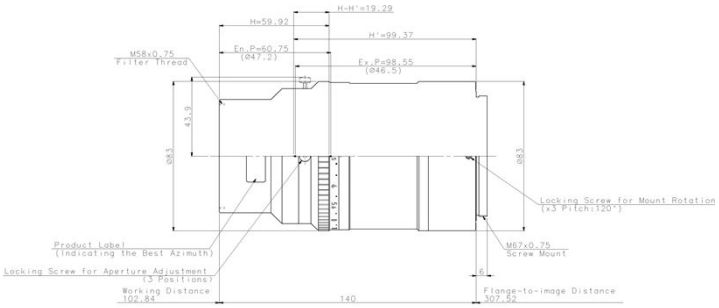
Model	L-OFM25143MN
Focal length	116.3mm
F Number (∞)	F2.5
NA (Diaphragm open)	0.143
Magnification scale	-2.5x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	12.0°
Image size	86.4mmφ
Object size	34.6mmφ
Distortion	+0.01% ※1
Relative illumination	95.4% ※1
Aperture scale	2.5 4 5.6 8 11 (With a click stop)
Object-to-image distance	550.4mm
Working distance	102.8mm
Mount size	M67(P=0.75)
Flange-to-image distance	307.5mm
Back focus	329.1mm
Attachment size	M58(P=0.75)
Diameter/length	83mmφ×140mm ※2
Weight	Approximately 1200g

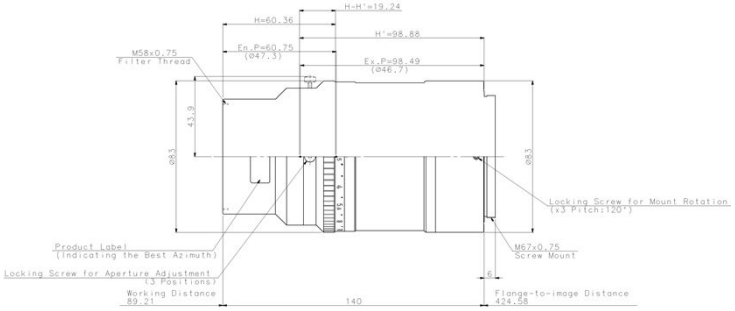
※1 Highest image height (Y'=43.2mm) at F2.5.
※2 Dimension excludes protrusion of screws or other convex part.

Specifications

Model	L-OFM35156MN
Focal length	116.3mm
F Number (∞)	F2.5
NA (Diaphragm open)	0.156
Magnification scale	-3.5x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	9.4°
Image size	86.4φmm
Object size	24.7φmm
Distortion	-0.03% ※1
Relative illumination	99.2% ※1
Aperture scale	2.5 4 5.6 8 11 (With a click stop)
Object-to-image distance	653.8mm
Working distance	89.2mm
Mount size	M67(P=0.75)
Flange-to-image distance	424.6mm
Back focus	446.2mm
Attachment size	M58(P=0.75)
Diameter/length	83mmφ×140mm ※2
Weight	Approximately 1200g

※1 Highest image height (Y'=43.2mm) at F2.5.
※2 Dimension excludes protrusion of screws or other convex part.



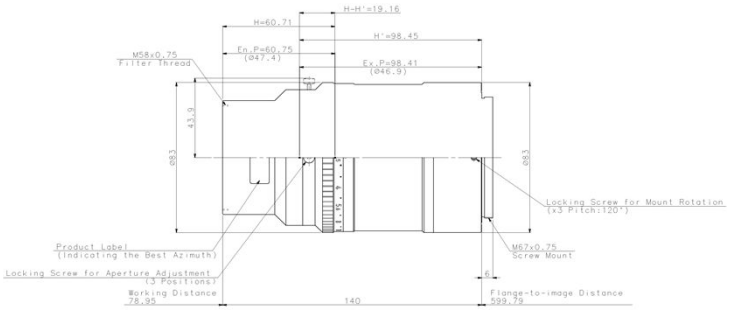


・Specifications unless any specific instructions are stated is at the standard magnification.
・Specifications are subject to change without prior notice.

Specifications

Model	L-OFM50167MN
Focal length	116.4mm
F Number (∞)	F2.5
NA (Diaphragm open)	0.167
Magnification scale	-5.0x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	7.0°
Image size	86.4φmm
Object size	17.3φmm
Distortion	-0.03% ※1
Relative illumination	99.7% ※1
Aperture scale	2.5 4 5.6 8 11(With a click stop)
Object-to-image distance	818.7mm
Working distance	79.0mm
Mount size	M67(P=0.75)
Flange-to-image distance	599.8mm
Back focus	621.4mm
Attachment size	M58(P=0.75)
Diameter/length	83mmφ×140mm ※2
Weight	Approximately1200g

※1 Highest image height (Y'=43.2mm) at F2.5.
※2 Dimension excludes protrusion of screws or other convex part.



・Specifications unless any specific instructions are stated is at the standard magnification.
・Specifications are subject to change without prior notice.

For further queries, please contact ;
Marketing Sec. Industrial Equipment Dept.
TOCHIGI NIKON CORPORATION
E-mail : ktn.eigyo@nikon.com
TEL+81-287-28-7100 FAX+81-287-28-7170

ver4.0