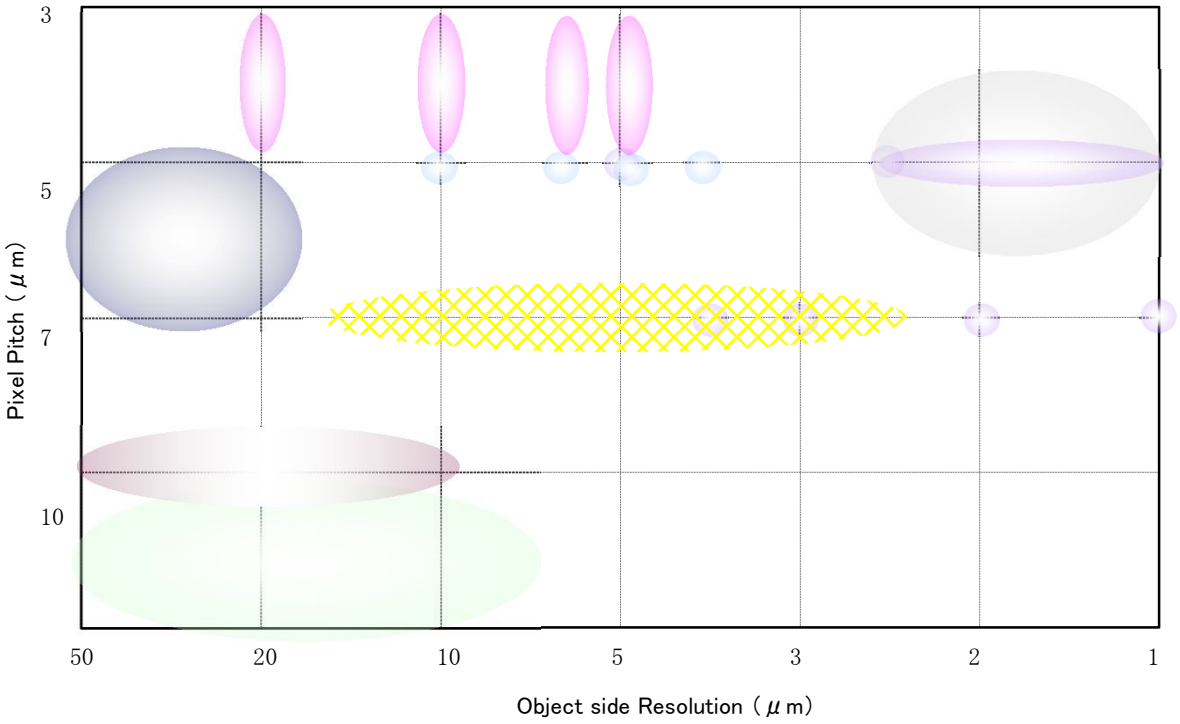
Nikon Rayfact

Tochigi Nikon Industrial Lens

TOCHIGI NIKON CORPORATION
Marketing Sec.
Industrial Equipment Dept.

《Each color corresponds to each lens series.》



2-5x Lens
- NikonRayfact2-5x
- NikonRayfact2-5x (prism suitable model)

Nikon Rayfact Series
- NikonRayfact7x(Straight-tube type)
- NikonRayfact7x (Coaxial epi-illumination type)
- NikonRayfact3.5x
- NikonRayfact2.35x(Build-to-order product)
- NikonRayfact2x
- NikonRayfact1.75x(Build-to-order product)
- NikonRayfact1x

Nikon Rayfact VL Series
- NikonRayfactVL0.5x
- NikonRayfactVL0.7x
- NikonRayfactVL1.0x
- NikonRayfactVL1.4x

Nikon Rayfact VW Series
- NikonRayfactVW0.14x
- NikonRayfactVW0.25x
- NikonRayfactVW0.35x

Nikon Rayfact MJ Series
- NikonRayfactMJ90mmF4
- NikonRayfactMJ95mmF4

Nikon Rayfact VF
- NikonRayfactVF
- NikonRayfactVF1.0x
- NikonRayfactVF1.4x
- NikonRayfactVF2.0x
- NikonRayfactVF2.5x
- NikonRayfactVF3.0x

Nikon Rayfact GF Series
- NikonRayfact80mmF4 0.235x (Build-to-order product)
- NikonRayfact80mmF4 0.47x (Build-to-order product)
- NikonRayfact80mmF4 0.7x (Build-to-order product)
- NikonRayfact80mmF4 1.0x (Build-to-order product)

Nikon Rayfact IL Series
- NikonRayfactIL40mm (Build-to-order product)
- NikonRayfactIL50mmF2.8N
- NikonRayfactIL63mmF2.8N
- NikonRayfactIL75mmF4N
- NikonRayfactIL95mmF5.6N
- NikonRayfactIL63mmF2.8N(F)

UV105mm-F4.5
- UV105mm-F4.5

ver3.3

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 - ϕ84mm - For high resolution, large-sized line sensor cameras.
- Recommendable line sensor cameras - 5μm x 16K / 5.2μm x 12K / 7μm 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.
- RoHs compliant

• Applications

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

NikonRayfact2-5x Variable Lens

Specifications

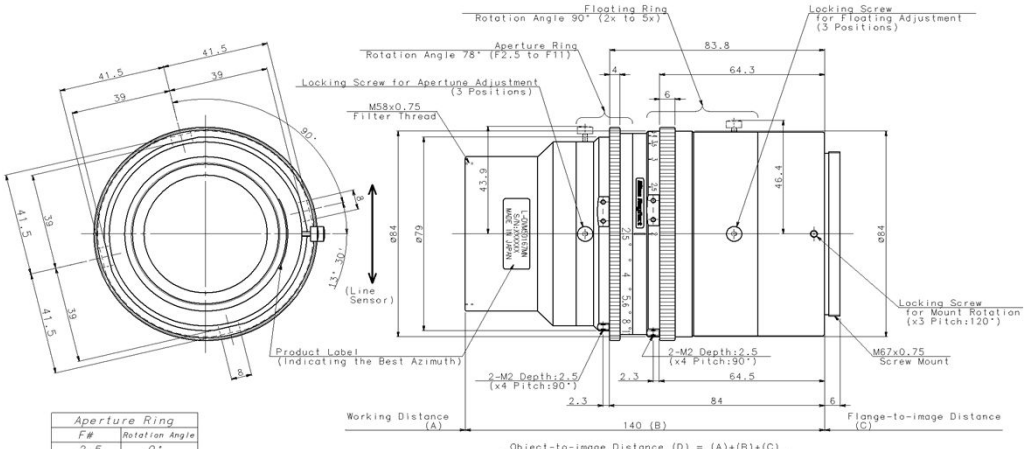
Model	L-OVM50167MN							
Magnification range	-2.0x～-5.0x							
Magnification	-2.0x	-2.5x	-3.0x	-3.5x	-4.0x	-4.5x	-5.0x	(-5.2x)※2
Focal length	116mm							
F Number (∞)	F2.5							
NA (Diaphragm open)	0.133	0.143	0.15	0.156	0.16	0.164	0.167	0.168
Reference wavelength	546.07nm (e-line)							
Wavelength range	400～700nm							
Image size	φ84mm							
Object size ※1	φ42mm	φ33.6mm	φ28mm	φ24mm	φ21mm	φ18.7mm	φ16.8mm	(φ16.2mm)
Distortion ※1	+0.08%	+0.01%	-0.02%	-0.03%	-0.03%	-0.03%	-0.03%	(-0.03%)
Relative illumination ※1	91.2%	95.7%	98.1%	98.9%	99.1%	99.1%	99.2%	(99.2%)
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	φ84mm×140mm							
Weight	Approximately 1350g							

※1 Highest image height (Y'=42mm) 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		φ47.2mm	φ47.2mm	φ47.3mm	φ47.4mm	φ47.4mm	φ47.4mm	φ47.4mm	(φ47.4mm)
Exit pupil ※3	d	[Ex.P]	98.57mm	98.55mm	98.52mm	98.49mm	98.46mm	98.43mm	98.41mm	(98.41mm)
	φ		φ46.4mm	φ46.5mm	φ46.6mm	φ46.7mm	φ46.8mm	φ46.8mm	φ46.9mm	(φ46.9mm)
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

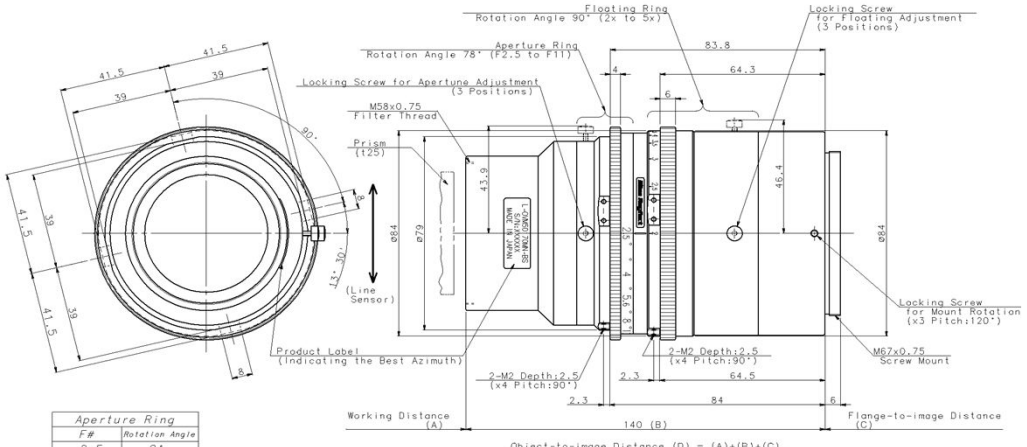
Model	L-OVM50170MN-BS							
Magnification range	-2.0x～-5.0x							
Magnification	-2.0x	-2.5x	-3.0x	-3.5x	-4.0x	-4.5x	-5.0x	(-5.2x)※2
Focal length	117mm							
F Number (∞)	F2.5							
NA (Diaphragm open)	0.133	0.144	0.151	0.157	0.162	0.166	0.17	0.171
Reference wavelength	546.07nm(e-line)							
Wavelength range	400～700nm							
Image size	φ84mm							
Object size ※1	φ42mm	φ33.6mm	φ28mm	φ24mm	φ21mm	φ18.7mm	φ16.8mm	(φ16.2mm)
Distortion ※1	+0.06%	-0.01%	-0.03%	-0.04%	-0.05%	-0.04%	-0.04%	(-0.04%)
Relative illumination ※1	88.9%	93.6%	96.2%	97.3%	97.9%	98.3%	98.7%	(98.8%)
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	φ84mm×140mm							
Weight	Approximately 1350g							

※1 Highest image height (Y'=42mm) 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		φ45.7mm	φ45.8mm	φ45.9mm	φ45.9mm	φ46.0mm	φ46.0mm	φ46.0mm	(φ46.0mm)
Exit pupil ※3	d	[Ex.P]	104.62mm	104.63mm	104.62mm	104.60mm	104.58mm	104.56mm	104.54mm	(104.54mm)
	φ		φ48.0mm	φ48.1mm	φ48.2mm	φ48.3mm	φ48.4mm	φ48.4mm	φ48.5mm	(φ48.5mm)
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					
β	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.	φ86	
m	0.5	
z	172	

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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

Nikon Rayfact Series

・ Features

・ Rayfact 2x and 1x : successor models to Printing Nikkor Lenses.
・ No lens aberration (0.0%) at the standard magnification ratio.
・ Guarantee high resolution and uniformity from the center to the edge of the lens.
・ Anti-reflection coating applied to minimize lens surface reflection.
・ Rayfact 2x and 1x : Apochromatic lens with the best chromatic aberration correction in the wide-range of 400-800nm.
・ Rayfact 7x and 3.5x : Image size φ64mm has a high relative illumination.
・ Rayfact 7x : Bilateral telecentric lenses.
・ RoHS compliant.

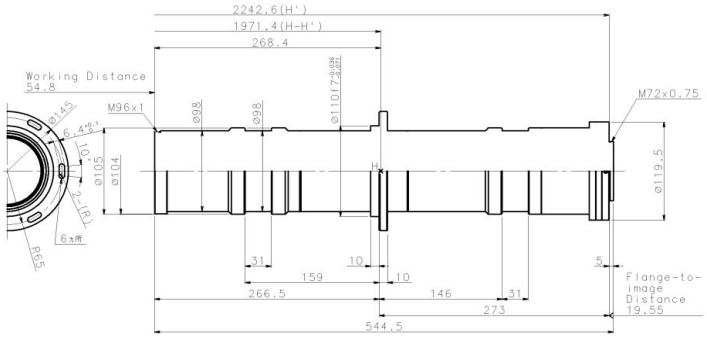
・ Applications

・ Inspection by high resolution line sensor cameras.
・ FPD inspection.
・ Fine pattern inspection – e.g. PCB.
・ Printed materials inspection.
・ Reproduction of color and monochrome film in the same size or scaling and data fetch.
・ 35mm format ： Enlargement of half format sliding and reduction copy.

Nikon Rayfact 7x(Straight-tube type)

Specifications

Model	OFM70350HN-TS
Focal length	Both sides telecentric
NA	0.35
Magnification scale	−7.0x
Reference wavelength	546.07nm(e-line)
Wavelength range	510～590nm
Picture angle	—
Image size	64mmϕ
Object size	9.1mmϕ
Distortion	0.0%(at 64mmϕ)
Relative illumination	103% (at 64mmϕ)
Aperture scale	A fixed diaphragm
Object-to-image distance	613.9mm
Working distance	54.8mm
Mount size	M72(P=0.75)
Flange-to-image distance	19.55mm
Back focus	81.17mm
Attachment size	M96(P=1.0)
Diameter/length	145mmϕ × 544.5mm
Weight	Approximately 7.4kg
An option	—

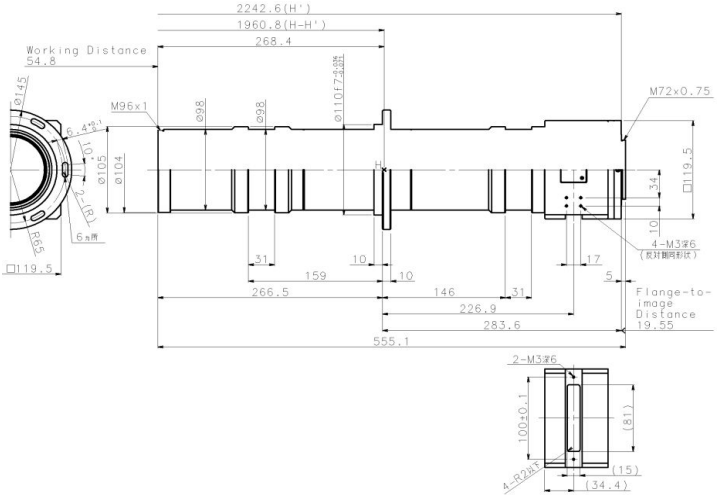


Nikon Rayfact 7x(Epi-illumination type)

Specifications

Model	OFM70350HN-TP
Focal length	Both sides telecentric
NA	0.35
Magnification scale	−7.0x
Reference wavelength	546.07nm(e-line)
Wavelength range	510～590nm
Picture angle	—
Image size	64mmϕ
Object size	9.1mmϕ
Distortion	0.0%(64mm)
Relative illumination	103% (64mm)
Aperture scale	Fixed diaphragm
Object-to-image distance	624.5mm
Working distance	54.8mm
Mount size	M72(P=0.75)
Flange-to-image distance	19.55mm
Back focus	58.75mm
Attachment size	M96(P=1.0)
Diameter/length	145mmϕ(partially □119.5mm) ×555.1mm
Weight	Approximately 8.9kg
An option	—

※ Suitable for line sensor cameras.



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ver3.3

NikonRayfact3.5x

NikonRayfact2.35x(Build-to-order product)

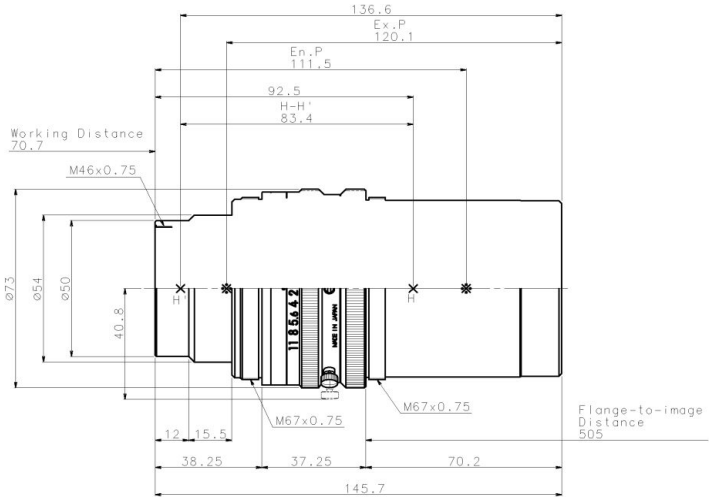
Specifications

Model	OFM35162MN
Focal length	127.0mm
F Number (∞)	F2.4
NA (Diaphragm open)	0.162
Magnification scale	−3.5x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	5.7°
Image size	64mmϕ
Object size	18.3mmϕ
Distortion	0.0%(at 64mmϕ)
Relative illumination	98%(at 64mmϕ)
Aperture scale	2.4,4,5.6,8,11 (9° interval ※1, 1/2 dials with a finger stop) ※2
Object-to-image distance	651.3mm
Working distance	70.8mm
Mount size	M67(P=0.75)
Flange-to-image distance	505.0mm
Back focus	437.9mm
Attachment size	M46(P=0.75)
Diameter/length	73mmϕ × 145.7mm ※3
Weight	Approximately 1.1kg
Option	Coaxial vertical tube

Specifications

Model	OFM24125MN
Focal length	95.1㎜
F Number (∞)	F2.8
NA (Diaphragm open)	0.125
Magnification scale	−2.35x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～800nm
Picture angle	11.4°
Image size	64mmϕ
Object size	27.24mmϕ
Distortion	0.0%(at 64mmϕ)
Relative illumination	78.9%(at 64mmϕ)
Aperture scale	2.8,4,5.6,8,11 (18° interval, 1/2 dials with a finger stop)
Object-to-image distance	424.2mm
Working distance	79.5mm
Mount size	M45(P=0.75)
Flange-to-image distance	254.5mm
Back focus	255.4mm
Attachment size	—
Diameter/length	57mmϕ × 94.2mm
Weight	Approximately 420g

※1 Aperture scale at 2.8 : Only lock-in position available. No numeric indication.
※2 Lockable setting mechanism.
※3 Dimension excludes protrusion of screws or other convex part.



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ver3.3

NikonRayfact2x

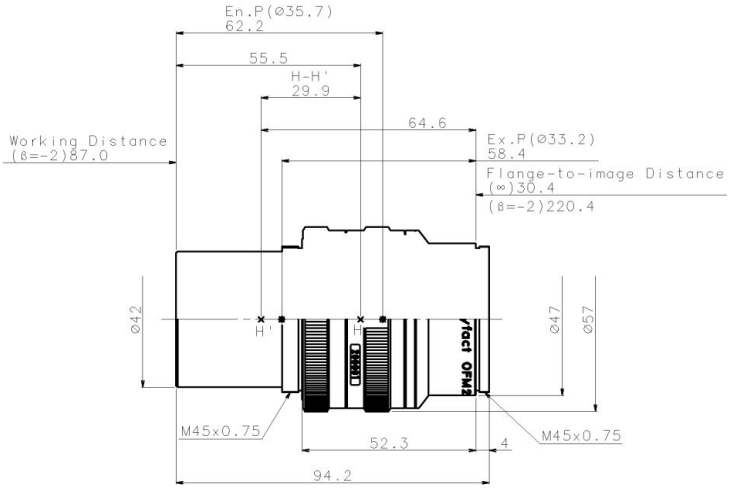
Specifications

Model	OFM20119MN	
	In use −2.0x	In use −0.5x
Focal length	95.0mm	
F Number (∞)	F2.8	
NA (Diaphragm open)	8.4 (at Standard magnification)	4.2 (at Standard magnification)
Magnification scale	−2.0x	−0.5x
Reference wavelength	546.07nm(e-line)	
Wavelength range	400～800nm	
Picture angle	12.8°	12.8°
Image size	64mmϕ	32mmϕ
Object size	32mmϕ	64mmϕ
Distortion	0.0% (at 64mmϕ)	0.0% (at 32mmϕ)
Relative illumination	74.6% (64mmϕ)	74.6% (32mmϕ)
Aperture scale	2.8,4,5.6,8,11 (18° interval, 1/2 dials with a finger stop)	
Object-to-image distance	397.6mm	
Working distance	87.0mm	212.4mm
Mount size	M45(P=0.75)	
Flange-to-image distance	220.4mm	124.9mm
Back focus	222.0mm	90.3mm
Attachment size	—	M43(P=0.5)
Diameter/length	57mmϕ×98.2mm	
Weight	Approximately 420g	

NikonRayfact1.75x(Build-to-order product)

Specifications

Model	L-OFM18113MN
Focal length	100.2mm
F Number (∞)	F2.8
NA (Diaphragm open)	0.113
Magnification scale	−1.75x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～800nm
Picture angle	17.8°
Image size	64mmϕ
Object size	36.57mmϕ
Distortion	0.1%(at 64mmϕ)
Relative illumination	65.2%(at 64mmϕ)
Aperture scale	2.8,4,5.6,8,11 (18° interval, 1/2 dials with a finger stop)
Object-to-image distance	392.1mm
Working distance	92.6mm
Mount size	M45(P=0.75)
Flange-to-image distance	203.2mm
Back focus	200.4mm
Attachment size	—
Diameter/length	57mmϕ×100.3mm
Weight	Approximately 430g



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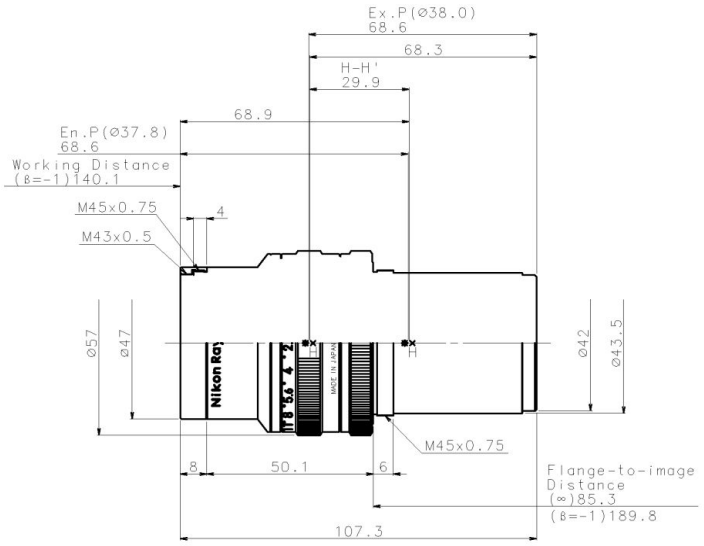
ver3.3

NikonRayfact1x

Specifications

Model	OFM10090MN
Focal length	104.5mm
F Number (∞)	F2.8
NA (Diaphragm open)	0.089
Magnification scale	−1.0x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～800nm
Picture angle	16.3°
Image size	60mmϕ
Object size	60mmϕ
Distortion	0.0%(at 60mmϕ)
Relative illumination	62%(at 60mmϕ)
Aperture scale	2.8,4,5.6,8,11 (18° interval, 1/2 dials with a finger stop)
Object-to-image distance	388.1mm
Working distance	140.1mm
Mount size	M45(P=0.75)
Flange-to-image distance	189.8mm
Back focus	147.7mm
Attachment size	M43(P=0.5)
Diameter/length	57mmϕ × 107.3mm
Weight	Approximately 400g



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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

ver3.3

▪ Features

・The optimal design for line censor cameras of 7 μm x 8K / 5 μm x 12K.
・Large image size φ 62mm suitable for high resolution cameras.
・Wide range of magnification at 0.5x, 0.7x, 1.0x and 1.4x for various applications.
・Minimal distortion (0.0% at the standard magnification).
・High resolution and uniformity from the center to the edge of the lens.
・Best performance at a diaphragm opening position.
・Rotating mount mechanism enables you to align the lens at the best resolution direction.
・Lockable screws to fix an aperture required.
・RoHS compliant.

▪ Applications

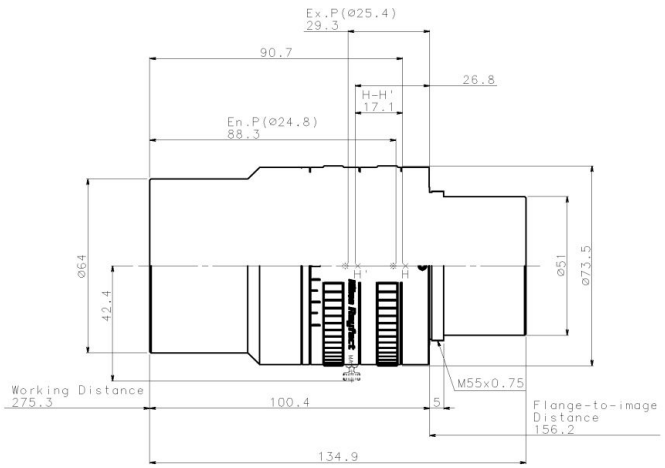
・Inspection by high resolution line sensor cameras.
・FPD inspection.
・Fine pattern inspection – e.g. PCB.
・Printed materials inspection.
・Fine pattern inspection and detecting defects – e.g. TAB, sheets.

NikonRayfactVL0.5x

Specifications

Model	L-OFM05034MN
Focal length	122.0mm
F Number (∞)	F4.9
NA (Diaphragm open)	0.034
Magnification scale	-0.5x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	19.4°
Image size	62mmϕ
Object Size	124.0mmϕ
Distortion	0.0% ※1
Relative illumination	92.9% ※1
Aperture scale	4.9,5.6,8,11 (With a click stop, short lines are 1/2 aperture)※2
Object-to-image distance	531.9mm
Working distance	275.3mm
Mount size	M55(P=0.75)
Flange-to-image distance	156.2mm
Back focus	124.4mm
Attachment size	M55(P=0.75)
Diameter/length	73.5mmϕ ×134.9mm ※3
Weight	Approximately 820g

※1 Image size 62mmϕ at F4.9.
※2 Diaphragm scale indicated with indexes. No numeric indication.
※3 Dimension excludes protrusion of screws or other convex part.

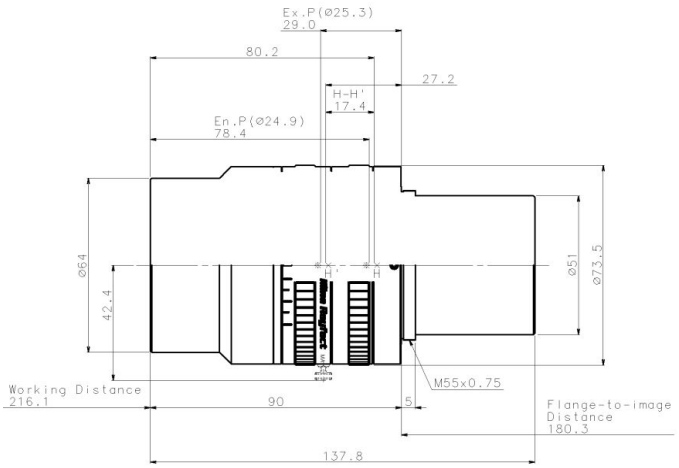


NikonRayfactVL0.7x

Specifications

Model	L-OFM07042MN
Focal length	122.0mm
F Number (∞)	F4.9
NA (Diaphragm open)	0.042
Magnification scale	-0.7x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	17.1°
Image size	62mmϕ
Object Size	88.6mmϕ
Distortion	0.0% ※1
Relative illumination	94.3% ※1
Aperture scale	4.9,5.6,8,11 (With a click stop, short lines are 1/2 aperture)※2
Object-to-image distance	486.4mm
Working distance	216.1mm
Mount size	M55(P=0.75)
Flange-to-image distance	180.3mm
Back focus	135.2mm
Attachment size	M55(P=0.75)
Diameter/length	73.5mmϕ ×137.8mm ※3
Weight	Approximately 780g

※1 Image size 62mmϕ at F4.9.
※2 Diaphragm scale indicated with indexes. No numeric indication.
※3 Dimension excludes protrusion of screws or other convex part.



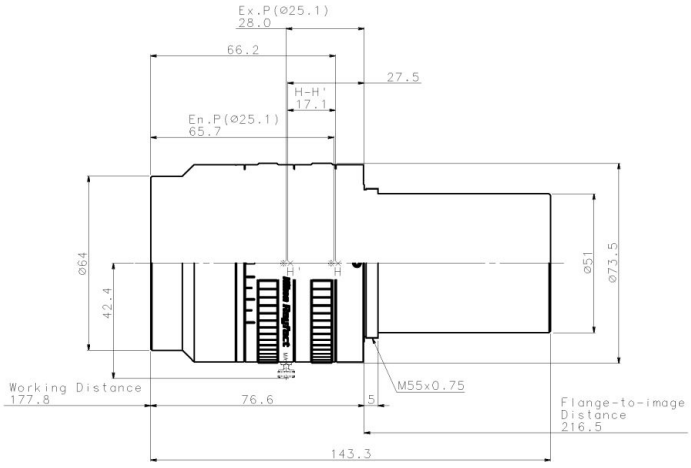
・Specifications unless any specific instructions are stated is at the standard magnification.
・Specifications are subject to change without prior notice.

NikonRayfactVL1.0x

Specifications

Model	L-OFM10051MN
Focal length	122.0mm
F Number (∞)	F4.9
NA (Diaphragm open)	0.051
Magnification scale	-1.0x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	14.5°
Image size	62mmϕ
Object Size	ϕ62.0mm
Distortion	0.0% ※1
Relative illumination	95.6% ※1
Aperture scale	4.9,5.6,8,11 (With a click stop, short lines are 1/2 aperture)※2
Object-to-image distance	470.9mm
Working distance	177.8mm
Mount size	M55(P=0.75)
Flange-to-image distance	216.5mm
Back focus	152.5mm
Attachment size	M55(P=0.75)
Diameter/length	73.5mmϕ×143.3mm ※3
Weight	Approximately 840g

※1 Image size 62mmϕ at F4.9.
※2 Diaphragm scale indicated with indexes. No numeric indication.
※3 Dimension excludes protrusion of screws or other convex part.

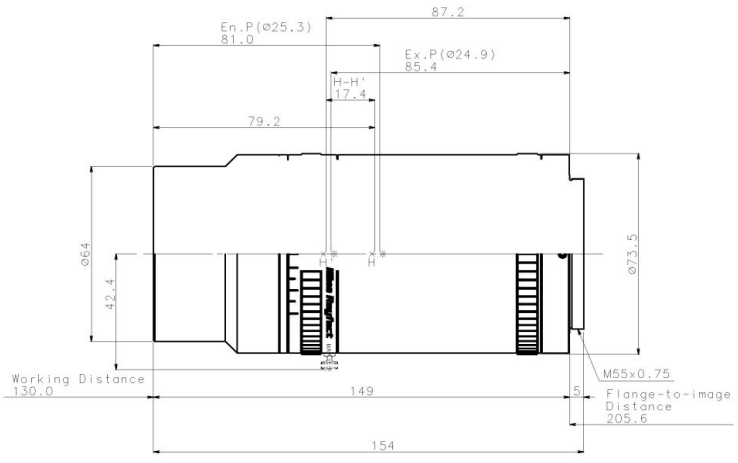


NikonRayfactVL1.4x

Specifications

Model	L-OFM14060MN
Focal length	122.0mm
F Number (∞)	F4.9
NA (Diaphragm open)	0.06
Magnification scale	-1.4x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	12.0°
Image size	62mmϕ
Object Size	ϕ44.3mm
Distortion	0.0% ※1
Relative illumination	96.8% ※1
Aperture scale	4.9,5.6,8,11 (With a click stop, short lines are 1/2 aperture)※2
Object-to-image distance	484.6mm
Working distance	130.0mm
Mount size	M55(P=0.75)
Flange-to-image distance	205.6mm
Back focus	220.6mm
Attachment size	M55(P=0.75)
Diameter/length	73.5mmϕ×154mm ※3
Weight	Approximately 920g

※1 Image size 62mmϕ at F4.9.
※2 Diaphragm scale indicated with indexes. No numeric indication.
※3 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.

ver3.3

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

ver3.3

・ Features

・Low magnification line-up suitable for large-sized line sensor cameras.
・Image size φ 62mm to meet your use of large-sized high resolution line censor cameras.
・Optical design suitable for line censor cameras : 7μm x 8K / 5μm x 12K.
Also, avaulable for 3.5μm x 16K line sensor cameras.
・3 models at the magnification range (0.1x - 0.4x) for your best choice.
・High resolution and uniformity from the center to the edge of the lens.
・Best performance at a diaphragm opening position.
・Minimal distortion (below 0.1% at the standard magnification).
・Rotating mount mechanism enables you to align the lens at the best resolution direction.
・Lockable screws to fix an aperture required.
・RoHS compliant.

・ Applications

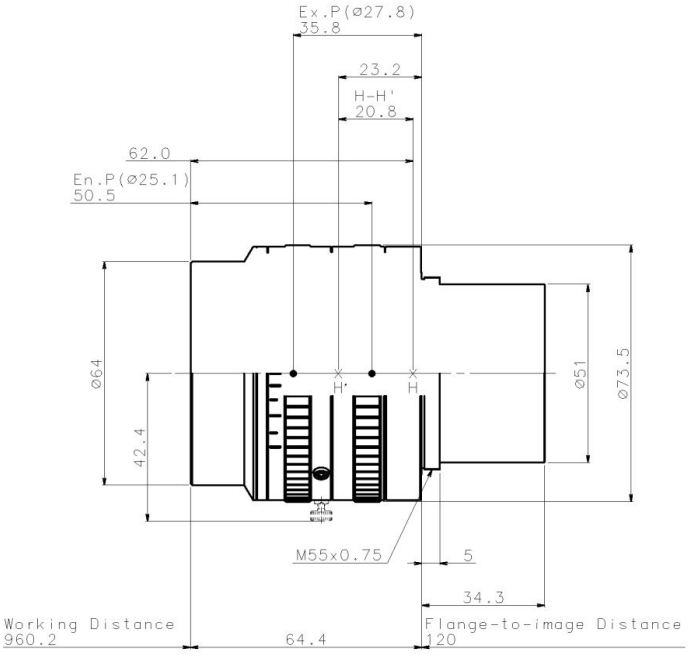
・Suitable for high resolution cameras (CCD pixel size : 7μm / 5μm)
・FPD inspection.
・Fine pattern inspection - e.g. PCB.
・Printed materials inspection.
・Fine pattern inspection and detecting defects - e.g. TAB, sheets.

NikonRayfactVW0.14x

Specifications

Model	L-OFM014012MN
Focal length	125.5mm
F Number (∞)	F4.9
NA (Diaphragm open)	0.013
Magnification scale	−0.14x
Magnification range	−0.1x～−0.18x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	24.7° ※1
Image size	62mmϕ
Object Size	442.9mmϕ ※1
Distortion	0.0% ※1
Relative illumination	90.9% ※1
Aperture scale	4.9,5.6,8,11(With a click stop) ※2
Object-to-image distance	1144.6mm ※1
Working distance	960.2mm ※1
Mount size	M55(P=0.75)
Flange-to-image distance	120.0mm ※1
Back focus	87.9mm
Attachment size	M55(P=0.75)
Diameter/length	73.5mmϕ×98.7mm ※3
Weight	Approximately 740g

※1 Value at the standard magnification.
※2 Diaphragm scale indicated with indexes. No numeric indication.
※3 Dimension excludes protrusion of screws or other convex part.

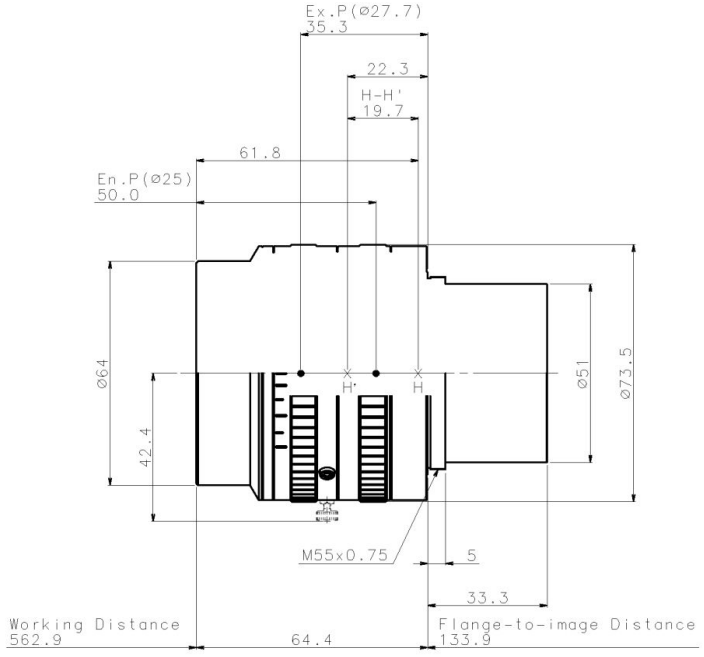


NikonRayfactVW0.25x

Specifications

Model	L-OFM025020MN
Focal length	124.9mm
F Number (∞)	F4.9
NA (Diaphragm open)	0.02
Magnification scale	−0.25x
Magnification range	−0.18x～−0.28x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	22.9° ※1
Image size	62mmϕ
Object Size	248.0mmϕ ※1
Distortion	−0.1% ※1
Relative illumination	93.4% ※1
Aperture scale	4.9,5.6,8,11(With a click stop) ※2
Object-to-image distance	761.1mm ※1
Working distance	562.9mm ※1
Mount size	M55(P=0.75)
Flange-to-image distance	133.9mm ※1
Back focus	102.7mm
Attachment size	M55(P=0.75)
Diameter/length	73.5mmϕ×97.7mm ※3
Weight	Approximately 740g

※1 Value at the standard magnification.
※2 Diaphragm scale indicated with indexes. No numeric indication.
※3 Dimension excludes protrusion of screws or other convex part.



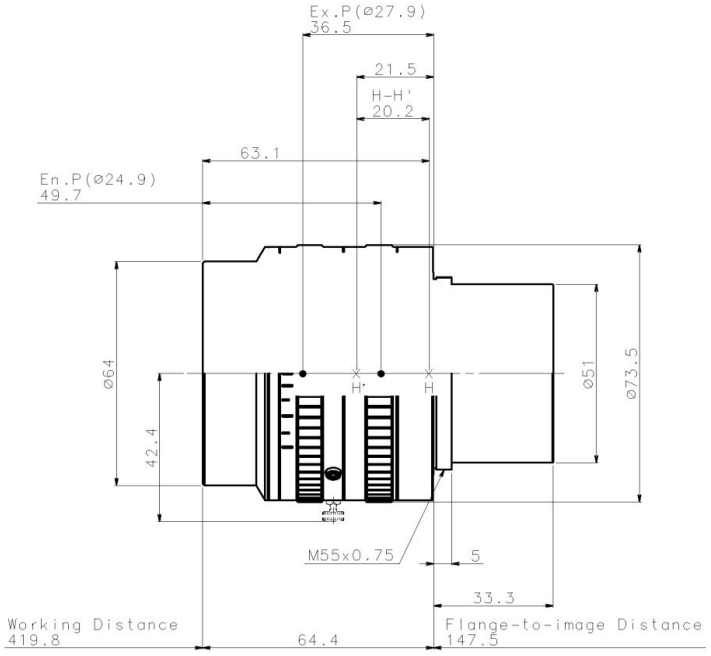
・Specifications unless any specific instructions are stated is at the standard magnification.
・Specifications are subject to change without prior notice.

NikonRayfactVW0.35x

Specifications

Model	L-OFM035026MN
Focal length	125.2mm
F Number (∞)	F4.9
NA (Diaphragm open)	0.026
Magnification scale	-0.35x
Magnification range	-0.28x～-0.4x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	21.3° ※1
Image size	62mmφ
Object Size	177.1mmφ※1
Distortion	-0.1% ※1
Relative illumination	94.3% ※1
Aperture scale	4.9,5.6,8,11(With a click stop) ※2
Object-to-image distance	631.7mm ※1
Working distance	419.8mm ※1
Mount size	M55(P=0.75)
Flange-to-image distance	147.5mm ※1
Back focus	115.6mm
Attachment size	M55(P=0.75)
Diameter/length	73.5mmφ×97.7mm ※3
Weight	Approximately 740g

※1 Value at the standard magnification.
※2 Diaphragm scale indicated with indexes. No numeric indication.
※3 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

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Nikon Rayfact VF

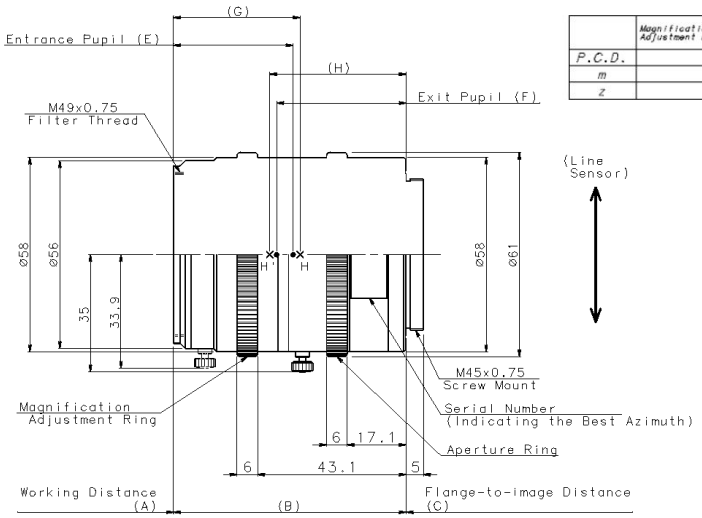
・ Features

・Variable magnification range : 0.5x – 3.0x
・Image size φ 64mm to meet large-sized high resolution line censor cameras.
・Suitable for line censor cameras of 7μm x 8K / 5μm x 12K.
・High performance guaranteed in all range of magnification.
・Adjustable diaphragm, Diaphragm open position at F4.
・Aperture lockable screw and floating ring lockable screw for easy use.
・Rotating mount mechanism enables you to align the lens at the best resolution direction.
・Fixed magnification model : Choice of 5 types of magnification (1.0x・1.4x・2.0x・2.5x・3.0x)
・Fixed magnification model : 3 types (Magnification at 2.0x・2.5x・3.0x) secure image size of φ84mm.
・RoHS compliant.

・ Applications

・Image receiving process by both line and area censor cameras.
・Printed materials inspection.
・Fine pattern inspection – e.g. PCB.
・Fine pattern inspection and detecting defects – e.g. TAB, sheets.
・FPD inspection.

NikonRayfactVF



	Magnification Adjustment Ring	Aperture Ring
P.C.D.	Ø60	
m	0.5	
z	120	

Specifications

Model	L-OVM30093MN						
Magnification range	−0.5x～−3.0x						
Magnification scale	−0.5x	−0.7x	−1.0x	−1.4x	−2.0x	−2.5x	−3.0x
Focal length	90mm						
F Number (∞)	F4						
NA (Diaphragm open)	0.042	0.051	0.062	0.073	0.083	0.089	0.093
Reference wavelength	546.07nm(e-line)						
Wavelength range	400～700nm						
Image size	64mmφ						
Object Size	128.0mmφ	91.4mmφ	64.0mmφ	45.7mmφ	32.0mmφ	25.6mmφ	21.3mmφ
Distortion ※1	+0.18%	+0.07%	+0.00%	−0.03%	−0.04%	−0.04%	−0.04%
Relative illumination ※1	56%	67%	78%	87%	93%	94%	95%
Aperture scale	4,5.6,8 (With a diaphragm lock)						
Object-to-image distance	405.93mm	371.87mm	360.08mm	370.56mm	405.93mm	442.62mm	482.36mm
Working distance	239.66mm	187.16mm	147.74mm	121.42mm	101.67mm	92.44mm	86.29mm
Mount size	M45(P=0.75)						
Flange-to-image distance	98.77mm	117.21mm	144.84mm	181.64mm	236.77mm	282.68mm	328.57mm
Attachment size	M49(P=0.75)						
Diameter/length	58mmφ×67.5mm ※2						
Weight	Approximately 430g						

※1 Highest image height (Y'=32mm) at F4.

		−0.5x	−0.7x	−1.0x	−1.4x	−2.0x	−2.5x	−3.0x
Entrance Pupil	d	34.32mm	34.93mm	35.69mm	36.44mm	37.12mm	37.48mm	37.75mm
	φ	22.8mm	22.9mm	23.0mm	23.0mm	23.1mm	23.2mm	23.2mm
Exit Pupil	d	39.97mm	39.34mm	38.59mm	37.83mm	37.18mm	36.82mm	35.56mm
	φ	23.1mm	23.0mm	23.0mm	22.8mm	22.7mm	22.7mm	22.7mm
Front Principal Point		35.48mm	35.57mm	35.69mm	35.80mm	35.90mm	35.96mm	36.00mm
Rear Principal Point		38.79mm	38.7mm	38.59mm	38.47mm	38.37mm	38.32mm	38.28mm
Nodal point distance		−6.77mm	−6.77mm	−6.78mm	−6.77mm	−6.77mm	−6.78mm	−6.78mm

β	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(J)
−0.5	239.66	67.5	98.77	405.93	34.32(φ22.8)	39.97(φ23.1)	35.48	38.79
−0.7	187.16		117.21	371.87	34.93(φ22.9)	39.34(φ23.0)	35.57	38.70
−1.0	147.74		144.84	360.08	35.69(φ23.0)	38.59(φ23.0)	35.69	38.59
−1.4	121.42		181.64	370.56	36.44(φ23.0)	37.83(φ22.8)	35.80	38.47
−2.0	101.66		236.77	405.93	37.12(φ23.1)	37.18(φ22.7)	35.90	38.37
−2.5	92.44		282.68	442.62	37.48(φ23.2)	36.82(φ22.7)	35.96	38.32
−3.0	86.29		328.57	482.36	37.75(φ23.2)	35.56(φ22.7)	36.00	38.28

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

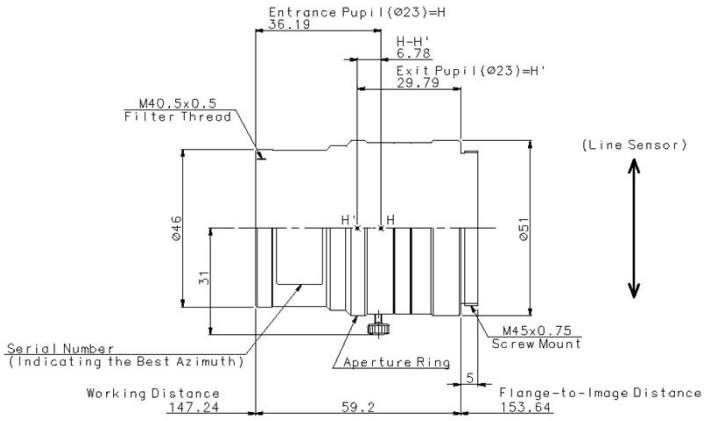
ver3.3

NikonRayfactVF 1.0x

Specifications

Model	L-OFM10062MN
Focal length	91.7mm
F Number (∞)	F4
NA (Diaphragm open)	0.062
Magnification scale	-1.0x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	19.8°
Image size	64mmϕ
Object Size	64mmϕ
Distortion	0% ※1
Relative illumination	77.9% ※1
Aperture scale	4,5.6,8(With a click stop ※2)
Object-to-image distance	360.1mm
Working distance	147.2mm
Mount size	M45(P=0.75)
Flange-to-image distance	153.6mm
Back focus	154.9mm
Attachment size	M40.5(P=0.5)
Diameter/length	51mmϕ×59.2mm ※3
Weight	Approximately 240g

※1 Image size 64mmϕ at F4
※2 Diaphragm scale indicated with indexes.
No numeric indication. The open position index states as "O".
※3 Dimension excludes protrusion of screws or other convex part.

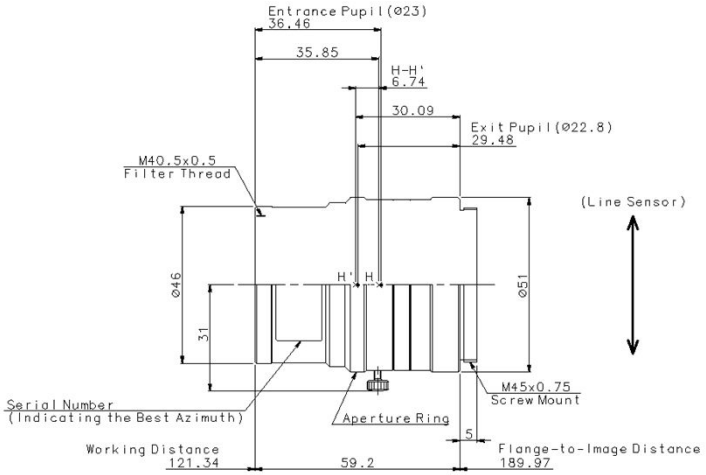


NikonRayfactVF 1.4x

Specifications

Model	L-OFM14073MN
Focal length	91.7mm
F Number (∞)	F4
NA (Diaphragm open)	0.073
Magnification scale	-1.4x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	16.4°
Image size	64mmϕ
Object Size	45.7mmϕ
Distortion	-0.03% ※1
Relative illumination	87.4% ※1
Aperture scale	4,5.6,8(With a click stop ※2)
Object-to-image distance	370.5mm
Working distance	121.3mm
Mount size	M45(P=0.75)
Flange-to-image distance	190mm
Back focus	191.7mm
Attachment size	M40.5(P=0.5)
Diameter/length	51mmϕ×59.2mm ※3
Weight	Approximately 240g

※1 Image size 64mmϕ at F4
※2 Diaphragm scale indicated with indexes.
No numeric indication. The open position index states as "O"
※3 Dimension excludes protrusion of screws or other convex part.



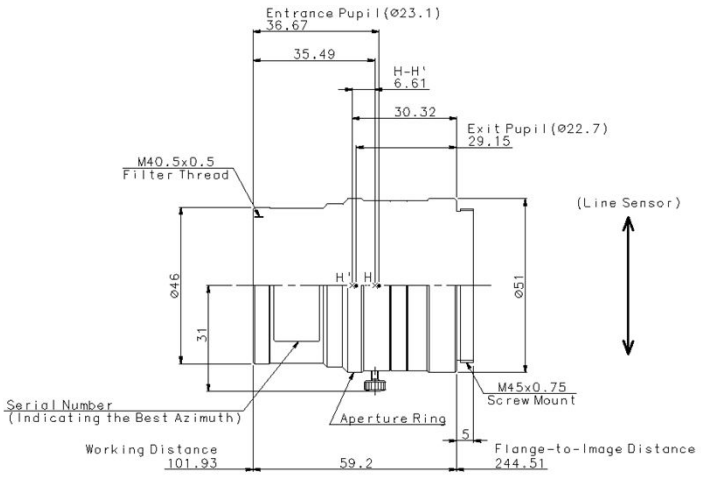
・Specifications unless any specific instructions are stated is at the standard magnification.
・Specifications are subject to change without prior notice.

NikonRayfactVF 2.0x

Specifications

Model	L-OFM20083MN
Focal length	91.6mm
F Number (∞)	F4
NA (Diaphragm open)	0.083
Magnification scale	-2.0x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	17.2°
Image size	84mmϕ
Object Size	42.0mmϕ
Distortion	-0.07% ※1
Relative illumination	85.5% ※1
Aperture scale	4,5.6,8(With a click stop ※2)
Object-to-image distance	405.6mm
Working distance	101.9mm
Mount size	M45(P=0.75)
Flange-to-image distance	244.5mm
Back focus	246.7mm
Attachment size	M40.5(P=0.5)
Diameter/length	51mmϕ×59.2mm ※3
Weight	Approximately 240g

※1 Image size 84mmϕ at F4
※2 Diaphragm scale indicated with indexes.
No numeric indication. The open position index states as "O".
※3 Dimension excludes protrusion of screws or other convex part.

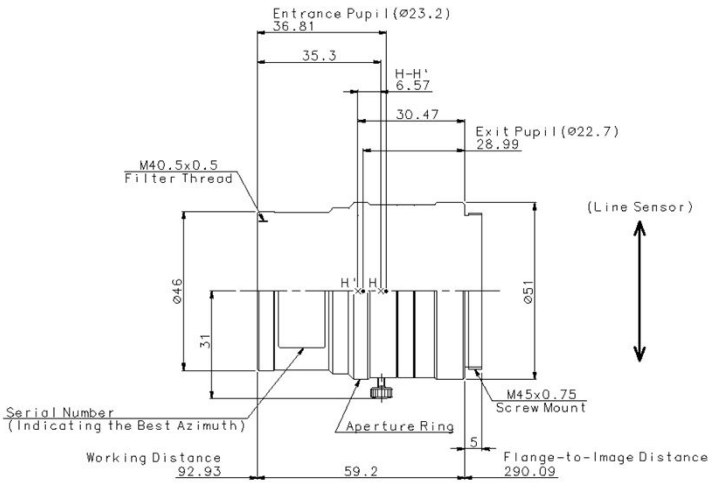


NikonRayfactVF 2.5x

Specifications

Model	L-OFM25089MN
Focal length	91.6mm
F Number (∞)	F4
NA (Diaphragm open)	0.089
Magnification scale	-2.5x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	14.8°
Image size	84mmϕ
Object Size	33.6mmϕ
Distortion	-0.07% ※1
Relative illumination	90.0% ※1
Aperture scale	4,5.6,8(With a click stop ※2)
Object-to-image distance	442.2mm
Working distance	92.9mm
Mount size	M45(P=0.75)
Flange-to-image distance	290.1mm
Back focus	292.6mm
Attachment size	M40.5(P=0.5)
Diameter/length	51mmϕ×59.2mm ※3
Weight	Approximately 240g

※1 Image size 84mmϕ at F4
※2 Diaphragm scale indicated with indexes.
No numeric indication. The open position index states as "O"
※3 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.

NikonRayfactVF 3.0x

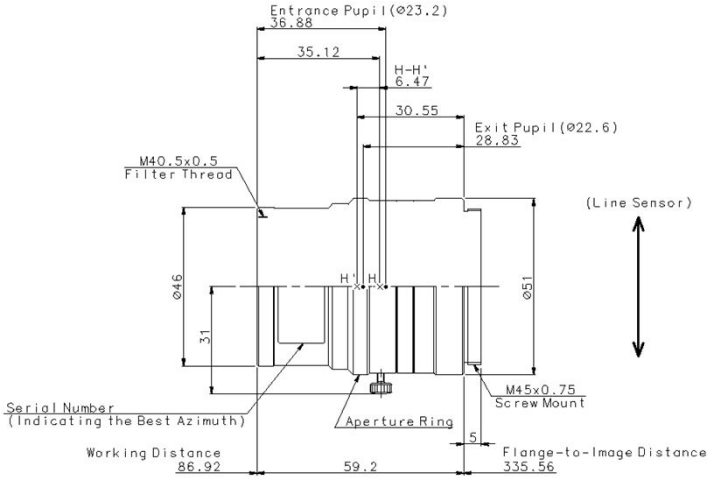
Specifications

Model	L-OFM30093MN
Focal length	91.5mm
F Number (∞)	F4
NA (Diaphragm open)	0.094
Magnification scale	-3.0x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	13.0°
Image size	84mmϕ
Object Size	28.0mmϕ
Distortion	-0.06% ※1
Relative illumination	92.6% ※1
Aperture scale	4,5.6,8 (With a click stop ※2)
Object-to-image distance	481.7mm
Working distance	86.9mm
Mount size	M45(P=0.75)
Flange-to-image distance	335.6mm
Back focus	338.3mm
Attachment size	M40.5(P=0.5)
Diameter/length	51mmϕ × 59.2mm ※3
Weight	Approximately 240g

※1 Image size 84mmϕ at F4

※2 Diaphragm scale indicated with indexes.
No numeric indication. The open position index states as "○".

※3 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 COROPRATION
E-mail : ktn.eigyo@nikon.com
TEL+81-287-28-7100 FAX+81-287-28-7170

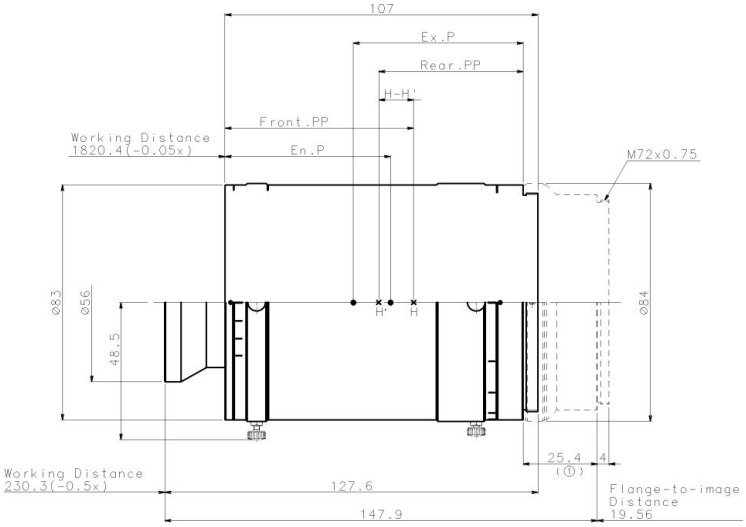
・ Features

・MJ90 : Variable magnification range of 0.05x – 0.5x.
・MJ95 : Variable magnification of 0.5x – 1.0x.
・Image size φ 82mm
・High performance in all range of magnification.
・Adjustable diaphragm, Diaphragm opening position at F4.
・Aperture ring lockable screw and focus lockable screw for easy use.
・Unit sales with a wide range of mounts to fit in your camera.
・RoHS compliant.

・ Applications

・Image receiving process by both line and area censor cameras.
・Printed materials inspection.
・Fine pattern inspection – e.g. PCB.
・Fine pattern inspection and detecting defects – e.g. TAB, sheets.
・FPD inspection.

NikonRayfactMJ90mmF4



Specifications

Model	Refer to the following table					
Magnification range	−0.05x～−0.5x					
Magnification scale	−0.05x	−0.1x	−0.2x	−0.3x	−0.4x	−0.5x
Focal length	89.8mm	90.0mm	90.4mm	90.8mm	91.2mm	91.6mm
F Number (∞)	F4					
NA (Diaphragm open)	0.006	0.011	0.021	0.029	0.036	0.042
Reference wavelength	546.07nm(e-line)					
Wavelength range	400～700nm					
Picture angle	47.2°	45.6°	42.3°	39.4°	36.7°	34.5°
Image size	82mmϕ					
Object Size	1640.0mm	820.0mm	410.0mm	273.3mm	205.0mm	164.0mm
Distortion ※1	+0.47%	+0.31%	+0.14%	+0.06%	+0.05%	+0.07%
Relative illumination ※1	42.2%	45.0%	49.9%	54.0%	57.6%	60.7%
Aperture scale	4,5.6,8,11(With a diaphragm lock, a click stop)					
Object-to-image distance	1967.3mm	1069.6mm	634.2mm	496.3mm	432.3mm	397.7mm
Working distance	1820.4mm	922.6mm	487.2mm	348.0mm	274.4mm	230.3mm
Mount size	Refer to the following table					
Flange-to-image distance	Refer to the following table					
Back focus	Refer to the following table					
Attachment size	M52(P=0.75)					
Diameter/length	Refer to the following table					
Weight	Refer to the following table					

※1 Highest image height (Y'=41mm) at F5.6

※2 Diaphragm scales indicated with indexes. No numeric indication.

Model	Camera Mount	Diameter/length ※3	Weight
1) OVM05042MN-M72D1	M72(M.B.f=19.56mm)	84mmϕ × 131.3mm～151.9mm	Approximately 900g
2) OVM05042MN-M72D2	M72(M.B.f=6.56mm)	84mmϕ × 144.3mm～164.9mm	Approximately 930g
3) OVM05042MN-M72T	M72(M.B.f=28.8mm)	84mmϕ × 122.2mm～142.6mm	Approximately 880g
4) OVM05042MN-M72N	M72(M.B.f=31.8mm)	84mmϕ × 119.1mm～139.7mm	Approximately 870g
5) OVM05042MN-NMT	M84.5 × P0.5(M.B.f=41mm)	93mmϕ × 110.4mm～130.9mm	Approximately 870g
6) OVM05042MN-FMT	F Mount(M.B.f=46.5mm)	84mmϕ × 104.9mm～125.4mm	Approximately 860g
7) OVM05042MN-VMT	V Mount Equivalency(M.B.f=15mm)	100mmϕ × 141.9mm～162.5mm	Approximately 970g
8) OVM05042MN-BMT	Screw flange end(M.B.f=9mm)	102mm□ × 137.9mm～158.4mm	Approximately 1020g
9) OVM05042MN-M95E	M95(M.B.f=9.4mm)	100mmϕ × 137.5mm～158.0mm	Approximately 940g

※3 Dimension excludes protrusion of screws or other convex part.

		−0.05x	−0.1x	−0.2x	−0.3x	−0.4x	−0.5x
Entrance Pupil	d	56.6mm	51.8mm	42.3mm	32.7mm	23.2mm	13.6mm
	ϕ	22.2mm	22.2mm	22.2mm	22.2mm	22.3mm	22.3mm
Exit Pupil	d	−58.0mm	−63.0mm	−73.2mm	−83.4mm	−93.7mm	−104.0mm
	ϕ	24.6mm	24.6mm	24.8mm	24.9mm	25.0mm	25.2mm
Front Principal Point [Front.PP]		64.5mm	60.0mm	51.0mm	41.9mm	32.9mm	23.9mm
Rear Principal Point [Rear.PP]		−49.3mm	−54.1mm	−63.6mm	−73.2mm	−82.8mm	−92.4mm
Nodal point distance [HH']		11.9mm	12.2mm	12.7mm	13.2mm	13.8mm	14.4mm

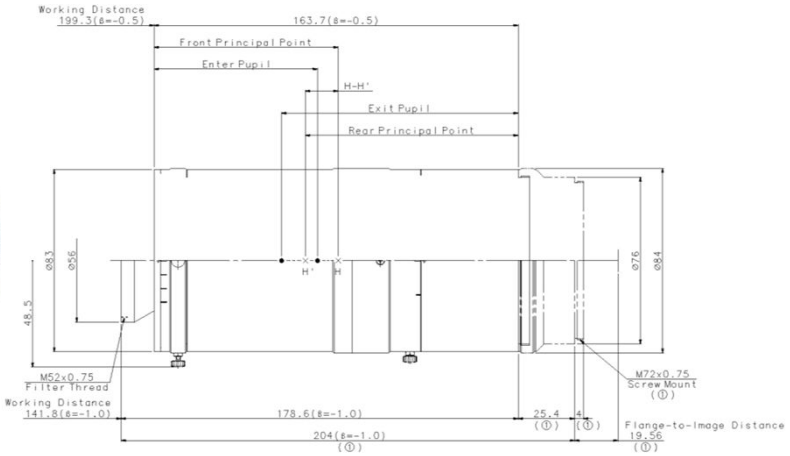
※ Entrance pupil En.P and principal point H at the front tip point of the lens (ϕ 83mm).

※ Exit pupil Ex.P, rear principal point H' at the mount side.

・Specifications unless any specific instructions are stated is at the standard magnification.

・Specifications are subject to change without prior notice.

NikonRayfactMJ95mmF4



Specifications

Model	Refer to the following table					
Magnification range	−0.5x～−1.0x					
Magnification scale	−0.5x	−0.6x	−0.7x	−0.8x	−0.9x	−1.0x
Focal length	93.9mm	94.3mm	94.7mm	95.1mm	95.5mm	95.9mm
F Number (∞)	F4					
NA (Diaphragm open)	0.041	0.047	0.051	0.055	0.059	0.062
Reference wavelength	546.07nm(e-line)					
Wavelength range	400～700nm					
Picture angle	33.5°	31.6°	29.9°	28.4°	27.0°	25.7°
Image size	82mm ϕ					
Object Size	164.0mm	136.7mm	117.1mm	102.5mm	91.1mm	82.0mm
Distortion ※1	−0.20%	−0.15%	−0.10%	−0.04%	+0.02%	+0.08%
Relative illumination ※1	61.9%	64.7%	67.5%	69.9%	72.0%	73.9%
Aperture scale	4,5.6,8,11(With a diaphragm lock, a click stop)					
Object-to-image distance	408.0mm	386.6mm	374.5mm	368.1mm	365.4mm	365.3mm
Working distance	199.3mm	177.9mm	165.8mm	159.4mm	152.0mm	141.8mm
Mount size	Refer to the following table					
Flange-to-image distance	Refer to the following table					
Back focus	Refer to the following table					
Attachment size	M52(P=0.75)					
Diameter/length	Refer to the following table					
Weight	Refer to the following table					

※1 Highest image height (Y'=41mm) at F5.6.

※2 Diaphragm scales indicated with indexes. No numeric indication.

Model	Camera Mount	Diameter/length ※3	Weight
1) OVM10062MN-1-M72D1	M72(M.B.f=19.56mm)	84mm ϕ × 193.1mm～208.0mm	Approximately 1230g
2) OVM10062MN-1-M72D2	M72(M.B.f=6.56mm)	84mm ϕ × 206.1mm～221.0mm	Approximately 1260g
3) OVM10062MN-1-M72T	M72(M.B.f=28.8mm)	84mm ϕ × 180.9mm～195.8mm	Approximately 1210g
4) OVM10062MN-1-M72N	M72(M.B.f=31.8mm)	84mm ϕ × 180.9mm～195.7mm	Approximately 1200g
5) OVM10062MN-1-NMT	M84.5 × P0.5(M.B.f=41mm)	84mm ϕ × 172.2mm～187.1mm	Approximately 1200g
6) OVM10062MN-1-VMT	V Mount Equivalency(M.B.f=15mm)	100mm ϕ × 203.7mm～218.6mm	Approximately 1300g
7) OVM10062MN-1-BMT	Screw flange end(M.B.f=9mm)	102mm□ × 199.7mm～214.6mm	Approximately 1350g
8) OVM10062MN-1-M95E	M95(M.B.f=9.4mm)	100mm ϕ × 193.3mm～214.2mm	Approximately 1270g

※3 Dimension excludes protrusion of screws or other convex part.

		−0.5x	−0.6x	−0.7x	−0.8x	−0.9x	−1.0x
Entrance Pupil	d	73.5mm	63.4mm	53.3mm	43.2mm	33.1mm	23.0mm
	ϕ	22.5mm	22.5mm	22.5mm	22.4mm	22.4mm	22.3mm
Exit Pupil	d	−106.4mm	−117.2mm	−128.0mm	−138.8mm	−149.7mm	−160.6mm
	ϕ	25.2mm	25.3mm	25.4mm	25.4mm	25.5mm	25.6mm
Front Principal Point [Front.PP]		83.1mm	73.5mm	63.9mm	54.3mm	44.7mm	35.1mm
Rear Principal Point [Rear.PP]		−95.7mm	−105.8mm	−116.1mm	−126.3mm	−136.5mm	−146.8mm
Nodal point distance[HH']		15.1mm	15.6mm	16.2mm	16.9mm	17.5mm	18.2mm

※ Entrance pupil En.P and principal point H at the front tip point of the lens (ϕ 83mm).

※ Exit pupil Ex.P, rear principal point H' at the mount side.

※ Image side : [+], Object side : [−]

・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

ver3.3

Nikon Rayfact GF Series

・ Features

・Lens mount : F mount for your use of various CCD cameras.
・High resolution and uniformity from the center to the edge of the lens.
・Minimal distortion (0.1% at the standard magnification).
・Aperture ring lockable screw and focus lockable screw for easy to use.
・RoHS compliant.

・ Applications

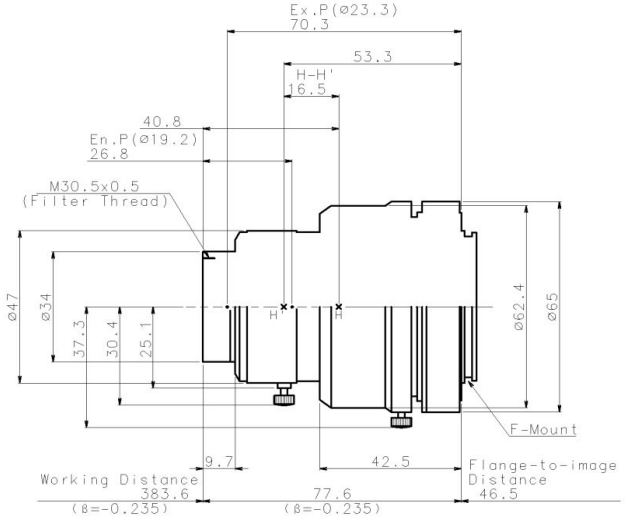
・For high resolution cameras (CCD pixel size : 4.7 μ m)
・FPD inspection.
・Fine pattern inspection – e.g. PCB.
・Fine pattern inspection and detecting defects – e.g. TAB, sheets.
・Printed materials inspection.

NikonRayfact80mmF4　0.235x (Build-to-order product)

Specifications

Model	QVM0235023MF
Focal length	80.8mm
F Number (∞)	F4
NA (Diaphragm open)	0.024
Magnification scale	−0.235x
Magnification range	−0.188x～−0.313x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	21.1°
Image size	36mmϕ
Object Size	153.2mmϕ　※1
Distortion	−0.06%　※1
Relative illumination	86.2%　※1
Aperture scale	4,5.6,8(With a diaphragm lock, a click stop)
Object-to-image distance	507.7mm　※1
Working distance	383.6mm　※1
Mount size	F Mount
Flange-to-image distance	46.5mm
Back focus	66.8mm
Attachment size	M30.5(P=0.5)
Diameter/length	65mmϕ×77.6mm　※2
Weight	Approximately 350g

※1　Value at the standard magnification.
※2　Dimension excludes protrusion of screws or other convex part.

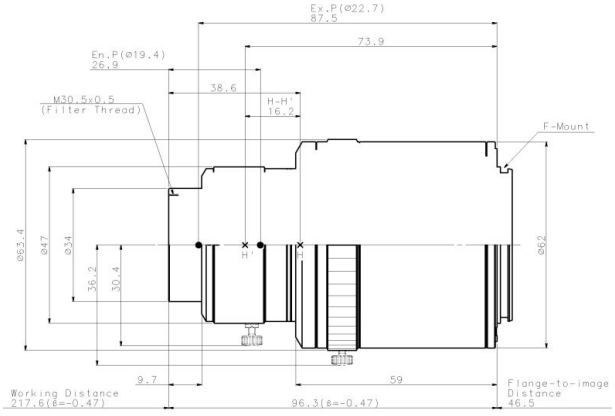


NikonRayfact80mmF4　0.47x (Build-to-order product)

Specifications

Model	QVM05041MF
Focal length	81.9mm
F Number (∞)	F4
NA (Diaphragm open)	0.04
Magnification scale	−0.47x
Magnification range	−0.4x～−0.5x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	17.8°
Image size	36mmϕ
Object Size	76.6mmϕ　※1
Distortion	−0.09%　※1
Relative illumination	94.0%　※1
Aperture scale	4,5.6,8(With a diaphragm lock, a click stop)
Object-to-image distance	360.4mm　※1
Working distance	217.6mm　※1
Mount size	F Mount
Flange-to-image distance	46.5mm
Back focus	85.5mm
Attachment size	M30.5(P=0.5)
Diameter/length	63.4mmϕ×100.8mm　※2
Weight	Approximately 440g

※1　Value at the standard magnification.
※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.

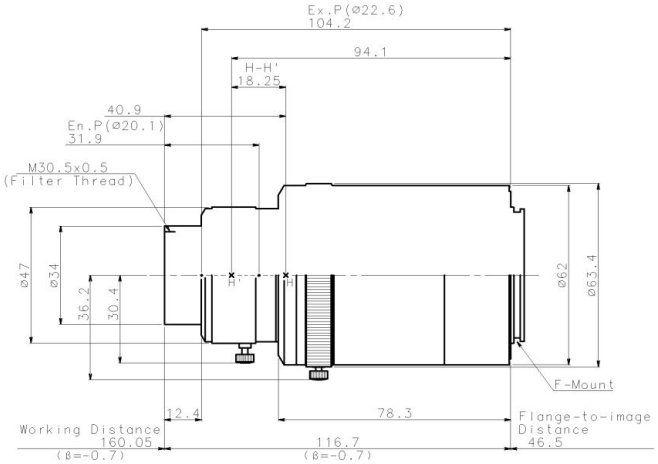
ver3.3

NikonRayfact80mmF4 0.7x (Build-to-order product)

Specifications

Model	QVM07052MF
Focal length	82.7mm
F Number (∞)	F4
NA (Diaphragm open)	0.051
Magnification scale	−0.7x
Magnification range	−0.65x～−0.75x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	14.6°
Image size	36mmϕ
Object Size	ϕ51.4mm ※1
Distortion	−0.08% ※1
Relative illumination	92.6% ※1
Aperture scale	4,5.6,8(With a diaphragm lock, a click stop)
Object-to-image distance	323.3mm ※1
Working distance	160.5mm ※1
Mount size	F Mount
Flange-to-image distance	46.5mm
Back focus	104.3mm
Attachment size	M30.5(P=0.5)
Diameter/length	65mmϕ×121.2mm ※2
Weight	Approximately 460g

※1 Data at the standard magnification.
※2 Dimension excludes protrusion of screws or other convex part.

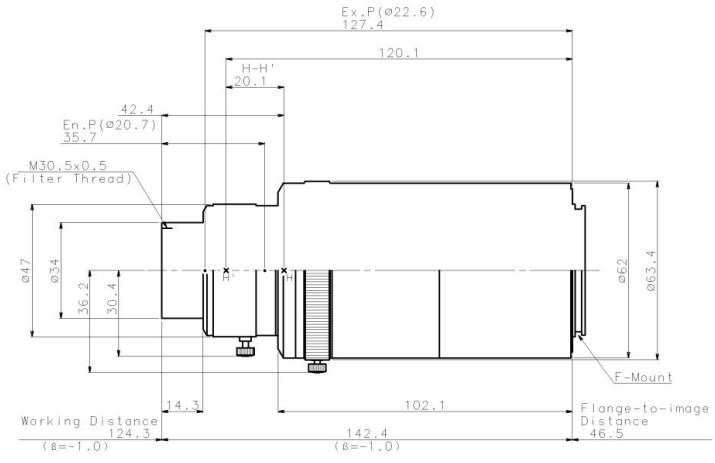


NikonRayfact80mmF4 1.0x (Build-to-order product)

Specifications

Model	QVM10065MF
Focal length	83.3mm
F Number (∞)	F4
NA (Diaphragm open)	0.063
Magnification scale	−1.0x
Magnification range	−0.95x～−1.05x
Reference wavelength	546.07nm(e-line)
Wavelength range	400～700nm
Picture angle	12.8°
Image size	36mmϕ
Object Size	ϕ36mm ※1
Distortion	−0.06% ※1
Relative illumination	90.7% ※1
Aperture scale	4,5.6,8(With a diaphragm lock, a click stop)
Object-to-image distance	313.1mm ※1
Working distance	124.8mm ※1
Mount size	F Mount
Flange-to-image distance	46.5mm
Back focus	129.5mm
Attachment size	M30.5(P=0.5)
Diameter/length	63.4mmϕ×146.9mm ※2
Weight	Approximately 490g

※1 Data at the standard magnification.
※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

Nikon Rayfact IL Series

・ Features

・ Compatible with EL･Nikkor40mmF4N, 50mmF2.8N, 63mmF2.8N and 75mmF4N

・ Lineup : 4 models

・New product release :「NikonRayfactIL95mmF5.6N」
＊ 4 models cover a wide range of magnification (0.25x ～ 2.0x)
＊ Image size φ90mm (The largest image size in our standard models)

・ Minimal chromatic aberration in the range of 380nm – 700nm.

・ Aperture ring lockable screw for easy use.

・ RoHS compliant.

・ Applications

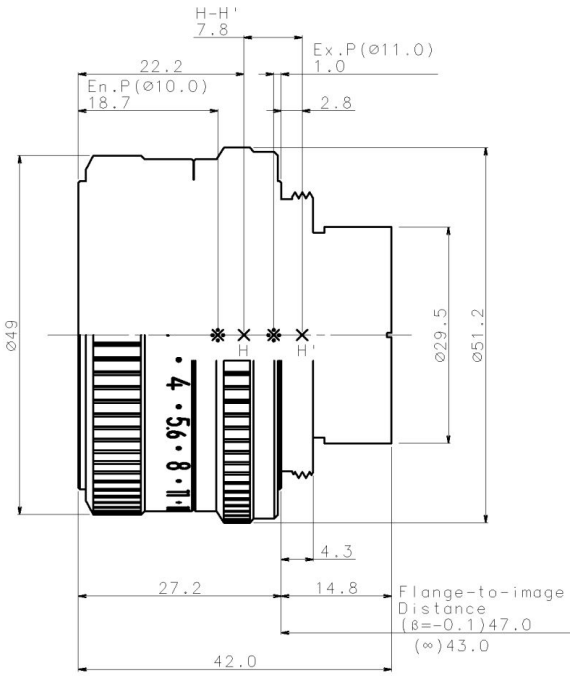
・ CCD camera photographing. (Both line and area sensor cameras)
・ Printed materials inspection.
・ Fine pattern inspection – e.g. PCB.
・ Fine pattern inspection and detecting defects – e.g. TAB, sheets.

NikonRayfactIL40mm(Build-to-order product)

Specifications

Model	PF4040ML
Focal length	40.1mm
F Number (∞)	F4
NA (Diaphragm open)	0.011
Magnification scale	−0.1x
Magnification range	−0.033x～−0.2x
Reference wavelength	587.56nm(d-line)
Wavelength range	380～700nm
Picture angle	52.2° ※1
Image size	43.2mmϕ
Object Size	432.0mmϕ※1
Distortion	−0.27% ※1
Relative illumination	55.3%
Aperture scale	4,5.6,8,11,16,22(1/2 dials with a finger stop)
Object-to-image distance	493.7mm ※1
Working distance	419.5mm ※1
Mount size	d=39mm 1/P=26(Leica)
Flange-to-image distance	47.0mm ※1
Back focus	33.0mm ※1
Attachment size	M40.5(P=0.5)
Diameter/length	51.2mmϕ×42mm ※2
Weight	Approximately 125g

※1 Data : Magnification 0.1x, F4, ϕ43.2mm
※2 Dimension excludes protrusion of screws or other convex parts.

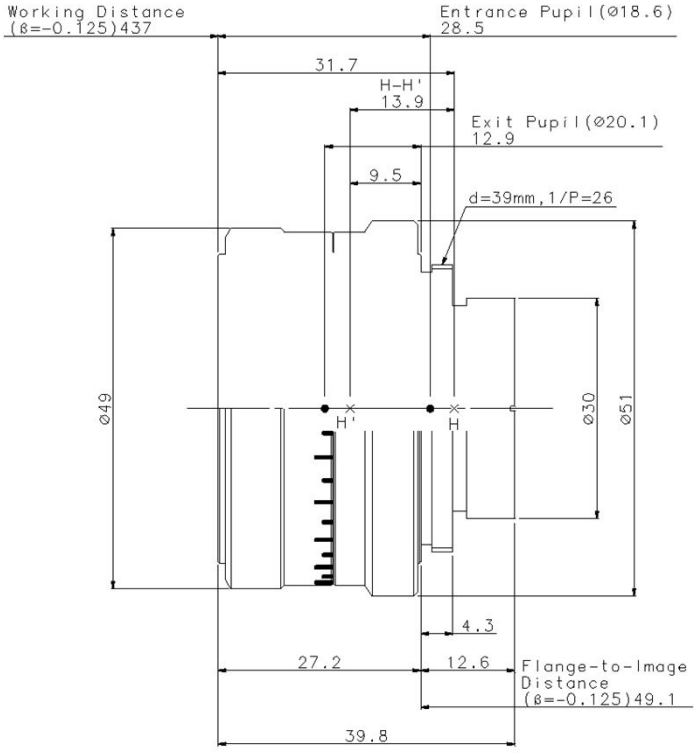


NikonRayfactIL50mmF2.8N

Specifications

Model	PFM0125020ML
Focal length	52.1mm
F Number (∞)	F2.8
NA (Diaphragm open)	0.02
Magnification scale	−0.125x
Magnification range	−0.05x～−0.5x
Reference wavelength	587.56nm(d-line)
Wavelength range	380～700nm
Picture angle	41°
Image size	43.2mmϕ
Object Size	345.6mmϕ※1
Distortion	−0.48% ※1
Relative illumination	47.7% ※1
Aperture scale	2.8,4,5.6,8,11,16(With a finger stop ※2)
Object-to-image distance	513.3mm ※1
Working distance	437.0mm ※1
Mount size	d=39mm 1/P=26(Leica)
Flange-to-image distance	49.1mm ※1
Back focus	37.7mm ※1
Attachment size	M40.5(P=0.5)
Diameter/length	51mmϕ×39.8mm ※2
Weight	Approximately 135g

※1 Data : Magnification 0.125x, F2.8, ϕ43.2mm
※2 Dimension excludes protrusion of screws or other convex parts.
※3 Diaphragm shows by index only − no numerical indication.
(Diaphragm opening index indicated)



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

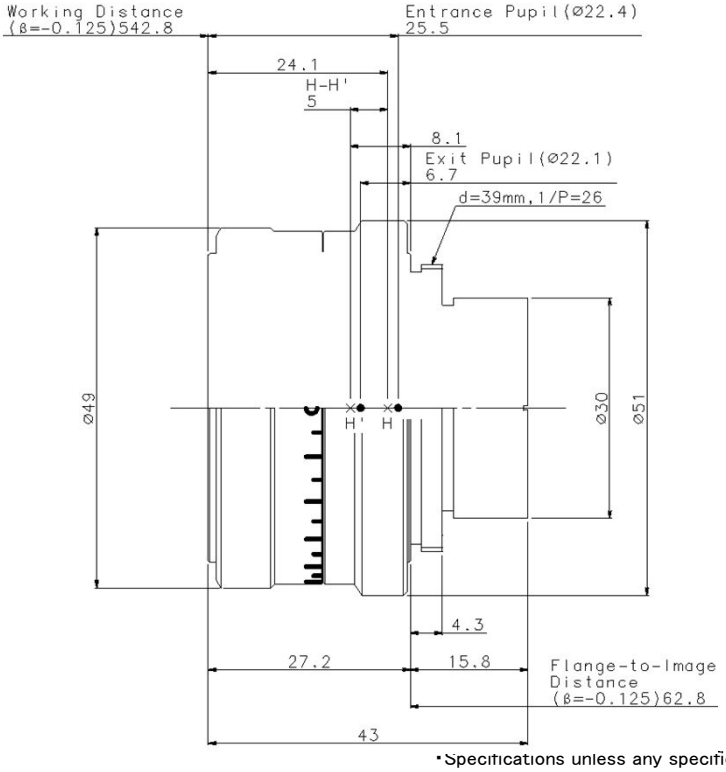
ver3.3

NikonRayfactIL63mmF2.8N

Specifications

Model	OFM0125020ML
Focal length	63.0mm
F Number (∞)	F2.8
NA (Diaphragm open)	0.02
Magnification scale	−0.125x
Magnification range	−0.05x～−0.5x
Reference wavelength	587.56nm(d-line)
Wavelength range	380～700nm
Picture angle	44.4° ※1
Image size	58mmϕ
Object Size	464mmϕ※1
Distortion	+0.12% ※1
Relative illumination	39.3%
Aperture scale	2.8,4,5.6,8,11,16(With a finger stop ※2)
Object-to-image distance	632.8mm ※1
Working distance	542.8mm ※1
Mount size	d=39mm 1/P=26(Leica)
Flange-to-image distance	62.8mm ※1
Back focus	48.2mm ※1
Attachment size	M40.5(P=0.5)
Diameter/length	51mmϕ×43mm ※2
Weight	Approximately 150g

※1 Data : Magnification 0.125x, F2.8, ϕ58mm
※2 Dimension excludes protrusion of screws or other convex part.
※3 Diaphragm shows by index only – no numerical indication.
(Diaphragm opening index indicated)

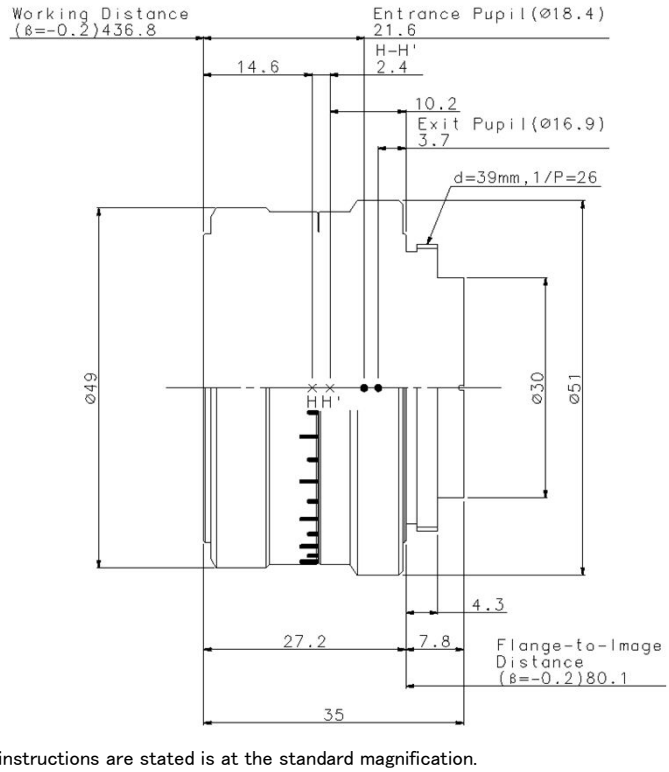


NikonRayfactIL75mmF4N

Specifications

Model	OFM0200020ML
Focal length	75.2mm
F Number (∞)	F4
NA (Diaphragm open)	0.021
Magnification scale	−0.2x
Magnification range	−0.1x～−0.5x
Reference wavelength	587.56nm(d-line)
Wavelength range	380～700nm
Picture angle	47.81° ※1
Image size	80mmϕ
Object Size	400.0mmϕ※1
Distortion	−0.04% ※1
Relative illumination	30.2% ※1
Aperture scale	4,5.6,8,11,16,22(With a finger stop ※2)
Object-to-image distance	544.1mm ※1
Working distance	436.8mm ※1
Mount size	d=39mm 1/P=26(Leica)
Flange-to-image distance	80.1mm ※1
Back focus	76.5mm ※1
Attachment size	M40.5(P=0.5)
Diameter/length	51mmϕ×35mm ※2
Weight	Approximately 120g

※1 Data : Magnification 0.2x, F4, ϕ80mm
※2 Dimension excludes protrusion of screws or other convex part.
※3 Diaphragm shows by index only – no numerical indication.
(Diaphragm opening index indicated)



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

NikonRayfactIL63mm(F)

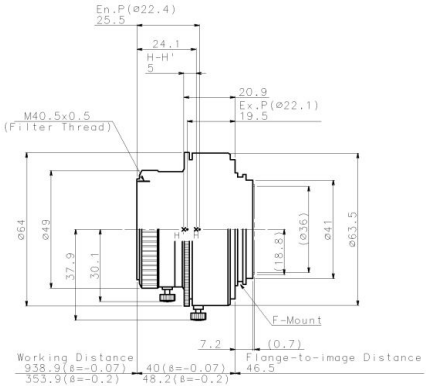
Model:OFM0125020MF-B

Model:OFM0125020MF-T

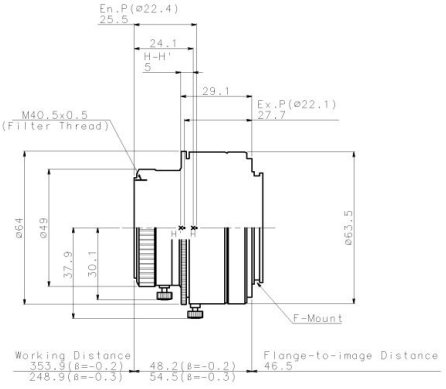
Specifications

Model	OFM0125020MF-B	OFM0125020MF-T
Focal length	63.0mm	
F Number (∞)	F2.8	
NA (Diaphragm open)	0.02 (-0.125x)	0.03 (-0.2x)
Magnification scale	-0.125x	
Magnification range	-0.07x～-0.2x	-0.2x～-0.3x
Reference wavelength	587.56nm(d-line)	
Wavelength range	380～700nm	
Picture angle	-	
Image size	55.2mmφ	
Object Size	788.6mmφ～276mmφ	276mmφ～184mmφ
Distortion	-	
Relative illumination	-	
Aperture scale	2.8,4,5.6,8,11,16(1/2 dials with a finger stop)	
Object-to-image distance	-	
Working distance	-	
Mount size	F Mount	
Flange-to-image distance	46.5mm	
Back focus	-	
Attachment size	M40.5(P=0.5)	
Diameter/length	64mmφ×47.2mm ※1	64mmφ×52.7mm ※1
Weight	Approximately 270g	Approximately 295g

※1 Dimension excludes protrusion of screws or other convex part.
(OFM0125020MF-B=-0.07x OFM0125020MF-T=-0.2x)



Model:OFM0125020MF-B



Model:OFM0125020MF-T

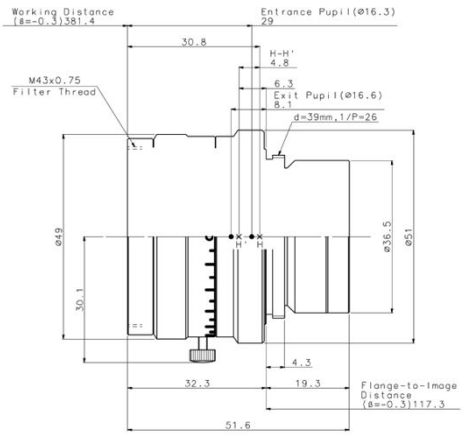
・Specifications unless any specific instructions are stated is at the standard magnification.
・Specifications are subject to change without prior notice.

NikonRayfactIL95mmF5.6N

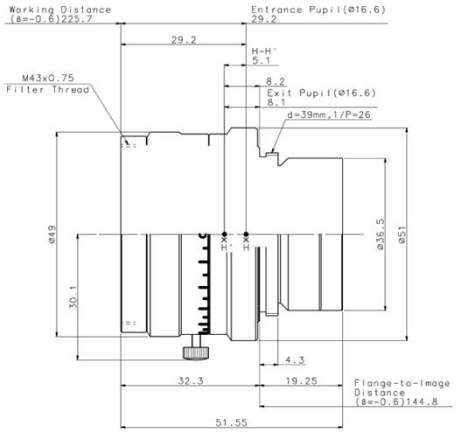
Specifications

Model	OFM0300020ML	OFM0600033ML	OFM1000044ML	OFM0600033ML
Magnification range	−0.25x～−0.5x	−0.5x～−0.75x	−0.75x～−1.25x	−1.25x～−2.0x
Magnification scale	−0.3x	−0.6x	−1.0x	−1.66x
Focal length	95.1mm	95.6mm	95.6mm	95.6mm
F Number (∞)	F5.6			
NA (Diaphragm open)	0.021	0.033	0.045	0.056
Reference wavelength	587.56nm(d-line)			
Wavelength range	380nm～700nm			
Picture angle	40.2°	32.8°	26.4°	20.0°
Image size	90.0mmφ			
Object Size ※1	300mmφ	150mmφ	90.0mmφ	54.0mmφ
Distortion ※1	−0.11%	+0.08%	0.00%	−0.03%
Relative illumination ※1	54.2%	69.9%	81.27%	91.4%
Aperture scale	Index (no numeric indication) : at 5.6,8,11,16,22,32(click stop index half aperture)			
Object-to-image distance ※1	531.0mm	402.9mm	377.4mm	402.9mm
Working distance ※1	381.4mm	255.7mm	161.9mm	125.6mm
Mount size	d=39mm 1/P=26(Leica)			M43(P=0.75)
Flange-to-image distance ※1	117.3mm	144.8mm	183.2mm	225.7mm
Attachment size	M43(P=0.75)			
Diameter/length	51.0mmφ×51.6mm	51.0mmφ×51.55mm	51.0mmφ×51.4mm	51.0mmφ×51.55mm
Weight	Approximately 120g	Approximately 120g	Approximately 120g	Approximately 120g

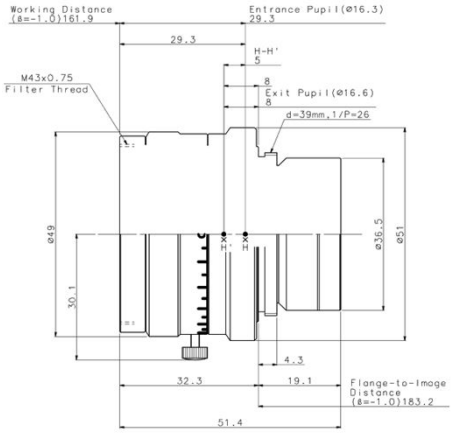
※1 Data : Standard magnification −0.3x, −0.6x, −1.0x, −1.66x F5.6, φ90mm
※2 Diaphragm shows by index only − no numerical indication.
(Diaphragm open index indicated)
※3 Magnification −1.66x : To use −0.6x lens at the reverse side.
Lens mount → To use the filter attachment (magnification at −0.6x).



OFM0300020ML



OFM0600033ML



OFM1000044ML

・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

ver3.3

UV105mm-F4.5

・ Features

・For photographing in the ultraviolet light range.
・No focus correction required at the time of photographing UV when you focus under visible light.
・High transmittance rate (approx. 70%) in the wide range of high wavelength 220nm - 900nm.
Minimal distortion at the magnification ∞ - 0.5x.
・RoHS compliant.

・ Applications

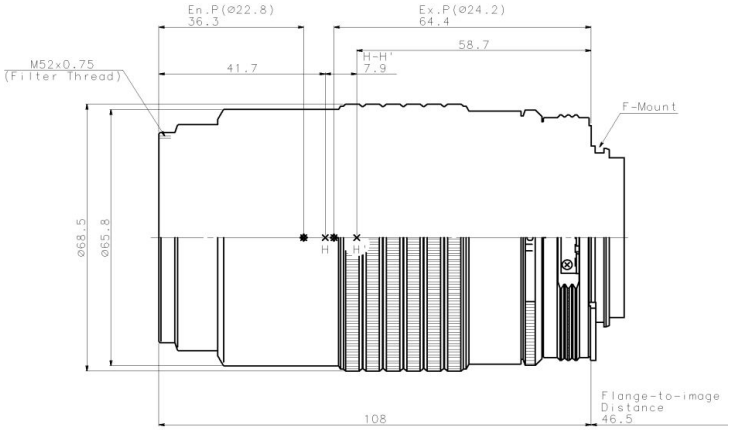
・Combustion study
・Plasma study
・Electric discharge study

UV105mm-F4.5

Specifications

Model	PF10545MF-UV
Focal length	105.2mm
F Number (∞)	F4.5
NA (Diaphragm open)	0.037
Magnification scale	–
Magnification range	∞～-0.5x
Reference wavelength	546.07nm(e-line)
Wavelength range	220～900nm
Picture angle	23.3°
Image size	43.6mmφ
Object Size	87.2mmφ （-0.5x）
Distortion	-0.25～-0.07%
Relative illumination ※1	51.4%
Aperture scale	4.5,5.6,8,11,16,22,32
Object-to-image distance	∞～481.2mm
Working distance	∞～273.9mm
Mount size	F Mount
Flange-to-image distance	46.5mm
Back focus	87.1～139.7mm
Attachment size	M52(P=0.75)
Diameter/length	68.5mmφ×116.5mm ※2
Weight	Approximately 515g

※1 Data : Magnification at 0.5x
※2 108mm from the mount surface.



・Specifications unless any specific instructions are stated is at the standard magnification.
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TOCHIGI NIKON CORPORATION
E-mail : ktn.eigyo@nikon.com
TEL+81-287-28-7100 FAX+81-287-28-7170

Tochigi Nikon industrial lens lineup

TOCHIGI NIKON CORPORATION
Marketing Sec.
Industrial Equipment Dept.

Underlined product : Build-to-order product

◇ **Customized products available**

	Product name	Model	Magnification range													Image size [mm]						Separate sale: Camera mount (order product)※3						
			<0.05	0.1	0.1	～	0.5	0.7	1.0	1.4	～	2.0	～	3.5	5.0	7.0	<36	36	43.2	58	62	80<	C	F	M72 (6.56)	M72 (19.56)	M72 (28.8)	M72 (31.8)	Other
Nikon Rayfact	Nikon Rayfact 2-5x	L-OVM50167MN										◆			◆							◆			◇	◇	◇	◇	◇
	Nikon Rayfact 2-5x (prism suitable model)	L-OVM50170MN-BS										◆			◆							◆			◇	◇	◇	◇	◇
	Nikon Rayfact 7x (Straight tube type)	OFM70350HN-TS														◆					◆				◆			
	Nikon Rayfact 7x (Epi-illumination type)	OFM70350HN-TP														◆					◆				◆			
	Nikon Rayfact 3.5x (※1)	OFM35162MN												◆							◆			◆	◆	◆	◇	◆	
	Nikon Rayfact 2.35x	OFM24125MN											◆								◆			◆	◆	◆	◇	◆	
	Nikon Rayfact 2x	OFM20119MN										◆									◆			◆	◆	◆	◇	◆	
	Nikon Rayfact 1.75x	L-OFM18113MN								◆											◆			◆	◆	◆	◇	◆	
	Nikon Rayfact 1x	OFM10090MN							◆												◆			◆	◆	◆	◇	◆	
	Nikon Rayfact 0.5x (※2)	OFM20119MN					◆										◆							◆	◆	◆	◇	◆	
VL	Nikon Rayfact VL0.5x	L-OFM05034MN					◆														◆			◆	◆	◆	◇	◆	
	Nikon Rayfact VL0.7x	L-OFM07042MN						◆													◆			◆	◆	◆	◇	◆	
	Nikon Rayfact VL1.0x	L-OFM10051MN							◆												◆			◆	◆	◆	◇	◆	
	Nikon Rayfact VL1.4x	L-OFM14060MN								◆											◆			◆	◆	◆	◇	◆	
VW	Nikon Rayfact VW0.14x	L-OFM014012MN			◆	◆															◆			◆	◆	◆	◇	◆	
	Nikon Rayfact VW0.25x	L-OFM025020MN				◆															◆			◆	◆	◆	◇	◆	
	Nikon Rayfact VW0.35x	L-OFM035026MN				◆															◆			◆	◆	◆	◇	◆	
VF	Nikon Rayfact VF	L-OVM30093MN					◆						◆												◆	◆	◇	◆	
	Nikon Rayfact VF 1x (Fixed)	L-OFM10062MN							◆												◆				◆	◆	◇	◆	
	Nikon Rayfact VF 1.4x (Fixed)	L-OFM14073MN								◆											◆				◆	◆	◇	◆	
	Nikon Rayfact VF 2x (Fixed)	L-OFM20083MN										◆										◆			◆	◆	◇	◆	
	Nikon Rayfact VF 2.5x (Fixed)	L-OFM25089MN											◆									◆			◆	◆	◇	◆	
	Nikon Rayfact VF 3x (Fixed)	L-OFM30093MN											◆									◆			◆	◆	◇	◆	
GF	Nikon Rayfact 80mmF4(0.235x)	QVM0235023MF				◆												◆						◆					
	Nikon Rayfact 80mmF4(0.47x)	QVM05041MF					◆											◆						◆					
	Nikon Rayfact 80mmF4 (0.7x)	QVM07052MF						◆										◆						◆					
	Nikon Rayfact 80mmF4 (1.0x)	QVM10065MF							◆									◆						◆					
IL	Nikon Rayfact IL40mm	PF4040ML	◆			◆													◆										◆
	Nikon Rayfact IL50mmF2.8N	PFM0125020ML		◆		◆													◆										◆
	Nikon Rayfact IL63mmF2.8N	OFM0125020ML		◆		◆														◆									◆
	└ Nikon Rayfact IL63mmF2.8N(F)	OFM0125020MF-B				◆													◆					◆					
	└ Nikon Rayfact IL63mmF2.8N(F)	OFM0125020MF-T		◆		◆													◆					◆					
	Nikon Rayfact IL75mmF4N	OFM0200020ML			◆	◆																◆							◆
	Nikon Rayfact IL95mmF5.6N	OFM0300020ML				◆	◆															◆		◆	◆	◆	◆	◆	◆
	Nikon Rayfact IL95mmF5.6N	OFM0600033ML					◆	◆														◆		◆	◆	◆	◆	◆	◆
	Nikon Rayfact IL95mmF5.6N	OFM1000044ML						◆	◆													◆		◆	◆	◆	◆	◆	◆
	Nikon Rayfact IL95mmF5.6N (※5)	OFM0600033ML							◆		◆											◆		◆	◆	◆	◆	◆	◆
MJ	Nikon Rayfact MJ90mmF4	OVM05042MN		◆		◆																◆		◆	◆	◆	◆	◆	◆
	Nikon Rayfact MJ95mmF4	OVM10062MN-1					◆	◆														◆			◆	◆	◆	◆	◆

(※1) Option item : Coaxial epi-illumination tube

(※2) To use Nikon Rayfact 2x at the reversed direction at the magnification of 0.5x

(※3) RF7x (both straight tube type and epi-illumination type)・GF・IL63(F) and MJ to be sold with a camera mount attached on it.

(※4) NikonRayfactVF fixed magnification models : Customized magnification types are available.

(※5) To use IL95mmF5.6N (OFM0600033ML) at the reversed direction at the magnification of 0.6x.

ver3.3