



INDUSTRIAL LENSES

Rayfact





INDUSTRIAL LENSES

High-performance industrial camera lens “Rayfact” utilizing Nikon’s original optical design

Rayfact is a lens specially designed for visual inspection and contributes to inspection in various fields such as sheets, films, prints and glass substrates for FPD.

We have a wide variety of know-how, such as original optical design technology, software development capability, and mechanical / electrical design.

Based on the accumulated know-how, we will support our customers’ vision for industrial applications.

Product features

- Variable magnification with one lens (RF1-2x/RF2-5x/VF/MJ)
- Compatible with high resolution large line sensor / area camera (Maximum: image size 86.4 mmφ)
- Consistent performance over the entire magnification range
- High performance and uniformity from the center to the outer edge
- Optical system designed to perform its best when the aperture is fully open
- Thorough reduction of distortion
- Equipped with lock screw for aperture and floating ring



Lineup



High-resolution and Large Format Industrial Lens



High-resolution Industrial Lens for Line Sensor



Industrial Lens



Lens for Large Line Sensor



Low Magnification Industrial Lens



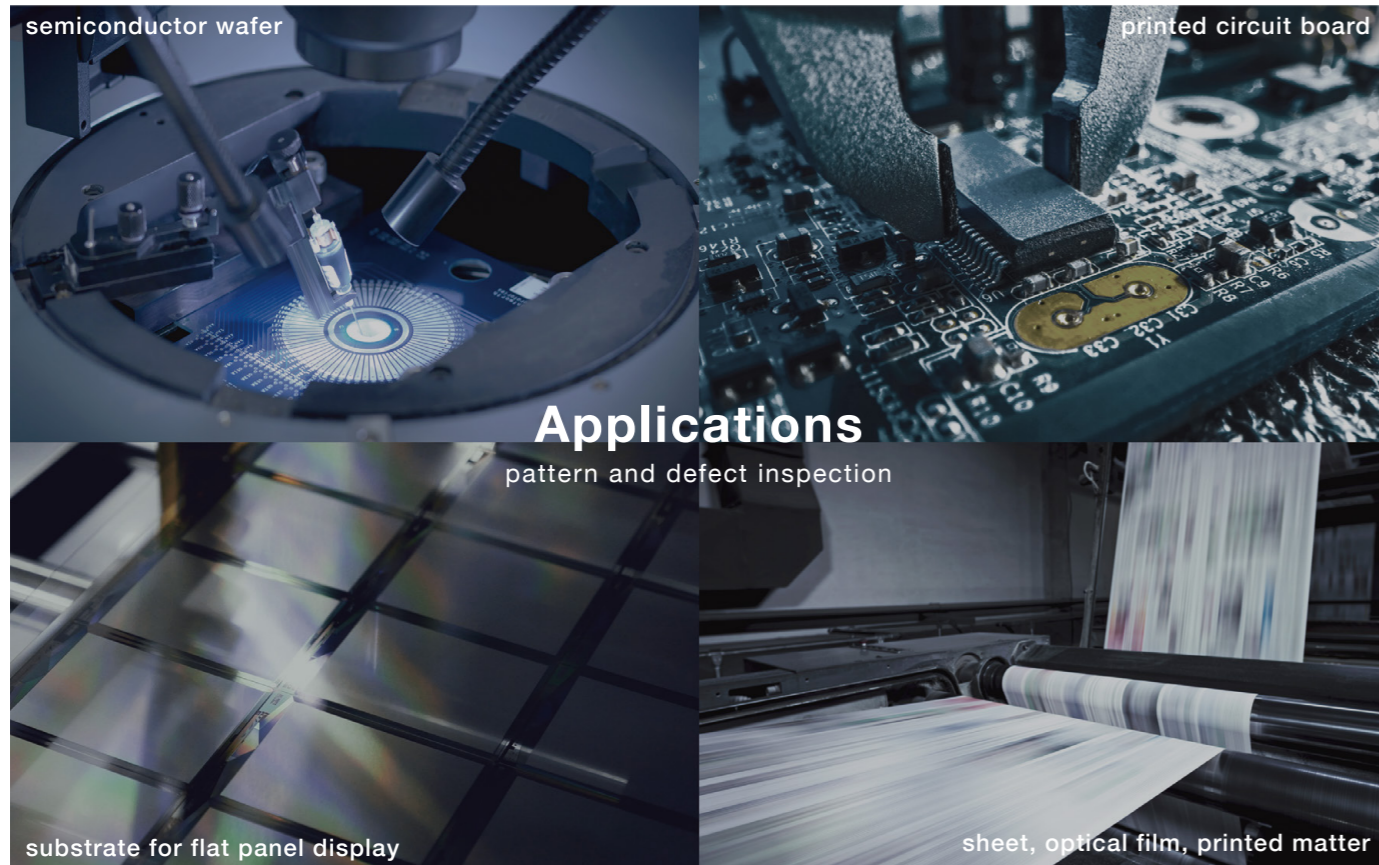
Industrial Micro Lens



Industrial Macro Lens



Lens for Ultraviolet Light



Applications

semiconductor wafer

printed circuit board

pattern and defect inspection

substrate for flat panel display

sheet, optical film, printed matter

Series	Product name	Model	Magnification range	Image size [mm]	Option:	
					Camera mount (Build-to-order product)*3	M72 M72 M72 M72
			<0.05 0.05 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 (6.56/19.56/28.8/31.8) Other
High-resolution and Large Format Industrial Lens	Rayfact 1-2x *1 *5	L-OVM20117MN/-BS	○—○		○	● ● ● ● ● ●
	Rayfact 2-5x *1 *5	L-OVM50167MN/-BS	○—○		○	● ● ● ● ● ●
	Rayfact 7x *2 *4 *6	OFM70350HN-TS/-TP		○	○	○
	Rayfact 5.2x *2 *4	OFM52275HN-TS/-TP		○	○	○
High-resolution Industrial Lens for Line Sensor	Rayfact VW0.14x	L-OFM014012MN	—○		○	○ ○ ○ ● ○
	Rayfact VW0.25x	L-OFM025020MN	—○		○	○ ○ ○ ● ○
	Rayfact VW0.35x	L-OFM035026MN	—○		○	○ ○ ○ ● ○
Industrial Lens	Rayfact VF *1 *3	L-OVM30093MN	○—○		○ ○ ^{*3}	○ ○ ● ○
	Rayfact XG0.35x	L-OFM035030MN	○		○	○ ○ ○
	Rayfact XG0.5x	L-OFM050037MN	○		○	○ ○ ○
Lens for Large Line Sensor	Rayfact XG0.7x	L-OFM070046MN	○		○	○ ○ ○
	Rayfact XG1x	L-OFM100055MN	○		○	○ ○ ○
	Rayfact XG1.4x	L-OFM140063MN	○		○	○ ○ ○
	Rayfact IL50mmF2.8N	PFM0125020ML	—○—		○	○
Low Magnification Industrial Lens	Rayfact IL63mmF2.8N	OFM0125020ML	—○—		○	○
	Rayfact IL63mmF2.8N(F) *2	OFM0125020MF-B	—○—		○	○
	Rayfact IL63mmF2.8N(F) *2	OFM0125020MF-T	—○—		○	○
Industrial Micro Lens	Rayfact MJ90mmF4 *2	OVM05042MN	○—○		○	○ ○ ○ ○ ○ ○
	Rayfact MJ95mmF4 *2	OVM10062MN-1	○—○		○	○ ○ ○ ○ ○ ○
Industrial Macro Lens	Rayfact NR35mmF1.4	BA01031	—○		○	○
Lens for Ultraviolet Light	Rayfact UV-105mmF4.5	PF10545MF-UV	—○		○	○

*1 Fixed magnification models are also available. *2 With camera mount. *3 For 2x, 2.5x and 3x models, the image size is larger than 80mmφ.

*4 Straight tube type and Epi-illumination type are available. *5 Prism suitable model is available. *6 Build-to-order product

● Customized products available



HIGH-RESOLUTION AND LARGE FORMAT INDUSTRIAL LENS WITH VARIABLE MAGNIFICATION

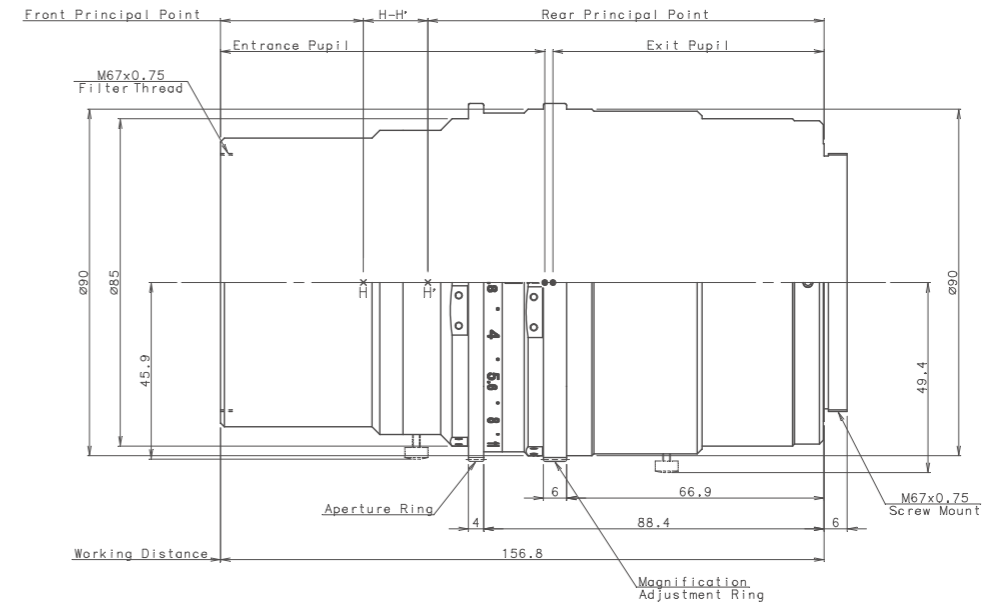
Features

- Variable magnification: 1-2x
- Variable magnification: 2-5x
- Prism optical optimization model available. (Coaxial vertical prism: Thickness up to 25mm)
(Handled)
- Large image size - 86.4mmφ - For high resolution, large-sized line sensor cameras.
- Recommendable line sensor cameras
3.5μm×23K/5μm×16K (Rayfact 1-2x)
5μm×16K/5.2μm×12K (Rayfact 2-5x)
- Less difference in performance, securing performance in the whole range of magnification.
- Diaphragm and floating ring setting lockable screws
- The gears of the diaphragm ring and floating ring can be moved by external drive.

Applications

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

	Magnification Adjustment Ring	Aperture Ring
P.C.D.	ø92	
m	0.5	
z	184	

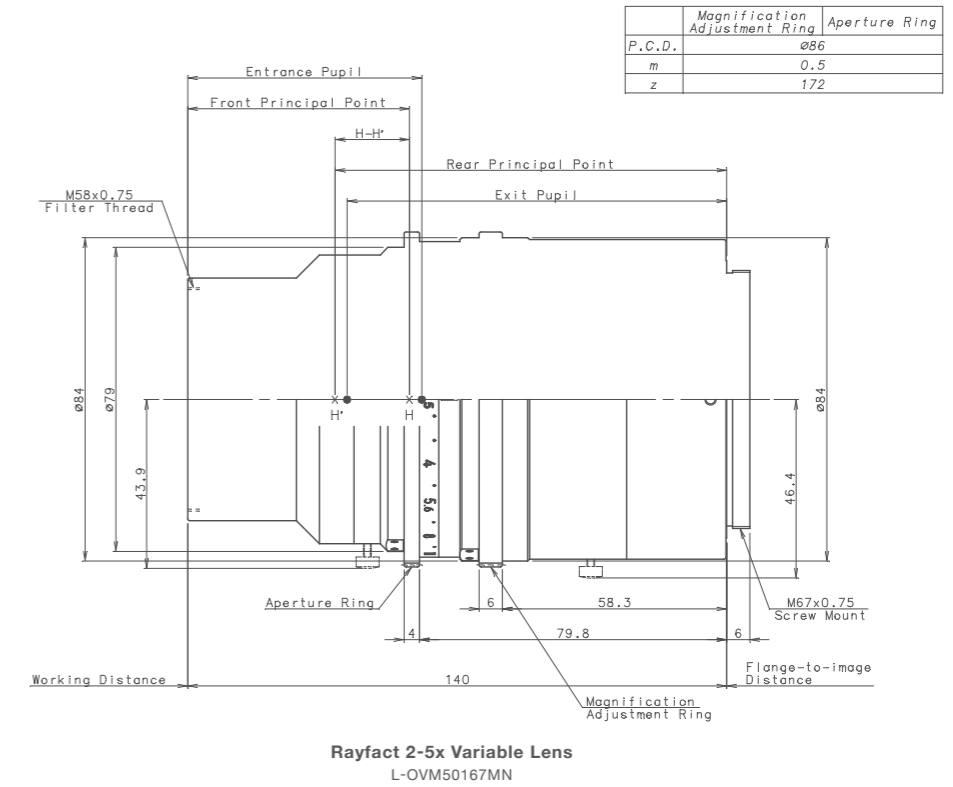
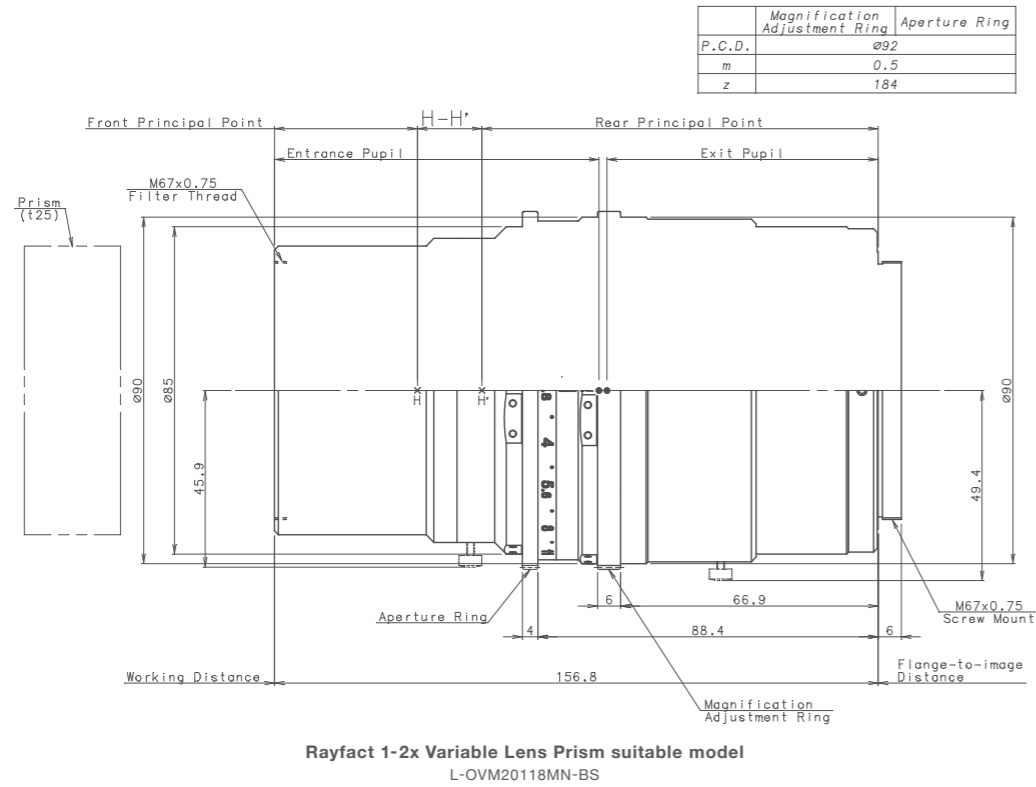


Rayfact 1-2x Variable Lens
L-OVM20117MN

Model	L-OVM20117MN					
Magnification range	-1x - -2x					
Magnification	-1x	-1.2x	-1.4x	-1.6x	-1.8x	-2x
Focal length	104.5mm (-1x)					
F Number (∞)	F2.8					
NA	0.092	0.099	0.105	0.109	0.113	0.117
Reference wavelength	546.07nm (e-line)					
Wavelength range	400nm - 700nm					
Image size	86.4mmφ					
Object size *1	86.4mmφ	72mmφ	61.7mmφ	54mmφ	48mmφ	43.2mmφ
Distortion *1	+0.2%	+0.1%	+0.1%	+0.0%	-0.0%	-0.0%
Relative illumination *1	82.9%	87.4%	90.6%	92.8%	94.1%	94.8%
Aperture scale	2.8 4 5.6 8 11					
Object-to-image distance	434.9mm	439.8mm	449.6mm	462.5mm	477.6mm	494.2mm
Working distance	172.0mm	154.3mm	141.5mm	131.7mm	124.0mm	117.7mm
Mount size	M67 (P=0.75)					
Flange-to-image distance	106.2mm	128.7mm	151.3mm	174.0mm	196.8mm	219.7mm
Attachment size	M67 (P=0.75)					
Diameter/length *2	90mmφ×156.8mm					
Weight	Approximately 1750g					

*1 Maximum image height (Y'=43.2mm) at F2.8.

*2 Dimension excludes protrusion of screws or other convex part.



Model	L-OVM20118MN-BS					
Magnification range	-1x - -2x					
Magnification	-1x	-1.2x	-1.4x	-1.6x	-1.8x	-2x
Focal length	105.1mm					
F Number (∞)	F2.8					
NA	0.092	0.099	0.105	0.110	0.114	0.118
Reference wavelength	546.07nm (e-line)					
Wavelength range	400nm - 700nm					
Image size	86.4mmφ					
Object size *1	86.4mmφ	72mmφ	61.7mmφ	54mmφ	48mmφ	43.2mmφ
Distortion *1	+0.2%	+0.1%	+0.0%	+0.0%	-0.0%	-0.0%
Relative illumination *1	82.2%	86.8%	90.1%	92.4%	93.8%	94.5%
Aperture scale	2.8 4 5.6 8 11					
Object-to-image distance	443.8mm	448.7mm	458.6mm	464.8mm	486.7mm	503.4mm
Working distance	179.8mm	162.1mm	149.2mm	139.3mm	131.6mm	125.3mm
Mount size	M67 (P=0.75)					
Flange-to-image distance	107.3mm	129.9mm	152.6mm	175.4mm	198.3mm	221.4mm
Attachment size	M67 (P=0.75)					
Diameter/length *2	90mmφ×156.8mm					
Weight	Approximately 1750g					

Model	L-OVM50167MN							
Magnification range	-2x - -5x							
Magnification	-2x	-2.5x	-3x	-3.5x	-4x	-4.5x	-5x	(-5.2x) *2
Focal length	116mm							
F Number (∞)	F2.5							
NA	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	86.4mmφ							
Object size *1	43.2mmφ	34.6mmφ	28.8mmφ	24.7mmφ	21.6mmφ	19.2mmφ	17.3mmφ	(16.6mmφ)
Distortion *1	+0.1%	+0.0%	-0.0%	-0.0%	-0.0%	-0.0%	-0.0%	(-0.0%)
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	78.9mm	(78.0mm)
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 *3	84mmφ×140mm							
Weight	Approximately 1350g							

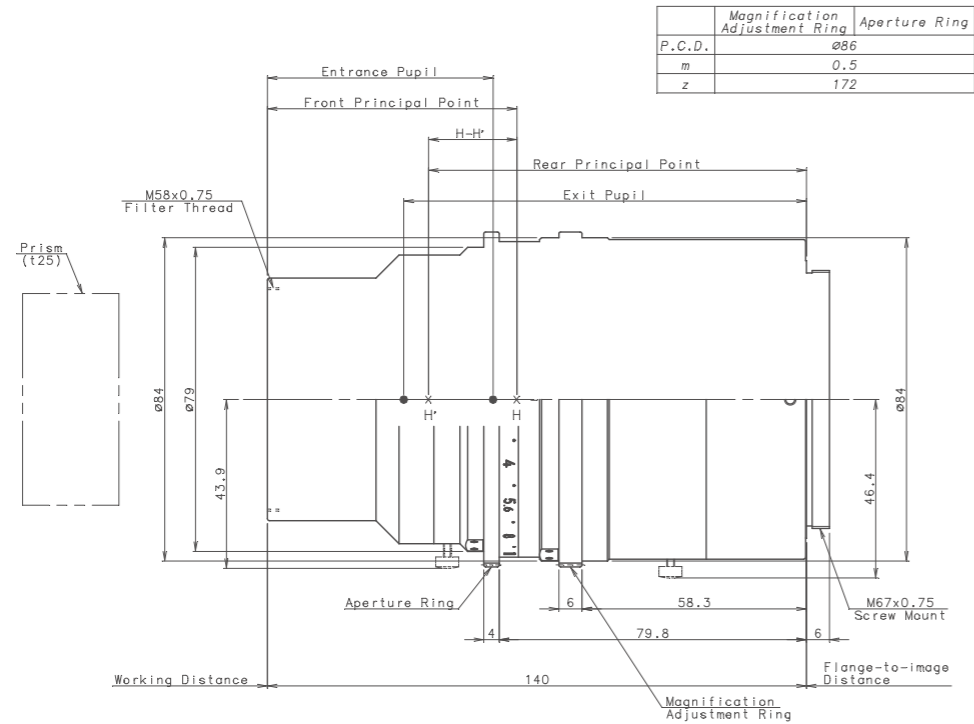
*1 Maximum image height (Y'=43.2mm) at F2.8.

*2 Dimension excludes protrusion of screws or other convex part.

*1 Maximum 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.

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



Rayfact 2-5x Variable Lens Prism suitable model
L-OVM50170MN-BS



HIGH-RESOLUTION AND LARGE FORMAT INDUSTRIAL LENS

Features

- Prism optical optimization model available. (Coaxial vertical prism : Thickness up to 25mm) (Handled)
- Large image size - 86.4mmφ - For high resolution, large-sized line sensor cameras.
- Recommendable line sensor cameras: 3.5μm×23K/5μm×16K (Rayfact 1.4S/1.75S), 5μm×16K/5.2μm×12K (Rayfact 2.5S/3.5S/5S)
- Less difference in performance, securing performance in the whole range of magnification.
- Diaphragm and floating ring setting lockable screws
- Fixed magnification model : Choice of 5 types of magnification (1.4x · 1.75x · 2.5x · 3.5x · 5x)

Applications

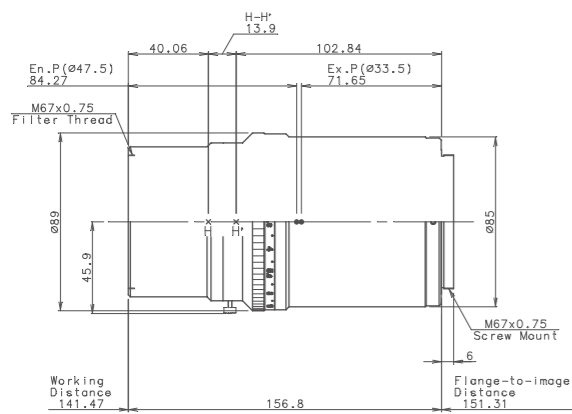
- Inspection by high-resolution line sensor cameras
- Flat panel inspection
- PCB inspection
- Wafer inspection

Model	L-OVM50170MN-BS							
Magnification range	-2x - -5x							
Magnification	-2x	-2.5x	-3x	-3.5x	-4x	-4.5x	-5x	(-5.2x) *2
Focal length	117mm							
F Number (∞)	F2.5							
NA	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	86.4mmφ							
Object size *1	43.2mmφ	34.6mmφ	28.8mmφ	24.7mmφ	21.6mmφ	19.2mmφ	17.3mmφ	(16.6mmφ)
Distortion *1	+0.1%	-0.0%	-0.0%	-0.1%	-0.1%	-0.1%	-0.1%	(-0.0%)
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	89.9mm	86.4mm	83.6mm	(82.7mm)
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 *3	84mmφ×140mm							
Weight	Approximately 1350g							

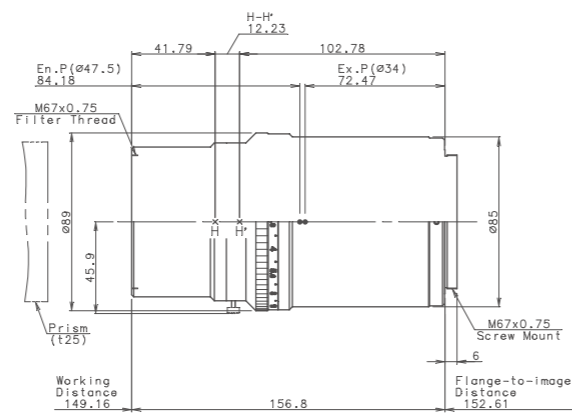
*1 Maximum image height (Y'=43.2mm) at F2.5 with prism (25mm thickness-material BK7 or equivalent) to put between an object and the lens.

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

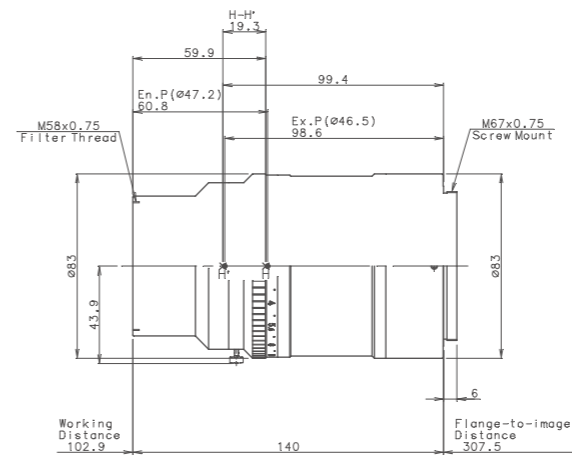
*3 Dimension excludes protrusion of screws or other convex part.



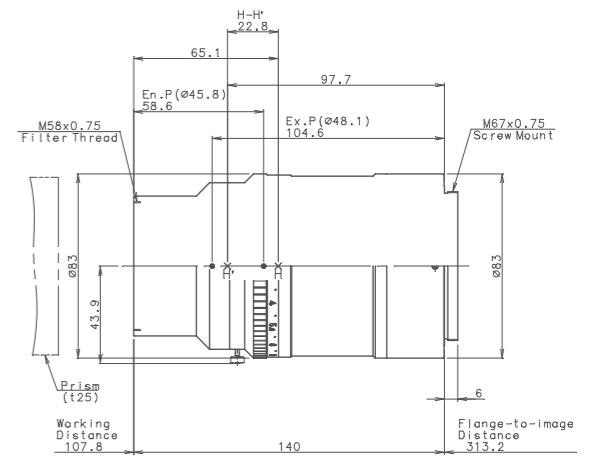
Rayfact 1.4S
L-OFM14105MN



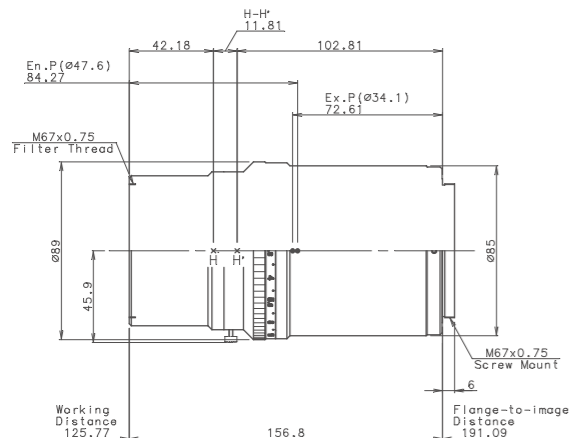
Rayfact 1.4S Prism suitable model
L-OFM14105MN-BS



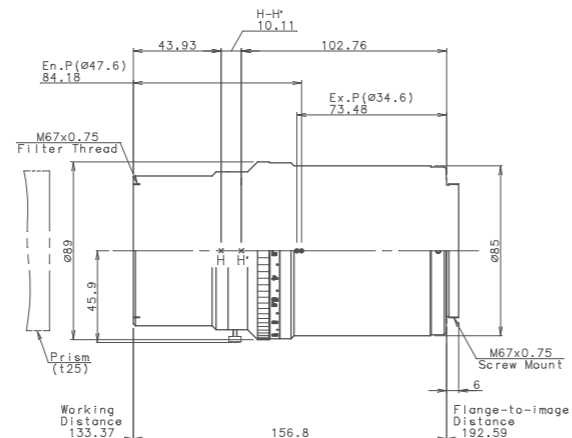
Rayfact 2.5S
L-OFM25143MN



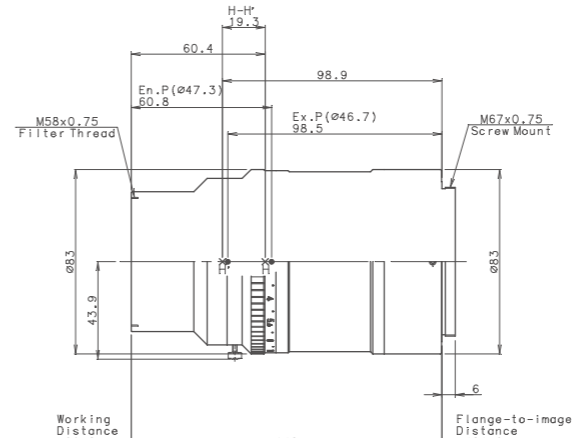
Rayfact 2.5S Prism suitable model
L-OFM25144MN-BS



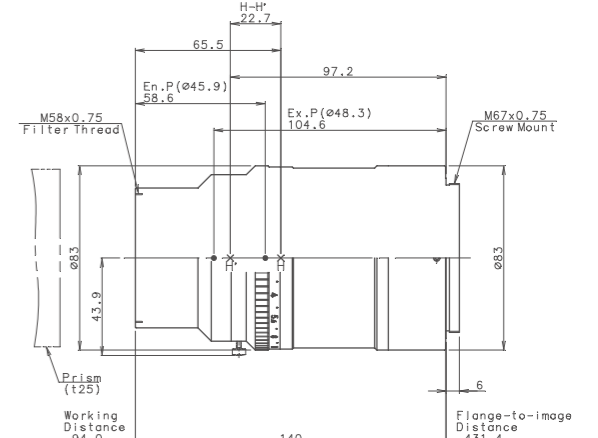
Rayfact 1.75S
L-OFM175112MN



Rayfact 1.75S Prism suitable model
L-OFM175113MN-BS



Rayfact 3.5S
L-OFM35156MN



Rayfact 3.5S Prism suitable model
L-OFM35157MN-BS

Model	L-OFM14105MN	L-OFM14105MN-BS	L-OFM175112MN	L-OFM175113MN-BS
Focal length	105.9mm	106.4mm	106.9mm	106.9mm
F Number (∞)	F2.8	F2.8	F2.8	F2.8
NA	0.105	0.105	0.112	0.113
Magnification scale	-1.4x	-1.4x	-1.75x	-1.75x
Reference wavelength	546.07nm (e-line)	546.07nm (e-line)	546.07nm (e-line)	546.07nm (e-line)
Wavelength range	400nm - 700nm	400nm - 700nm	400nm - 700nm	400nm - 700nm
Field angle *1	15.0°	14.4°	12.8°	12.8°
Image size	86.4mmφ	86.4mmφ	86.4mmφ	86.4mmφ
Object size	61.7mmφ	61.7mmφ	49.4mmφ	49.4mmφ
Distortion *1	+0.1%	+0.0%	-0.0%	-0.0%
Relative illumination *1	90.6%	90.1%	93.8%	93.8%
Aperture scale	2.8 4 5.6 8 11	2.8 4 5.6 8 11	2.8 4 5.6 8 11	2.8 4 5.6 8 11
Object-to-image distance	449.6mm	458.6mm	473.7mm	482.8mm
Working distance	141.5mm	149.2mm	125.8mm	133.4mm
Mount size	M67 (P=0.75)	M67 (P=0.75)	M67 (P=0.75)	M67 (P=0.75)
Flange-to-image distance	151.3mm	152.6mm	191.1mm	192.6mm
Attachment size	M67 (P=0.75)	M67 (P=0.75)	M67 (P=0.75)	M67 (P=0.75)
Diameter/length *2	89mmφ×156.8mm	89mmφ×156.8mm	89mmφ×156.8mm	89mmφ×156.8mm
Weight	Approximately 1450g	Approximately 1450g	Approximately 1450g	Approximately 1450g

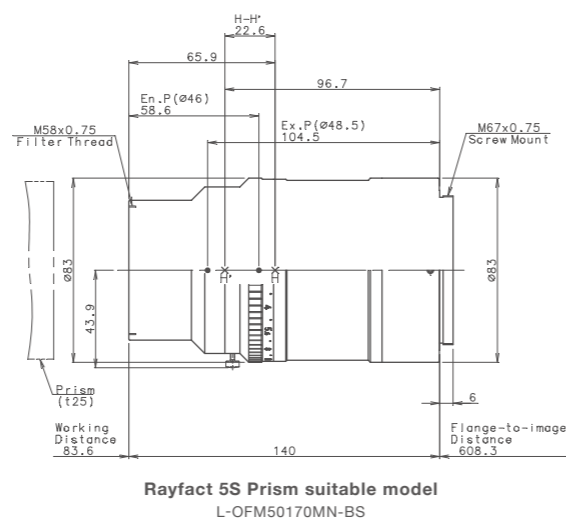
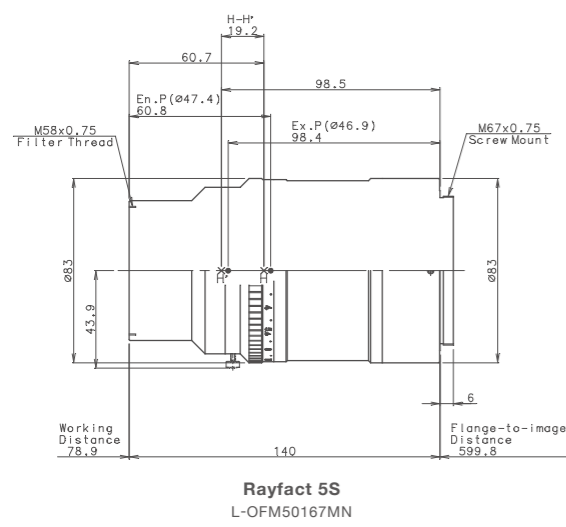
*1 Maximum image height (Y'=43.2mm) at F2.8.

*2 Dimension excludes protrusion of screws or other convex part.

Model	L-OFM25143MN	L-OFM25144MN-BS	L-OFM35156MN	L-OFM35157MN-BS
Focal length	116.3mm	117.4mm	116.3mm	117.5mm
F Number (∞)	F2.5	F2.5	F2.5	F2.5
NA	0.143	0.144	0.156	0.157
Magnification scale	-2.5x	-2.5x	-3.5x	-3.5x
Reference wavelength	546.07nm (e-line)	546.07nm (e-line)	546.07nm (e-line)	546.07nm (e-line)
Wavelength range	400 - 700nm	400 - 700nm	400 - 700nm	400 - 700nm
Field angle *1	12.0°	12.4°	9.4°	9.8°
Image size	86.4mmφ	86.4mmφ	86.4mmφ	86.4mmφ
Object size	34.6mmφ	34.6mmφ	24.7mmφ	24.7mmφ
Distortion *1	+0.0%	-0.0%	-0.0%	-0.1%
Relative illumination *1	95.4%	93.3%	99.2%	97.5%
Aperture scale	2.5 4 5.6 8 11	2.5 4 5.6 8 11	2.5 4 5.6 8 11	2.5 4 5.6 8 11
Object-to-image distance	550.4mm	561mm	653.8mm	665.4mm
Working distance	102.8mm	107.8mm	89.2mm	94mm
Mount size	M67 (P=0.75)	M67 (P=0.75)	M67 (P=0.75)	M67 (P=0.75)
Flange-to-image distance	307.5mm	313.2mm	424.6mm	431.4mm
Attachment size	M58 (P=0.75)	M58 (P=0.75)	M58 (P=0.75)	M58 (P=0.75)
Diameter/length *2	83mmφ×140mm	83mmφ×140mm	83mmφ×140mm	83mmφ×140mm
Weight	Approximately 1200g	Approximately 1200g	Approximately 1200g	Approximately 1200g

*1 Maximum image height (Y'=43.2mm) at F2.5.

*2 Dimension excludes protrusion of screws or other convex part.



HIGH-RESOLUTION INDUSTRIAL LENS FOR LINE SENSOR

Features

- For high resolution, large-sized line sensor cameras.
- Recommendable line sensor cameras - 5.2 μ m x 12K / 7 μ m x 8K
- Guarantee high resolution and uniformity from the center to the edge of the lens.
- Rayfact 7x 5.2x: Image size 64mm ϕ has a high relative illumination.
- Rayfact 7x 5.2x: Double telecentric lenses.

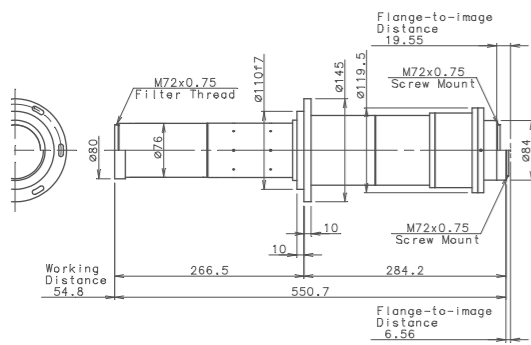
Applications

- Inspection by high-resolution line sensor cameras
- Flat panel inspection
- PCB inspection
- Wafer inspection
- Printed materials inspection.

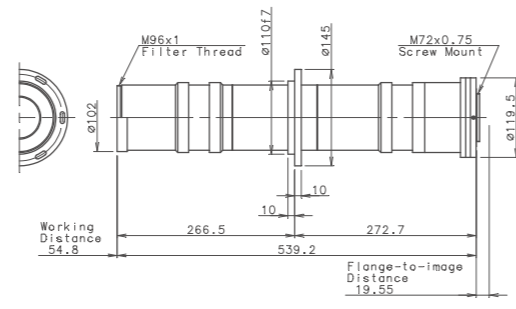
Model	L-OFM50167MN	L-OFM50170MN-BS
Focal length	116.4mm	117.5mm
F Number (∞)	F2.5	F2.5
NA	0.167	0.170
Magnification scale	-5x	-5x
Reference wavelength	546.07nm (e-line)	546.07nm (e-line)
Wavelength range	400 - 700nm	400 - 700nm
Field angle *1	7.0°	7.4°
Image size	86.4mm ϕ	86.4mm ϕ
Object size	17.3mm ϕ	17.3mm ϕ
Distortion *1	-0.0%	-0.1%
Relative illumination *1	99.7%	99.0%
Aperture scale	2.5 4 5.6 8 11	2.5 4 5.6 8 11
Object-to-image distance	818.7mm	831.9mm
Working distance	79.0mm	83.6mm
Mount size	M67 (P=0.75)	M67 (P=0.75)
Flange-to-image distance	599.8mm	608.3mm
Attachment size	M58 (P=0.75)	M58 (P=0.75)
Diameter/length *2	83mm ϕ ×140mm	83mm ϕ ×140mm
Weight	Approximately1200g	Approximately1200g

*1 Maximum image height (Y'=43.2mm) at F2.5.

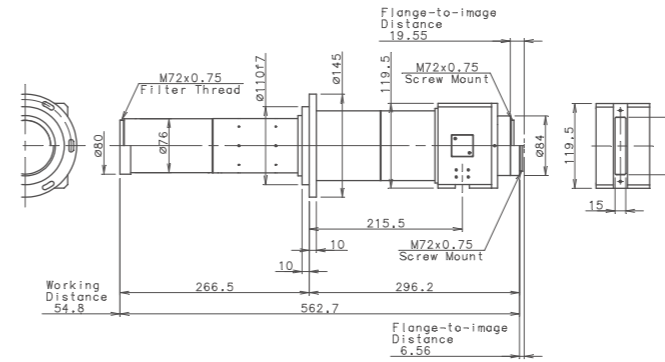
*2 Dimension excludes protrusion of screws or other convex part.



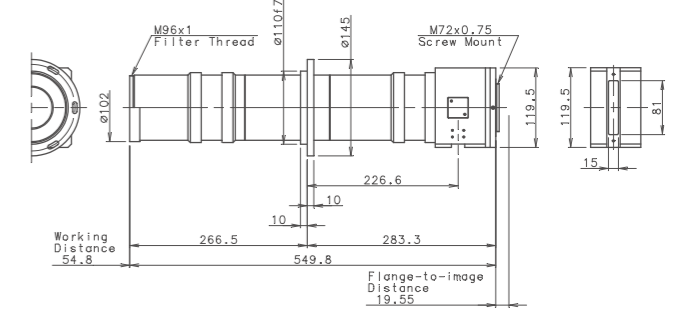
Rayfact 5.2x (Straight-tube type)
OFM52275HN-TS



Rayfact 7x (Straight-tube type Build-to-order product)
OFM70350HN-TS



Rayfact 5.2x (Epi-illumination type)
OFM52275HN-TP



Rayfact 7x (Epi-illumination type Build-to-order product)
OFM70350HN-TP

Model	OFM52275HN-TS	OFM70350HN-TS
Focal length	Double telecentric	Double telecentric
NA	0.275	0.35
Magnification scale	-5.2x	-7x
Reference wavelength	546.07nm (e-line)	546.07nm (e-line)
Wavelength range	510 - 590nm	510 - 590nm
Field angle *1	-	-
Image size	64mmφ	64mmφ
Object size	12.3mmφ	9.1mmφ
Distortion *1	-0.0%	+0.0%
Relative illumination *1	101%	103%
Aperture scale	A fixed diaphragm	A fixed diaphragm
Object-to-image distance	612.1mm	613.9mm
Working distance	54.8mm	54.85mm
Mount size	M72 (P=0.75)	M72 (P=0.75)
Flange-to-image distance	6.56mm	19.55mm
Attachment size	M72 (P=0.75)	M96 (P=1.0)
Diameter/length *2	145mmφ×550.7mm	145mmφ×539.2mm
Weight	Approximately 4.4kg	Approximately 7.4kg

*1 Maximum image height (Y'=32mm)

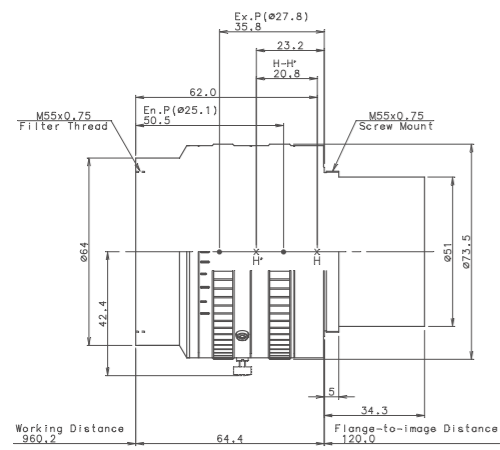
*2 Dimension excludes protrusion of screws or other convex part.

Model	OFM52275HN-TP	OFM70350HN-TP
Focal length	Double telecentric	Double telecentric
NA	0.275	0.35
Magnification scale	-5.2x	-7x
Reference wavelength	546.07nm (e-line)	546.07nm (e-line)
Wavelength range	510 - 590nm	510 - 590nm
Field angle *2	-	-
Image size *1	64mmφ	64mmφ
Object size	12.3mmφ	9.1mmφ
Distortion *2	-0.0%	+0.0%
Relative illumination *2	101%	103%
Aperture scale	Fixed diaphragm	Fixed diaphragm
Object-to-image distance	624.0mm	624.5mm
Working distance	54.8mm	54.85mm
Mount size	M72 (P=0.75)	M72 (P=0.75)
Flange-to-image distance	6.56mm	19.55mm
Attachment size	M72 (P=0.75)	M96 (P=1.0)
Diameter/length *3	145mmφ (partially □119.5mm) ×562.7mm	145mmφ (partially □119.5mm) ×549.8mm
Weight	Approximately 5.9kg	Approximately 8.9kg

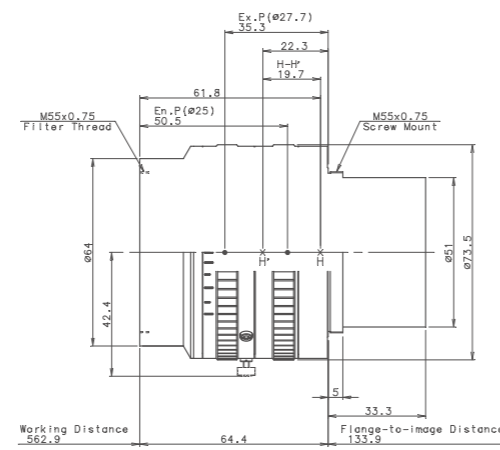
*1 Suitable for line sensor cameras.

*2 Maximum image height (Y'=32mm)

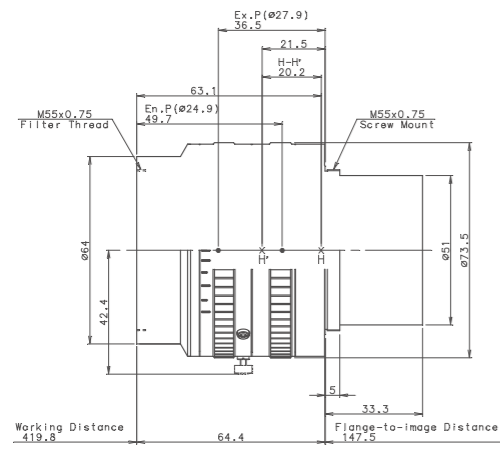
*3 Dimension excludes protrusion of screws or other convex part.



Rayfact VW0.14x
L-OFM014012MN



Rayfact VW0.25x
L-OFM025020MN



Rayfact VW0.35x
L-OFM035026MN



INDUSTRIAL LENS WITH VARIABLE MAGNIFICATION

Features

- Variable magnification : 0.5 - 3x
- For high resolution, large-sized line sensor cameras.
- Recommendable line sensor cameras - 5.2 μ m x 12K / 7 μ m x 8K
- High performance guaranteed in all range of magnification.
- Aperture lockable screw and floating ring lockable screw for easy use.
- Gear on the diaphragm ring and the floating ring to have the mechanism be variable by external driving.

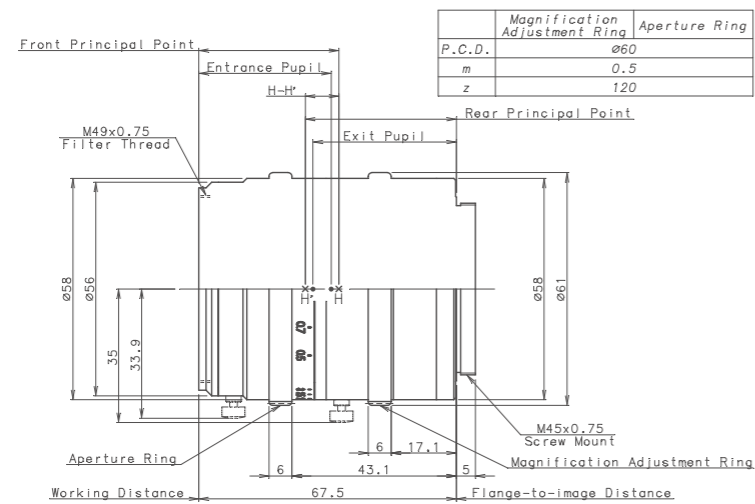
Applications

- Inspection by high-resolution line sensor cameras
- Flat panel inspection
- PCB inspection
- Wafer inspection
- Printed materials inspection.

Model	L-OFM014012MN	L-OFM025020MN	L-OFM035026MN
Focal length	125.5mm	124.9mm	125.2mm
F Number (∞)	F4.9	F4.9	F4.9
NA	0.013	0.02	0.026
Magnification scale	-0.14x	-0.25x	-0.35x
Magnification range	-0.1x - -0.18x	-0.18x - -0.28x	-0.28x - -0.4x
Reference wavelength	546.07nm (e-line)	546.07nm (e-line)	546.07nm (e-line)
Wavelength range	400 - 700nm	400 - 700nm	400 - 700nm
Field angle *1	24.7°	22.9°	21.3°
Image size	62mm ϕ	62mm ϕ	62mm ϕ
Object size *1	442.9mm ϕ	248.0mm ϕ	177.1mm ϕ
Distortion *1	+0.0%	-0.1%	-0.1%
Relative illumination *1	90.9%	93.4%	94.3%
Aperture scale	4.9 5.6 8 11	4.9 5.6 8 11	4.9 5.6 8 11
Object-to-image distance *1	1144.6mm	761.1mm	631.7mm
Working distance *1	960.2mm	562.9mm	419.8mm
Mount size	M55 (P=0.75)	M55 (P=0.75)	M55 (P=0.75)
Flange-to-image distance *1	120.0mm	133.9mm	147.5mm
Attachment size	M55 (P=0.75)	M55 (P=0.75)	M55 (P=0.75)
Diameter/length *2	73.5mm ϕ ×98.7mm	73.5mm ϕ ×97.7mm	73.5mm ϕ ×97.7mm
Weight	Approximately 740g	Approximately 740g	Approximately 740g

*1 Maximum image height (Y'=31mm) at F4.9 and standard magnification.

*2 Dimension excludes protrusion of screws or other convex part.



Rayfact VF
L-OVM30093MN



INDUSTRIAL LENS

Features

- For high resolution, large-sized line sensor cameras.
- Recommendable line sensor cameras - 5.2μm x 12K / 7μm x 8K
- High performance guaranteed in all range of magnification.
- Aperture 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 (1x · 1.4x · 2x · 2.5x · 3x)
- Fixed magnification model : 3 types (Magnification at 2x · 2.5x · 3x)
secure image size of 86.4mmφ.

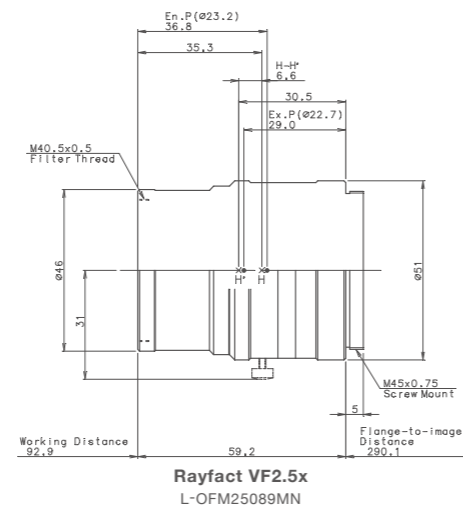
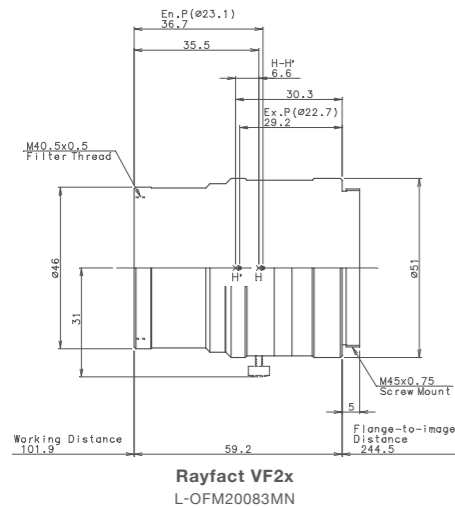
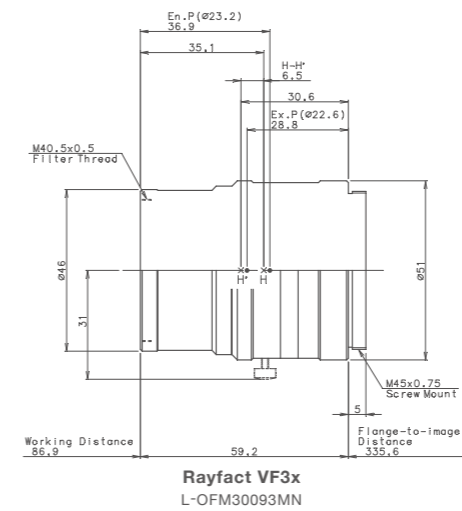
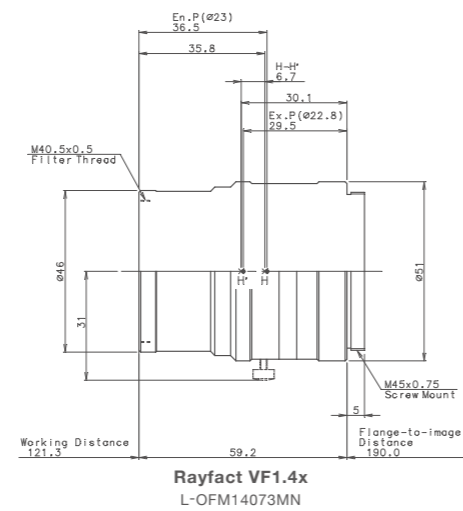
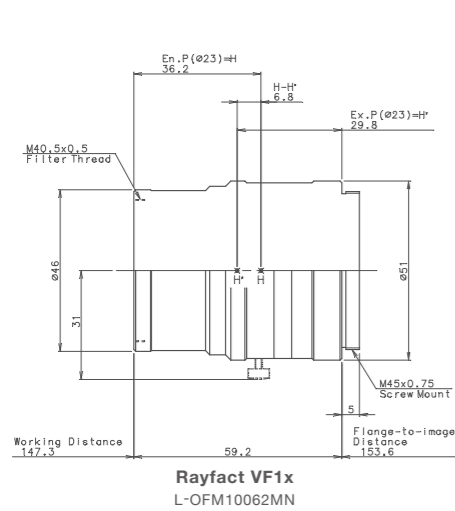
Applications

- Inspection by high-resolution line sensor cameras
- Flat panel inspection
- PCB inspection
- Wafer inspection
- Printed materials inspection.

Model	L-OVM30093MN						
Magnification range	-0.5x - -3x						
Magnification scale	-0.5x	-0.7x	-1x	-1.4x	-2x	-2.5x	-3x
Focal length	90mm						
F Number(∞)	F4						
NA	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	+0.2%	+0.1%	+0.0%	-0.0%	-0.0%	-0.0%	-0.0%
Relative illumination *1	56.2%	66.6%	77.9%	87.4%	92.7%	95.0%	95.3%
Aperture scale	4 5.6 8						
Object-to-image distance	405.9mm	371.9mm	360.1mm	370.6mm	405.9mm	442.6mm	482.4mm
Working distance	239.7mm	187.2mm	147.8mm	121.5mm	101.6mm	92.4mm	86.3mm
Mount size	M45 (P=0.75)						
Flange-to-image distance	98.8mm	117.2mm	144.8mm	181.6mm	236.8mm	282.7mm	328.6mm
Attachment size	M49 (P=0.75)						
Diameter/length *2	58mmφ×67.5mm						
Weight	Approximately 430g						

*1 Maximum image height (Y'=32mm) at F4.

*2 Dimension excludes protrusion of screws or other convex part.



Model	L-OFM10062MN	L-OFM14073MN	L-OFM20083MN	L-OFM25089MN
Focal length	91.7mm	91.7mm	91.6mm	91.6mm
F Number (∞)	F4	F4	F4	F4
NA	0.062	0.073	0.083	0.089
Magnification scale	-1x	-1.4x	-2x	-2.5x
Reference wavelength	546.07nm (e-line)	546.07nm (e-line)	546.07nm (e-line)	546.07nm (e-line)
Wavelength range	400 - 700nm	400 - 700nm	400 - 700nm	400 - 700nm
Field angle *1	19.8°	16.4°	17.8°	15.2°
Image size	64mmφ	64mmφ	86.4mmφ	86.4mmφ
Object size	64mmφ	45.7mmφ	43.2mmφ	34.6mmφ
Distortion *1	+0.0%	-0.0%	-0.1%	-0.1%
Relative illumination *1	77.9%	87.4%	84.9%	90.1%
Aperture scale	4 5.6 8	4 5.6 8	4 5.6 8	4 5.6 8
Object-to-image distance	360.1mm	370.5mm	405.6mm	442.2mm
Working distance	147.2mm	121.3mm	101.9mm	92.9mm
Mount size	M45 (P=0.75)	M45 (P=0.75)	M45 (P=0.75)	M45 (P=0.75)
Flange-to-image distance	153.6mm	190mm	244.5mm	290.1mm
Attachment size	M40.5 (P=0.5)	M40.5 (P=0.5)	M40.5 (P=0.5)	M40.5 (P=0.5)
Diameter/length *2	51mmφ×59.2mm	51mmφ×59.2mm	51mmφ×59.2mm	51mmφ×59.2mm
Weight	Approximately 240g	Approximately 240g	Approximately 240g	Approximately 240g

*1 Maximum image height (Y'=32mm) at F4.

*2 Dimension excludes protrusion of screws or other convex part.

Model	L-OFM30093MN
Focal length	91.5mm
F Number (∞)	F4
NA	0.094
Magnification scale	-3x
Reference wavelength	546.07nm (e-line)
Wavelength range	400 - 700nm
Field angle *1	13.2°
Image size	86.4mmφ
Object size	28.8mmφ
Distortion *1	-0.1%
Relative illumination *1	92.8%
Aperture scale	4 5.6 8
Object-to-image distance	481.7mm
Working distance	86.9mm
Mount size	M45 (P=0.75)
Flange-to-image distance	335.6mm
Attachment size	M40.5 (P=0.5)
Diameter/length *2	51mmφ×59.2mm
Weight	Approximately 240g

*1 Maximum image height (Y'=43.2mm) at F4.

*2 Dimension excludes protrusion of screws or other convex part.



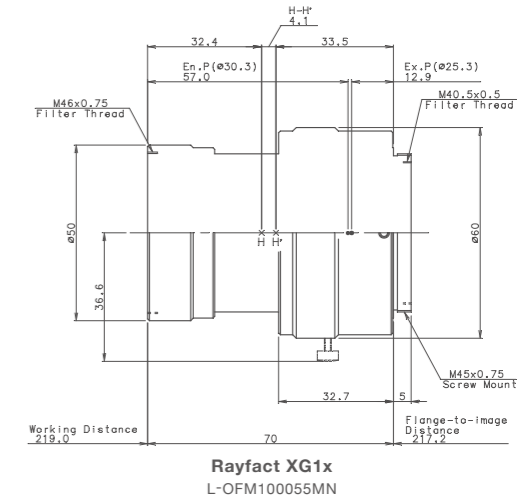
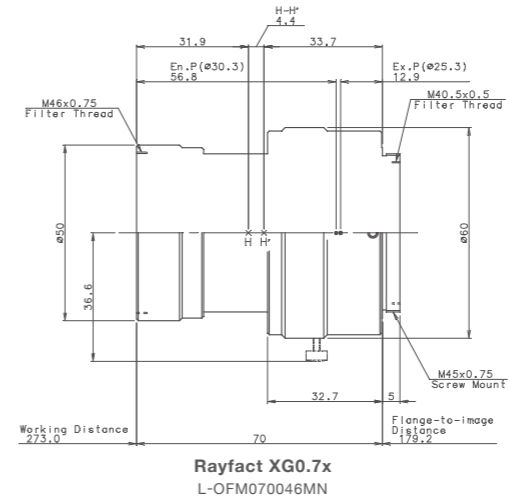
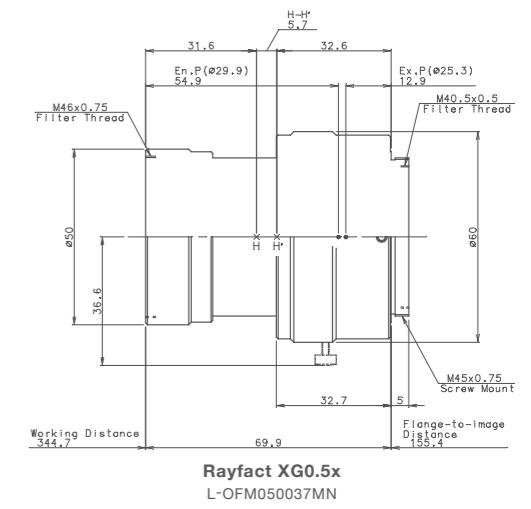
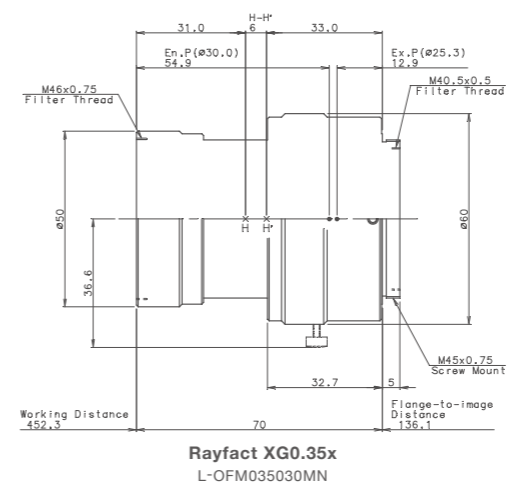
LENS FOR LARGE LINE SENSOR

Features

- For high resolution, large-sized line sensor cameras.
- Recommendable line sensor cameras - 5.2μm x 12K / 7μm x 8K
- Fixed magnification : Choice of 5 types of magnification (0.35x·0.5x·0.7x·1x·1.4x)
- High performance guaranteed in all range of magnification.
- Aperture lockable screw and floating ring lockable screw for easy use.

Applications

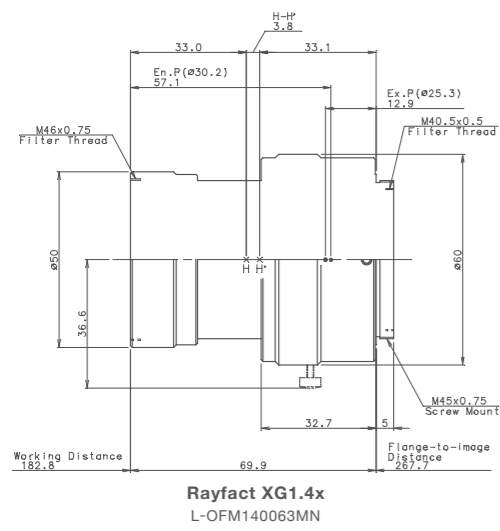
- Inspection by high-resolution line sensor cameras
- Flat panel inspection
- PCB inspection
- Wafer inspection
- Printed materials inspection.



Model	L-OFM035030MN	L-OFM050037MN	L-OFM070046MN	L-OFM100055MN
Focal length	125.3mm	125.4mm	125.5mm	125.7mm
F Number (∞)	F4.5	F4.5	F4.5	F4.5
NA	0.030	0.037	0.046	0.055
Magnification scale	-0.35x	-0.5x	-0.7x	-1x
Reference wavelength	546.07nm (e-line)	546.07nm (e-line)	546.07nm (e-line)	546.07nm (e-line)
Wavelength range	400 - 700nm	400 - 700nm	400 - 700nm	400 - 700nm
Field angle *1	27.4°	24.4°	21.2°	17.8°
Image size	86.4mmφ	86.4mmφ	86.4mmφ	86.4mmφ
Object size	246.9mmφ	172.8mmφ	123.4mmφ	86.4mmφ
Distortion *1	-0.2%	-0.2%	+0.1%	+0.0%
Relative illumination *1	59.8%	66.5%	73.6%	82.2%
Aperture scale	4.5 5.6 8	4.5 5.6 8	4.5 5.6 8	4.5 5.6 8
Object-to-image distance	658.4mm	570.0mm	522.2mm	506.2mm
Working distance	452.3mm	344.7mm	273.0mm	219.0mm
Mount size	M45 (P=0.75)	M45 (P=0.75)	M45 (P=0.75)	M45 (P=0.75)
Flange-to-image distance	136.1mm	155.4mm	179.2mm	217.2mm
Attachment size	Front : M46×0.75 Back : M40.5×0.5	Front : M46×0.75 Back : M40.5×0.5	Front : M46×0.75 Back : M40.5×0.5	Front : M46×0.75 Back : M40.5×0.5
Diameter/length *2	60mmφ×70mm	60mmφ×69.9mm	60mmφ×70mm	60mmφ×70mm
Weight	Approximately 340g	Approximately 340g	Approximately 340g	Approximately 340g

*1 Maximum image height (Y'=43.2mm) at F4.5

*2 Dimension excludes protrusion of screws or other convex part.



INDUSTRIAL MICRO LENS

Features

- Rayfact MJ90mmF4 : Variable magnification range of 0.05x - 0.5x.
- Rayfact MJ95mmF4 : Variable magnification range of 0.5x - 1.0x.
- For high resolution, large-sized line and area sensor cameras.
- High performance guaranteed in all range of magnification.
- Aperture lockable screw and floating ring lockable screw for easy use.
- Unit sales with a wide range of mounts to fit in your camera.

Applications

- Image receiving process by both line and area sensor cameras.
- Flat panel inspection
- PCB inspection
- Wafer inspection
- Printed materials inspection.

Model	L-OFM140063MN
Focal length	125.9mm
F Number (∞)	F4.5
NA	0.063
Magnification scale	-1.4x
Reference wavelength	546.07nm (e-line)
Wavelength range	400 - 700nm
Field angle *1	14.6°
Image size	86.4mmφ
Object size	61.7mmφ
Distortion *1	-0.0%
Relative illumination *1	90.0%
Aperture scale	4.5 5.6 8
Object-to-image distance	520.4mm
Working distance	182.8mm
Mount size	M45 (P=0.75)
Flange-to-image distance	267.7mm
Attachment size	Front : M46×0.75 Back : M40.5×0.5
Diameter/length *2	60mmφ×69.9mm
Weight	Approximately 340g

*1 Maximum image height (Y'=43.2mm) at F4.5

*2 Dimension excludes protrusion of screws or other convex part.



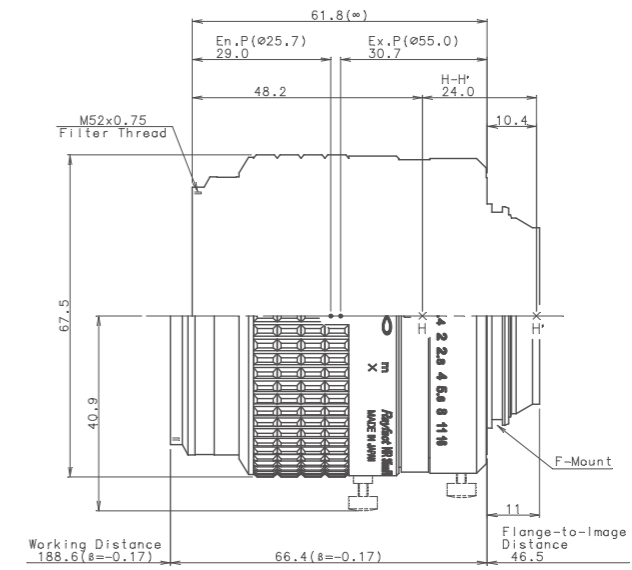
INDUSTRIAL MACRO LENS

Features

- “Ai Nikkor 35mm f/1.4S” optical system adopted
- Aperture ring and focus ring lockable screw for easy use.
- Lens for industrial use.

Applications

- CCD camera photographing.
- Printed materials inspection.
- Fine pattern inspection - e.g. PCB.
- Fine pattern inspection and detecting defects - e.g. TAB, sheets.



Rayfact NR35mmF1.4
BA01031

Model	BA01031								
Magnification range	∞ - -0.17x								
Distance scale m	∞	2	1	0.7	0.5	0.4	0.35	0.3	
Shooting magnification *1	-	-0.017x	-0.037x	-0.056x	-0.084x	-0.112x	-0.135x	-0.169x	
Focal length	36.1mm	36.0mm	35.9mm	35.9mm	35.8mm	35.6mm	35.6mm	35.4mm	
F Number (∞)	F1.4								
Reference wavelength	587.56nm (d-Line)								
Wavelength range	400 - 700nm								
Image size	43.2mm ϕ								
Distortion *2	-2.4%	-2.7%	-3.0%	-3.3%	-3.7%	-4.1%	-4.3%	-4.6%	
Relative illumination	Y'=15mm	48.4%	50.0%	51.7%	53.4%	55.9%	58.4%	60.4%	63.3%
	Y'=21.6mm	20.2%	21.7%	23.4%	25.1%	27.6%	30.2%	32.3%	35.6%
Aperture scale	1.4 2 2.8 4 5.6 8 11 16								
Object-to-image distance	-	2142.4mm	1033.6mm	717.3mm	508.1mm	404.5mm	353mm	301.5mm	
Working distance	-	2033.7mm	924.3mm	607.5mm	397.6mm	293.1mm	241mm	188.6mm	
Mount size	F Mount								
Flange-to-image distance	46.5mm								
Attachment size	M52x0.75								
Diameter/length *3	67.5 ϕ x61.8 - 66.4mm								
Weight	Approximately 430g								

* This lens cannot be used with the consumer-use camera made by Nikon. Camera may be damaged.

*1 Shooting magnification: Magnification including distortion and an image size of 43.2mm ϕ

*2 Maximum image height (Y'=21.6mm) at F1.4

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



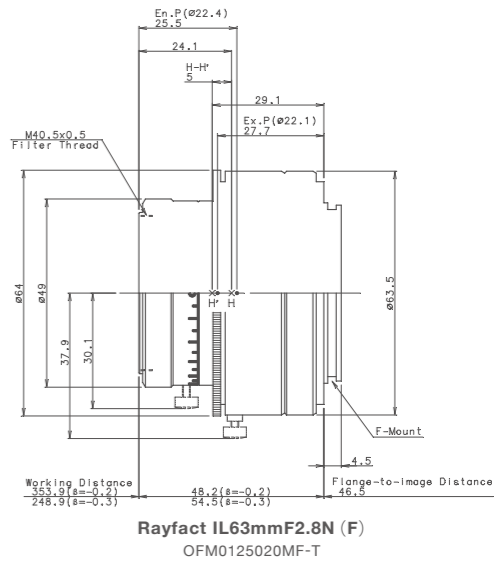
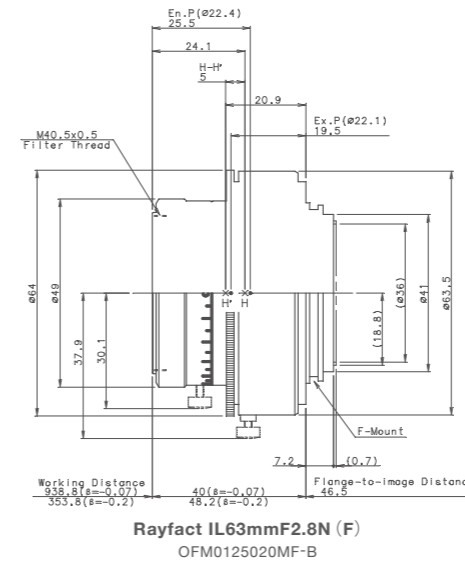
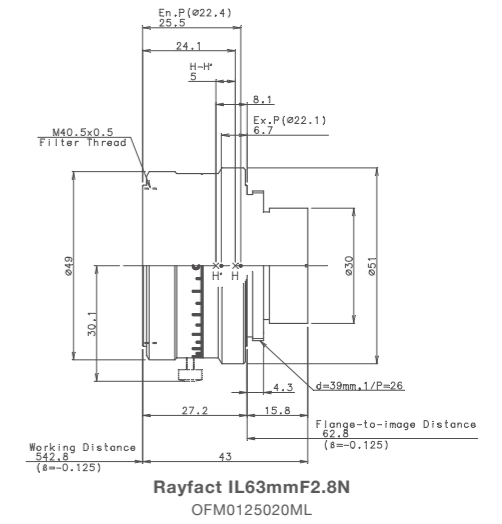
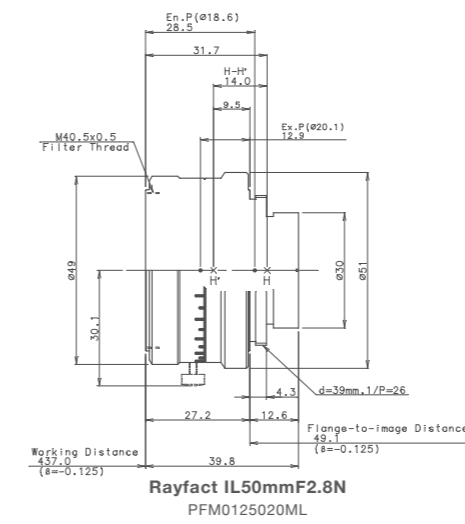
LOW MAGNIFICATION INDUSTRIAL LENS

Features

- Compatible with EL·50mmF2.8N, 63mmF2.8N
- Minimal chromatic aberration in the range of 380nm - 700nm.
- Aperture ring lockable screw for easy use.

Applications

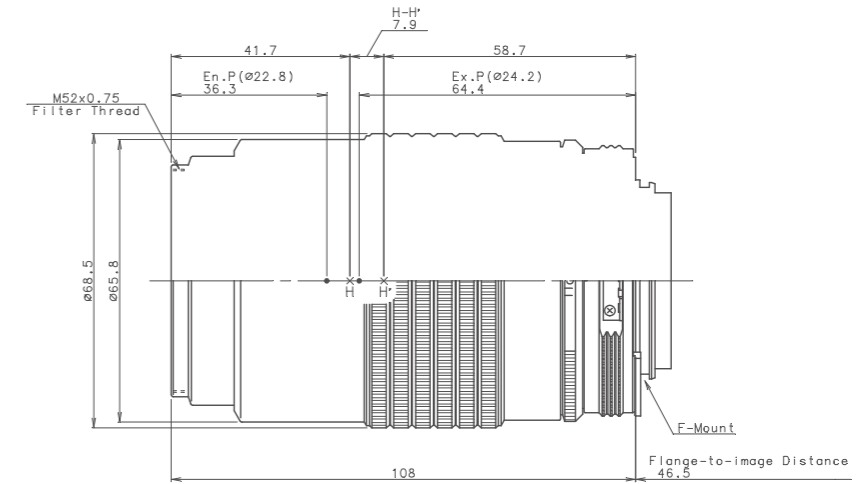
- CCD camera photographing. (Both line and area sensor cameras)
- Printed materials inspection.
- Fine pattern inspection - e.g. PCB.
- Fine pattern inspection and detecting defects - e.g. TAB, sheets.



Model	PFM0125020ML	OFM0125020ML	OFM0125020MF-B	OFM0125020MF-T
Focal length	52.1mm	63.0mm	63.0mm	63.0mm
F Number (∞)	F2.8	F2.8	F2.8	F2.8
NA	0.02	0.02	0.02 (-0.125x)	0.03 (-0.2x)
Magnification scale	-0.125x	-0.125x	-	-
Magnification range	-0.05x - -0.5x	-0.05x - -0.5x	-0.07x - -0.2x	-0.2x - -0.3x
Reference wavelength	587.56nm (d-Line)	587.56nm (d-Line)	587.56nm (d-Line)	587.56nm (d-Line)
Wavelength range	380 - 700nm	380 - 700nm	380 - 700nm	380 - 700nm
Field angle *1	41°	44.4°	42.4° (-0.125x)	40.0° (-0.2x)
Image size	43.2mmφ	58mmφ	55.2mmφ	55.2mmφ
Object size *1	345.6mmφ	464mmφ	788.6mmφ - 276mmφ	276mmφ - 184mmφ
Distortion *1	-0.5%	+0.1%	+0.1% (-0.125x)	-0.1% (-0.2x)
Relative illumination *1	47.7%	39.3%	44.1% (-0.125x)	50.3% (-0.2x)
Aperture scale	2.8 4 5.6 8 11 16	2.8 4 5.6 8 11 16	2.8 4 5.6 8 11 16	2.8 4 5.6 8 11 16
Object-to-image distance *1	513.3mm	632.8mm	1025.3mm - 448.5mm	448.5mm - 349.9mm
Working distance *1	437.0mm	542.8mm	938.8mm - 353.8mm	353.8mm - 248.9mm
Mount size	d=39mm 1/P=26 (Leica)	d=39mm 1/P=26 (Leica)	F Mount	F Mount
Flange-to-image distance *1	49.1mm	62.8mm	46.5mm	46.5mm
Attachment size	M40.5 (P=0.5)	M40.5 (P=0.5)	M40.5 (P=0.5)	M40.5 (P=0.5)
Diameter/length *2	51mmφ×39.8mm	51mmφ×43mm	64mmφ×47.2mm	64mmφ×52.7mm
Weight	Approximately 135g	Approximately 150g	Approximately 270g	Approximately 300g

*1 Value at the standard magnification. Maximum image height (Y'=21.6mm, 29mm, 27.6mm) at F2.8

*2 Dimension excludes protrusion of screws or other convex parts. Length at standard magnification.



UV-105mm F4.5
PF10545MF-UV

LENS FOR ULTRAVIOLET LIGHT

Features

- For photographing in the ultraviolet light.
- 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.

Applications

- Combustion study
- Plasma study
- Electric discharge study

Model	PF10545MF-UV
Focal length	105.2mm
F Number (∞)	F4.5
NA *1	0.037
Magnification scale	-
Magnification range	∞ - -0.5x
Reference wavelength	546.07nm (e-line)
Wavelength range	220 - 900nm
Field angle *1	23.3°
Image size	43.2mm ϕ
Object size	86.4mm ϕ (-0.5x)
Distortion *3	-0.25% - -0.07%
Relative illumination *1 *3	51.4% - 72.4%
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
Attachment size	M52 (P=0.75)
Diameter/length *2	68.5mm ϕ ×108mm
Weight	Approximately 515g

*1 Data: Magnification at 0.5x

*2 Dimension excludes protrusion of screws or other convex parts.

*3 Maximum image height(Y'=21.6mm) at F4.5.

**WARNING**

TO ENSURE CORRECT USAGE, READ THE CORRESPONDENCE MANUALS CAREFULLY BEFORE USING YOUR EQUIPMENT.

*The specifications and appearances are subject to change without prior notice due to technological innovations and improvements.
*Please contact us for further information regarding our products.

N.B. Export of the products* in this catalog are controlled under the Japanese Foreign Exchange and Foreign Trade Law.
Appropriate export procedure shall be required in case of export from Japan.

*Products: Hardware and its technical information (including software)



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