

MORITEX Machine Vision Lens

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Telecentric Lens



MORITEX high quality telecentric lenses have become the industry standard for semiconductor, FPD, and other electronics manufacturing applications that require machine vision for recognition, mounting, alignment, or inspection. Our lenses enable high contrast, high resolution and low distortion imaging with optional integrated coaxial illumination that utilizes our proprietary hot spot reduction techniques.

Catalog specifications alone cannot convey the high level of MORITEX lens quality.



SOD-X

The cutting-edge SOD-X Series consists of a unique set of multifunctional telecentric lenses designed with high NA, high magnification, and integrated coaxial illumination while providing a long working distance. They allow for high resolution imaging never seen before in a machine vision lens.

High Magnification
Machine Micro Lens
SOD-10X / 20X-VI



MML

Essential in alignment, gauging, and inspection applications, the Machine Micro Lens (MML) Series are the highest quality fixed magnification, compact telecentric lenses available. The Standard (ST), High Resolution (HR), and 5 Megapixel (HR 5M) Series offer solutions for a wide-range of machine vision systems including the NIR light range.

Fixed Magnification Telecentric Lens
MML-STandard Series
For Use with Near-Infrared
MML-NIR Series



MML-Zoom Lens

This telecentric zoom lens series is used for high performance inspection and object recognition when a wide range of FOV and long WD are required. The ML-Z and ML-Z HR Series offer integrated coaxial illumination, adapter lenses, and motorized zoom function options.

High Resolution Zoom Lens
ML-Z07545HR Series
Standard Zoom Lens
ML-Z07545 Series

High Magnification
Machine Micro Lens

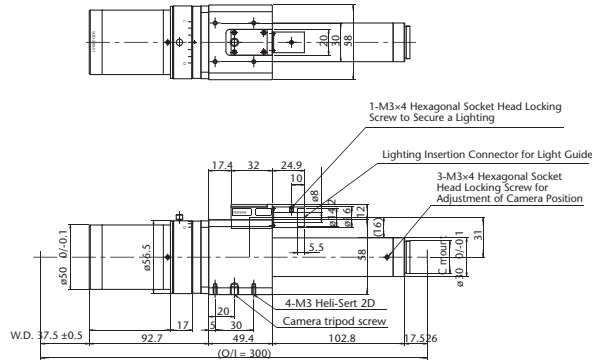
SOD-20X-VI

This revolutionary 20x magnification SOD series model has a high NA & resolution that put it in the microscope objective lens class. In addition, it boasts a long WD of 37.5 mm that provides you with additional space to install Illumination and motion, handling, & transfer systems. The all-in-one machine vision lens has a compact body with an integrated coaxial epi-illumination also saving space & improving on-axis light quality.

- 20x optical magnification
- Capable of 30x and 40x with rear converter lenses
- High NA of 0.35
- High resolution, 1µm
- Variable iris

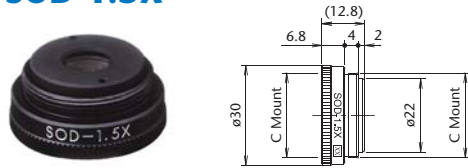


SOD-20X-VI

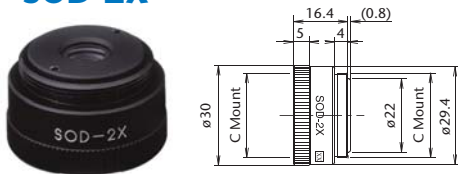


Rear Converter Lens (Option)

SOD-1.5X



SOD-2X



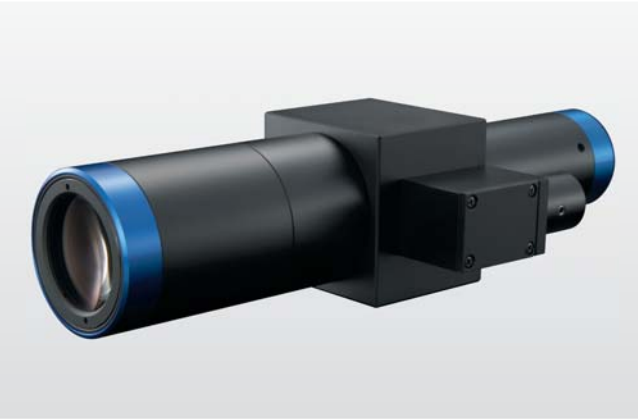
Model	Magnification	WD (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Coaxial port	Variable aperture	Weight (g)
SOD-10X	x10	55.2	22	2/3"	C	○	-	500
SOD-20X-VI	x20	37.5	28.3 ~ 88	2/3"	C	○	○	930
SOD-1.5X	x1.5	-	-	-	C	-	-	20
SOD-2X	x2	-	-	-	C	-	-	30

High Magnification
Machine Micro Lens

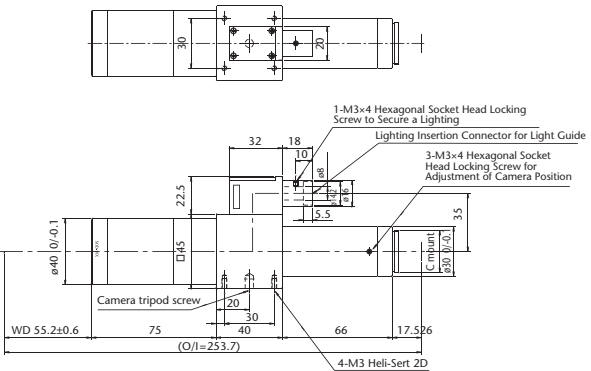
SOD-10X

The SOD-10X is the first telecentric machine vision lens that we introduced with the resolution to rival microscope objectives. The long WD and high NA have made it indispensable for high magnification alignment & inspection applications of 10x or greater. High performance rear converters allow for magnifications of 15x & 20x to be achieved without changing the working distance allowing microscope type performance in a relatively compact package.

- 10x optical magnification
- Capable of 15x and 20x with rear converter lenses
- High NA of 0.23
- High resolution, 1.5µm
- Compact, integrated design



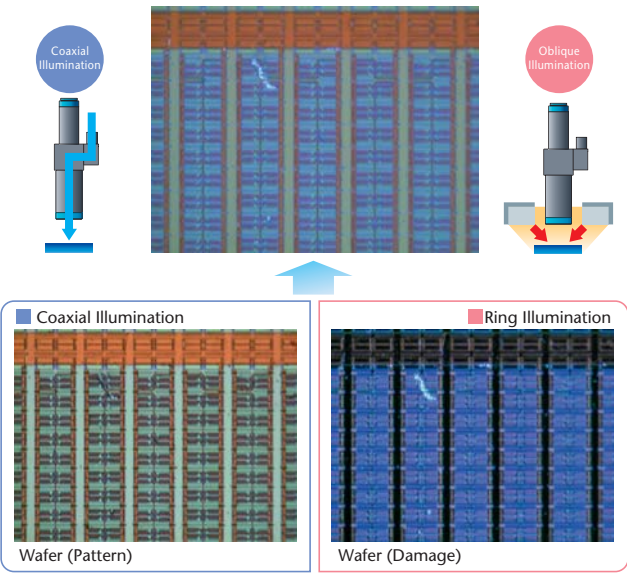
SOD-10X



Application Sample

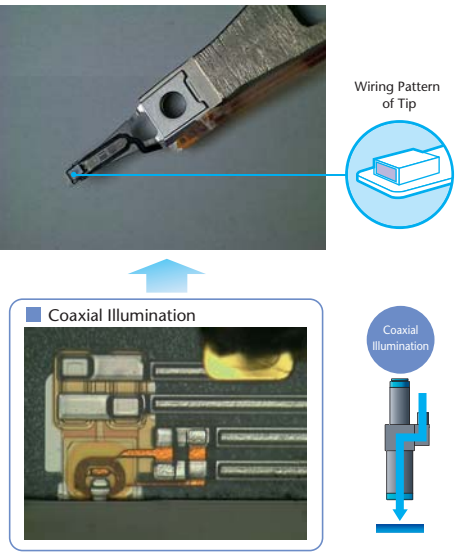
Silicon Wafers

Recognition of wafer patterns using coaxial illumination. Recognition of damage and foreign objects using ring illumination.



Hard Disk Reading Head

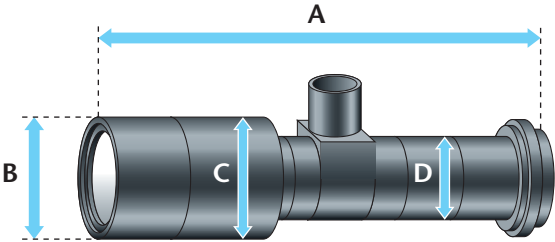
Highly uneven objects are covered by using a wide focus range.



Fixed Magnification
Telecentric Lens

MML-ST Series

Through combination with 410 thousand pixel or greater cameras, the renewed design of the MML-ST Series realizes high level optical performance. These compact models with a diameter of 16mm feature a long depth of field making them ideal for installation in manufacturing equipment.



WD : 40mm

Model	Magnification	WD (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Coaxial port	Variable aperture	Weight (g)	Size A	Size B	Size C	Size D
MML1-ST40D	x1	40	11	1/2"	C	○	-	31	47.5	16	16	16
MML1-ST40	x1	40	11	1/2"	C	-	-	26	47.5	16	16	16
MML1.5-ST40D	x1.5	40.1	12.5	1/2"	C	○	-	31	47.4	16	16	16
MML1.5-ST40	x1.5	40.1	12.5	1/2"	C	-	-	26	47.4	16	16	16
MML2-ST40D	x2	40.1	14.3	1/2"	C	○	-	34	38.5	16	16	16
MML2-ST40	x2	40.1	14.3	1/2"	C	-	-	29	38.5	16	16	16
★ MML3-ST40D	x3	37.9	21.3	1/2"	C	○	-	33	51.5	16	16	16
★ MML3-ST40	x3	37.9	21.3	1/2"	C	-	-	28	51.5	16	16	16
MML4-ST40D	x4	40.9	28.5	1/2"	C	○	-	36	45.5	16	16	16
MML4-ST40	x4	40.9	28.5	1/2"	C	-	-	31	45.5	16	16	16
MML6-ST40D	x6	40.3	42.8	1/2"	C	○	-	39	59.6	16	16	16
MML6-ST40	x6	40.3	42.8	1/2"	C	-	-	35	59.6	16	16	16
MML8-ST40D	x8	40	57	1/2"	C	○	-	42	73.8	16	16	16
★ MML8-ST40	x8	40	57	1/2"	C	-	-	37	73.8	16	16	16

★ Made to order products

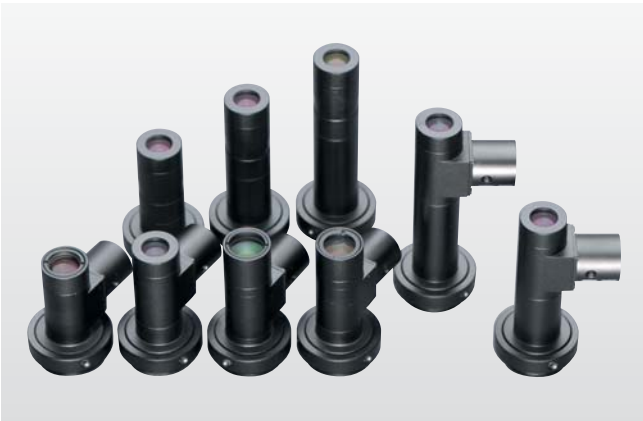
WD : 65mm

Model	Magnification	WD (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Coaxial port	Variable aperture	Weight (g)	Size A	Size B	Size C	Size D
MML08-ST65D	x0.8	65	14.9	1/2"	C	○	-	49	89.8	18	18	16
MML08-ST65	x0.8	65	14.9	1/2"	C	-	-	44	89.8	18	18	16
MML1-ST65D	x1	65	18.6	1/2"	C	○	-	44	80	16	16	16
MML1-ST65	x1	65	18.6	1/2"	C	-	-	38	80	16	16	16
MML1.5-ST65D	x1.5	65	15.5	1/2"	C	○	-	43	74.6	16	16	16
MML1.5-ST65	x1.5	65	15.5	1/2"	C	-	-	36	74.6	16	16	16
MML2-ST65D	x2	65	17.3	1/2"	C	○	-	44	80.1	16	16	16
MML2-ST65	x2	65	17.3	1/2"	C	-	-	38	80.1	16	16	16
MML4-ST65D	x4	65	27	1/2"	C	○	-	55	103.8	16	16	16
MML4-ST65	x4	65	27	1/2"	C	-	-	50	103.8	16	16	16
MML6-ST65D	x6	65	40.9	1/2"	C	○	-	60	118.5	16	16	16
★ MML6-ST65	x6	65	40.9	1/2"	C	-	-	55	118.5	16	16	16

★ Made to order products

WD : 65mm Short type

Model	Magnification	WD (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Coaxial port	Variable aperture	Weight (g)	Size A	Size B	Size C	Size D
MML2-ST65DS	x2	65	17.3	1/2"	C	○	-	37	61.5	16	16	16
MML2-ST65S	x2	65	17.3	1/2"	C	-	-	32	61.5	16	16	16
MML3-ST65DS	x3	65	21.9	1/2"	C	○	-	35	59.5	16	16	16
MML3-ST65S	x3	65	21.9	1/2"	C	-	-	30	59.5	16	16	16
MML4-ST65DS	x4	66	25.9	1/2"	C	○	-	41	63.9	16	16	16
MML4-ST65S	x4	66	25.9	1/2"	C	-	-	36	63.9	16	16	16
MML6-ST65DS	x6	65.3	39.3	1/2"	C	○	-	43	80.7	16	16	16
MML6-ST65S	x6	65.3	39.3	1/2"	C	-	-	38	80.7	16	16	16
MML8-ST65DS	x8	64.9	52.3	1/2"	C	○	-	46	97.6	16	16	16
MML8-ST65S	x8	64.9	52.3	1/2"	C	-	-	42	97.6	16	16	16



WD:110mm

Model	Magnification	WD (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Coaxial port	Variable aperture	Weight (g)	Size A	Size B	Size C	Size D
MML08-ST110D	x0.8	110	16.1	1/2"	C	○	-	85	129.4	25	25	16
MML08-ST110	x0.8	110	16.1	1/2"	C	-	-	79	129.4	25	25	16
MML1-ST110D	x1	113	20.9	1/2"	C	○	-	58	109.8	18	18	16
MML1-ST110	x1	113	20.9	1/2"	C	-	-	50	109.8	18	18	16
MML2-ST110D	x2	110	33.2	1/2"	C	○	-	55	129.4	16	16	16
MML2-ST110	x2	110	33.2	1/2"	C	-	-	50	129.4	16	16	16
MML4-ST110D	x4	110.8	44.4	1/2"	C	○	-	43	81.9	16	16	16
MML4-ST110	x4	110.8	44.4	1/2"	C	-	-	38	81.9	16	16	16
MML6-ST110D	x6	109.8	66.4	1/2"	C	○	-	48	105.7	16	16	16
MML6-ST110	x6	109.8	66.4	1/2"	C	-	-	43	105.7	16	16	16
MML8-ST110D	x8	109.3	88.4	1/2"	C	○	-	54	129.4	16	16	16
MML8-ST110	x8	109.3	88.4	1/2"	C	-	-	49	129.4	16	16	16

WD:110mm Short type

Model	Magnification	WD (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Coaxial port	Variable aperture	Weight (g)	Size A	Size B	Size C	Size D
MML2-ST110DS	x2	112	33.2	1/2"	C	○	-	39	71.8	16	16	16
MML2-ST110S	x2	112	33.2	1/2"	C	-	-	34	71.8	16	16	16
MML3-ST110DS	x3	108.3	49.7	1/2"	C	○	-	43	93.9	16	16	16
MML3-ST110S	x3	108.3	49.7	1/2"	C	-	-	37	93.9	16	16	16

Long WD type

Model	Magnification	WD (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Coaxial port	Variable aperture	Weight (g)	Size A	Size B	Size C	Size D
MML08-ST170D	x0.8	172.9	14	1/2"	C	○	-	80	124.3	25	25	22
MML08-ST170	x0.8	172.9	14	1/2"	C	-	-	76	124.3	25	25	22
MML1-ST150D	x1	156	13	1/2"	C	○	-	90	137.8	25	25	22
MML1-ST150	x1	156	13	1/2"	C	-	-	84	137.8	25	25	22
MML05-ST300DVI	x0.5	348	11.4 ~ 27.8	1/2"	C	○	○	200	166.1	36	36	27
MML1-ST300D	x1	305	22.7 ~ 32	1/2"	C	○	-	150	201	27	27	27

For Near-Infrared Applications

MML-NIR Series

The MML-NIR Series is designed for a wavelength band of 770 to 1200nm. This series provides special use MML lenses that allow the observation of in-wafer defects and rear patterns when combined with an infrared camera and illumination.



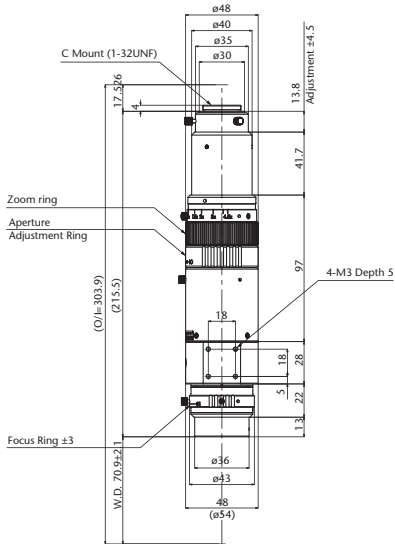
Model	Magnification	WD (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Coaxial port	Variable aperture	Weight (g)	Size A	Size B	Size C	Size D
MML4-80D-IR	x4	82.4	13.3	2/3"	C	○	-	90	128.7	34	34	30
MML6-80D-IR	x6	81.5	20.1	2/3"	C	○	-	100	150.8	34	34	30
MML8-80D-IR	x8	81	26.9	2/3"	C	○	-	110	172.8	34	34	30

High Resolution Zoom Lens

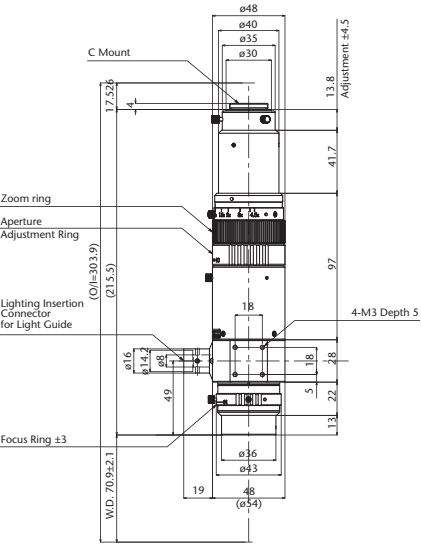
ML-Z07545HR Series

To exploit the full potential of high pixel count cameras, this unique high NA, high resolution telecentric zoom lens series has a long working distance and wide zoom ratio as well as adjustable iris & focus. Available with an integrated coaxial illumination system as well as other options, this lens series is versatile and ideal for extremely accurate gauging and inspection applications at various field of views (FOVs).

ML-Z07545HR



ML-Z07545HRD

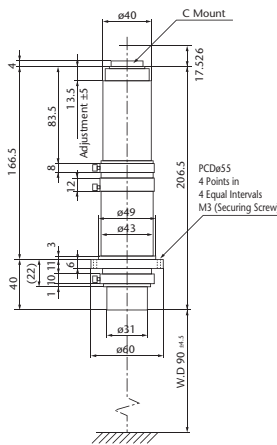


Standard Zoom Lens

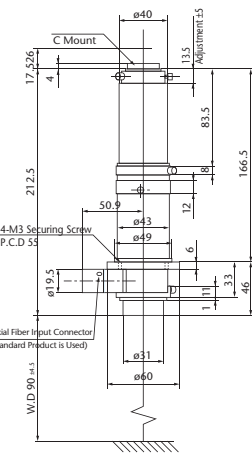
ML-Z07545 Series

Standard model zoom lens with outstanding functionality. Adjustment of magnification and working distance is possible through combination with optional optics.

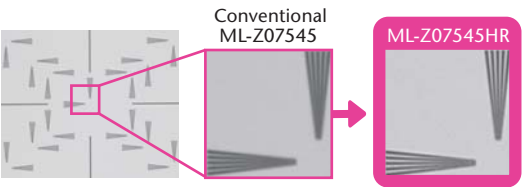
ML-Z07545



ML-Z07545D



HR Series Improves Resolution



Lineup



ML-Z07545HR



ML-Z07545HRD
Coaxial Illumination Model D



ML-Z07545HRD-M
Motorized Zoom Model

Model	Magnification	WD (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Coaxial port	Variable aperture	Weight (g)
ML-Z07545HR	x0.75 ~ x4.5 (Zoom ratio of 6:1)	70.9	8.4 ~ 19	1/2"	C	-	○	600
ML-Z07545HRD	x0.75 ~ x4.5 (Zoom ratio of 6:1)	70.9	8.4 ~ 19	1/2"	C	○	○	610
ML-Z07545HRD-M	x0.75 ~ x4.5 (Zoom ratio of 6:1)	70.9	8.4 ~ 19	1/2"	C	○	○	1,200

Model	Magnification	WD (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Coaxial port	Variable aperture	Weight (g)
ML-Z025HR	x0.19 ~ x1.14 ^{※1}	243	-	-	-	-	-	-
ML-Z03HR	x0.23 ~ x1.36 ^{※1}	200	-	-	-	-	-	-

※1 The indicated Magnification and WD are in the condition of the "Middle" focus position.

Model	Magnification	WD (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Coaxial port	Variable aperture	Weight (g)
ML-Z07545	x0.75 ~ x4.5 (Zoom ratio of 6:1)	90	11	1/2"	C	-	-	440
ML-Z07545D	x0.75 ~ x4.5 (Zoom ratio of 6:1)	90	16	1/2"	C	○	-	470
ML-Z07545DMR	x0.75 ~ x4.5 (Zoom ratio of 6:1)	90	28	1/2"	C	○	-	1,000

Model	Magnification ^{※1}	WD (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Coaxial port	Variable aperture	Weight (g)
ML-Z03	x0.23 ~ x1.36 ^{※2}	283	-	-	-	-	-	-
ML-Z04	x0.3 ~ x1.81 ^{※2}	211	-	-	-	-	-	-
ML-Z05	x0.37 ~ x2.24 ^{※2}	170	-	-	-	-	-	-
ML-Z07	x0.53 ~ x3.16 ^{※2}	119	-	-	-	-	-	-
ML-Z20	x1.49 ~ x9.01 ^{※2}	32.7	-	-	-	-	-	-

※1 Indicated values are the magnification for ML-Z07545 with front converter lens.

※2 The indicated Magnification and WD are in the condition of the "Middle" focus position.

Lens Unit for Vacuum Environments

Vacuum Lenses

This new lens unit avoids leakage of gas even under vacuum environments by applying our unique manufacturing method and through the use of special materials. Combining this lens with vacuum-resistant light guides enables image recognition inside vacuum chambers which conventional products could not achieve.



Waterproof Lens Unit

Imaging unit suitable for various applications requiring environmental resistance such as machine tools, food facilities and medical device manufacturing. Combined with the MSPP Series of LED illumination to enable use for various applications.



High Accuracy
Two Fields of View Optical Unit

ML-2PLBOX
ML-W1000

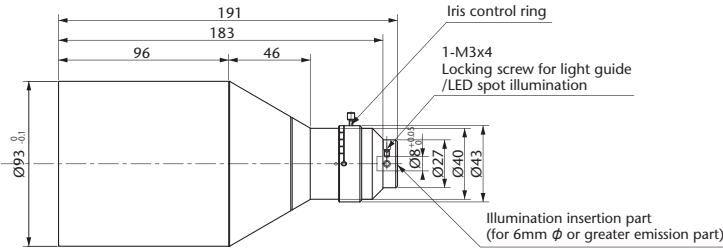
Two field of views and two focus points can be observed using two lenses & cameras. MORITEX adjusts cameras and optical units to positions desired by customers to provide support to meet specific customer requirements for lenses and illumination, condition of optical units, etc. These adjustments and quality inspection ensure high accuracy of mounted components and the resulting images.



Telecentric Illuminator
Collimated Light Illumination for High Contrast Silhouette

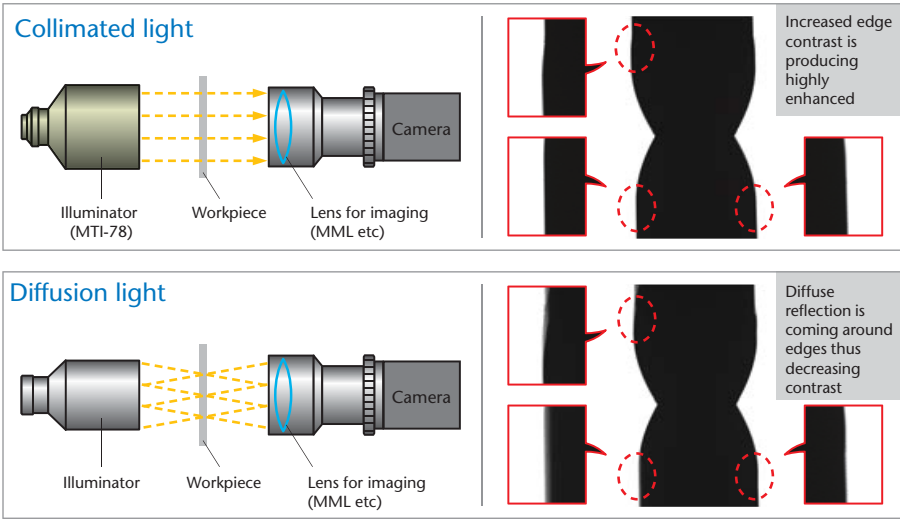
MTI-78

Designed to provide the best collimated light performance possible over a large field of view, the MTI-78 has a flexible design allowing it to be coupled with the various coaxial lights in our LED portfolio. For optimal system results, this illuminator should be matched with our industry leading telecentric lenses.



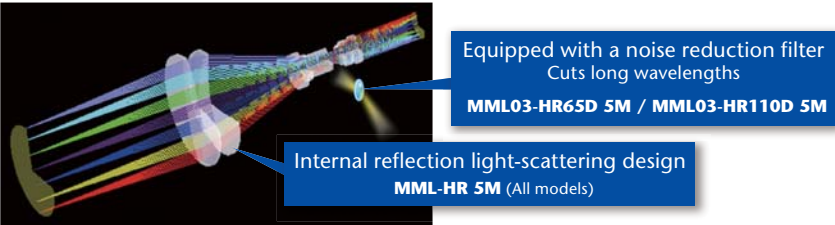
Model	Magnification	WD (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Lighting Area (mm)	Variable aperture	Weight (g)
MTI-78	-	110	-	-	-	$\phi 78$	\bigcirc	620

Benefit of collimated light backlighting compared to diffusion light in contour inspection



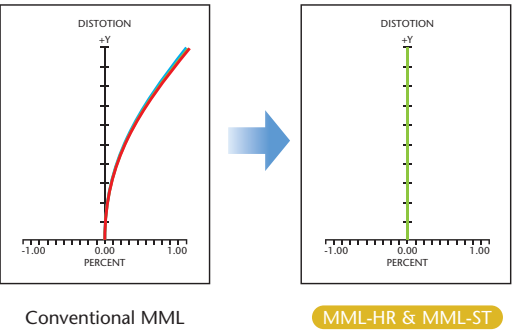
Features of MORITEX Telecentric Lens

Provisions made to reduce coaxial illumination hot spots seen in low magnification lenses



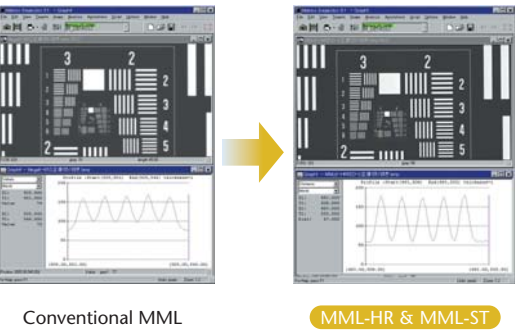
Extremely Low Distortion

The pursuit of high resolution with no aberration has resulted in the elimination of image bending. This means that it is no longer necessary to consider distortion offsets.



High Contrast

Contrast improvement has enabled image recognition with greater emphasis on the black and white shading. By converting the resolution chart image to binary form and then graphing and comparing the brightness levels, the MML-HR greatly emphasizes the difference in brightness between black and white object features when compared to our prior Mega MML.



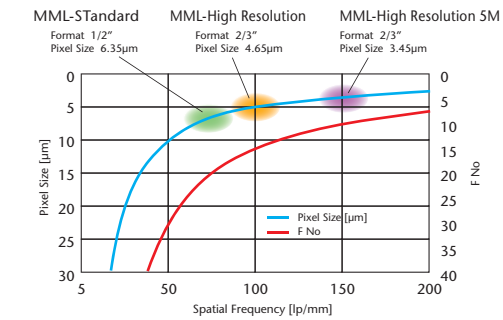
Illumination Uniformity

For object recognition on a matte surface with coaxial illumination, only a small amount of light is reflected from the surface requiring the coaxial light intensity to be increased. When this is done, however, the brightness in the center of the image increases due to reflection in the coaxial illumination lensing. The ST and HR Series solve this problem through a hot spot reduction technique that vastly reduces the reflection from the lens. This improves the uniformity of coaxial illumination for even matte surfaces.

Below, OCR using coaxial illumination was performed on a rough, microcomputer chip surface. The MML-ST/HR brightness graph shows a reduction in the variation between the brightness in the center and periphery of the FOV which can also be seen in the sample images.

Design Concept

Pixel size, resolution limitation frequency, F No relation
The MML HR/ST Series consist of three types of optical design focuses as well as for camera compatibility.



FA Lens Series Macro Lens



Macro Lens

These short, compact non-telecentric lenses with high performance and reasonable cost are an alternative to our MML and CCTV lenses for alignment and inspection applications.

ML-MCHR Series

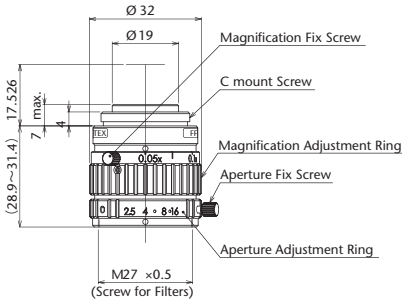
2 Mega Pixel Macro Lens

ML-MCHR Series

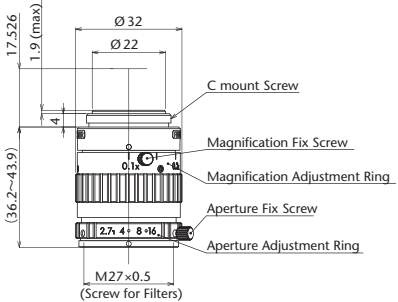
High quality image and image format 12.8mm, the ML-MCHR Series is not only the best machine vision lens compatible with the latest 2 Mega pixel CMOS sensor, but also vibration resistance design is one of great benefit for industrial applications.



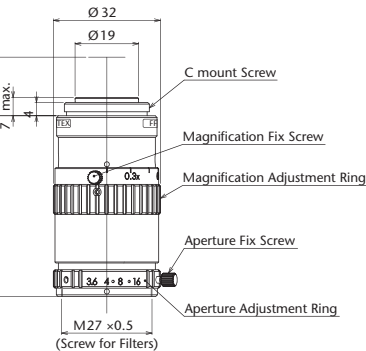
ML-MC16HR



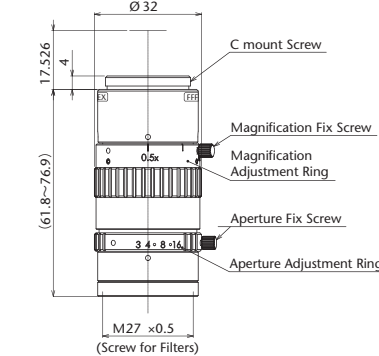
ML-MC25HR



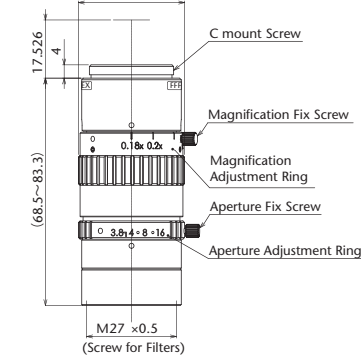
ML-MC35HR



ML-MC50HR



ML-MC75HR



Model	Magnification	WD (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Coaxial port	Variable aperture	Weight (g)
ML-MC16HR	x0.05 ~ x0.2	317.5 ~ 69.8	2.5 ~ 16	φ12.8	C	-	○	43
ML-MC25HR	x0.1 ~ x0.4	255.9 ~ 64.6	2.7 ~ 16	φ12.8	C	-	○	52
ML-MC35HR	x0.25 ~ x0.7	139.8 ~ 51	3.6 ~ 16	φ12.8	C	-	○	73
ML-MC50HR	x0.5 ~ x0.8	149.1 ~ 111.1	3 ~ 16	φ12.8	C	-	○	95
ML-MC75HR	x0.18 ~ x0.38	494.3 ~ 276.4	3.8 ~ 16	φ12.8	C	-	○	105

Field of View, WD and Magnification using Close-up Ring

Close-up Ring (mm)	ML-MC16HR				
	Field of View (Length x Width)	Field of View (Length x Width)	Field of View (Length x Width)	WD (mm)	Magnification
	2/3"	1/2"	1/3"		
0	33.0 x 44.0	24.0 x 32.0	18.0 x 24.0	71	x0.20
	132.0 x 176.0	96.0 x 128.0	72.0 x 96.0	318	x0.05

Close-up Ring (mm)	ML-MC25HR				
	Field of View (Length x Width)	Field of View (Length x Width)	Field of View (Length x Width)	WD (mm)	Magnification
	2/3"	1/2"	1/3"		
0	16.5 x 22.0	12.0 x 16.0	9.0 x 12.0	67	x0.40
	66.0 x 88.0	48.0 x 64.0	36.0 x 48.0	258	x0.10
0.5	15.7 x 21.0	11.4 x 15.3	8.6 x 11.4	64	x0.42
	55.2 x 73.6	40.1 x 53.5	30.1 x 40.1	216	x0.12
1	15.0 x 20.0	10.9 x 14.6	8.2 x 10.9	61	x0.44
	47.4 x 63.2	34.5 x 46.0	25.9 x 34.5	186	x0.14
1.5	14.4 x 19.2	10.5 x 13.9	7.8 x 10.5	59	x0.46
	41.6 x 55.4	30.2 x 40.3	22.7 x 30.2	164	x0.16
2	13.8 x 18.4	10.0 x 13.4	7.5 x 10.0	57	x0.48
	37.0 x 49.3	26.9 x 35.9	20.2 x 26.9	146	x0.18
5	11.1 x 14.8	8.1 x 10.7	6.0 x 8.1	46	x0.60
	22.3 x 29.7	16.2 x 21.6	12.2 x 16.2	89	x0.30
10	8.3 x 11.1	6.1 x 8.1	4.5 x 6.1	35	x0.79
	13.4 x 17.9	9.8 x 13.0	7.3 x 9.8	55	x0.49
15	6.7 x 8.9	4.9 x 6.5	3.6 x 4.9	29	x0.99
	9.6 x 12.8	7.0 x 9.3	5.2 x 7.0	40	x0.69
20	5.6 x 7.4	4.1 x 5.4	3.0 x 4.1	25	x1.18
	7.5 x 10.0	5.4 x 7.2	4.1 x 5.4	32	x0.88

Close-up Ring (mm)	ML-MC50HR				
	Field of View (Length x Width)	Field of View (Length x Width)	Field of View (Length x Width)	WD (mm)	Magnification
	2/3"	1/2"	1/3"		
0	8.2 x 11.0	6.0 x 8.0	4.5 x 6.0	111	x0.80
	13.2 x 17.6	9.6 x 12.8	7.2 x 9.6	149	x0.50
0.5	8.1 x 10.9	5.9 x 7.9	4.4 x 5.9	110	x0.81
	12.9 x 17.3	9.4 x 12.6	7.1 x 9.4	147	x0.51
1	8.1 x 10.7	5.9 x 7.8	4.4 x 5.9	110	x0.82
	12.7 x 16.9	9.2 x 12.3	6.9 x 9.2	145	x0.52
1.5	8.0 x 10.6	5.8 x 7.7	4.3 x 5.8	109	x0.83
	12.5 x 16.6	9.1 x 12.1	6.8 x 9.1	143	x0.53
2	7.9 x 10.5	5.7 x 7.6	4.3 x 5.7	108	x0.84
	12.2 x 16.3	8.9 x 11.9	6.7 x 8.9	142	x0.54
5	7.3 x 9.8	5.3 x 7.1	4.0 x 5.3	104	x0.90
	11.0 x 14.7	8.0 x 10.7	6.0 x 8.0	132	x0.60
10	6.6 x 8.8	4.8 x 6.4	3.6 x 4.8	99	x1.00
	9.5 x 12.6	6.9 x 9.2	5.2 x 6.9	120	x0.70
15	6.0 x 8.0	4.4 x 5.8	3.3 x 4.4	94	x1.10
	8.3 x 11.0	6.0 x 8.0	4.5 x 6.0	111	x0.80
20	5.5 x 7.4	4.0 x 5.4	3.0 x 4.0	90	x1.20
	7.4 x 9.8	5.4 x 7.1	4.0 x 5.4	104	x0.90
25	5.1 x 6.8	3.7 x 4.9	2.8 x 3.7	87	x1.29
	6.6 x 8.9	4.8 x 6.4	3.6 x 4.8	99	x0.99
30	4.7 x 6.3	3.4 x 4.6	2.6 x 3.4	84	x1.39
	6.0 x 8.0	4.4 x 5.9	3.3 x 4.4	94	x1.09
35	4.4 x 5.9	3.2 x 4.3	2.4 x 3.2	82	x1.49
	5.5 x 7.4	4.0 x 5.4	3.0 x 4.0	90	x1.19

Close-up Ring (mm)	ML-MC35HR				
	Field of View (Length x Width)	Field of View (Length x Width)	Field of View (Length x Width)	WD (mm)	Magnification
	2/3"	1/2"	1/3"		
0	9.4 x 12.6	6.9 x 9.1	5.1 x 6.9	54	x0.70
	26.4 x 35.2	19.2 x 25.6	14.4 x 19.2	143	x0.25
0.5	9.2 x 12.3	6.7 x 9.0	5.0 x 6.7	53	x0.71
	25.0 x 33.3	18.1 x 24.2	13.6 x 18.1	135	x0.26
1	9.1 x 12.1	6.6 x 8.8	4.9 x 6.6	52	x0.73
	23.7 x 31.5	17.2 x 22.9	12.9 x 17.2	128	x0.28
1.5	8.9 x 11.8	6.5 x 8.6	4.8 x 6.5	51	x0.74
	22.5 x 30.0	16.4 x 21.8	12.3 x 16.4	122	x0.29
2	8.7 x 11.6	6.3 x 8.4	4.7 x 6.3	50	x0.76
	21.4 x 28.6	15.6 x 20.8	11.7 x 15.6	117	x0.31
5	7.8 x 10.4	5.7 x 7.6	4.3 x 5.7	46	x0.84
	16.7 x 22.3	12.2 x 16.2	9.1 x 12.2	92	x0.39
10	6.7 x 8.9	4.8 x 6.5	3.6 x 4.8	40	x0.99
	12.2 x 16.3	8.9 x 11.9	6.7 x 8.9	69	x0.54
15	5.8 x 7.8	4.2 x 5.6	3.2 x 4.2	35	x1.13
	9.6 x 12.9	7.0 x 9.3	5.3 x 7.0	55	x0.68
20	5.2 x 6.9	3.8 x 5.0	2.8 x 3.8	32	x1.28
	8.0 x 10.6	5.8 x 7.7	4.3 x 5.8	46	x0.83

Close-up Ring (mm)	ML-MC75HR				
	Field of View (Length x Width)	Field of View (Length x Width)	Field of View (Length x Width)	WD (mm)	Magnification
	2/3"	1/2"	1/3"		
0	17.4 x 23.2	12.6 x 16.8	9.5 x 12.6	276	x0.38
	37.3 x 49.7	27.1 x 36.2	20.3 x 27.1	501	x0.18
0.5	17.1 x 22.8	12.4 x 16.5	9.3 x 12.4	273	x0.39
	35.9 x 47.9	26.1 x 34.8	19.6 x 26.1	486	x0.18
1	16.8 x 22.4	12.2 x 16.3	9.2 x 12.2	270	x0.39
	34.7 x 46.2	25.2 x 33.6	18.9 x 25.2	472	x0.19
1.5	16.5 x 22.0	12.0 x 16.0	9.0 x 12.0	267	x0.40
	33.5 x 44.6	24.3 x 32.5	18.3 x 24.3	458	x0.20
2	16.2 x 21.6	11.8 x 15.7	8.8 x 11.8	264	x0.41
	32.4 x 43.2	23.5 x 31.4	17.7 x 23.5	446	x0.20
5	14.8 x 19.7	10.7 x 14.3	8.1 x 10.7	247	x0.45
	27.0 x 36.0	19.7 x 26.2	14.7 x 19.7	386	x0.24
10	12.8 x 17.1	9.3 x 12.4	7.0 x 9.3	225	x0.51
	21.2 x 28.3	15.4 x 20.6	11.6 x 15.4	320	x0.31
15	11.4 x 15.1	8.3 x 11.0	6.2 x 8.3	209	x0.58
	17.4 x 23.3	12.7 x 16.9	9.5 x 12.7	277	x0.38
20	10.2 x 13.6	7.4 x 9.9	5.6 x 7.4	195	x0.65
	14.8 x 19.8	10.8 x 14.4	8.1 x 10.8	248	x0.45
25	9.2 x 12.3	6.7 x 8.9	5.0 x 6.7	184	x0.72
	12.9 x 17.2	9.4 x 12.5	7.0 x 9.4	226	x0.51
30	8.4 x 11.2	6.1 x 8.2	4.6 x 6.1	176	x0.78
	11.4 x 15.2	8.3 x 11.0	6.2 x 8.3	209	x0.58
35	7.8 x 10.4	5.6 x 7.5	4.2 x 5.6	168	x0.85
	10.2 x 13.6	7.4 x 9.9	5.6 x 7.4	196	x0.65
40	7.2 x 9.6	5.2 x 7.0	3.9 x 5.2	162	x0.92
	9.2 x 12.3	6.7 x 9.0	5.0 x 6.7	185	x0.71
45	6.7 x 8.9	4.9 x 6.5	3.7 x 4.9	156	x0.98
	8.5 x 11.3	6.1 x 8.2	4.6 x 6.1	176	x0.78
50	6.3 x 8.4	4.6 x 6.1	3.4 x 4.6	151	x1.05
	7.8 x 10.4	5.7 x 7.5	4.2 x 5.7	168	x0.85
60	5.6 x 7.4	4.0 x 5.4	3.0 x 4.0	143	x1.19
	6.7 x 9.0	4.9 x 6.5	3.7 x 4.9	156	x0.98
70	5.0 x 6.7	3.6 x 4.8	2.7 x 3.6	137	x1.32
	5.9 x 7.9	4.3 x 5.7	3.2 x 4.3	147	x1.12
80	4.5 x 6.1	3.3 x 4.4	2.5 x 3.3	132	x1.45
	5.3 x 7.0	3.8 x 5.1	2.9 x 3.8	140	x1.25
90	4.2 x 5.5	3.0 x 4.0	2.3 x 3.0	127	x1.59
	4.8 x 6.4	3.5 x 4.6	2.6 x 3.5	134	x1.39
100	3.8 x 5.1	2.8 x 3.7	2.1 x 2.8	124	x1.72
	4.3 x 5.8	3.2 x 4.2	2.4 x 3.2	129	x1.52

•Indicated values are based on calculation and actual measurements may differ. Please use values as a reference.

• Accuracy of the products is guaranteed only when used without additional attachments. Please note that when using in combination with a close-up ring or other equipment, working distance, distortion and image quality may be distorted due to enlargement of the lens tolerance.



CCTV Lens

The most common machine vision lenses, we offer Standard, Megapixel (ML-MP), 3 Megapixel (ML-MP3) and a telecentric CCTV lens models.

- ML-M MP5 Series
- ML-MP Series
- ML Series

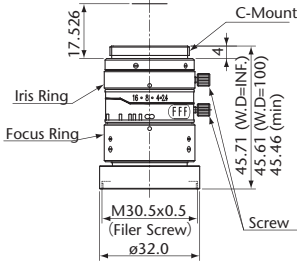
5 Mega Pixel FA Lens CCTV

ML-M MP5 Series

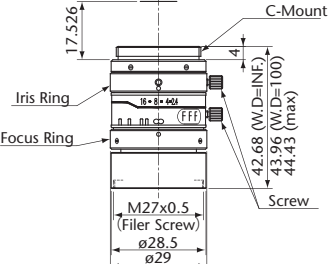
The ML-M MP5 Series is high end CCTV lenses addressing the needs of applications using high pixel count image sensors. The ability of the lenses to realize a resolution of 150lp/mm when imaging at close distances is a particularly strong feature.



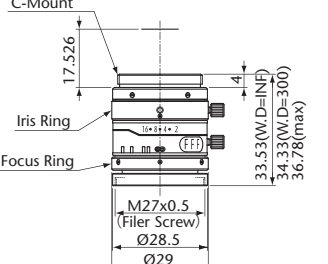
ML-M0824MP5



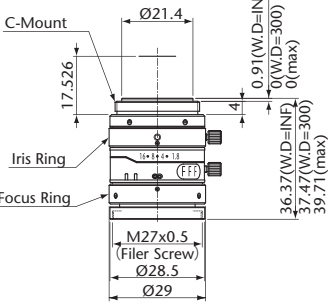
ML-M1224MP5



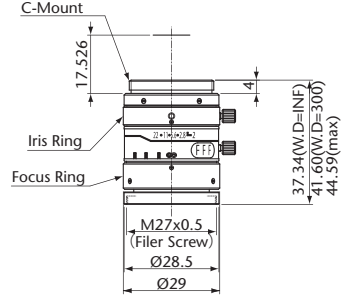
ML-M1620MP5



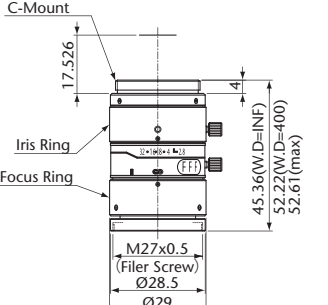
ML-M2518MP5



ML-M3520MP5



ML-M5028MP5



ML-M MP5 Series

Model	Closest Magnification	Closest Distance (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Field of View ^{#1}	Variable aperture	Weight (g)
ML-M0824MP5	x0.12	50	2.4 ~ Close	2/3"	C	55 x 73	○	80
ML-M1224MP5	x0.1	100	2.4 ~ Close	2/3"	C	66 x 88	○	72
ML-M1620MP5	x0.08	100	2.0 ~ Close	2/3"	C	82 x 110	○	53
ML-M2518MP5	x0.12	150	1.8 ~ Close	2/3"	C	55 x 73	○	60
ML-M3520MP5	x0.19	200	2.0 ~ Close	2/3"	C	34 x 46	○	59
ML-M5028MP5	x0.14	400	2.8 ~ Close	2/3"	C	47 x 62	○	69

ML-MP Series

Model	Closest Magnification	Closest Distance (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Field of View ^{#1}	Variable aperture	Weight (g)
ML-H0514MP	x0.02	300	1.4 ~ Close	1/2"	C	240 x 320 ^{#2}	○	107
ML-M0814MP	x0.07	100	1.4 ~ Close	2/3"	C	94 x 126	○	70
ML-M1214MP	x0.07	150	1.4 ~ Close	2/3"	C	94 x 126	○	65
ML-M1614MP	x0.05	300	1.4 ~ Close	2/3"	C	132 x 175	○	65
ML-M2514MP	x0.08	300	1.4 ~ Close	2/3"	C	82 x 110	○	75
ML-M3514MP	x0.11	300	1.4 ~ Close	2/3"	C	60 x 80	○	87
ML-M5018MP	x0.1	500	1.8 ~ Close	2/3"	C	66 x 88	○	90
ML-M7528MP	x0.21	300	2.8 ~ Close	2/3"	C	31 x 42	○	113

ML Series

Model	Closest Magnification	Closest Distance (mm)	Effective Fno/Fno	Image Format size Largest Compatible	Mount type	Field of View ^{#1}	Variable aperture	Weight (g)
ML-0614	x0.03	200	F1.4 ~ Close	1/2"	C	160 x 213 ^{#2}	○	60
ML-0813	x0.05	200	F1.3 ~ Close	2/3"	C	132 x 176	○	60
ML-1214	x0.05	300	F1.4 ~ Close	1/2"	C	96 x 128 ^{#2}	○	60
ML-1614	x0.04	400	F1.4 ~ Close	2/3"	C	165 x 220	○	40
ML-2514	x0.06	500	F1.4 ~ Close	1"	C	160 x 213 ^{#3}	○	45
ML-3519	x0.07	500	F1.9 ~ Close	2/3"	C	94 x 125	○	50
ML-5018	x0.05	1000	F1.8 ~ Close	2/3"	C	132 x 176	○	60
ML-7527	x0.08	1000	F2.7 ~ Close	2/3"	C	83 x 110	○	65
ML-10035	x0.1	1000	F3.5 ~ Close	2/3"	C	66 x 88	○	65

※1 Indicated FOV are based on the calculation of 2/3" sensor
※2 FOV for 1/2" sensor
※3 FOV for 1" sensor