

# Non-Telecentric Lens



## Macro Lens

**ML-N Series**  
**WD=90mm Series**

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.



## Macro Zoom Lens

**ML-Z0108**  
**ML-0310VF**  
**MLH Series**

The Macro Zoom Lens Series are flexible, quality lenses with a number of options that can be used for a variety of vision applications.



## CCTV Lens

**MTE-55**  
**ML-MP3 Series**  
**ML-MP Series**  
**ML Series**

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

# Non-Telecentric Macro Lens

## ML-N Series

ML-N Series lenses were developed to be compact, high performance models. Based on many years of experience producing MMLs (Machine Micro Lens), MORITEX adopted the non-telecentric optical system as the lens design for this series. By limiting the number of lenses in each layer to less than 3, we have succeeded in developing high performance models at reasonable prices. Magnification and working distances can be tailored to your needs by using an optional close-up ring adapter.



Non-Telecentric Macro Lens

ML-N

- Compact body of  $\phi 16$
- High resolution, low optical distortion
- Reasonable prices
- Best matching with peripherals

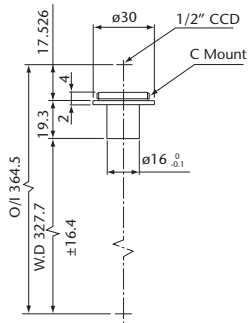
Model	Magnification	WD	Resolution	Depth of Field	Effective F No	Optical Distortion	Largest Compatible CCD	Weight	Mount (Sold Separately)	Product code
<b>ML01-327N</b>	0.1x	327.7mm	33.9 $\mu$ m	37.66mm	4.71	0.4% or less	1/2"	10g	C Mount	A-0133
<b>ML03-181N</b>	0.3x	181.3mm	14.6 $\mu$ m	5.43mm	6.11	0.2% or less	1/2"	15g	C Mount	A-0134
<b>ML05-132N</b>	0.5x	132.5mm	11.7 $\mu$ m	1.95mm	6.08	0.08% or less	1/2"	18g	C Mount	A-0131
<b>ML05-250N</b>	0.5x	250mm	13.3 $\mu$ m	2.27mm	7.1	0.06%	1/2"	90g	C Mount	A-0135
<b>ML1-89N</b>	1.0x	89.6mm	7.9 $\mu$ m	0.7mm	8.82	0.04% or less	1/2"	15g	C Mount	A-0132

\* Depth of field is calculated assuming a horizontal 240TV resolution using a 1/2" CCD camera. (Permissible circle of confusion on the image-formation side: 40 $\mu$ m)  
 \* Resolution values indicate the theoretical resolution at a wavelength of 550nm.

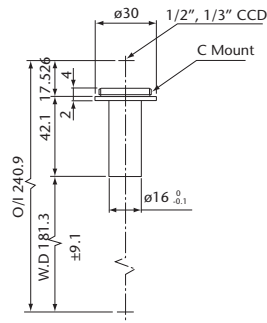
### Magnification conversion table

	Close-Up Ring Thickness	0mm	1mm	2mm	5mm	7mm	10mm	15mm	17mm	20mm
<b>ML01-327N</b>	Magnification	0.1x	0.13x	0.17x	0.27x	0.33x	0.43x	0.6x	0.67x	0.77x
	WD	327.7mm	253mm	204mm	138.8mm	118.6mm	97.5mm	77.7mm	72.5mm	67.2mm
<b>ML03-181N</b>	Magnification	0.3x	0.32x	0.35x	0.42x	0.47x	0.54x	0.65x	0.7x	0.77x
	WD	181.3mm	170mm	162mm	140.7mm	131mm	119mm	104.6mm	100mm	94.6mm
<b>ML05-132N</b>	Magnification	0.5x	0.53x	0.55x	0.62x	0.66x	0.73x	0.85x	0.9x	0.97x
	WD	132.5mm	128.4mm	125mm	116.3mm	111.3mm	105.2mm	97.4mm	94.2mm	91mm
<b>ML05-250N</b>	Magnification	0.5x	0.51x	0.52x	0.56x	0.58x	0.62x	0.68x	0.71x	0.74x
	WD	250mm	246mm	242.3mm	232mm	225.8mm	217.5mm	205.6mm	201.5mm	195.7mm
<b>ML1-89N</b>	Magnification	1x	1.02x	1.05x	1.12x	1.16x	1.2x	1.35x	1.4x	1.47x
	WD	89mm	88mm	87mm	85mm	83.5mm	81.5mm	78.5mm	77.3mm	75.9mm

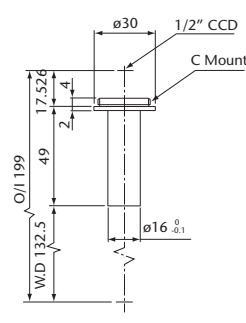
**ML01-327N**



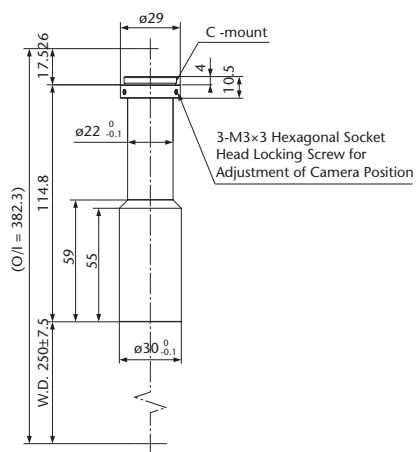
**ML03-181N**



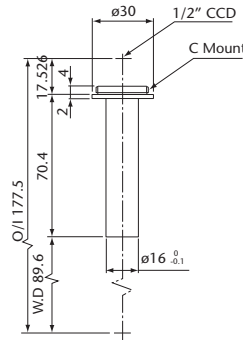
**ML05-132N**



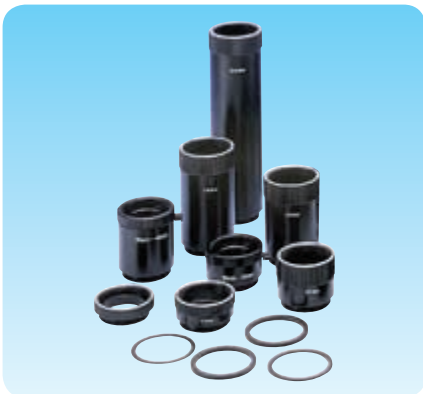
**ML05-250N**



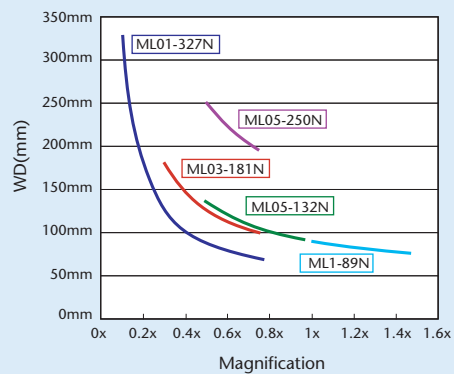
**ML1-89N**



The magnification can be changed by using the ML-EXR Series close-up ring.



Reference magnification and WD data for close-up ring combinations



# Low Magnification Macro Lens

## WD=90mm Series

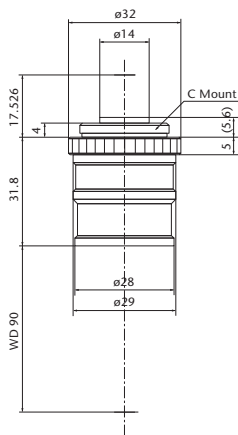
Low Magnification Macro Lens

WD = 90 mm

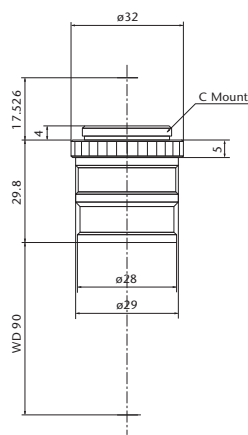


Small, high-resolution macro lenses to be mounted directly on machines. WD=90mm for all models.

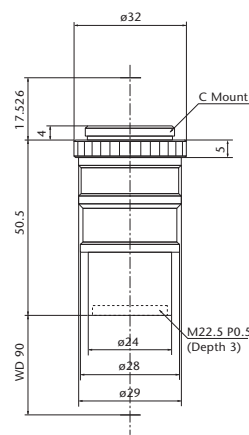
**ML-15014**



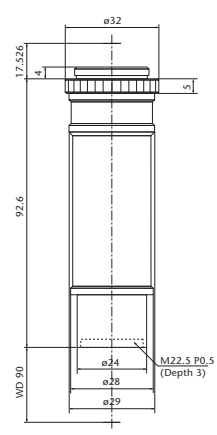
**ML-24030**



**ML-3505**



**ML-5010**



Model	Magnification	Effective F No	WD	Depth of Field	Resolution	Optical Distortion	Weight	Largest Compatible CCD	Mount	Product Code
<b>ML-15014</b>	0.14x	4.6	90mm	18mm	36µm	0.1% or less	28g	2/3"	C Mount	A-0127
<b>ML-24030</b>	0.3x	7.3	90mm	6.5mm	21µm	0.1% or less	39g	2/3"	C Mount	A-0128
<b>ML-3505</b>	0.5x	8.4	90mm	2.7mm	13µm	0.1% or less	55g	2/3"	C Mount	A-0129
<b>ML-5010</b>	1x	8	90mm	0.6mm	6.3µm	0.1% or less	68g	2/3"	C Mount	A-0130

\* Depth of field is calculated assuming a horizontal 240TV resolution using a 1/2" CCD camera. (Permissible circle of confusion on the image-formation side: 40µm)  
 \* Resolution values indicate the theoretical resolution at a wavelength of 550nm.

# High Performance Macro Zoom Lens

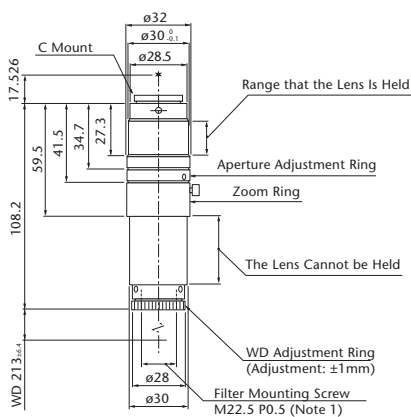
## ML-Z0108



High performance macro lens with 8:1 magnification ratio and long working distance. By using the focus ring on the end, working distance can be changed within a range of 20mm.

- Zoom ratio of 8:1. Magnification range of 0.1x-0.8x
- WD=213mm
- Focus adjustment  $\pm 20$ mm (magnification variation  $\pm 13\%$ )
- Iris, focus, and zoom are adjustable.
- Equipped with locking screws.

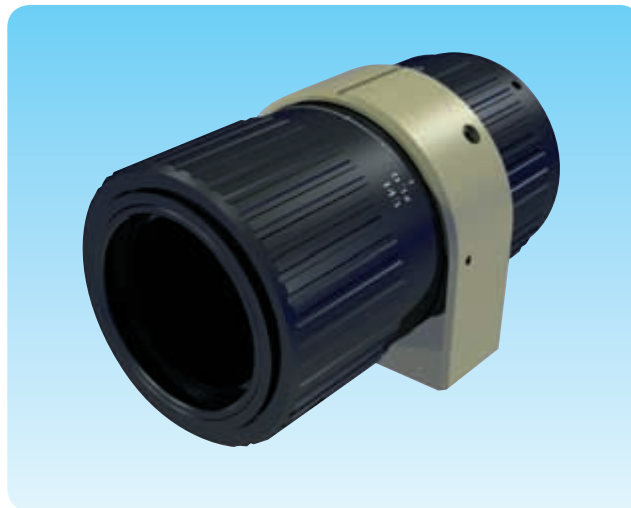
### ML-Z0108



Model	Magnification	WD	Focus Position	Motor	Effective F No	Depth of Field	Resolution	Optical Distortion	Operation Function	Weight	Largest Compatible CCD	Mount	Product Code
ML-Z0108	0.1x to 0.8x (Zoom Ratio of 8:1)	213mm	Without (Manual Zoom)	at 0.1x at 0.4x at 0.8x	8.2 9.3	32.8mm 2.1mm 0.6mm	55 $\mu$ m 14 $\mu$ m 8 $\mu$ m	-0.02% or less 0.18% or less 0.17% or less	Manual (Adjusting Aperture, Zoom, and Focus)	140g	1/2"	C Mount	A-0155

\* Depth of field is calculated assuming a horizontal 240TV resolution using a 1/2" CCD camera. (Permissible circle of confusion on the image-formation side: 40 $\mu$ m)  
 \* Resolution values indicate the theoretical resolution at a wavelength of 550nm.

## Varifocal Lens for Large Image Format

**ML-0310VF**

Varifocal lens with optimized magnification and working distance for FA. The key features of this lens are the support of large, up to 1.2" CCD elements and the varifocal, variable magnification for wide field of views. This lens is great for high speed and high resolution image recognition.

- Supports camera format of up to 1.2" max. (15.15mmx15.15mm)
- Varifocal magnification variation of 0.3x~1x
- Equipped with variable aperture
- Equipped with screws to lock movable parts for FA
- Wide wavelength transmission

Chart for Field of View According to CCD Element Size • WD

Magnification	0310VF	VF03	1/3 (3.6x4.8)	1/2 (4.8x6.4)	2/3 (6.6x8.8)	1.1 (12x12.3)	1.2 (15.15x15.15)
<b>0.1x</b>	-	414.5mm	36x48	48x64	66x88	120x123	151.5x151.5
<b>0.15x</b>	-	288.5mm	24x32	32x42.7	44x58.7	80x82	101x101
<b>0.2x</b>	-	220.3mm	18x24	24x32	33x44	60x61.5	75.8x75.8
<b>0.25x</b>	-	180.9mm	14.4x19.2	19.2x25.6	26.4x35.2	48x49.2	60.6x60.6
<b>0.3x</b>	143mm	155.8mm	12x16	16x21	22x29.3	40x41	50.5x50.5
<b>0.4x</b>	114mm	127.1mm	9x12	12x16	16.5x22.0	30x30.8	37.9x37.9
<b>0.5x</b>	97mm	113.0mm	7.2x9.6	9.6x12.8	13.2x17.6	24x24.6	30.3x30.3
<b>0.6x</b>	87mm	107.2mm	6x8	8x10.7	11x14.7	20x20.5	25.3x25.3
<b>0.65x</b>	83mm	106.4mm	5.5x7.4	7.4x9.8	10.2x13.5	18.5x18.9	23.3x23.3
<b>0.7x</b>	81mm	-	5.1x6.9	6.9x9.1	9.4x12.6	17.1x17.6	21.6x21.6
<b>0.8x</b>	77mm	-	4.5x6	6x8	8.3x11.0	15x15.4	18.9x18.9
<b>0.9x</b>	76mm	-	4x5.3	5.3x7.1	7.3x9.8	13.3x13.7	16.8x16.8
<b>1x</b>	75mm	-	3.6x4.8	4.8x6.4	6.6x8.8	12x12.3	15.2x15.2

## Optical Specifications

Model	Magnification	WD	Resolution	Depth of Field	Optical Distortion	Weight	Mount (Sold Separately)	Compatible Camera Size	Product Code
<b>ML-0310VF</b>	0.3x	143.5mm	15.3 $\mu$ m	6.0mm	0.07% or less	Approx. 180g	C Mount	Supports Maximum size of 1.2" (15.15mmx15.15mm)	A-3127
	0.65x	83.2mm	8.8 $\mu$ m	1.6mm	0.02% or less				
	1.0x	75.2mm	7.1 $\mu$ m	0.7mm	0.01% or less				

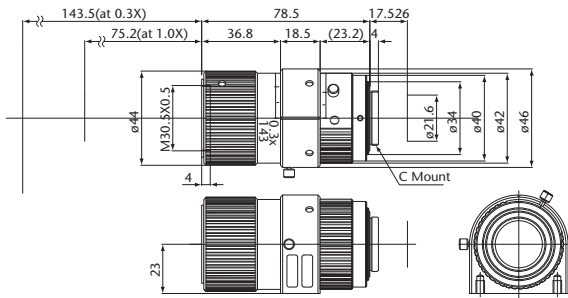
## Option Proxar Lens

Model	Magnification	WD	Resolution	Depth of Field	Optical Distortion	Product Code
<b>ML-VF03</b>	0.1x	414.4mm	44.0 $\mu$ m	54.4mm	-0.1% or less	A-8034
	0.37x	133.4mm	15.3 $\mu$ m	4.9mm	-0.06% or less	
	0.65x	106.3mm	10.8 $\mu$ m	2.0mm	-0.03% or less	

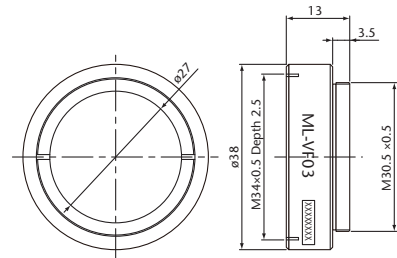
\* Calculated from permissible circle of confusion diameter of 40 $\mu$ m.

\* Resolution values indicate the theoretical resolution at a wavelength of 550nm.

### ML-0310VF

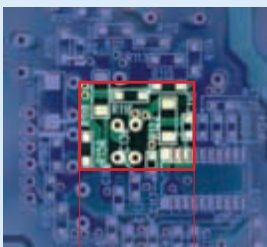


### ML-VF03



### ML-0310VF Examples of Field of View

1/2 CCD at 0.3x



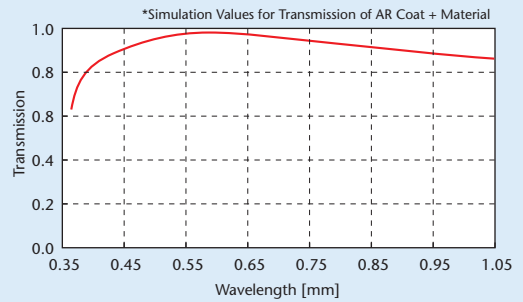
1.2 CCD at 0.3x



### Benefits of Using a Large Element Camera

- Achieves a large field of view with one camera
- Bright pictures due to large pixel size

### Chart for Spectral Transmission



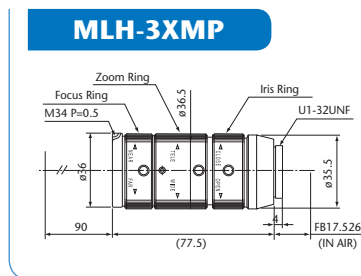
# Mega Pixel Macro Zoom Lens

## MLH-3XMP



This high-performance macro zoom lens supports CCD cameras of the 1 million pixel class. The zoom range is 0.3x~1x by optical magnification. The resolution of 100/mm or more is realized at the center and periphery of the entire zoom range. Combination with a mega pixel CCD realizes wide-range image recognition with excellent contrast.

- Zoom: Optical magnification of 0.3x~1x
- WD=90mm
- Variable focus
- Variable iris Effective NO4.5~Close
- Equipped with screws to lock movable parts (Zoom, focus, and iris)
- Maximum compatible camera format ~2/3"
- C mount



<b>Model</b>	<b>MLH-3XMP</b>
<b>Magnification</b>	0.3x to 1x (Manual Zoom)
<b>WD</b>	90mm
<b>Aperture (F No)</b>	F4.5~Close
<b>Filter Screw</b>	M34 P=0.5
<b>Weight</b>	150g
<b>Largest Compatible CCD</b>	2/3"
<b>Camera Mounts</b>	C Mount
<b>Product Code</b>	A-0220

# 10x Zoom Lens

## MLH-10X



A wide zoom ratio lens developed for large field of view imaging. Zoom ratio of 10:1 at a working distance of 150mm to 450mm by adjusting the focus. This lens can be used for FA, laboratory work, weak eyesight correction, and environment-related projects.

- Zoom ratio of 10:1 (Magnification range: 0.084x(min)~0.84x(max))
- WD=450mm(min)~150mm(max)
- Iris, focus, and zoom are adjustable.
- Equipped with locking screws.

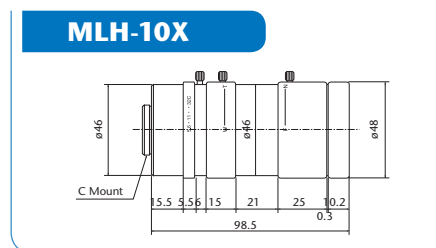


Chart for Field of View

WD	Magnifications	Field of View	
		1/2"(Length mm x Width mm)	1/3"(Length mm x Width mm)
150mm	0.086x ~ 0.84x	55.8 x 74.4 ~ 5.7 x 7.6	42 x 56 ~ 4.3 x 5.7
200mm	0.06x ~ 0.58x	80 x 107 ~ 8.3 x 11	60 x 80 ~ 6.2 x 8.3
250mm	0.045x ~ 0.44x	107 x 142 ~ 10.9 x 14.5	80 x 107 ~ 8.2 x 10.9
300mm	0.037x ~ 0.36x	130 x 173 ~ 13.3 x 17.8	97 x 130 ~ 10 x 13.3
350mm	0.031x ~ 0.3x	155 x 206 ~ 16 x 21.3	116 x 155 ~ 12 x 16
400mm	0.02x ~ 0.25x	185 x 246 ~ 19.2 x 25.6	138 x 185 ~ 14.4 x 19.2
450mm	0.023x ~ 0.22x	209 x 278 ~ 21.8 x 29.1	157 x 209 ~ 16.4 x 21.8

<b>Model</b>	<b>MLH-10X</b>
<b>Magnification</b>	0.084x to 0.84x (Zoom Ratio of 10:1)
<b>WD</b>	150~450mm
<b>Iris</b>	F5.6~Close
<b>Filter Size</b>	M46 P=0.75
<b>Weight</b>	233g
<b>largest Compatible CCD</b>	1/2"
<b>Camera Mount</b>	C Mount
<b>product Code</b>	A-0149

Mega pixel Macro Zoom Lens / 10x Zoom Lens

MLH-3XMP / MLH-10X

# Telecentric CCTV Lens

## MTE-55

The MTE-55 lens adopts F2.8/ f-55mm telecentric optical system that reduces angle and magnification errors when observing objects. Accurate telecentric performance is achieved when combined with the optional lens MTE2 with at a magnification of 0.4x ~ 0.9x. Although no telecentric effect is achieved at the magnification of infinity ~ 0.4x, it is designed to correct aberrations far better than regular lenses.



Telecentric CCTV Lens

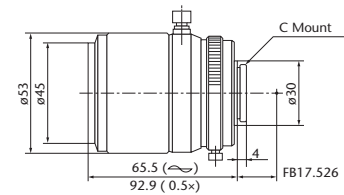
MTE-55

<b>Model</b>	<b>MTE-55</b>
<b>Magnification</b>	Infinity to 0.5x (when dedicated converter is used). 1.0x at max)
<b>Focal Distance f (mm)</b>	55
<b>F No</b>	2.8~close
<b>Photographing Distance</b>	Infinite to 140mm
<b>Optical Distortion</b>	0.6% at max
<b>Marginal Light Quantity</b>	78.50%
<b>Mount</b>	C Mount
<b>Filter Size</b>	M43 P0.75
<b>Largest Compatible Camera</b>	2/3"
<b>Weight</b>	320g
<b>Product Code</b>	A-0212

Chart for Field of View by CCD Camera Size (MTE-55)

WD (mm)	MTE-55			Optical Magnification
	2/3" (Length x Width)	1/2" (Length x Width)	1/3" (Length x Width)	
5000	550x733	415x550	300x400	x0.012
3000	330x440	240x320	170x220	x0.02
1000	132x176	090x120	61x82	x0.05
500	55x73	40x53	30x40	x0.12
300	31x41	24x32	17x22	x0.21
200	22x29	15x20	11x15	x0.3
140	13x18	10x13	7x10	x0.48

### MTE-55

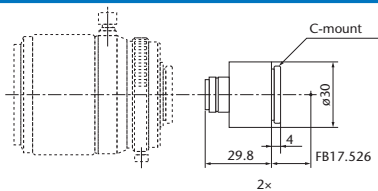


## Options

### x2 Converter Lens MTE2

Dedicated x2 Converter Lens	Product Code
<b>MTE2</b>	A-8083

#### MTE2



### x0.75 Converter Lens MTE075

Dedicated x0.75 Converter Lens	Product Code
<b>MTE075</b>	A-8084

#### MTE075

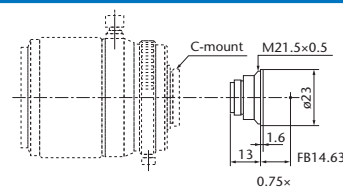


Chart for Field of View by CCD Camera Size(MTE-55+MTE2)

WD (mm)	MTE-55 +2xConverter Lenses (MTE2)			
	2/3" (Length x Width)	1/2" (Length x Width)	1/3" (Length x Width)	Optical Magnification
5000	275x366	207x275	150x200	x0.024
3000	165x220	120x160	85x110	x0.04
1000	66x88	45x60	30x41	x0.1
500	27x36	20x26	15x20	x0.24
300	15x20	12x16	8x11	x0.42
200	11x14	07x10	5x7	x0.6
140	6x9	5x6	3x5	x0.9

Chart for Field of View by CCD Camera Size(MTE-55+MTE075)

WD (mm)	MTE-55 +0.75xConverter Lenses (MTE075)			
	2/3" (Length x Width)	1/2" (Length x Width)	1/3" (Length x Width)	Optical Magnification
5000	733x977	553x733	400x533	x0.009
3000	440x586	320x426	226x293	x0.015
1000	176x234	120x160	081x109	x0.03
500	73x97	53x70	40x53	x0.09
300	41x54	32x42	22x29	x0.15
200	29x38	20x26	14x20	x0.22
140	17x24	13x17	9x13	x0.36

# 3 Mega Pixel CCTV Lens

## ML-MP3 Series

The ML-MP and ML-MP3 Mega Pixel CCTV Series are lenses developed for wide view image recognition with higher definition. The ability of the lenses to realize a resolution of higher than 100lp/mm both at the center and periphery when imaging at close distances is a particularly strong feature. In combination with a mega pixel camera, imaging with higher resolution and contrast than conventional CCTV lenses is achieved. With all models, the variable iris and focus can be set with locking screws as needed<sup>(\*)</sup>. The lenses also support small FOV imaging when combined with close-up rings and rear converter lenses<sup>(\*\*)</sup>.



The 3 Mega Pixel (ML-MP3) Series is our newest lineup of high end CCTV lenses addressing the needs of applications using high pixel count image sensors.

- High resolving power of 3 mega pixels or higher
- Supports 2/3" lenses
- Close distance (0.2 meters or greater) design suitable for machine vision
- Low distortion : 0.1% or less
- High image quality through improved marginal light quantity ratio
- Includes focus lock screws and iris lock screws
- Lens OD: 29mm
- Uniform filter mount M27 P0.5

(\*1) Vibration resistance is not considered in design.

(\*2) If a close-up ring and a rear converter lens are used, individual differences in product performance, or image deterioration occurs due to an enlargement of lens tolerance.

(Images must be checked when using the lenses. Contact us if uncertain.)

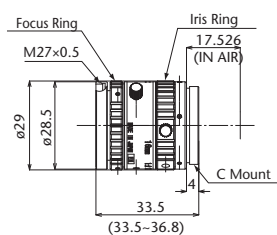
Note: Product performance is guaranteed only if the product is used without additional attachments.

Support for Special Orders

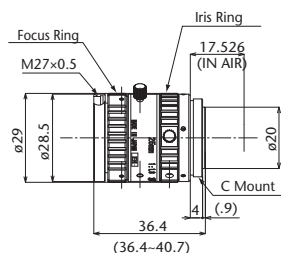
**Fixed Aperture / Focus Lock Type**



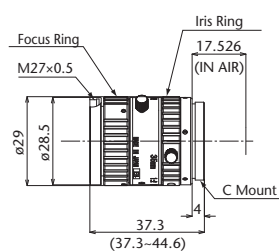
### ML-M1620MP3



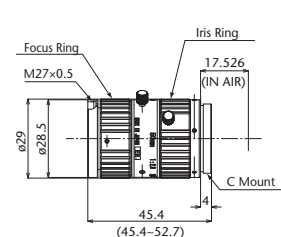
### ML-M2518MP3



### ML-M3520MP3



### ML-M5028MP3



Model	Focal Distance	F No	Field of View(HxV)	Closest Distance	Filter Screw	Weight	Largest compatible CCD	Mount	Product Code
ML-M1620MP3	16mm	F2.0 - 16	23.3° x 30.7°	0.2m	M27 P0.5	53g	2/3"	C mount	A-0229
ML-M2518MP3	25mm	F1.8 - 16	15° x 19.9°	0.2m	M27 P0.5	60g	2/3"	C mount	A-0230
ML-M3520MP3	35mm	F2.0 - 16	10.7° x 14.3°	0.2m	M27 P0.5	59g	2/3"	C mount	A-0231
ML-M5028MP3	50mm	F2.8 - 16	7.5° x 10.0°	0.2m	M27 P0.5	69g	2/3"	C mount	A-0232

# Mega Pixel CCTV Lens

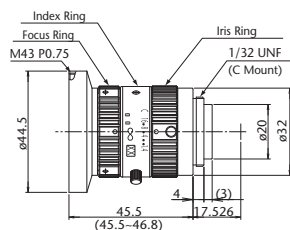
## ML-MP Series



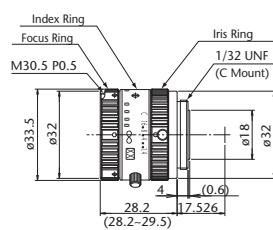
Compact CCTV lenses with high resolution design for use with 1 mega pixel or higher count sensors.

- Lineup of 6 models (f = 5~50mm)
- Compatible with mega pixel cameras
- Variable focus and iris
- Equipped with screws to lock movable parts (focus and iris)
- Maximum compatible camera format ~2/3"
- C mount

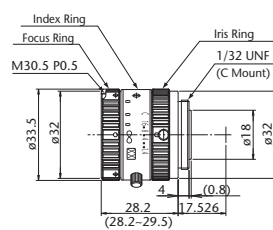
### ML-H0514MP



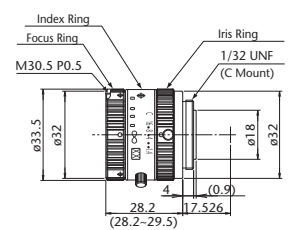
### ML-M0814MP



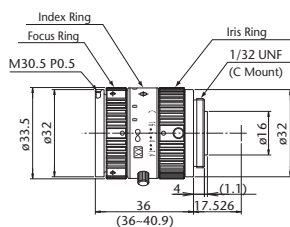
### ML-M1214MP



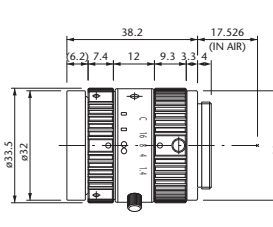
### ML-M1614MP



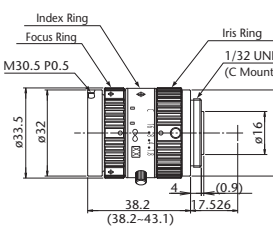
### ML-M2514MP



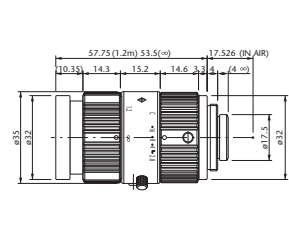
### ML-M3514MP



### ML-M5018MP



### ML-M7528MP



Model	Focal Distance	F No	Field of View(HxV)	Closest Distance	Filter Screw	Weight	Largest compatible CCD	Mount	Product Code
ML-H0514MP	5mm	F1.4 - 16C	51.4° x 65.5°	0.3m	M43 P0.75	107g	1/2"	C mount	A-3100
ML-M0814MP	8mm	F1.4 - 16C	43.7° x 56.3°	0.1m	M30.5 P0.5	70g	2/3"	C mount	A-0221
ML-M1214MP	12mm	F1.4 - 16C	30.8° x 40.4°	0.15m	M30.5 P0.5	65g	2/3"	C mount	A-0222
ML-M1614MP	16mm	F1.4 - 16C	23.4° x 30.8°	0.3m	M30.5 P0.5	65g	2/3"	C mount	A-0223
ML-M2514MP	25mm	F1.4 - 16C	15.1° x 20°	0.3m	M30.5 P0.5	75g	2/3"	C mount	A-0224
ML-M5018MP	50mm	F1.8 - 16C	7.9° x 10.5°	0.5m	M30.5 P0.5	90g	2/3"	C mount	A-0225

# CCTV Lens

## ML Series

CCTV (Closed Circuit Television) lenses were developed to recognize images in a wide field of view. With all models, the variable iris and focus can be set with locking screws as needed.<sup>(\*)</sup> The lenses also support micro imaging in combination with close-up ring and rear converter lenses.<sup>(\*)</sup>

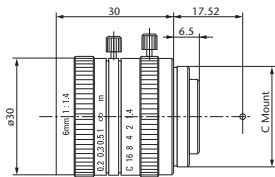


- A wide range of products from f=6mm to 100mm.
- Variable focus and iris equipped with lock screws.
- Camera mount: C mount

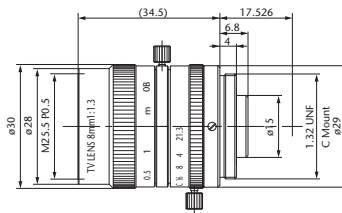
(\*1) Vibration resistance is not considered in design.

(\*2) Image quality may be distorted with enlargement of lens tolerance.

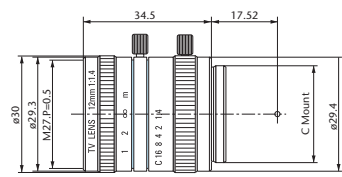
**ML-0614**



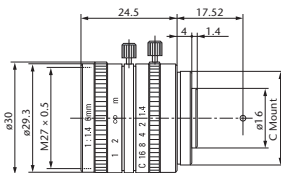
**ML-0813**



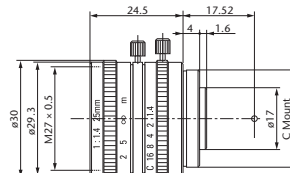
**ML-1214**



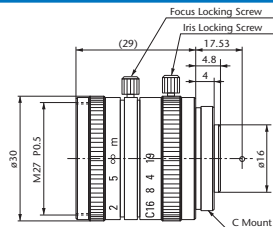
**ML-1614**



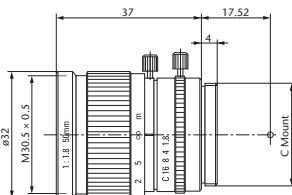
**ML-2514**



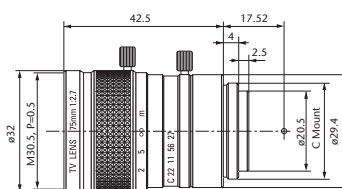
**ML-3519**



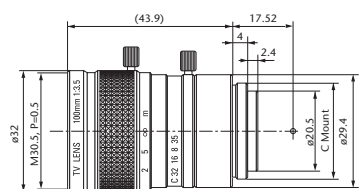
**ML-5018**



**ML-7527**



**ML-10035**



Model	Focal Distance	F No	Field of View(HxV)	Closest Distance	Filter Screw	Weight	Largest compatible CCD	Mount	Product Code
<b>ML-0614</b>	6mm	F1.4 - close	42.3° x 54.6°	0.2m	M27 P0.5	60g	1/2"	C mount	A-0198
<b>ML-0813</b>	8mm	F1.3 - close	45.0° x 57.8°	0.2m	M25.5 P0.5	60g	2/3"	C mount	A-0199
<b>ML-1214</b>	12mm	F1.4 - close	21.9° x 29.0°	0.3m	M27 P0.5	60g	1/2"	C mount	A-0200
<b>ML-1614</b>	16mm	F1.4 - close	23.0° x 30.4°	0.4m	M27 P0.5	40g	2/3"	C mount	A-0201
<b>ML-2514</b>	25mm	F1.4 - close	21.6° x 28.5°	0.5m	M27 P0.5	45g	1"	C mount	A-0202
<b>ML-3519</b>	35mm	F1.9 - close	10.8° x 14.4°	0.5m	M27 P0.5	50g	2/3"	C mount	A-0203
<b>ML-5018</b>	50mm	F1.8 - close	7.9° x 10.5°	1m	M30.5 P0.5	60g	2/3"	C mount	A-0204
<b>ML-7527</b>	75mm	F2.7 - close	4.9° x 6.5°	1m	M30.5 P0.5	65g	2/3"	C mount	A-0205
<b>ML-10035</b>	100mm	F3.5 - close	3.8° x 5.1°	1m	M30.5 P0.5	65g	2/3"	C mount	A-0206

Field, WD, and Magnification when a Close-Up Ring is Used

Close-Up Ring (mm)	ML-0614				ML-0813				ML-1214			
	Field of View (Length x Width)	Field of View (Length x Width)	WD (mm)	Magnification	Field of View (Length x Width)	Field of View (Length x Width)	WD (mm)	Magnification	Field of View (Length x Width)	Field of View (Length x Width)	WD (mm)	Magnification
	1/2"	1/3"			1/2"	1/3"			1/2"	1/3"		
0	165 x 221	124 x 165	200	0.03x	96 x 128	72 x 96	148	0.05x	103 x 137	77 x 103	248	0.05x
0.5	44 x 58	33 x 44	43	0.11x	43 x 57	32 x 43	59	0.11x	55 x 73	41 x 55	125	0.09x
	60 x 79	45 x 60	63	0.08x	77 x 102	57 x 77	115	0.06x	119 x 159	89 x 119	289	0.04x
1	25 x 34	19 x 25	19	0.19x	27 x 37	21 x 27	34	0.18x	38 x 50	28 x 38	80	0.13x
	30 x 40	22 x 30	25	0.16x	38 x 51	29 x 38	52	0.13x	59 x 79	45 x 59	136	0.08x
1.5					20 x 27	15 x 20	22	0.24x	29 x 38	21 x 29	57	0.17x
					26 x 34	19 x 26	31	0.19x	40 x 53	30 x 40	85	0.12x
2									23 x 31	17 x 23	42	0.21x
									30 x 40	22 x 30	59	0.16x

Close-Up Ring (mm)	ML-1614				ML-2514				ML-3519			
	Field of View (Length x Width)	Field of View (Length x Width)	WD (mm)	Magnification	Field of View (Length x Width)	Field of View (Length x Width)	WD (mm)	Magnification	Field of View (Length x Width)	Field of View (Length x Width)	WD (mm)	Magnification
	1/2"	1/3"			1/2"	1/3"			1/2"	1/3"		
0	109 x 145	82 x 109	358	0.04x	87 x 115	65 x 87	458	0.06x	66 x 87	49 x 66	500	0.07x
0.5	64 x 86	48 x 64	206	0.07x	64 x 85	48 x 64	338	0.08x	55 x 73	41 x 55	422	0.09x
	156 x 208	117 x 156	515	0.03x	242 x 322	181 x 242	1270	0.02x	335 x 447	251 x 335	2459	0.01x
1	45 x 61	34 x 45	143	0.11x	50 x 67	38 x 50	269	0.10x	47 x 63	35 x 47	366	0.10x
	78 x 104	58 x 78	252	0.06x	121 x 161	91 x 121	637	0.04x	168 x 223	126 x 168	1240	0.03x
1.5	35 x 47	26 x 35	108	0.14x	42 x 56	31 x 42	223	0.12x	41 x 55	31 x 41	324	0.12x
	52 x 69	39 x 52	164	0.09x	81 x 107	60 x 81	425	0.06x	112 x 149	84 x 112	834	0.04x
2	29 x 38	22 x 29	86	0.17x	36 x 47	27 x 36	191	0.13x	37 x 49	28 x 37	291	0.13x
	39 x 52	29 x 39	120	0.12x	60 x 81	45 x 60	320	0.08x	84 x 112	63 x 84	631	0.06x
5	14 x 18	10 x 14	35	0.35x	19 x 25	14 x 19	103	0.25x	22 x 30	17 x 22	185	0.22x
	16 x 21	12 x 16	42	0.31x	24 x 32	18 x 24	130	0.20x	34 x 45	25 x 34	265	0.14x
10	7.3 x 9.7	5.4 x 7.3	14	0.66x	11 x 14	8.0 x 11	60	0.45x	13 x 18	10 x 13	121	0.36x
	7.8 x 10	5.8 x 7.8	15	0.62x	12 x 16	9.1 x 12	66	0.40x	17 x 22	13 x 17	143	0.29x
15					7.4 x 9.8	5.5 x 7.4	43	0.65x	9.5 x 13	7.2 x 9.5	93	0.50x
					8.1 x 11	6.0 x 8.1	45	0.60x	11 x 15	8.4 x 11	103	0.43x
20					5.6 x 7.5	4.2 x 5.6	34	0.85x	7.4 x 9.9	5.6 x 7.4	78	0.65x
					6.0 x 8.1	4.5 x 6.0	35	0.79x	8.4 x 11	6.3 x 8.4	82	0.57x
25									6.1 x 8.1	4.6 x 6.1	68	0.79x
									6.7 x 8.9	5.0 x 6.7	70	0.72x

Close-Up Ring (mm)	ML-5018				ML-7527				ML-10035			
	Field of View (Length x Width)	Field of View (Length x Width)	WD (mm)	Magnification	Field of View (Length x Width)	Field of View (Length x Width)	WD (mm)	Magnification	Field of View (Length x Width)	Field of View (Length x Width)	WD (mm)	Magnification
	1/2"	1/3"			1/2"	1/3"			1/2"	1/3"		
0	90 x 120	68 x 90	943	0.05x	60 x 80	45 x 60	1000	0.08x	46 x 62	35 x 46	1000	0.10x
1.5	57 x 76	43 x 57	610	0.08x								
	154 x 205	115 x 154	1577	0.03x								
2	51 x 67	38 x 51	548	0.10x	43 x 57	32 x 43	776	0.11x				
	115 x 154	86 x 115	1193	0.04x	184 x 246	138 x 184	3189	0.03x				
5	31 x 41	23 x 31	347	0.16x	30 x 40	23 x 30	607	0.16x	27 x 37	21 x 27	724	0.18x
	46 x 61	35 x 46	503	0.10x	74 x 98	55 x 74	1422	0.07x	95 x 127	71 x 95	2413	0.05x
10	18 x 25	14 x 18	226	0.26x	20 x 27	15 x 20	475	0.24x	19 x 26	15 x 19	609	0.25x
	23 x 31	17 x 23	273	0.21x	37 x 49	28 x 37	833	0.13x	48 x 63	36 x 48	1432	0.10x
15	13 x 18	10 x 13	174	0.37x	15 x 20	11 x 15	408	0.32x	15 x 20	11 x 15	546	0.32x
	15 x 21	12 x 15	196	0.31x	25 x 33	18 x 25	636	0.20x	32 x 42	24 x 32	1105	0.15x
20	10 x 14	7.7 x 10	145	0.47x	12 x 16	9 x 12	369	0.40x	12 x 16	9 x 12	505	0.39x
	12 x 15	8.6 x 12	158	0.42x	18 x 25	14 x 18	538	0.26x	24 x 32	18 x 24	941	0.20x
25	8.4 x 11	6.3 x 8.4	126	0.57x	10 x 14	7.6 x 10	342	0.47x	10 x 14	8 x 10	478	0.46x
	9.2 x 12	6.9 x 9.2	134	0.52x	15 x 20	11 x 15	479	0.33x	19 x 25	14 x 19	843	0.25x
30	7.1 x 9.4	5.3 x 7.1	113	0.68x	8.7 x 12	6.5 x 8.7	323	0.55x	9.0 x 12	6.7 x 9.0	458	0.54x
	7.7 x 10	5.8 x 7.7	119	0.63x	12 x 16	9.2 x 12	440	0.39x	16 x 21	12 x 16	778	0.30x
35	6.1 x 8.2	4.6 x 6.1	104	0.78x	7.6 x 10	5.7 x 7.6	309	0.63x	7.9 x 11	5.9 x 7.9	443	0.61x
	6.6 x 8.8	4.9 x 6.6	108	0.73x	11 x 14	7.9 x 11	412	0.46x	14 x 18	10 x 14	731	0.35x
40	5.4 x 7.2	4.1 x 5.4	97	0.89x	6.7 x 9.0	5.1 x 6.7	297	0.71x	7.1 x 9.4	5.3 x 7.1	430	0.68x
	5.8 x 7.7	4.3 x 5.8	100	0.83x	9.2 x 12	6.9 x 9.2	391	0.52x	12 x 16	8.9 x 12	696	0.40x
45					6.1 x 8.1	4.6 x 6.1	289	0.79x	6.4 x 8.5	4.8 x 6.4	421	0.75x
					8.2 x 11	6.1 x 8.2	375	0.59x	11 x 14	7.9 x 11	669	0.45x
50					5.5 x 7.4	4.1 x 5.5	281	0.87x	5.8 x 7.8	4.4 x 5.8	412	0.82x
					7.4 x 9.8	5.5 x 7.4	361	0.65x	9.5 x 13	7.1 x 9.5	647	0.50x
60								5.0 x 6.6	3.7 x 5.0	400	0.97x	
								7.9 x 11	5.9 x 7.9	614	0.61x	

- Indicated values are based on calculation and actual measurements may differ. 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 and image will be distorted due to enlargement of the lens tolerance.

# Rear Converter Lens

## ML-X

Attaching these lenses between a CCTV lens and a CCD camera enables the adjustment of magnification without changing the working distance of the system.  
\*May decrease the resolution.

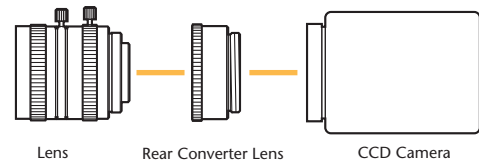


Rear Converter Lens

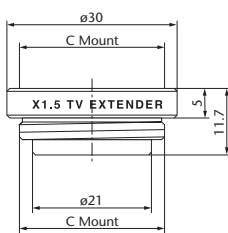
ML-X

Model	Product Code
ML-1.5X	A-8090
ML-2X	A-8091
ML-2.5X	A-8092
ML-3X	A-8093
ML-4X	A-8094

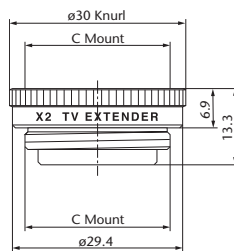
Configuration



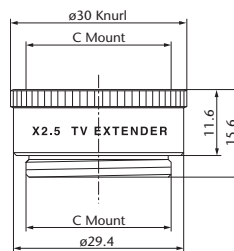
### ML-1.5X



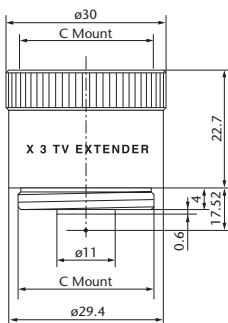
### ML-2X



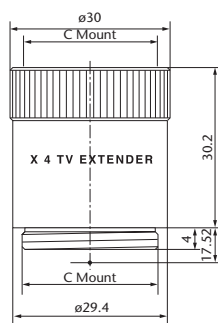
### ML-2.5X



### ML-3X

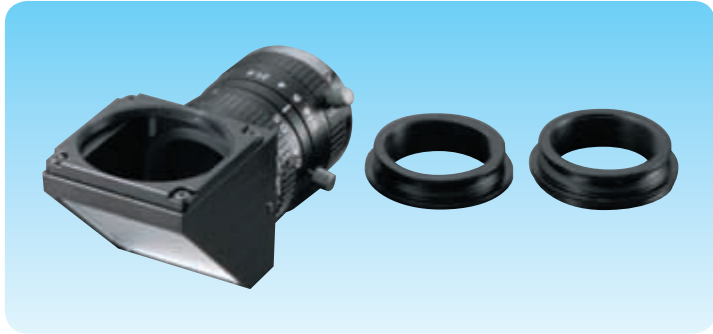


### ML-4X



# 90° Mirror Prism

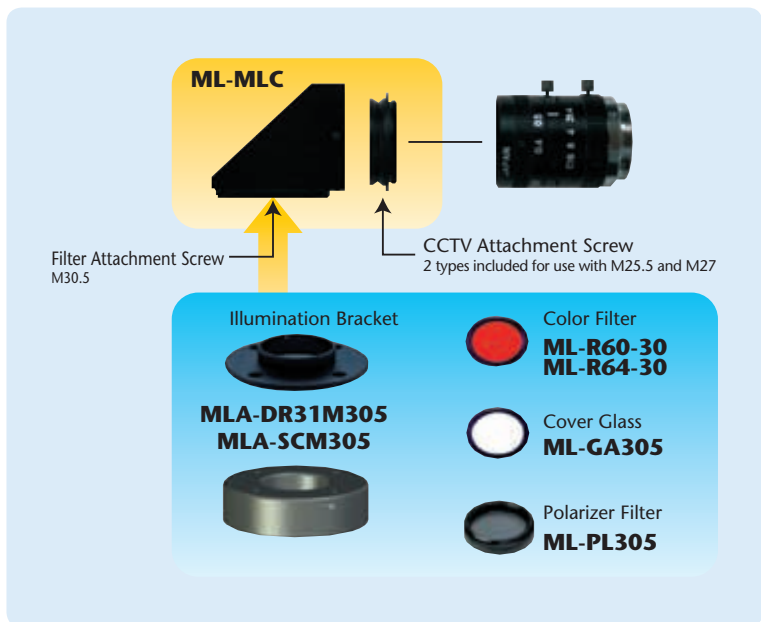
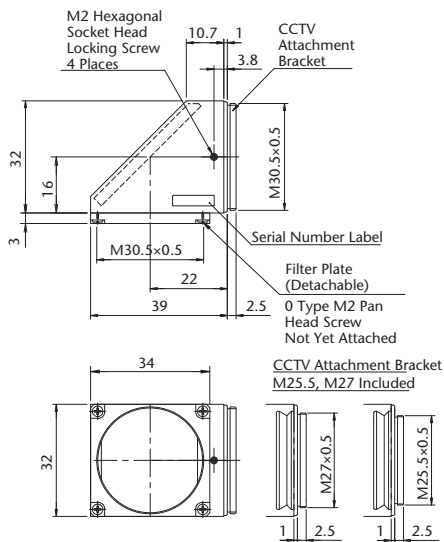
## ML-MLC



- Fully supports CCTV M25.5, 27, and 30.5.
- Equipped with screws to attach filters.

Model	Product Code
ML-MLC	A-8014

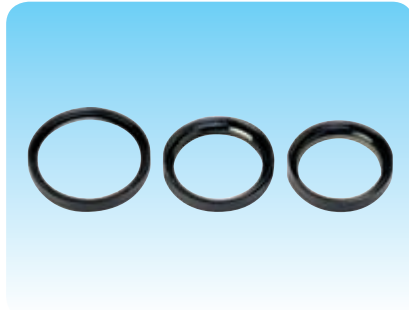
### ML-MLC



## Options for CCTV Lenses

### Glass Covers

#### ML-GA Series



A cover glass adapter for preventing the adhesion of dirt and foreign objects to the lens surface.

### Polarizers (Analyzers)

#### ML-PL Series



A polarizer (analyzer) adapter with revolution function for suppressing glare from objects and localized flare when used as a set with polarizer illumination.

### Ring Illumination Attachment Adapters

#### ML-FL Series



Ring illumination adapter ML-FL.

### Options

Screw Pitch	255		270		305	
	Model	Product Code	Model	Product Code	Model	Product Code
Glass Covers	<b>ML-GA255</b>	A-8059	<b>ML-GA270</b>	A-8060	<b>ML-GA305</b>	A-8061
Polarizer	<b>ML-PL255</b>	A-8067	<b>ML-PL270</b>	A-8068	<b>ML-PL305</b>	A-8069
Polarizer (With Locking Screw)	<b>ML-PL255LB</b>	A-3130	<b>ML-PL270LB</b>	A-3131	<b>ML-PL305LB</b>	A-3132
Red Filter	<b>ML-R60-25</b>	A-8031	<b>ML-R60-27</b>	A-8032	<b>ML-R60-30</b>	A-8033
Sharp Cut Filter	<b>ML-R64-25</b>	A-9055	<b>ML-R64-27</b>	A-9056	<b>ML-R64-30</b>	A-9057
Close-Up Ring	<b>ML-EXR</b>					

### Close-Up Ring

#### ML-EXR Series

Used when using the CCTV lens at a close distance or when enlarging the magnification.

See comparison table on page P.L-63 for the field of view, working distance, and magnification when close-up ring is attached.

Model	Remarks	Product Code
<b>ML-EXR</b>	Set of 7 (0.5, 1, 2, 5, 10, 20, 40)	A-8100
<b>ML-EXR05</b>	0.5mm	A-8101
<b>ML-EXR1</b>	1mm	A-8102
<b>ML-EXR2</b>	2mm	A-8103
<b>ML-EXR5</b>	5mm	A-8104
<b>ML-EXR10</b>	10mm	A-8105
<b>ML-EXR15</b>	15mm	A-8106
<b>ML-EXR20</b>	20mm	A-8107
<b>ML-EXR25</b>	25mm	A-8108
<b>ML-EXR30</b>	30mm	A-8109
<b>ML-EXR40</b>	40mm	A-8110
<b>ML-EXR50</b>	50mm	A-8111
<b>ML-EXR100</b>	100mm	A-8112
<b>ML-EXR1520</b>	Variable Type (15 to 20 mm)	A-8113
<b>ML-EXR3042</b>	Variable Type (30 to 42 mm)	A-8114



# Coaxial Epi-illumination Unit for Objective Lens

## SOD-III Series

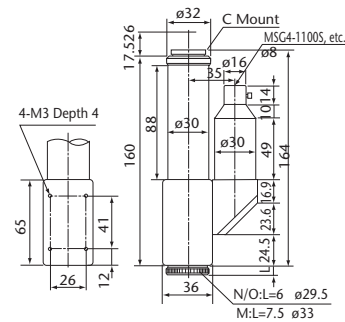
The SOD-III is an optical unit used for coaxial illumination with objective lenses. If you are using a metallurgical microscope, this unit is effective for image input because it produces video of the same level. It is designed for infinity corrected objective lenses (bright vision) and can be used with the lenses listed below. In addition to the monocular type, the 5-hole revolver type (manual and electric) is available, which can be mounted with 5 objective lenses,

- Compact design
- Compatible with various bright field lenses
- Enables horizontal and various other kinds of mountings



Model	Product Code
SOD-III	A-0171

### SOD-III



## Compact Objective Lens



### Mitsutoyo

Model	NA	WD (mm)	Product Code
M Plan Apo 2 x	0.055	34	A-8132
M Plan Apo 5 x	0.14	34	A-8133
M Plan Apo 10 x	0.28	33.5	A-8134
M Plan Apo 20 x	0.42	20	A-8137
M Plan Apo SL 20 x	0.28	30.5	A-8135
M Plan Apo SL 50 x	0.42	20.5	A-8136

### Nikon

Model	NA	WD (mm)	Product Code
CF IC EPI Plan 2.5 x	0.075	8.8	A-8143
CF IC EPI Plan 5 x	0.13	22.5	A-8144
CF IC EPI Plan 10 x A	0.3	16.5	A-8148
CF IC EPI SLWDPlan 10 x A	0.21	20.3	A-8145
CF IC EPI SLWDPlan 20 x A	0.35	20.5	A-8146
CF IC EPI SLWDPlan 50 x A	0.45	13.8	A-8147

