

# 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), we 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.



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

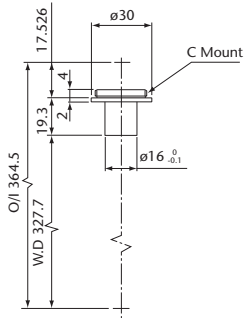
Model	Magnification	O/I	WD	Focal Length	Resolution	Depth of Field	Effective F No	TV Distortion	Largest Compatible Camera	Weight
ML01-327N	$\times 0.1$	364.5mm	327.7mm	30.1	33.9 $\mu$ m	37.7mm	4.7	0.4% or less	1/2"	10g
ML03-181N	$\times 0.3$	240.9mm	181.3mm	42.6	14.6 $\mu$ m	5.43mm	6.1	0.2% or less	1/2"	15g
ML05-132N	$\times 0.5$	199mm	132.5mm	43	11.7 $\mu$ m	1.95mm	6.1	0.08% or less	1/2"	18g
ML05-250N	$\times 0.5$	382.3mm	250mm	81.6	13.3 $\mu$ m	2.27mm	7.1	0.06% or less	1/2"	90g
ML1-89N	$\times 1$	177.5mm	89.6mm	43	7.9 $\mu$ m	0.7mm	8.8	0.04% or less	1/2"	15g

\* 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.

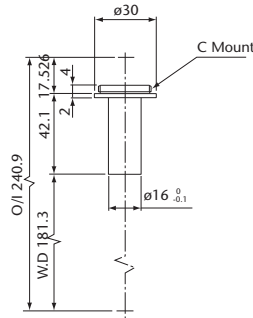
### Magnification Conversion Table

	Close-Up Ring Thickness	0mm	1mm	2mm	5mm	7mm	10mm	15mm	17mm	20mm
ML01-327N	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
ML03-181N	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
ML05-132N	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
ML05-250N	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
ML1-89N	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

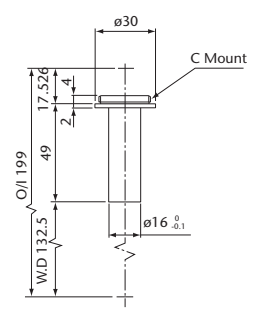
**ML01-327N**



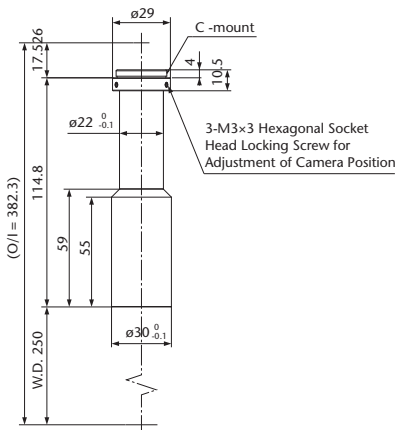
**ML03-181N**



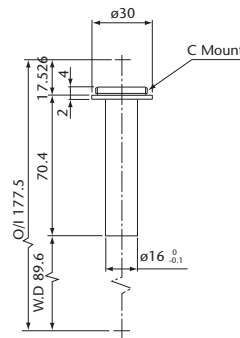
**ML05-132N**



**ML05-250N**



**ML1-89N**



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



Reference magnification and WD data for close-up ring combinations

