

# MACRO ZOOM LENS

FACTORY AUTOMATION LENS



- Wide zoom range for general inspection, documentation, and visual aid applications

## MLH-10X

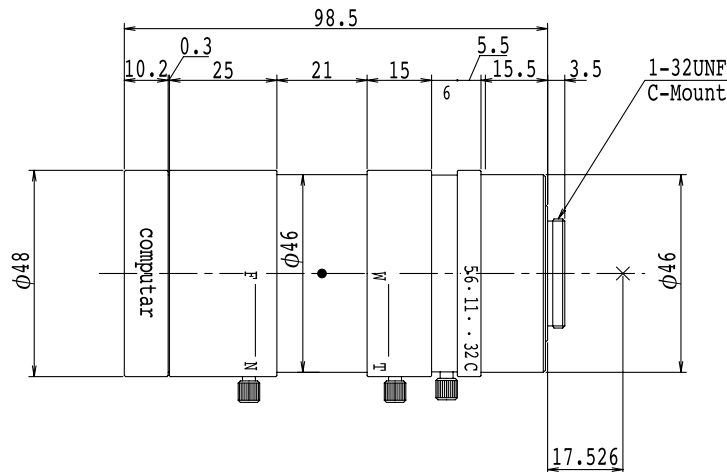


Optical Magnification	0.084X - 0.84X			
Max. Magnification	0.084mm - 0.84mm			
Max. Aperture Ratio	1:5.6			
Max. Image Format	6.4mm x 4.8mm (φ 8mm)			
Operation Range	Iris	F5.6 - F32C		
	Focus	0.15m - 0.45m		
Control	Iris	Manual		
	Focus	Manual		
	Zoom	Manual		
Angle of View	D	21.6° - 4.5°	17.0° - 3.3°	13.0° - 2.5°
	H	1/2" 18.0° - 3.6°	1/3" 13.8° - 2.7°	1/4" 10.6° - 2.0°
	V	13.8° - 2.7°	10.6° - 2.0°	8.0° - 1.5°
Operating Temperature	-10° C ~ +50° C			

Distortion	1/2"	+0.9% at 0.084X (y=4.0)
		+1.6% at 0.84X (y=4.0)
Back Focal Length	23.29mm	
Flange Back Length	17.526mm	
Mount	C-Mount	
Filter Size	M46 P=0.75mm	
Dimensions	φ 48mm x 98.5mm	
Weight	260g	

Working Distance (mm)	Optical Magnification	Field of View(mm)												
		1/2"			Magnification on Monitor	1/3"			Magnification on Monitor	1/4"			Magnification on Monitor	
		H	V	D		H	V	D		H	V	D		
150	Wide	0.084X	76.2	57.1	95.2	3.73X	57.1	42.9	71.4	4.98X	42.9	32.1	53.6	6.64X
	Middle	0.19X	33.5	25.2	42.3	8.47X	25.2	18.9	31.4	11.29X	18.9	14.2	23.6	15.06X
	Tele	0.84X	7.6	5.7	9.5	37.34X	5.7	4.3	7.1	49.78X	4.3	3.2	5.4	66.38X
200	Wide	0.06X	106.7	80.0	133.3	2.67X	80.0	60.0	100.0	3.56X	60.0	45.0	75.0	4.74X
	Middle	0.13X	47.8	36.1	59.4	5.87X	36.1	27.2	44.9	7.83X	27.2	20.4	33.9	10.44X
	Tele	0.60X	10.7	8.0	13.3	26.67X	8.0	6.0	10.0	35.56X	6.0	4.5	7.5	47.41X
250	Wide	0.045X	142.2	106.7	177.8	2.00X	106.7	80.0	133.3	2.67X	80.0	60.0	100.0	3.56X
	Middle	0.101X	62.3	47.1	77.0	4.49X	47.1	35.5	58.5	5.99X	35.5	26.7	44.2	7.98X
	Tele	0.45X	14.2	10.7	17.8	20.00X	10.7	8.0	13.3	26.67X	8.0	6.0	10.0	35.56X
300	Wide	0.036X	177.8	133.3	222.2	1.60X	133.3	100.0	166.7	2.13X	100.0	75.0	125.0	2.84X
	Middle	0.082X	76.8	58.2	94.8	3.63X	58.2	43.8	72.2	4.84X	43.8	33.0	54.6	6.46X
	Tele	0.36X	17.8	13.3	22.2	16.00X	13.3	10.0	16.7	21.34X	10.0	7.5	12.5	28.45X
350	Wide	0.03X	213.3	160.0	266.7	1.33X	160.0	120.0	200.0	1.78X	120.0	90.0	150.0	2.37X
	Middle	0.069X	91.4	69.3	112.7	3.05X	69.3	52.2	85.9	4.07X	52.2	39.3	65.0	5.42X
	Tele	0.30X	21.3	16.0	26.7	13.34X	16.0	12.0	20.0	17.78X	12.0	9.0	15.0	23.71X
400	Wide	0.025X	256.0	192.0	320.0	1.11X	192.0	144.0	240.0	1.48X	144.0	108.0	180.0	1.98X
	Middle	0.06X	106.0	80.3	130.7	2.63X	80.3	60.6	99.7	3.5X	60.6	45.6	75.4	4.67X
	Tele	0.25X	25.6	19.2	32.0	11.11X	19.2	14.4	24.0	14.82X	14.4	10.8	18.0	19.76X
450	Wide	0.022X	290.9	218.2	363.6	0.98X	218.2	163.6	272.7	1.30X	163.6	122.7	204.5	1.74X
	Middle	0.05X	120.7	91.5	148.7	2.31X	91.5	69.0	113.5	3.08X	69.0	51.9	85.9	4.1X
	Tele	0.22X	29.1	21.8	36.4	9.78X	21.8	16.4	27.3	13.04X	16.4	12.3	20.5	17.38X

Field of View : Horizontal (mm) x Vertical (mm) x Diagonal (mm)  
 Monitor Magnification on 14inch Monitor  
 Magnification on Monitor = Optical Magnification x Monitor Size / CCD Size



# MEGAPIXEL MACRO ZOOM LENS

FACTORY AUTOMATION LENS

- Captures full resolution of megapixel cameras
- High contrast & sharp picture in all areas of the screen
- Compact design-Diameter 36.5mm
- Locking set screws for zoom, focus, and iris
- Low distortion
- High resolution macro zoom lens
- 3.3X magnification
- Attachment of fiber ring light can be installed (Ring Guide: M34 P=0.5)

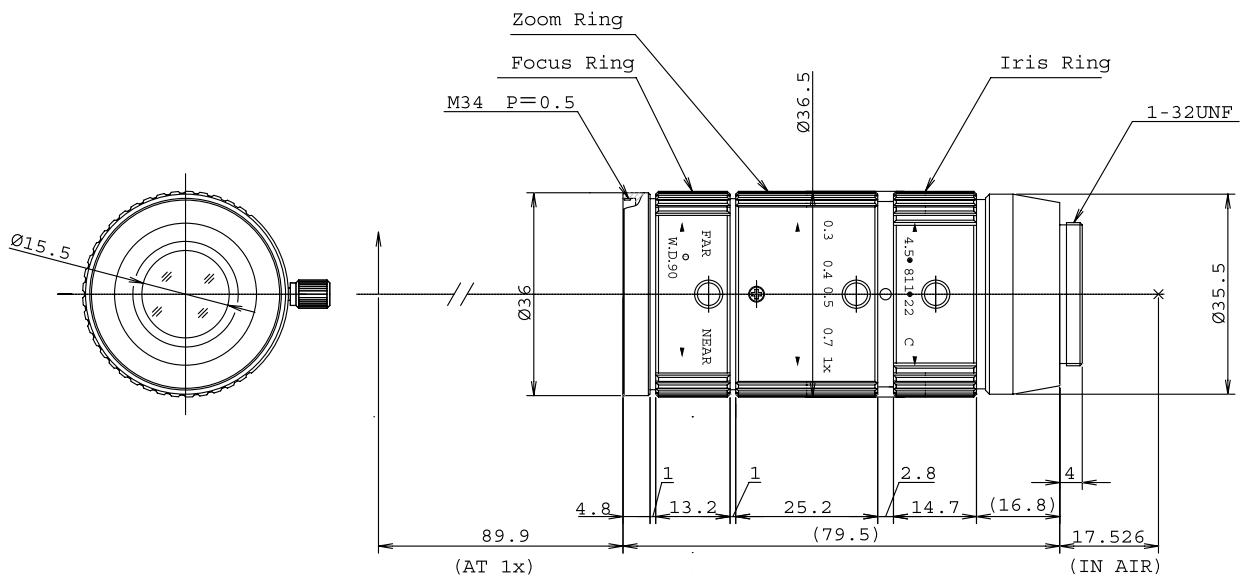
## MLM-3XMP



Max. Magnification	0.3X - 1.0X			Distortion	2/3"	+0.12% at 0.3X (y=5.5)	-0.12% at 0.3X (y=4.0)	
Max. Aperture Ratio	1:4.5					1/2"	+1.78% at 1.0X (y=5.5)	+0.77% at 1.0X (y=4.0)
Max. Image Format	8.8mm x 6.6mm (φ 11mm)			Back Focal Length	20.4mm			
Operation Range	Iris	F4.5 - F22C			Flange Back Length	17.526mm		
	Focus	90mm			Mount	C-Mount		
Control	Iris	Manual			Filter Size	M34 P=0.5mm		
	Focus	Manual			Dimensions	φ 36.5mm x 79.5mm		
	Zoom	Manual			Weight	150g		
Angle of View	D	14.88° - 2.84°		10.70° - 2.72°				
	H	2/3"	11.80° - 2.78°		1/2"	8.48° - 2.18°		
	V	8.74° - 2.24°		6.38° - 1.64°				
Operating Temperature	-10° C ~ +50° C							

Monitor Magnification on 14inch Monitor  
 Working Distance: 90mm  
 Magnification on Monitor = Optical Magnification x Monitor Size / CCD Size

Optical Magnification	Field of View(mm)											
	2/3"			Magnification on Monitor	1/2"			Magnification on Monitor	1/3"			Magnification on Monitor
	H	V	D		H	V	D		H	V	D	
0.3X	29.3	22.0	36.7	9.7X	21.3	16.0	26.7	13.3X	16.0	12.0	20.0	17.8X
0.4X	22.0	16.5	27.5	12.9X	16.0	12.0	20.0	17.8X	12.0	9.0	15.0	23.7X
0.5X	17.6	13.2	22.0	16.2X	12.8	9.6	16.0	22.2X	9.6	7.2	12.0	29.6X
0.6X	14.7	11.0	18.3	19.4X	10.7	8.0	13.3	26.7X	8.0	6.0	10.0	35.6X
0.7X	12.6	9.4	15.7	22.6X	9.1	6.9	11.4	31.1X	6.9	5.1	8.6	41.5X
0.8X	11.0	8.3	13.8	25.9X	8.0	6.0	10.0	35.6X	6.0	4.5	7.5	47.4X
0.9X	9.8	7.3	12.2	29.1X	7.1	5.3	8.9	40.0X	5.3	4.0	6.7	53.3X
1.0X	8.8	6.6	11.0	32.3X	6.4	4.8	8.0	44.5X	4.8	3.6	6.0	59.3X



# 5 MEGAPIXEL TELECENTRIC MACRO ZOOM LENS

FACTORY AUTOMATION LENS

TELECENTRIC  
MACRO  
ZOOM

- 5 megapixel resolution for a 1.1-inch sensor
- 7.1X magnification (0.5X - 0.07X)
- Relative Illumination rate is more than 70%

- Adjustable W.D. (182mm - 577.2mm)
- Telecentric design at 0.25X - 0.5X

NEW

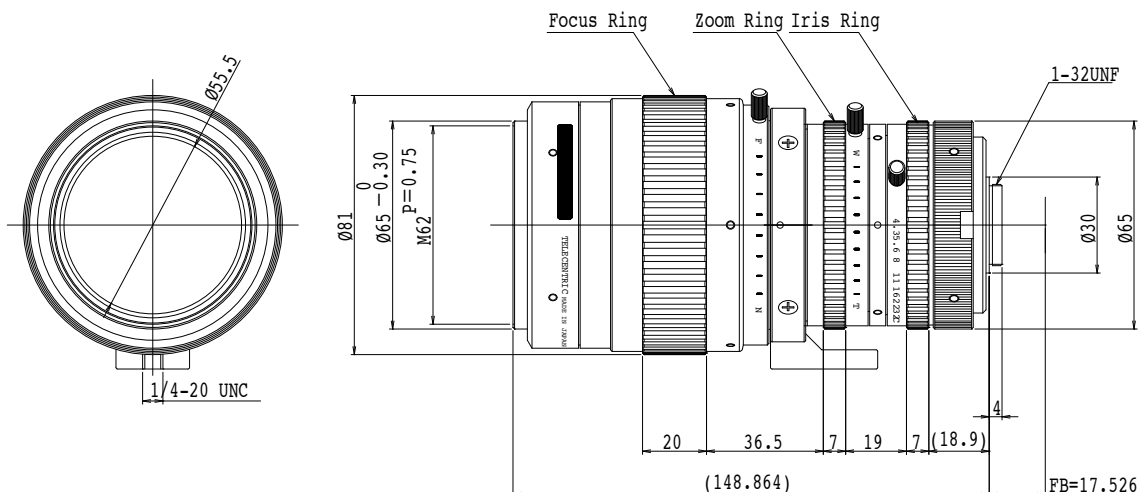
TEC-V7X



Optical Magnification	0.07X - 0.5X
Max. Aperture Ratio	1 : 4.3
Max. Image Format	12.3mm x 12.3mm (φ 17.4mm)
Operation Range	Iris F4.3 - F32
	Focus 182mm - 577.2mm
Control	Iris Manual operation
	Focus Manual operation
	Zoom Manual operation
Operating Temperature	-10° C ~ 50° C

Optical distortion	tele	1.0%	1"	0.84%	2/3"	0.39%
	wide	-1.7%		-1.45%		-0.7%
BackFocal Length	tele	39.53mm				
	wide	49.78mm				
Flange Back Length	17.526mm					
Mount	C Mount					
Filter Size	M62 x P0.75					
Dimensions	φ 61 x 152.86mm					
Weight	1.4kg					

Working Distance(mm)	Optical Magnification	Field of View(mm)									
		1.1"			1"			2/3"			
(mm)		H	V	D	H	V	D	H	V	D	
182	Wide	0.2525	48.74	48.74	69.12	50.32	38.06	63.28	34.88	26.16	43.6
	Middle	0.3643	33.64	33.64	47.33	34.72	26.3	43.6	24.12	18.1	30.11
	Tele	0.5	24.6	24.6	34.75	25.4	19.246	31.88	17.65	13.26	22
200	Wide	0.2258	54.52	54.62	76.94	56.3	42.56	70.84	39	29.24	48.76
	Middle	0.3258	37.62	37.62	52.95	38.83	29.4	48.78	26.96	20.24	33.67
	Tele	0.4451	27.5	27.5	38.68	28.38	21.51	35.64	19.72	14.81	24.62
300	Wide	0.1413	87.48	87.48	124.06	90.34	68.18	114.1	62.46	46.8	78.178
	Middle	0.2037	60.24	60.24	85.34	62.18	47.06	78.18	42.15	32.38	53.898
	Tele	0.2784	44	44	61.94	45.42	34.3	57.46	31.55	23.69	39.38
400	Wide	0.1037	119.47	119.47	169.98	123.4	93.02	156.05	85.2	63.82	106.71
	Middle	0.1495	82.15	82.15	115.97	84.8	64.16	106.72	58.82	44.12	73.48
	Tele	0.2042	59.99	59.99	84.52	61.92	46.89	77.82	43	32.28	53.7
500	Wide	0.082	151.25	151.25	215.44	156.25	117.67	197.8	107.78	80.68	135.04
	Middle	0.1183	103.92	103.92	146.82	107.28	81.12	135	74.37	55.78	92.94
	Tele	0.1617	75.84	75.84	106.89	78.29	59.28	98.4	54.36	40.8	67.88
577.5	Wide	0.0708	175.21	175.21	250.66	181.4	136.35	229.82	125.08	93.62	156.76
	Middle	0.102	120.57	120.57	170.44	124.47	94.1	156.74	86.28	64.72	107.84
	Tele	0.1398	87.99	87.99	124.04	90.8	68.75	114.16	63.06	47.32	78.74



# 5MP TELECENTRIC LENS

FACTORY AUTOMATION LENS

- Compact body design, compatible with 5MP sensors
- Optical magnification 0.057x - 0.5x

- Relative Illuminance more than 80%
- Low distortion, less than 1%

**NEW**

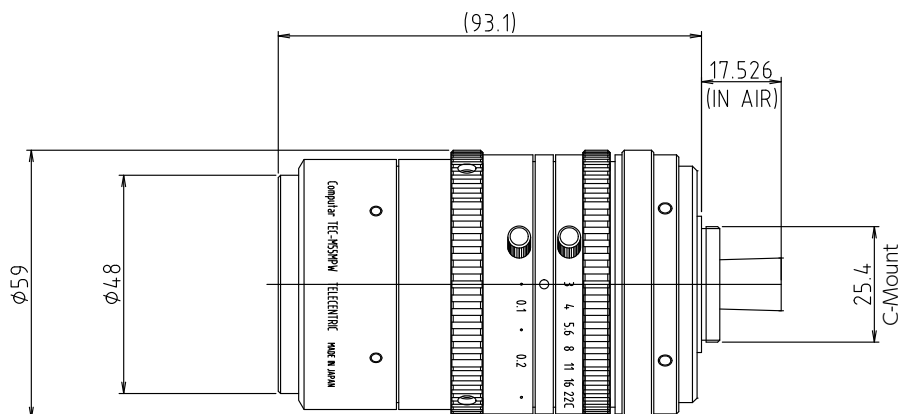
## TEC-M55MPW



Focal length	55mm (at 0.057X) 51mm (at 0.5X)
Max Aperture Ratio	1:3.0
Max. Image Format	8.8mm x 6.6mm (φ11mm)
Operation Iris	F3.0-F22C
Range Focus	139mm - 1000mm
Magnification	0.057x - 0.5x
Relative Illumination	94% (at 0.057x) 81% (at 0.5x)
Control Iris	Manual
Control Focus	Manual
Object Dimension at M.O.D	17(H)mm x 1.3(V)mm 2/3"
Operation Temperature	-10° C ~ 50° C

Distortion	2/3"	+0.52% at 0.057x (y=5.5)
		+0.6% at 0.5x (y=5.5)
Back focal length	17.0mm	
Flange Back Length	17.526mm	
Mount	C-Mount	
Filter Size	Focal length	
Dimensions	φ59.0mm x 93.1mm	
Weight	470g	

Working Distance(mm)	Optical Magnification (X)	Field of View(mm)					
		2/3"		1/2"		1/3"	
		H	V	H	V	H	V
1000	0.057	154.4	115.8	112.3	84.2	84.2	63.2
950	0.060	146.7	110.0	106.7	80.0	80.0	60.0
900	0.064	137.5	103.1	100.0	75.0	75.0	56.3
850	0.067	131.3	98.5	95.5	71.6	71.6	53.7
800	0.072	122.2	91.7	88.9	66.7	66.7	50.0
750	0.077	114.3	85.7	83.1	62.3	62.3	46.8
700	0.083	106.0	79.5	77.1	57.8	57.8	43.4
650	0.089	98.9	74.2	71.9	53.9	53.9	40.4
600	0.097	90.7	68.0	66.0	49.5	49.5	37.1
550	0.106	83.0	62.3	60.4	45.3	45.3	34.0
500	0.118	74.6	55.9	54.2	40.7	40.7	30.5
450	0.132	66.7	50.0	48.5	36.4	36.4	27.3
400	0.150	58.7	44.0	42.7	32.0	32.0	24.0
350	0.173	50.9	38.2	37.0	27.7	27.7	20.8
300	0.204	43.1	32.4	31.4	23.5	23.5	17.6
250	0.251	35.1	26.3	25.5	19.1	19.1	14.3
200	0.323	27.2	20.4	19.8	14.9	14.9	11.1
150	0.456	19.3	14.5	14.0	10.5	10.5	7.9
140	0.504	17.5	13.1	12.7	9.5	9.5	7.1



# TELECENTRIC LENS

## FACTORY AUTOMATION LENS



- Very low distortion compared to standard macro lens
- Wide depth of field
- Working distance: 140mm - Infinity
- Suitable for use as a telephoto lens and macro lens
- Fast F2.8 F-stop at Infinity

## TEC-M55



Focal Length	55mm
Max. Aperture Ratio	1:2.8
Max. Image Format	8.8mm x 6.6mm (φ 11mm)
Operation Range	Iris F2.8 - F32C Focus 0.14m - Inf.
Magnification	Inf. - 0.5X (Max 1.0X at 140mm with 2X Converter)
Relative Illumination	78.5% (at 0.5X)
Depth of Field	1/2" 3.5mm(at 0.5X F2.8), 6.0mm(at 0.5X F5.6)
Control	Iris Manual Focus Manual
Object Dimension at M.O.D	1.7(H)cm x 1.3(V)cm 2/3"
Operating Temperature	-10° C ~ +50° C

Distortion	2/3"	+0.2% at 0.2X (y=5.5) +0.6% at 0.5X (y=5.5)	1/2"	+0.1% at 0.2X (y=4.0) +0.3% at 0.5X (y=4.0)
	Back Focal Length 29.8mm			
Flange Back Length	17.526mm			
Mount	C-Mount			
Filter Size	M43 P=0.75mm			
Dimensions	φ 53.0mm x 92.9mm (Max. at 0.5X)			
Weight	320g			

### TEC-M55

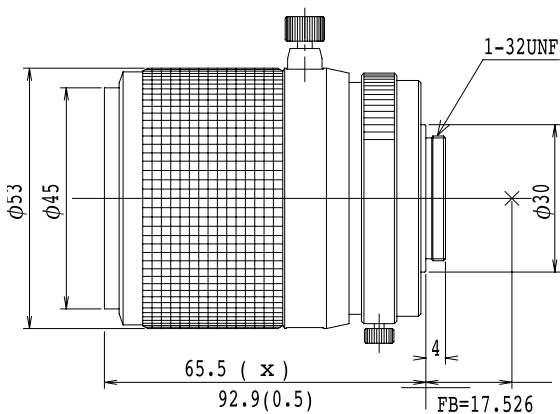
Working Distance (mm)	Optical Magnification	Field of View(mm)					
		2/3"		1/2"		1/3"	
		H	V	H	V	H	V
5000	0.011X	796.2	597.8	579.7	435.0	435.0	326.3
4000	0.014X	636.1	477.6	463.1	347.5	347.5	260.7
3000	0.018X	476.0	357.4	346.6	260.1	260.1	195.1
2000	0.028X	315.9	237.2	230.0	172.6	172.6	129.5
1500	0.037X	235.9	177.1	177.1	128.9	128.9	96.7
1000	0.056X	155.8	117.0	113.4	85.1	85.1	63.9
950	0.059X	147.8	111.0	107.6	80.7	80.7	60.6
900	0.063X	139.8	105.0	101.8	76.4	76.4	57.3
850	0.067X	131.8	99.0	96.0	72.0	72.0	54.0
800	0.071X	123.8	92.9	90.1	67.6	67.6	50.7
750	0.076X	115.8	86.9	84.3	63.2	63.2	47.4
700	0.081X	107.8	80.9	78.5	58.9	58.9	44.2
650	0.088X	99.8	74.9	72.6	55.5	54.5	40.9
600	0.096X	91.8	68.9	66.8	50.1	50.1	37.6
550	0.105X	83.8	62.9	61.0	45.8	45.8	34.3
500	0.116X	75.8	56.9	55.2	41.4	41.4	31.0
450	0.130X	67.8	50.9	49.3	37.0	37.0	27.8
400	0.147X	59.8	44.9	43.5	32.6	32.6	24.5
350	0.170X	51.8	38.8	37.7	28.3	28.3	21.2
300	0.201X	43.8	32.8	31.8	23.9	23.9	17.9
250	0.246X	35.7	26.8	26.0	19.5	19.5	14.6
200	0.317X	27.7	20.8	20.2	15.1	15.1	11.4
150	0.446X	19.7	14.8	14.3	10.8	10.8	8.1
140	0.486X	18.1	13.6	13.2	9.9	9.9	7.4

### TEC-M55 with 0.75X Converter

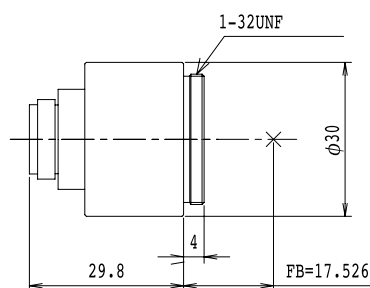
Working Distance (mm)	Optical Magnification	Field of View(mm)					
		2/3"		1/2"		1/3"	
		H	V	H	V	H	V
5000	0.008X	1066.2	797.6	773.3	579.2	579.2	434.0
4000	0.010X	851.9	637.3	617.8	462.7	462.7	346.8
3000	0.014X	637.6	476.9	462.4	346.3	346.3	259.5
2000	0.021X	423.2	316.6	306.9	229.9	229.9	172.3
1500	0.028X	316.1	236.4	229.2	171.7	171.7	128.6
1000	0.423X	208.9	156.2	151.5	113.4	113.4	85.0
950	0.045X	198.2	148.2	143.7	107.6	107.6	80.6
900	0.047X	187.4	140.2	135.9	101.8	101.8	76.3
850	0.050X	176.7	132.2	128.1	96.0	96.0	71.9
800	0.053X	166.0	124.2	120.4	90.1	90.1	67.5
750	0.057X	155.3	116.1	112.6	84.3	84.3	63.2
700	0.061X	144.6	108.1	104.8	78.5	78.5	58.8
650	0.066X	133.8	100.1	97.0	72.7	72.7	54.5
600	0.072X	123.1	92.1	89.3	66.8	66.8	50.1
550	0.079X	112.4	84.1	81.5	61.0	61.0	45.7
500	0.087X	101.7	76.0	73.7	55.2	55.2	41.4
450	0.097X	90.9	68.0	65.9	49.4	49.4	37.0
400	0.110X	80.2	60.0	58.2	43.6	43.6	32.6
350	0.127X	69.5	52.0	50.4	37.7	37.7	28.3
300	0.151X	58.7	43.9	42.6	31.9	31.9	23.9
250	0.184X	48.0	35.9	34.8	26.1	26.1	19.5
200	0.238X	37.3	27.9	27.0	20.2	20.2	15.2
150	0.334X	26.5	19.8	19.2	14.4	14.4	10.8
140	0.363X	24.4	18.2	17.7	13.2	13.2	9.9

### TEC-M55 with 2X Converter

Working Distance (mm)	Optical Magnification	Field of View(mm)					
		2/3"		1/2"		1/3"	
		H	V	H	V	H	V
5000	0.019X	453.1	340.3	330.0	247.7	247.7	185.8
4000	0.024X	362.0	271.9	263.6	197.9	197.9	148.5
3000	0.032X	270.9	203.4	197.3	148.1	148.1	111.1
2000	0.049X	179.8	135.0	130.9	98.3	98.3	73.7
1500	0.065X	134.3	100.8	97.8	73.4	73.4	55.0
1000	0.098X	88.7	66.6	64.6	48.5	48.5	36.4
950	0.104X	84.1	63.2	61.3	46.0	46.0	34.5
900	0.110X	79.6	59.8	58.0	43.5	43.5	32.6
850	0.116X	75.0	56.3	54.6	41.0	41.0	30.8
800	0.124X	70.5	52.9	51.3	38.5	38.5	28.9
750	0.133X	65.9	49.5	48.0	36.0	36.0	27.0
700	0.142X	61.4	46.1	44.7	33.5	33.5	25.2
650	0.154X	56.8	42.7	41.4	31.0	31.0	23.3
600	0.167X	52.3	39.2	38.1	28.6	28.6	21.4
550	0.183X	47.7	35.8	34.7	26.1	26.1	19.6
500	0.203X	43.2	32.4	31.4	23.6	23.6	17.7
450	0.227X	38.6	29.0	28.1	21.1	21.1	15.8
400	0.257X	34.0	25.6	24.8	18.6	18.6	14.0
350	0.297X	29.5	22.1	21.5	16.1	16.1	12.1
300	0.352X	24.9	18.7	18.2	13.6	13.6	10.2
250	0.431X	20.4	15.3	14.8	11.1	11.1	8.4
200	0.558X	15.8	11.9	11.5	8.7	8.7	6.5
150	0.789X	11.3	8.5	8.2	6.2	6.2	4.6
140	0.861X	10.4	7.8	7.6	5.7	5.7	4.3



### 2X Converter



### 0.75X Converter

