MC3-03X | DATASHEET

OPTO ENGINEERING

Macro lens for 2/3" sensors, variable magnification from 0.1x to 3x, C-mount

REACH DOSSIER

KEY ADVANTAGES

Wide range of magnifications

The MC3-03X is suitable for the inspection of many different object sizes.

Nearly zero distortion

Less than 0.05% distortion, at any magnification, makes this lens a perfect choice for measurement applications.

Perfect optical parameters mix

Changing the magnification also changes the lens working F-number in such a way that resolution and distortion are always optimized.

MC3-03X is a multi-configuration macro lens suitable for the inspection of objects whose size varies from a few millimeters to some centimeters. Magnification and focus can be tuned by adjusting a lockable rotating knob.

SPECIFICATIONS

Optical specifications

Magnification range	(x)	0.1 - 3.0
Image circle	(mm)	11
Max sensor size		2/3"
Working distance at 0.1x[1]	(mm)	275
Working distance at 3.0x[1]	(mm)	28
Focal length	(mm)	28
f/*N*		5.3
w*f*/*N* at 0.1x[2]		6
w*f*/*N* at 3.0x[2]		21

Mechanical specifications

Mount		C
Phase adjustment		No
Length at 0.1x[6]	(mm)	50.8
Length at 3.0x[6]	(mm)	106.3
Front diameter	(mm)	28
Mass at 0.1x	(g)	64
Mass at 3.0x	(g)	124

[1] Working distance: distance between the front end of the mechanics and the object. Set this distance within $\pm 3\%$ of the nominal value for maximum resolution and minimum distortion.
[2] working *f*/*N*: the real *f*/*N* of a lens in operating conditions.
[3] Percent deviation of the real image compared to an ideal, undistorted image.
[4] At the borders of the field depth the image can be still used for measurement but, to get a very sharp image, only half of the nominal field depth should be considered. Pixel size used for calculation is 3.45 µm.
[5] Object side, calculated with the Rayleigh criterion with λ = 520 nm
[6] Measured from the front end of the mechanics to the camera flange.

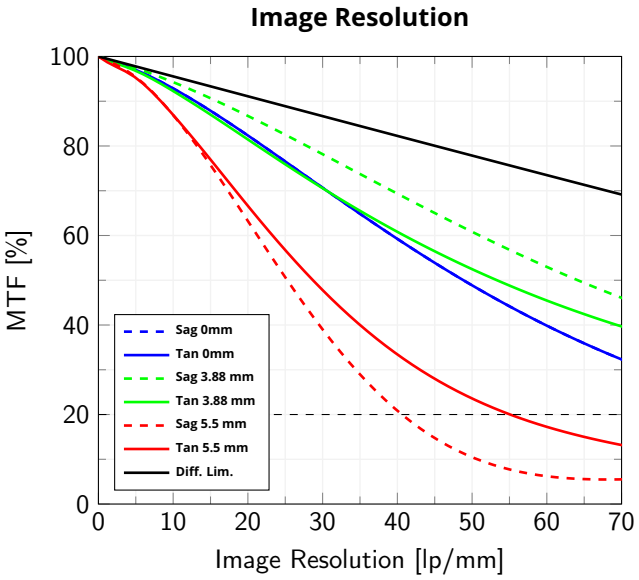
COMPATIBLE PRODUCTS

Full list of compatible products available *here*.

A wide selection of innovative machine vision components.

OPTICAL PARAMETERS							SENSOR FIELD OF VIEW		
Mag	Sp	WD[1]	wƒ/N[2]	Dist[3]	FD[4]	Res[5]	1/3" (4.80 x 3.60)	1/2" (6.40 x 4.80)	2/3" (8.50 x 7.09)
(x)		(mm)		(%)	(mm)	(µm)	(mm x mm)	(mm x mm)	(mm x mm)
0.1	0	275	6	< 0.10	31.1	38	48.00 x 36.00	64.00 x 48.00	85.00 x 70.90
0.2	0	136	6	< 0.10	7.8	19	24.00 x 18.00	32.00 x 24.00	42.50 x 35.45
0.3	0	92	7	< 0.08	4.0	15	16.00 x 12.00	21.33 x 16.00	28.33 x 23.63
0.4	0	71	7	< 0.05	2.3	11	12.00 x 9.00	16.00 x 12.00	21.25 x 17.73
0.5	0	60	8	< 0.04	1.7	10	9.60 x 7.20	12.80 x 9.60	17.00 x 14.18
0.6	0	54	9	< 0.03	1.3	10	8.00 x 6.00	10.67 x 8.00	14.17 x 11.82
0.7	0	50	9	< 0.03	1.0	8	6.86 x 5.14	9.14 x 6.86	12.14 x 10.13
0.8	0	47	10	< 0.02	0.8	8	6.00 x 4.50	8.00 x 6.00	10.63 x 8.86
0.9	0	46	10	< 0.01	0.6	7	5.33 x 4.00	7.11 x 5.33	9.44 x 7.88
1.0	0	46	11	< 0.01	0.6	7	4.80 x 3.60	6.40 x 4.80	8.50 x 7.09
0.7	1	31	9	< 0.03	1.0	8	6.86 x 5.14	9.14 x 6.86	12.14 x 10.13
0.8	1	29	10	< 0.02	0.8	8	6.00 x 4.50	8.00 x 6.00	10.63 x 8.86
0.9	1	28	10	< 0.01	0.6	7	5.33 x 4.00	7.11 x 5.33	9.44 x 7.88
1.0	1	27	11	< 0.01	0.6	7	4.80 x 3.60	6.40 x 4.80	8.50 x 7.09
1.1	1	28	11	< 0.01	0.5	6	4.36 x 3.27	5.82 x 4.36	7.73 x 6.45
1.2	1	28	12	< 0.01	0.4	6	4.00 x 3.00	5.33 x 4.00	7.08 x 5.91
1.3	1	29	12	< 0.01	0.4	6	3.69 x 2.77	4.92 x 3.69	6.54 x 5.45
1.4	1	31	13	< 0.01	0.3	6	3.43 x 2.57	4.57 x 3.43	6.07 x 5.06
1.5	1	32	13	< 0.01	0.3	5	3.20 x 2.40	4.27 x 3.20	5.67 x 4.73
1.6	1	34	14	< 0.01	0.3	6	3.00 x 2.25	4.00 x 3.00	5.31 x 4.43
1.4	2	12	13	< 0.02	0.3	6	3.43 x 2.57	4.57 x 3.43	6.07 x 5.06
1.5	2	14	13	< 0.02	0.3	5	3.20 x 2.40	4.27 x 3.20	5.67 x 4.73
1.6	2	15	14	< 0.02	0.3	6	3.00 x 2.25	4.00 x 3.00	5.31 x 4.43
1.7	2	17	14	< 0.02	0.3	5	2.82 x 2.12	3.76 x 2.82	5.00 x 4.17
1.8	2	19	15	< 0.02	0.2	5	2.67 x 2.00	3.56 x 2.67	4.72 x 3.94
1.9	2	21	15	< 0.02	0.2	5	2.53 x 1.89	3.37 x 2.53	4.47 x 3.73
2.0	2	23	16	< 0.02	0.2	5	2.40 x 1.80	3.20 x 2.40	4.25 x 3.55
2.1	2	25	16	< 0.02	0.2	5	2.29 x 1.71	3.05 x 2.29	4.05 x 3.38
2.2	2	27	17	< 0.02	0.2	5	2.18 x 1.64	2.91 x 2.18	3.86 x 3.22
2.3	2	30	18	< 0.02	0.2	5	2.09 x 1.57	2.78 x 2.09	3.70 x 3.08
2.1	3	7	16	< 0.02	0.2	5	2.29 x 1.71	3.05 x 2.29	4.05 x 3.38
2.2	3	9	17	< 0.02	0.2	5	2.18 x 1.64	2.91 x 2.18	3.86 x 3.22
2.3	3	11	18	< 0.02	0.2	5	2.09 x 1.57	2.78 x 2.09	3.70 x 3.08
2.4	3	14	18	< 0.02	0.2	5	2.00 x 1.50	2.67 x 2.00	3.54 x 2.95
2.5	3	16	19	< 0.02	0.2	5	1.92 x 1.44	2.56 x 1.92	3.40 x 2.84
2.6	3	18	19	< 0.02	0.1	5	1.85 x 1.38	2.46 x 1.85	3.27 x 2.73
2.7	3	21	20	< 0.02	0.1	5	1.78 x 1.33	2.37 x 1.78	3.15 x 2.63
2.8	3	23	20	< 0.02	0.1	5	1.71 x 1.29	2.29 x 1.71	3.04 x 2.53
2.9	3	26	21	< 0.02	0.1	5	1.66 x 1.24	2.21 x 1.66	2.93 x 2.44
3.0	3	28	21	< 0.02	0.1	4	1.60 x 1.20	2.13 x 1.60	2.83 x 2.36

MAGNIFICATION 0.1 x, 0 SPACER



Modulation Transfer Function (MTF) vs. Image Resolution, wavelength range 486 nm - 656 nm. Fields in legend are represented as distance from the center of the image

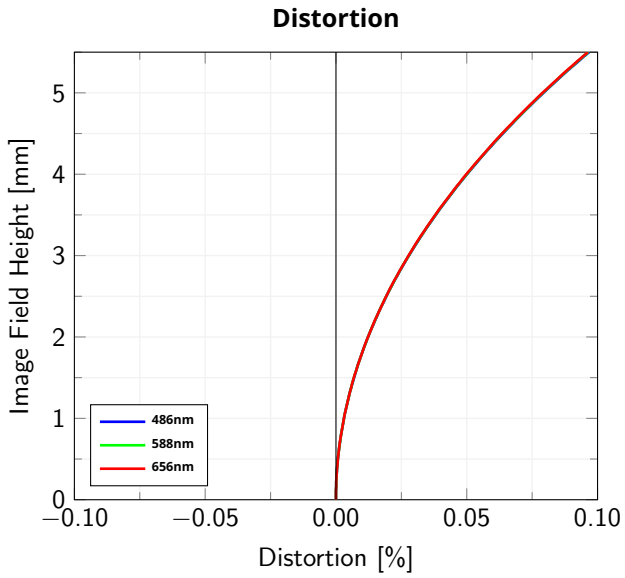
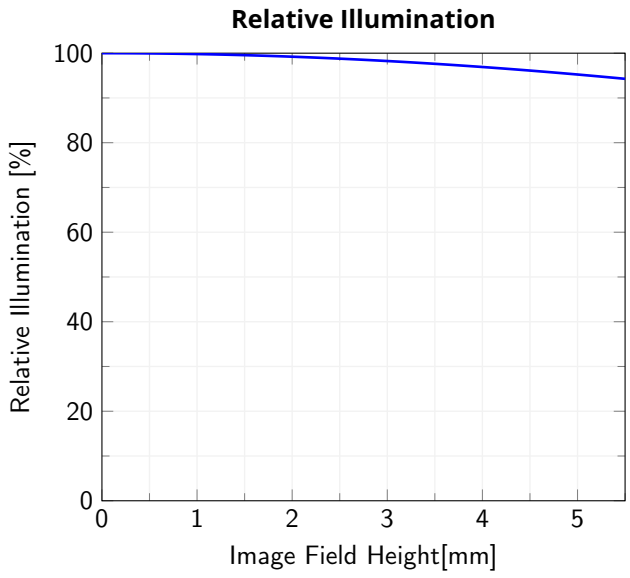
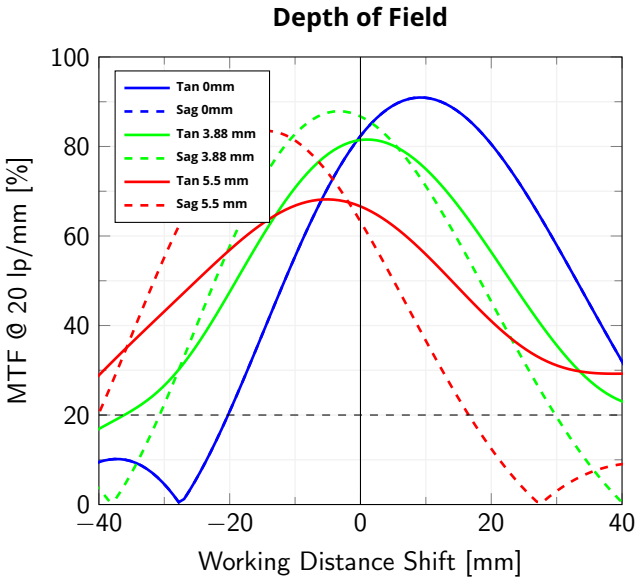


Image Field Height vs. Distortion, from the optical axis to the corner of the image

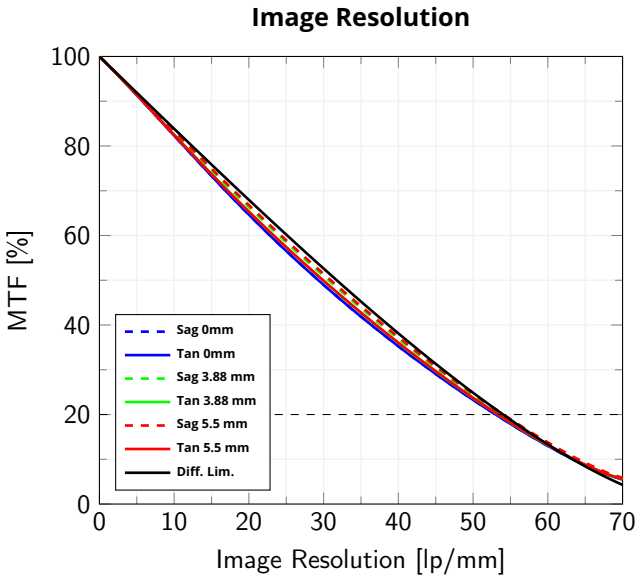


Relative illumination vs. Image Field Height, from the optical axis to the corner of the created image



Modulation Transfer Function (MTF) @ 20 lp/mm vs. Working Distance Shift from the best focus Working Distance, wavelength range 486 nm - 656 nm. Fields in legend are represented as distance from the center of the image

MAGNIFICATION 3.0 x, 3 SPACER



Modulation Transfer Function (MTF) vs. Image Resolution, wavelength range 486 nm - 656 nm. Fields in legend are represented as distance from the center of the image

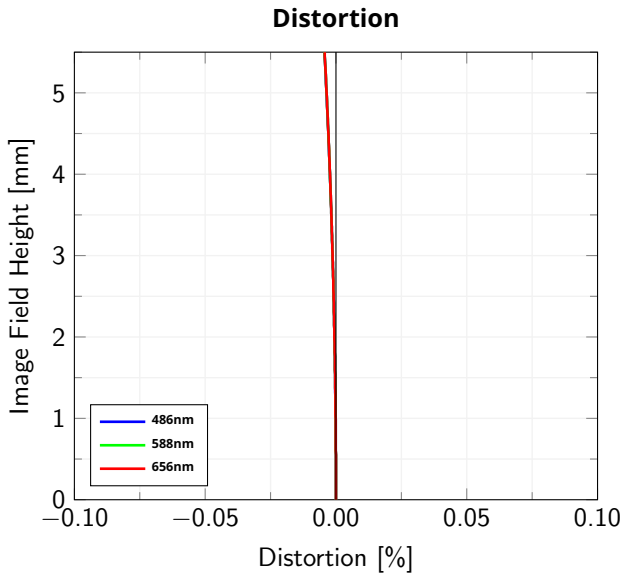
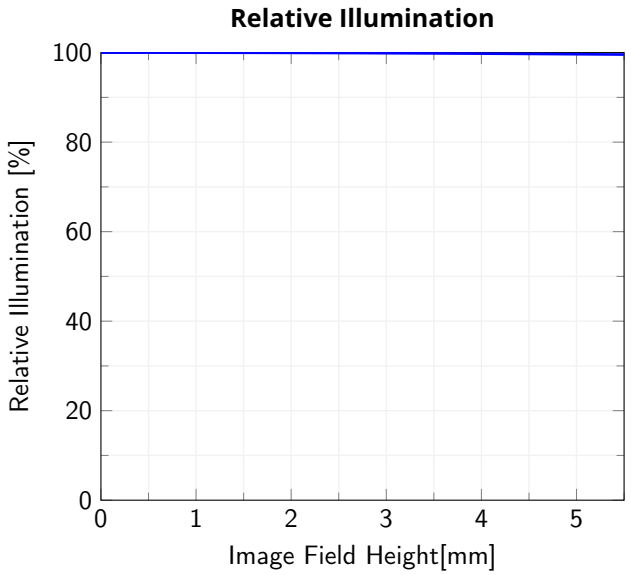
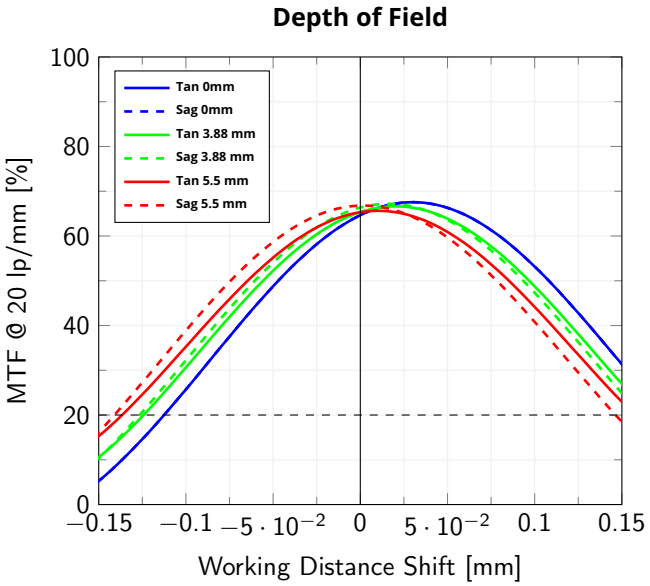


Image Field Height vs. Distortion, from the optical axis to the corner of the image



Relative illumination vs. Image Field Height, from the optical axis to the corner of the created image



Modulation Transfer Function (MTF) @ 20 lp/mm vs. Working Distance Shift from the best focus Working Distance, wavelength range 486 nm - 656 nm. Fields in legend are represented as distance from the center of the image