



# TC4MHRP009-C | DATASHEET

## High resolution telecentric lens for 4/3" detectors, magnification 2.000x, C mount



### KEY ADVANTAGES

- Wide image circle** for sensors up to 4/3".
- Excellent resolution and low distortion.**
- Simple and robust design** for industrial environments.
- Detailed **test report** with **certified optical parameters.**
- C, F M42X1 (-E) mount options Easy phase adjustment**

**TC4MHR series** are high resolution telecentric lenses designed for sensors up to 4/3" and is the perfect choice for advanced metrology applications.

### SPECIFICATIONS

#### Optical specifications

Magnification		2.000
Image circle	(mm)	22.0
Max sensor size		4/3"
Working distance <sup>2</sup>	(mm)	62.2
$wf/N$ <sup>3</sup>		16
Telecentricity typical (max) <sup>4</sup>	(°)	<0.08 (0.10)
Distortion typical (max) <sup>5</sup>	(%)	<0.08 (0.10)
Field depth <sup>6</sup>	(mm)	0.2
Resolution (max) <sup>7</sup>	(µm)	5

#### Mechanical specifications

Mount		C
Phase adjustment <sup>8</sup>		Yes
Length <sup>9</sup>	(mm)	111.6
Front diameter	(mm)	28.0
Mass	(g)	227

### FIELD OF VIEW

Sensors	(mm x mm)
1" (14.19 x 7.51 mm x mm)	7.09 x 3.75
1.1" (14.16 x 10.37 mm x mm)	7.08 x 5.18
4/3" (18.93 x 10.61 mm x mm) <sup>1</sup>	9.46 x 5.30

- <sup>1</sup> With IMX387 (21.7 mm diagonal) sensors, the FOV may show some vignetting at the image corners.
- <sup>2</sup> 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.
- <sup>3</sup> working  $f/N$ : the real  $f/N$  of a lens in operating conditions.
- <sup>4</sup> Maximum angle between chief rays and optical axis on the object side. Typical (average production) values and maximum (guaranteed) values are listed.
- <sup>5</sup> Percent deviation of the real image compared to an ideal, undistorted image. Typical (average production) values and maximum (guaranteed) values are listed.
- <sup>6</sup> 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.
- <sup>7</sup> Object side, calculated with the Rayleigh criterion with  $\lambda = 520$  nm
- <sup>8</sup> Indicates the availability of an integrated camera phase adjustment feature.
- <sup>9</sup> Measured from the front end of the mechanics to the camera flange.

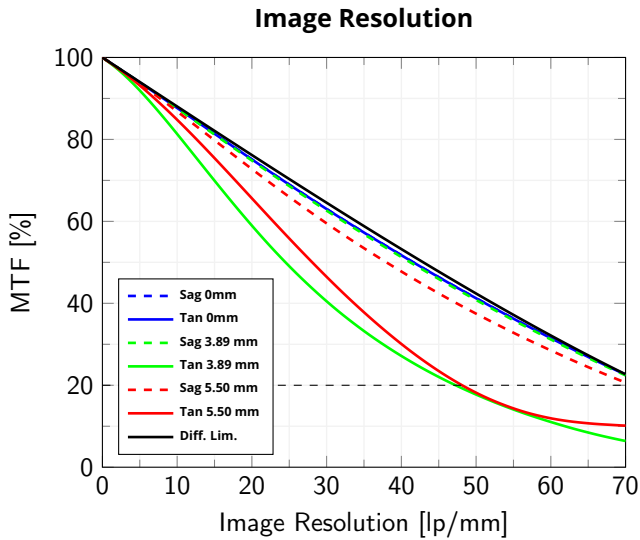
### COMPATIBLE PRODUCTS

Full list of compatible products available [here](#).

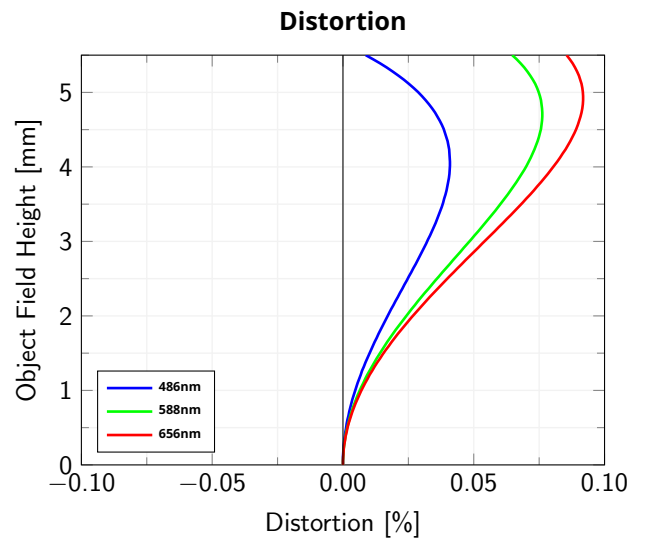


A wide selection of innovative machine vision components.

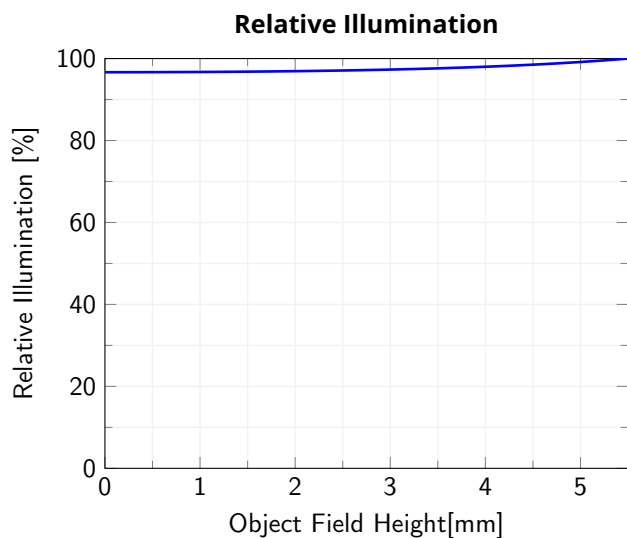
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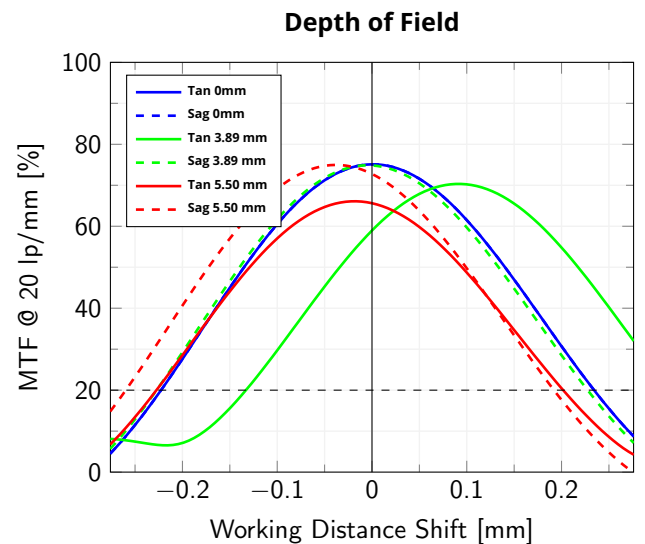
Modulation Transfer Function (MTF) vs. Image Resolution, wavelength range 486 nm - 656 nm



Object Field Height vs. Distortion, from the optical axis to the corner of the field of view



Relative illumination vs. Object Field Height, from the optical axis to the corner of the field of view



Modulation Transfer Function (MTF) @ 20 lp/mm vs. Working Distance Shift from the best focus Working Distance, wavelength range 486 nm - 656 nm

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