

TCDP2MC4XC096 | DATASHEET

Bi-telecentric lens for 1" detectors, magnification 0.137x, C mount



SPECIFICATIONS

Optical specifications straight ocular

Magnification		0.137
Image circle	(mm)	16
Max sensor size		1"
Working distance ²	(mm)	278.6
wf/N ³		16
Telecentricity typical (max) ⁴	(°)	< 0.05 (0.10)
Distortion typical (max) ⁵	(%)	< 0.07 (0.10)
Field depth ⁶	(mm)	44.12
Resolution (max) ⁷	(μ m)	74

Optical specifications right angled ocular

Magnification		0.374
Image circle	(mm)	11
Max sensor size		2/3"
Working distance ²	(mm)	278.6
wf/N ³		12
Telecentricity typical (max) ⁴	(°)	< 0.08 (0.10)
Distortion typical (max) ⁵	(%)	< 0.08 (0.10)
Field depth ⁶	(mm)	4.44
Resolution (max) ⁷	(μ m)	20

¹ With IMX387 (21.7 mm diagonal) sensors, the FOV of TC4MHRyyy-x lenses may show some vignetting at the image corners.

² 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.

³ Working f/N : the real f/N of a lens in operating conditions.

KEY ADVANTAGES

Perfect measurement accuracy

TCDP PLUS telecentric lenses produce two images at different magnifications to cover an extended range of your product dimensions with the same accuracy.

Smart cost reduction

Solving two vision tasks with one lens involves less components and lowers the vision system cost.

Detailed test report with measured optical parameters.

TCDP PLUS series are dual magnification telecentric lenses supporting two cameras to measure objects with different magnifications.

Mechanical specifications

Mount		C
Phase adjustment ⁸		Yes
Length ⁹	(mm)	366.2
H1 ¹⁰	(mm)	192.1
Front diameter	(mm)	143.0
Mass	(g)	3025

⁴ Maximum angle between chief rays and optical axis on the object side. Typical (average production) values and maximum (guaranteed) values are listed.

⁵ Percent deviation of the real image compared to an ideal, undistorted image. Typical (average production) values and maximum (guaranteed) values are listed.

⁶ 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 μ m.

⁷ Object side, calculated with the Rayleigh criterion with $\lambda = 520$ nm

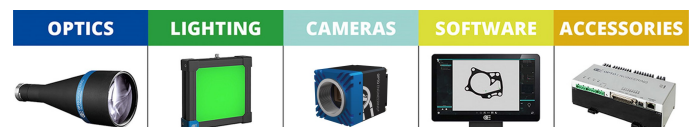
⁸ Indicates the availability of an integrated camera phase adjustment feature.

⁹ Measured from the front end of the mechanics to the camera flange.

¹⁰ Right angled ocular length, measured from the optical axis of the frontal lens to the camera flange

COMPATIBLE PRODUCTS

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



A wide selection of innovative machine vision components.

FIELD OF VIEW STRAIGHT OCULAR

Sensors ¹	(mm x mm)
1/2" (6.40 x 4.80 mm x mm)	46.72 x 35.04
2/3" (8.50 x 7.09 mm x mm)	62.04 x 51.75
1" (14.19 x 7.51 mm x mm)	103.58 x 54.82
4/3" (18.93 x 10.61 mm x mm)	-

FIELD OF VIEW RIGHT ANGLED OCULAR

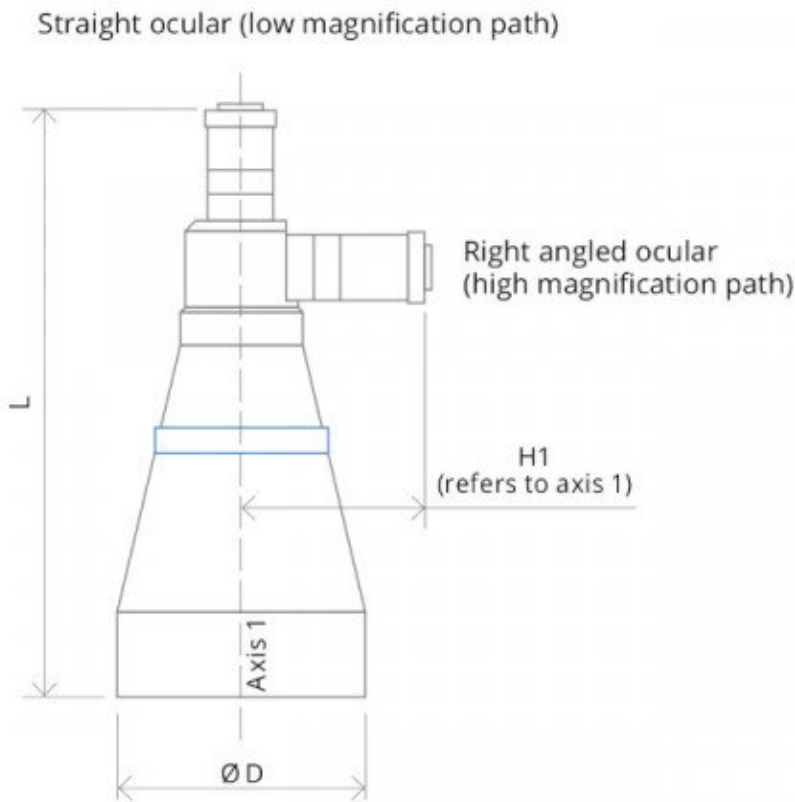
Sensors ¹	(mm x mm)
1/2" (6.40 x 4.80 mm x mm)	17.11 x 12.83
2/3" (8.50 x 7.09 mm x mm)	22.73 x 18.96
1" (14.19 x 7.51 mm x mm)	-
4/3" (18.93 x 10.61 mm x mm)	-

TCDP PLUS LENS DIMENSIONS

L = length of the lens from the front end to its straight ocular (low magnification path).

H1 = distance from the end of the right angled ocular (high magnification path) to the middle of the lens (axis 1).

D = lens diameter

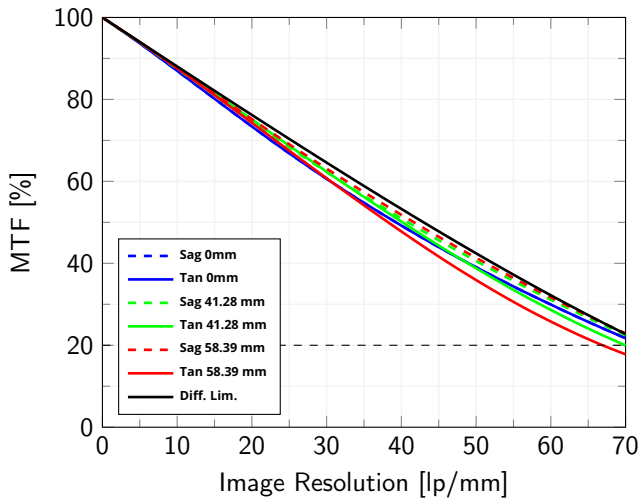


Dimensions of a TCDP PLUS lens.

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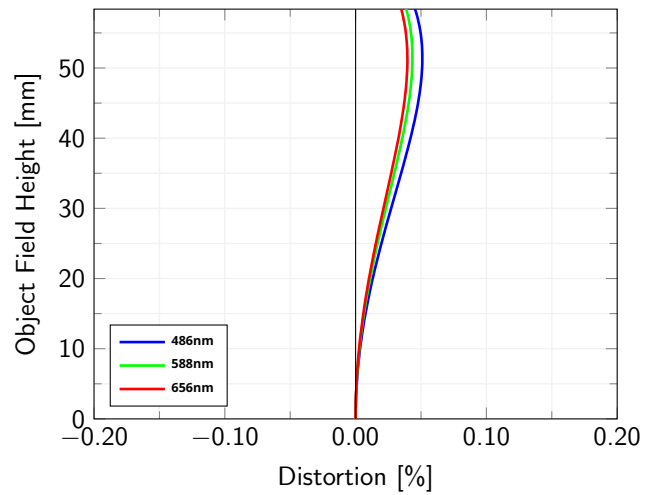
STRAIGHT OCULAR PERFORMANCE

Image Resolution



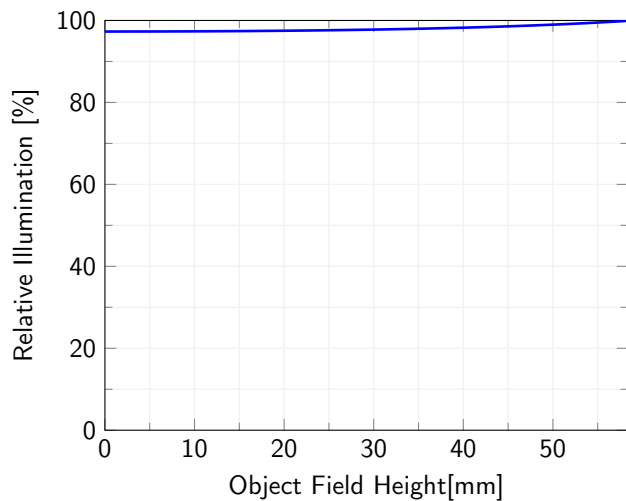
Modulation Transfer Function (MTF) vs. Image Resolution, wavelength range 486 nm - 656 nm

Distortion



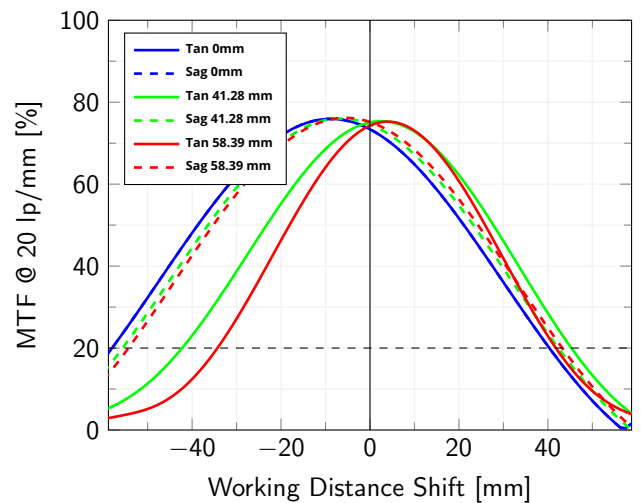
Object Field Height vs. Distortion, from the optical axis to the corner of the field of view

Relative Illumination



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

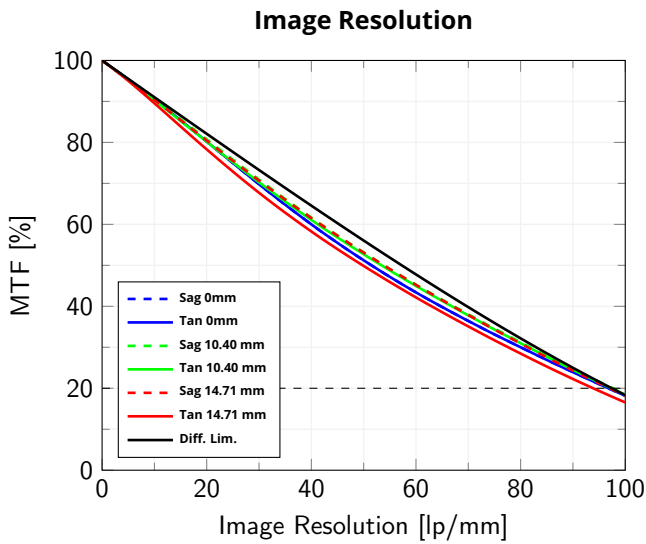
Depth of Field



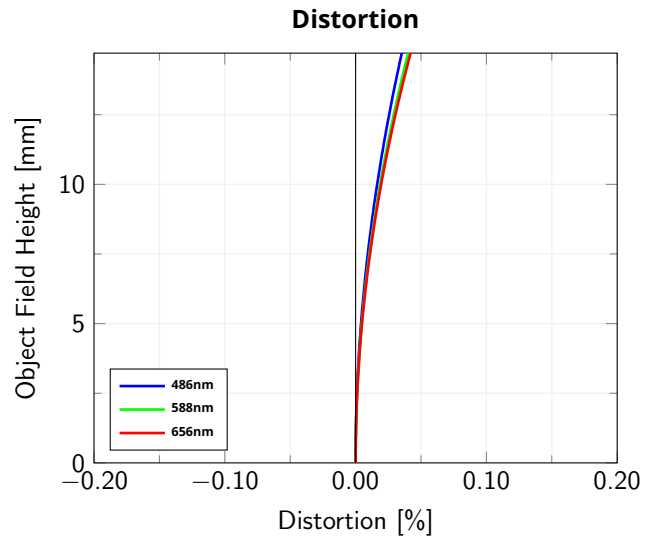
Modulation Transfer Function (MTF) @ 20 lp/mm vs. Working Distance Shift from the best focus Working Distance, wavelength range 486 nm - 656 nm

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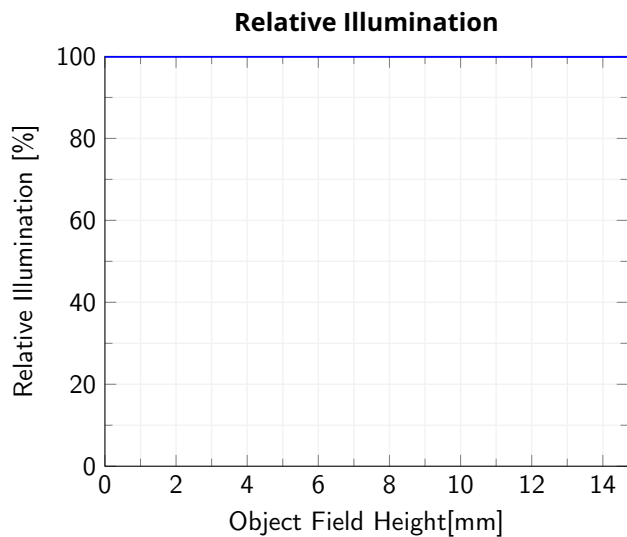
RIGHT ANGLED OCULAR OCULAR PERFORMANCE



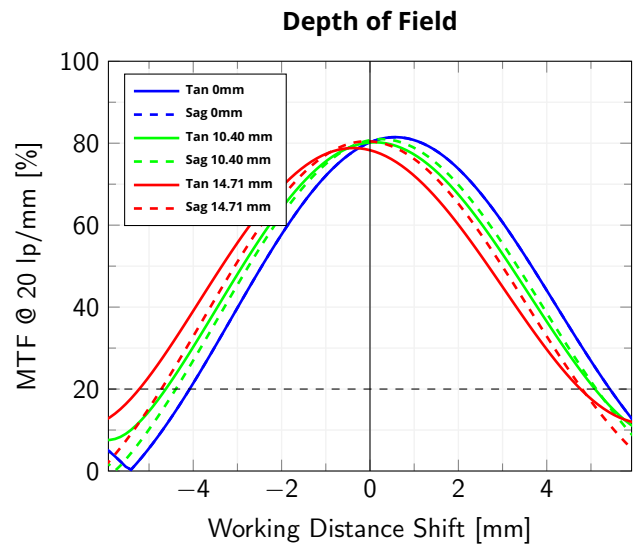
Modulation Transfer Function (MTF) vs. Image Resolution, wavelength range 486 nm - 656 nm



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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