TCSM056 | DATASHEET

OPTO ENGINEERING

Bi-telecentric lens fi 2/3"detectors, mag. 0.157x, C-mount, Scheimpflug adjustment

REACH DOSSIER

KEY ADVANTAGES

Scheimpflug tilt adjustment
No other lens can perform oblique measurements
The image is radially undistorted
Linear extension can be perfectly calibrated
Compatible with any C-mount cameras
C-mount standard compliant
Detailed test report with measured optical parameters

TCSM series is a unique family of bi-telecentric lenses for extremely accurate 3D dimensional measurement systems. All TCSM lenses are equipped with a high-precision Scheimpflug adjustment mechanism that fits any type of C-mount camera.

SPECIFICATIONS

Optical specifications

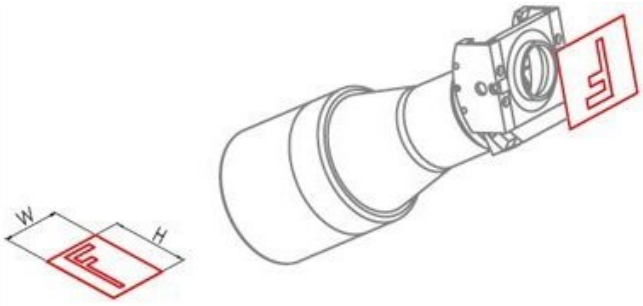
Max sensor size		2/3"
Working distance[1]	(mm)	157.8
wf/N[2]		8
Telecentricity typical (max)[3]	(°)	< 0.05 (0.08)
Distortion typical (max)[4]	(%)	< 0.03 (0.08)

Mechanical specifications

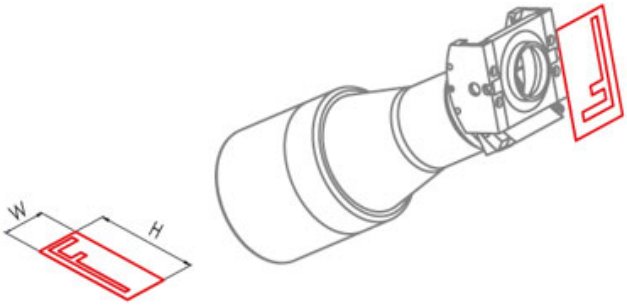
Mount		C
Max mount tilt	(°)	20
Phase adjustment[5]		Yes
Length[6]	(mm)	224.4
Front diameter	(mm)	80.0
Mass	(g)	1021

[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] Maximum angle between chief rays and optical axis on the object side calculated at 588nm
[4] Percent deviation of the real image compared to an ideal, undistorted image: typical (average production) values and maximum (guaranteed) values are listed.
[5] Indicates the availability of an integrated camera phase adjustment feature.
[6] Measured from the front end of the mechanics to the camera flange.

VISUALISING TCSM FIELD OF VIEW



Field of View with detector's long side set horizontal



Field of View with detector's long side set vertical

COMPATIBLE PRODUCTS

Full list of compatible products available *here*.

A wide selection of innovative machine vision components.

OBJECT TILT 0°

Mount tilt	(°)	0
Horizontal magnification	(x)	0.157
Vertical magnification	(x)	0.157

LONG DETECTOR SIDE HORIZONTAL - FIELD OF VIEW

Sensors	(mm x mm)
1/3" (4.8 x 3.6 mm)	30.57 x 22.93
1/2.5" (5.70 x 4.28 mm)	36.31 x 27.26
1/2" (6.4 x 4.8 mm)	40.76 x 30.57
1/1.8" (7.13 x 5.33 mm)	45.41 x 33.95
2/3" (8.50 x 7.09 mm)	54.14 x 45.16

LONG DETECTOR SIDE VERTICAL - FIELD OF VIEW

Sensors	(mm x mm)
1/3" (4.8 x 3.6 mm)	22.93 x 30.57
1/2.5" (5.70 x 4.28 mm)	27.26 x 36.31
1/2" (6.4 x 4.8 mm)	30.57 x 40.76
1/1.8" (7.13 x 5.33 mm)	33.95 x 45.41
2/3" (8.50 x 7.09 mm)	45.16 x 54.14

OBJECT TILT 15°

Mount tilt	(°)	2.4
Horizontal magnification	(x)	0.157
Vertical magnification	(x)	0.152

LONG DETECTOR SIDE HORIZONTAL - FIELD OF VIEW

Sensors	(mm x mm)
1/3" (4.8 x 3.6 mm)	30.57 x 23.68
1/2.5" (5.70 x 4.28 mm)	36.31 x 28.16
1/2" (6.4 x 4.8 mm)	40.76 x 31.58
1/1.8" (7.13 x 5.33 mm)	45.41 x 35.07
2/3" (8.50 x 7.09 mm)	54.14 x 46.64

LONG DETECTOR SIDE VERTICAL - FIELD OF VIEW

Sensors	(mm x mm)
1/3" (4.8 x 3.6 mm)	22.93 x 31.58
1/2.5" (5.70 x 4.28 mm)	27.26 x 37.50
1/2" (6.4 x 4.8 mm)	30.57 x 42.11
1/1.8" (7.13 x 5.33 mm)	33.95 x 46.91
2/3" (8.50 x 7.09 mm)	45.16 x 55.92

OBJECT TILT 30°

Mount tilt	(°)	5.1
Horizontal magnification	(x)	0.157
Vertical magnification	(x)	0.137

LONG DETECTOR SIDE HORIZONTAL - FIELD OF VIEW

Sensors	(mm x mm)
1/3" (4.8 x 3.6 mm)	30.57 x 26.28
1/2.5" (5.70 x 4.28 mm)	36.31 x 31.24
1/2" (6.4 x 4.8 mm)	40.76 x 35.04
1/1.8" (7.13 x 5.33 mm)	45.41 x 38.91
2/3" (8.50 x 7.09 mm)	54.14 x 46.64

LONG DETECTOR SIDE VERTICAL - FIELD OF VIEW

Sensors	(mm x mm)
1/3" (4.8 x 3.6 mm)	22.93 x 35.04
1/2.5" (5.70 x 4.28 mm)	27.26 x 41.61
1/2" (6.4 x 4.8 mm)	30.57 x 46.72
1/1.8" (7.13 x 5.33 mm)	33.95 x 52.04
2/3" (8.50 x 7.09 mm)	45.16 x 55.92

OBJECT TILT 45°

Mount tilt	(°)	8.8
Horizontal magnification	(x)	0.157
Vertical magnification	(x)	0.112

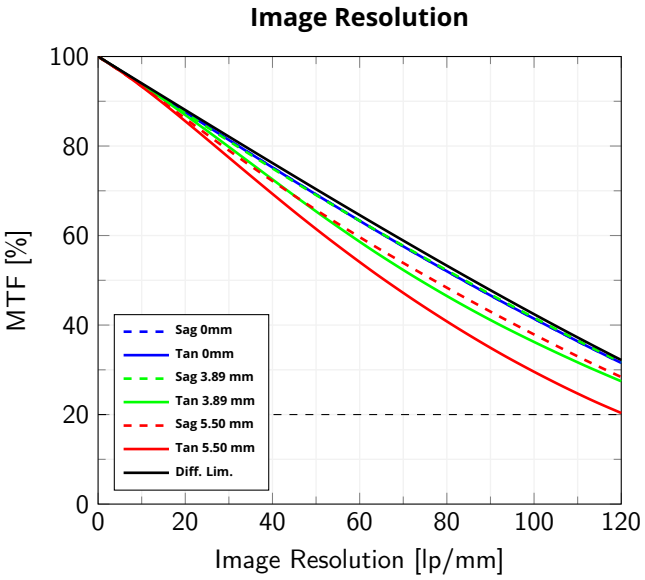
LONG DETECTOR SIDE HORIZONTAL - FIELD OF VIEW

Sensors	(mm x mm)
1/3" (4.8 x 3.6 mm)	30.57 x 32.14
1/2.5" (5.70 x 4.28 mm)	36.31 x 38.21
1/2" (6.4 x 4.8 mm)	40.76 x 42.86
1/1.8" (7.13 x 5.33 mm)	45.41 x 47.59
2/3" (8.50 x 7.09 mm)	54.14 x 46.64

LONG DETECTOR SIDE VERTICAL - FIELD OF VIEW

Sensors	(mm x mm)
1/3" (4.8 x 3.6 mm)	22.93 x 42.86
1/2.5" (5.70 x 4.28 mm)	27.26 x 50.89
1/2" (6.4 x 4.8 mm)	30.57 x 57.14
1/1.8" (7.13 x 5.33 mm)	33.95 x 63.66
2/3" (8.50 x 7.09 mm)	45.16 x 55.92

DATA AT OBJECT TILT 0°



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

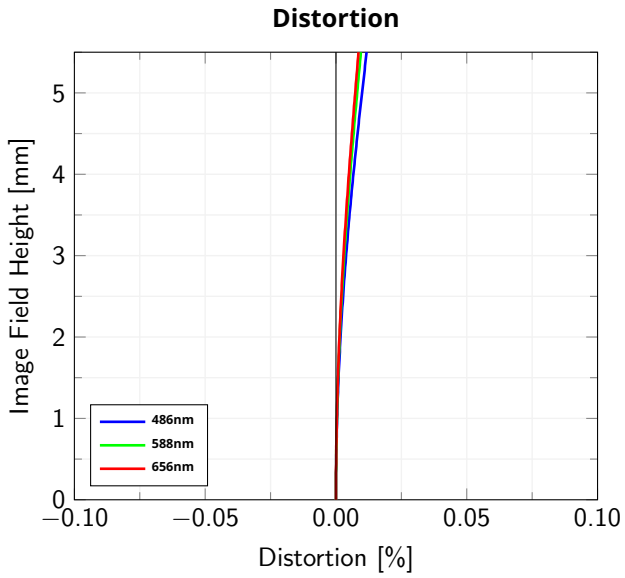
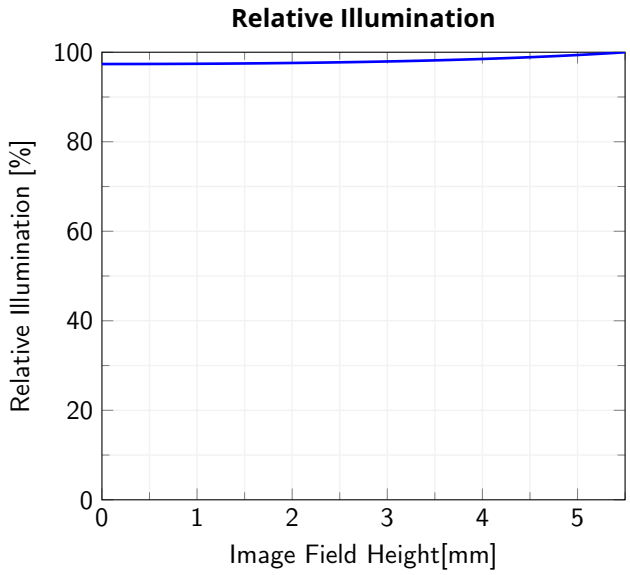
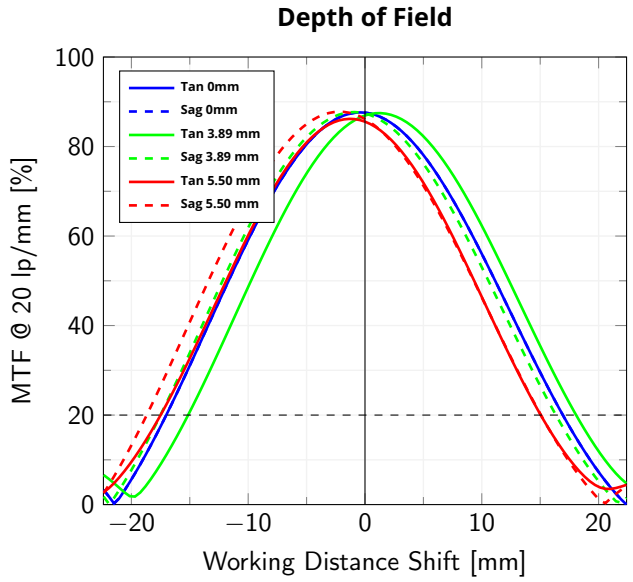


Image Field Height vs. Distortion, from the optical axis to the corner of the image



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