

# TCCR4M096-F

Telecentric CORE lens for 4/3" detectors, magnification 0.186 x, F-mount

## SPECIFICATIONS

Part number	TCCR4M096-F	
Magnification	(x)	0.186
Image shape dimension (8)	( $\emptyset$ , x mm)	$\emptyset=22.5$ , x=18.6
Phase adjustment (7)	Yes	

### Object field of view 7

with IMX174/IMX249 13.3 mm diag w x h 11.35 x 7.13	(mm x mm)	60.8 x 38.2
with KAI-2020 14.8 mm diagonal w x h 11.84 x 8.88	(mm x mm)	63.5 x 47.6
with IMX253/IMX304 17.6 mm diag w x h 14.16 x 10.37	(mm x mm)	76.3 x 55.9
with KAI-4022/4021 21.5 mm diagonal w x h 15.2 x 15.2	(mm x mm)	81.7 x 81.7
with KAI-08050 22.6 mm diagonal w x h 18.1 x 13.6	(mm x mm)	97.3 x 73.1

### Optical specifications

Working distance (1)	(mm)	278.6
wF/# (2)	16	
Telecentricity typical (max) (3)	(deg)	< 0.05 (0.10)
Distortion typical (max) (4)	(%)	< 0.04 (0.10)
Field depth (5)	(mm)	38.2
CTF@ 50 lp/mm	(%)	> 35

### Mechanical specifications

Mount (6)	F	
A	(mm)	139
B	(mm)	175
C	(mm)	225
Mass	(g)	4441

### Compatibility

LTCLCR096-x, CMHOCR096, CMPTR096, LTCLHP096-x

Last update: 2019-05-10

## NOTES

- Working distance: distance between the front end of the mechanics and the object. Set this distance within +/- 3% of the nominal value for maximum resolution and minimum distortion.
- Working F-number (wF/#): the real F-number of a lens when used as a macro. Lenses with smaller apertures can be supplied on request.
- Maximum slope of chief rays inside the lens: when converted to milliradians, it gives the maximum measurement error for any millimeter of object displacement. Typical (average production) values and maximum (guaranteed) values are listed.
- Percent deviation of the real image compared to an ideal, undistorted image: typical (average production) values and maximum (guaranteed) values are listed.
- At the borders of the field depth the image can be still used for measurement but, to get a perfectly sharp image, only half of the nominal field depth should be considered. Pixel size used for calculation is 5.5  $\mu$ m.
- In case the of vignetting, FOV dimensions are indicated with " $\emptyset$  = , x = ", where " $\emptyset$  =" stands for diameter and "x=" indicates the nominal FOV height and length (see [Tech Info](#) for related drawing).
- Indicates the availability of an integrated camera phase adjustment feature.
- Indicates the dimensions and shape of image, where " $\emptyset$  =" stands for diameter and "x=" indicates the nominal image height and length (see [Tech Info](#) for related drawing)

## COMPATIBLE PRODUCTS

Despite the efforts made to generate an error-free compatibility list, we always recommend to consult the Opto Engineering® technical support department before purchasing a compatible product. Opto Engineering® shall not be liable for any damage or malfunctioning caused by the incorrect selection of a compatible product.

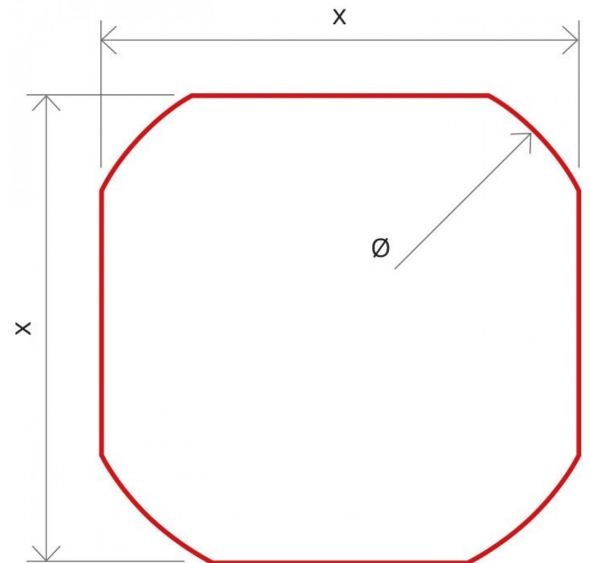


Image shape dimensions ( $\emptyset$ , x)

All product specifications and data are subject to change without notice to improve reliability, functionality, design or other. Photos and pictures are for illustration purposes only.



### LTCLHP series

High-performance telecentric illuminators

LTCLHP096-G	Telecentric HP illuminator, beam diameter 120 mm, green
LTCLHP096-R	Telecentric HP illuminator, beam diameter 120 mm, red
LTCLHP096-B	Telecentric HP illuminator, beam diameter 120 mm, blue
LTCLHP096-W	Telecentric HP illuminator, beam diameter 120 mm, white



### LTCLHP CORE series

Ultra compact telecentric illuminators

LTCLCR096-R	Telecentric CORE illuminator, beam dimensions $\varnothing = 120$ ; x = 99, red
LTCLCR096-G	Telecentric CORE illuminator, beam dimensions $\varnothing = 120$ ; x = 99, green
LTCLCR096-W	Telecentric CORE illuminator, beam dimensions $\varnothing = 120$ ; x = 99, white



### LTBC series

Continuous LED backlight

LTBC174174-W	Continuous LED backlight, 174x174 illumination area, white
LTBC174174-G	Continuous LED backlight, 174x174 illumination area, green



### CMHOCR series

Clamping mechanics CORE series

CMHOCR096	Clamping mechanics for CORE telecentric lenses and illuminators TCCRxx96 and LTCLCR096-x
-----------	--



### CMPTCR series

CORE series mounting plates

CMPTCR096	Mechanical components designed for CORE telecentric lenses and illuminators $\varnothing 96$ mm
-----------	---



### CMT series

Precision alignment mechanics

CMTHCR096	Precision alignment mechanics for CORE telecentric optics 096
-----------	---



### mvBlueFOX3-2 series

USB3 vision camera with Sony Pregius CMOS sensors

RT-mvBF3-2089a	USB3 Vision camera with Sony Pregius CMOS sensor IMX267
RT-mvBF3-2089	USB3 Vision camera with Sony Pregius CMOS sensor IMX255
RT-mvBF3-2124a	USB3 Vision camera with Sony Pregius CMOS sensor IMX304
RT-mvBF3-2124	USB3 Vision camera with Sony Pregius CMOS sensor IMX253



### mvBlueCOUGAR series

GigE & Dual GigE Vision cameras

RT-mvBC-X109b	Camera with interface GigE (1GB/s), sensor size 1", mpixel 8.95, resolution 4112 x 2176, sensor name IMX267, sensor type CMOS
RT-mvBC-XD109b	Camera with interface Dual GigE (2GB/s), sensor size 1", mpixel 8.95, resolution 4112 X 2176, sensor name IMX267, sensor type CMOS
RT-mvBC-X1012b	Camera with interface GigE (1GB/s), sensor size 1.1", mpixel 12.37, resolution 4112 x 3008, sensor name IMX304, sensor type CMOS
RT-mvBC-XD107	Camera with interface Dual GigE (2GB/s), sensor size 1.1", mpixel 7.1, resolution 3216 x 2208, sensor name IMX420, sensor type CMOS
RT-mvBC-XD1012b	Camera with interface Dual GigE (2GB/s), sensor size 1.1", mpixel 12.37, resolution 4112 x 3008, sensor name IMX304, sensor type CMOS



### TCLIB Suite

Software library & stand-alone tools for the optimization of telecentric setups

---

TCLIB-01 Software library & stand-alone tools for the optimization of telecentric setups

---



COE HR AS-X series

20MP, 26MP and 29MP area scan cameras for high-speed applications

---

[COE-200-M-POE-070-IR-C](#) HR Area Scan camera IMX183, CMOS, Rolling shutter, 5472 × 3648, 20.4 MP, 2.4 pix, 1", Gray, GigE, 6 fps, POE, C - mount, Glass filter

---

[COE-200-C-POE-070-IR-C](#) HR Area Scan camera IMX183, CMOS, Rolling shutter, 5472 × 3648, 20.4 MP, 2.4 pix, 1", Color, GigE, 6 fps, POE, C - mount, Infrared cut filter

---

[COE-200-M-USB-070-IR-C](#) HR Area Scan camera IMX183, CMOS, Rolling shutter, 5472 × 3648, 20.4 MP, 2.4 pix, 1", Gray, 14 fps, C - mount, Glass filter

---

[COE-200-C-USB-070-IR-C](#) HR Area Scan camera IMX183, CMOS, Rolling shutter, 5472 × 3648, 20.4 MP, 2.4 pix, 1", Color, 14 fps, C - mount, Infrared cut filter

---