

# TC12192

Bi-telecentric lens for 1/2" detectors, magnification 0.033 x, C-mount

## SPECIFICATIONS

Magnification	(x)	0.033
Image circle Ø	(mm)	8.0

### Object field of view(8)

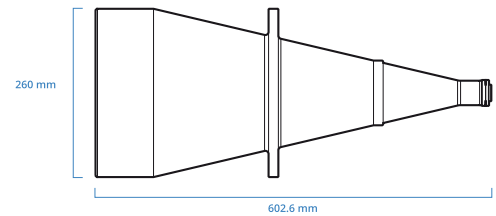
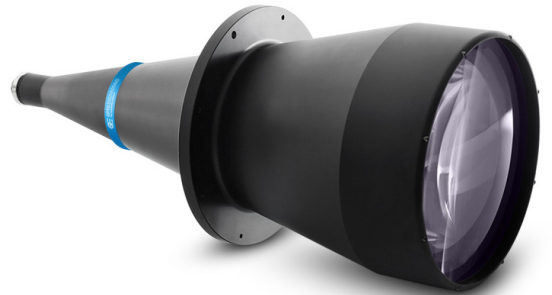
with 1/3" detector (4.8 x 3.6 mm)	(mm x mm)	145.45 x 109.09
with 1/2.5" detector (5.70 x 4.28 mm)	(mm x mm)	172.73 x 129.70
with 1/2" detector (6.4 x 4.8 mm)	(mm x mm)	193.94 x 145.45
with 1/1.8" detector (7.13 x 5.37 mm) (7)	(mm x mm)	216.06 x 161.52
with 2/3" - 5 MP detector (8.45 x 7.07 mm)	(mm x mm)	∅ = 214.8

### Optical specifications

Working distance (1)	(mm)	526.9
wF/# (2)		8
Telecentricity typical (max) (3)	(deg)	< 0.06 (0.08)
Distortion typical (max) (4)	(%)	< 0.04 (0.08)
Field depth (5)	(mm)	603
CTF @ 70 lp/mm	(%)	> 45

### Dimensions

Mount		C
Phase Adjustment (9)		Yes
Length (6)	(mm)	602.6
Diameter	(mm)	260
Mass	(g)	11300



## NOTES

1. 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.
2. Working F-number (higher wF/#): the real F-number of a lens when used as a macro. Lenses with smaller apertures can be supplied on request.
3. Maximum slope of chief rays inside the lens: when converted to millirad, it gives the maximum measurement error for any millimeter of object displacement. Typical (average production) values and maximum (guaranteed) values are listed.
4. Percent deviation of the real image compared to an ideal, undistorted image: typical (average production) values and maximum (guaranteed) values are listed.
5. 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 5.5 µm.
6. Measured from the front end of the mechanics to the camera flange.
7. With 1/1.8" (8.9 mm diagonal) detectors, the FOV of TC12yyy lenses may show some vignetting at the image corners, as these lenses are optimized for 1/2" detectors (8 mm diagonal).
8. For the fields with the indication "∅ =", the image of a circular object of such diameter is fully inscribed into the detector.
9. Indicates the availability of an integrated camera phase adjustment feature. If missing, it can be supplied upon request (except for TC23004, TC23007, TC23009, TC23012).

## 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.



LTCLHP series

High-performance telecentric illuminators

<a href="#">LTCLHP192-G</a>	Telecentric HP illuminator, beam diameter 250 mm, green
<a href="#">LTCLHP192-W</a>	Telecentric HP illuminator, beam diameter 250 mm, white



CMHO series

Clamping mechanics

<a href="#">CMHO192R</a>	Clamping mechanics for TCxx192 lenses and LTCLHP192-X illuminators rotation type
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PTTC, PTCP series

Accurate calibration patterns for machine vision systems

<a href="#">PT120-240</a>	Calibration pattern
<a href="#">PT192-240</a>	Calibration pattern for telecentric lenses
<a href="#">PT192-240-C</a>	Calibration pattern for telecentric lenses with a certificate of conformity



Accessories

Accessories and add-ons to make the most of Opto Engineering lenses.

<a href="#">TCFILTER</a>	Filter mount for telecentric lenses
<a href="#">RT-mvBC-X104iC</a>	CMOS camera GIGE, 2064 x 1544 color, 1/1.8", 37 Hz, IR cut, C-mount, I/O
<a href="#">RT-mvBC-X105bC</a>	CMOS camera GIGE, 2464 x 2056 Colour sensor, 2/3", 23.5 Hz, IR cut, C-mount, I/O



LTPR series

LED patterns projectors

<a href="#">LTPRHP3W-W</a>	LED pattern projector 3W, HP, white
<a href="#">LTPRHP3W-R</a>	LED pattern projector 3W, HP, red
<a href="#">LTPRHP3W-G</a>	LED pattern projector 3W, HP, green
<a href="#">LTPRHP3W-B</a>	LED pattern projector 3W, HP, blue
<a href="#">LTPRUP-W</a>	90W strobed LED pattern projector white
<a href="#">LTPRUP-R</a>	90W strobed LED pattern projector red
<a href="#">LTPRUP-G</a>	90W strobed LED pattern projector green
<a href="#">LTPRUP-B</a>	90W strobed LED pattern projector blue



COE-G series

GeniCam® PoE cameras

<a href="#">COE-050-M-POE-023-IR-C</a>	Area Scan camera MT9P031, CMOS, Rolling shutter, 2592 x 1944, 5 MP, 2.2 pix, 1/2.5", Gray, 14 fps, GigE, POE, C - mount, Glass filter
<a href="#">COE-013-M-POE-030-IR-C</a>	Area Scan camera PYTHON 1300, CMOS, Global shutter, 1280 x 1024, 1.3 MP, 4.8 pix, 1/2", Gray, 90 fps, GigE, POE, C - mount, Glass filter
<a href="#">COE-013-C-POE-030-IR-C</a>	Area Scan camera PYTHON 1300, CMOS, Global shutter, 1280 x 1024, 1.3 MP, 4.8 pix, 1/2", Color, 90 fps, GigE, POE, C - mount, Infrared cut filter
<a href="#">COE-106-M-POE-031-IR-C-2</a>	Area Scan camera MT9J003, CMOS, Rolling shutter, 3840 x 2748, 10.6 MP, 1.67 pix, 1/2.3", Gray, 11 fps, GigE, POE, C - mount, Glass filter
<a href="#">COE-106-C-POE-031-IR-C</a>	Area Scan camera MT9J003, CMOS, Global shutter, 3840 x 2748, 10.6 MP, 1.67 pix, 1/2.3", Color, 7 fps, GigE, POE, C - mount, Infrared cut filter
<a href="#">COE-032-M-POE-040-IR-C</a>	Area Scan camera IMX265, CMOS, Global shutter, 2048 x 1536, 3.1 MP, 3.45 pix, 1/1.8", Gray, 37.5 fps, GigE, POE, C - mount, Glass filter
<a href="#">COE-032-C-POE-040-IR-C</a>	Area Scan camera IMX265, CMOS, Global shutter, 2048 x 1536, 3.1 MP, 3.45 pix, 1/1.8", Color, 37.5 fps, GigE, POE, C - mount, Infrared cut filter
<a href="#">COE-063-M-POE-040-IR-C-B</a>	Area Scan camera IMX178, CMOS, Rolling shutter, 3072 x 2048, 6.3 MP, 2.4 pix, 1/1.8", Gray, 17 fps, GigE, POE, C - mount, Glass filter
<a href="#">COE-063-C-POE-040-IR-C</a>	Area Scan camera IMX178, CMOS, Rolling shutter, 3072 x 2048, 6.3 MP, 2.4 pix, 1/1.8", Color, 17 fps, GigE, POE, C - mount, Infrared cut filter



COE-U series

USB 3.0 GeniCam® cameras

<a href="#">COE-016-M-USB-021-IR-C</a>	Area Scan camera IMX273, CMOS, Global shutter, 1440 x 1080, 1.6 MP, 3.45 pix, 1/2.9", Gray, 165 fps, USB 3.0, C - mount, Glass filter
<a href="#">COE-016-C-USB-021-IR-C</a>	Area Scan camera IMX273, CMOS, Global shutter, 1440 x 1080, 1.6 MP, 3.45 pix, 1/2.9", Color, 165 fps, USB 3.0, C - mount, Infrared cut filter

<a href="#">COE-050-C-USB-023-IR-C</a>	Area Scan camera AR0521, CMOS, Rolling shutter, 2592 x 1944, 5 MP, 2.2 pix, 1/2.5", Color, 31 fps, USB 3.0, C - mount, Infrared cut filter
<a href="#">COE-013-M-USB-030-IR-C</a>	Area Scan camera PYTHON 1300, CMOS, Global shutter, 1280 x 1024, 1.3 MP, 4.8 pix, 1/2", Gray, 170 fps, USB 3.0, C - mount, Glass filter
<a href="#">COE-013-C-USB-030-IR-C</a>	Area Scan camera PYTHON 1300, CMOS, Global shutter, 1280 x 1024, 1.3 MP, 4.8 pix, 1/2", Color, 90 fps, USB 3.0, C - mount, Infrared cut filter
<a href="#">COE-063-M-USB-040-IR-C</a>	Area Scan camera IMX178, CMOS, Rolling shutter, 3072 x 2048, 6.3 MP, 2.4 pix, 1/1.8", Gray, 42 fps, USB 3.0, C - mount, Glass filter
<a href="#">COE-063-C-USB-040-IR-C</a>	Area Scan camera IMX178, CMOS, Rolling shutter, 3072 x 2048, 6.3 MP, 2.4 pix, 1/1.8", Color, 42 fps, USB 3.0, C - mount, Infrared cut filter



#### mvBlueFOX3-2 series

USB3 vision camera with Sony Pregius CMOS sensors

<a href="#">RT-mvBF3-2004</a>	Usb3 vision camera with sony pregius cmos sensor imx287
<a href="#">RT-mvBF3-2016</a>	Usb3 vision camera with sony pregius cmos sensor imx273
<a href="#">RT-mvBF3-2032a</a>	USB3 Vision camera with Sony Pregius CMOS sensor IMX265
<a href="#">RT-mvBF3-2032</a>	USB3 Vision camera with Sony Pregius CMOS sensor IMX252
<a href="#">RT-mvBF3-2064</a>	Usb3 vision camera with sony pregius cmos sensor imx178



#### mvBlueCOUGAR series

GigE & Dual GigE Vision cameras

<a href="#">RT-mvBC-X100f</a>	Camera with interface GigE (1GB/s), sensor size 1/2.9", mpixel 0.4, resolution 728 x 544, sensor name IMX287, sensor type CMOS
<a href="#">RT-mvBC-X102f</a>	Camera with interface GigE (1GB/s), sensor size 1/2.9", mpixel 1.58, resolution 1456 x 1088, sensor name IMX273, sensor type CMOS
<a href="#">RT-mvBC-XD102f</a>	Camera with interface Dual GigE (2GB/s), sensor size 1/2.9", mpixel 1.58, resolution 1456 x 1088, sensor name IMX273, sensor type CMOS
<a href="#">RT-mvBC-X105</a>	Camera with interface GigE (1GB/s), sensor size 1/2.5", mpixel 5.04, resolution 2592 x 1944, sensor name MT9P031, sensor type CMOS
<a href="#">RT-mvBC-X1010</a>	Camera with interface GigE (1GB/s), sensor size 1/2.3", mpixel 10.66, resolution 3856 x 2764, sensor name MT9J003, sensor type CMOS
<a href="#">RT-mvBC-X104i</a>	Camera with interface GigE (1GB/s), sensor size 1/1.8", mpixel 3.19, resolution 2064 x 1544, sensor name IMX265, sensor type CMOS
<a href="#">RT-mvBC-XD104h</a>	Camera with interface Dual GigE (2GB/s), sensor size 1/1.8", mpixel 3.19, resolution 2064 x 1544, sensor name IMX252, sensor type CMOS