

# TC23120

Bi-telecentric lens for 2/3" detectors, magnification 0.072 x, C-mount

## SPECIFICATIONS

Magnification	(x)	0.072
Image circle Ø	(mm)	11.0

### Object field of view(8)

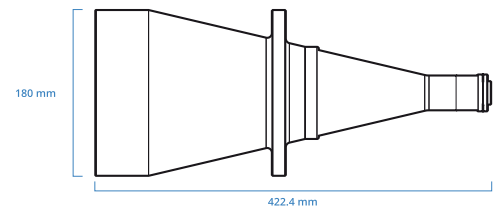
with 1/3" detector (4.8 x 3.6 mm)	(mm x mm)	66.67 x 50.00
with 1/2.5" detector (5.70 x 4.28 mm)	(mm x mm)	79.17 x 59.44
with 1/2" detector (6.4 x 4.8 mm)	(mm x mm)	88.89 x 66.67
with 1/1.8" detector (7.13 x 5.37 mm) (7)	(mm x mm)	99.03 x 74.03
with 2/3" - 5 MP detector (8.45 x 7.07 mm)	(mm x mm)	118.06 x 98.47

### Optical specifications

Working distance (1)	(mm)	334.5
wF/# (2)		8
Telecentricity typical (max) (3)	(deg)	< 0.07 (0.08)
Distortion typical (max) (4)	(%)	< 0.04 (0.10)
Field depth (5)	(mm)	131
CTF @ 70 lp/mm	(%)	> 35

### Dimensions

Mount		C
Phase Adjustment (9)		Yes
Length (6)	(mm)	422.4
Diameter	(mm)	180
Mass	(g)	5300



## 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 "Ø =", 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

LTCLHP120-G	Telecentric HP illuminator, beam diameter 150 mm, green
LTCLHP120-W	Telecentric HP illuminator, beam diameter 150 mm, white



#### LTCLHP CORE series

Ultra compact telecentric illuminators

LTCLCR120-R	Telecentric CORE illuminator, beam dimensions $\varnothing = 156$ , $x = 130$ , red, 630 nm
LTCLCR120-G	Telecentric CORE illuminator, beam dimensions $\varnothing = 156$ , $x = 130$ , green, 520 nm
LTCLCR120-W	Telecentric CORE illuminator, beam dimensions $\varnothing = 156$ , $x = 130$ , white



#### LTRNST series

LED ring illuminators - straight type

LTRN120RD	Ring LED illuminator, inner diameter 180 mm, straight type, red 630 nm
LTRN120GR	Ring LED illuminator, inner diameter 180 mm, straight type, green 525 nm
LTRN120BL	Ring LED illuminator, inner diameter 180 mm, straight type, blue 470 nm
LTRN120NW	Ring LED illuminator, inner diameter 180 mm, straight type, white



#### LTBC series

Continuous LED backlight

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



#### LTBDC series

Continuous LED bar lights

LTZPFL160-00-6-W-24V	LED bar light, 6 LED rows, 160X26.3 illumination area, white, 24V
LTZPFL160-00-6-R-24V	LED bar light, 6 LED rows, 160X26.3 illumination area, red, 24V
LTZPFL160-00-6-G-24V	LED bar light, 6 LED rows, 160X26.3 illumination area, green, 24V
LTZPFL160-00-6-B-24V	LED bar light, 6 LED rows, 160X26.3 illumination area, blue, 24V



#### CMHO series

Clamping mechanics

CMHO120	Clamping mechanics for TCxx110, TCxx120 lenses and LTCLHP120-X illuminators
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#### PTTC, PTCP series

Accurate calibration patterns for machine vision systems

PT120-240	Calibration pattern
PT120-144	Calibration pattern for telecentric lenses
PT120-144-C	Calibration pattern for telecentric lenses with a certificate of conformity



#### Accessories

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

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



#### LTPR series

LED patterns projectors

LTPRHP3W-W	LED pattern projector 3W, HP, white
LTPRHP3W-R	LED pattern projector 3W, HP, red
LTPRHP3W-G	LED pattern projector 3W, HP, green
LTPRHP3W-B	LED pattern projector 3W, HP, blue
LTPRUP-W	90W strobed LED pattern projector white
LTPRUP-R	90W strobed LED pattern projector red

LTPRUP-G	90W strobed LED pattern projector green
LTPRUP-B	90W strobed LED pattern projector blue



#### COE-G series

GeniCam® PoE cameras

COE-050-M-POE-023-IR-C	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
COE-013-M-POE-030-IR-C	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
COE-013-C-POE-030-IR-C	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
COE-106-M-POE-031-IR-C-2	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
COE-106-C-POE-031-IR-C	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
COE-032-M-POE-040-IR-C	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
COE-032-C-POE-040-IR-C	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
COE-063-M-POE-040-IR-C-B	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
COE-063-C-POE-040-IR-C	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-122-M-POE-041-IR-C	Area Scan camera IMX226, CMOS, Rolling shutter, 4024 x 3036, 12.2 MP, 1.85 pix, 1/1.7", Gray, 9.6 fps, GigE, POE, C - mount, Glass filter
COE-122-C-POE-041-IR-C	Area Scan camera IMX226, CMOS, Rolling shutter, 4024 x 3036, 12.2 MP, 1.85 pix, 1/1.7", Color, 9.6 fps, GigE, POE, C - mount, Infrared cut filter
COE-023-M-POE-050-IR-C	Area Scan camera PYTHON 2000, CMOS, Global shutter, 1920 x 1200, 2.3 MP, 4.8 pix, 2/3", Gray, 51 fps, GigE, POE, C - mount, Glass filter
COE-023-C-POE-050-IR-C	Area Scan camera PYTHON 2000, CMOS, Global shutter, 1920 x 1200, 2.3 MP, 4.8 pix, 2/3", Color, 51 fps, GigE, POE, C - mount, Infrared cut filter
COE-050-M-POE-050-IR-C	Area Scan camera IMX264, CMOS, Global shutter, 2448 x 2048, 5 MP, 3.45 pix, 2/3", Gray, 23.5 fps, GigE, POE, C - mount, Glass filter
COE-050-C-POE-050-IR-C	Area Scan camera IMX264, CMOS, Global shutter, 2448 x 2048, 5 MP, 3.45 pix, 2/3", Color, 23.5 fps, GigE, POE, C - mount, Infrared cut filter



#### COE-U series

USB 3.0 GeniCam® cameras

COE-016-M-USB-021-IR-C	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
COE-016-C-USB-021-IR-C	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
COE-050-C-USB-023-IR-C	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
COE-013-M-USB-030-IR-C	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
COE-013-C-USB-030-IR-C	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
COE-063-M-USB-040-IR-C	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
COE-063-C-USB-040-IR-C	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
COE-050-M-USB-050-IR-C	Area Scan camera IMX264, CMOS, Global shutter, 2448 x 2048, 5 MP, 3.45 pix, 2/3", Gray, 35 fps, USB 3.0, C - mount, Glass filter



#### mvBlueFOX3-2 series

USB3 vision camera with Sony Pregius CMOS sensors

RT-mvBF3-2004	Usb3 vision camera with sony pregius cmos sensor imx287
RT-mvBF3-2016	Usb3 vision camera with sony pregius cmos sensor imx273
RT-mvBF3-2032a	USB3 Vision camera with Sony Pregius CMOS sensor IMX265
RT-mvBF3-2032	USB3 Vision camera with Sony Pregius CMOS sensor IMX252
RT-mvBF3-2064	Usb3 vision camera with sony pregius cmos sensor imx178
RT-mvBF3-2051a	USB3 Vision camera with Sony Pregius CMOS sensor IMX264
RT-mvBF3-2051	USB3 Vision camera with Sony Pregius CMOS sensor IMX250



mvBlueCOUGAR series

GigE & Dual GigE Vision cameras

<a href="#">RT-mvBC-X100w</a>	Camera with interface GigE (1GB/s), sensor size 1/3", mpixel 0.36, resolution 752 x 480, sensor name MT9V034, sensor type CMOS
<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
<a href="#">RT-mvBC-X105b</a>	Camera with interface GigE (1GB/s), sensor size 2/3", mpixel 5.07, resolution 2464 x 2056, sensor name IMX264, sensor type CMOS
<a href="#">RT-mvBC-XD105a</a>	Camera with interface Dual GigE (2GB/s), sensor size 2/3", mpixel 5.01, resolution 2448 x 2048, sensor name IMX250, sensor type CMOS