

# TC13036

Bi-telecentric lens for 1/3" detectors, magnification 0.133 x, C-mount

## SPECIFICATIONS

Magnification	(x)	0.133
Image circle Ø	(mm)	6.0

### Object field of view(8)

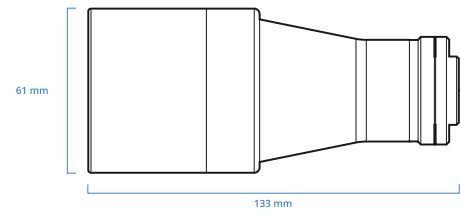
with 1/3" detector (4.8 x 3.6 mm)	(mm × mm)	36.09 x 27.07
with 1/2.5" detector (5.70 x 4.28 mm)	(mm × mm)	Ø = 32.2
with 1/2" detector (6.4 x 4.8 mm)	(mm × mm)	Ø = 36.1
with 1/1.8" detector (7.13 x 5.37 mm) (7)	(mm × mm)	Ø = 40.1
with 2/3" - 5 MP detector (8.45 x 7.07 mm)	(mm × mm)	Ø = 45.1

### Optical specifications

Working distance (1)	(mm)	102.5
wF/# (2)		8
Telecentricity typical (max) (3)	(deg)	< 0.04 (0.08)
Distortion typical (max) (4)	(%)	< 0.03 (0.08)
Field depth (5)	(mm)	38
CTF @ 70 lp/mm	(%)	> 50

### Dimensions

Mount		C
Phase Adjustment (9)		
Length (6)	(mm)	133.0
Diameter	(mm)	61
Mass	(g)	460



## 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

LTCLHP036-G	Telecentric HP illuminator, beam diameter 45 mm, green
LTCLHP036-B	Telecentric HP illuminator, beam diameter 45 mm, blue
LTCLHP036-W	Telecentric HP illuminator, beam diameter 45 mm, white



#### LTLA series

High-power strobed LED low angle diffused ringlights

LTLAB2-R	Diffusive strobed low angle ring light illuminator - medium size high power red
LTLAB2-G	Diffusive strobed low angle ring light illuminator - medium size high power green
LTLAB2-W	Diffusive strobed low angle ring light illuminator - medium size high power white
LTLAC1-W	Diffusive strobed low angle ring light illuminator - large size medium power white
LTLAC2-R	Diffusive strobed low angle ring light illuminator - large size high power red
LTLAC2-G	Diffusive strobed low angle ring light illuminator - large size high power green
LTLAC2-W	Diffusive strobed low angle ring light illuminator - large size high power white



#### LTLAIC series (discontinued models)

Continuous LED low angle diffused ringlights

LT2RZF100-60-2-W-24V	LED ringlight, 2 LED rows, 100 mm outer diameter, 60°, white, 24V
LT2RZF100-60-2-R-24V	LED ringlight, 2 LED rows, 100 mm outer diameter, 60°, red, 24V
LT2RZF100-60-2-G-24V	LED ringlight, 2 LED rows, 100 mm outer diameter, 60°, green, 24V
LT2RZF100-60-2-B-24V	LED ringlight, 2 LED rows, 100 mm outer diameter, 60°, blue, 24V



#### LTLAIC series

Continuous LED low angle diffused ringlights

LT3RZF100-60-1-W-24V	LED ringlight, 1 LED row, 105.2 mm outer diameter, 60°, white, 24V
LT3RZF100-60-1-R-24V	LED ringlight, 1 LED row, 105.2 mm outer diameter, 60°, red, 24V
LT3RZF100-60-1-G-24V	LED ringlight, 1 LED row, 105.2 mm outer diameter, 60°, green, 24V
LT3RZF100-60-1-B-24V	LED ringlight, 1 LED row, 105.2 mm outer diameter, 60°, blue, 24V



#### LTLADC series

Continuous LED low angle direct ringlights

LTZZO130-75-3-W-24V	LED low angle ringlight, 3 LED rows, outer diameter 131 mm, 75°, white, 24V
LTZZO130-75-3-R-24V	LED low angle ringlight, 3 LED rows, outer diameter 131 mm, 75°, red, 24V
LTZZO130-75-3-G-24V	LED low angle ringlight, 3 LED rows, outer diameter 131 mm, 75°, green, 24V
LTZZO130-75-3-B-24V	LED low angle ringlight, 3 LED rows, outer diameter 131 mm, 75°, blue, 24V



#### LTRNST series

LED ring illuminators - straight type

LTRN036RD	Ring LED illuminator, inner diameter 61 mm, straight type, red 630 nm
LTRN036GR	Ring LED illuminator, inner diameter 61 mm, straight type, green 525 nm
LTRN036BL	Ring LED illuminator, inner diameter 61 mm, straight type, blue 470 nm
LTRN036NW	Ring LED illuminator, inner diameter 61 mm, straight type, white



#### LTBC series

Continuous LED backlight

LTBC054054-W	Continuous LED backlight, 54x54 illumination area, white
LTBC054054-G	Continuous LED backlight, 54x54 illumination area, green



#### LTBFC series

Continuous flat side-emitting LED backlights

LTPVR070-00-1-W-24V	Flat side-emitting LED backlight, 70X70 mm illumination area, white, 24V
LTPVR070-00-1-R-24V	Flat side-emitting LED backlight, 70X70 mm illumination area, red, 24V
LTPVR070-00-1-G-24V	Flat side-emitting LED backlight, 70X70 mm illumination area, green, 24V
LTPVR070-00-1-B-24V	Flat side-emitting LED backlight, 70X70 mm illumination area, blue, 24V

<a href="#">LTPVRG070-00-1-W-24V</a>	Flat side-emitting LED backlight, thin borders, 70X70 mm illumination area, white, 24V
<a href="#">LTPVRG070-00-1-R-24V</a>	Flat side-emitting LED backlight, thin borders, 70X70 mm illumination area, red, 24V
<a href="#">LTPVRG070-00-1-G-24V</a>	Flat side-emitting LED backlight, thin borders, 70X70 mm illumination area, green, 24V
<a href="#">LTPVRG070-00-1-B-24V</a>	Flat side-emitting LED backlight, thin borders, 70X70 mm illumination area, blue, 24V



LTBRDC series

Continuous LED bar lights

<a href="#">LTZPFL080-00-6-W-24V</a>	LED bar light, 6 LED rows, 80X26.3 illumination area, white, 24V
<a href="#">LTZPFL080-00-6-R-24V</a>	LED bar light, 6 LED rows, 80X26.3 illumination area, red, 24V
<a href="#">LTZPFL080-00-6-G-24V</a>	LED bar light, 6 LED rows, 80X26.3 illumination area, green, 24V
<a href="#">LTZPFL080-00-6-B-24V</a>	LED bar light, 6 LED rows, 80X26.3 illumination area, blue, 24V



LTCXC series

Continuous LED coaxial lights

<a href="#">LT2QOG040-00-X-W-24V</a>	LED coaxial light, 48x48 mm light emitting area, white, 24V
<a href="#">LT2QOG040-00-X-R-24V</a>	LED coaxial light, 48x48 mm light emitting area, red, 24V
<a href="#">LT2QOG040-00-X-G-24V</a>	LED coaxial light, 48x48 mm light emitting area, green, 24V
<a href="#">LT2QOG040-00-X-B-24V</a>	LED coaxial light, 48x48 mm light emitting area, blue, 24V



CMBS series

45° beam splitters

<a href="#">CMBS036</a>	45° beam splitter with mount for 61 mm clamping diameter optics
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CMMR series

45° first surface mirrors

<a href="#">CMMR036</a>	45° first surface mirror for 61 mm clamping diameter optics
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WI series

Protective windows

<a href="#">WI036</a>	Protective window for 61 mm clamping diameter optics
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CMHO series

Clamping mechanics

<a href="#">CMHO036</a>	Clamping mechanics for TCx036 lenses and LTCLHP036-X illuminators
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PTTC, PTCP series

Accurate calibration patterns for machine vision systems

<a href="#">PT036-056</a>	Calibration pattern
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<a href="#">PT036-056-C</a>	Calibration pattern for telecentric lenses with a certificate of conformity
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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

COE-003-M-POE-010-IR-C	Area Scan camera Python 300, CMOS, Global shutter, 640 x 480, 0.3 MP, 4.8 pix, 1/4", Gray, GigE, POE, 173 fps, C - mount, Glass filter
COE-004-M-POE-010-IR-C	Area Scan camera Python 300, CMOS, Global shutter, 640 x 480, 0.3 MP, 4.8 pix, 1/4", Gray, 300 fps, GigE, POE, C - mount, Glass filter
COE-003-C-POE-010-IR-C	Area Scan camera Python 300, CMOS, Global shutter, 640 x 480, 0.3 MP, 4.8 pix, 1/4", Color, 173 fps, GigE, POE, C - mount, Infrared cut filter
COE-004-C-POE-010-IR-C	Area Scan camera Python 300, CMOS, Global shutter, 640 x 480, 0.3 MP, 4.8 pix, 1/4", Color, 300 fps, GigE, POE, C - mount, Infrared cut filter
COE-003-M-POE-020-IR-C	Area Scan camera RJ33B4AD0DT, CCD, Global shutter, 640 x 480, 0.3 MP, 7.4 pix, 1/3", Gray, 200 fps, GigE, POE, C - mount, Glass filter
COE-003-C-POE-020-IR-C	Area Scan camera RJ33B4AD0DT, CCD, Global shutter, 640 x 480, 0.3 MP, 7.4 pix, 1/3", Color, 200 fps, GigE, POE, C - mount, Infrared cut filter
COE-012-M-POE-020-IR-C	Area Scan camera RJ33J4CA3DE, CCD, Global shutter, 1280 x 960, 1.2 MP, 3.75 pix, 1/3", Gray, 30 fps, GigE, POE, C - mount, Glass filter
COE-012-C-POE-020-IR-C	Area Scan camera RJ33J4CA3DE, CCD, Global shutter, 1280 x 960, 1.2 MP, 3.75 pix, 1/3", Color, 30 fps, GigE, POE, C - mount, Infrared cut filter



### COE-U series

#### USB 3.0 GeniCam® cameras

COE-003-M-USB-010-IR-C	Area Scan camera PYTHON 300, CMOS, Global shutter, 640 x 480, 0.3 MP, 4.8 pix, 1/4", Gray, 814 fps, USB 3.0, C - mount, Glass filter
COE-003-C-USB-010-IR-C	Area Scan camera PYTHON 300, CMOS, Global shutter, 640 x 480, 0.3 MP, 4.8 pix, 1/4", Color, 814 fps, USB 3.0, C - mount, Infrared cut filter



### mvBlueCOUGAR series

#### GigE & Dual GigE Vision cameras

RT-mvBC-X100w	Camera with interface GigE (1GB/s), sensor size 1/3", mpixel 0.36, resolution 752 x 480, sensor name MT9V034, sensor type CMOS
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### Accessories

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