

# TC3MHR036-C

High resolution telecentric lens for 1.1" detectors, magnification 0.392x, C-mount

## SPECIFICATIONS

Magnification	(x)	0.392
Image circle Ø	(mm)	17.6

Object field of view <sup>8</sup>	(mm x mm or Ø)
with IMX174/IMX249 13.3 mm diag w x h 11.35 x 7.13	28.94 x 18.18
with IMX255/IMX267 16.1 mm diag w x h 14.19 x 7.51	36.20 x 19.16
with IMX253/IMX304 17.6 mm diag w x h 14.16 x 10.37	36.12 x 26.46
with KAI-4022/4021 21.5 mm diagonal w x h 15.2 x 15.2	Ø = 38.66
with KAI-08050 22.6 mm diagonal w x h 18.1 x 13.6 <sup>(7)</sup>	Ø = 34.68

## Optical specifications

Working distance <sup>(1)</sup>	(mm)	102.6
wF/# <sup>(2)</sup>		11
Telecentricity typical (max) <sup>(3)</sup>	(deg)	<0.08 (0.10)
Distortion typical (max) <sup>(4)</sup>	(%)	<0.08 (0.10)
Field depth <sup>(5)</sup>	(mm)	5.4
CTF@ 50 lp/mm	(%)	> 40

## Mechanical specifications

Mount		C
Phase adjustment <sup>(9)</sup>		Yes
Length <sup>(6)</sup>	(mm)	204.4
Diameter	(mm)	61
Mass	(g)	548

Last update: 2018-06-12

## 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 (higher wF/#) 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 µm.
- Measured from the front end of the mechanics to the camera flange.
- With KAI-08050 (22.6 mm diagonal) detectors, the FOV of TC4MHRyyy-x lenses may show some vignetting at the image corners.
- For the fields with the indication "Ø =", the image of a circular object of such diameter is fully inscribed into the detector.
- Indicates the availability of an integrated camera phase adjustment feature

## 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



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.

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



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



CMBS series

45° beam splitters

CMBS036	45° beam splitter with mount for 61 mm clamping diameter optics
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CMMR series

45° first surface mirrors

CMMR036	45° first surface mirror for 61 mm clamping diameter optics
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WI series

Protective windows

WI036	Protective window for 61 mm clamping diameter optics
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CMHO series

Clamping mechanics

CMHO036	Clamping mechanics for TCxx036 lenses and LTCLHP036-X illuminators
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COE-G series

GenICam® PoE cameras

COE-053-M-POE-070-IR-C	Area Scan camera PYTHON 5000, CMOS, Global shutter, 2592 x 2048, 5.3 MP, 4.8 pix, 1", Gray, 22 fps, GigE, POE, C - mount, Glass filter
COE-053-C-POE-070-IR-C	Area Scan camera PYTHON 5000, CMOS, Global shutter, 2592 x 2048, 5.3 MP, 4.8 pix, 1", Color, 22 fps, GigE, POE, C - mount, Infrared cut filter
COE-089-M-POE-070-IR-C	Area Scan camera IMX267, CMOS, Global shutter, 4096 x 2160, 8.8 MP, 3.45 pix, 1", Gray, 13 fps, GigE, POE, C - mount, Glass filter
COE-089-C-POE-070-IR-C	Area Scan camera IMX267, CMOS, Global shutter, 4096 x 2160, 8.8 MP, 3.45 pix, 1", Color, 13 fps, GigE, POE, C - mount, Infrared cut filter
COE-123-M-POE-080-IR-C	Area Scan camera IMX304, CMOS, Global shutter, 4096 x 3000, 12.3 MP, 3.45 pix, 1.1", Gray, 9.4 fps, GigE, POE, C - mount, Glass filter

COE-123-C-POE-080-IR-C Area Scan camera IMX304, CMOS, Global shutter, 4096 x 3000, 12.3 MP, 3.45 pix, 1.1", Color, 9.4 fps, GigE, POE, C - mount, Infrared cut filter

 COE-U series

USB 3.0 GenICam® cameras

COE-053-M-USB-070-IR-C Area Scan camera PYTHON 5000, CMOS, Global shutter, 2592 x 1944, 5 MP, 4.8 pix, 1", Gray, 60 fps, USB 3.0, C - mount, Glass filter

COE-053-C-USB-070-IR-C Area Scan camera PYTHON 5000, CMOS, Global shutter, 2592 x 1944, 5 MP, 4.8 pix, 1", Color, 30 fps, USB 3.0, C - mount, Infrared cut filter

COE-089-M-USB-070-IR-C Area Scan camera IMX267, CMOS, Global shutter, 4096 x 2160, 8.8 MP, 3.45 pix, 1", Gray, 32 fps, USB 3.0, C - mount, Glass filter

COE-089-C-USB-070-IR-C Area Scan camera IMX267, CMOS, Global shutter, 4096 x 2160, 8.8 MP, 3.45 pix, 1", Color, 32 fps, USB 3.0, C - mount, Infrared cut filter

COE-123-M-USB-080-IR-C Area Scan camera IMX304, CMOS, Global shutter, 4096 x 3000, 12.3 MP, 3.45 pix, 1.1", Gray, 23 fps, USB 3.0, C - mount, Glass filter

COE-123-C-USB-080-IR-C Area Scan camera IMX304, CMOS, Global shutter, 4096 x 3000, 12.3 MP, 3.45 pix, 1.1", Color, 23 fps, USB 3.0, C - mount, Infrared cut filter



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



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 x 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 x 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 x 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 x 3648, 20.4 MP, 2.4 pix, 1", Color, 14 fps, C - mount, Infrared cut filter