

# TC4MHR036-C

High resolution telecentric lens for 4/3" detectors, magnification 0.486x, C-mount

## SPECIFICATIONS

Magnification	(x)	0.486
Image circle Ø	(mm)	21.4
<b>Object field of view<sup>8</sup></b>		
	(mm x mm or Ø)	
with IMX174/IMX249 13.3 mm diag w x h 11.35 x 7.13		23.34 x 14.66
with IMX255/IMX267 16.1 mm diag w x h 14.19 x 7.51		29.20 x 15.45
with IMX253/IMX304 17.6 mm diag w x h 14.16 x 10.37		29.13 x 21.34
with KAI-4022/4021 21.5 mm diagonal w x h 15.2 x 15.2		31.3 x 31.3
with KAI-08050 22.6 mm diagonal w x h 18.1 x 13.6 <sup>(7)</sup>		37.2 x 28.0
<b>Optical specifications</b>		
Working distance <sup>(1)</sup>	(mm)	102.6
wF/# <sup>(2)</sup>		16
Telecentricity typical (max) <sup>(3)</sup>	(deg)	<0.05 (0.10)
Distortion typical (max) <sup>(4)</sup>	(%)	<0.08 (0.10)
Field depth <sup>(5)</sup>	(mm)	5.1
CTF@ 50 lp/mm	(%)	> 30
<b>Mechanical specifications</b>		
Mount		C
Phase adjustment <sup>(9)</sup>		Yes
Length <sup>(6)</sup>	(mm)	222.0
Diameter	(mm)	61
Mass	(g)	633

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## 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 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.

## 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-R	Telecentric HP illuminator, beam diameter 45 mm, red
LTCLHP036-G	Telecentric HP illuminator, beam diameter 45 mm, green



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-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 TCxx036 lenses and LTCLHP036-X illuminators
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Accessories

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

<a href="#">TCFILTER</a>	Filter mount for telecentric lenses
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mvBlueFOX3-2 series

USB3 vision camera with Sony Pregius CMOS sensors

<a href="#">RT-mvBF3-2089a</a>	USB3 Vision camera with Sony Pregius CMOS sensor IMX267
<a href="#">RT-mvBF3-2089</a>	USB3 Vision camera with Sony Pregius CMOS sensor IMX255
<a href="#">RT-mvBF3-2124a</a>	USB3 Vision camera with Sony Pregius CMOS sensor IMX304
<a href="#">RT-mvBF3-2124</a>	USB3 Vision camera with Sony Pregius CMOS sensor IMX253



mvBlueCOUGAR series

GigE & Dual GigE Vision cameras

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

<a href="#">COE-200-M-POE-070-IR-C</a>	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
<a href="#">COE-200-C-POE-070-IR-C</a>	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
<a href="#">COE-200-M-USB-070-IR-C</a>	HR Area Scan camera IMX183, CMOS, Rolling shutter, 5472 × 3648, 20.4 MP, 2.4 pix, 1", Gray, 14 fps, C - mount, Glass filter
<a href="#">COE-200-C-USB-070-IR-C</a>	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