

# TC16M096-Q

Telecentric lens for 35 mm detectors, magnification 0.380 x, mount M58x0.75 FD = 6.56

## SPECIFICATIONS

Magnification	(x)	0.38
Image circle Ø	(mm)	43.3

### Object field of view

with APS-H KAI-16050 32.4 mm diagonal w x h 26.93 x 17.95	(mm x mm)	70.86 x 47.24
with CHR70 38 mm diagonal w x h 31.0 x 21.99	(mm x mm)	81.58 x 57.87
with 8k x 5 µm detector	(mm)	107.37
Full frame 35 mm, 43.3 mm diagonal w x h 36.0 x 24.00	(mm x mm)	94.74 x 63.16
with CMV50000 45.72 mm diagonal w x h 36.43 x 27.62	(mm x mm)	95.87 x 72.68

### Optical specifications

Working distance (1)	(mm)	262.3
wF/# (2)		16
Telecentricity typical (max) (3)	(deg)	< 0.06 (0.08)
Distortion typical (max) (4)	(%)	< 0.07 (0.15)
Field depth (5)	(mm)	9.1
CTF@ 50 lp/mm	(%)	> 40

### Mechanical specifications

Mount (6)		M58x0.75 FD6.56
Phase adjustment (7)		
Length (8)	(mm)	489.1
Diameter	(mm)	143
Mass	(g)	2697

Last update: 2020-07-16

## 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/#: the real F/# 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 very sharp image, only half of the nominal field depth should be considered. Pixel size used for calculation is 5.5 µm.
- FD stands for Flange Distance (in mm), defined as the distance from the mounting flange (the "metal ring" in rear part of the lens) to the camera detector plane.
- Indicates the availability of an integrated camera phase adjustment feature.
- Measured from the front end of the mechanics to the camera flange.

## 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

LTCLHP096-G	Telecentric HP illuminator, beam diameter 120 mm, green
LTCLHP096-R	Telecentric HP illuminator, beam diameter 120 mm, red



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.

LTCLHP096-B	Telecentric HP illuminator, beam diameter 120 mm, blue
LTCLHP096-W	Telecentric HP illuminator, beam diameter 120 mm, white



LTCLHP CORE series  
Ultra compact telecentric illuminators

LTCLCR096-R	Telecentric CORE illuminator, beam dimensions $\varnothing = 120$ ; x = 99, red
LTCLCR096-G	Telecentric CORE illuminator, beam dimensions $\varnothing = 120$ ; x = 99, green
LTCLCR096-W	Telecentric CORE illuminator, beam dimensions $\varnothing = 120$ ; x = 99, white



LTLADC series  
Continuous LED low angle direct ringlights

LTZZO170-75-3-W24V	LED low angle ringlight, 3 LED rows, outer diameter 175 mm, 75°, white, 24V
LTZZO170-75-3-R-24V	LED low angle ringlight, 3 LED rows, outer diameter 175 mm, 75°, red, 24V
LTZZO170-75-3-G-24V	LED low angle ringlight, 3 LED rows, outer diameter 175 mm, 75°, green, 24V
LTZZO170-75-3-B-24V	LED low angle ringlight, 3 LED rows, outer diameter 175 mm, 75°, blue, 24V



LTRNST series  
LED ring illuminators - straight type

LTRN096RD	Ring LED illuminator, inner diameter 143 mm, straight type, red 630 nm
LTRN096GR	Ring LED illuminator, inner diameter 143 mm, straight type, green 525 nm
LTRN096BL	Ring LED illuminator, inner diameter 143 mm, straight type, blue 470 nm
LTRN096NW	Ring LED illuminator, inner diameter 143 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



LTBRDC series  
Continuous LED bar lights

LTZPFL120-00-6-W-24V	LED bar light, 6 LED rows, 120X26.3 illumination area, white, 24V
LTZPFL120-00-6-R-24V	LED bar light, 6 LED rows, 120X26.3 illumination area, red, 24V
LTZPFL120-00-6-G-24V	LED bar light, 6 LED rows, 120X26.3 illumination area, green, 24V
LTZPFL120-00-6-B-24V	LED bar light, 6 LED rows, 120X26.3 illumination area, blue, 24V



CMMR series  
45° first surface mirrors

CMMR096	45° first surface mirror for 143 mm clamping diameter optics
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WI series  
Protective windows

WI096	Protective window for 143 mm clamping diameter optics
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CMHO series  
Clamping mechanics

CMHO096	Clamping mechanics for TCxx085, TCxx096 lenses and LTCLHP096-X illuminators
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COE HR AS series  
29 MP, 48MP and 71MP area scan cameras for high-speed applications

COE29MUSB3IR-K	Area scan camera CCD, USB3, 6576 x 4384 monochrome, 35mm, 2fps, IR Cut filter, K mount
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COE29CUSB3IR-K	Area scan camera CCD, USB3, 6576 x 4384 color, 35mm, 2fps, IR cut, IR Cut filter, K mount
COE29MUSB3IR-F	Area scan camera CCD, USB3, 6576 x 4384 monochrome, 35mm, 2fps, IR Cut filter, F-mount
COE29CUSB3IR-F	Area scan camera CCD, USB3, 6576 x 4384 color, 35mm, 2fps, IR cut, IR Cut filter, F-mount
COE29MCLIR-K	Area scan camera CCD, Camera Link, 6576 x 4384 monochrome, 35mm, 4fps, IR Cut filter, K mount
COE29CCLIR-K	Area scan camera CCD, Camera Link, 6576 x 4384 color, 35mm, 4fps, IR Cut filter, K mount
COE29MCLIR-F	Area scan camera CCD, Camera Link, 6576 x 4384 monochrome, 35mm, 4fps, IR Cut filter, F-mount
COE29CCLIR-F	Area scan camera CCD, Camera Link, 6576 x 4384 color, 35mm, 4fps, IR Cut filter, F-mount
COE29MUSB3SK-K	Area scan camera CCD, USB3, 6576 x 4384 monochrome, 35mm, 2fps, skylight/glass filter, K mount
COE29CUSB3SK-K	Area scan camera CCD, USB3, 6576 x 4384 color, 35mm, 2fps, skylight/glass filter, K mount
COE29MUSB3SK-F	Area scan camera CCD, USB3, 6576 x 4384 monochrome, 35mm, 2fps, skylight/glass filter, F-mount
COE29CUSB3SK-F	Area scan camera CCD, USB3, 6576 x 4384 color, 35mm, 2fps, skylight/glass filter, F-mount
COE29MCLSK-K	Area scan camera CCD, Camera Link, 6576 x 4384 monochrome, 35mm, 4fps, skylight/glass filter, K mount
COE29CCLSK-K	Area scan camera CCD, Camera Link, 6576 x 4384 color, 35mm, 4fps, skylight/glass filter, K mount
COE29MCLSK-F	Area scan camera CCD, Camera Link, 6576 x 4384 monochrome, 35mm, 4fps, skylight/glass filter, F-mount
COE29CCLSK-F	Area scan camera CCD, Camera Link, 6576 x 4384 color, 35mm, 4fps, skylight/glass filter, F-mount
COE50MUSB3IR-K	Area scan camera CMOS, USB3, 7920 x 6004, monochrome, 6.8fps, IR Cut filter, K mount
COE50CUSB3IR-K	Area scan camera CMOS, USB3, 7920 x 6004, color, 6.8fps, IR Cut filter, K mount
COE50MUSB3IR-F	Area scan camera CMOS, USB3, 7920 x 6004, monochrome, 6.8fps, IR Cut filter, F-mount
COE50CUSB3IR-F	Area scan camera CMOS, USB3, 7920 x 6004, color, 6.8fps, IR Cut filter, F-mount
COE50MCLIR-K	Area scan camera CMOS, Camera Link, 7920 x 6004, monochrome, 27.3fps, IR Cut filter, K mount
COE50CCLIR-K	Area scan camera CMOS, Camera Link, 7920 x 6004, color, 27.3fps, IR Cut filter, K mount
COE50MCLIR-F	Area scan camera CMOS, Camera Link, 7920 x 6004, monochrome, 27.3fps, IR Cut filter, F-mount
COE50CCLIR-F	Area scan camera CMOS, Camera Link, 7920 x 6004, color, 27.3fps, IR Cut filter, F-mount
COE50MUSB3SK-K	Area scan camera CMOS, USB3, 7920 x 6004, monochrome, 6.8fps, skylight/glass filter, K mount
COE50CUSB3SK-K	Area scan camera CMOS, USB3, 7920 x 6004, color, 6.8fps, skylight/glass filter, K mount
COE50MUSB3SK-F	Area scan camera CMOS, USB3, 7920 x 6004, monochrome, 6.8fps, skylight/glass filter, F-mount
COE50CUSB3SK-F	Area scan camera CMOS, USB3, 7920 x 6004, color, 6.8fps, skylight/glass filter, F-mount
COE50MCLSK-K	Area scan camera CMOS, Camera Link, 7920 x 6004, monochrome, 27.3fps, skylight/glass filter, K mount
COE50CCLSK-K	Area scan camera CMOS, Camera Link, 7920 x 6004, color, 27.3fps, skylight/glass filter, K mount
COE50MCLSK-F	Area scan camera CMOS, Camera Link, 7920 x 6004, monochrome, 27.3fps, skylight/glass filter, F-mount
COE50CCLSK-F	Area scan camera CMOS, Camera Link, 7920 x 6004, color, 27.3fps, skylight/glass filter, F-mount
COE71MUSB3IR-K	Area scan camera CMOS, USB3, 10000 x 7094, monochrome, 3fps, IR Cut filter, K mount
COE71CUSB3IR-K	Area scan camera CMOS, USB3, 10000 x 7094, color, 3fps, IR Cut filter, K mount
COE71MUSB3IR-F	Area scan camera CMOS, USB3, 10000 x 7094, monochrome, 3fps, IR Cut filter, F-mount
COE71CUSB3IR-F	Area scan camera CMOS, USB3, 10000 x 7094, color, 3fps, IR Cut filter, F-mount
COE71MCLIR-K	Area scan camera CMOS, Camera Link, 10000 x 7094, monochrome, 3fps, IR Cut filter, K mount
COE71CCLIR-K	Area scan camera CMOS, Camera Link, 10000 x 7094, color, 3fps, IR Cut filter, K mount

COE71MCLIR-F	Area scan camera CMOS, Camera Link, 10000 x 7094, monochrome, 3fps, IR Cut filter, F-mount
COE71CCLIR-F	Area scan camera CMOS, Camera Link, 10000 x 7094, color, 3fps, IR Cut filter, F-mount
COE71MUSB3SK-K	Area scan camera CMOS, USB3, 10000 x 7094, monochrome, 3fps, skylight/glass filter, K mount
COE71CUSB3SK-K	Area scan camera CMOS, USB3, 10000 x 7094, color, 3fps, skylight/glass filter, K mount
COE71MUSB3SK-F	Area scan camera CMOS, USB3, 10000 x 7094, monochrome, 3fps, skylight/glass filter, F-mount
COE71CUSB3SK-F	Area scan camera CMOS, USB3, 10000 x 7094, color, 3fps, skylight/glass filter, F-mount
COE71MCLSK-K	Area scan camera CMOS, Camera Link, 10000 x 7094, monochrome, 3fps, skylight/glass filter, K mount
COE71CCLSK-K	Area scan camera CMOS, Camera Link, 10000 x 7094, color, 3fps, skylight/glass filter, K mount
COE71MCLSK-F	Area scan camera CMOS, Camera Link, 10000 x 7094, monochrome, 3fps, skylight/glass filter, F-mount
COE71CCLSK-F	Area scan camera CMOS, Camera Link, 10000 x 7094, color, 3fps, skylight/glass filter, F-mount



#### COE HR AS-X series

20MP, 26MP and 29MP area scan cameras for high-speed applications

COE-260-M-10GIGE-100-IR-F	HR Area Scan camera PYTHON 25K, CMOS, 5120 x 5120, 26 MP, 4.5 pix, APS-H, Gray, 10GigE, 40 fps, F - mount, Glass filter
COE-260-M-10GIGE-100-IR-I	HR Area Scan camera PYTHON 25K, CMOS, 5120 x 5120, 26 MP, 4.5 pix, APS-H, Gray, 10GigE, 40 fps, M58x0.75 - mount, Glass filter
COE-290-M-GIGE-110-IR-F-A	HR Area Scan camera KAI29050-B1, CCD, Global shutter, 6576 x 4384, 29 MP, 5.5 pix, 35 mm, Gray, GigE, 4 fps, F - mount, Glass filter
COE-290-M-GIGE-110-IR-F-B	HR Area Scan camera KAI29050-B2, CCD, Global shutter, 6576 x 4384, 29 MP, 5.5 pix, 35 mm, Gray, GigE, 4 fps, F - mount, Glass filter
COE-290-M-GIGE-110-IR-I-A	HR Area Scan camera KAI29050-B1, CCD, Global shutter, 6576 x 4384, 29 MP, 5.5 pix, 35 mm, Gray, GigE, 4 fps, M58x0.75 - mount, Glass filter
COE-290-M-GIGE-110-IR-I-B	HR Area Scan camera KAI29050-B2, CCD, Global shutter, 6576 x 4384, 29 MP, 5.5 pix, 35 mm, Gray, GigE, 4 fps, M58x0.75 - mount, Glass filter
COE-290-C-GIGE-110-IR-F-B	HR Area Scan camera KAI29050-B2, CCD, Global shutter, 6576 x 4384, 29 MP, 5.5 pix, 35 mm, Color, GigE, 4 fps, F - mount, Infrared cut filter
COE-290-C-GIGE-110-IR-I-B	HR Area Scan camera KAI29050-B2, CCD, Global shutter, 6576 x 4384, 29 MP, 5.5 pix, 35 mm, Color, GigE, 4 fps, M58x0.75 - mount, Infrared cut filter