

TC2MHR056-C

High resolution telecentric lens for 1" detectors, magnification 0.228x, C-mount

SPECIFICATIONS

| | | |
|--|----------------|---------------|
| Magnification | (x) | 0.228 |
| Image circle Ø | (mm) | 16.8 |
| Object field of view⁸ | | |
| | (mm x mm or Ø) | |
| with IMX174/IMX249 13.3 mm diag w x h 11.35 x 7.13 | | 49.76 x 31.25 |
| with IMX255/IMX267 16.1 mm diag w x h 14.19 x 7.51 | | 62.24 x 32.94 |
| with IMX253/IMX304 17.6 mm diag w x h 14.16 x 10.37 | | Ø = 45.49 |
| with KAI-4022/4021 21.5 mm diagonal w x h 15.2 x 15.2 | | Ø = 66.47 |
| with KAI-08050 22.6 mm diagonal w x h 18.1 x 13.6 ⁽⁷⁾ | | Ø = 59.63 |
| Optical specifications | | |
| Working distance ⁽¹⁾ | (mm) | 157.8 |
| wF/# ⁽²⁾ | | 16 |
| Telecentricity typical (max) ⁽³⁾ | (deg) | <0.04 (0.08) |
| Distortion typical (max) ⁽⁴⁾ | (%) | <0.05 (0.10) |
| Field depth ⁽⁵⁾ | (mm) | 23.1 |
| CTF@ 50 lp/mm | (%) | > 40 |
| Mechanical specifications | | |
| Mount | | C |
| Phase adjustment ⁽⁹⁾ | | Yes |
| Length ⁽⁶⁾ | (mm) | 257.1 |
| Diameter | (mm) | 80 |
| Mass | (g) | 979 |

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 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

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|-------------|--|
| LTCLHP056-R | Telecentric HP illuminator, beam diameter 70 mm, red |
| LTCLHP056-G | Telecentric HP illuminator, beam diameter 70 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.

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|-------------|--|
| LTCLHP056-B | Telecentric HP illuminator, beam diameter 70 mm, blue |
| LTCLHP056-W | Telecentric HP illuminator, beam diameter 70 mm, white |



LTCLHP CORE series

Ultra compact telecentric illuminators

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|-------------|--|
| LTCLCR056-R | Telecentric CORE illuminator, beam dimensions $\varnothing = 74$; x = 66, red |
| LTCLCR056-G | Telecentric CORE illuminator, beam dimensions $\varnothing = 74$; x = 66, green |
| LTCLCR056-W | Telecentric CORE illuminator, beam dimensions $\varnothing = 74$; x = 66, white |
| LTCLCR064-R | Telecentric CORE illuminator, beam dimensions $\varnothing = 86$; x = 67, red |
| LTCLCR064-G | Telecentric CORE illuminator, beam dimensions $\varnothing = 86$; x = 67, green |
| LTCLCR064-W | Telecentric CORE illuminator, beam dimensions $\varnothing = 86$; x = 67, white |



LTLA series

High-power strobed LED low angle diffused ringlights

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| 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

| | |
|----------------------|---|
| LT2RZF120-60-2-W-24V | LED ringlight, 2 LED rows, 126.5 mm outer diameter, 60°, white, 24V |
| LT2RZF120-60-2-R-24V | LED ringlight, 2 LED rows, 126.5 mm outer diameter, 60°, red, 24V |
| LT2RZF120-60-2-G-24V | LED ringlight, 2 LED rows, 126.5 mm outer diameter, 60°, green, 24V |
| LT2RZF120-60-2-B-24V | LED ringlight, 2 LED rows, 126.5 mm outer diameter, 60°, blue, 24V |



LTLAIC series

Continuous LED low angle diffused ringlights

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|----------------------|--|
| LT3RZF130-60-1-W-24V | LED ringlight, 1 LED row, 131.5 mm outer diameter, 60°, white, 24V |
| LT3RZF130-60-1-R-24V | LED ringlight, 1 LED row, 131.5 mm outer diameter, 60°, red, 24V |
| LT3RZF130-60-1-G-24V | LED ringlight, 1 LED row, 131.5 mm outer diameter, 60°, green, 24V |
| LT3RZF130-60-1-B-24V | LED ringlight, 1 LED row, 131.5 mm outer diameter, 60°, blue, 24V |



LTLADC series

Continuous LED low angle direct ringlights

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|---------------------|---|
| 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

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| LTRN056RD | Ring LED illuminator, inner diameter 80 mm, straight type, red 630 nm |
| LTRN056GR | Ring LED illuminator, inner diameter 80 mm, straight type, green 525 nm |
| LTRN056BL | Ring LED illuminator, inner diameter 80 mm, straight type, blue 470 nm |
| LTRN056NW | Ring LED illuminator, inner diameter 80 mm, straight type, white |



LTBC series

Continuous LED backlight

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|--------------|--|
| LTBC114114-W | Continuous LED backlight, 114x114 illumination area, white |
| LTBC114114-G | Continuous LED backlight, 114x114 illumination area, green |



LTBFC series

Continuous flat side-emitting LED backlights

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| LTPVR100-00-1-W-24V | Flat side-emitting LED backlight, 100X100 mm illumination area, white, 24V |
| LTPVR100-00-1-R-24V | Flat side-emitting LED backlight, 100X100 mm illumination area, red, 24V |
| LTPVR100-00-1-G-24V | Flat side-emitting LED backlight, 100X100 mm illumination area, green, 24V |
| LTPVR100-00-1-B-24V | Flat side-emitting LED backlight, 100X100 mm illumination area, blue, 24V |



LTRDC series

Continuous LED bar lights

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|--------------------------------------|--|
| LTZPFL080-00-6-W-24V | LED bar light, 6 LED rows, 80X26.3 illumination area, white, 24V |
| LTZPFL080-00-6-R-24V | LED bar light, 6 LED rows, 80X26.3 illumination area, red, 24V |
| LTZPFL080-00-6-G-24V | LED bar light, 6 LED rows, 80X26.3 illumination area, green, 24V |
| LTZPFL080-00-6-B-24V | LED bar light, 6 LED rows, 80X26.3 illumination area, blue, 24V |



LTCXC series

Continuous LED coaxial lights

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|--------------------------------------|---|
| LT2QOG070-00-X-W-24V | LED coaxial light, 70x70 mm light emitting area, white, 24V |
| LT2QOG070-00-X-R-24V | LED coaxial light, 70x70 mm light emitting area, red, 24V |
| LT2QOG070-00-X-G-24V | LED coaxial light, 70x70 mm light emitting area, green, 24V |
| LT2QOG070-00-X-B-24V | LED coaxial light, 70x70 mm light emitting area, blue, 24V |



CMBS series

45° beam splitters

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| CMBS056 | 45° beam splitter with mount for 80 mm clamping diameter optics |
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CMMR series

45° first surface mirrors

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| CMMR056 | 45° first surface mirror for 80 mm clamping diameter optics |
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WI series

Protective windows

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| WI056 | Protective window for 80 mm clamping diameter optics |
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CMHO series

Clamping mechanics

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| CMHO056 | Clamping mechanics for TCxx056 lenses and LTCLHP056-X illuminators |
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Accessories

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

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| TCFILTER | Filter mount for telecentric lenses |
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mvBlueFOX3-2 series

USB3 vision camera with Sony Pregius CMOS sensors

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| RT-mvBF3-2024a | USB3 Vision camera with Sony Pregius CMOS sensor IMX249 |
| RT-mvBF3-2024 | USB3 Vision camera with Sony Pregius CMOS sensor IMX174 |
| RT-mvBF3-2089a | USB3 Vision camera with Sony Pregius CMOS sensor IMX267 |
| RT-mvBF3-2089 | USB3 Vision camera with Sony Pregius CMOS sensor IMX255 |



mvBlueCOUGAR series

GigE & Dual GigE Vision cameras

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| RT-mvBC-X104f | Camera with interface GigE (1GB/s), sensor size 1/1.2", mpixel 2.35, resolution 1936 x 1216, sensor name IMX249, sensor type CMOS |
| RT-mvBC-XD104d | Camera with interface Dual GigE (2GB/s), sensor size 1/1.2", mpixel 2.35, resolution 1936 x 1214, sensor name IMX174, sensor type CMOS |
| 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 |



COE HR AS-X series

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

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| COE-200-M-POE-070-IR-C | 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 |
| COE-200-C-POE-070-IR-C | 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 |
| COE-200-M-USB-070-IR-C | HR Area Scan camera IMX183, CMOS, Rolling shutter, 5472 × 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 × 3648, 20.4 MP, 2.4 pix, 1", Color, 14 fps, C - mount, Infrared cut filter |