## MC4K025X-F

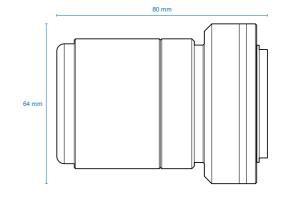
OPTO ENGINEERING

Macro lens for 4k linescan cameras, magnification 0.25x, F-mount

## SPECIFICATIONS

| Magnification       (x)       0.295       0.250       0.205         Object field of view (mm x mm)       with KAI-04050 16 mm diagonal w x h 12.8 x 9.6       43.4 x 32.5 38.4 46.8 46.8       62.4 x 32.5 38.4 46.8         with 2k x 10 µm detector 20.48       69.4 81.9 99.9       99.9         with KAI-4022/4021 21.5 mm diagonal w x h 15.2 x 15.2 51.5 60.8 74.1       61.4 x 72.4 x 88.3 x 46.1 51.5 66.3         with KAI-08050 22.6 mm diagonal w x h 18.1 x 13.6 46.1 54.4 66.3       46.1 54.4 66.3         with 4k x 7 µm detector 28.67       97.2 114.7 139.9         Optical specifications       (mm) 298.5 346.1 414.3         f/# (wF/#) (2)       6.4 (8)         Distortion typical (max) (3)       (%) < 0.08 (0.1)         Field depth (4)       (mm) 6.8         CTF @ 50 lp/mm       (%) < 60         Image side numerical aperture       0.063         Object side numerical aperture       0.018         Mechanical specifications         Length (5)       (mm) 80.0         Mass       (g) 507         Mount (6)       F | Focusing (1)  |      | near    | nominal | far   |  |
|--|---|------|---------|---------|-------|--|
| with KAI-04050 16 mm diagonal w x h 12.8 x 9.6       43.4 x 32.5 38.4 46.8         with 2k x 10 µm detector 20.48       69.4 81.9 99.9         with KAI-4022/4021 21.5 mm diagonal w x h 15.2 x 15.2       51.5 x 60.8 74.1 x 51.5 60.8 74.1         with KAI-08050 22.6 mm diagonal w x h 18.1 x 13.6       61.4 x 72.4 x 88.3 x 46.1 54.4 66.3         with 4k x 7 µm detector 28.67       97.2 114.7 139.9         Optical specifications         Working distance       (mm) 298.5 346.1 414.3         f/# (wF/#) (2)       6.4 (8)         Distortion typical (max) (3)       (%) <0.08 (0.1)   | Magnification   | (x)  | 0.295   | 0.250   | 0.205 |  |
| with KAI-04050 16 mm diagonal w x h 12.8 x 9.6       32.5       38.4       46.8         with 2k x 10 μm detector 20.48       69.4       81.9       99.9         with KAI-4022/4021 21.5 mm diagonal w x h 15.2 x 15.2       51.5 x 60.8 x 74.1 x 51.5 60.8 74.1         with KAI-08050 22.6 mm diagonal w x h 18.1 x 13.6       61.4 x 72.4 x 88.3 x 46.1 54.4 66.3         with 4k x 7 μm detector 28.67       97.2       114.7 139.9         Optical specifications         Working distance       (mm) 298.5 346.1 414.3         f/# (wF/#) (2)       6.4 (8)         Distortion typical (max) (3)       (%) < 0.08 (0.1)   | Object field of view (mm x mm)                        |      |         |         |       |  |
| with KAI-4022/4021 21.5 mm diagonal w x h 15.2 x 15.2       51.5 x 60.8 x 74.1 x 51.5 60.8 74.1         with KAI-08050 22.6 mm diagonal w x h 18.1 x 13.6       61.4 x 72.4 x 88.3 x 46.1 54.4 66.3         with 4k x 7 µm detector 28.67       97.2 114.7 139.9         Optical specifications         Working distance       (mm) 298.5 346.1 414.3         f/# (wF/#) (2)       6.4 (8)         Distortion typical (max) (3)       (%) <0.08 (0.1)  | with KAI-04050 16 mm diagonal w x h 12.8 x 9.6        |      |         |         |       |  |
| with KAI-4022/4021 21.5 mm diagonal w x h 15.2 x 15.2       51.5       60.8       74.1         with KAI-08050 22.6 mm diagonal w x h 18.1 x 13.6       61.4 x 72.4 x 88.3 x 46.1       54.4 66.3         with 4k x 7 µm detector 28.67       97.2       114.7 139.9         Optical specifications         Working distance       (mm) 298.5 346.1 414.3         f/# (wF/#) (2)       6.4 (8)         Distortion typical (max) (3)       (%) <0.08 (0.1)   | with 2k x 10 $\mu$ m detector 20.48                   |      | 69.4    | 81.9    | 99.9  |  |
| with KAI-08050 22.6 mm diagonal w x h 18.1 x 13.6       46.1       54.4       66.3         with 4k x 7 μm detector 28.67       97.2       114.7       139.9         Optical specifications         Working distance       (mm)       298.5       346.1       414.3         f/# (wF/#) (2)       6.4 (8)           Distortion typical (max) (3)       (%)       < 0.08  | with KAI-4022/4021 21.5 mm diagonal w x h 15.2 x 15.2 |      |         |         |       |  |
| Optical specifications         Working distance       (mm)       298.5       346.1       414.3         f/# (wF/#) (2)       6.4 (8)           Distortion typical (max) (3)       (%)       < 0.08  | with KAI-08050 22.6 mm diagonal w x h 18.1 x 13.6     |      |         |         |       |  |
| Working distance         (mm)         298.5         346.1         414.3           f/# (wF/#) (2)         6.4 (8)             Distortion typical (max) (3)         (%)         < 0.08 (0.1)   | with $4k \times 7 \mu m$ detector $28.67$             |      | 97.2    | 114.7   | 139.9 |  |
| f/# (wF/#) (2)       6.4 (8)           Distortion typical (max) (3)       (%)       < 0.08 (0.1)   | Optical specifications                                |      |         |         |       |  |
| Distortion typical (max) (3)  (%)  (%)  (0.1)   Field depth (4)  (mm)  6.8    CTF @ 50 lp/mm  (%)  >60   Image side numerical aperture  0.063   Object side numerical aperture  0.018   Mechanical specifications  Length (5)  (mm)  80.0    Mass  (g)  507   Field depth (4)  (mm)  6.8   | Working distance                                      | (mm) | 298.5   | 346.1   | 414.3 |  |
| (%)  | f/# (wF/#) (2)  |      | 6.4 (8) |         |       |  |
| CTF @ 50 lp/mm         (%) >60           Image side numerical aperture         0.063           Object side numerical aperture         0.018           Mechanical specifications            Length (5)         (mm) 80.0           Diameter         (mm) 64.0           Mass         (g) 507  | Distortion typical (max) (3)                          | (%)  |         |         |       |  |
| Image side numerical aperture         0.063           Object side numerical aperture         0.018           Mechanical specifications            Length (5)         (mm) 80.0           Diameter         (mm) 64.0           Mass         (g) 507   | Field depth (4)                                       | (mm) | 6.8     |         |       |  |
| Object side numerical aperture         0.018           Mechanical specifications           Length (5)         (mm) 80.0           Diameter         (mm) 64.0           Mass         (g) 507  | CTF @ 50 lp/mm  | (%)  | >60     |         |       |  |
| Mechanical specifications         (mm) 80.0           Length (5)         (mm) 64.0           Diameter         (mm) 64.0           Mass         (g) 507   | Image side numerical aperture                         |      | 0.063   |         |       |  |
| Length (5)         (mm)         80.0             Diameter         (mm)         64.0             Mass         (g)         507   | Object side numerical aperture                        |      | 0.018   |         |       |  |
| Diameter         (mm)         64.0             Mass         (g)         507  | Mechanical specifications                             |      |         |         |       |  |
| Mass (g) 507   | Length (5)  | (mm) | 80.0    |         |       |  |
| M  | Diameter  | (mm) | 64.0    |         |       |  |
| Mount (6) F  | Mass  | (g)  | 507     |         |       |  |
|  | Mount (6)   |      | F       |         |       |  |









## NOTES

- 1. Maximum and minimum magnification changes when focusing.
- 2. F/# = F-number, wF/# = working F-number, the real F-number of a lens when used as a macro. Lenses with smaller apertures can be supplied on request.
- 3. Percent deviation of the real image compared to an ideal, undistorted image: typical (average production) values and maximum (guaranteed) values are listed.
- 4. 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 taken into account.
- 5. Measured from the front end of the mechanics to the camera flange; take into account a +/- 2.5 mm tolerance due to the focussing mechanism.