

## High power multi mirror system for 1.1" sensors, C-mount



### SPECIFICATIONS

#### Optical specifications

|                                      |           |             |
|--------------------------------------|-----------|-------------|
| Magnification                        |           | 0.303       |
| Sensor size <sup>1</sup>             | (mm x mm) | 14.2 x 10.4 |
| FOV (diameter x height) <sup>2</sup> | (mm x mm) | 8.0 x 32.0  |
| Min sensor size                      |           | 1.1"        |
| wf/N <sup>3</sup>                    |           | 16          |
| Depth of field <sup>4</sup>          |           | 9.0         |

#### Mechanical specifications

|                               |      |       |
|-------------------------------|------|-------|
| Mount                         |      | C     |
| Phase adjustment <sup>7</sup> |      | Yes   |
| Length                        | (mm) | 200.8 |
| Width                         | (mm) | 111.0 |
| Height                        | (mm) | 270.7 |
| Mass                          | (g)  | 2063  |

#### Environment

|                             |      |                         |
|-----------------------------|------|-------------------------|
| Operating temperature       | (°C) | 0-40                    |
| Storage temperature         | (°C) | 0-50                    |
| Operating relative humidity | (%)  | 20 - 85, non-condensing |
| Installation                |      | Indoor use only         |

#### Eye safety

|                                |  |        |
|--------------------------------|--|--------|
| Risk group (CEI EN 62471:2010) |  | Exempt |
|--------------------------------|--|--------|

### KEY ADVANTAGES

#### 90° lateral imaging

the 4 orthonormal views allow visualization of object features that are hidden when looked at from the top

#### Long and thin object inspection

the characteristic aspect ratio of the four image segments perfectly fits long and thin objects

#### Built-in illumination

the device also incorporates two different light sources, for back and direct illumination

#### Suitable for measurement

the telecentric optics makes this module perfect for any multiple-measurement application.

**TCCAGE** is an integrated optomechanical system designed to fully inspect and measure parts from the side without any need of rotation. Four orthonormal views of an object are provided by a bitelecentric lens through an array of mirrors.

<sup>1</sup> Recommended sensor. Different sensor sizes may cause incomplete images

<sup>2</sup> Maximum sample diameter in each of the four views and maximum sample height with the recommended sensor.

<sup>3</sup> Working  $f/N$ : the real  $f/N$  of a lens in operating conditions. Lenses with reduced aperture can be supplied on request.

<sup>4</sup> At the limits of the depth of field, the image can still be used for measurements. For a very sharp image, however, only half of the depth of field should be considered. Pixel size used for calculation is 3.45  $\mu\text{m}$ .

<sup>5</sup> Tolerance  $\pm 2\%$ .

<sup>6</sup> Drop to 50% intensity @ 25°C.

<sup>7</sup> Indicates the availability of an integrated camera phase adjustment feature

### COMPATIBLE PRODUCTS

Full list of compatible products available [here](#).



A wide selection of innovative machine vision components.

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. Data are reported by design, actual lens performance may vary due to manufacturing tolerances.

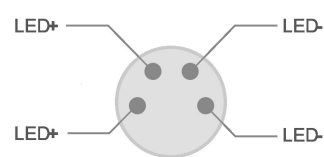
### Electrical specifications of coaxial light

|                              |         |              |
|------------------------------|---------|--------------|
| Light color, peak wavelength |         | white, 6500K |
| Supply voltage <sup>5</sup>  | (V)     | -            |
| Max continuous current       | (A)     | -            |
| Typical pulse voltage        | (V)     | 30           |
| Max pulse current            | (A)     | 6            |
| Peak power consumption       | (W)     | 180          |
| Max duty cycle               | (%)     | 1            |
| Max pulse duration           | (ms)    | 1            |
| Estimated MTBF <sup>6</sup>  | (hours) | 50000        |
| Cable length                 | (mm)    | 0.3          |
| Connector                    |         | M8           |
| Included cables              |         | CBLT003      |

### Electrical specifications of ring light

|                              |         |              |
|------------------------------|---------|--------------|
| Light color, peak wavelength |         | white, 6500K |
| Supply voltage <sup>5</sup>  | (V)     | -            |
| Max continuous current       | (W)     | -            |
| Typical pulse voltage        | (V)     | 20           |
| Max pulse current            | (A)     | 2            |
| Peak power consumption       | (W)     | 40           |
| Max duty cycle               | (%)     | 1.5          |
| Max pulse duration           | (ms)    | 1            |
| Estimated MTBF <sup>6</sup>  | (hours) | 50000        |
| Cable length                 | (mm)    | 0.3          |
| Connector                    |         | M8           |
| Included cables              |         | CBLT003      |

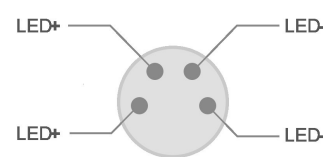
### COAXIAL LIGHTING PINOUT



Device side

| Function | Cable color |
|----------|-------------|
| LED +    | Brown       |
| LED +    | White       |
| LED -    | Blue        |
| LED -    | Black       |

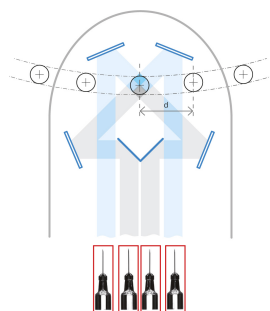
### RINGLIGHT PINOUT



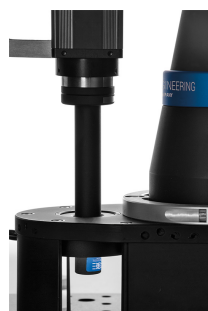
Device side

| Function | Cable color |
|----------|-------------|
| LED +    | Brown       |
| LED +    | White       |
| LED -    | Blue        |
| LED -    | Black       |

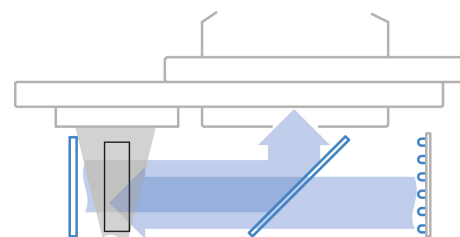
### WORKING PRINCIPLE AND ADDITIONAL INFO



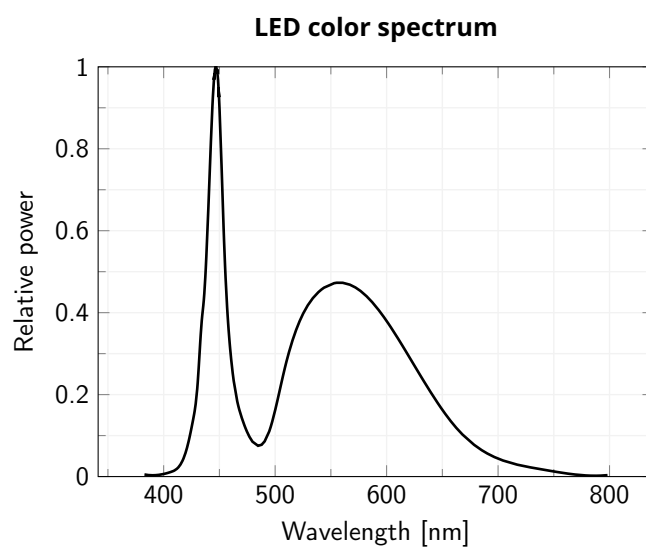
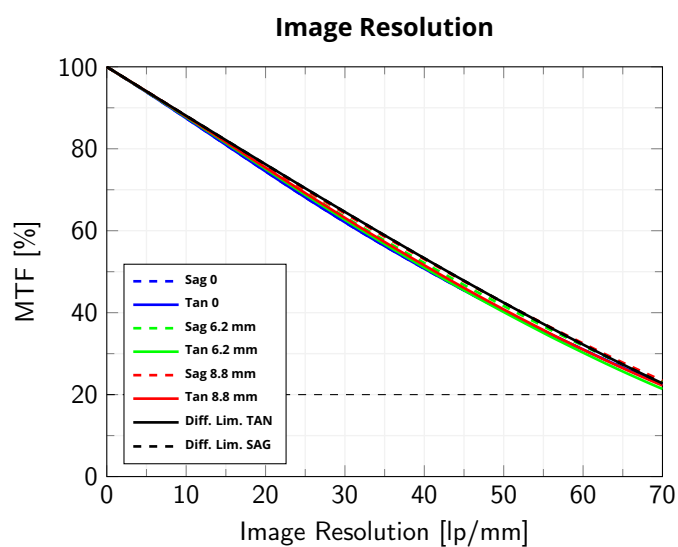
The four views are equally spaced by 90° and partially overlapped, obtaining complete coverage of the object lateral surfaces.



TCCAGE is provided with an extra port placed right above the object. This port can be used to inspect the top of the part using an additional lens and camera system.



TCCAGE series integrates both direct and back-light illumination.



Modulation Transfer Function (MTF) vs. Image Resolution, wavelength range 486 nm - 656 nm from the centre to to the corner of images sensor