

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



### 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.

### 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)	2171

#### 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
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- <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, 6300K
Supply voltage <sup>5</sup>	(V)	24
Max continuous current	(mA)	280
Typical pulse voltage	(V)	36
Max pulse current	(A)	2.8
Peak power consumption	(W)	6.7
Max duty cycle	(%)	10
Max pulse duration	(ms)	10
Estimated MTBF <sup>6</sup>	(hours)	20000
Cable length	(mm)	1
Connector		Flying leads
Included cables		-

**Electrical specifications of ring light**

Light color, peak wavelength		white, 6300K
Supply voltage <sup>5</sup>	(V)	24
Max continuous current	(mA)	105
Typical pulse voltage	(V)	36
Max pulse current	(A)	0.315
Peak power consumption	(W)	2.5
Max duty cycle	(%)	10
Max pulse duration	(ms)	10
Estimated MTBF <sup>6</sup>	(hours)	20000
Cable length	(mm)	1
Connector		Flying leads
Included cables		-

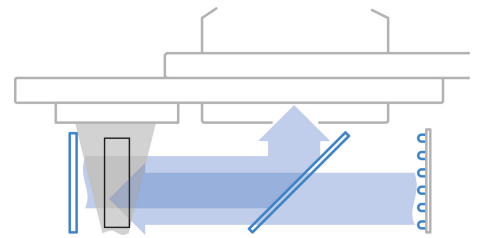
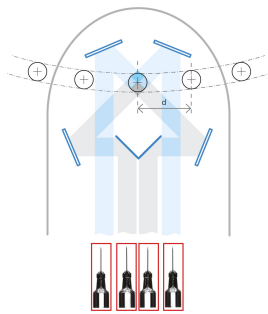
**COAXIAL LIGHTING PINOUT**

Function	Cable color
LED +	Black/White
LED -	Black

**RINGLIGHT PINOUT**

Function	Cable color
LED +	Red
LED -	White

**WORKING PRINCIPLE AND ADDITIONAL INFO**



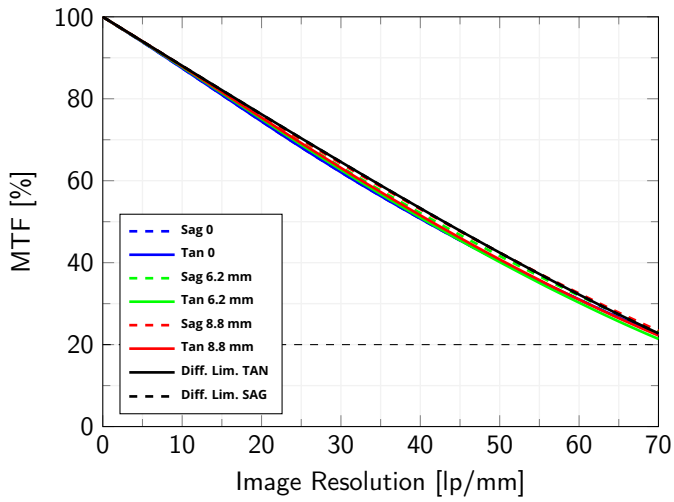
The four views are equally spaced by 90° and partially overlapped, obtaining complete coverage of the object lateral surfaces.

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.

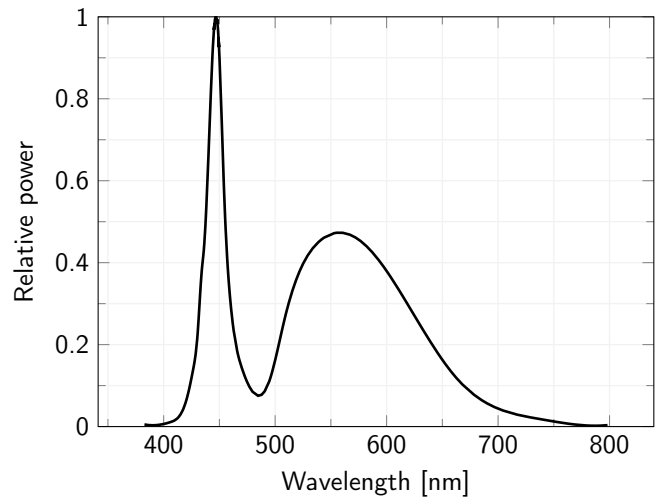
TCCAGE series integrates both direct and back-light illumination.

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**Image Resolution**



**LED color spectrum**



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