

datasheet

# pc<sub>o</sub>.edge 10 bi LT CLHS

the next-level sCMOS camera

**bi** back illuminated

resolution  
**10.4 MPixel**

pixel size  
**4.6 μm x 4.6 μm**

interface  
**CLHS FOL**



high dynamic range  
14 000 : 1

fiber-optic data  
interface

high resolution  
4416 x 2368 pixels

temperature-stabilized  
image sensor

back illuminated sCMOS  
with high MTF

low readout noise  
1.3 e<sup>-</sup> @ 122 fps

## technical data

### image sensor

<b>sensor technology</b>	back illuminated scientific CMOS (bi sCMOS)
<b>color type</b>	monochrome
<b>resolution (horizontal x vertical)</b>	4416 px x 2368 px
<b>pixel size (horizontal x vertical)</b>	4.6 $\mu\text{m}$ x 4.6 $\mu\text{m}$
<b>sensor size (horizontal x vertical)</b>	20.3 mm x 10.8 mm
<b>sensor diagonal</b>	23.0 mm
<b>shutter mode</b>	rolling shutter (RS)
<b>modulation transfer function (theoretical max.)</b>	108.6 lp/mm
<b>peak quantum efficiency</b>	85 % @ 500 nm
<b>spectral range</b>	400 nm - 1100 nm
<b>dark current (typ.)</b>	0.4 e <sup>-</sup> /pixel/s @ +10 °C sensor temperature
<b>fullwell capacity</b>	18 000 e <sup>-</sup>
<b>readout noise (typ.)<sup>1</sup></b>	1.3 e <sup>-</sup> rms 1.3 e <sup>-</sup> med
<b>dynamic range (intra-scene)<sup>2</sup></b>	14 000 : 1 (83 dB)

<sup>1</sup> The readout noise values are given as median (med) and root mean square (rms) values, due to the different noise models which can be used for evaluation. All values are raw data without any filtering.

<sup>2</sup> The dynamic range value is calculated with the median value of the readout noise and rounded.

### frame rate table

#### vertical resolution reduction

<b>4416 x 2368</b>	122 fps
<b>4416 x 2048</b>	141 fps
<b>4416 x 1024</b>	281 fps
<b>4416 x 512</b>	557 fps
<b>4416 x 256</b>	1098 fps
<b>4416 x 128</b>	2132 fps
<b>4416 x 64</b>	4028 fps
<b>4416 x 32</b>	7252 fps
<b>4416 x 16</b>	12 086 fps
<b>4416 x 8</b>	18 130 fps

#### typical resolutions

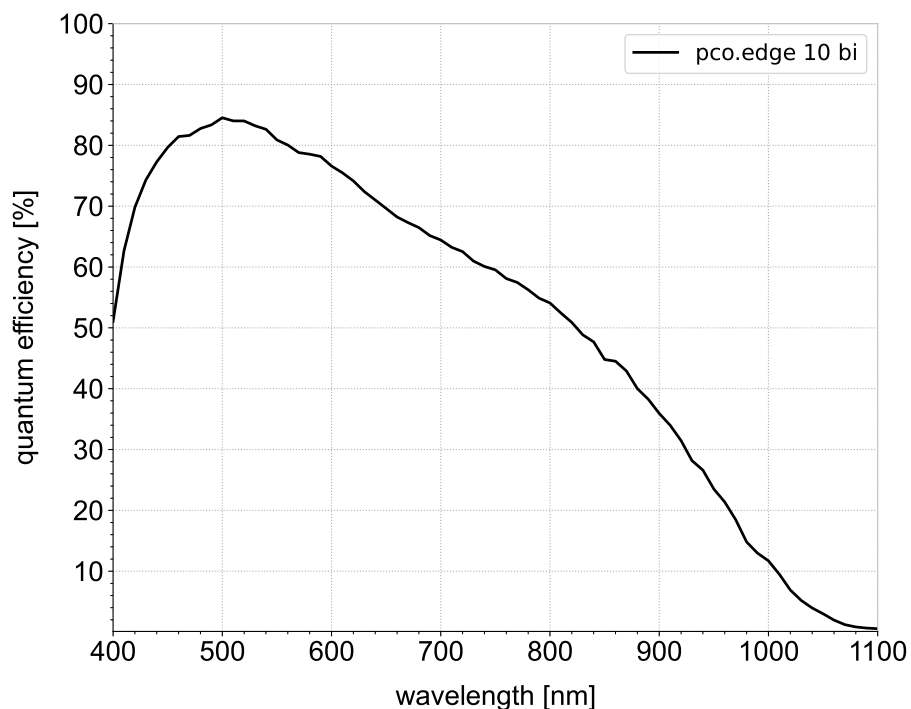
<b>2304 x 2304</b>	125 fps
<b>2048 x 2048</b>	141 fps
<b>1920 x 1080</b>	266 fps
<b>1280 x 1024</b>	281 fps
<b>640 x 512</b>	557 fps
<b>320 x 256</b>	1098 fps

**camera**

<b>max. frame rate @ full resolution</b>	122 fps
<b>exposure time range</b>	6.9 $\mu$ s - 10 s
<b>dynamic range A/D<sup>1</sup></b>	16 bit
<b>conversion factor<sup>2</sup></b>	0.275 e-/DN
<b>pixel rate</b>	1467 MPixel/s
<b>region of interest (ROI)</b>	horizontal: steps of 32 columns vertical: steps of 4 rows
<b>binning</b>	horizontal: x2, x4 (average, sum) vertical: x2, x4 (average, sum)
<b>non-linearity</b>	< 0.33 %
<b>dark signal non-uniformity (DSNU)</b>	< 0.37 e- rms
<b>photo response non-uniformity (PRNU)</b>	< 0.72 %
<b>cooling temperature image sensor</b>	adjustable: 0 °C to +25 °C calibration setpoint: +10 °C
<b>cooling method</b>	forced air & liquid cooling
<b>trigger input signals</b>	external exposure start, external exposure control, acquire enable
<b>status output signals</b>	exposure, busy, line
<b>input / output signal connectors</b>	SMA
<b>time stamp</b>	in image (1 $\mu$ s resolution)
<b>data interface</b>	Camera Link HS FOL

<sup>1</sup> The high dynamic signal is simultaneously converted at high and low gain by two 11 bit A/D converters and the two 11 bit values are sophistically merged into one 16 bit value.

<sup>2</sup> According to EMVA1288, the conversion factor equals the inverse of the system gain and can be operational mode dependent.

**quantum efficiency**

### general

power supply	24 VDC (±10 %)
power consumption	max. 40 W
weight	1.35 kg
dimensions (height x width x length <sup>1</sup> )	95 mm x 90 mm x 109 mm
operating temperature range	+10 °C to +40 °C
storage temperature range	-10 °C to +60 °C
humidity range (non-condensing)	10 % to 80 % (recommended < 65 %)
certifications	CE, FCC, UKCA

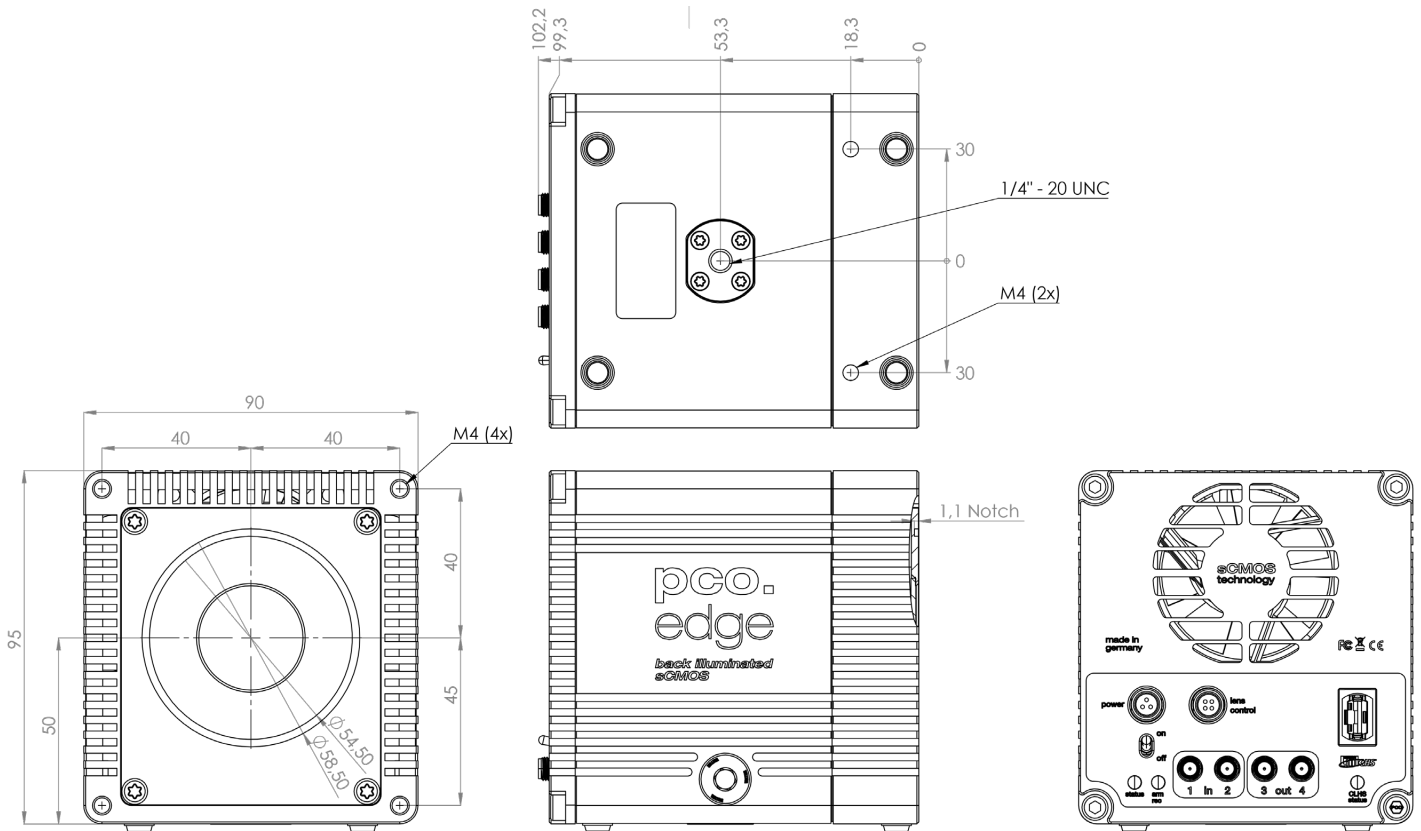
<sup>1</sup> This value refers to the length including the camera flange.

### optical interface

direct mounting distance (no camera flange)	6.2 mm (±10 %)
lens mounting	C-mount, F-mount
optional lens mounting	TFL-mount
optional lens remote control	EF-mount, EF-S-mount (Canon)

Configure your optical setup with our **MachVis Lens Selector** online tool.

### dimensions



outlines of pco.edge 10 bi LT CLHS without camera flange (all dimensions given in mm)

## software

### Your first choice is pco.camware:

Our main camera control software enables control of most camera settings and facilitates image acquisition and storage.

You can customize it exactly to your needs using different layouts, styles and features.

### You prefer to use a different software:

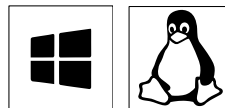
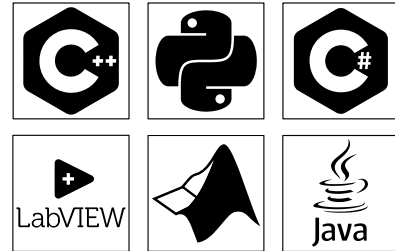
Our cameras integrate with a range of third-party software applications.

In microscopy we offer dedicated support for  $\mu$ Manager, while ensuring compatibility with other software maintained by their providers.

### You want to create your own application:

We feature a wide range of software development kits (SDK) for various programming languages, such as C++, Python, C#, LabVIEW, Matlab, and Java.

If you are looking for more general SDKs, we present pco.sdk and pco.recorder, our low-level SDKs with C interface.



Our software is available for Windows and Linux platforms.

Visit our **website** for detailed information, installation guidance, and Github projects.

## areas of application

3D metrology | biochip reading | biometrics | brightfield microscopy | calcium imaging | digital pathology | fluorescence microscopy | fluorescence recovery after photobleaching (FRAP) | Förster resonance energy transfer (FRET) | high-speed brightfield ratio imaging | high-throughput screening | image intensifier imaging | in vivo microscopy | industrial quality inspection | intravital microscopy | lightsheet fluorescence microscopy (LSFM) | material testing | ophthalmology | raman spectroscopy | selective plane illumination microscopy (SPIM) | single molecule localization microscopy (SMLM) – PALM, STORM, dSTORM, GSDIM | structured illumination microscopy (SIM) | total internal reflection fluorescence microscopy (TIRF) | wafer inspection

## ordering information

pco.edge 10 bi LT CLHS

85108076025

camera system, 4432 x 2368 pixel, monochrome, back illuminated, rolling shutter, fast scan mode only, CLHS interface, air & liquid cooling

address: Excelitas PCO GmbH  
Donaupark 11  
93309 Kelheim, Germany

phone: (+49) 9441-2005-0  
(+1) 866-662-6653  
(+86) 0512-6763-4643

mail: [pco@excelitas.com](mailto:pco@excelitas.com)

web: [www.excelitas.com/pco](http://www.excelitas.com/pco)

