data sheet
pco.edge 10 bi CLHS

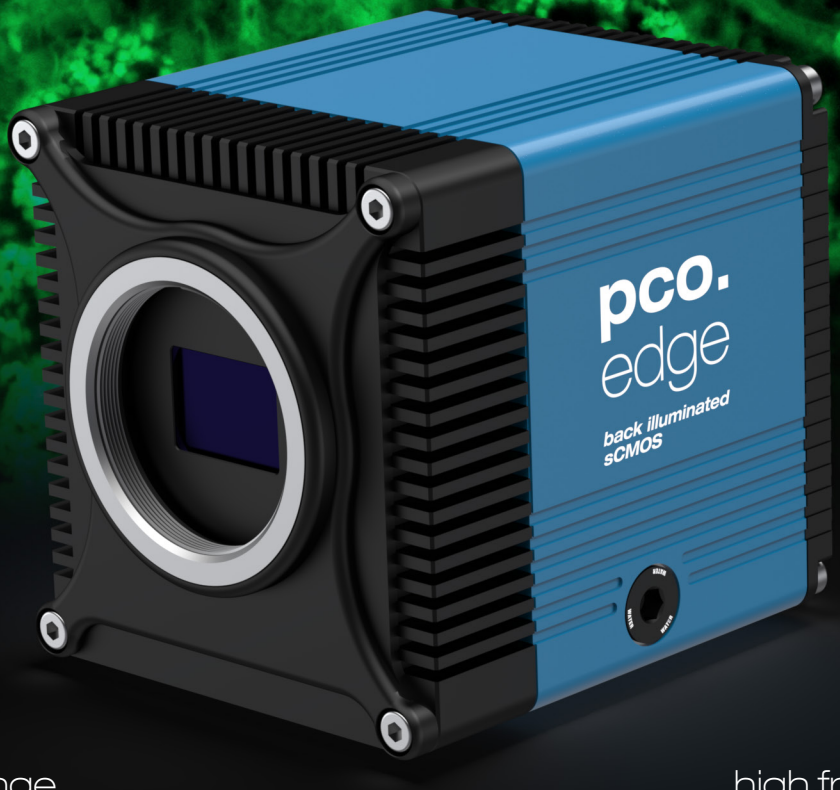
the next level **sCMOS** camera

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

high frame rate
122 fps

high resolution
4416 x 2368 pixel

low readout noise
0.7 $e^-_{(med)}$

back illuminated sCMOS
with high MTF

temperature-stabilized
image sensor

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technical data

image sensor

	slow scan	medium scan	fast scan
sensor technology	back illuminated scientific CMOS (bi sCMOS)		
color type	monochrome		
resolution (horizontal x vertical)	4416 pixel x 2368 pixel		
pixel size (horizontal x vertical)	4.6 µm x 4.6 µm		
sensor size (horizontal x vertical)	20.3 mm x 10.8 mm		
sensor diagonal	23.0 mm		
shutter type	rolling shutter		
modulation transfer function (theoretical max.)	108.6 lp/mm		
peak quantum efficiency	85 % @ 500 nm		
spectral range	400 nm - 1100 nm		
dark current	0.4 e^-/pixel/s @ +10 °C sensor temperature		
fullwell capacity	625 e^-	14,000 e^-	18,000 e^-
readout noise (typ.)	0.8 e^- rms 0.7 e^- med	1.2 e^- rms 1.2 e^- med	1.3 e^- rms 1.3 e^- med
dynamic range (intra-scene)	900 : 1	12,000 : 1	14,000 : 1

frame rate table

vertical resolution reduction in fps

	slow scan	medium scan	fast scan
4416 x 2368	30	61	122
4416 x 2048	35	70	141
4416 x 1024	70	140	281
4416 x 512	139	278	557
4416 x 256	274	549	1098
4416 x 128	533	1066	2132
4416 x 64	1007	2014	4028
4416 x 32	1813	3626	7252
4416 x 16	3021	6043	12,086
4416 x 8	4532	9065	18,130

typical resolutions in fps

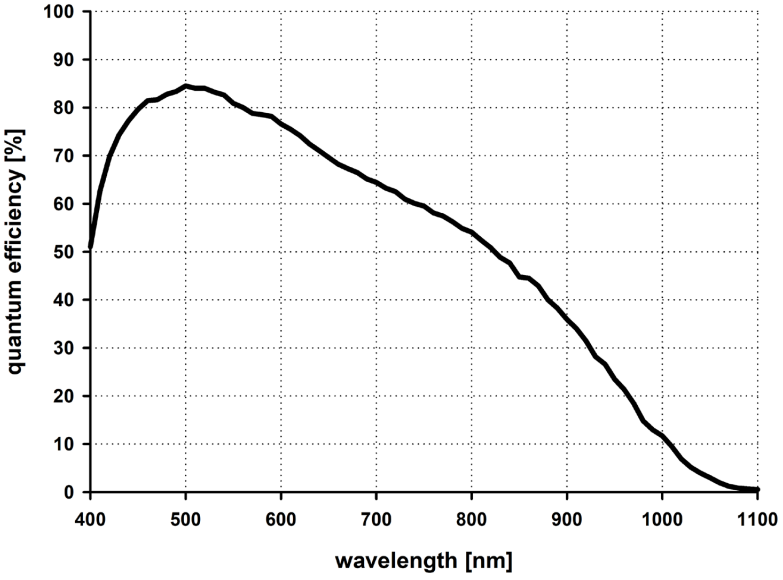
	slow scan	medium scan	fast scan
2304 x 2304	31	62	125
2048 x 2048	35	70	141
1920 x 1080	66	133	266
1280 x 1024	70	140	281
640 x 512	139	278	557
320 x 256	274	549	1098

camera

	slow scan	medium scan	fast scan
max. frame rate @ full resolution	30 fps	61 fps	122 fps
exposure time range	1 ms - 1 s	13.6 µs - 1 s	6.8 µs - 1 s
dynamic range A/D	11 bit	16 bit	
conversion factor[1]	0.305 e^-/DN	0.214 e^-/DN	0.275 e^-/DN
pixel rate	366 MPixel/s	733 MPixel/s	1467 MPixel/s
region of interest (ROI)	horizontal: steps of 32 columns vertical: steps of 4 rows		
binning	horizontal: x2, x4 (average, sum) vertical: x2, x4 (average, sum)		
non-linearity	< 0.5 %	< 0.2 %	
dark signal non-uniformity (DSNU)	< 0.08 e^- rms	< 0.23 e^- rms	
photo response non-uniformity (PRNU)	< 0.3 %	< 0.25 %	
cooling temperature image sensor	+10 °C stabilized		
cooling method	forced air & water		
trigger input signals	frame trigger, sequence trigger, programmable input		
trigger output signals	exposure, busy, programmable output		
input / output signal interface	SMA connectors		
time stamp	in image (1 µs resolution)		
data interface	Camera Link HS FOL		

[1] According to EMVA1288 the conversion factor equals the inverse of the system gain and can be operational mode dependent.

quantum efficiency



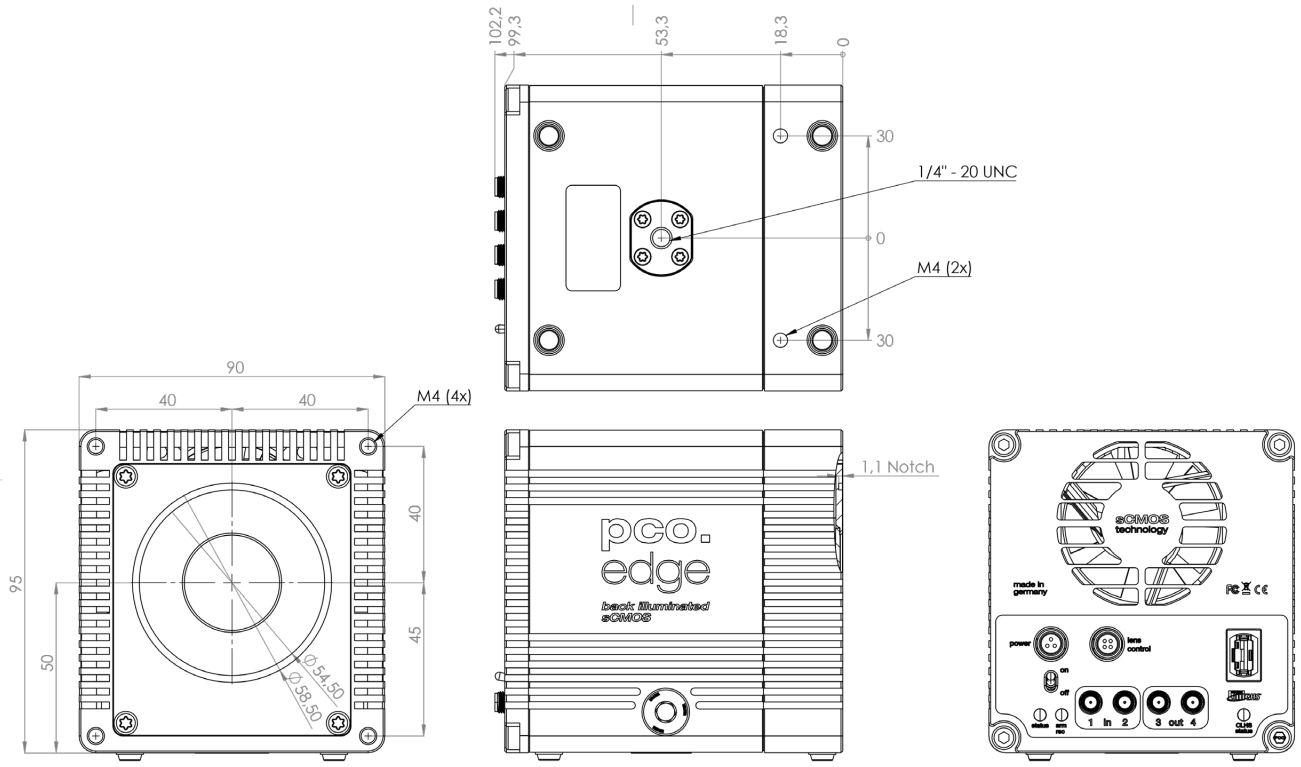
general	
power supply	24 VDC (±10 %)
power consumption	< 40 W
weight	1.35 kg
dimensions (height x width x length[1])	95 mm x 90 mm x 109 mm
operating temperature range	+10 °C to +40 °C
operating humidity range (non-condensing)	10 % to 80 % (non-condensing)
storage temperature range	-10 °C to +60 °C
CE / FCC certified	yes

[1] This value refers to the length including the lens mount adapter.

optical interface	
direct mounting	6.2 mm ± 10 %
lens mounting	C-mount
optional lens mounting	F-mount, TFL-mount
optional lens remote controller	EF-mount, EF-S-mount (Canon)

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

dimensions



Outlines of pco.edge 10 bi CLHS without lens mount adapter (all dimensions given in mm).

software

Your first choice is pco.camware:
Our main camera control software enables full control of all 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:
PCO cameras are integrated in a variety of software applications.

(available soon)

(available soon)

You want to create your own application:
We offer a wide range of Software Development Kits (SDK) for different programming languages, both for windows and linux. Our pco.sdk, pco.recorder and high-level SDK are designed for C/C++ apps. With pco.python, pco.matlab, pco.labview and pco.java you can control the camera in your C#, python, matlab, labview and java applications, respectively.

You are in the field of microscopy:
PCO cameras are integrated in µManager.

areas of application

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

ordering information

pco.edge 10 bi CLHS	85108076021	camera system, 4432 x 2368 pixel, mono, air & water cooled, CLHS FOL, rolling shutter

pco.®

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