data sheet
pco.edge 10 bi

the next level **sCMOS** camera

resolution
10.4 MPixel

pixel size
4.6 µm x 4.6 µm

interface
CLHS FOL

high dynamic range
15,385 : 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

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
fullwell capacity	20,000 e^- @ fast scan
readout noise (typ.)	1.3 e^- rms @ fast scan 1.3 e^- med @ fast scan 0.8 e^- rms @ slow scan 0.7 e^- med @ slow scan
dynamic range (intra-scene)	15,385:1 (83.7dB) @ fast scan
peak quantum efficiency	85 % @ 500 nm
spectral range	400 nm - 1100 nm
dark current	0.4 e^- /pixel/s @ +10 °C sensor temperature

frame rate table

vertical resolution reduction

	fast scan	slow scan
4416 x 2368	122 fps	30 fps
4416 x 2048	141 fps	35 fps
4416 x 1024	281 fps	70 fps
4416 x 512	557 fps	139 fps
4416 x 256	1098 fps	274 fps
4416 x 128	2132 fps	533 fps
4416 x 64	4028 fps	1007 fps
4416 x 32	7252 fps	1813 fps
4416 x 16	12,086 fps	3021 fps
4416 x 8	18,130 fps	4532 fps

typical resolutions

	fast scan	slow scan
2304 x 2304	125 fps	31 fps
2048 x 2048	141 fps	35 fps
1920 x 1080	266 fps	66 fps
1280 x 1024	281 fps	70 fps
640 x 512	557 fps	139 fps
320 x 256	1098 fps	274 fps

camera

max. frame rate @ full resolution	122 fps @ fast scan 30 fps @ slow scan
exposure time range	6.8 µs - 1 s @ fast scan 27.5 µs - 1 s @ slow scan
dynamic range A/D	16 bit
conversion factor[1]	0.275 e⁻/DN @ fast scan 0.305 e⁻/DN @ slow scan
pixel rate	1467 MPixel/s @ fast scan 366 MPixel/s @ slow scan
region of interest (ROI)	horizontal: steps of 1 column vertical: steps of 8 rows
binning	horizontal: x2, x4 (average, sum) vertical: x2, x4 (average, sum)
non-linearity	< 0.33 % @ fast scan < 0.5 % @ slow scan
dark signal non-uniformity (DSNU)	< 0.23 e⁻ rms @ fast scan < 0.07 e⁻ rms @ slow scan
photo response non-uniformity (PRNU)	< 0.3 %
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
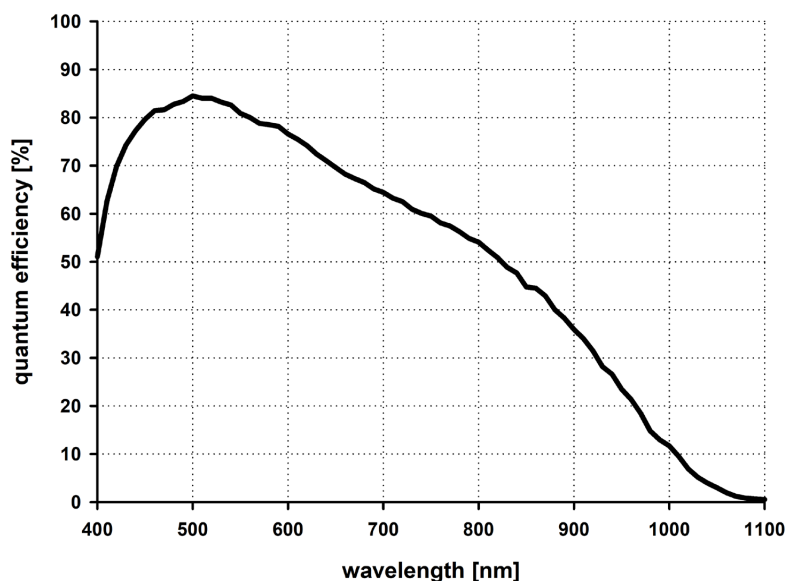
general

power supply	24 VDC (±10 %)
power consumption	< 40 W
weight	1.35 kg
dimensions (height x width x length)	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

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
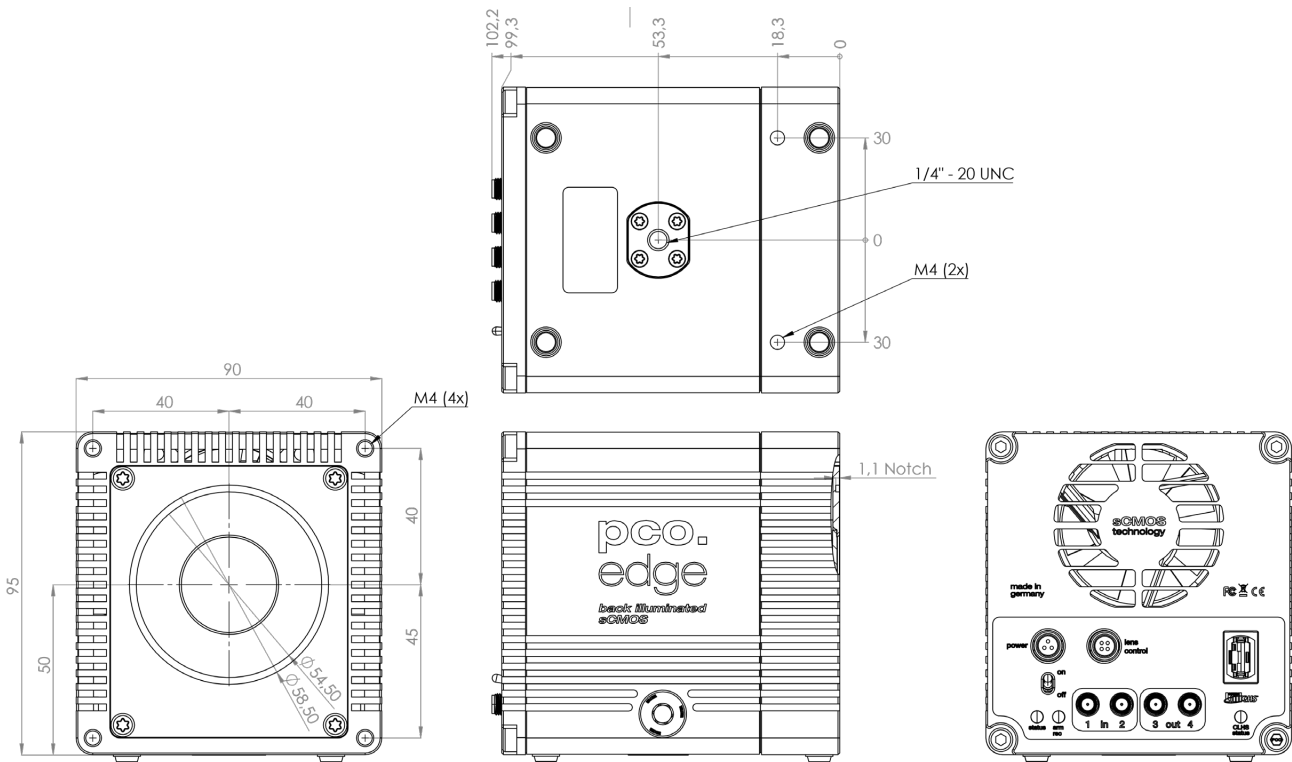
Outlines of pco.edge 10 bi (all dimensions given in mm).

software

Our main camera control software pco.camware is the first choice to get started with your camera. It enables full control of all camera settings and makes image acquisition and storage very easy. Using different layouts, stiles and features you can customize it exactly to your needs.

You are using a different software:

PCO cameras are also integrated in a variety of software applications. Check our homepage to find a list of all applications that support PCO cameras.


(in preparation)   (in preparation)

You want to create your own application for the camera:

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.
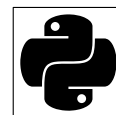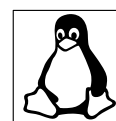
Your use case is in the field of microscopy:

PCO cameras are also integrated in µManager.

areas of application

bright-field 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 bright-field 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

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