

data sheet
pcO. edge 3.1 USB

scientific CMOS camera

resolution
3.1 MPixel

pixel size
6.5 μm x 6.5 μm

interface
USB 3.0



low noise
1.1 electrons

high quantum efficiency
> 60 %

high dynamic range
27 000 : 1

high speed
50 fps

high resolution
2048 x 1536 pixel

pcO.

An Excelitas Technologies Brand

technical data

image sensor

sensor technology	scientific CMOS (sCMOS)
color type	monochrome or color
resolution (horizontal x vertical)	2048 pixel x 1536 pixel
pixel size (horizontal x vertical)	6.5 μm x 6.5 μm
sensor size (horizontal x vertical)	13.3 mm x 10.0 mm
sensor diagonal	16.6 mm
shutter type	rolling shutter (RS) with free selectable readout modes, global / snapshot shutter (GS), global reset - rolling readout (GR)
modulation transfer function (theoretical max.)	76.9 lp/mm
fullwell capacity	30.000 e ⁻
readout noise (typ.) ¹	1.1 _{med} / 1.5 _{rms} e ⁻ @ RS / GR ² 2.7 _{med} / 2.9 _{rms} e ⁻ @ GS
dynamic range	27 000 : 1 @ RS / GR 11 000 : 1 @ GS
peak quantum efficiency	> 60 % @ peak
spectral range	370 nm - 1100 nm
dark current	< 0.5 e ⁻ /pixel/s RS / GR @ +5 °C sensor temperature < 0.8 e ⁻ /pixel/s GS @ +5 °C sensor temperature

frame rate table³

vertical resolution reduction	GS	RS
2048 x 1536	50 fps	50 fps
1920 x 1080	72 fps	74 fps
1280 x 1024	75 fps	77 fps
640 x 480	160 fps	164 fps



camera

max. frame rate @ full resolution	50 fps @ 2048 x 1536 pixel
exposure time range	500 μ s - 2 s (RS) 20 μ s - 100 ms (GS) 30 μ s - 2 s (GR)
dynamic range A/D⁴	16 bit
conversion factor	0.46 e ⁻ /count
pixel scan rate	204.0 MHz (GS) 105.0 MHz (RS/GR)
pixel data rate	408.0 MPixel/s (GS) 210.0 MPixel/s (RS / GR)
binning	x2, x4
non-linearity	< 0.6 %
cooling method	+5 °C stabilized, peltier with forced air (fan), (up to 27 °C ambient)
dark signal non-uniformity (DSNU)	< 0.3 e ⁻ rms (RS / GR) < 2.0 e ⁻ rms (GS)
photo response non-uniformity (PRNU)	< 0.2 %
auto blooming factor	> 10,000
trigger input signals	frame trigger, programmable input
trigger output signals	exposure, busy, line, programmable output
input / output signal interface	SMA connectors
time stamp	in image (1 μ s resolution)
data interface	USB 3.0

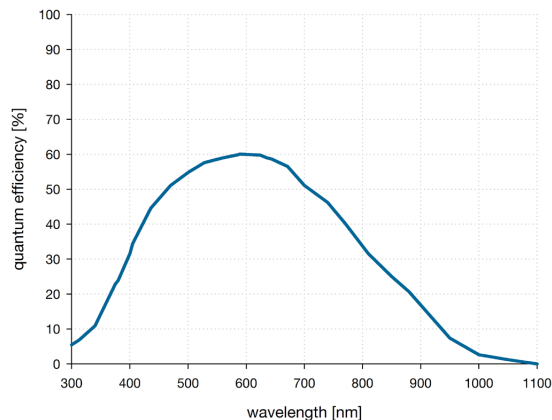
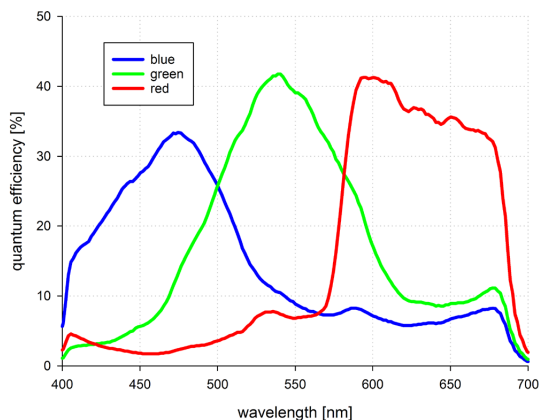
¹ The readout noise values are given as median (med) and root mean square (rms) values, due to the different noise models, which can be used for evaluation.

² Raw data without filtering.

³ Max. fps with centered ROI.

⁴ 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.

quantum efficiency



general

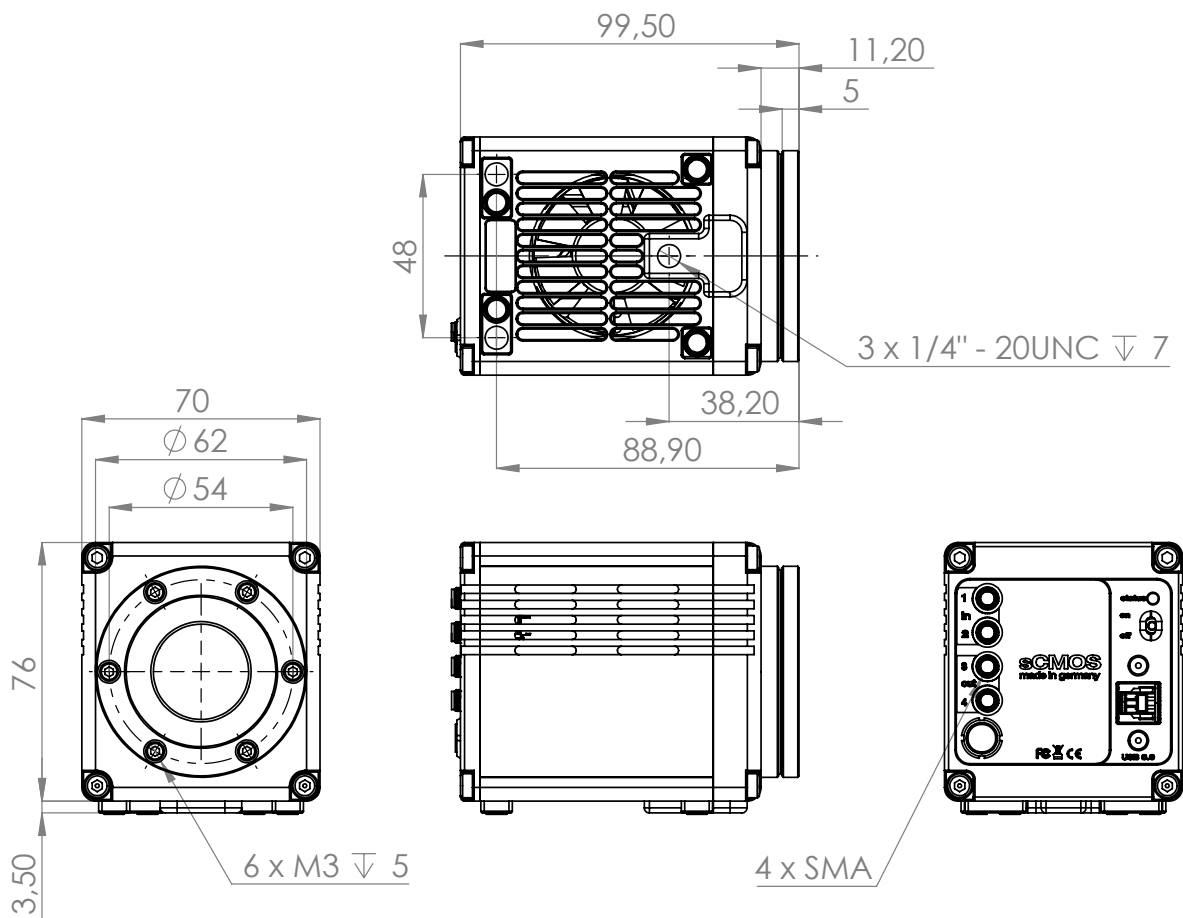
power supply	12 - 24 VDC (+ / - 10 %)
power consumption	21 W max. (typ. 12 W @ +20 °C)
weight	900 g
dimensions (height x width x length)	79.5 mm x 70 mm x 103 mm
operating temperature range	+10 °C to +40 °C
operating humidity range (non-condensing)	10 % to 80 % (non-condensing)
storage temperature range	-10 °C to +60 °C
CE / FCC certified	yes

optical interface

direct mounting	11.1 mm ±10 %
lens mounting	C-Mount
optional lens mounting	F-Mount, TFL-Mount

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

dimensions



Outlines of pco.edge 3.1 USB (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, styles 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.

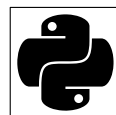
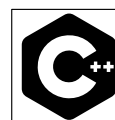
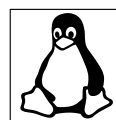
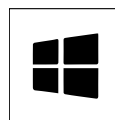


METAMORPH



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

widefield microscopy | fluorescent microscopy | digital pathology | PALM | STORM | GSDIM | dSTORM | superresolution microscopy | lightsheet microscopy | selective plane imaging microscopy (SPIM) | calcium imaging | FRET | FRAP | 3D structured illumination microscopy | high speed bright field ratio imaging | high throughput screening | high content screening | biochip reading | TIRF | TIRF microscopy / waveguides | spinning disk confocal microscopy | live cell microscopy | 3D metrology | TV / broadcasting | ophthalmology | electro physiology | lucky astronomy | photovoltaic inspection

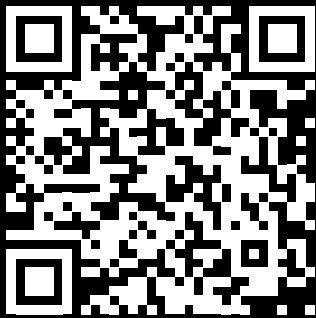
ordering information

pco.edge 3.1 USB	85108072433	camera system, monochrome, 2048x1536 pixel, air cooled, USB3
pco.edge 3.1 C USB	85108072441	camera system, color, 2048x1536 pixel, air cooled, USB3

pcoco.

An Excelitas Technologies Brand

telephone:	+49 (0) 9441 2005 0
fax:	+49 (0) 9441 2005 20
postal address:	Excelitas PCO GmbH Donaupark 11 93309 Kelheim, Germany
e-mail:	pcoco@excelitas.com
web:	www.excelitas.com



EXCELITAS
TECHNOLOGIES®