

data sheet

# pco.edge 5.5 DS CLHS

cooled sCMOS camera with double shutter feature

**DS** double shutter

resolution

**5.5 MPixel**

pixel size

**6.5  $\mu\text{m}$  x 6.5  $\mu\text{m}$**

interface

**CLHS FOL**



low noise  
1.0 electrons

high dynamic range  
30,000 : 1

high resolution  
2560 x 2160 pixel

shutter modes  
rolling & global shutter,  
global reset, double shutter

high speed  
100 fps

**pco.**

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## technical data

### image sensor

<b>sensor technology</b>	scientific CMOS (sCMOS)
<b>color type</b>	monochrome or color
<b>resolution (horizontal x vertical)</b>	2560 pixel x 2160 pixel
<b>pixel size (horizontal x vertical)</b>	6.5 $\mu\text{m}$ x 6.5 $\mu\text{m}$
<b>sensor size (horizontal x vertical)</b>	16.6 mm x 14.0 mm
<b>sensor diagonal</b>	21.8 mm
<b>shutter type</b>	rolling shutter (RS) with free selectable readout modes, global/snapshot shutter (GS) global reset - rolling readout (GR) double shutter (DS)
<b>modulation transfer function (theoretical max.)</b>	76.9 lp/mm
<b>fullwell capacity</b>	30,000 e <sup>-</sup>
<b>readout noise (typ.)<sup>1</sup></b>	1.0 <sub>med</sub> / 1.4 <sub>rms</sub> e <sup>-</sup> @ RS/GR, slow scan 1.1 <sub>med</sub> / 1.5 <sub>rms</sub> e <sup>-</sup> @ RS/GR, fast scan 2.2 <sub>med</sub> / 2.5 <sub>rms</sub> e <sup>-</sup> @ GS/DS, fast scan
<b>dynamic range (intra-scene)</b>	30,000 : 1 (89.5 dB RS, slow scan)
<b>peak quantum efficiency</b>	60 % @ 600 nm
<b>spectral range</b>	370 nm - 1100 nm
<b>dark current</b>	< 0.6 e <sup>-</sup> /pixel/s RS/GR @ +7 °C sensor temperature < 0.9 e <sup>-</sup> /pixel/s GS @ +7 °C sensor temperature

### frame rate table<sup>2</sup>

	fast scan			slow scan
	RS	GS	DS	RS
<b>2560 x 2160</b>	100 fps	50 fps	25 fps	33 fps
<b>2560 x 1024</b>	212 fps	105 fps	52 fps	70 fps
<b>2560 x 512</b>	422 fps	208 fps	104 fps	140 fps
<b>2560 x 256</b>	838 fps	409 fps	204 fps	279 fps
<b>2560 x 128</b>	1651 fps	789 fps	394 fps	550 fps

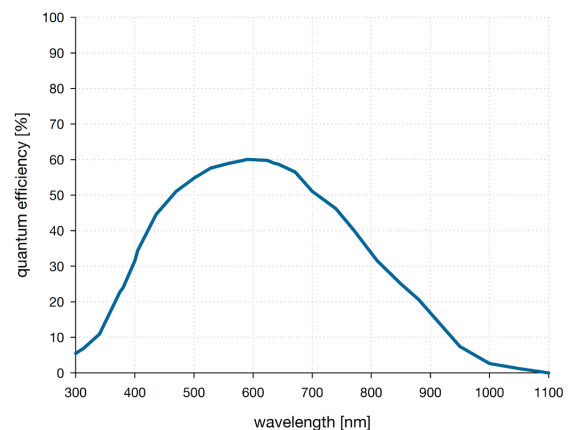
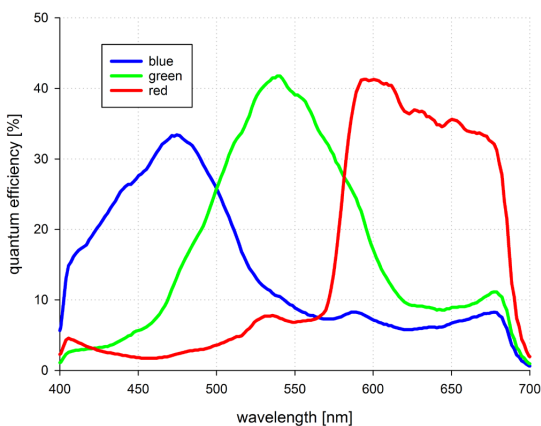
### typical resolutions

	fast scan			slow scan
	RS	GS	DS	RS
<b>1920 x 1080</b>	201 fps	100 fps	50 fps	67 fps
<b>1600 x 1200</b>	181 fps	90 fps	45 fps	60 fps
<b>1280 x 1024</b>	212 fps	105 fps	52 fps	70 fps
<b>640 x 480</b>	450 fps	222 fps	111 fps	150 fps
<b>320 x 240</b>	893 fps	436 fps	218 fps	297 fps

## camera

<b>max. frame rate @ full resolution</b>	100 fps @ RS/GR 50 fps @ GS 25 fps @ DS
<b>exposure time range</b>	500 $\mu$ s - 2 s (RS) 10 $\mu$ s - 100 ms (GS/DS) 10 $\mu$ s - 2 s (GR)
<b>dynamic range A/D<sup>3</sup></b>	16 bit
<b>conversion factor</b>	0.46 e-/count
<b>pixel scan rate</b>	286.0 MHz fast scan RS/GS/GR/DS 100.0 MHz slow scan RS/GR
<b>pixel data rate</b>	572.0 MPixel/s fast scan RS/GS/GR/DS 200.0 MPixel/s slow scan RS/GR
<b>region of interest (ROI)</b>	horizontal: steps of 16 pixels vertical: steps of 1 pixel
<b>binning</b>	horizontal: x2, x4 vertical: x2, x4
<b>non-linearity</b>	< 0.6 %
<b>cooling method</b>	+7 °C stabilized, selectable: peltier with forced air (fan), or water cooling (both up to 27 °C ambient)
<b>dark signal non-uniformity (DSNU)</b>	< 0.3 e- rms RS/GR slow scan < 3.9 e- rms GS/DS fast scan < 0.3 e- rms RS/GR fast scan
<b>photo response non-uniformity (PRNU)</b>	< 0.34 %
<b>anti blooming factor<sup>4</sup></b>	> 10,000
<b>interframing time</b>	100 ns
<b>trigger input signals</b>	programmable input - exposure trigger, acquire enable
<b>trigger output signals</b>	programmable output - status busy, status exposure
<b>input / output signal interface</b>	SMA connectors
<b>time stamp</b>	in image (1 $\mu$ s resolution)
<b>data interface</b>	Camera Link HS FOL

## quantum efficiency



## general

<b>power supply</b>	24 VDC ( $\pm 10\%$ )
<b>power consumption</b>	32 W max. (typ. 19 W @ +20 °C)
<b>weight</b>	850 g (air-cooled variant) 1060 g (water-cooled variant)
<b>dimensions (height x width x length)</b>	79.5 mm x 70 mm x 122.5 mm
<b>operating temperature range</b>	+10 °C to +40 °C
<b>operating humidity range (non-condensing)</b>	10 % to 80 % (non-condensing)
<b>storage temperature range</b>	-10 °C to +60 °C
<b>CE / FCC certified</b>	yes

## optical interface

<b>direct mounting</b>	5.0 mm $\pm 10\%$
<b>lens mounting</b>	C-Mount
<b>optional lens mounting</b>	F-Mount, TFL-Mount
<b>optional lens remote control<sup>5</sup></b>	EF-Mount, EF-S-Mount (Canon)

<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> Max. fps with centered ROI.

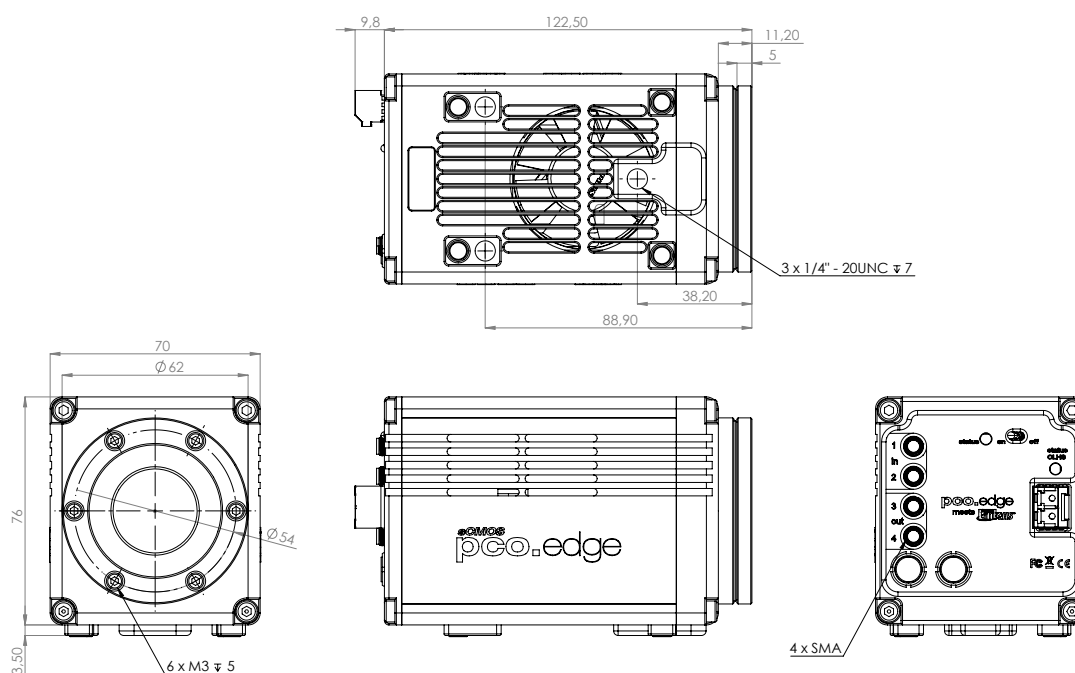
<sup>3</sup> The high dynamic signal is simultaneously converted at high and low gain by two 11 bit A/D converters and the two 11 bit values are sophisticatedly merged into one 16 bit value.

<sup>4</sup> Based on image sensor data sheet.

<sup>5</sup> Available for air-cooled variants only.

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

## dimensions



Outlines of pco.edge 5.5 DS CLHS (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.



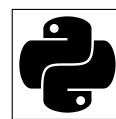
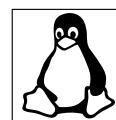
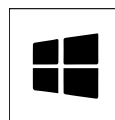
### You are using a different software:

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.



### 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  $\mu$ Manager.



## double shutter applications

flow visualization | particle imaging velocimetry (PIV) | particle tracking velocimetry (PTV)

### ordering information

<b>pc<sub>o</sub>.edge 5.5 DS CLHS</b>	85108072647	camera system, double shutter, monochrome, 2560x2160 pixel, air cooled, CLHS
<b>pc<sub>o</sub>.edge 5.5 DS CLHS</b>	85108072649	camera system, double shutter, monochrome, 2560x2160 pixel, air and water cooled, CLHS
<b>pc<sub>o</sub>.edge 5.5 DS C CLHS</b>	85108072648	camera system, double shutter, color, 2560x2160 pixel, air cooled, CLHS
<b>pc<sub>o</sub>.edge 5.5 DS C CLHS</b>	85108072650	camera system, double shutter, color, 2560x2160 pixel, air and water cooled, CLHS

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