

# pco.ultraviolet

digital 14 bit CCD camera

low noise

**8 electrons**

resolution

**1.4 megapixel**



housing

**ultra compact design**

UV quantum efficiency

**40%**

scientific application

**superior flat field**

# technical data

## image sensor

image sensor	interline CCD
resolution (h x v)	1392 x 1040 pixel (normal) 800 x 600 (center ROI)
pixel size (h x v)	4.65 $\mu\text{m}$ x 4.65 $\mu\text{m}$
sensor format / diagonal	1/2" / 8 mm
shutter mode	global (snapshot)
MTF	107 lp/mm (theoretical)
fullwell capacity	14 000 e <sup>-</sup> 24 000 e <sup>-</sup> (binning)
readout noise	7 .. 9 e <sup>-</sup> rms <sup>1</sup>
dynamic range	1 750 : 1 (65 dB) 3 000 : 1 (69.5 dB) binning
quantum efficiency	40 % @ 193 nm
spectral range	190 nm .. 1100 nm
dark current	2 e <sup>-</sup> /pixel/s @ 25 °C <sup>2</sup>
DSNU <sup>3</sup>	3 e <sup>-</sup> rms
PRNU <sup>4</sup>	< 1 %

## camera

max. frame rate	7.3 fps (12 MHz, normal) 11.7 fps (12 MHz, center)
exposure/shutter time	1 $\mu\text{s}$ .. 60 s
dynamic range A/D	14 bit
A/D conversion factor	0.8 e <sup>-</sup> /count 1.4 e <sup>-</sup> /count (binning)
pixel scan rate	12 MHz
binning (hor x ver)	1 x 1 .. 4 x 4
non linearity	< 1 %
smear	< 0.005 %
anti-blooming factor	> 200 (standard 100 ms exposure)
interframing time <sup>5</sup>	< 1 $\mu\text{s}$
trigger input signals	software / TTL level
trigger output signals	3.3 V LVTTTL level
data interface	USB 2.0

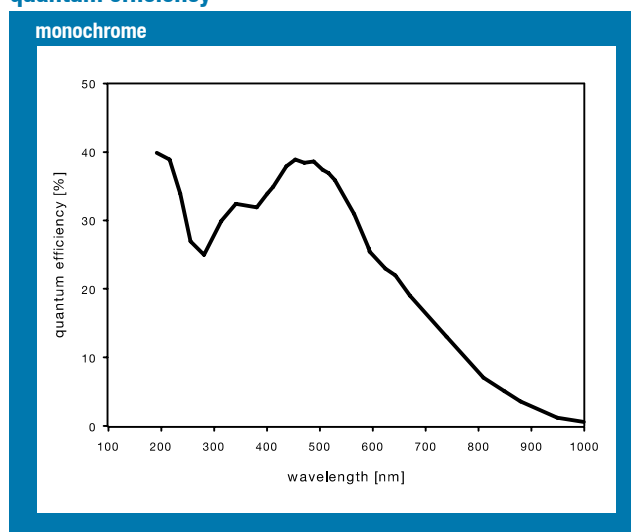
## general

power supply	9 .. 28 VDC (12 VDC typ.)
power consumption	< 3 W
weight	0.35 kg
operating temperature	+ 10 °C .. + 35 °C
operating humidity range	10 % .. 80 % (non-condensing)
storage temperature range	- 20 °C .. + 70 °C
optical interface	C-mount
CE certified	yes

## frame rate table

resolution	normal	center
1392 x 1040	7.3 fps	
800 x 600		11.7 fps
v2 binning	14.7 fps	21.8 fps
v4 binning	27.0 fps	35.7 fps

## quantum efficiency



<sup>1</sup> for operating environment up to 27°C

<sup>2</sup> temperature of CCD sensor element

<sup>3</sup> dark signal non-uniformity measured in a 90% center zone of the image sensor

<sup>4</sup> photo response non-uniformity

<sup>5</sup> time between two consecutive images for particle image velocimetry (PIV) applications

# technical data

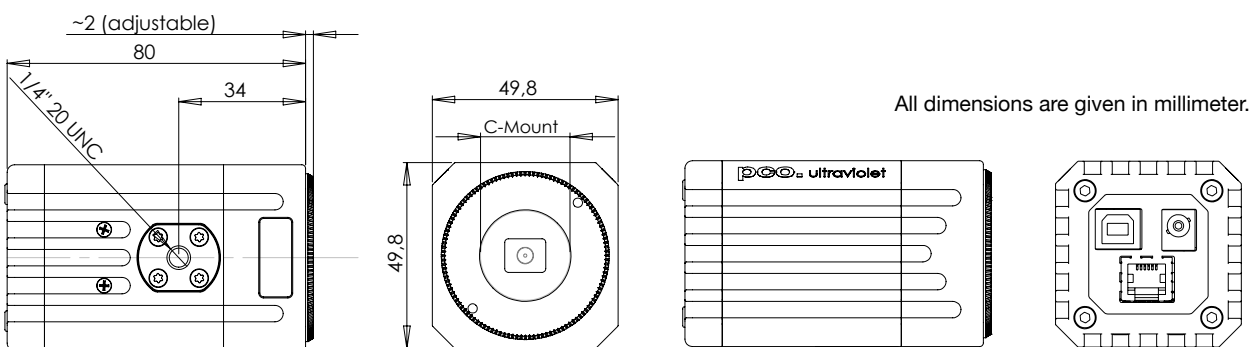
## software

For camera control, image acquisition and archiving of images in various file formats PCO provides the software application Camware (Windows XP, 7 and 8).

A camera SDK (software development kit) including a 32 / 64 bit dynamic link library for user customization and integration on PC platforms is available for free.

For a list of third party software supported, please visit [www.pco.de](http://www.pco.de)

## dimensions



## camera views

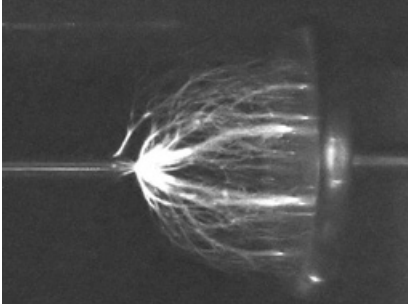


Further information can be found on [www.pco.de](http://www.pco.de)



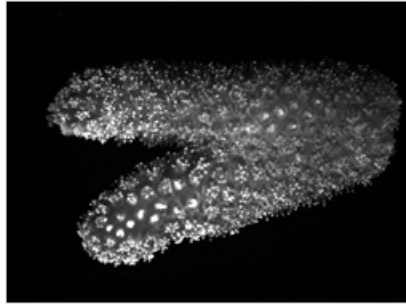
# applications

## high voltage technology



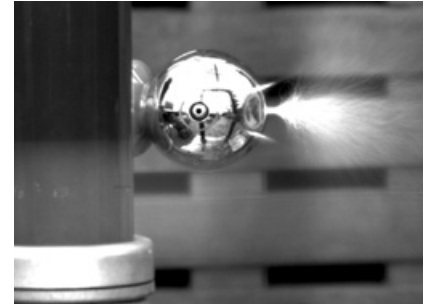
High voltage discharge between gas insulated (SF6 gas) conduits. With friendly permission of: Laboratory of High Voltage Engineering and Switchgear Technology, Technische Universität München, Munich, Germany [www.hsa.ei.tum.de](http://www.hsa.ei.tum.de)

## life science



UV light excited fluorescent symbionts zooxanthellae in Stylophera corals

## high voltage technology



Corona discharge in air at the terminal of a transformer at 163 kV. With friendly permission of: Laboratory of High Voltage Engineering and Switchgear Technology, Technische Universität München, Munich, Germany [www.hsa.ei.tum.de](http://www.hsa.ei.tum.de)

## application areas

■ uv detection ■ hyper spectral imaging ■ wafer inspection ■ mask inspection ■ scientific imaging ■ low light level imaging ■ combustion imaging ■ high resolution microscopy ■ machine vision ■ industrial applications ■ spectroscopy ■ industrial oem applications ■ material testing ■ luminescence spectroscopy

## europa

PCO AG  
Donaupark 11  
93309 Kelheim, Germany

fon +49 (0)9441 2005 50  
fax +49 (0)9441 2005 20  
[info@pco.de](mailto:info@pco.de)  
[www.pco.de](http://www.pco.de)

## america

PCO-TECH Inc.  
6930 Metroplex Drive  
Romulus, Michigan 48174, USA

fon +1 (248) 276 8820  
fax +1 (248) 276 8825  
[info@pco-tech.com](mailto:info@pco-tech.com)  
[www.pco-tech.com](http://www.pco-tech.com)

## asia

PCO Imaging Asia Pte.  
3 Temasek Ave  
Centennial Tower, Level 34  
Singapore, 039190

fon +65 6549 7054  
fax +65 6549 7001  
[info@pco-imaging.com](mailto:info@pco-imaging.com)  
[www.pco-imaging.com](http://www.pco-imaging.com)