

# pco.pixelfly usb

digital 14 bit CCD camera

low noise  
**6 electrons**

resolution  
**1.3 megapixel**



short  
**interframing  
time**

quantum efficiency  
**up to 65 %**

The new pco.pixelfly usb is a high performance digital 14 bit CCD camera system specially designed for low light applications in the spectral range of visible light if a small form factor is required.

**pco.**

1288   
EMVA Standard Compliant

# technical data

## image sensor

type of sensor	CCD
image sensor	ICX285AL
resolution (h x v)	1392 x 1040 pixel (normal) 800 x 600 (center)
pixel size (h x v)	6.45 µm x 6.45 µm
sensor format / diagonal	2/3" / 11.14 mm
shutter mode	global (snapshot)
MTF	77.5 lp/mm (theoretical)
fullwell capacity	16 000 e <sup>-</sup> (full frame) 24 000 e <sup>-</sup> (binning)
readout noise	5 .. 7 e <sup>-</sup> rms @ 12 MHz (typ.) 6 .. 8 e <sup>-</sup> rms @ 24 MHz (typ.)
dynamic range	2 667 : 1 (68 dB, 12 MHz, full frame)
quantum efficiency	65 % @ peak
spectral range	290 nm .. 1100 nm
dark current	1 e <sup>-</sup> /pixel/s @ 23 °C
DSNU <sup>1</sup>	2 e <sup>-</sup> rms
PRNU <sup>2</sup>	< 1 %

## camera

max. frame rate	7.3 / 13.5 fps (12 / 25 MHz, normal ) 11.7 / 21.6 fps (12 / 25 MHz, center)
exposure/shutter time	5 µs .. 60 s
dynamic range A/D	14 bit
A/D conversion factor	1.0 e <sup>-</sup> /count
pixel scan rate	12 MHz / 24 MHz
pixel data rate	19.5 Mpixel/s
binning (hor x ver)	1 x 1 .. 2 x 2
non linearity	< 1 %
smear	< 0.002 %
anti-blooming factor	> 400 (standard 100 ms exposure) > 4 (NIR enhanced 100 ms expos.)
interframing time <sup>3</sup>	1 µs
trigger input signals	software / TTL level
trigger output signals	3.3 V LVTTTL level

<sup>1</sup> dark signal non-uniformity measured in a 90% center zone of the image sensor

<sup>2</sup> photo response non-uniformity

<sup>3</sup> time between two consecutive images for particle image velocimetry (PIV) applications

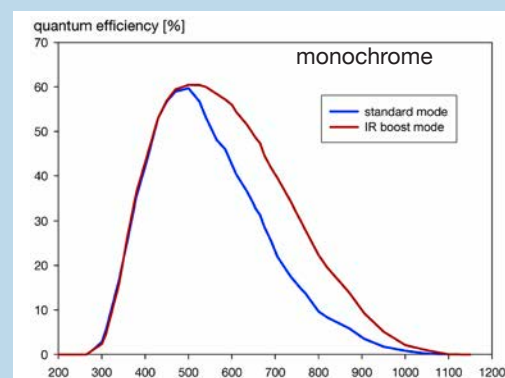
## general

power supply	9 .. 28 VDC (12 VDC typ.)
power consumption	< 4 W
weight	0.25 kg
operating temperature	+ 10 °C .. + 45 °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<sup>4</sup>

resolution	normal		center	
pixelclock [MHz]	12	25	12	25
1392 x 1040	7.3 fps	13.5 fps	11.7 fps	21.6 fps
v2 binning	14.7 fps	27 fps	21.8 fps	40.4 fps

## quantum efficiency



# technical data

## software

Camware is provided for camera control, image acquisition and archiving of images in various file formats (WindowsXP and later). A free software development kit (SDK) including a 32 / 64 bit dynamic link library, for user customization, integration on PC platforms is available. Drivers for popular third party software packages are also available.

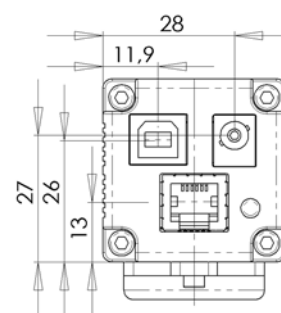
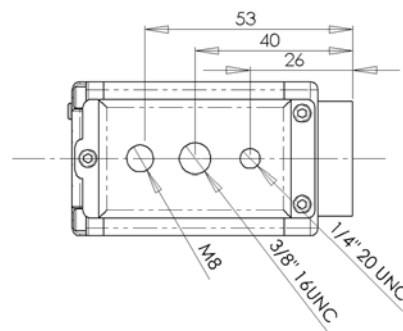
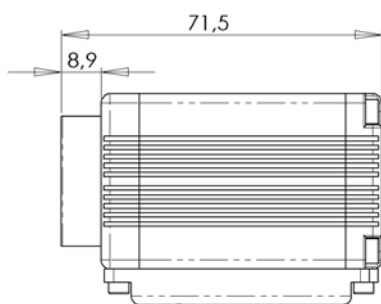
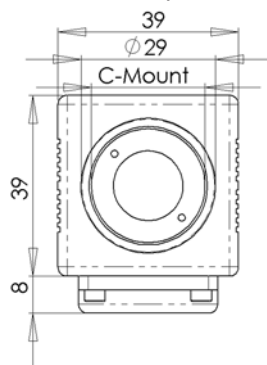
(Please visit [www.pco.de](http://www.pco.de) for more information)

## options

monochrome & color versions available; custom made versions

## dimensions

C-mount lens adapter



All dimensions are given in millimeter.

## camera views

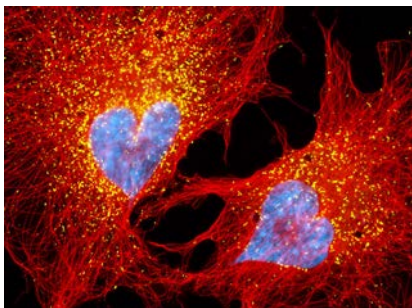


Further information can be found on [www.pco.de](http://www.pco.de)



# applications

## bio marker



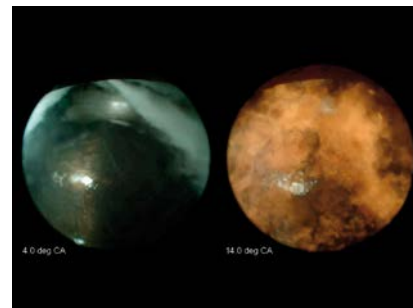
The high sensitivity and image quality are extremely useful characteristics for fluorescent multi-probe marker applications in microscopy.

## quality control



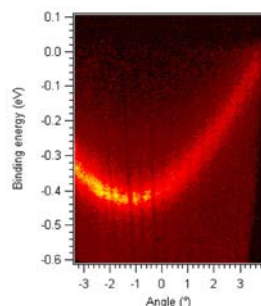
View of a row of an empty bottle inspection system, which uses pixelfly cameras for the improved resolution inspection (IRIS), courtesy of Krones AG, Neutraubling, Germany

## combustion analysis



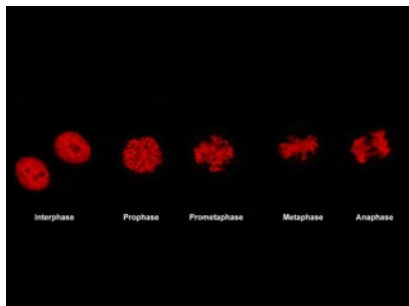
An endoscopic view into the combustion chamber of a Diesel engine. The two images show the injection and combustion of Diesel fuel. They were recorded at different Crank angles with the AVL VisioScope system, courtesy of AVL List GmbH, Graz, Austria

## electron spectroscopy



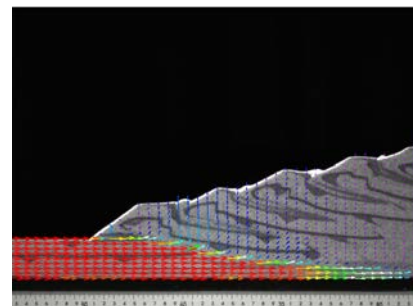
Cu (111) state dispersion image by a pco.pixelfly, courtesy of Specs GmbH - Surface Analysis and Computer Technology, Berlin, Germany

## microscopy



Human cervical carcinoma epithelial cells (HeLa) stained with mCherry Fluorescent Protein Histone H2B, recorded with a pco.pixelfly, the Cooke corporation

## strain field



In the above experiment the motion of the different quartz sand layers was measured by a strainmaster system (incorporating pco.pixelfly cameras) and the strain field was computed, courtesy of LaVision, Göttingen, Germany

## application areas

■ scientific imaging ■ low light level imaging ■ combustion imaging ■ high resolution microscopy ■ machine vision ■ industrial applications ■ particle image velocimetry (PIV) ■ spectroscopy ■ flow visualization (hydrodynamics) ■ industrial oem applications ■ fuel injection ■ material testing ■ luminescence spectroscopy ■ Red and NIR fluorescence applications ■ imaging of bio-markers (e.g. green fluorescent protein) ■ scintillation recording

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