pco.edge series
## product overview

active cooled
sCMOS
cameras

pco.
An Excelitas Technologies Brand

Top feature – Camera Link HS

Camera Link HS (CLHS) is a standardized protocol with outstanding performance in speed, reliability, and bandwidth.
It evolved from Camera Link, the vision industry's first standard camera interface protocol. Camera Link HS is poised to provide significantly expanded capability in upcoming releases, with changes that promise to make it the standout choice for camera interfacing. Cameras of the pco.edge series use the mature and robust interface in combination with a fiber-optic link (FOL) which results in high-speed data transmission over long distances.

## Top feature – Lightsheet scanning mode

The PCO lightsheet scanning mode is a special readout mode dedicated to lightsheet microscopy which guarantees optimized synchronization of the camera and a lightsheet microscope system. This feature is based on the rolling shutter mode. Compared to the standard rolling shutter mode, in lightsheet scanning mode parameters for the number of exposure lines and line time are adjustable. The number of exposure lines corresponds to a slit width while the line time defines the slit speed. The camera supports various trigger options for external synchronization.
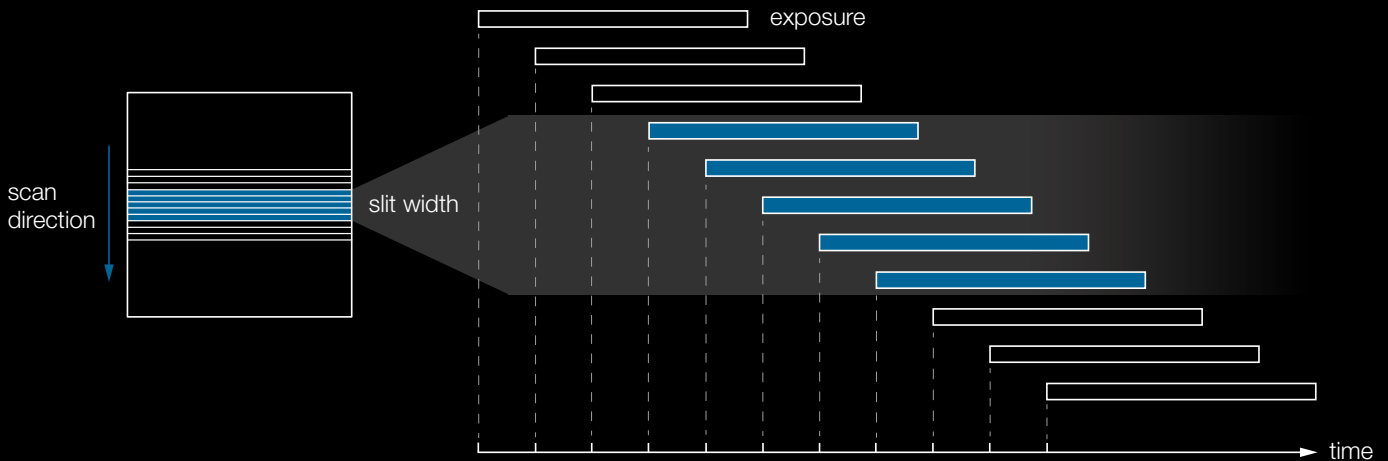

Exemplary illustration of the readout in lightsheet scanning mode with five exposure lines. This corresponds to a slit width of five times the pixel height.

Top feature – Low light mode

In standard mode, two images with exactly the same exposure time but different gains are recorded. The low gain image is optimized for high full well capacity and the high gain image is optimized for low readout noise. Both images are merged into one high dynamic range image.
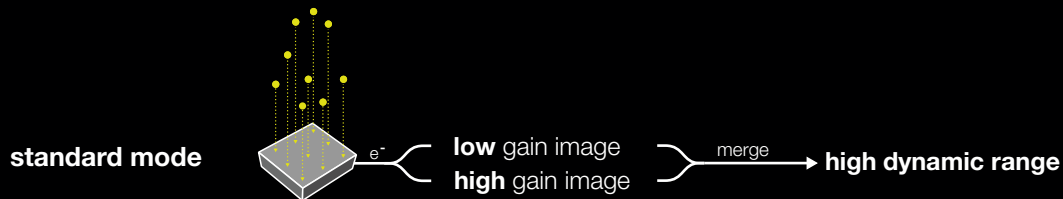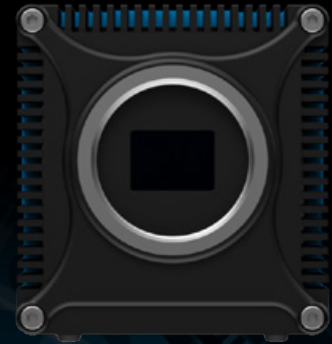

The low light mode benefits from two times correlated multi sampling of high gain images. This reduces the temporal noise by a factor of the square root of 2, which is ideal for applications demanding low noise and high sensitivity.
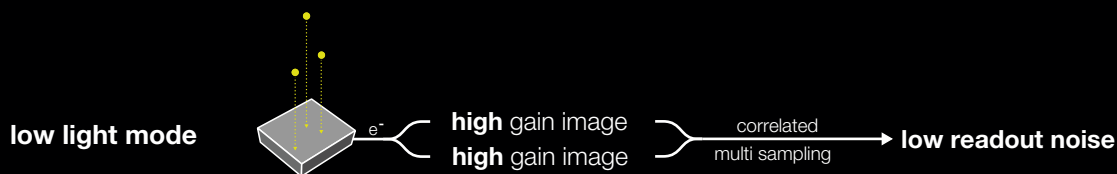
pco.edge series

The pco.edge series represents the high-end cameras within PCO's scientific CMOS (sCMOS) camera product portfolio. They provide significant benefits in a broad field of applications due to unprecedented imaging capabilities. The pco.edge cameras are based on temperature-stabilized, high-performance sCMOS image sensors enabling an extremely low readout noise, wide dynamic range, high frame rates and resolution over a large field of view. The pco.edge cameras are available with versatile optional features like low light mode, lightsheet scanning mode, or lens control which even increase the cameras' performance for dedicated applications.

technical table	**pco.**edge 26		**pco.**edge 10 bi	**pco.**edge 6.2 LE
interface	CLHS FOL	USB 3.1 Gen 1	CLHS FOL	USB 3.1 Gen 1
sensor technology	sCMOS		back–illuminated sCMOS	sCMOS
color type	monochrome		monochrome	monochrome
resolution [pixel]	5120 x 5120		4432 x 2368	2496 x 2496
sensor diagonal [mm]	18.1		23.1	17.7
pixel size [µm]	2.5 x 2.5		4.6 x 4.6	5.0 x 5.0
max. frame rate @ full resolution [fps]	150	6	120	6
max. pixel rate [MPixel/s]	4608	157	1467	47
peak QE	72 % @ 500 nm		85 % @ 500 nm	63 % @ 500 nm
typ. read noise[2] [e−]	3.2	2.3	0.8	3.7
dark current @ sensor temperature [e−/pixel/s]	0.7 @ +10 °C	0.09 @ −10 °C	0.2 @ +10 °C	0.3 @ −10 °C
max. dynamic range	2000 : 1		25,000 : 1	3200 : 1
shutter type[3]	GS		RS	GS
sensor cooling[4]	air & water		air & water	air & water
additional options	double shutter, lens control	–	lightsheet scanning mode[5], lens control	–
dimensions H x W x L [mm]	95 x 90 x 109	85 x 80 x 109	95 x 90 x 109	85 x 80 x 109
camera housing				

High performance through optimized mechanics

The pco.edge series comes in a sophisticated mechanical housing. An optimized cooling concept enables thermal stabilization of the sensor at low temperatures. This ensures a neglectable low dark current and thus an increase in image quality. The cooling takes place either by means of an external water cooling, by an optimized air flow within the camera, or both. A special design of the cooling system protects the sensor from vibrations and guarantees unimpaired imaging performance.

technical table	pco.edge 5.5		pco.edge 4.2 bi	pco.edge 4.2 bi UV
interface	CLHS FOL	USB 3.0	USB 3.1 Gen 1	
sensor technology	sCMOS		back–illuminated sCMOS	
color type	monochrome or color		monochrome	
resolution [pixel]	2560 x 2160		2048 x 2048	
sensor diagonal [mm]	21.8		18.8	
pixel size [µm]	6.5 x 6.5		6.5 x 6.5	
max. frame rate @ full resolution [fps]	100	30	40	
max. pixel rate [MPixel/s]	572	320	184	
peak QE	60 % @ 600 nm[1]		95 % @ 580 nm	89 % @ 580 nm 48 % @ 240 nm
typ. read noise[2] [e−]	1.0		1.0	
dark current @ sensor temperature [e−/pixel/s]	< 0.6 RS/GR < 0.9 GS @ 7 °C	< 0.5 RS/GR < 0.8 GS @ 5 °C	< 0.2 @ −25 °C	
max. dynamic range	30,000 : 1		26,667 : 1	
shutter type[3]	RS, GS, GR		RS, GR	
sensor cooling[4]	air, optional: water	air & water	air & water	
additional options	double shutter, lens control	–	lightsheet scanning mode[5], low light mode	
dimensions H x W x L [mm]	76 x 70 x 122	76 x 70 x 99	85 x 80 x 109	
camera housing				

technical table	pco.edge 4.2		pco.edge 4.2 LT	pco.edge 3.1
interface	CLHS FOL	USB 3.0	USB 3.0	USB 3.0
sensor technology	sCMOS		sCMOS	sCMOS
color type	monochrome		monochrome	monochrome or color
resolution [pixel]	2048 x 2048		2048 x 2048	2048 x 1536
sensor diagonal [mm]	18.8		18.8	16.6
pixel size [µm]	6.5 x 6.5		6.5 x 6.5	6.5 x 6.5
max. frame rate @ full resolution [fps]	100	40	40	50
max. pixel rate [MPixel/s]	548	220	220	408
peak QE	82 % @ 580 nm		82 % @ 580 nm	60 % @ 600 nm[1]
typ. read noise[2] [e−]	0.8		0.8	1.1
dark current @ sensor temperature [e−/pixel/s]	< 0.6 @ 7 °C	< 0.3 @ 0 °C	< 0.8 @ 10 °C	< 0.5 RS/GR @ 5 °C < 0.8 GS @ 5 °C
max. dynamic range	37,500 : 1		37,500 : 1	27,000 : 1
shutter type[3]	RS	RS, GR	RS, GR	RS, GS, GR
sensor cooling[4]	air, optional: water	air & water	air	air
additional options	lens control	–	–	–
dimensions H x W x L [mm]	76 x 70 x 122	76 x 70 x 99	76 x 70 x 99	76 x 70 x 99
camera housing				

[1] Monochrome version
[2] The readout noise values are given as median (med). All values are raw data without any filtering.
[3] RS = Rolling Shutter | GS = Global Shutter | GR = Global Reset
[4] air = air forced with fan | water = external water connection
[5] Selectable via software.

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