Alkeria
IMAGINACTION

CELERA P
Polarization cameras

CELERA P series

CELERA P and **CELERA One P** are USB3 polarization cameras with a **special polarization image sensor**, providing a new way to perform inspection processes.

Thanks to the advanced sensor technology, CELERA P and CELERA One P, combine the ease-of-use of Alkeria USB3 cameras with the capabilities of polarization imaging and the unique **FusionView feature**.

Based on the dual-USB3 platform of CELERA cameras, CELERA P is capable of reaching **up to 152 fps** while processing something like ~200 million vectors per second. On the other hand, CELERA One P, based on the single-USB3 interface of CELERA One cameras, gives the possibility to perform inspection processes with the same quality and features as CELERA P but in a **convenient package**.

Even beyond

Alkeria development team is also deeply focused on full-custom camera products. If you need more from your polarization camera, we can implement smarter hardware and extra firmware features for you. Depending on volumes, we can design your custom camera to protect your IP, differentiate your products, and let you gain market share over competitors. If you have been discouraged by custom designs, give us a call; you'll be surprised.

Features

Polarization image sensor

SONY IMX250MZR and IMX264MZR are 5 megapixels global shutter sensors with unique polarization imaging capabilities. They features a unique array of polarizer filters overlaid on top of the pixel array and beneath the micro-lenses; thanks to this technology, the camera sensor directly acquires data on light polarization without any additional filter.

FPGA architecture

Thanks to the **powerful FPGA architecture**, CELERA P and CELERA One P can execute polarization detection **directly on-board**, without overloading the computer.

Tiny rugged design

A small, ultra-lightweight, rugged aluminum machined high precision case, allows maximum installation flexibility, even in space-constrained environments.

FusionView feature

FusionView is a unique feature available only on Alkeria's polarization cameras: it maps AoLP to the Hue component of the HSV color space and DoLP to the Saturation component, giving an intuitive preview of these properties of light.

Versatile I/O

CELERA P and CELERA One P offer unprecedented flexibility for interfacing to outer world signals: line/frame triggering, direct encoder readout and strobed lighting have never been so easy.

Advanced triggering

With the Alkeria's polarization cameras, users can choose among a long list of triggering mechanisms. The acquisition can be driven by high/low logic levels, edges and encoder position. Furthermore, the frequency of triggering signals can be internally converted to solve even the most challenging problems.

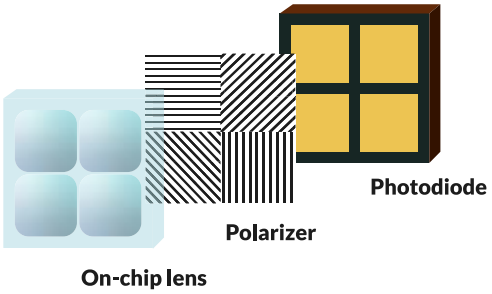
Polarizing sensor vs filter

Some applications require the inspection of polarized light to get relevant information. Standard digital monochrome sensors capture light intensity and wavelength for each pixel: to detect light polarization, special filters can be used.

Polarizer filters absorb all the components of light with random angles, allowing only the light with a specific polarization angle to pass. Those filters are usually mounted in front of camera lenses: if you need to change polarization acquisition parameters, you have to rotate the filter.

SONY, however, developed a machine vision global shutter sensor featuring a **unique array of polarizer filters** overlaid on top of the pixel array and beneath the micro-lenses. Thanks to this technology, camera sensor **directly acquires the data on light polarization** without any additional filter on top of the lens, thus reducing system complexity.

Each pixel is provided with a dedicated polarized filter. Those filters are orientated 0°, 45°, 90° and 135°, arranged in a 2x2 pixel array called "*superpixel*".



Get more out of the light

Alkeria developed a new camera model featuring SONY special polarization image sensor that can be used instead of external polarizing filters.

Thanks to the special polarization filter array applied on the sensor, each "*superpixel*" can acquire **4 different polarization angles simultaneously**. Based on the information acquired from these four channels, a special interpolation algorithm computes data for all the in-between angles, as if a rotating polarizer had been put in front of a plain monochrome camera.

This measure is the key to deriving complex parameters such as the **Degree of Linear Polarization** (DoLP), an estimate of the polarization coherency of the light, and the **Angle of Linear Polarization** (AoLP), an estimate of the polarization angle.

Since monochrome video format is not suitable for visualizing AoLP and DoLP informations, we developed **FusionView**, an advanced feature for our cameras.

FusionView is an unique feature available only on Alkeria's polarization cameras: it maps AoLP on the Hue component of the HSV color space and DoLP on the Saturation component, giving an intuitive preview of these properties of light.

***FusionView** feature example*

Accessories

Image quality does not depend only on the resolution of the camera: to get top performances out of a vision system, it is essential to choose the best combination of all components. For this reason, we offer our customers a complete range of high-quality accessories to equip our cameras with: lens adapters, I/O and USB3 industrial-grade cables, selected machine vision lenses, and more.

Visit ***www.alkeria.com/accessories*** to discover the complete range of accessories.

C-mount

F-mount

Interfacing

Dual and single-USB3

Cost-effective, wide-spread, highly performant, plug&play, directly powered by the PC. All of these perks make USB3 the right choice for cameras intended to be ready out-of-the-box.

I/O

CELERA P and CELERA One P provide a versatile 24 V tolerant I/O interface to control external devices such as strobe lights, encoders, etc.: 2 input lines with direct encoder interface, 2 output lines, and 1 input/output (RS422, RS644 LVDS, LVTTL). Its multipurpose I/O connector provides user I/O, line/frame triggering, and a direct encoder interface.

HALCON COMPATIBLE

COGNEX COMPATIBLE

Vision libraries

Image processing libraries represent the most flexible way of developing vision applications; these systems provide a complete range of powerful vision analysis tools, as well as the possibility to develop tailor-made algorithms and functionality to address specific application needs.

That's why our cameras are totally compatible with the major vision libraries, such as MVTech Halcon or COGNEX VisionPro.

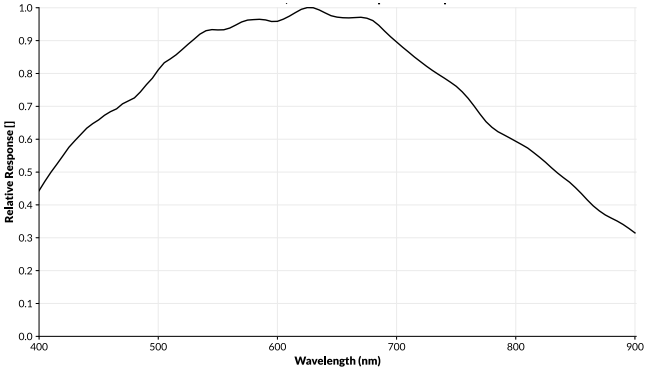
Want to use your own code instead?

Our cameras come with a comprehensive SDK for Windows and Linux, featuring a sample player for live view and setting of the camera and a rich list of code samples in C# and C++ (WIN32 and Qt).

Technical specifications

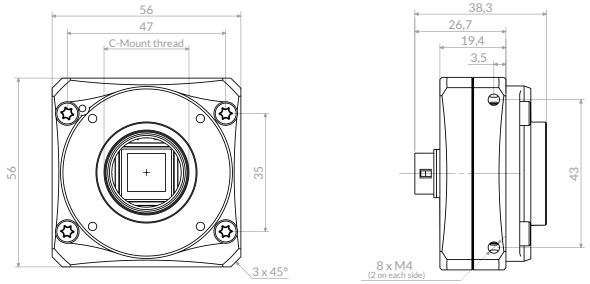
MODEL	C5S-MP	CO5S-MP
Sensor	SONY IMX 250 MZR	SONY IMX 264 MZR
Megapixels	5 MP	
Resolution (w x h)	2464 x 2056	
Format	2/3"	
Pixel Size	3.45 × 3.45 µm²	
Color mode	Mono Polarized	
Max framerate	152 fps	35 fps
Pixel format	MONO8/16, RAW8/16, RGB24	
Min Shutter	17 µs	
Max Shutter	5 s	
A / D Conversion	8 - 10 - 12 bits	12 bits
Synchronization	External trigger, software trigger	
Power Supply	< 3 W, powered by USB3 interface	
Inputs / Outputs	2 in (direct encoder interface), 2 out and 1 I/O (RS422, RS644 LVDS, LVTTL), 24 V tolerant	
Interface	2 × USB3.2 Gen1x1	USB3.2 Gen1x1
Lens adapter	C-mount included | F-mount optional	
Weight	<150 g (with C-mount lens adapter)	
Dimensions	56 mm × 56 mm × 26.7 mm - camera only	
Conformity	CE, RoHS, FCC/IC	
Main Controls	Shutter, gain, LUT, Virtual Angle, FusionView	
Operative Temp	0 ÷ 50 °C	

Sensors specifications

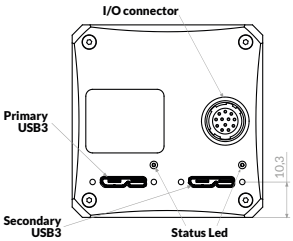


Mechanical specifications

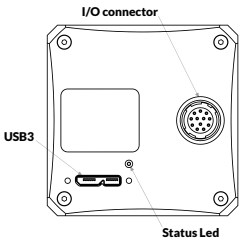
C5S-MP and CO5S-MP front and side



C5S-MP back



CO5S-MP back



All dimensions are expressed in millimeters.
Camera specifications are subject to change without notice.
Sensor specifications are taken from the data sheet of the manufacturer.

This chart shows all technical specifications of the current CELERA P and CELERA One P product line.

To learn more about specifications and prices, please contact our Sales department at ***sales@alkeria.com***: we'll help you find the right camera for your application.

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