

EoSens® CXP Series

High-Speed CMOS Cameras



EoSens® CXP Series advantages at a glance:

- 3, 4 and 25 megapixel resolution
- Highest frame rates through CoaXPress interface
- Flexible region of interest (ROI)
- More than 100,000 fps at reduced resolution
- Cable lengths up to 100 m
- Small and compact design

Extremely Fast and Flexible

The MIKROTRON EoSens® CXP camera family utilizes the latest camera technology for the demanding machine vision applications of today. Three different camera models serve the need for flexibility, speed and resolution on the highest level. The CoaXPress interface allows the camera to provide all the image information in real-time for clear decisions in production processes.

Long cable lengths allow the most flexible use of the cameras. Ideal for capturing fast motion processes with maximal resolution, the models of the EoSens® CXP family are the right choice for many different applications such as laser triangulation, 3D inspection, surface inspection and fluid dynamics (PIV).



CoaXPress - Future proof Interface

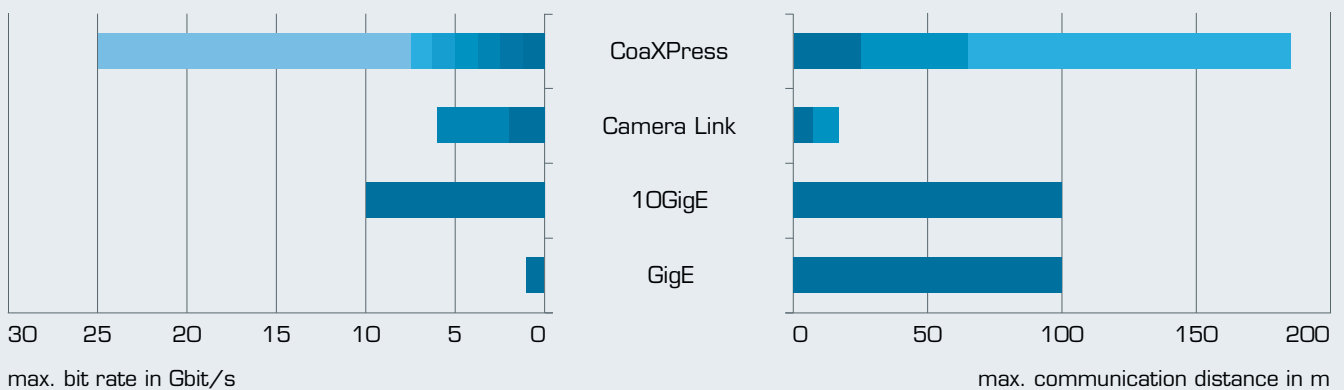
Its CoaXPress interface allows the EoSens® CXP high-speed camera family to transfer high frame rates and megapixel images over more than 100 m. Direct evaluation and processing of high-speed data received at the PC becomes possible. With up to 25 Gbit/s this interface outperforms all other, helping to reduce system costs and maximize system performance.

As a state-of-the-art interface, CoaXPress provides real time control, reliable communication and precise triggering, even in multi-camera applications. Integration is simplified as only one single cable carries data, communication and power. Consolidating all the previously used cables into one reduces costs and strengthens the system, even in the roughest environments.

State of the art CoaXPress interface – advantages at a glance

- High data rates: up to 6.25 Gbit/s over a single coax cable and up to 25 Gbit/s using four cables
- Long cable lengths: in excess of 100 m (without any hubs, repeaters etc.)
- Real-time functionality through fixed, low latency
- Precise trigger capabilities
- Ease of integration: video, communication, control and power over one single coax cable
- Plug and play

Interface comparison – bit rate and maximum communication distance



FIELDS OF APPLICATION

For nearly every task the right camera

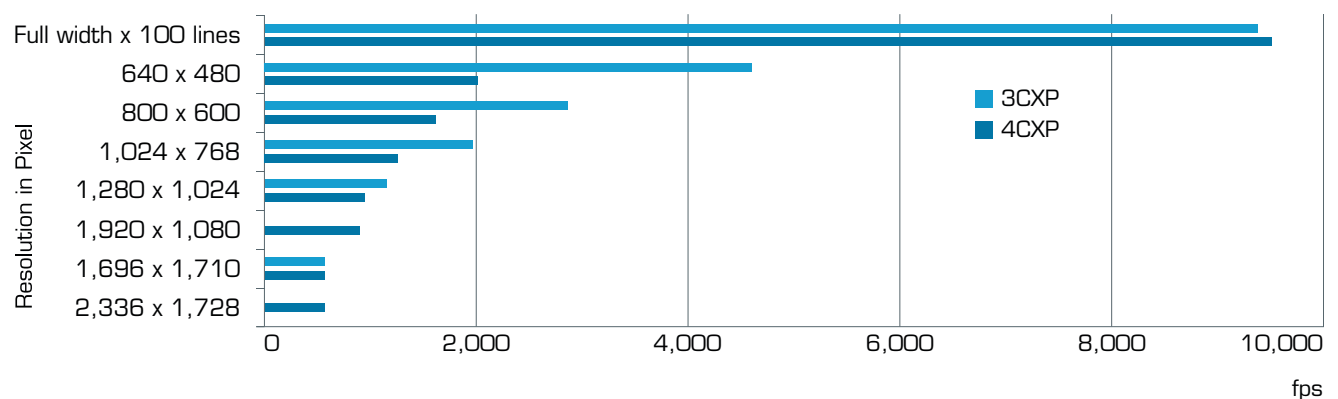
Light sensitive, maximum flexibility in ROI or with the highest bandwidth: As illustrated on the following page, the

EoSens® CXP family can always come up with a solution that perfectly fits your needs.

Due to their different performance characteristics, each camera in the EoSens® CXP family has its own strengths:

- **EoSens® 3CXP**
with high flexibility in ROIs.
- **EoSens® 4CXP**
for most light-sensitive tasks and the highest bandwidth and frame rates.
- **EoSens® 25CXP**
for the most detailed area scan inspection and flexible ROI functionality.

Thus, you will find the right camera for nearly every application.



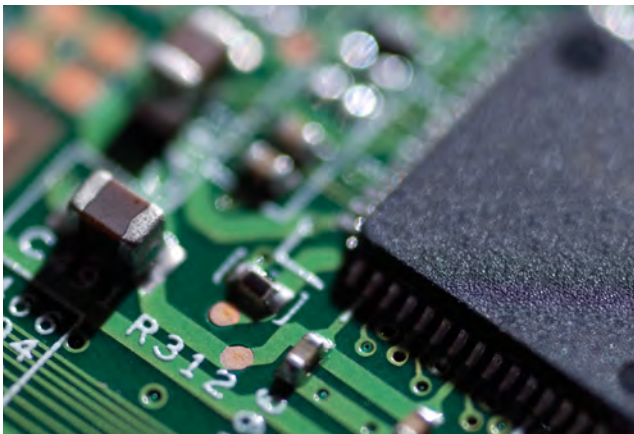
PCB Inspection

With the miniaturization of the parts on PCBs, each component needs to be properly placed and soldered. To meet the high demands of the PCB production process the cameras in the EoSens® CXP family are particularly suitable whenever a precise analytical tool is required.

EoSens® CXP advantages for PCB inspection:

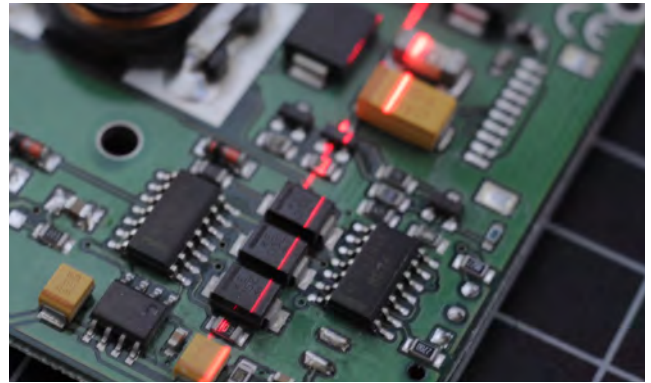
- High speed coupled with high resolution
- Only one camera per inspection task needed
- No scaling necessary
- Precise trigger capability

Especially the high resolution of the EoSens® 25CXP provides imperceptible details in critical inspections – even on large PCBs one single image is enough to reduce complexity. Precise trigger capability ensures you get the right images, capturing the moment that matters, even on fast production lines for PCBs of any size.



3D Triangulation

High frame rates are required to get a high level of accuracy in 3D reconstructions of parts. The EoSens® CXP cameras perfectly fit when both the highest frame rates as well as



detailed image information are needed – the global shutter ensures crisp sharp images of the laser line, while the region of Interest (ROI) can be adjusted for maximum speed.

EoSens® CXP advantages for 3D Triangulation:

- Adjustable ROI for highest framerate
- Global shutter for sharp points
- Short inter-frame time
- High speed uplink for very precise control accuracy

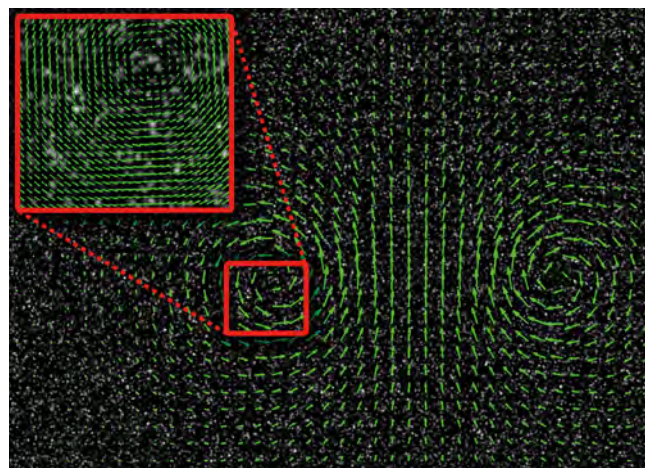
A transfer rate of up to 25 Gbit/s helps to avoid any readout breaks between the frames and therefore to increase speed and provide more condensed data. Using their high-speed uplink the EoSens® CXP cameras can be reconfigured between different assignments without stopping or resetting.

Particle Image Velocimetry (PIV)

To get fast and accurate test results in the measurement of flow behavior of fluids or gases, high-quality imaging instruments are required. With extremely high frame rates and high resolution the EoSens® CXP cameras provide the well-defined characteristics for demanding PIV applications.

Precise triggering and a short inter-frame time facilitate exact flow calculation using tightly coupled images. Owing to their high light sensitivity, the EoSens® CXP cameras reliably capture significant pictures even under extremely

difficult lighting conditions in particle image velocimetry. A real time data transfer rate of up to 25 Gbit/s allows instant readout of the data and thus immediate evaluation of the footage obtained.



EoSens® CXP advantages for PIV:

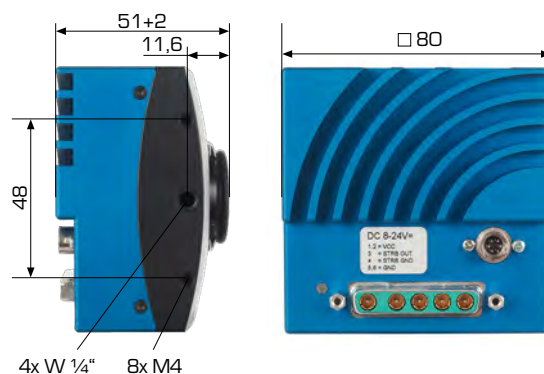
- High speed coupled with high resolution
- Real-time transfer and real-time processing
- Precise triggering of image streams
- High light sensitivity
- Short inter-frame time
- Moveable ROIs to follow particles

Camera Models – Technical Data

(More detailed specifications are available on request)

	High Flexibility	High Sensitivity	High Res
	EoSens® 3CXP	EoSens® 4CXP	EoSens® 25CXP Preliminary
Resolution	3 MPix	4 MPix	25 MPix
Interface	CXP-5	CXP-6	CXP-6
Max. Framerate (8 bit)	560	560	80
Sensor	CMOS global shutter	CMOS global shutter	CMOS global shutter
Sensor format	1"	4/3"	35mm FF
Active sensor area	13.57 (H) x 13.68 (V) mm	16.35 (H) x 12.10 (V) mm	23.04 (H) x 23.04 (V) mm
Resolution	1,690 x 1,710	2,336 x 1,728	5,120 x 5,120
Pixel size in µm	8 x 8 µm	7 x 7 µm	4.5 x 4.5 µm
Max. No. of ROIs	1	3	32
Speed raise will reached by	lines and columns	lines	lines
Sensitivity	3.81 V/Lux*sec @ 550 nm	11 V/Lux*sec @ 550 nm	3.4 V/Lux*sec @ 550 nm
Color depth	8 bit	10 bit	10 bit
Max. Dynamic range	80 dB	60 dB	53 dB
Shutter time (Steps)	1 µs		
Min. Shutter speed	1 µs - 1 s	1 µs - 1 s	1 µs - 0,25 s
Max. Trigger frequency	150 kHz regular (300 kHz in AnyEdge mode)		
Max. Jitter	±4 ns		
High speed uplink	coming soon		
(W x H x L) C-Mount	80 x 80 x 53 mm		
Weight (g), (camera only)	450 g		
Power consumption (W)	7 W		
Camera body temperature	+5 ... 55°C		
Shock proof	70 g, 7 grms		
Power supply	12-24 V		
Features	GPIO via camera (on request) Available with 5W5 Link test feature		
Special modes	CLK up Mode (higher Sensor CLK at reduced line length) Multi ROI option (up to 3 independent ROI's) Dezimation Mode (Skipping mode)		

Body dimensions



MIKROTRON GmbH

MIKROTRON is a renowned manufacturer of small and robust high-speed cameras on the international industrial image processing market. Due to their outstanding performance characteristics the cameras are perfectly suited for usage in industrial and scientific applications, as well as in sports analysis, advertisements or documentaries.

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