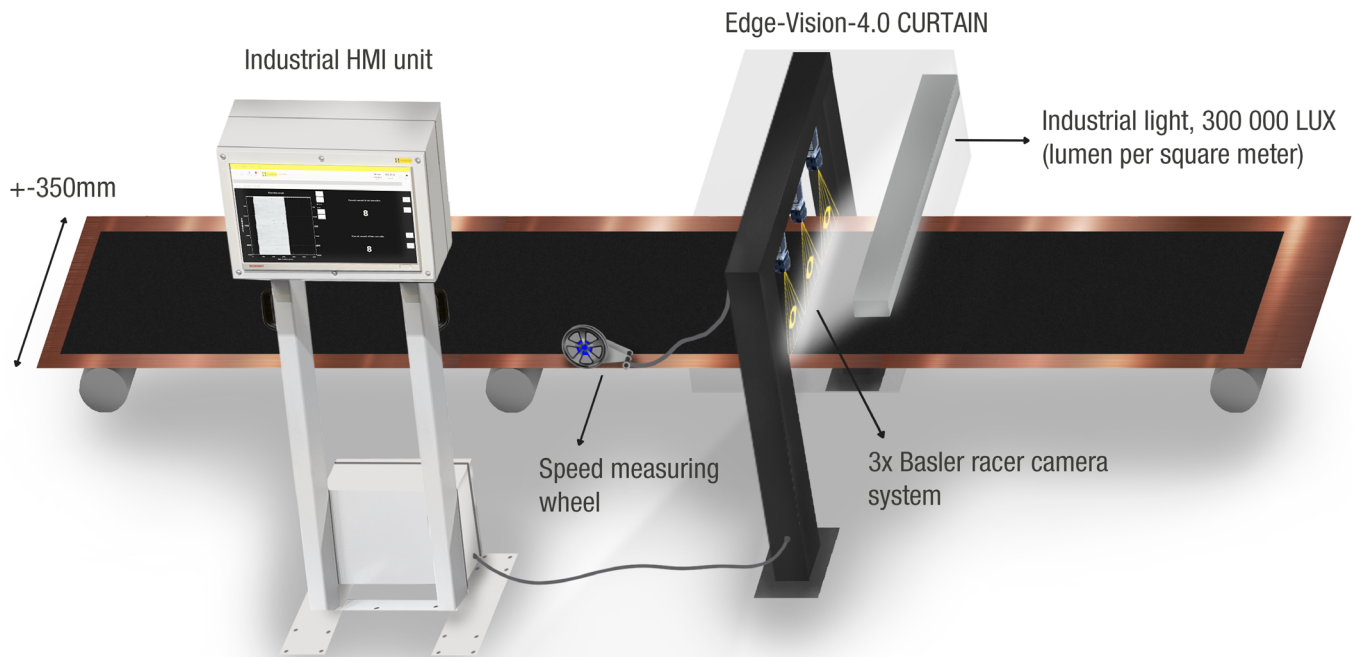




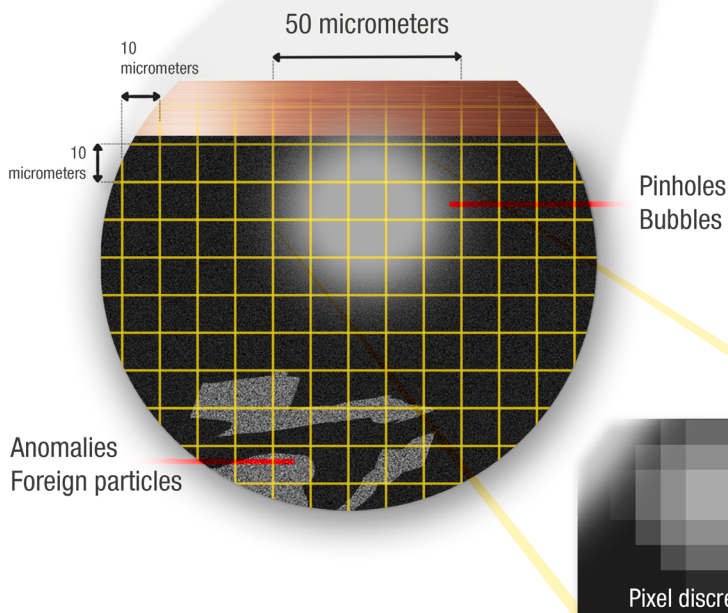
HAMMER-IMS

One-stop shop for quality and process control

Edge-Vision-4.0-CURTAIN for battery film quality control



Detect pinholes and other anomalies down to 50x50 micrometers

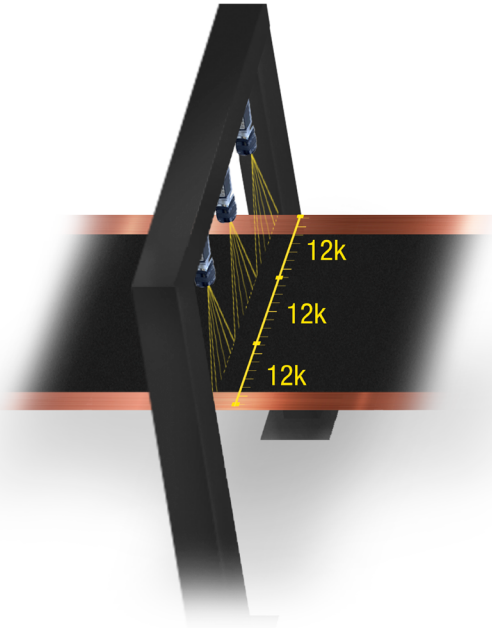


The Edge-Vision-4.0-CURTAIN machine-vision system from Hammer-IMS is able to detect pinholes and other anomalies in battery film/electrode coating at a scale of 10 micrometers.

Utilization of 3x 12k resolution Basler racer camera modules allow for scans from the production every 125 microseconds, or in other words, 8000 scans per second. This translates to a line speed of 0.08 m/second or about 5 meters per minute for quality scans to be achieved.

This 10 micrometer oversampling capture at that rate of speed minimizes pixel discretization errors, which is the process of converting continuous data into a digital form, enabling us to detect anomalies as tiny as 50x50 micrometers more accurately. In contrast, systems utilizing lower-resolution cameras will inherently introduce more discretization, rendering them less effective at identifying such minuscule defects.

Edge-to-edge analysis of material surface



Edge-Vision-4.0-CURTAIN utilizes 3 image sensors that have an overlap zone of 2.5 cm between each camera. This allows us to stitch the three camera images into one image without losing any pixel. There is also a small margin of pixels that are scanned at both ends of the material being scanned, and this allows for Edge-Vision-4.0 to have a safe margin in cases where the material shifts in cross-machine direction.

-12k pixels x 3 image sensors = 36k pixel line scans
-36k pixels / 350mm of material surface = full analysis of material surface.

Equipped with specialized line scan cameras

The Edge-Vision-4.0-CURTAIN systems come equipped with high-speed Basler racer line scan cameras that deliver 12k resolution inspection of materials.

Featuring a monochrome 43mm CMOS sensor with an effective resolution of 12288x1 pixels, the Basler racer is able to capture sharper and more detailed images compared to color cameras. This is because monochrome cameras do not have a color filter array, which reduces the amount of light that reaches the sensor.

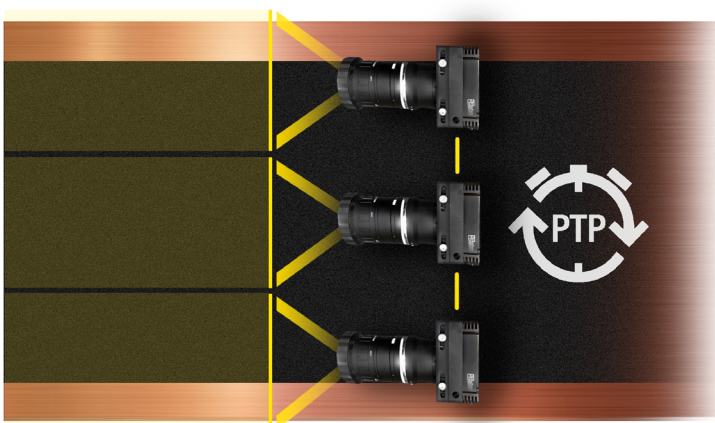
Additionally, Basler racer cameras use the GigE Vision interface standard for industrial image processing, making it highly reliable and capable for ultra-high data transfer rates, high compatibility and simple upgradeability.



Basler racer

Equipped with 12k resolution CMOS sensor.

Multi-scanning synchronization with PTP



PTP stands for 'Precision Time Protocol' and is responsible for the synchronization of clocks on multiple devices within a computer network. Edge-Vision-4.0-CURTAIN makes use of 3x PTP synchronized Basler racer cameras. This precision in timing ensures a seamlessly stitched camera feed. Without PTP, timing discrepancies between cameras can lead to noticeable misalignment in high-resolution applications.

Real-time analysis with Connectivity software 3.0

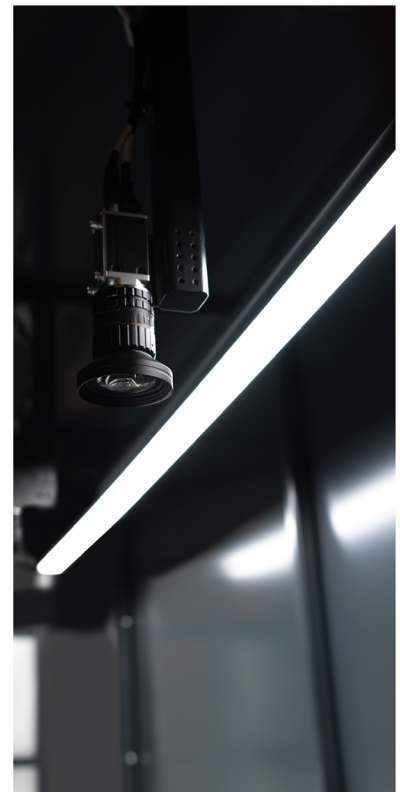
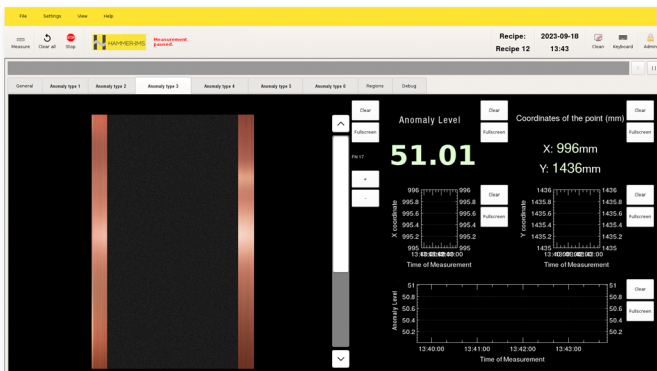
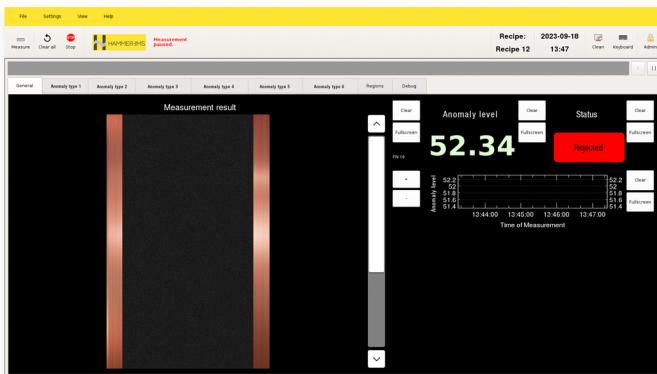


Thanks to Connectivity Software 3.0 by Hammer-IMS, real-time production analysis follows a streamlined process: detection of anomalies, classification of issues, counting/averaging for quality assessment, and action based on results. The PTP protocol ensures seamless integration of three image sensor feeds, leaving no part of the material unexamined. Optional FTP image-capture server uploads allow for later inspection or immediate adjustments.

The images below to the left show the Connectivity Software 3.0 and a battery film coating being analyzed. To get a detailed video of the different defects, there are tabs of each type of defect, and each tab is able to display relevant statistics such as how many defects are being detected, and then averaged over time. A recipe system can be used to define properties of the material that is being measured. Certain parameters can be custom to your production.

The ultimate light system to spot even the smallest surface anomalies

Our light system plays a pivotal role in pinhole and anomaly detection. With 300,000 lux, shadows are significantly reduced or eliminated, ensuring uniform illumination across the object. This uniformity is crucial because shadows can obscure anomalies, making them harder to detect. Lower-intensity lighting fails to provide the necessary contrast, making it challenging to distinguish anomalies from the background. This can lead to false negatives in the detection process. Additionally, our very high-intensity lighting system complements the low exposure in the Basler racer cameras by providing ample illumination. This combination reduces blurriness to a minimum, resulting in sharp, clear images essential for accurate anomaly detection. The bottom-right image shows the Edge-Vision-4.0-CURTAIN light system.



Contact us to discuss your specific application

The list below provides a general product overview of the Edge-Vision-4.0-CURTAIN systems and the software package for the control of it. An extensive list of add-ons can be implemented to your Edge-Vision-4.0-CURTAIN system on consultation with a sales representative.

Product name	Product group	Product description
Edge-Vision-4.0-CURTAIN-O	Machine-vision systems	Machine-vision solution for detection and classification of anomalies or continuous monitoring. Closed frame.
Edge-Vision-4.0-CURTAIN-C	Machine-vision systems	Machine-vision solution for detection and classification of anomalies or continuous monitoring. Open frame.
Connectivity 3.0	Control software	Industrial software to connect to PLCs and various information sources.



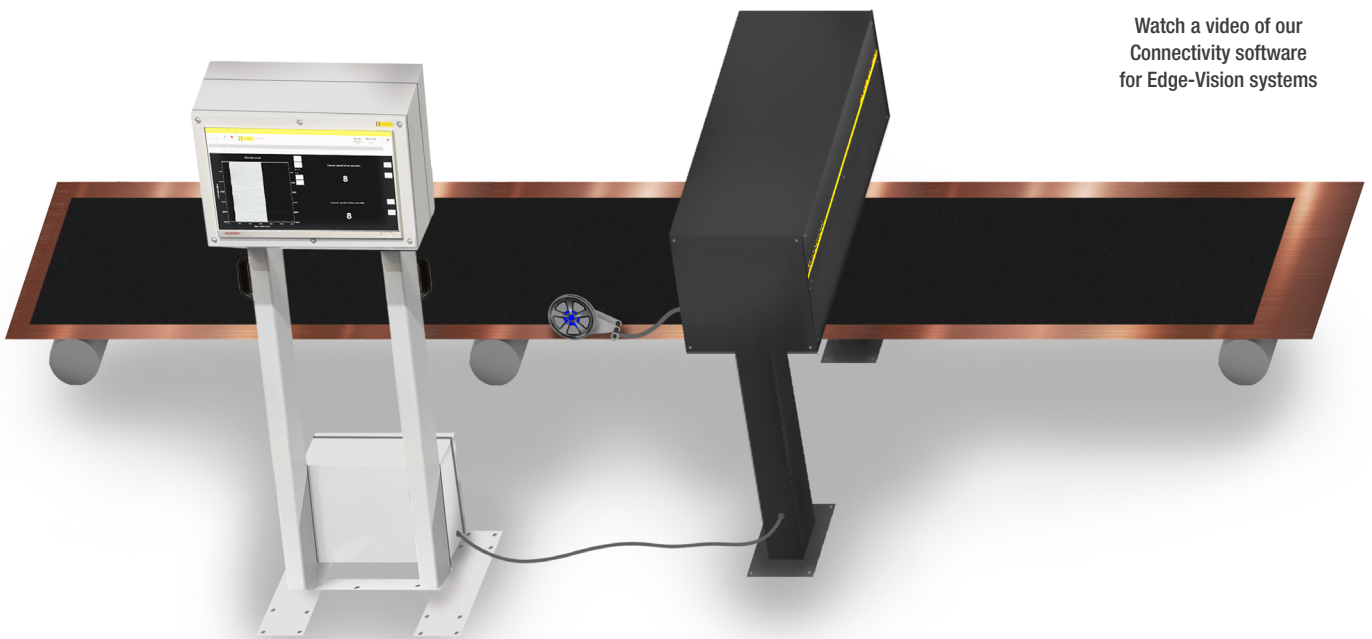
Get in contact with our sales representatives



Explore our wide-range product brochure



Watch a video of our Connectivity software for Edge-Vision systems



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The data as listed in this brochure is non-binding. Contact us to obtain a dedicated technical datasheet, a feasibility analysis for your industrial case, or to get in touch with our preferred integrators and resellers. Our general terms and conditions apply.

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