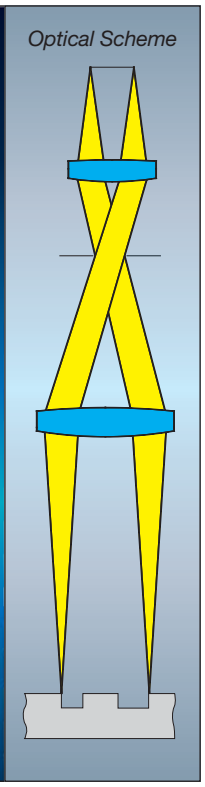
Precise Telecentric Width Measurement and Texture Analysis

Line Scan Camera SK8160GKO-XL with telecentric lens and integrated brightfield illumination



SK8160GKO-XL with SVL-050-TCD64	
Resolution	10 µm
Field of View	82 mm
Working distance	160 mm
Depth of Focus	1.8 mm
NA	0.045
F-Number	5.5
Distortion	<0.2%

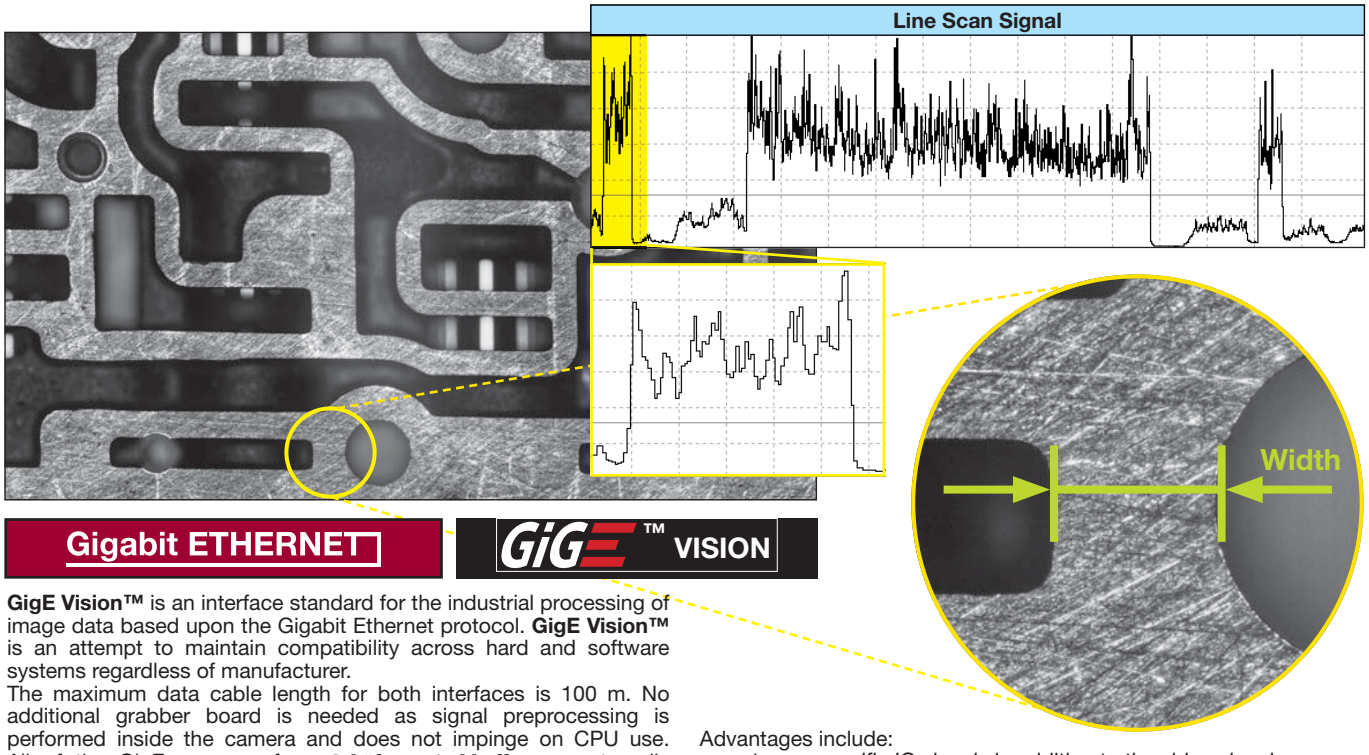
Application:

- **Measurement of width and length**
- **Surface inspection**
- **Texture Analysis**
- **Measurement of roughness**

A standard camera lens as well as the human eye provide an endocentric perspective. An object appears to be larger when viewed from close up and smaller when it is further away. This means that when an object with vertical indentations is viewed from above then not only the indentation but also a portion of the vertical sidewalls can be seen, as well. This confuses the precise determination of an object width, a cavity size, or a ridge width in machine vision and severely compromises the measurement results. The solution to this problem is to use a lens with a telecentric perspective.

A telecentric lens views all points of the object directly from above. The resultant image is similar to a 2D technical drawing of the object. Variations in object distance may still result in localized blurring of the image (especially if these extend beyond the depth of focus) but the apparent object size remains constant. It is now possible to determine the width of the indentation without any distraction from the vertical sidewalls.

In telecentric imagery, the front lens must be larger than the size of the object. This is a challenging requirement with larger objects, especially if a high optical resolution is needed. The present system maintains a resolution of 10 µm/pixel (2540 DPI) over a field of view of more than 80 mm. Sub-pixel algorithms can push down the measurement accuracies even further, to only a few microns.



Gigabit ETHERNET

GiGE™ VISION

GigE Vision™ is an interface standard for the industrial processing of image data based upon the Gigabit Ethernet protocol. **GigE Vision™** is an attempt to maintain compatibility across hard and software systems regardless of manufacturer.
The maximum data cable length for both interfaces is 100 m. No additional grabber board is needed as signal preprocessing is performed inside the camera and does not impinge on CPU use. All of the GigE cameras from **Schäfter+Kirchhoff** are externally synchronizable.
The **Schäfter+Kirchhoff** line scan cameras with **Gigabit Ethernet** interface are distinguished by their high performance and total flexibility.

Advantages include:

- customer-specific IO signals in addition to the video signal
- special preprocessing algorithms can be implemented in the camera.
- consistent attribution of camera-IDs in multi-camera operations
- SDK from **Schäfter+Kirchhoff** with the **SkLineScan** operating program, libraries and examples (**SK91GigE-WIN**).

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