C5-1280-GigE

The World's Fastest High Speed 3D Sensor

- Profile Speed up to 200 kHz (200,000 Profiles/s)

- Ruggedized Enclosure (IP67)

- Integrated High Precision 3D Profile Algorithms

- Enhanced 3D Imaging with HDR-3D Technology

- Integrated Illumination Control

- GigE Vision and GenICam Compliant

- Sophisticated 3D Scan Features like Autostart, Automatic AOI-Tracking, Multiple AOIs, etc.


GiGE®
VISION

C5-1280-GigE

## High Speed Sensors for Fast Three-Dimensional Measuring Tasks with High Precision

The 3D sensor C5-1280-GigE scans objects by means of the sheet of light method. This occurs through a projected laser line that migrates along the surface. With the help of a C5-1280-GigE camera, an image of the laser line is acquired from the triangulation angle alpha (α). As a result of this arrangement, the 3D profile of the object is captured.

Through an internal processing of the line images performed by different evaluation algorithms, the C5-1280-GigE camera generates the 3D scan data. Using state-of-the-art FPGA technology, the sensors of the C5 series can operate at profile speeds of up to 200 kHz, independently of the chosen algorithm.

The transmission of the 3D data is carried out via a Gigabit Ethernet interface that complies with the GigE Vision standard and GenICam protocol. Once the C5-1280-GigE camera is connected, the vision software will automatically load an XML file with all camera functions. This is why the integration of AT's 3D sensors requires no more effort than setting up a conventional 2D camera.
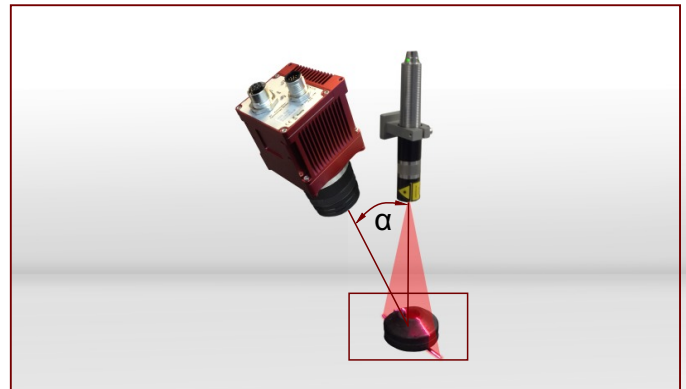
The C5 Sensor records the Shape of the Laser Line.
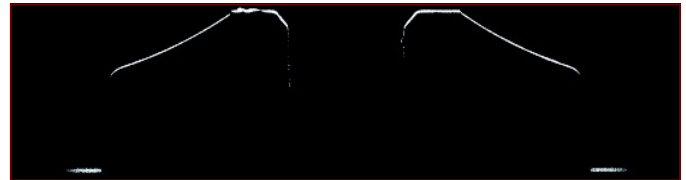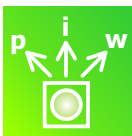

Captured Laser Line in the Sensor Image
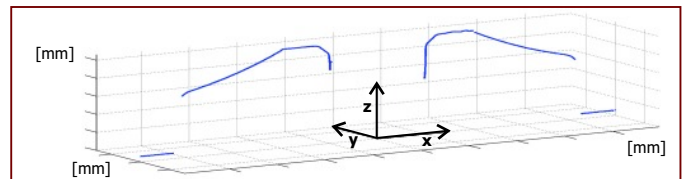
Display of 3D Data in a Vision Software

Features at a Glance

AOI-Functions
Automatic AOI-Tracking, Automatic AOI-Search, Autostart

Multiple Feature Output
Sensor output delivers data of position, intensity, line width, etc.

Multiple Sensor-AOIs
Define up to 8 AOIs for dividing the sensor in seperate subwindows for detection of multiple lines

High Dynamic Range (HDR-3D)
HDR-3D enables the scanning of objects with inhomogeneous reflection properties

Advanced Triangulation Algorithms
Wide variety of evaluation algorithms (COG, FIR-PEAK, TRSH, MAX) and filters (smoothing and derivative)

Chunk Data
Additional information output, e.g. timestamps, trigger/encoder coordinate, frame index, etc.

Enhanced Encoder Interface
Enables asymmetric signal transmission, supports differential (RS422) and of single-ended/single-channel encoders

GEV Events & Packet Resend
Secure data transmission according to the GigE Vision® standard

STEMMER® IMAGING

3D Imaging Applications

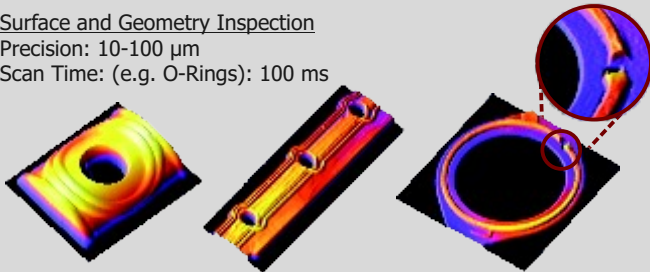Examples of Typical Applications with CX Sensors

Inspection of Elastomer Parts
(e.g. Radial Shaft Seals, Gaskets, Tyres)

Surface and Geometry Inspection
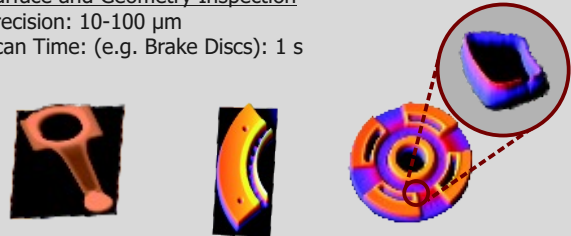Precision: 10-100 µm
Scan Time: (e.g. O-Rings): 100 ms

Inspection of Metal Parts
(e.g. Brake Discs, Conrods, Pistons)

Surface and Geometry Inspection
Precision: 10-100 µm
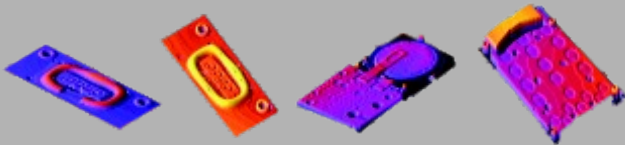Scan Time: (e.g. Brake Discs): 1 s

In-Line Inspection in Assembly Lines
(e.g. Glue Beads, Rivets, Screws, PCBs, Batteries, Contacts)

Assembly Verification, Flatness & Geometry Inspection
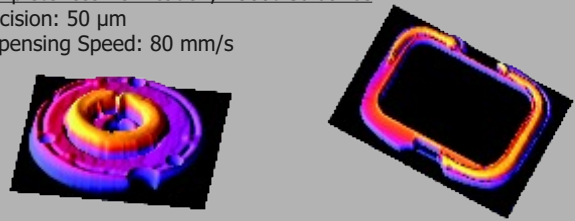Precision: 20 µm
Scan Time: <1 s

Inspection of Adhesive and Sealing Beads
(e.g. Automotive Parts)

Online inspection During Dispensing, Volumetric Measurement, Completeness Verification, Robot Guidance
Precision: 50 µm
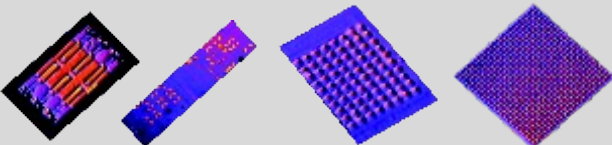Dispensing Speed: 80 mm/s

Inspection of Electronic Components
(e.g. PCBs, BGAs, Connectors)

Inspection of Solder Paste, Assembly Verification, Coplanarity Inspection, Pin Inspection
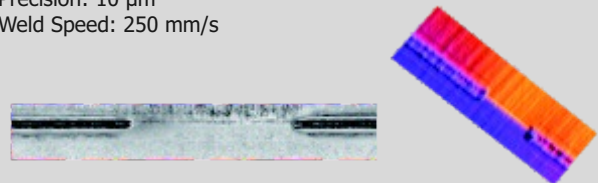Precision: 5 µm
Scan Speed (e.g. BGA): 300 mm/s

Weld Seam Inspection
(e.g. Steel Blank Welding)

Surface and Geometry Inspection
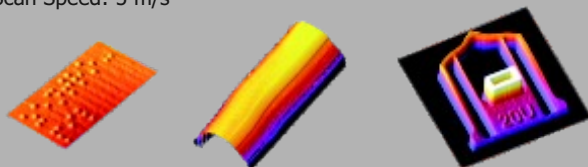Precision: 10 µm
Weld Speed: 250 mm/s

Automatic Text Recognition
(e.g. Tyre Specification, Braille Characters)

OCR (Optical Character Recognition)
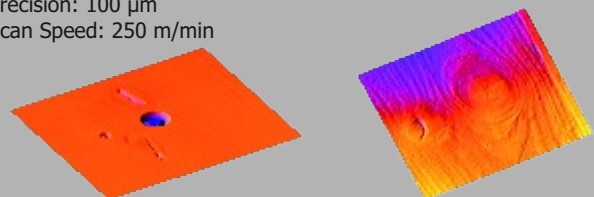Precision: 10-100 µm
Scan Speed: 5 m/s

Inspection of Wood Surfaces
(e.g. Plywood)

Surface Inspection, Detection of Branch Holes, Detection of Glue Stains, Texture inspection
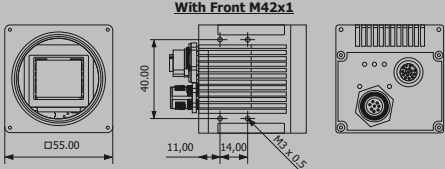Precision: 100 µm
Scan Speed: 250 m/min

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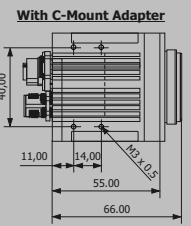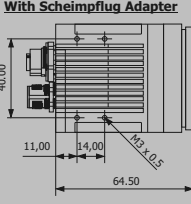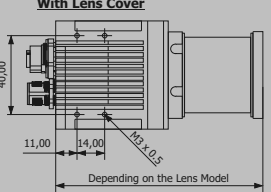
C5-1280-GigE

Technical Specifications

Sensor Specifications

Sensor Resolution	1280 (H) x 1024 (V)
Pixel Size	6.6 µm x 6.6 µm
Dynamic Range (*with HDR-3D)	90 dB
Digitization	10 Bit
Sensitivity	9.6 V/lux.s @ 525 nm
Sensor Algorithm	MAX, TRSH, COG, FIR-PEAK
Profile Length in 3D-Mode	1280 Pixel per Profile

Typical Profile Speed depending on Number of Sensor Rows

Height Resolution can be increased by using TRSH (1/2 pixel) or COG/FIR-PEAK (1/64 pixel) without Loss of Speed

Sensor Rows	Profile Speed (with 1280 Pixel/Row)	Profile Speed (with 640 Pixel/Row)
1024	1.06 kHz	1.86 kHz
256	4.21 kHz	7.40 kHz
128	8.38 kHz	14.7 kHz
32	32.5 kHz	55.3 kHz
16	62.3 kHz	102.7 kHz
8	115.2 kHz	180.0 kHz

Max. Frame Rate for Image Mode (Full Frame)	- 288 fps (Internal Recording) - 94 fps (via GigE Vision)

Options

Scheimpflug Adapter

C-Mount F-Mount — C-Mount / F-Mount

3D-Calibration Software

□≠□ 3D-Matching Software

Starterkit

Lens Cover (IP 67)

General Camera Specifications

Interface Specifications

Digital Input	2 Electrical Isolated Inputs (5 -24 V DC)
Digital Output	2 Electrical Isolated Outputs (5 -24 V DC)
Encoder / Resolver Input	Resolver Interface with Signals A,/A, B, /B, Z, /Z High Speed, Triple RS-422 / RS-485 Receiver Max. Input Voltage ± 24 V DC
Analog Output	Range: 0 - 5 V DC
Data Interface	GigE Vision with GenICam Protocol

Power Requirements

Power Supply	10 - 24V DC
Power Consumption	<6 W

Mechanical Specifications

Lens Mount	C-Mount / M42 with F-Mount Adapter
Size	55 mm x 55 mm x 55 mm
Mass (without Lens & Adaptor)	200 g
Housing Mount	M3 + Adaptor Plate with Metric and Inch Threads

Enviromental Specifications

Operating Temperature	0°C to +50°C (Non-Condensing)
Storage Temperature	-30°C to +70°C

General

PC Requirements	Gigabit Ethernet NIC
Operating Systems	Windows 10 / 8 / 7 / XP, Vista, Linux
Software Environments	Configuration Tool CX-Explorer, GenICam API, Compatible with any GigE Vision compliant Image Processing Library, e.g. CVB, NI-IMAQ, HALCON, MIL, VisionPro, EyeVision, GOM

Mechanical Size

With Front M42x1

□55.00 | 40.00 | 11,00 | 14,00 | M3 x 0.5

With C-Mount Adapter

40.00 | 11,00 | 14,00 | M3 x 0.5 | 55.00 | 66.00

With Scheimpflug Adapter

40.00 | 11,00 | 14,00 | M3 x 0.5 | 64.50

With Lens Cover

40.00 | 11,00 | 14,00 | M3 x 0.5 | Depending on the Lens Model

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