

C5-CS Series

High Speed 3D Compact Sensors with Ultra-HD Resolution

- 3D Sensor Heads based on Laser Triangulation
- Profile Resolution up to 4096 Points / Profile
- Profile Speed up to 25 kHz
- Integrated High Precision 3D Profile Algorithms
- Enhanced 3D Imaging with HDR-3D Technology
- Ruggedized Enclosure (IP67)
- GigE Vision and GenICam Compliant
- Flexible Trigger Interface
- Sophisticated 3D Scan Features like Autostart, Automatic AOI-Tracking, Multiple AOIs, etc.



C5-CS Series

High Speed 3D Imaging with Ultra-High Resolution

C5 compact sensors (C5-CS) scan objects by means of the laser triangulation method. This occurs through a projected laser line that migrates along the surface. By scanning the laser line, the 3D profile of the object is captured in the sensor image.

Through an internal processing of the line images performed by different evaluation algorithms, the C5-CS generates the 3D scan data. Using state-of-the-art FPGA technology, the C5 sensors can operate at profile speeds of up to 25 kHz, independently of the chosen algorithm.

C5 compact sensors are available with resolutions starting from 648 points per profile up to a 4K Ultra-HD version with 4096 points per profile. The C5-CS models enable measurement-ranges of up to 1060mm (width) and 800mm (height).

A special effort was made to enhance the industrial capabilities of the enclosures. This is why the C5-CS series has a ruggedized design with protection class IP67. To assure a reliable power supply and data transfer, all cable connections are equipped with M12 tensile- and tear-resistant connectors.

Apart from that, all other characteristics of our CX series have been adopted. Therefore, the C5 compact sensors feature a Gigabit Ethernet interface and comply with the GigE-Vision standard. In combination with the GenICam standard, the configuration of the new 3D sensors is easily done by Plug n' Play.

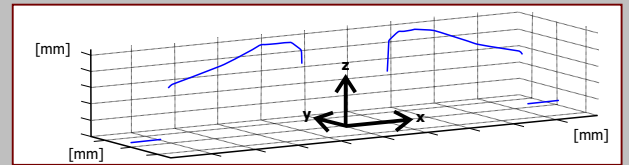
3D Measurement by Means of Laser Triangulation



The C5-CS Sensor records the Shape of the Laser Line.



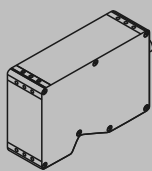
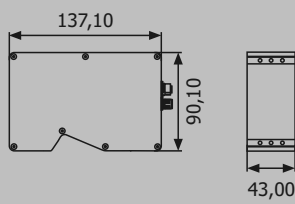
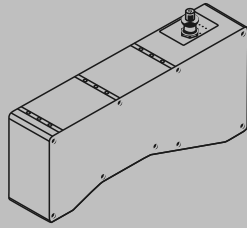
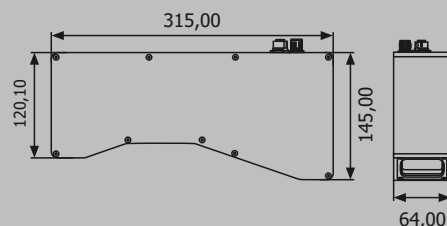
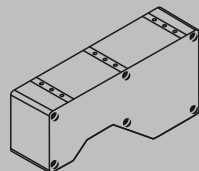
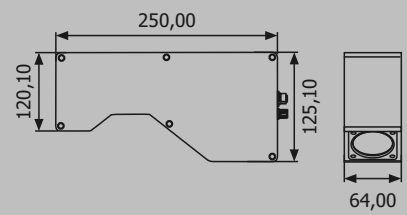
Captured Laser Line in the Sensor Image



Display of 3D Data in a Vision Software

C5-CS Features

 Calibrated	 Advanced Evaluation Algorithms	 Chunk Data
 Multiple Feature Output	 GEV Events & Paket Resend	 HDR-3D

Modell 1	Modell 2	Modell 3
 	 	 

C5-CS Series

Model Overview with Specifications

General Specifications		Specification Description					
Profile Speed	Up to 25000 Hz (Depending on the Model)						
Profile Resolution	Up to 4096 Points / Profile (Depending on the Model)						
Interface	GigE Vision / GenICam						
Dynamic Range (*with HDR-3D)	90 dB (with HDR-3D)						
Connectors	M12						
Protection Class	IP67						
Laser Safety Class	2M, 3R, 3B						
Sensor Algorithm	MAX, TRSH, COG, FIR-PEAK						
Digital I/Os	Opto-Isolated Inputs (2x) / Outputs (2x), Laser Safety, Trigger, Encoder (RS442)						
Power Supply	10 - 24V DC						
PC Requirements	Gigabit Ethernet NIC						
Software Environments	Configuration Tool CX-Explorer, GenICam API, CVB, NI-IMAQ, HALCON, MIL, VisionPro, MATLAB, etc.						
Model Name	FOV [mm]	Z-Range [mm]	Lateral Resolution [mm]	Height Resolution [µm]	Working Distance [mm]	Points per Profile	Mechanical Setup
C5-640CS23-27	27	±20	0,042	1,7	106	648	Model 1
C5-1600CS23-30	30	±20	0,019	0,8	106	1600	Model 1
C5-2040CS23-38	38	±20	0,019	0,8	106	2048	Model 1
C5-640CS23-43	43	±20	0,066	2,7	106	648	Model 1
C5-1600CS23-49	49	±20	0,031	1,2	106	1600	Model 1
C5-2040CS23-63	63	±20	0,031	1,2	106	2048	Model 1
C5-3360CS39-67	67	±7,5	0,020	0,5	172,5	3360	Model 3
C5-1600CS23-78	78	±20	0,049	2,0	106	1600	Model 1
C5-2040CS23-100	100	±20	0,049	2,0	106	2048	Model 1
C5-3360CS30-150	150	±100	0,045	1,4	398	3360	Model 2
C5-4090CS30-182	182	±125	0,044	1,4	398	4096	Model 2
C5-3360CS19-248	248	±250	0,074	3,6	685	3360	Model 2
C5-3360CS30-255	255	±150	0,076	2,4	398	3360	Model 2
C5-1600CS30-260	260	±150	0,163	5,1	398	1600	Model 2
C5-4090CS19-302	302	±250	0,074	3,6	685	4096	Model 2
C5-4090CS30-310	310	±150	0,076	2,4	398	4096	Model 2
C5-2040CS30-330	330	±150	0,161	5,0	398	2048	Model 2
C5-3360CS30-406	406	±150	0,121	3,8	398	3360	Model 2
C5-3360CS18-420	420	±400	0,125	6,3	742	3360	Model 2
C5-4090CS30-495	495	±150	0,121	3,8	398	4096	Model 2
C5-1600CS19-500	500	±250	0,313	15,0	685	1600	Model 2
C5-4090CS18-510	510	±400	0,125	6,3	742	4096	Model 2
C5-2040CS19-640	640	±250	0,313	15,0	685	2048	Model 2
C5-3360CS18-691	691	±400	0,206	10,4	742	3360	Model 2
C5-1600CS18-825	825	±400	0,516	26,1	742	1600	Model 2
C5-4090CS18-842	842	±400	0,206	10,4	742	4096	Model 2
C5-2040CS18-1060	1060	±400	0,518	26,2	742	2048	Model 2

C5-CS Series

Examples of Typical Applications

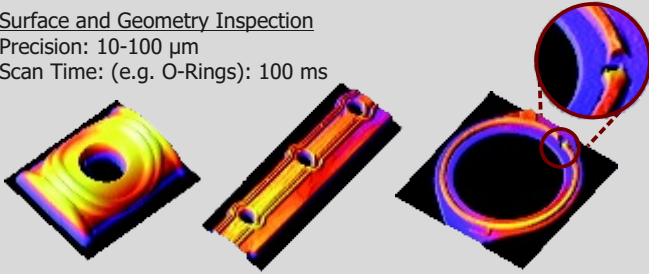
Inspection of Elastomer Parts

(e.g. Radial Shaft Seals, Gaskets, Tyres)

Surface and Geometry Inspection

Precision: 10-100 μm

Scan Time: (e.g. O-Rings): 100 ms



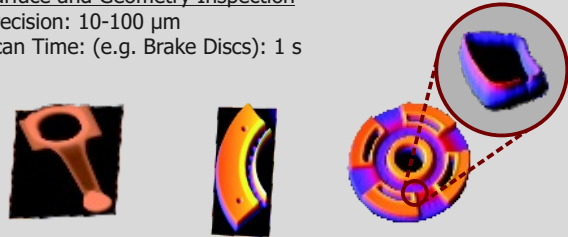
Inspection of Metal Parts

(e.g. Brake Discs, Conrods, Pistons)

Surface and Geometry Inspection

Precision: 10-100 μm

Scan Time: (e.g. Brake Discs): 1 s



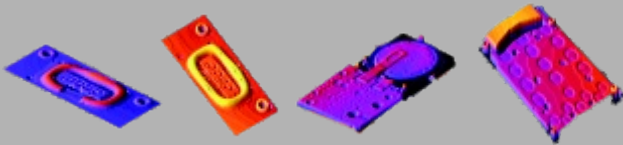
In-Line Inspection in Assembly Lines

(e.g. Glue Beads, Rivets, Screws, PCBs, Batteries, Contacts)

Assembly Verification, Flatness & Geometry Inspection

Precision: 20 μm

Scan Time: <1 s



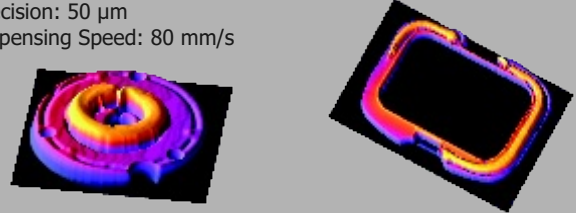
Inspection of Adhesive and Sealing Beads

(e.g. Automotive Parts)

Online inspection During Dispensing, Volumetric Measurement, Completeness Verification, Robot Guidance

Precision: 50 μm

Dispensing Speed: 80 mm/s



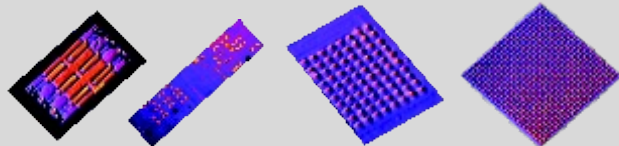
Inspection of Electronic Components

(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



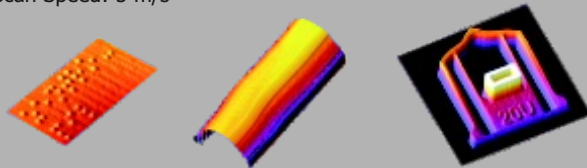
Automatic Text Recognition

(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

