C4®-2350-GigE

Intelligent High Speed 3D Measurement

- Smart High Resolution and High Speed CMOS Camera
- Integrated 3D-Profile High Precision Algorithms up to 23.500 Profiles/s
- GigE Vision Interface, GenICam Compliant
- Flexible Trigger Interfaces
- Integrated Illumination Control
- Multiple Sensor AOIs

Automation Technology
Vision Systems for Automation

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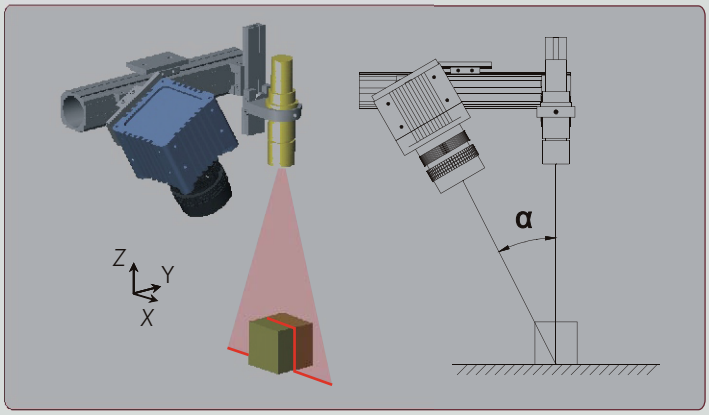
C4®-2350-GigE unmatched performance and flexibility for 3D imaging

The C4®-2350-GigE is a revolution for three dimensional shape measurement. It offers unique key benefits for OEMs and Vision Integrators while making 3D imaging as easy as 2D vision.

Measurement Principle

The C4® sensor acquires height profiles and height images by means of laser sheet-of-light (triangulation) technique: a laser line is projected on the object, the resulting sensor image is evaluated by the C4® camera core and converted into a single height profile. By scanning the laser line over the object a complete height image of the object can be acquired.



Fastest 3D-Sensor on market

By using the C4®-Technology of high speed parallel hardware processors the complete 3D data calculation is done inside the camera. This enables the C4®-2350-GigE to acquire up to 23.500 profiles per second. For a maximum of flexibility, three profile algorithms are included in the C4®-core: TRSH, MAX and COG. Furthermore, the choice of the profile algorithm does not influence the profile speed. This means that the profile data are always output at the same maximum speed.

Multiple Sensor-AOIs and Multiple-Featureoutput

The C4® sensor is capable of delivering position data as well as additional features (e.g. intensity, line width) without sacrificing profile speed. Furthermore up to four sensor AOIs can bedefined for dividing the sensor in separate subwindows.

High quality profile data

All C4®-2350 sensors are equipped with a global snapshot shutter for capturing sharp, undistorted images and profile data even for fast moving objects.

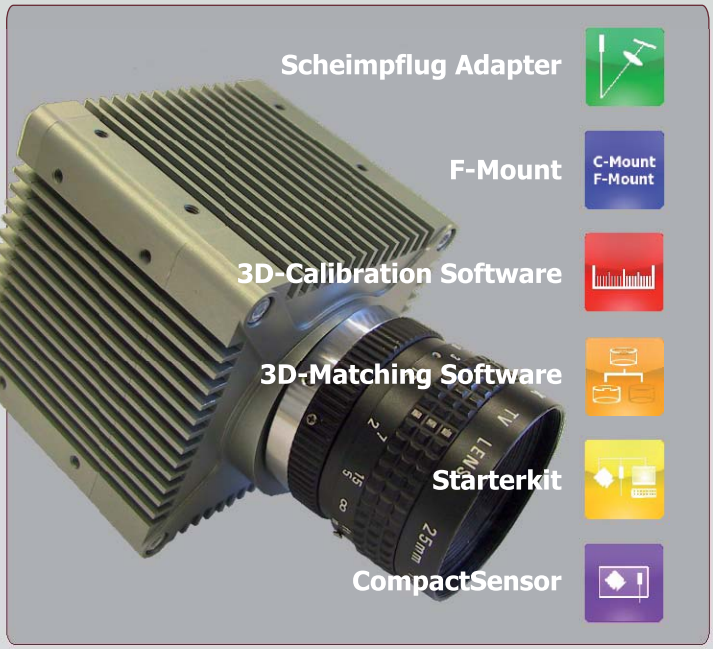
Flexible Trigger Interface

The C4® camera contains a configurable trigger interface based on opto-coupled I/O lines and a RS422 shaft encoder with tick counter and direction evaluation. Using this advanced trigger options assures precise profile triggering even at changes of movement velocity.

Easy Integration in Machine Vision Systems

The C4® concept is based on Gigabit-Ethernet interface and complies to GigE standard. Through the GenICam protocol the integration effort is minimised. We support our customer with an API and a standalone tool for configuring the camera. Once the camera is configured it boots up using the predefined configuration without any camera specific programming. Furthermore, the camera FPGA allows the storage of up to 4 different firmware versions, which can be field updated at any time.

Available Options



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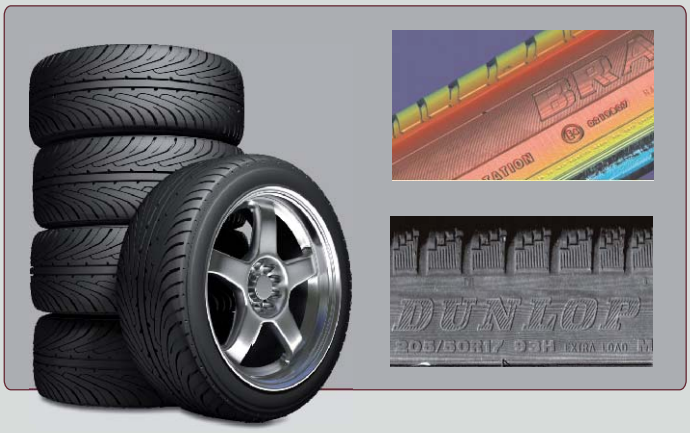
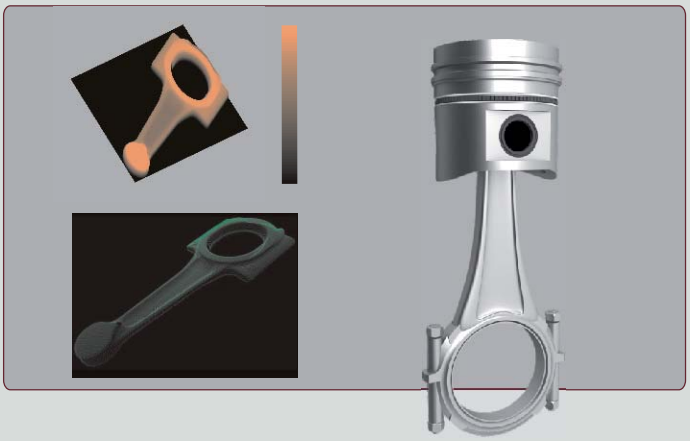
3D - Imaging solution for numerous applications

The C4®-2350-GigE provides a powerful solution to a broad field of industrial 3D- applications

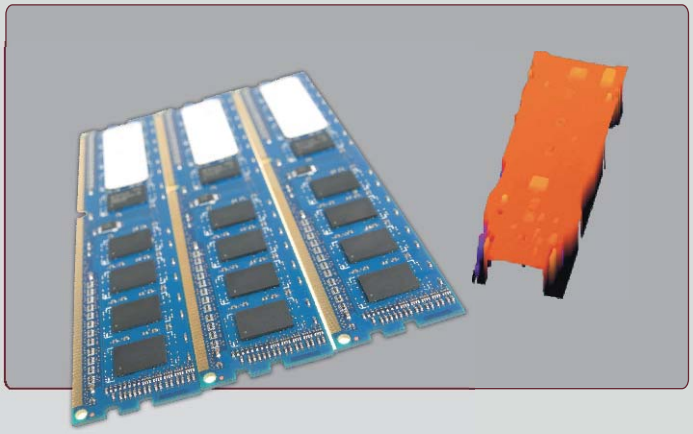
Inspection of tyres and rubber gaskets



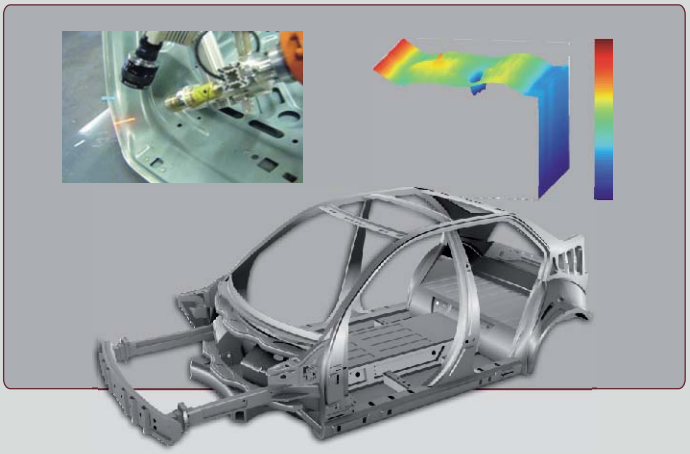
Inspection of connection rods



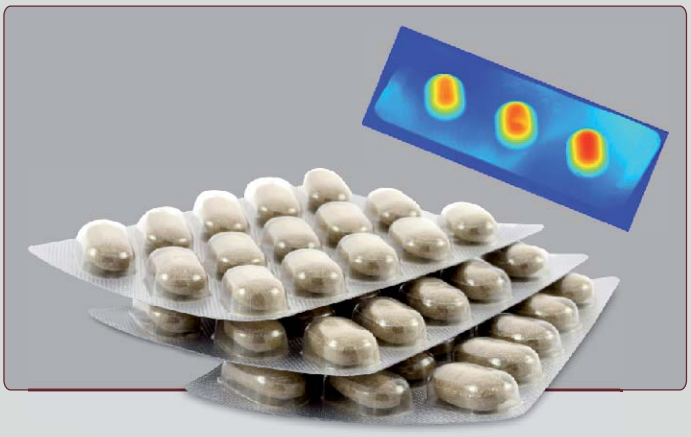
Inspection of Printed Circuit Boards (PCB)



Inspection of glue beads

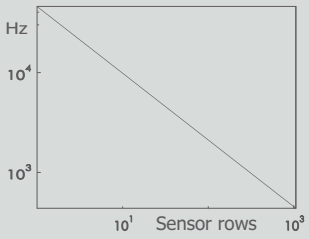


3D Inspection of Packaging



Inspection of Sintered Components

C4®-2350-GigE

Sensor Specifications	
Pixels	2352 (H) x 1728 (V)
Pixel size	7µm x 7µm
Digitization	10Bit
Shutter	Rolling Shutter
Sensitivity	17000 LSB/(µJ cm2) @ 610nm
Sensor algorithm	Image, Profile-MAX, Profile-TRSH, Profile-COG, User specific (Peak)
Length of profile in 3D-mode	2352 pixels
Typical profile speed depending on number of sensor rows Height resolution can be increased by using Profile-TRSH (1/2 pixel) or Profile-COG (1/64 pixel) without loss of speed	Sensor rows / Profile speed (Hz) with 1280 pixels: 1728 — 190 216 — 1550 108 — 3100 54 — 6150 27 — 12400 14 — 23850 
Max. frame rate for image mode (full frame)	190 fps (internal memory)
Max. numbers of sensor AOIs	4 or 8 (depending on Firmware Revision)
Interface Specifications	
Digital I/O's and external synchronisation signals (MDR20 connector)	2 opto-coupled inputs, 2 opto-coupled outputs, Laser control interface Inputs can be configured as image and profile trigger, RS422 Resolver interface with signals A,/A,B,/B, tick divider and direction evaluation
Illumination interface (5-pin M9 connector)	To control line laser projectors
Video output	GigE Vision with GenICam protocol
Power Requirements	
Power supply	10 - 24V
Power consumption	< 10W
Mechanical Specifications	
Lens mount	M42 x 1 (requires adapter for C-/F-Mount lens)
Size	68mm x 68mm x 64,20mm (C-Mount) / 93,20mm (F-Mount)
Mass (without optics)	350g (C-Mount) / 420g (F-Mount)
Housing mount	4 x M3 on each side
Environmental Specifications	
Operating temperature	0°C to +50°C (non condensing)
Storage temperature	-30°C to +70°C (non condensing)
General	
PC requirements	Gigabit Ethernet
Operating systems	Windows 7, Vista, XP, WIN NT, 2000, Linux (on request)
Software environement	Configuration tool CX-Explorer, GenICam API, Compatible with any GigE vision compliant image processing library, e.g. CVB, NI-IMAQ, HALCON, MIL

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