C4®-4090-GigE

High Speed 3D Measurement

- High speed CMOS camera with ultra-high resolution

- Enhanced 3D imaging with High Dynamic Range 3D profiling technology (HDR-3D)

- Integrated 3D-profile high precision algorithms up to 14500 Profiles/s

- GigE Vision interface, GenICam compliant

- Flexible trigger interfaces

- Integrated illumination control

AT **Automation Technology**
Vision Systems for Automation

C4®-4090-GigE unmatched performance and flexibility for 3D imaging

The C4®-4090-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 which extracts the 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®-4090-GigE to acquire up to 14500 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 Feature output

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 be defined for dividing the sensor in separate subwindows.

High quality profile data

All C4®-4090 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.
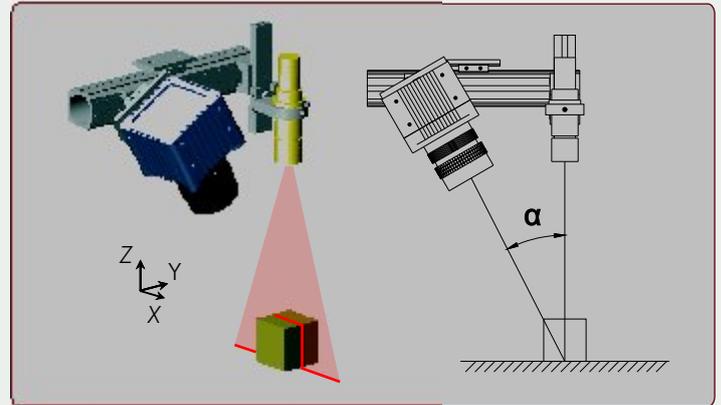
Easy integration in machine vision systems

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.
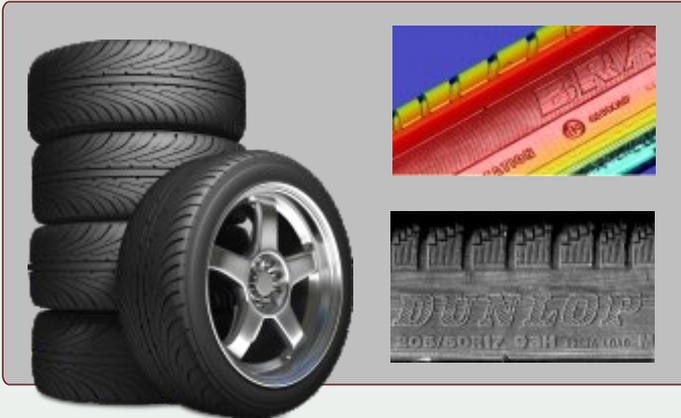
Available Options

- Scheimpflug Adapter
- 3D-Calibration Software
- 3D-Matching Software
- Starterkit
- CompactSensor

3D - Imaging solution for numerous applications

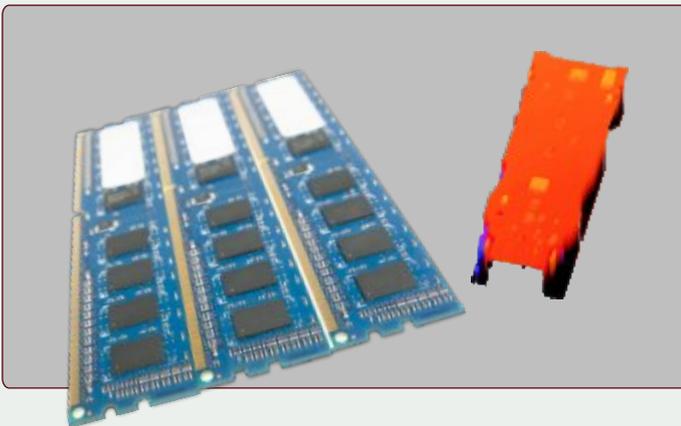The C4®-4090-GigE provides a powerful solution to a broad field of industrial 3D- applications
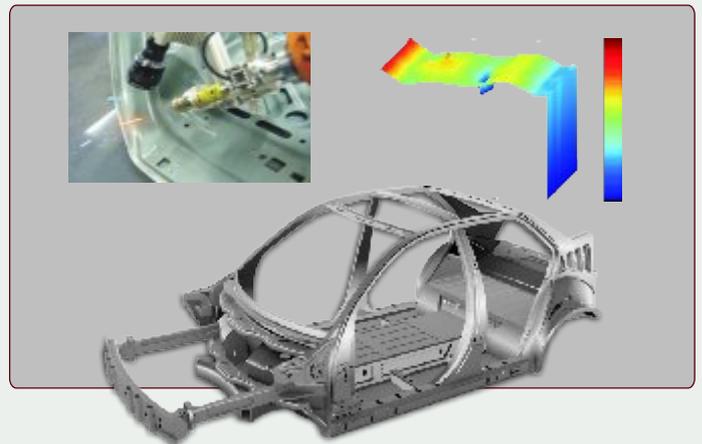
Inspection of tyres and rubber gaskets
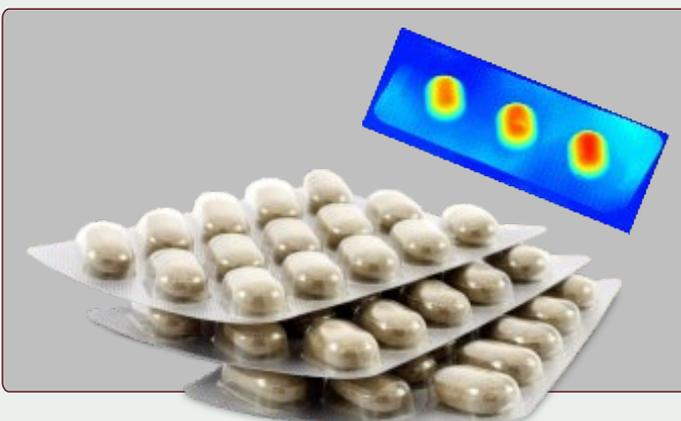

Inspection of connection rods

Inspection of Printed Circuit Boards (PCB)

Inspection of glue beads

3D Inspection of Packaging

Inspection of Sintered Components

C4®-4090-GigE

Sensor Specifications

Pixels	4096 x 3072
Pixel size	5.5µm x 5.5µm
Dynamic range	90dB with High Dynamic Range 3D (HDR-3D)
Digitization	10Bit
Shutter	Global Shutter with Multiple Slopes and Multiframe Readout
Sensitivity	4000 LSB/(µJ cm²) @ 550nm
Sensor algorithm	Image, Profile-MAX, Profile-TRSH, Profile-COG
Length of profile in 3D-mode	4096 pixels per profile

Typical profile speed depending on number of sensor rows	Sensor rows	Profile speed (Hz) with 4096 pixels
	3072	75
	512	450
Height resolution can be increased by using Profile-TRSH (1/2 pixel) or Profile-COG (1/64 pixel) without loss of speed	128	1700
	64	3200
	32	5800
	16	9700
	8	14500

Max. frame rate for image mode (full frame)	75 fps (internal memory)

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 with Back Focal Distance 6,52 mm (F-Mount adapter recommended)
Size	68mm x 68mm x 88mm (F-Mount)
Mass (without optics)	410g (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, XP, Vista, 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, VisionPro

Sales contact: