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The Machine Vision and Imaging Speciaists
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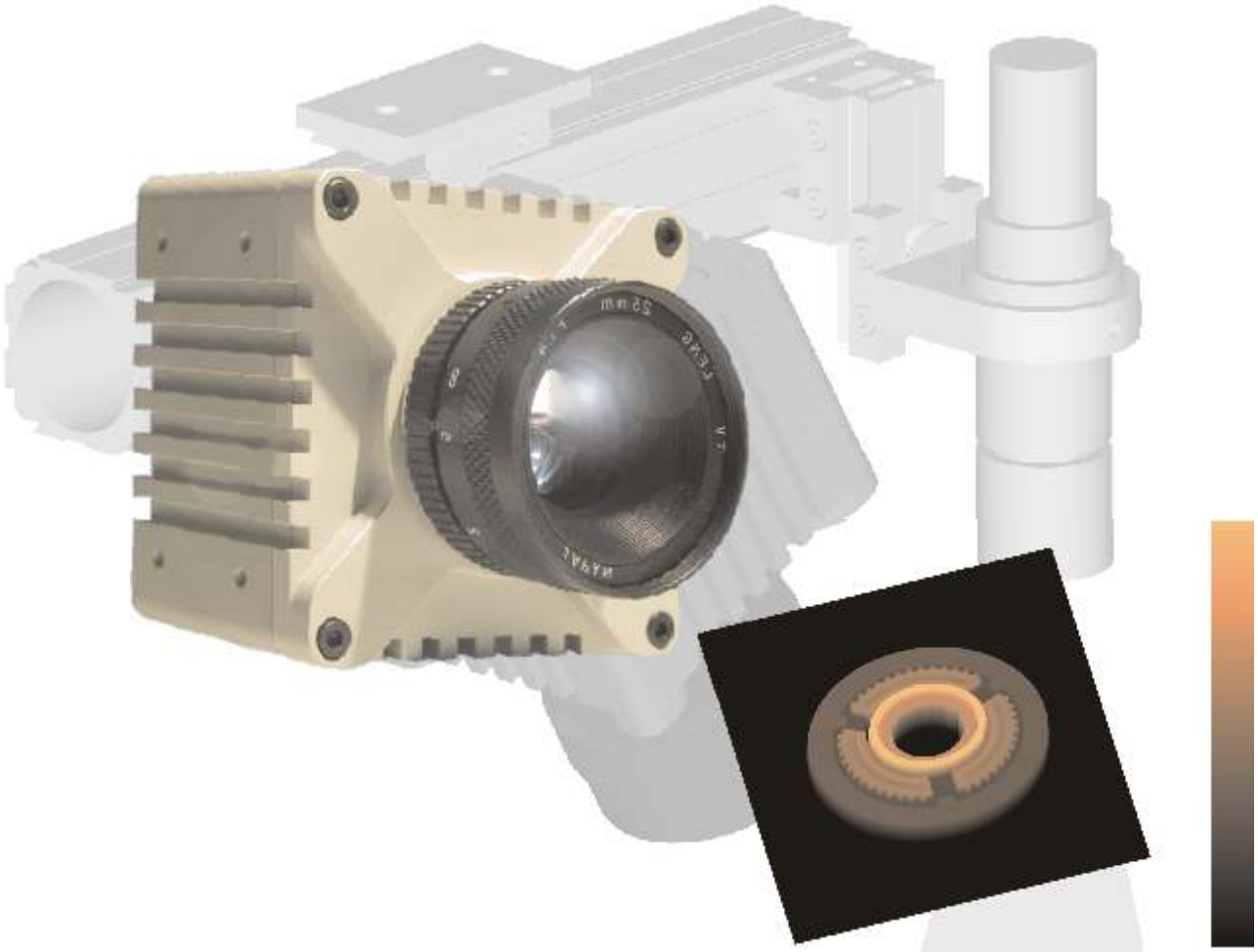
Automation Technology

C3-2350-CL Camera



High resolution and high speed CMOS camera

Built-in 3D-profile algorithms:
up to 23500 Profiles/s with 58 Million 3D-Points/s

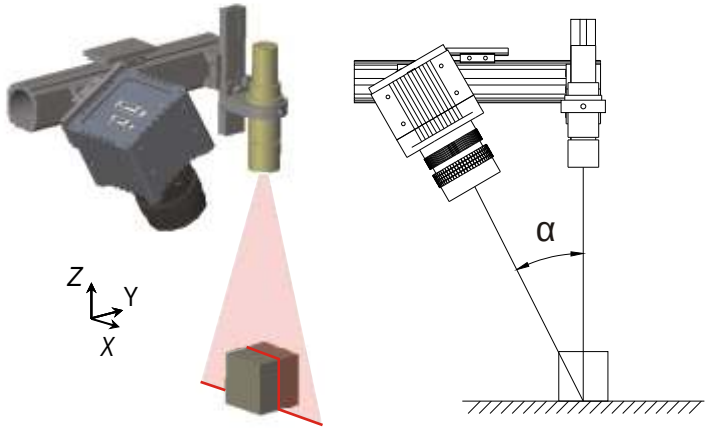
Standard CameraLink™ interface

Flexible trigger interfaces: RS422 resolver interface,
opto coupled trigger inputs and CameraLink™ trigger

Multiple sensor AOIs

C3-2350-CL unmatched performance and flexibility for 3D imaging

The C3-2350-CL 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 C3 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 C3 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 C3-Technology of high speed parallel hardware processors the complete 3D data calculation is done inside the camera. This enables the C3-2350-CL to acquire up to 23500 profiles with more than 58 million 3D points per second. For a maximum of flexibility, three profile algorithms are included in the C3-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 C3 sensor is capable of delivering position data as well as additional features (e.g. intensity, line width) without sacrificing profile speed. Furthermore up to eight sensor AOIs (depending on firmware version) can be defined for dividing the sensor in separate subwindows.

Flexible Trigger Interface

The C3 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

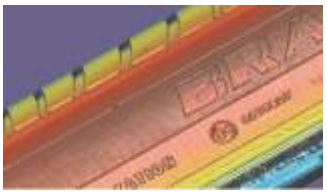
The C3 concept is based on standards in machine vision. Using C3 cameras you are free to choose your preferred hardware and software components. We support our customer with an API and a standalone tool for configuring the camera. Once the camera is configured it boots up using the predefined configuration 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.

3D - Imaging solution for numerous applications

The C3-2350-CL provides a powerful solution to a broad field of industrial 3D- applications

Some Application Examples

Tire Inspection



Inspection of Connecting Rods

Available Options

Scheimpflug Adapter

F-Mount

3D-Calibration Software

3D-Matching Software

Starterkit

CompactSensor

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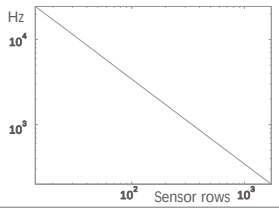
Automation Technology

C3-2350-CL

Sensor Specifications			
Pixels	2352 (H) x 1728 (V)		
Pixel size	7µm x 7µm		
Digitization	10Bit		
Shutter	Rolling shutter		
Sensor algorithm	Image, Profile-MAX, Profile-TRSH, Profile-COG		
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 (up to 1/16 pixel) without loss of speed	Sensor rows	Profile speed (Hz)	
	1728	190	
	864	380	
	108	3045	
	27	12180	
	14	23500	
Max. frame rate for image mode over CameraLink™ (full frame)	20fps with 40Mhz CameraLink™ – clock (2 tap mode) 30fps with 60Mhz CameraLink™ – clock (2 tap mode)		
Max. number of sensor AOIs	4 or 8 depending on Firmware Revision		
Interface Specifications			
Digital I/O's and external synchronisation signals (MDR14 connector)	2 opto-coupled inputs, 2 opto-coupled outputs Inputs can be configured as image and profile trigger RS422 Resolver interface with signals A,/A,B,/B, tick divider and direction evaluation		
Video output	CameraLink™(Base)		
Power Requirements			
Power supply	7 - 24V		
Power consumption	3.5 W		
Mechanical Specifications			
Lens mount	C-Mount / F-Mount		
Size	72mm x 72mm x 57.4mm (C-Mount) / 86.4mm (F-Mount)		
Mass (without optics)	330g (C-Mount) / 400g (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	CameraLink™ board with base connector		
Operating systems	Windows 98, WIN NT, 2000, XP, Linux (on request)		
Software environement	Configuration tool C3-Explorer C3Lib API with source code (C++) Compatible with standard image processing libs, e.g. CVB, HALCON, MIL, IFC, SAPERA, MULTICAM, NI-IMAQ, LABVIEW, MATLAB etc		

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