PRODUCT CATALOG 2014/2015

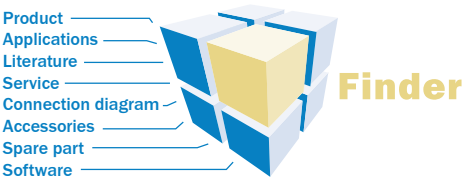
Vision

Vision sensors
Smart cameras
High-end cameras

SICK
Sensor Intelligence.

www.mysick.com – select and order online

Search online quickly and safely – with the SICK “Finders”

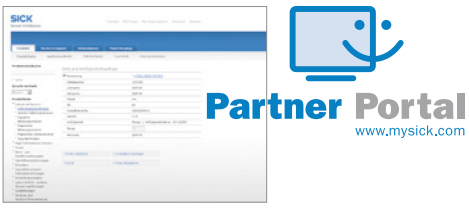


Product Finder: We can help you to quickly target the product that best matches your application.

Applications Finder: Select the application description on the basis of the challenge posed, industrial sector, or product group.

Literature Finder: Go directly to the operating instructions, technical information, and other literature on all aspects of SICK products.

Efficiency – with the e-commerce tools from SICK



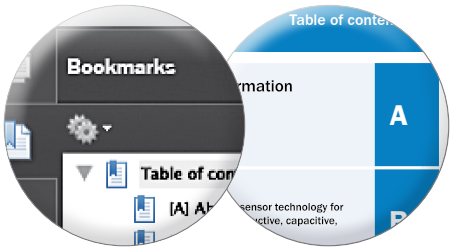
Find out prices and availability: Determine the price and possible delivery date of your desired product simply and quickly at any time.

Request or view a quote: You can have a quote generated online here. Every quote is confirmed to you via e-mail.

Order online: You can go through the ordering process in just a few steps.

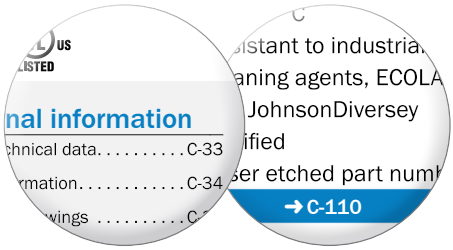
Navigation in the PDF document – Links to online ordering system

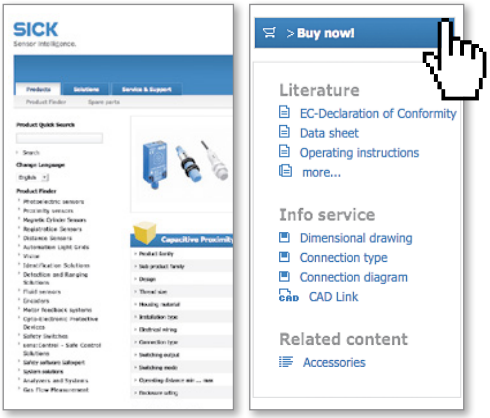
By bookmarks and tables of contents



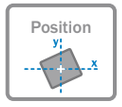
By links, QR codes and part numbers

By page references



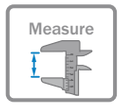


Tasks



Positioning locates objects and provides information about their coordinates for robot guidance, for example.

Inspection verifies product quality by checking the object for correct shape, completeness or other defects.



Measuring determines object dimensions like length, width, height, area or volume.

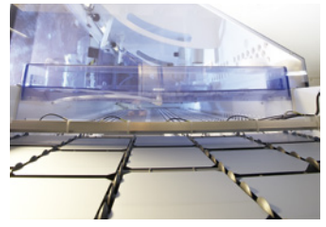
Reading decodes 1D, 2D or stacked codes and reads text.

Your industry in our focus

Automotive

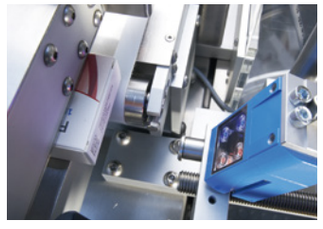
Beverages

Electronics



Solar

Food



Pharma and Cosmetics

Storage and Conveyer

Traffic

Products

Chapter		Product family	Page	Technology		Main tasks				Color inspection	Maximum resolution	Fieldbus/industrial network and protocols										Main industries							
													Ethernet					CAN bus		PROFIBUS DP	USB								
				2D	3D	Position	Inspect	Measure	Read			Serial	TCP/IP	FTP	EtherNet/IP	EtherCAT	PROFINET	CANopen	CSN (SICK CAN sensor network)			Automotive	Beverages	Electronics and Solar	Food	Pharma and Cosmetics	Storage and Conveyer	Traffic	
E	Vision sensors	Inspector	E-46	■		■	■	■			640 px x 480 px		■	■	■	■						■	■	■	■	■	■		E
		LECTOR®62x	E-52	■					■		752 px x 480 px	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
		LECTOR®65x	E-64	■					■		2,048 px x 2,048 px	■	■	■	■		■		■	■	■	■			■	■	■		
		CVS2	E-70	■			■			■	208 px x 236 px x 3 px (RGB)	■										■	■	■	■	■			
F	Smart cameras	IVC-2D	F-98	■		■	■	■	■		1,600 px x 1,200 px	■	■		■							■	■	■	■	■			F
		IVC-3D	F-100		■	■	■	■	■		1,536 px (3D)	■	■		■							■	■	■	■	■			
G	High-end cameras	Ranger	G-114		■	■	■	■		■	1,536 px (3D) 3,072 px (grey) 3,072 px (color)	■	■									■		■	■	■		■	G
		Ruler	G-118		■	■	■	■			1,536 px (3D) 1,536 px (grey)	■	■									■			■			■	

A

We deliver "Sensor Intelligence."

SICK sensor solutions for industrial automation are the result of exceptional dedication and experience. From development all the way to service: The people at SICK are committed to investing all their expertise in providing with the very best sensors and system solutions possible.

A company with a culture of success

Over 5,800 people are on staff, with products and services available to help SICK sensor technology users increase their productivity and reduce their costs. Founded in 1946 and headquartered in Waldkirch, Germany, SICK is a global sensor specialist with nearly 50 subsidiaries and representations worldwide. Our exemplary corporate culture fosters an optimum work-life balance, thus attracting the best employees from all over the world. SICK is one of the best employers – we have been among the winners of the prestigious German “Great Place to Work” award for many years in succession.

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Subject to change without notice

A

Innovation for the leading edge

SICK sensor systems simplify and optimize processes and allow for sustainable production. SICK operates at many research and development centers all over the world. Co-designed with customers and universities, our innovative sensor products and solutions are made to give a decisive edge. With an impressive track record of innovation, we take the key parameters of modern production to new levels: reliable process control, safety of people and environmental protection.

A corporate culture for sustainable excellence

SICK is backed by a holistic, homogeneous corporate culture. We are an independent company. And our sensor technology is open to all system environments. The power of innovation has made SICK one of the technology and market leaders – sensor technology that is successful in the long term.

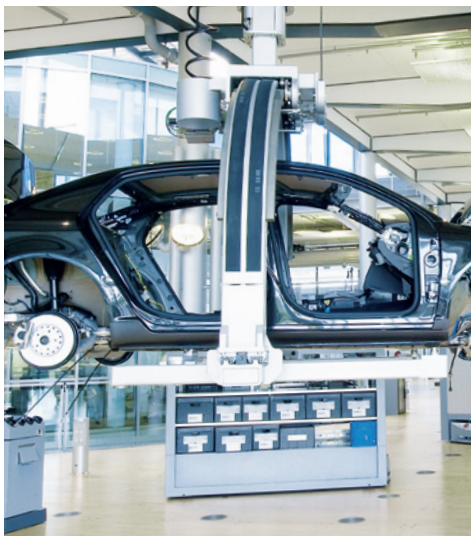
A

"Sensor Intelligence." for all requirements

SICK is a renowned expert in many industries, and is entirely familiar with the critical challenges they face. While speed, accuracy and availability take center stage in all industries, technical implementations vary greatly. SICK puts its vast experience to use to provide with precisely the solution you need.

For applications worldwide

Hundreds of thousands of installations and applications go to prove that SICK knows the different industries and their processes inside out. This tradition of uncompromising expertise is ongoing: As we move into the future, we will continue to design, implement and optimize customized solutions in our application centers in Europe, Asia and North America. You can count on SICK as a reliable supplier and development partner.



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A

For your specific industry

With a track record of proven expertise in a great variety of industries, SICK has taken quality and productivity to new heights. The automotive, pharmaceutical, electronics and solar industries are just a few examples of sectors that benefit from our know-how. In addition to increasing speed and improving traceability in warehouses and distribution centers, SICK solutions provide accident protection for automated guided vehicles. SICK system solutions for analysis and flow measurement of gases and liquids enable environmental protection and sustainability in, for example, energy production, cement production or waste incineration plants.

For performance across the board

SICK provides the right technology to respond to the tasks involved in industrial automation: measuring, detecting, monitoring and controlling, protecting, networking and integrating, identifying, positioning. Our development and industry experts continually create groundbreaking innovations to solve these tasks.

www.sick.com/industries

A

For safety and productivity: SICK LifeTime Services

SICK LifeTime Services is a comprehensive set of high-quality services provided to support the entire life cycle of products and applications from plant walk-through all the way to upgrades. These services increase the safety of people, boost the productivity of machines and serve as the basis for our customers' sustainable business success.

The benefit of SICK services

Each of our products and solutions is accompanied by a comprehensive range of services tuned precisely to the requirements of the product or solution – along its entire life cycle. Backed by extensive industry expertise and more than 60 years of experience, LifeTime Services stand for maximum availability and an exceptional service life of our products and solutions.

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A

Consulting & Design

- Plant walk-through
- Risk assessment
- Safety concept
- Feasibility studies
- Software and hardware design

Verification & Optimization

- Inspection
- Maintenance
- Barcode checks
- Accident investigation
- Stoptime measurement
- Machine safety inspection

Training & Education

- User training
- Seminars
- WebTraining

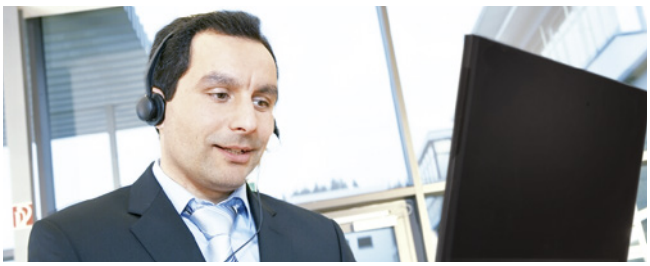
Product & System Support

- Commissioning
- Exchange units and repairs
- Remote support
- Hotline

Upgrade & Retrofits

- Machine conversion
- Sensor upgrades
- Retrofitting of technology

www.sick.com/services



A

Versatile product range for industrial automation

From the simple acquisition task to the key sensor technology in a complex production process: With every product from its broad portfolio, SICK offers a sensor solution that best combines cost effectiveness and safety.

www.sick.com/products

Photoelectric sensors

- Miniature photoelectric sensors
- Small photoelectric sensors
- Compact photoelectric sensors
- Fiber-optic sensors and fibers
- Cylindrical photoelectric sensors
- MutliTask photoelectric sensors

Proximity sensors

- Inductive proximity sensors
- Capacitive proximity sensors
- Magnetic proximity sensors

Magnetic cylinder sensors

- Analog positioning sensors
- Sensors for T-slot cylinders
- Sensors for C-slot cylinders
- Sensor adapters for other cylinder types

Identification solutions

- Bar code scanners
- Image-based code readers
- Hand-held scanners
- RFID

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A

Detection and ranging solutions

- Laser measurement technology

System solutions

- Volume measurement systems
- Code reading systems
- Dimension weighing scanning systems
- Vision systems

Fluid sensors

- Level sensors
- Pressure sensors
- Flow sensors
- Temperature sensors

Registration sensors

- Contrast sensors
- Color sensors
- Luminescence sensors
- Fork sensors
- Array sensors
- Register sensors
- Markless sensors

Distance sensors

- Short range distance sensors (displacement)
- Mid range distance sensors
- Long range distance sensors
- Linear measurement sensors
- Ultrasonic sensors
- Double sheet detector
- Optical data transmission
- Position finders

A

Automation light grids

- Advanced automation light grids
- Standard automation light grids
- Smart light grids

Vision

- Vision sensors
- Smart cameras
- High-end cameras

Opto-electronic protective devices

- Safety laser scanners
- Safety camera systems
- Safety light curtains
- Multiple light beam safety devices
- Single-beam photoelectric safety switches
- Mirror and device columns
- Upgrade kits

Safety switches

- Electro-mechanical safety switches
- Non-contact safety switches
- Safety command devices

sens:Control – safe control solutions

- Safety relays
- Safety controllers
- Network solutions

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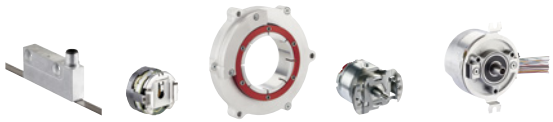
A

Motor feedback systems



- Interfaces: incremental, HIPERFACE® and HIPERFACE DSL®
- Safety motor feedback systems
- Rotary and linear motor feedback systems for asynchronous, synchronous motors and linear motors

Encoders

- Absolute encoders
- Incremental encoders
- Linear encoders
- Wire draw encoders

Analyzers and systems

- Gas analyzers
- Dust measuring devices
- Analyzer systems
- Liquid analyzers
- Data acquisition systems
- Tunnel sensors

Gas flow measuring devices

- Gas flow meters
- Mass flow meters
- Volume flow measuring devices

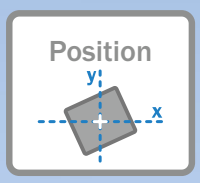
Software

- Safexpert® safety software

B

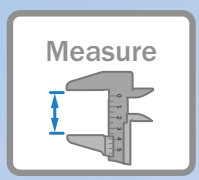
What is vision?

**Vision technology gives machines the gift of sight.
It replaces or complements manual inspection tasks
using the latest camera technology.**



Position

- Positioning is the ability to locate objects and their coordinates
- Guide robots and align parts



Measure

- Measurement is the ability to determine object dimensions
- Gauge length, width, height, area and volume

Inspect

- Inspection is the ability to verify product quality
- Check presence and find defects

Read

- Reading is the ability to decode and read texts
- 1D code, stacked code, 2D code and OCV/OCR

SICK saves you money

Vision is used in a wide range of industries to:

- Automate production
- Increase throughput
- Improve product quality
- Increase customer satisfaction

Vision sensors

- Configurable for ease-of-use
- Stand-alone operation, no PC needed

Smart cameras

- Programmable for flexibility
- Stand-alone operation, no PC needed

High-end cameras

- Data streamer for maximum performance
- External processing in PC

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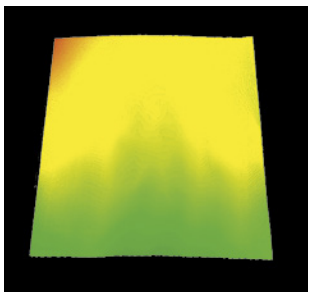
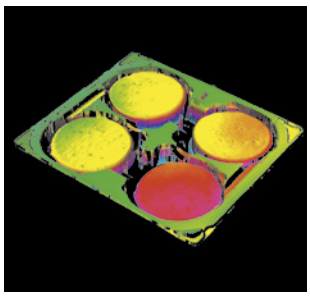
What is a vision camera?

An industrial vision camera consists of a lens, an imager, a processing unit and a communication interface, all protected by a rugged housing. SICK offers different vision camera families, depending on the application needs and integration environment.





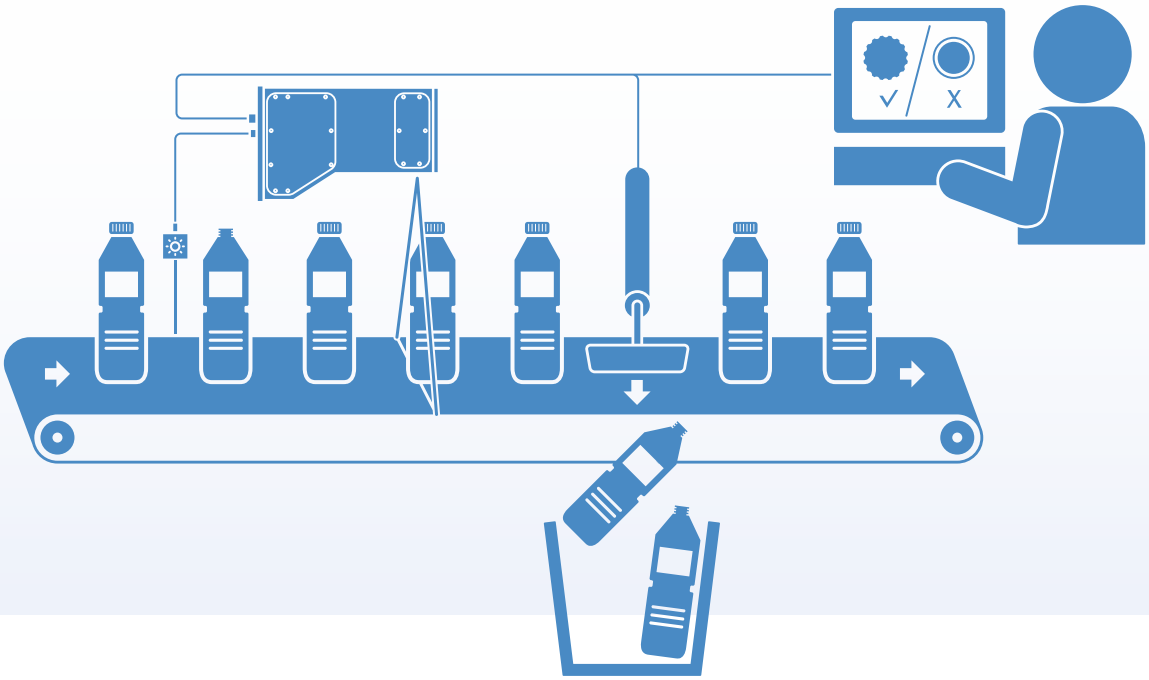
Box print is best seen in 2D

Some applications are best solved by 2D and some by 3D. 2D is recommended when the object has high contrast.

Box content is best seen in 3D

3D is suitable for analyzing features such as shape and height that have low contrast.

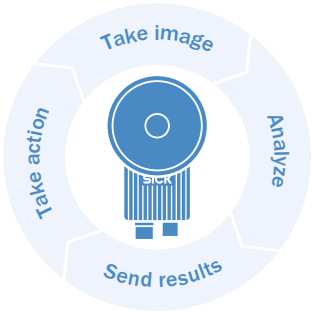
B



How does a vision system work?

A vision system operates in four-step cycles: image acquisition, analysis, reporting results and action. Depending on the application, the action can be object rejection, picking, process control or data logging for traceability.

A vision system often works together with other equipment, for example, a photoelectric sensor to trigger the camera, a network for reporting results and monitoring by an operator, and a device that removes the objects that have failed.

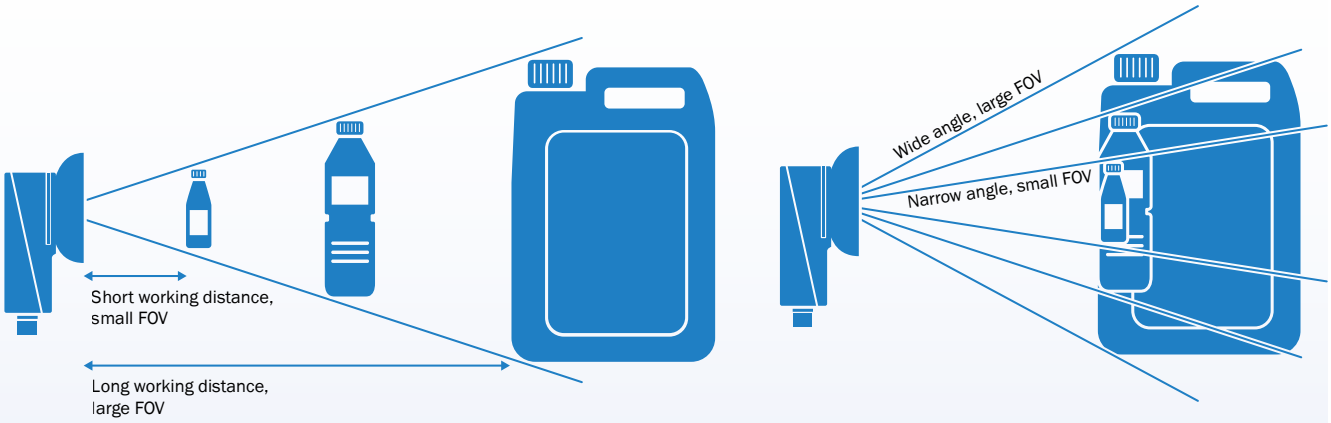


Focus and image exposure

To create a reliable solution, the image needs to be well focused and properly exposed. SICK vision cameras offer both automatic and manual adjustments to suit the application at hand.

Resolution

The image resolution is defined by the number of pixels. A low-resolution image allows faster analysis but does not show the fine details of a high-resolution image. Object resolution is the physical dimension of the object that corresponds to one pixel on the imager. For example, decoding a 2D code requires that each cell is seen by 2x2 pixels on the imager.



B

Focal length, working distance and field of view (FOV)

The field of view is the whole scene that the camera sees. The working distance is the distance between the lens and the object.

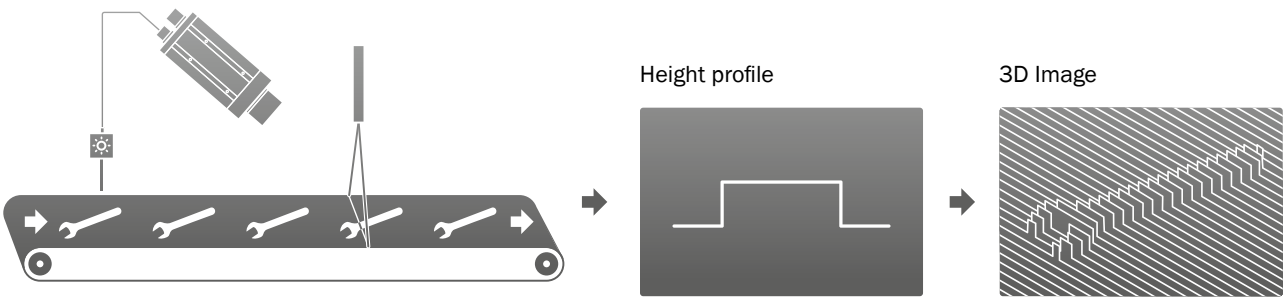
A short focal length provides a wide viewing angle and a large field of view. A long focal length allows the camera to see details from a longer distance. The focal length of the lens combined with the working distance determines the size of the field of view.

All cameras have a minimum working distance and depending on the camera type, they may also have a maximum working distance.

Laser triangulation – getting the third dimension

Laser triangulation is a fast scanning technology that gives accurate 3D data for reliable analysis of true shape aspects such as height, cross section area and volume.

This 3D imaging technology uses a laser line and a camera to create height profiles. A complete 3D image is acquired by collecting height profiles across the object while it moves.



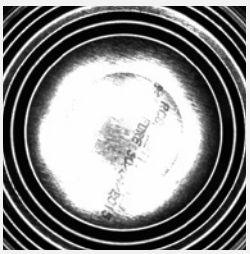
B

Light the way to better performance

Proper illumination is important to the performance of the vision system.
Correct lighting emphasizes the features to analyze and ensures a uniform image quality over time.

Lighting can be either internal in the camera or external. SICK offers a range of accessories to suit individual application needs.

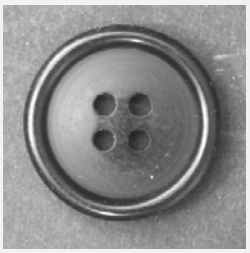
Some basic illumination principles assist in the selection of the right kind of lighting. For example, matte surfaces can be illuminated by direct light and shiny surfaces require diffuse, indirect light to avoid reflections.



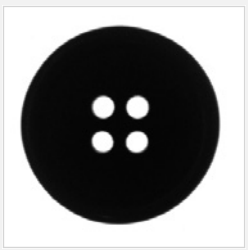
Direct ring light

Diffuse dome light

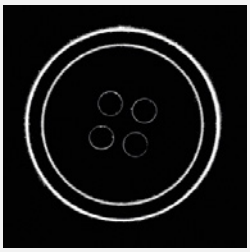
Using different illumination methods on the same object can provide a wide variety of results, depending on which features need to be enhanced.



Ambient light



Backlight



Darkfield illumination

It is possible to improve or suppress contrast between colored features and their background by using colored lighting and an optical filter on the lens.

Ambient light

Dome light without optical filter

Dome light with red filter

Image pre-processing

After the best possible image has been captured, pre-processing can further improve the image by removing unwanted details and enhancing wanted characteristics. For example, image calibration removes perspective and a digital filter increases the dot or cell size of a DataMatrix code so that it becomes easy to read.

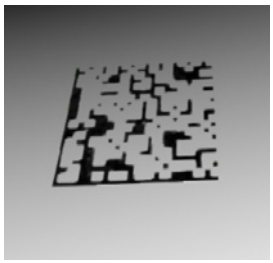
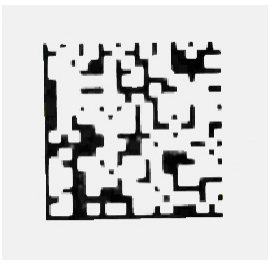
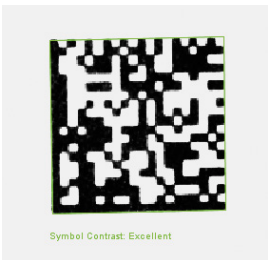


Image with perspective



Calibrated image without perspective



Easy to read code with increased cell size

Analysis tools

The image content is analyzed by different tools to extract the wanted information. The main tool tasks are to position, inspect, measure and read.

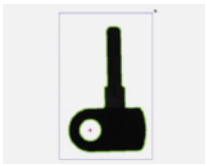
Position

Object locator
- Find an object of known shape

Blob locator
- Find objects of any shape
- Count objects

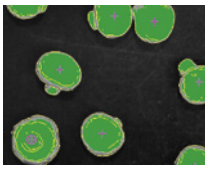
Feature finders
- Find an edge
- Find a circle and measure its diameter

Examples

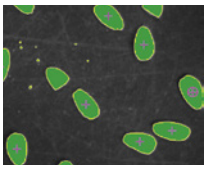


Reference object

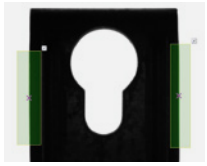
Live image



Counting



Sorting



Find edge

Find circle

B

Inspect

Pixel counter
- Check for presence of area-based features
- Find defects

Edge pixel counter
- Check for presence of contour-based features
- Find defects

Pattern
- Check for presence of a specific pattern on the object
- Find defects
- Identify misalignment in position or orientation

Examples

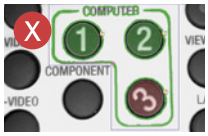

Correct cap


Faulty cap


Print present


Incomplete print

Correct keys

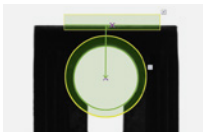


Misaligned key

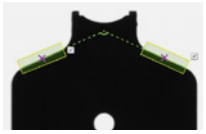
Measure

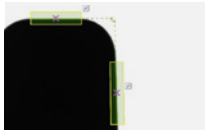
Distance
Measure the distance between two features
- Edge to edge / circle
- Circle to circle
- Edge to pattern / blob

Angle
- Measure the angle between two edges
- Calculate the intersection between two edges


Circle to edge distance


Edge to edge distance


Angle


Intersection

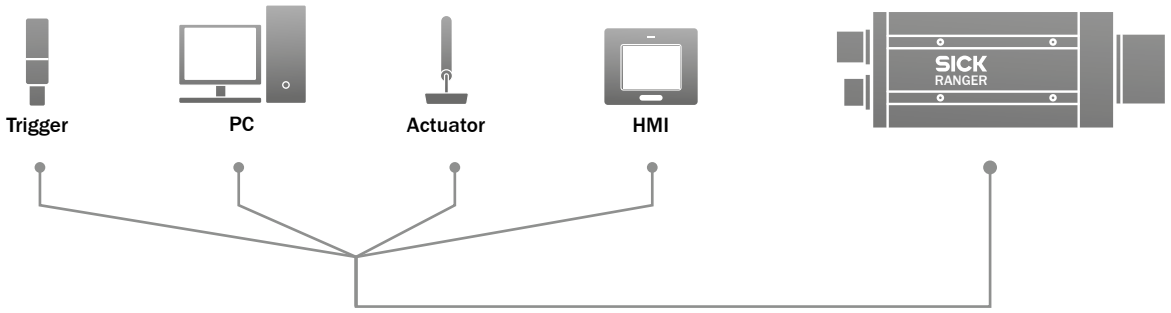
Read

1D bar codes
- Interleaved 2 of 5, Codabar
- Code 32, Code 39, Code 93
- OPC/GTIN/EAN
- Code 128, EAN 128/GS1-128
- Pharmacode

2D stacked codes
- PDF417, PDF417 Truncated
- GS1 data bar

2D matrix codes
- Data Matrix ECC200, GS1 Data Matrix
- QR Model 1 and 2
- Maxicode

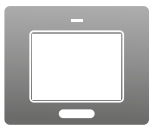
OCV/OCR
- Checks for text correctness (OCV) or reads unkown text (OCR)
- Machine printed fonts: OCR-A, OCR-B, Sans, Arial, Dot5, etc.



B

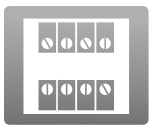
Connectivity

Connectivity enables the camera to send the results of the analysis to a reject nozzle or a PLC. SICK offers a wide variety of standardized connectivity options, both for communicating directly with a network or via a connection module.



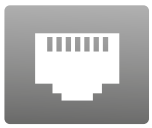
HMI

A HMI (Human Machine Interface) is used to monitor results and control the basic settings of the vision system. For example, a touch panel with software built with .Net or a web API.



Digital I/O

Digital inputs and outputs are the simplest and fastest communication channel, for example, for synchronization signals and pass / fail results.



Ethernet

Ethernet is a standard connectivity channel that provides TCP/IP, FTP transfer, fieldbuses (EtherNet/IP, PROFINET, EtherCAT) and OPC options.

PLC function blocks

A function block is a small piece of software that translates the result from the vision system to a format that is understandable to a PLC.

Serial

Serial communication is a standard communication interface, for example RS-232, RS-422 and RS-485. RS-485 is the basic communication for PROFIBUS fieldbus communication.

IDpro signifies interchangeable identification technologies based on

- Identical connectivity
- Identical user interface
- Identical accessories concept

www.sick-IDpro.com

www.sick.com/industrial-communication

C

Typical applications

This chapter describes typical applications for SICK vision solutions. The detailed descriptions of **applications**, **tasks**, **implementation** and **benefits** also contain **further recommendations on products** you can use for your application.

Descriptions in the catalog are categorized by industry sector as follows:

- Automotive
- Beverage
- Electronics and solar
- Food
- Pharma and cosmetics
- Traffic

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C

Typical applications

Recommended products for selected applications

	Inspector	LECTOR®62x	IVC-2D	IVC-3D	Ranger	Ruler
Automotive						
Inspection | | Positioning Inline quality control during automotive final assembly	■		■			
Inspection | | Measuring | | Positioning Checking brake pads using 3D vision				■	■	■
Reading Identification of Data Matrix codes on circuit boards		■	■			
Reading Identification of dot peened Data Matrix codes on engine blocks		■	■			
Beverages						
Inspection | | Measuring | | Positioning Lid integrity inspection				■		
Electronics and solar						
Reading Identification of Data Matrix codes on circuit boards		■	■			
Inspection | | Positioning Solar wafer alignment and damage detection	■					
Inspection Inspection of press-fit assembled circuit boards					■	
Food						
Inspection | | Measuring | | Positioning Bun inspection and robot picking	■			■	■	■
Inspection Color and 3D quality inspection of food					■	
Pharma and cosmetics						
Reading Reading of Data Matrix codes on folded boxes for pharmaceutical preparations		■	■			
Traffic						
Inspection | | Measuring 3D vision for cost-efficient maintenance of rail networks					■	■
From page	**E-46**	**E-52**	**F-98**	**F-100**	**G-114**	**G-118**

The following pages include selected applications that can be solved using SICK vision solutions, but is not meant to be a complete list. You will find more applications online ➜ www.mysick.com/applications

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Inline quality control during automotive final assembly

Short description

In the final assembly line of an automotive plant, smart cameras and vision sensors from SICK are successfully used to ensure quality and production control.

Task

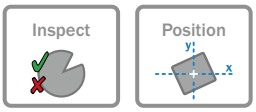
There are a variety of inspection tasks during final assembly in the automotive industry, such as checking the presence of the gravel shield on the lower shock absorber, inspecting the headlamp leveling system, and detecting contours on wheel mounts and checking that they have been assigned to the correct construction order. In addition, the cameras are also used to monitor the presence and position of various small components for rear axle assembly.

Implementation

The Inspector vision sensor family makes it easy for production engineers to configure the camera to “locate and inspect” selected features of each part. Step one is to locate the object independent of rotation and scale. Step two is to apply inspection tools to areas where the object needs to be inspected. The programmable IVC-2D smart camera is the perfect choice for more complex inspection tasks.

Customer benefits

- Improved product quality as a result of the excellent inspection capabilities of the Inspector
- Inspector is easy to set up for different applications thanks to the locate and inspect concept
- The powerful and easy-to-use measurement tools of the Inspector offer a reliable way to ensure high-quality verification
- The flexibility of the IVC-2D ensures that the most demanding application can be solved



Applications Finder

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Other applications

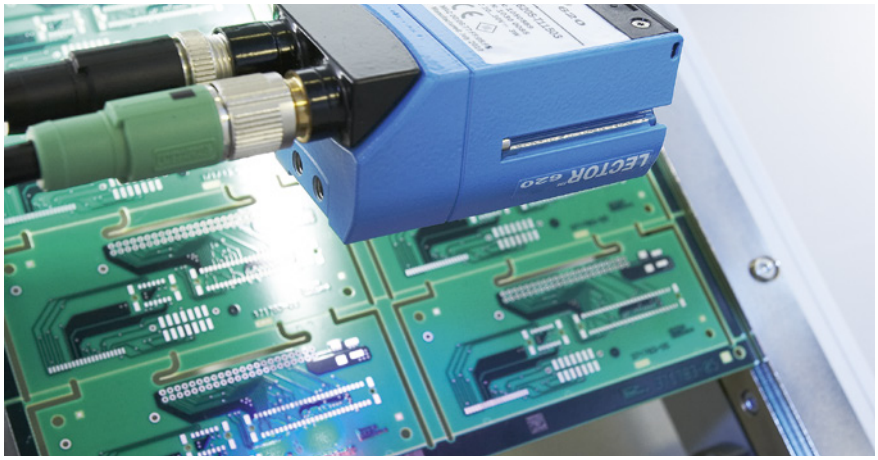
- Checking the installation of the instrument panel
- Release agent application monitoring before processing in curing presses
- Reliable differentiation of windscreen types
- Welding cap inspection at spot welding robot during the process

Recommended products

Inspector E-46
IVC-2D F-98

C

Identification of Data Matrix codes on circuit boards



Short description

Reading Data Matrix codes on circuit boards using the LECTOR®62x image-based code reader.

Task

Printed circuit board manufacturers need to identify their products for traceability and quality control. Small Data Matrix codes with a resolution down to 0.1 mm are used to fulfill this need. These codes are often not larger than 2 to 4 mm and are directly laser marked or printed on a label. The size of the boards and therefore the position of the codes vary. The codes must be identified on the fly while the PCBs are moving at speeds of 0.3 m/s. Image-based code readers must reliably detect these codes.

Implementation

This task can be solved using the LECTOR®62x image-based code reader, which offers the highest read rates, even on small and low-contrast codes. By pressing the function button, the automatic setup adjusts the image settings and focus to achieve the highest read rate performance. The integrated red and blue LED illumination makes the product suitable for all kinds of PCBs, including ceramic and aluminum boards. The codes can be positioned anywhere on the board as long as they pass through the readers field of view.
In instances when inspection or positioning is needed in addition to code reading, the programmable IVC-2D smart camera, can be used.

Customer benefits

- Automatic setup reduces commissioning and training costs
- The swivel connector and sliding nuts allow mounting in tight spaces
- The large choice of interfaces simplifies integration

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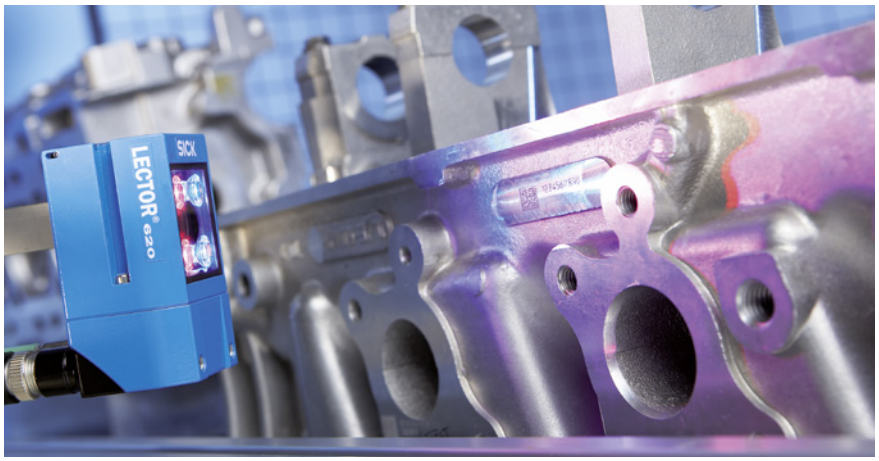
Other applications

- 2D code identification for gas engines for airbags and front seat joints
- Identification of light systems using 2D codes
- Identification of mixed batteries on a conveyor belt
- Reliable component identification for pipes with direct marking

Recommended products

LECTOR®62x E-52
IVC-2D F-98

Identification of dot peened Data Matrix codes on engine blocks



Short description

Identification of parts in automotive production with dot peened code.

Task

During final assembly in a car factory, engine blocks are transported on conveyors to different car bodies and suspensions. To ensure that the right engine arrives at the right body shell and the related suspension, a permanent dot peened code is marked on the side of the engine block. This code must be reliably identified.

Implementation

The LECTOR®62x image-based code reader reliably solves this application. It can read dot peened codes, even on curved objects and objects in motion. Even codes with some missing dots or covered by an oil film can be identified. If the application requires inspections, the programmable IVC-2D smart camera is the preferable choice.

Customer benefits

- Intelligent decoding algorithms provide reliable reading performance for improved read rates and throughput
- The large choice of integrated interfaces such as EtherNet/IP, PROFINET, etc., simplify integration in automotive applications

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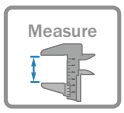
Other applications

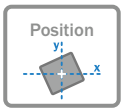
- 2D code identification for gas engines for airbags and front seat joints
- Identification of 2D codes on camshafts
- Identification of data matrix paper labels on car bodies
- Identification of light systems using 2D codes
- Identification of mixed batteries on a conveyor belt
- Identification of tires before storage

C

Recommended products

LECTOR®62x E-52
IVC-2D F-98





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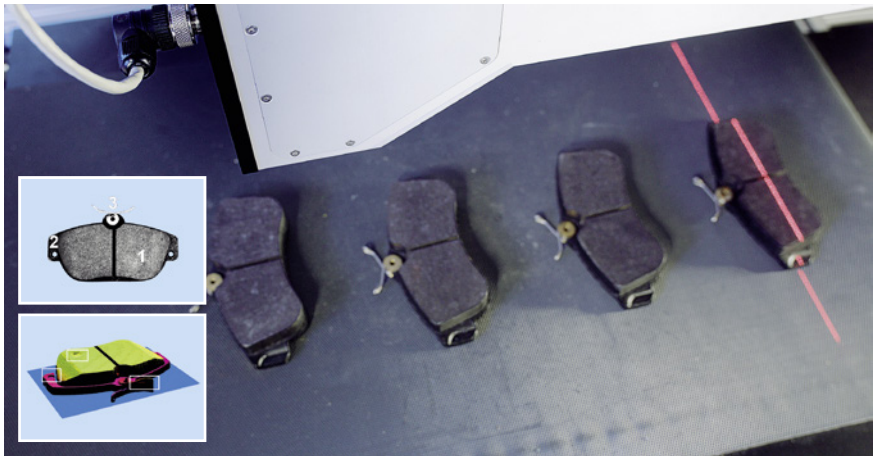
Other applications

- 3D glue inspection during the process
- Optimizing processes in power unit assembly and minimizing setup times
- Precise inline quality control during final assembly
- Flexible plastic parts inspection for automotive suppliers
- Checking printed circuit boards using a 3D smart camera

Recommended products

Checking brake pads using 3D vision



Short description

If brake pads delivered to a supplier or end customer are faulty, the consequences for the brake pad manufacturer can be serious. It is therefore very important to perform reliable quality control. With the IVC-3D smart camera, it is possible to check each brake pad in-line.

Task

Three characteristics in particular must be inspected: Firstly that the surface is smooth, secondly that the height of the dowel pins are correct and thirdly that the metal springs are level.
The true 3D shape of all three must be checked simultaneously to verify quality.

Implementation

This application is solved using the IVC-3D smart camera. It has the flexibility and performance for high-speed industrial 3D inspection. It is configured in a graphical programming environment that uses tools to inspect surface smoothness, height of pins and the angle at which the springs are set up. After setup, the device operates in stand-alone or as part of the production network. No PC is needed. The result of the inspection can be sent directly to a PLC or a handling device and can be monitored over Ethernet.

Customer benefits

- In-line inspection lets only high quality brake pad pass on to delivery
- Reliable solution using true shape, contrast-independent 3D images
- Easy integration with self-contained, factory-calibrated smart camera
- Simple interfacing with PLCs and robots using Ethernet (EtherNet/IP, OPC, TCP/IP), digital I/O or RS-485

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Lid integrity inspection

Short description

Containers with liquids must be leak-proof. Leakage cannot only cause production problems, but also product contamination.

With the IVC-3D smart camera it is possible to check each lid in-line.

Task

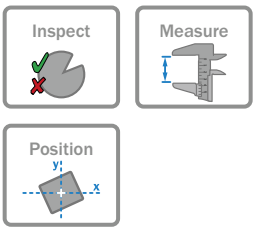
The task is to automatically verify the lid integrity for each container and to reject any faulty products.

Implementation

The containers pass the IVC-3D smart camera on a conveyor belt on their way to the packaging line. The 3D shape is captured at high speed. In each 3D image, the lid height and tilt are measured to verify correct sealing. The 3D measurements can often be made relative to the container; this gives an accurate result even if the container tilts or varies in position on the conveyor. The IVC-3D offers a reliable solution when containers are placed inside a box and 2D/backlight solutions won't work. Containers with faulty lids are rejected, and the measured values are communicated to the control system for analysis and statistics.

Customer benefits

- High quality products as only correctly sealed bottles are delivered
- Leak-proof inspection reduces production downtime and ensures product is not contaminated
- Reliable 3D solution that adjusts to variations in the container position and tilt in a way that is not possible with 2D solutions
- Easy integration with self-contained, factory-calibrated smart camera
- Simple interfacing with control systems using Ethernet (EtherNet/IP, OPC, TCP/IP), digital I/O or RS-485



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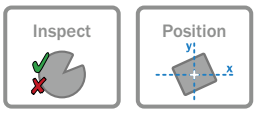
Other applications

- 3D quality check for lids and caps during liquid packaging
- Inspection of bottles using the 2D smart camera

Recommended products

IVC-3D F-100

C



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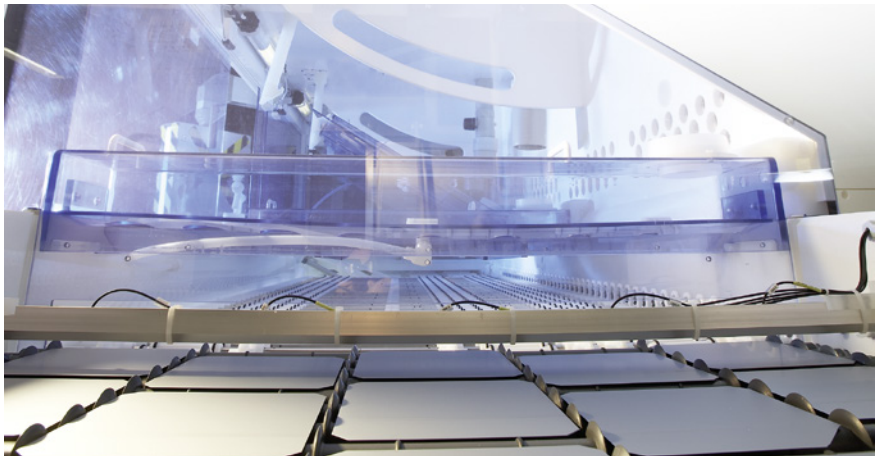
Other applications

- Fiducial alignment in electronics and solar industry
- Positioning and inspection of solar cells on a conveyor
- Solar wafer alignment and damage detection

Recommended products

Solar wafer alignment and damage detection



Short description

When manufacturing solar cells, the material is moved throughout the factory using robots and conveyers. Due to the high degree of automated handling and the fragility of the wafers, it is important to identify the position of the wafers and detect any damaged materials. The Inspector is the ideal solution for both these tasks.

Task

Damaged wafers must be detected to avoid waste and consequential damages to additional material. To allow automated handling of the wafers such as robot picking, the wafer's position also has to be accurately determined. In both cases, a vision-based solution that can report damages and position data in a format that can be adapted to various control systems is preferred.

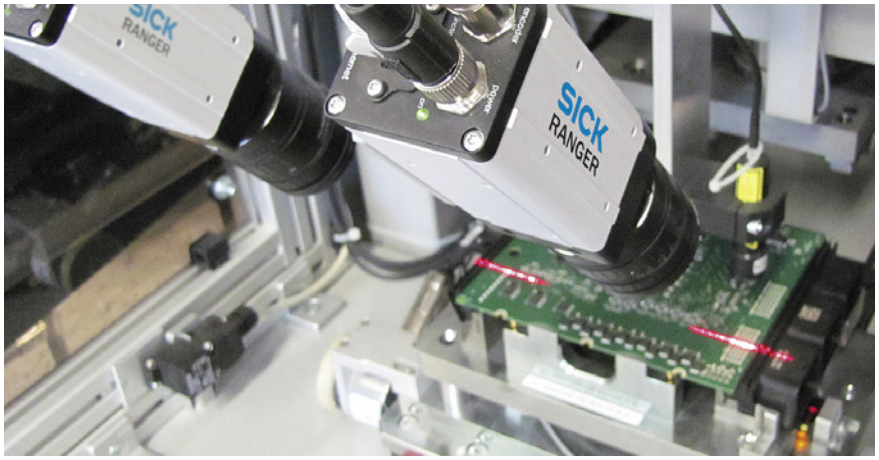
Implementation

The Inspector is a powerful yet easy to use vision sensor that doesn't require any programming to set up. The Inspector contains image processing tools for solar wafers and for calibrated positioning of objects in metric units. A very flexible connectivity concept ensures that data can be reported to a wide range of control systems. All this ensures a quick and easy installation.

Customer benefits

- Easy-to-use vision solution that solves both detailed inspection and precise positioning applications
- Calibration feature and powerful vision tools provide high-performance inspections to help reduce waste
- Flexible Ethernet and fieldbus interfaces optimize connectivity

Inspection of press-fit assembled circuit boards



Short description

Inspection of press-fit assembly using 3D vision for non-contact quality control and waste reduction.

Task

The press-fit assembly is a solder-free method to mount through-hole components like connectors onto Printed Circuit Boards (PCB). The press-fit method has numerous advantages and is commonly used in telecommunication gear and power electronics. However, there are some challenges with this method: before the press fit, the component and PCB are loosely pre-assembled, making them prone to errors. After the press fit, the contact between the PCB and the pin is sufficient and reliable only if the designated part of the pin is in contact with the plated through hole.

Implementation

A 3D vision system that uses the Ranger camera is mounted on the press machine to inspect the circuit board and component pins before and after pressing. Before pressing, the Ranger system ensures that the components are properly placed. As a result, the risk of destroying the board in the press is eliminated. After pressing, the Ranger system measures the height of each pin to make sure all pins were inserted to the designated depth. This verifies that a sufficient mechanical and electrical contact was created.

Customer benefits

- Reduction of waste – since the risk of destroying the product is reduced
- Improved quality – post-press inspection ensures a high-quality mount
- Time saving – non-contact solution does not require precise mechanical adjustments
- Scaleable solution – the system can be scaled in performance and cost by a wide range of Ranger models

Inspect

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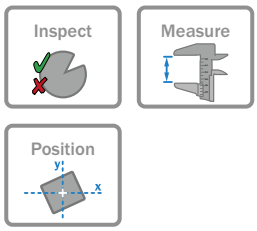
Other applications

- 3D inspection of components (co-planarity inspection) with the Ranger camera system
- 3D inspection of electronic components in the semiconductor backend
- 3D inspection of solder paste with the Ranger camera system
- Pick and place machine component inspection

Recommended products

Ranger G-114

C



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Other applications

- Box content (assorted crackers) completeness inspection
- Cookie shape verification and quality control
- Optimizing slicing with the 3D smart camera
- Quality control of hamburgers
- 3D quality check for lids and caps during liquid packaging
- Color and 3D quality inspection of food

Recommended products

Bun inspection and robot picking

Short description

Quality inspection and automatic robot picking from conveyor belts in the packaging line.

Task

In automated packaging lines it is necessary to know the exact position of each bun on the conveyor belt on the X, Y and Z axes. Some brands have very high-quality demands and require that the shape of the bun and the amount of sesame seeds on the top be inspected.

Implementation

As the hamburger buns pass by on the conveyor belt, the IVC-3D smart camera measures the bun quality at high speed. The 3D measurement obtains the height, volume and shape of each bun. Additionally, the number of sesame seeds on each bun is counted. When the buns are scanned and inspected, a robot picks up all good buns and puts them into boxes. Buns that fail the inspection fall into a rejection basket. In instances when the object height is constant and the inspection features can be viewed in 2D grayscale, the IVC-2D smart camera or the Inspector vision sensor can be used. In addition, the Ranger camera is the high-end alternative for complete flexibility and highest performance in 3D and color.

Customer benefits

- 3D technology is contrast independent and makes it possible to pick objects of same color as the belt
- Objects of different height can be picked very accurately thanks to 3D information
- Improved productivity as a result of excellent communication between the EtherCAT version of the Inspector and high-speed picking robots
- 3D and color inspection with Ranger makes complete inspection possible including degree of doneness

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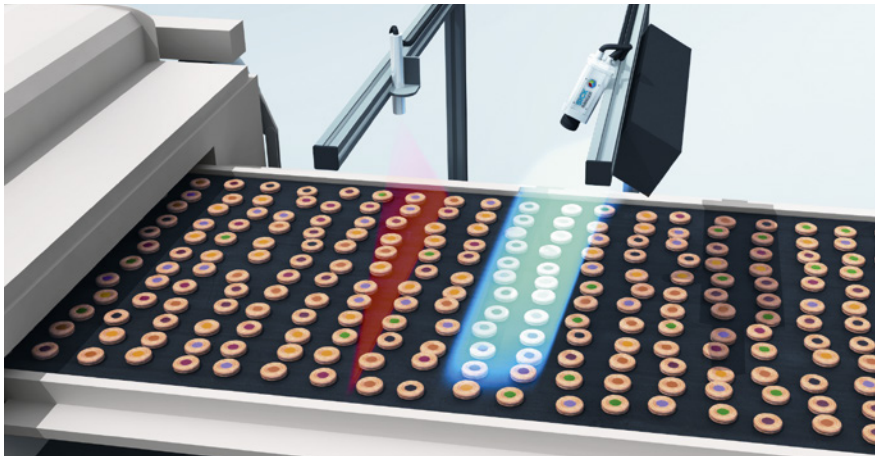
Color and 3D quality inspection of food



Short description

Sorting and quality inspection of baked goods using color and 3D vision for improved product quality.

Task

To ensure the quality of baked goods, such as bread and biscuits, and to make the correct sorting decision, several properties need to be measured, including product shape, thickness, the amount and color of the topping, the quality of imprinted patterns, detection of foreign parts, as well as the overall degree of doneness. In order to consider all such properties, the inspection system needs the ability to measure both 3D and color properties at a high speed and resolution. In order to equip existing production lines with such an inspection system, the solution also needs to allow for retrofitting, which often implies restrictions on size.

Implementation

The ColorRanger E 3D camera provides simultaneous 3D and color images at high speed. The camera offers a high degree of flexibility, which enables adjustment of speed, resolution, and field-of-view to adapt the system to fit a specific production line. With the use of two external light sources, a white light for color and a laser for 3D measurements, one single camera provides both types of image data, which enables concise systems and retrofitting.

Customer benefits

- 3D and color measurements for reliable grading decisions
- All measurements in one camera reduce system size and cost and enable easier retrofitting
- Allows adaptation of speed and resolution to fit needs of a specific production line

Inspect

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Other applications

- Classification of 70,000 oysters per hour with SICK vision technology
- Bun inspection and robot picking

Recommended products

ColorRanger E G-114

C

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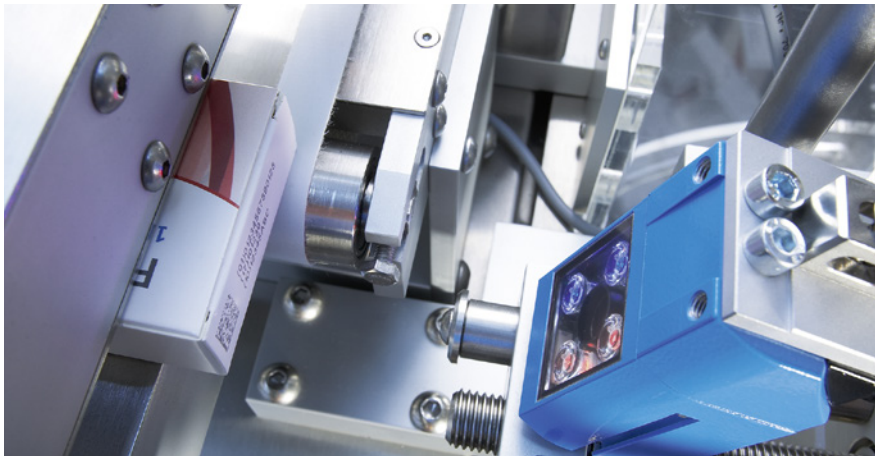
Other applications

- Matching product with packaging, label or leaflet by reading linear or 2D codes
- Reading and verifying the 2D Data Matrix serialization code. Track & Trace.
- Reading of 2D codes on tubes

Recommended products

LECTOR®62x E-52
IVC-2D F-98

Reading of Data Matrix codes on folded boxes for pharmaceutical preparations



Short description

Pharmaceutical preparations must be traceable, clearly identifiable and allocatable, in spite of significantly varying quality of the codes.

Task

Data Matrix codes printed on the boxes using inkjet printers contain important information such as serial number, product number, production codes, packaging and expiration date. These codes must be evaluated quickly and reliably. As the inkjet printer prints the Data Matrix code while the object is moving, the quality of the codes varies significantly. When the preparation and therefore the folding box are changed, the scanner must be adjusted to suit the new reading situation quickly and with little effort.

Implementation

The LECTOR®62x image-based code reader reliably reads up to 30 codes per second even when the code is distorted or destroyed. To simply setup the code reader, the code is located via aiming the taught laser using the auto setup function.
For applications where label position, label type or box integrity also have to be inspected, the programmable IVC-2D smart camera is an alternative choice.

Customer benefits

- Intuitive setup with function buttons, auto setup, aiming laser, focus adjustment and green feedback LED reduce training and installation time and costs
- Intelligent decoding algorithms provide reliable reading performance for improved read rates and throughput

8015547/2013-05-06
Subject to change without notice

3D vision for cost-efficient maintenance of rail networks

Short description

High-speed inspection of railway systems using 3D vision.

Task

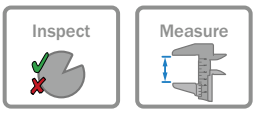
Providers of rail-based networks, such as railways and metros, need to perform regular maintenance checks to ensure operational safety and capacity. The work includes inspection of rails, ties, and the clearance distance around the track. It is essential that inspections are performed at high speeds to allow regular railway traffic to run at full operational speed. Several different measurements need to be considered, including rail distance, angles, and relative height position; abrasion and corrosion of rails; condition of ties and fixating spikes; and the ballast volume between ties.

Implementation

The Ranger and Ruler provide accurate and reliable 3D measurements of rails, ties, ballast, and tracks at high speed and resolution. To measure all aspects of the tracks, several cameras aimed at different points of interest are needed. System integrators can either use the rugged and factory-calibrated Ruler with built-in laser for 3D data in millimeters, or make more concise and flexible solutions using the Ranger camera with external high-power lasers. The 3D data from the cameras is sent to a hosting PC where it is analyzed by the integrator's software for defects and railway properties.

Customer benefits

- High-speed measurements ensure minimal interference during normal traffic operations
- Accurate 3D measurement detects small defects and deviations, improving safety
- Reliable cameras that withstand harsh environments



Applications Finder

- For up-to-date application solutions, visit SICK's web site
  ➜ **www.mysick.com/applications**
- The "Applications Finder" will lead you to further solutions that use SICK products

Recommended products

C

D

SICK as a vision system provider

SICK supplies customers worldwide with intelligent vision products. SICK also offers excellent vision systems, built and designed based on many years of experience in factory and logistics automation.

The vision systems incorporate leading edge technology to provide application solutions that give customers unique benefits, such as increased throughput, quality and production yield as well as reduced downtime and costs.

SICK's local engineers, who have extensive vision knowledge, will ensure a timely and smooth commissioning of the vision system you ordered from SICK.

Our strengths are your benefits

- Individual system design, project planning and implementation
- Composed of high-performance components
- On-site supervision by our worldwide Service & Support network
- Recommended by well-known and respected companies from around the world

8015547/2013-05-06

Vision systems

SICK provides solutions for applications, e.g., in the automotive and courier, express, postal and cargo (CEP) industries.

PLR
Part localization for de-racking

The PLR vision system is the cost-effective and easy-to-use solution for robot guidance in stamped sheet metal part handling, especially for parts stored in racks.

For more information:
www.mysick.com/en/PLR

PLB
Part localization in bins

The PLB vision system is designed for precise localization of randomly oriented parts in bins and boxes. PLB reduces your cycle times and increases production.

For more information:
www.mysick.com/en/PLB

ICR890
High-end parcel scanning system

The ICR890 is an efficient camera system for all kinds of parcel sorting applications. It provides the highest 1D/2D reading rates and superior image quality for OCR and video coding solutions.

For more information:
www.mysick.com/en/ICR890

D

The powerful simplicity of vision

SICK offers a powerful vision sensor portfolio designed to manage challenges in all industries where a standard sensor would not work. These vision sensors provide a full toolset for positioning, inspection, measurement and reading, depending on the variant. A flexible optical design fulfills the needs of almost all applications. Simplicity is ensured by automatic setup, intelligent algorithms and a common, intuitive user interface.

Your benefits

- The powerful vision sensors from SICK make your production line more efficient
- The flexible optical design and full toolset enables users to meet several application requirement with just one device
- The reliability of the vision sensors and the variety of operation and maintenance features ensure an optimum solution to keep your lines up and running
- All SICK vision sensors have a rugged industry-proven design, perfectly suitable for an industrial production environment
- The simplicity of design decreases installation and configuration time and reduces costs

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Vision sensors

E

Vision sensors from SICK
The powerful simplicity of vision

The right sensor for every task

SICK vision sensors provide a full toolset for positioning, inspecting, measuring and reading tasks.

E

LECTOR®62x, LECTOR®65x

Read

CVS2, Inspector I-series

Inspect

Inspector PI-series

Inspect | Position

Inspector PIM-series

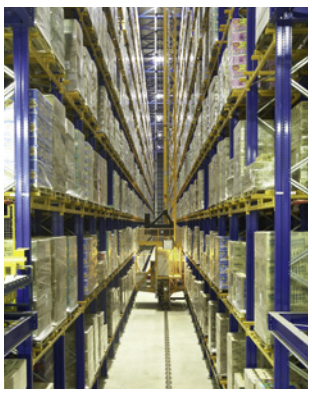
Inspect | Position | Measure

8015547/2013-05-06

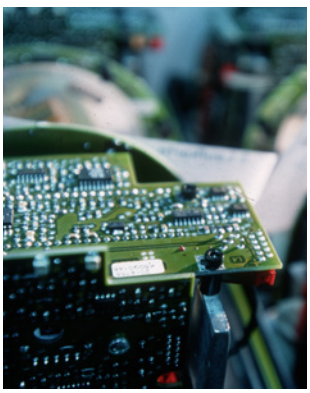
Inspector

The intelligent vision solution in an easy-to-use sensor package

Integrated quality control in packaging machines



Guidance for positioning stacker cranes



Edge damage detection in electronics

Part inspection and dimensioning in automotive assembly

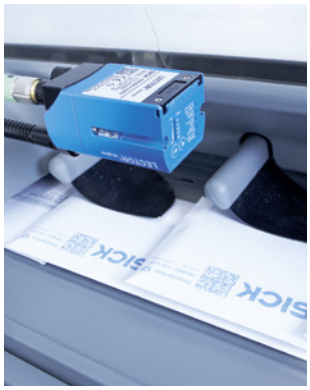
E

LECTOR®62x

Clever. Simple. Industrial.

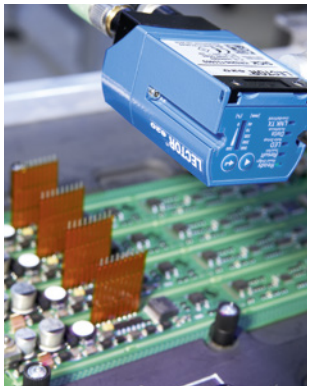
E

Reading and verifying Data Matrix serialization codes on pharmaceutical packages



Code reading on high-speed printer and sorter machines

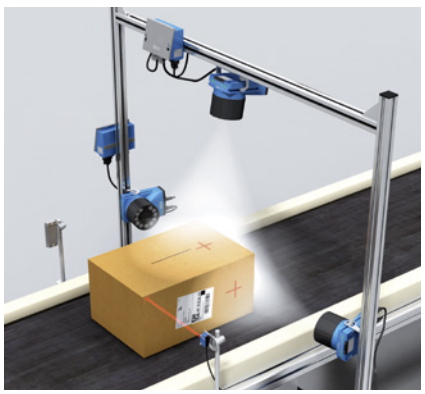
Identification of engine blocks for individual production control and traceability



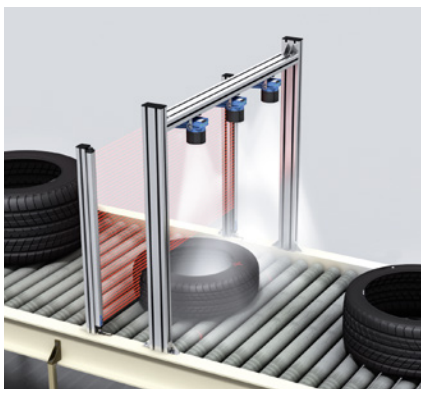
Quality assurance of freshly applied direct marked codes on PCBs

LECTOR®65x

Nonstop code reading flexibility



LECTOR®652 identifying parcels on a conveyor



LECTOR®652 reading codes on tires

LECTOR®654 in a hand presentation application

E

Product family overview

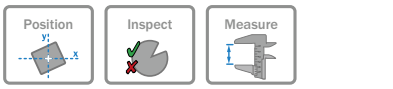
	 **Inspector**	 **LECTOR®62x**	
	An intelligent vision solution in an easy-to-use sensor package	Clever. Simple. Industrial.	
Technical data overview			
Task	Inspection, positioning, measuring	Reading	
Sensor	CMOS matrix sensor, gray scale values	CMOS matrix sensor, gray scale values	
Sensor resolution	640 px x 480 px	752 px x 480 px (WVGA)	
Light source	White Infrared UV	Red Red, blue Infrared Blue	
Focus	Manually adjustable focus	Adjustable focus Auto focus (during teach-in)	
Lens	Exchangeable (M12-mount)	Integrated	
Operator interfaces	Inspector Viewer, web server	Web server	
Control elements	–	2 buttons (choose and start/stop functions)	
Serial (RS-232, RS-422)	–	✔	
USB	–	✔ , USB 2.0	
Ethernet	✔ , 100 MBit/s TCP/IP, FTP, EtherNet/IP, EtherCAT	– / ✔ , 10/100 MBit/s TCP/IP, FTP (image transmission), EtherNet/IP, EtherCAT (optional via external connection module CDF600-2), PROFINET	
CAN bus	–	✔ CANopen, CSN (SICK CAN Sensor Network)	
PROFIBUS DP	–	✔ , optional via external connection module (CDF600-2)	
Dimensions	100 mm x 53 mm x 38 mm	71 mm x 43 mm x 35.6 mm	
At a glance			
			
	• High-speed positioning, inspection and measurement • Powerful “object locator” tool, independent of position, rotation and scale • Unique, interchangeable housing design supporting dome and various optical accessories • Simple step-by-step configuration in PC including emulator • Easy-to-use operator interfaces • Flexible machine and HMI design interfaces	• Decoding of most popular code types: 1D, 2D, direct part marking • Easy integration with industrial networks: serial, USB, several fieldbus technologies • Auto setup with function buttons, aiming laser, focus adjustment and green feedback LED – for quick setup without PC • Compact design and industrial housing • Analysis tools include live image capturing, code verification and read rate view	
Detailed information	➜ E-46	➜ E-52	

E

	LECTOR®65x	CVS2
		
	Nonstop code reading flexibility	Detect, distinguish and sorting colors
	Reading	Inspection
	CMOS matrix sensor, gray scale values	CMOS matrix sensor, color values
	2,048 px x 1,088 px 2,048 px x 2,048 px	208 px x 236 px x 3 px (RGB)
	White	White
	Manually adjustable focus (C-mount) Dynamic focus control	Fixed focus
	Exchangeable (C-mount), to be ordered separately as accessory / integrated	Integrated
	Web server	External display or integrated display
	2 buttons (choose and start/stop functions)	5 buttons (setup)
	✔	✔ , RS-232 only
	✔ , USB 2.0	–
	✔ , 10/100/1,000 MBit/s TCP/IP, FTP (image transmission), EtherNet/IP, PROFINET (optional via external connection module CDF600-2)	–
	✔ CSN (SICK CAN Sensor Network)	–
	✔ , optional via external connection module (CDF600-2)	–
	142 mm x 89 mm x 46 m 142 mm x 89 mm x 106 m	95 mm x 42 mm x 34 mm
		
	• 2/4 megapixel resolution; high frame repetition rate of 40 Hz • Dynamic focus adjustment from object to object • Integrated high-power LED illumination • Function button, aiming laser, optical and acoustic feedback signal • Intelligent, rapid decoding algorithms • MicroSD memory card for storing images and back-up copies of parameters	• Color inspection and sorting on large fields of view • Inspecting one color, minimum and maximum fill • 2-color matching • Sorting up to 15 colors • Reference capacity of 15 color configurations • Parameter up- and download to PC • Compact IP-67 rated housing with integrated display for configuration and monitoring • Different variants for different fields of view and working distances
	➜ E-64	➜ E-70

E

An intelligent vision solution in an easy-to-use sensor package



Product description

The Inspector is an intelligent vision solution in an easy-to-use sensor package. No matter if the task is to verify completeness and quality, find a part's position or measure its dimensions, the Inspector is up to the challenge. The sensors' rugged design and IP 67 metal housing makes them ideal for tough environments and intelligent processing technology makes the Inspector perfect for high-speed applications. The flexible housing is designed to easily optimize the optical needs of your application. This ensures excellent inspection even with tough targets, such as highly reflective metal parts and multicolored labels. The Inspector family provides broad support for control, monitoring and data collection through a variety of interfaces. This vision sensor provides everything to meet your integration needs and facilitate daily work.

At a glance

- High-speed positioning, inspection and measurement
- Powerful "object locator" tool, independent of position, rotation and scale
- Unique, interchangeable housing design supporting dome and various optical accessories
- Simple step-by-step configuration in PC including emulator
- Easy-to-use operator interfaces
- Flexible machine and HMI design interfaces

Your benefits

- The multi-functional vision toolbox offers smart camera-level performance but with sensor ease-of-use
- Unique, interchangeable housing design provides the easiest way to improve image quality
- The simple configuration in SOPAS, including emulator for offline configuration and testing, will reduce downtimes in production to a minimum
- The easy-to-use operator interfaces are optimized to make it easier for the operator to oversee daily work more efficiently
- Ethernet communication and web API gives excellent connectivity and freedom to customize user's HMI

→ **www.mysick.com/en/Inspector**
For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.

Additional information

E

Detailed technical data

Features

	Inspector I-series	Inspector PI-series	Inspector PIM-series
Task	Inspection	Inspection, positioning	Inspection, positioning, measuring
Technology	2D, snapshot, image analysis		
Toolset	Object locator, Contour, Pixel count, Edge pixel count, Pattern	Object locator, Pixel count, Edge pixel count, Pattern, Blob locator, Polygon	Object locator, Pixel count, Edge pixel count, Pattern, Blob locator, Polygon, Edge, Circle, Distance, Angle
Sensor	CMOS matrix sensor, gray scale values		
Focus	Manually adjustable focus		
Calibration	–	Perspective and lens distortion correction, mm results	
Working distance	≥ 50 mm		
Working distance internal illumination (min. ... max.)	50 mm ... 200 mm		
Field of view internal illumination	22 mm x 15 mm ... 79 mm x 58 mm		
LED class			
White	Risk group 1 (low risk, IEC62471 : 2006)		
Infrared	Risk group 0 (exempt risk, IEC62471 : 2006)		
UV	–		Risk group 1 (low risk, IEC62471 : 2006)
Spectral range			
White	Approx. 400 nm ... 750 nm		
Infrared	Approx. 370 nm ... 900 nm		
UV	–		Approx. 400 nm ... 750 nm
Offline support	Emulator		

Performance

	Inspector I-series	Inspector PI-series	Inspector PIM-series
Maximum performance	250 frames/s	200 frames/s	
Typical performance	40 frames/s		
Number of inspections	32		64
Reference images	32 objects		

Interfaces

	Inspector I-series	Inspector PI-series	Inspector PIM-series
Operator interfaces	Inspector Viewer	Inspector Viewer, web server	Web server
Configuration software	SOPAS		
Data store and retrieve	30 images device log, record images on PC, store images to FTP		
Communication interface	100 MBit/s Ethernet		
Ethernet communication	EtherNet/IP	EtherNet/IP, TCP/IP, Web API, EtherCAT, dual port, DC, EoE, FoE, CoE, Web API (depending on type)	EtherNet/IP, TCP/IP, Web API
Digital inputs	4 inputs (24 V)		
Configurable inputs	External trigger, encoder input, external teach, reference object selection		
Digital outputs	3 outputs, 24 V (B-type)		
Configurable outputs	Output by logical expressions, store images to FTP overflow		
Output current	≤ 100 mA		

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	Inspector I-series	Inspector PI-series	Inspector PIM-series
Default outputs	No object detected, all pass, any fail		
Maximum encoder frequency	40 kHz		
Control of external illumination	5 V TTL		
I/O Box extension	5 x inputs for object selection, 16 outputs		

Mechanics/electronics

	Inspector I-series	Inspector PI-series	Inspector PIM-series
Connectors	M12, 12-pin male, M12, 4-pin female		
Supply voltage	24 V DC, ± 20 %		
Ripple	< 5 V_{pp}		
Current consumption	< 450 mA, without output load		
Enclosure rating	IP 67		
Housing material	Aluminum		
Window material			
White	PMMA		
Infrared	PMMA		
UV	–		Glass
Weight	350 g	350 g / 445 g (depending on type)	350 g
Dimensions (L x W x H)	100 mm x 53 mm x 38 mm		
Lens	Exchangeable (M12-mount)		

Ambient data

Shock load	EN 60068-2-27
Vibration load	IEC 60068-2-6
Ambient operating temperature	0 °C ... +45 °C [1]
Ambient storage temperature	–20 °C ... +70 °C [1]

[1] Rel. humidity: 35 % ... 85 %, 95 % at operation.

Ordering information

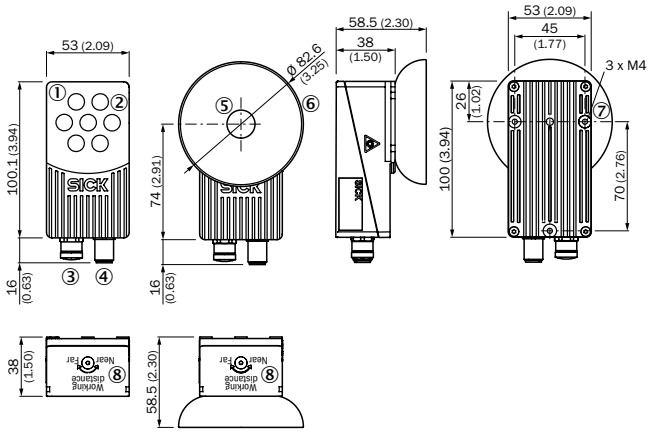
- **Resolution:** 640 px x 480 px

Sub product family	Light source	Product name	Model name	Part no.
Inspector I-series	White	Inspector I40	VSPI-4F2111	1047913
	Infrared	Inspector I40-IR	VSPI-4F2411	1054705
Inspector PI-series	White	Inspector PI50	VSPP-5F2113	1056082
	Infrared	Inspector PI50-IR	VSPP-5F2413	1057303
	White	Inspector PI50 EtherCAT	VSPP-5F2134	1056394
Inspector PIM-series	White	Inspector PIM60	VSPM-6F2113	1062407
	UV	Inspector PIM60-LUT	VSPM-6F2313	1062409
	Infrared	Inspector PIM60-IR	VSPM-6F2413	1062408

Dimensional drawing

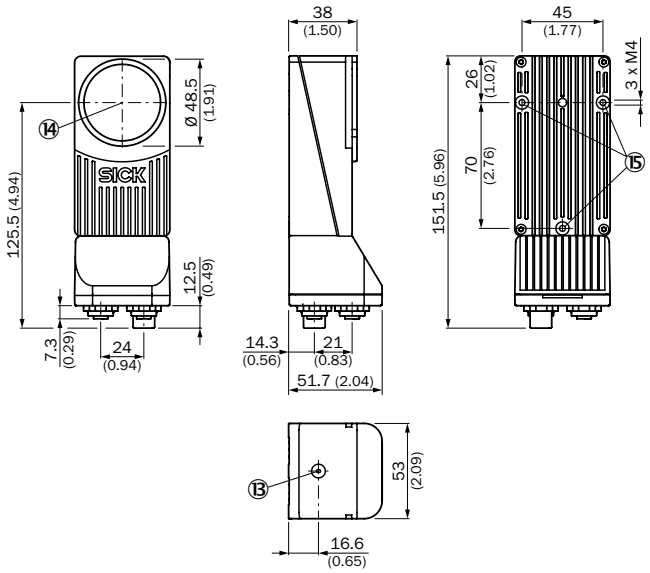
dimensions in mm (inch)

Standard



① Front screen; standard, flex
② Ring light
③ Ethernet connection M12, 4-pin, female
④ Power connection M12, 12-pin, male
⑤ Front screen; dome
⑥ Dome light
⑦ Mounting hole M4
⑧ Focus adjustment

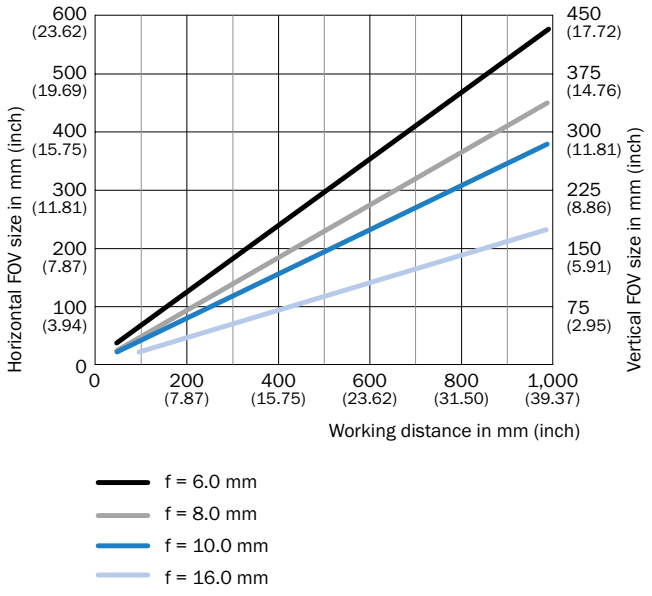
EtherCAT



⑬ Focus adjustment
⑭ Front screen
⑮ Mounting hole M4

Field of view

Theoretical FOV size (640 x 480 pixels)



f = 6.0 mm
f = 8.0 mm
f = 10.0 mm
f = 16.0 mm

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Recommended accessories

Lens and accessories

	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV
	Replaces the front window and creates even and homogeneous illumination. For shiny surfaces. Includes adapter ring and O-ring.	Inspector Flex Dome	2050678	●	●	–
	Interchangeable lens, focal length 6 mm, including distance ring	OBJ-B06025BA	2049668	●	●	●
	Interchangeable lens, focal length 16 mm, including distance ring	OBJ-B16018BA	2049418	●	●	●

Modules

Connection modules

	Description	Part no.	Inspector white	Inspector infrared	Inspector UV
	I/O box extension with 2 ethernet ports enabling switch functionality, number of logical input = 4, output = 8 [1]	6037654	●	●	●

[1] Not supported by EtherCAT variant.

Mounting brackets/plates

Mounting brackets

	Description	Part no.	Inspector white	Inspector infrared	Inspector UV
	Mounting bracket Inspector, angled	2045167	●	●	–

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Optical filters

	Description	Part no.	Inspector white	Inspector infrared	Inspector UV
	Color filter/blue filter (468 nm ± 62 nm), PMMA	2050676	●	–	–
	Color filter/green filter (544 nm ± 53 nm), PMMA	2050677	●	–	–
	Color filter/red filter (> 548 nm), PMMA	2050675	●	●	–
	Visible block filter (> 730 nm), PMMA	2061248	–	●	–

Plug connectors and cables

Connecting cable (female connector-open)

	Connection type head A	Connection type head B	Cable length	Part no.	Inspector white	Inspector infrared	Inspector UV
	Female connector, M12, 12-pin, straight	Cable	2 m	6036555	●	●	●

Connection cable (male connector-male connector)

	Connection type head A	Connection type head B	Special feature	Cable length	Part no.	Inspector white	Inspector infrared	Inspector UV
	Connector, M12, 4-pin, straight, D-coded	Connector, RJ45, 8-pin, straight	Drag chain use	2 m	6034414	●	●	●

Test and monitoring tools

	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV
	Inspector Viewer for Inspector I-/P-/PI-series	VSPV-22222	2057556	●	●	●

→ **For additional accessories, please see page E-74**

Clever. Simple. Industrial.

Product description

The LECTOR®62x is an industrial, compact image-based code reader with highly reliable identification of 1D, 2D and direct part mark (DPM) codes. Whether in motion or stationary, it can read even the poorest quality codes. Its compact housing ensures flexible integration in reduced spaces. Multiple on-board interfaces allow for universal network integration.

LECTOR®620 Professional with integrated aiming laser, automatic focus teach-in, green feedback LED and auto setup is intuitive to set up and reliable in performance even with poor code qualities.

LECTOR®620 ECO, the price-attractive alternative for more simple applications and moderate conveyer speed.

LECTOR®620 High Speed, the specialist for fast packaging machines with high throughput at transport speeds up to 6 m/s.

LECTOR®620 DPM Plus, for codes on solar cells and very difficult DPM codes in automotive industry.

At a glance

- Decoding of most popular code types: 1D, 2D, direct part marking
- Easy integration with industrial networks: serial, USB, several fieldbus technologies
- Auto setup with function buttons, aiming laser, focus adjustment and green feedback LED – for quick setup without PC
- Compact design and industrial housing
- Analysis tools include live image capturing, code verification and read rate view

Your benefits

- Intelligent decoding algorithms provide reliable reading performance for improved read rates and throughput
- IDpro facilitates integration with most popular industrial networks
- Intuitive setup with function buttons, auto setup, aiming laser, focus adjustment and green feedback LED reduces training and installation time and costs
- Compact design and flexible interface connections make it easy to install in reduced spaces
- Quick analysis of read rate performance and code quality allows for efficient control
- Cloning back-up systems ensure low machine downtime in the event of unexpected incidents

→ **www.mysick.com/en/LECTOR62x**

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.

Additional information

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8015547/2013-05-06
Subject to change without notice

Detailed technical data

Features

	LECTOR®620 ECO	LECTOR®620 Professional	LECTOR®620 High Speed	LECTOR®620 DPM Plus
Focus	Adjustable focus	Auto focus (during teach-in)		
Sensor	CMOS matrix sensor, gray scale values			
Light source	Lighting LEDs: visible red light (λ = 617 ± 15 nm) Feedback spot: visible green light (λ = 525 ± 15 nm)	Lighting LEDs: visible red light (λ = 617 ± 15 nm), visible blue light (λ = 470 ± 15 nm) Feedback spot: visible green light (λ = 525 ± 15 nm) Aiming laser: visible red light (λ = 630 nm ... 680 nm) / lighting LEDs: invisible infrared light (λ = 850 ± 25 nm) Feedback spot: visible green light (λ = 525 ± 15 nm) Aiming laser: visible red light (λ = 630 nm ... 680 nm) (depending on type)	Lighting LEDs: visible red light (λ = 617 ± 15 nm), visible blue light (λ = 470 ± 15 nm) Feedback spot: visible green light (λ = 525 ± 15 nm) Aiming laser: visible red light (λ = 630 nm ... 680 nm)	Lighting LEDs: visible red light (λ = 617 ± 15 nm), visible blue light (λ = 470 ± 15 nm) Feedback spot: visible green light (λ = 525 ± 15 nm) Aiming laser: visible red light (λ = 630 nm ... 680 nm) / lighting LEDs: visible blue light (λ = 470 ± 15 nm) Feedback spot: visible green light (λ = 525 ± 15 nm) Aiming laser: visible red light (λ = 630 nm ... 680 nm) (depending on type)
MTBF	75,000 h			
LED class	1, radiance L_B < 10 kW/(m²sr) within 100 s, L_R < 28/α kW/(m²sr) within 10 s At distance > 200 mm (IEC 62471 (2006-07) / EN 62471 (2008-09))	1, radiance L_B < 10 kW/(m²sr) within 100 s, L_R < 28/α kW/(m²sr) within 10 s At distance > 200 mm (IEC 62471 (2006-07) / EN 62471 (2008-09)) 0, Irradiance: E_{IR} < 100 W/m² within 1,000 s at distance ≥ 200 mm (IEC 62471 (2006-07) / EN 62471 (2008-09)) (depending on type)	1, radiance L_B < 10 kW/(m²sr) within 100 s, L_R < 28/α kW/(m²sr) within 10 s At distance > 200 mm (IEC 62471 (2006-07) / EN 62471 (2008-09))	
Laser class	–	1, complies with CFR 1040.10 except for the tolerance according to Laser Notice No. 50 from June 24, 2007 (IEC 60825-1 (2007-3))		
Scanning frequency	25 Hz, WVGA resolution	60 Hz, WVGA resolution		
Code resolution	≥ 0.1 mm [1]			
Reading distance (at code resolution)	40 mm ... 1,500 mm (2.6 mm) [1]		30 mm ... 500 mm (0.9 mm)	30 mm ... 500 mm (0.9 mm) [1]

[1] Valid for Data Matrix, PDF417 and 1D codes with good printing quality.

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Performance

	LECTOR®620 ECO	LECTOR®620 Professional	LECTOR®620 High Speed	LECTOR®620 DPM Plus
Bar code types	GS1-128 / EAN 128, UPC / GTIN / EAN, Interleaved 2 of 5, Pharmacode, GS1 DataBar, Code 39, Code 128, Codabar, Code 32, Code 93			
2D code types	Data Matrix ECC200, GS1 Data Matrix, PDF417, PDF417 Truncated, QR code			Data Matrix ECC200, GS1 Data Matrix, PDF417, QR code, PDF417 Truncated, Data Matrix SEMI PV29-0212 (depending on type)
Code qualification	–	On the basis of ISO/IEC 16022, ISO/IEC 15415, ISO/IEC 15416, ISO/IEC 18004		On the basis of ISO/IEC 16022, ISO/IEC 15415, ISO/IEC 18004, AIM DPM Quality Guideline
No. of codes per reading interval	1 ... 50			
No. of characters per reading interval	500 (for multiplexer function in CAN operation)			
Internal image storage	135 MB			
Transport speed	2 m/s	4 m/s	6 m/s	4 m/s

Interfaces

	LECTOR®620 ECO	LECTOR®620 Professional	LECTOR®620 High Speed	LECTOR®620 DPM Plus
Serial (RS-232, RS-422)	✔			
Function	Host, AUX			
Data transmission rate	300 Baud ... 115.2 kBaud, AUX: 57.6 kBaud (RS-232)			
USB	✔, USB 2.0			
Ethernet	–	✔		
Function	–	Host, AUX, image transmission		
Data transmission rate	–	10/100 Mbit		
Protocol	PROFINET (optional via external connection module CDM)	TCP/IP, FTP (image transmission), PROFINET, EtherNet/IP, EtherCAT (optional via external connection module CDF600-2)		
CAN bus	✔			
Function	SICK CAN sensor network (Master/Slave, Multiplexer/Server)			
Data transmission rate	20 kbit/s ... 1 Mbit/s			
Protocol	CANopen, CSN (SICK CAN Sensor Network)			
PROFIBUS DP	✔, optional via external connection module (CDF600-2)			
Switching inputs	4 (“Sensor 1”, “Sensor 2”, 2 inputs via optional CMC600 in CDB620/CDM420)			
Switching outputs	4 (CDB620/CDM420: “Result 1”, “Result 2”, 2 outputs via optional CMC600)	4 (CDB620/CDM420: “Result 1”, “Result 2”, 2 outputs via CMC600 or 17-pin cable: “Result 1”, “Result 2”,“Result 3”, “Result 4”)		
Reading pulse	Switching inputs, non-powered, serial interface, CAN, auto pulse, presentation mode	Switching inputs, non-powered, serial interface, Ethernet, CAN, auto pulse, presentation mode		
Optical indicators	16 LEDs (5 x status display, 10 x LED bar graph, 1 green feedback spot)			
Acoustic indicators	Beeper/buzzer (can be switched off, can be assigned a function to signal the result status)			
Control elements	2 buttons (choose and start/stop functions)			
Memory card	–	MicroSD memory card (flash card) max. 32 GB, optional		

E

Mechanics/electronics

	LECTOR®620 ECO	LECTOR®620 Professional	LECTOR®620 High Speed	LECTOR®620 DPM Plus
Electrical connection	1 15-pin D-Sub HD male connector (0.9 m)	1 x M12, 17-pin male connector 1 x M12, 4-pin female connector Ethernet Cylindrical connectors		
Operating voltage	10 V DC ... 30 V DC			
Power consumption	Typ. 3 W			
Housing	Die-cast aluminum			
Housing color	Light blue (RAL 5012)			
Protection class	III			
Weight	170 g			
Dimensions	71 mm x 43 mm x 35.6 mm [1]			

[1] Swivel connector is 17.8 mm longer.

Ambient data

Electromagnetic compatibility (EMC)	EN 61000-6-2 (2006-03) / EN 61000-6-2 (2009-05)
Vibration resistance	EN 60068-2-6 (2008-02)
Shock resistance	EN 60068-2-27 (2009-05)
Electrical safety	EN 60950-1 (2006-04) / EN 60950-1/A11 (2009-03)
Ambient operating temperature	0 °C ... +50 °C
Storage temperature	–20 °C ... +70 °C
Permissible relative humidity	90 %, non-condensing
Ambient light safety	2,000 lx, on code

Ordering information

- **Reading field:** side
- **Sensor resolution:** 752 px 480 px WVGA
- **Lens:** integrated

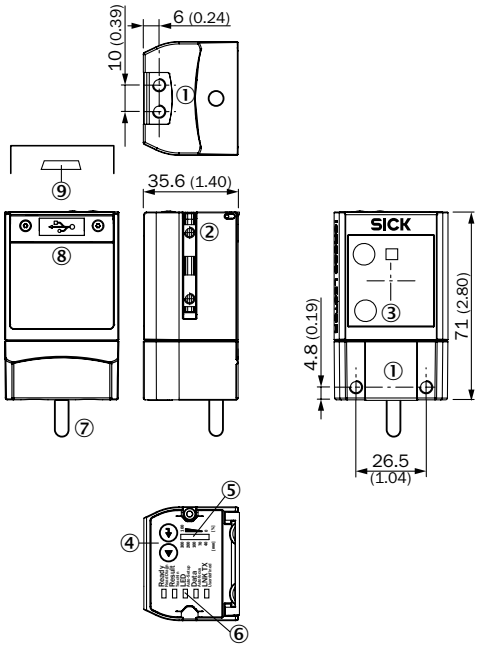
Version	Internal lighting	Enclosure rating	Model name	Part no.
LECTOR®620 ECO	Red	IP 65	ICR620E-H12013 ECO	1054507
LECTOR®620 Professional	Red, blue	IP 65	ICR620S-T11503 Professional	1050589
		IP 67	ICR620S-T11504 Professional	1054375
	Infrared	IP 65	ICR620S-T16503 Professional	1058623
LECTOR®620 High Speed	Red, blue	IP 65	ICR620H-T11503 High Speed	1055890
LECTOR®620 DPM Plus	Red, blue	IP 65	ICR620D-T11503 DPM Plus	1055891
	Blue	IP 65	ICR620D-T17503 DPM Plus Solar	1060912

E

Dimensional drawings

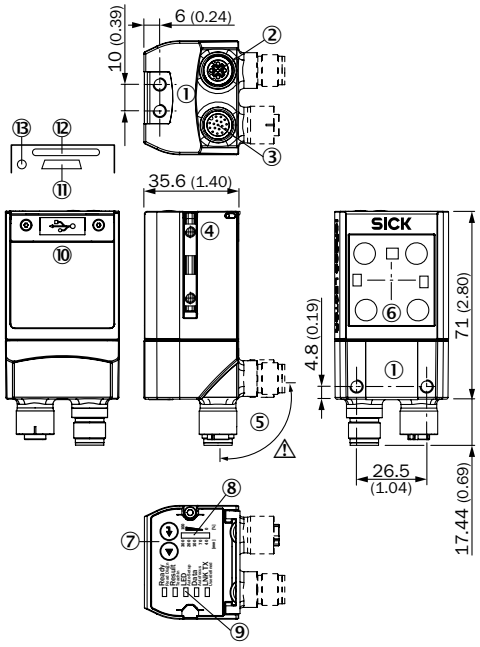
dimensions in mm (inch)

LECTOR®620 ECO



① Blind hole thread M5, 5 mm deep (4 x), for mounting
② Sliding nut M5, 5 mm deep (2 x), for mounting (as alternative)
③ Reading field
④ Function button (2 x)
⑤ Bar graph display
⑥ LED for status display (2 levels), 5 x
⑦ Cable with 15-pin D-sub HD male connector
⑧ Cover (flap)
⑨ “Micro USB” connection

LECTOR®620 Professional
LECTOR®620 High Speed
LECTOR®620 DPM Plus

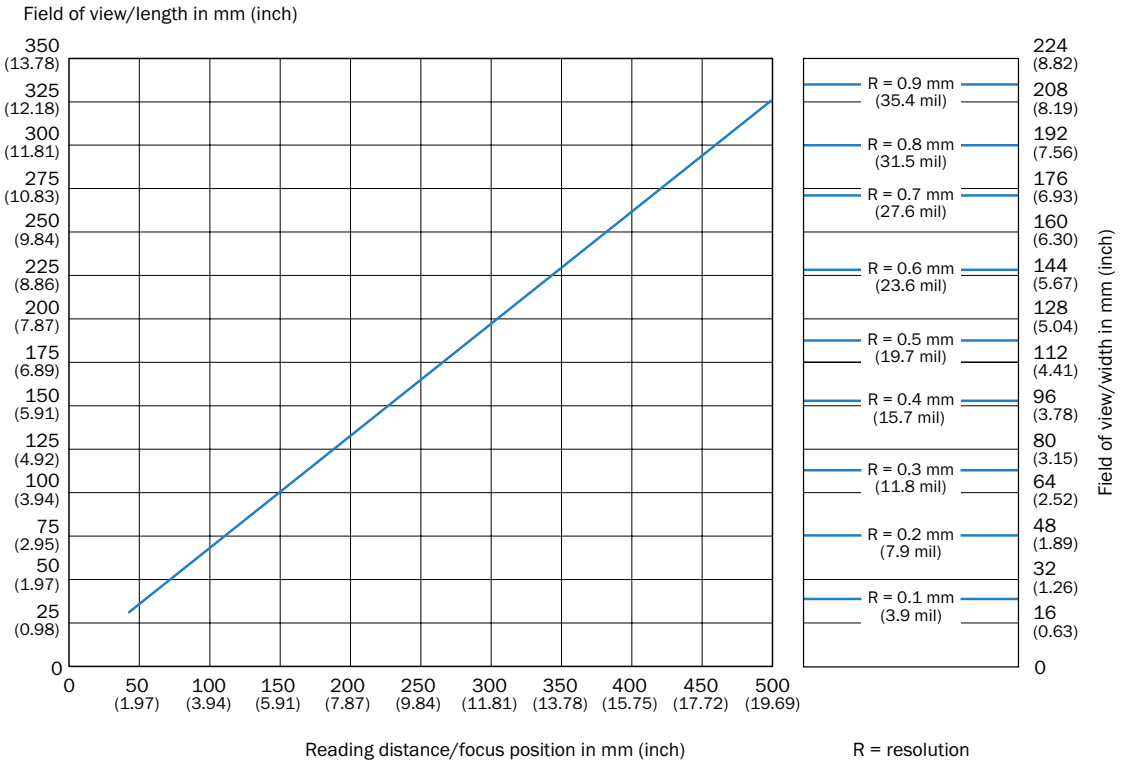


① Blind hole thread M5, 5 mm deep (4 x), for mounting
② “Ethernet” connection
③ “Power/Serial Data/CAN/I/O” connection
④ Sliding nut M5, 5 mm deep (2 x), for mounting (as alternative)
⑤ Swivel connector unit
⑥ Reading field
⑦ Function button (2 x)
⑧ Bar graph display
⑨ LED for status display (2 levels), 5 x
⑩ Cover (flap)
⑪ “Micro USB” connection
⑫ Slot for microSD memory card
⑬ LED for microSD memory card

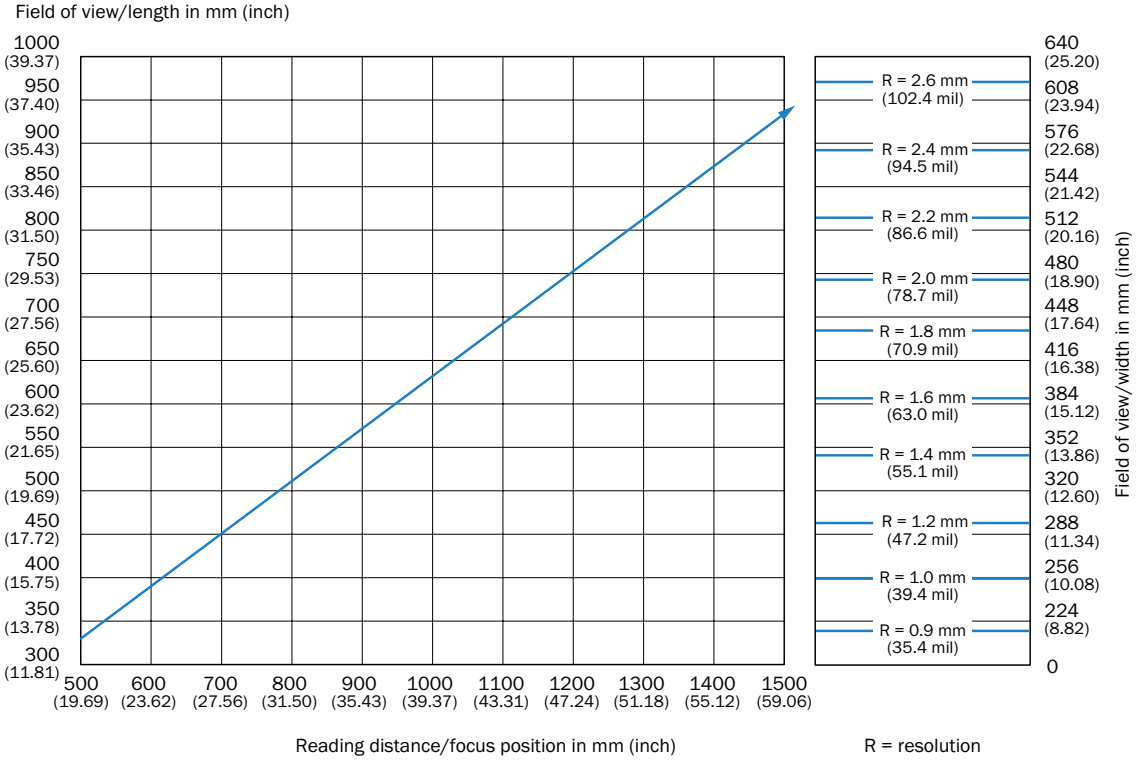
E

Field of view

LECTOR®620 ECO
LECTOR®620 Professional (ICR620S-T11504, ICR620S-T11503)



LECTOR®620 ECO
LECTOR®620 Professional (ICR620S-T11504, ICR620S-T11503)



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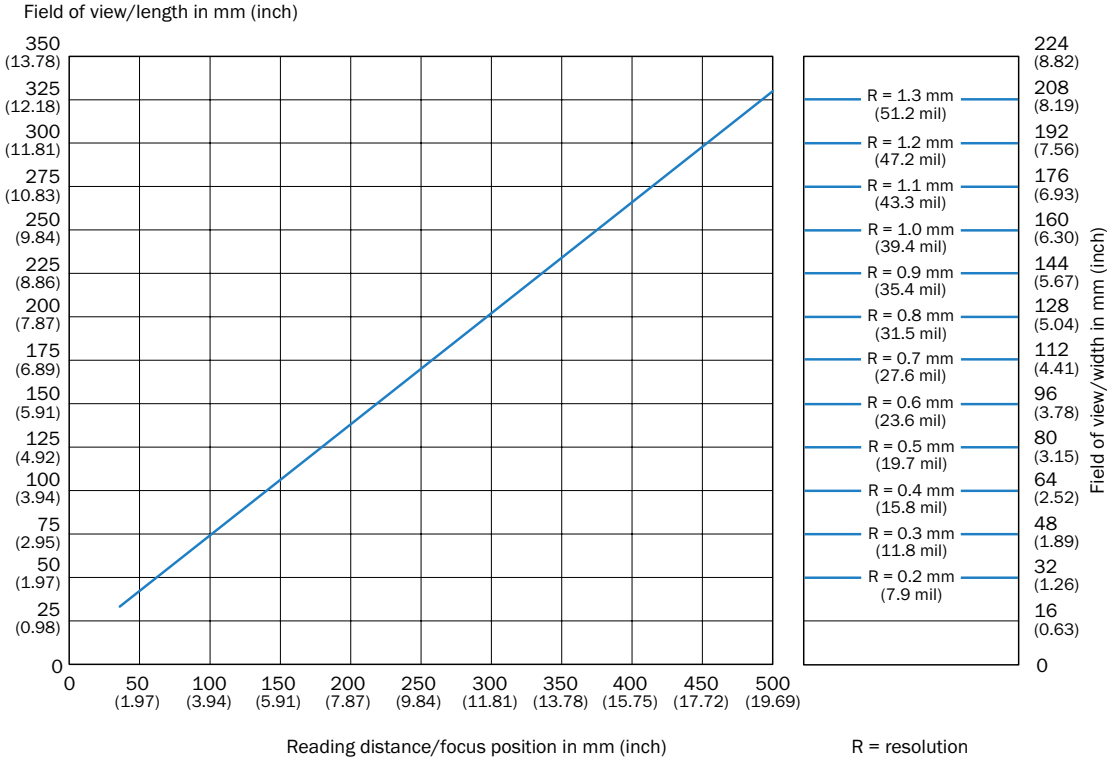
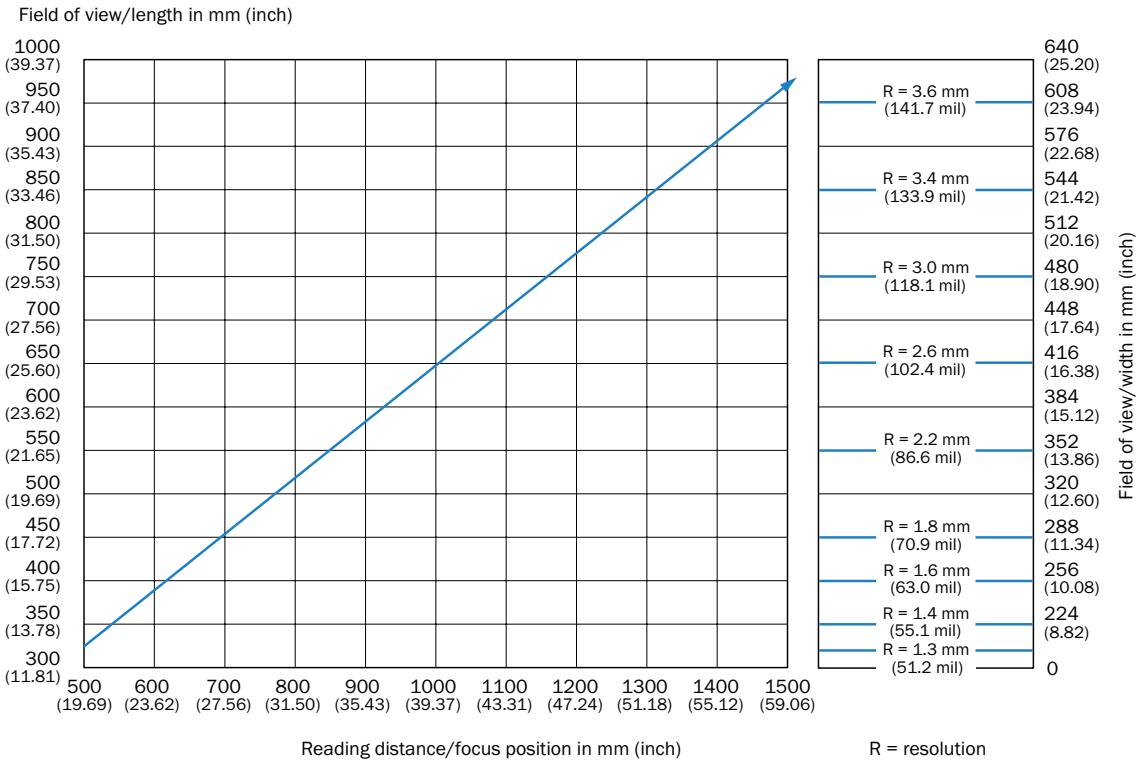
LECTOR®620 Professional (ICR620S-T16503)



LECTOR®620 Professional (ICR620S-T16503)



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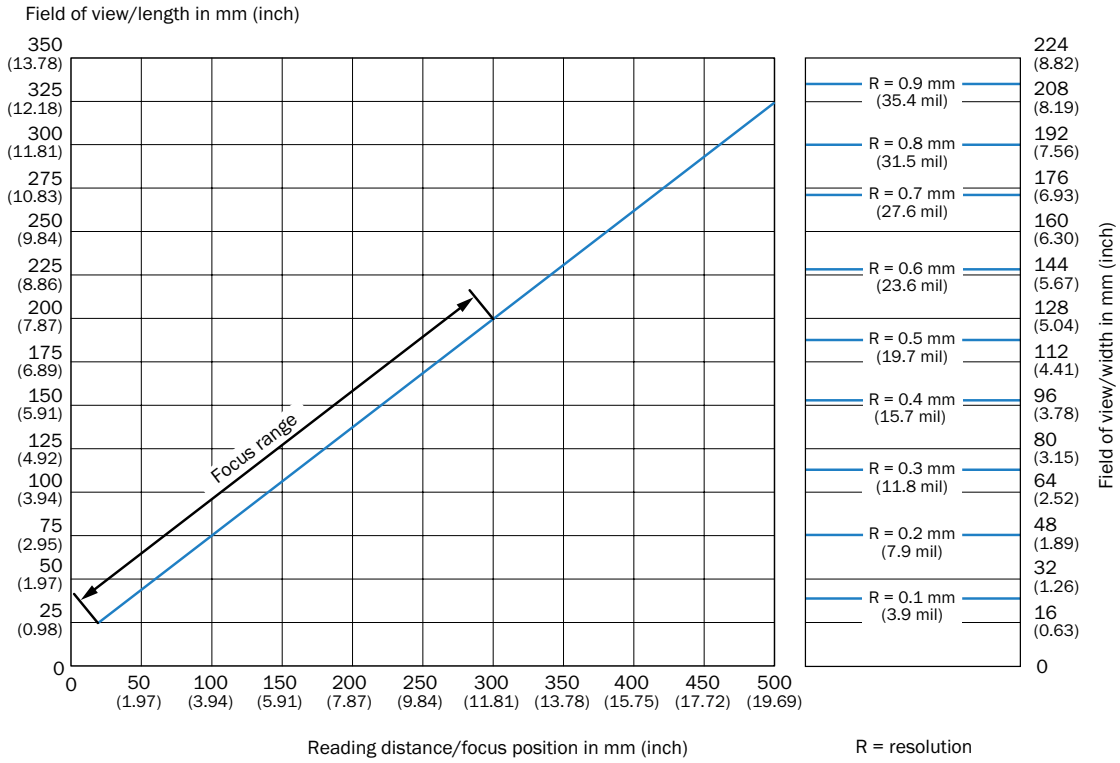
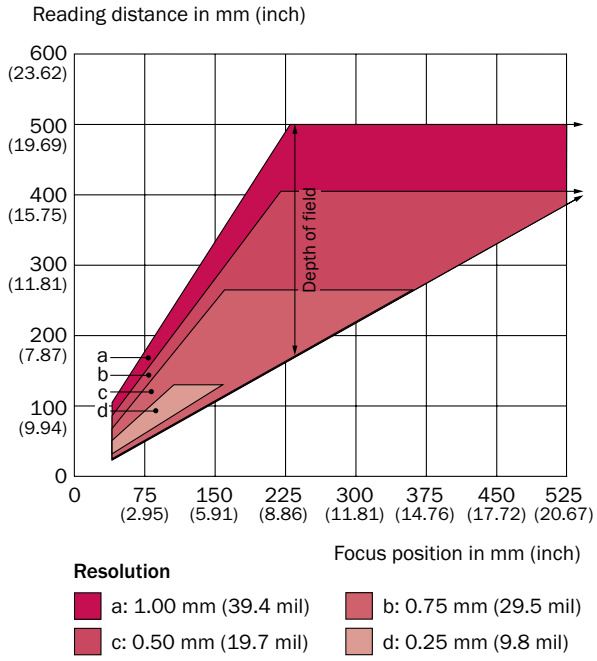
LECTOR®620 High Speed
LECTOR®620 DPM Plus

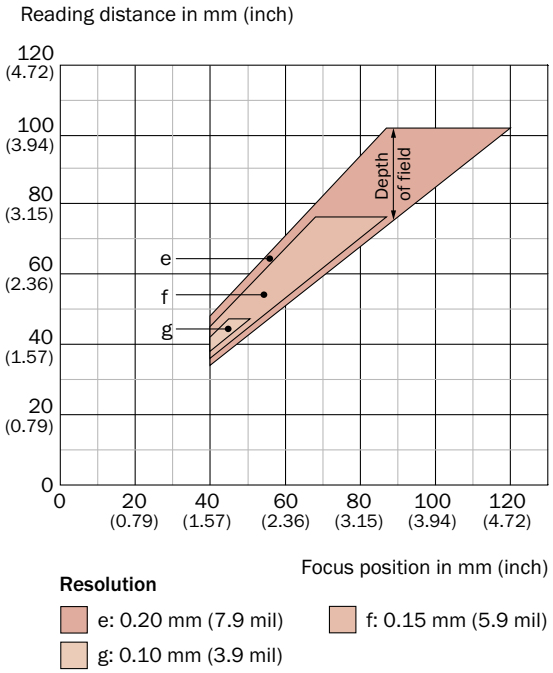


Reading field diagrams

LECTOR®620 ECO
LECTOR®620 Professional
(ICR620S-T11504, ICR620S-T11503)



LECTOR®620 ECO
LECTOR®620 Professional
(ICR620S-T11504, ICR620S-T11503)



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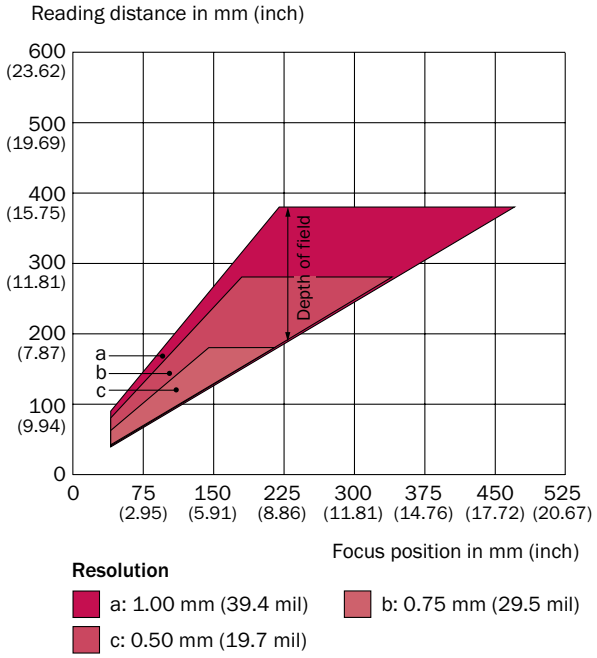
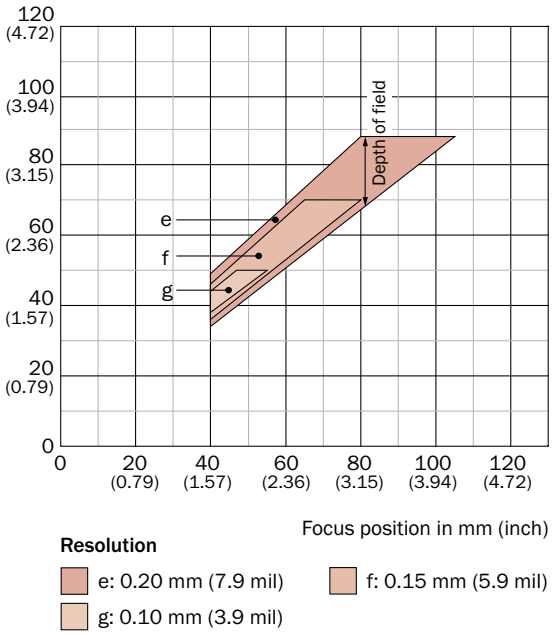
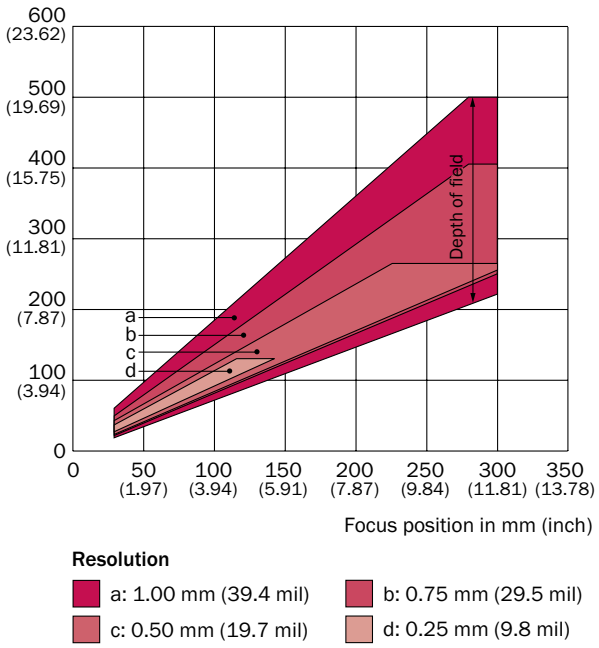
LECTOR®620 Professional (ICR620S-T16503)



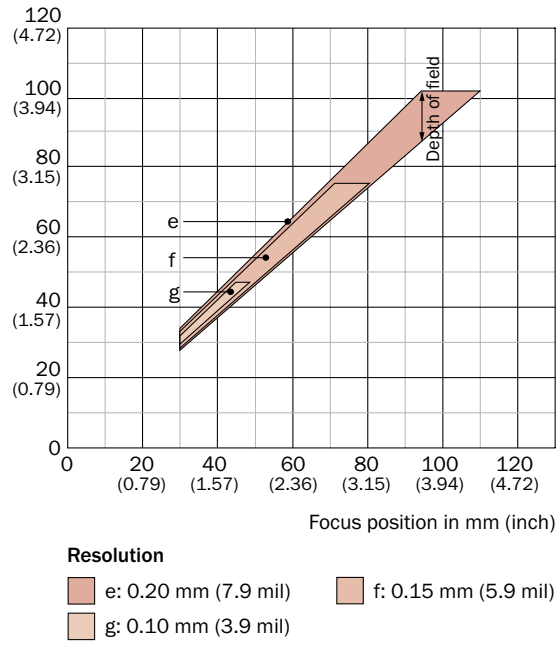
LECTOR®620 Professional (ICR620S-T16503)



LECTOR®620 High Speed



LECTOR®620 High Speed



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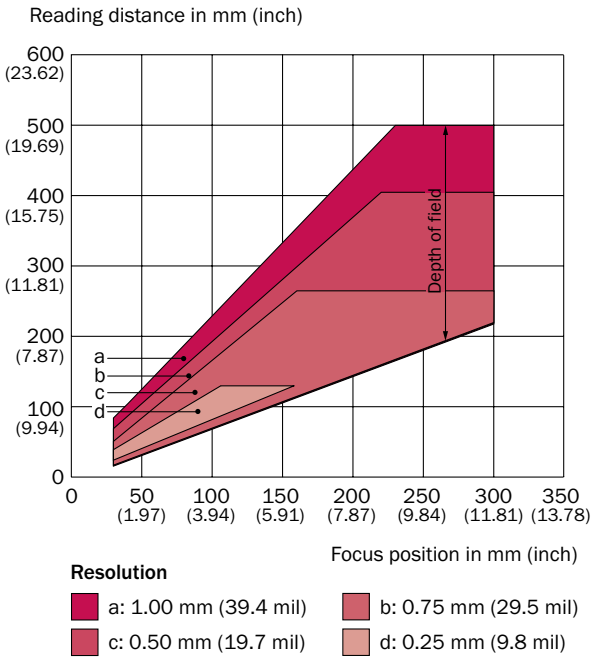
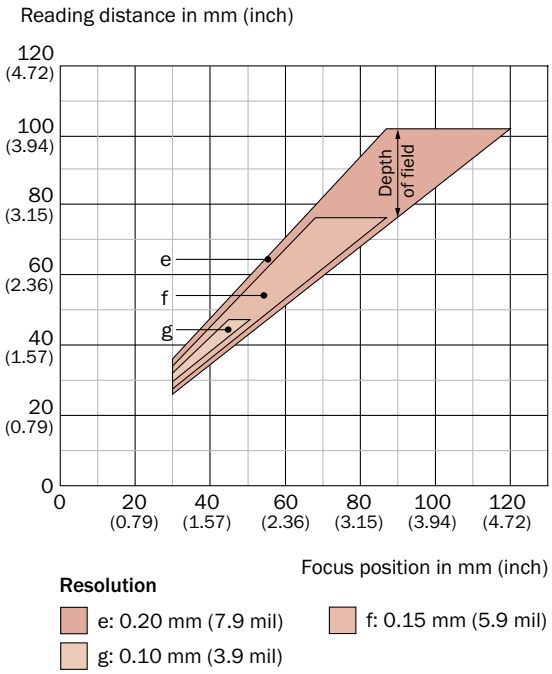
LECTOR®620 DPM Plus

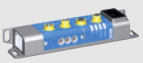


LECTOR®620 DPM Plus



Recommended accessories

Modules

	Description	Model name	Part no.	LECTOR®62x ECO	LECTOR®62x
 Illustration may differ	Small connection module for one sensor, 4 cable glands, base for CMC600	CDB620-001	1042256	●	●
	Fieldbus proxy/gateway for connecting identification sensors to PROFIBUS-DP networks (PROFIBUS interface 2 x M12, male connector/female connector, 5-pin)	CDF600-2100	1058965	●	●
	Fieldbus proxy/gateway for connecting identification sensors to PROFIBUS-DP networks (PROFIBUS interface 1 x D-Sub, female connector, 9-pin)	CDF600-2103	1058966	●	●

Mounting brackets/plates

Mounting brackets

	Description	Part no.	LECTOR®62x ECO	LECTOR®62x
	Mounting bracket (simple bracket)	2020410	●	●

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Plug connectors and cables

Connection cable (male connector-male connector)

- **Cable length:** 2 m

	Signal type	Connection type head A	Connection type head B	Special feature	Part no.	LECTOR®62x ECO	LECTOR®62x
	Ethernet	Connector, M12, 4-pin, D-coded	Connector, M12, 4-pin	–	6034420	–	●
		Connector, M12, 4-pin, straight, D-coded	Connector, RJ45, 8-pin, straight	Drag chain use	6034414	–	●
	USB 2.0	Connector, USB-A	Connector, Micro-B	–	6036106	●	●

Connection cable (male-female connector)

	Connection type head A	Connection type head B	Description	Cable length	Part no.	LECTOR®62x ECO	LECTOR®62x
	Female connector, M12, 17-pin, straight	Connector, D-Sub, 15-pin, straight	To connection module CDx (except CDB650)	2 m	2055419	–	●

→ **For additional accessories, please see page E-74**

E

E

Nonstop code reading flexibility

Product description

The LECTOR®65x image-based code reader from SICK provides maximum performance and optimum throughput in logistics and factory automation. With a frame repetition rate of 40 Hz and real-time decoding, the LECTOR®65x can reliably identify 1D, 2D and directly marked codes at the highest possible speed. The 2/4 megapixel image resolution offers a large field of view. Combined with the dynamic focus, maximum flexibility in code positioning, object height and transport speed is achieved. The intuitive device equipment – featuring function buttons, auto setup, an aiming laser, an acoustic feedback signal, and a green feedback LED – reduce the amount of work required for training and installation. The microSD memory card can be used to store images or back-up copies of parameters. Due to SICK's ID*pro* feature, the LECTOR®65x can be integrated into any industrial network.

At a glance

- 2/4 megapixel resolution; high frame repetition rate of 40 Hz
- Dynamic focus adjustment from object to object
- Integrated high-power LED illumination
- Function button, aiming laser, optical and acoustic feedback signal
- Intelligent, rapid decoding algorithms
- MicroSD memory card for storing images and back-up copies of parameters

Your benefits

- Highly flexible code position, object height, and transport speed due to a large field of view and dynamic focus
- Cost-effective, straightforward, modular integration of multiple devices adapted to the width of the conveyor belt
- Minimum training and installation work due to intuitive device equipment that includes function buttons, auto setup, integrated illumination, an aiming laser, an acoustic feedback signal, and a green feedback LED
- Intelligent decoding algorithms ensure maximum reading performance and high package throughput, even with codes that are difficult to read
- SICK ID*pro* platform facilitates quick and easy integration into numerous industrial networks

Additional information

→ **www.mysick.com/en/LECTOR65x**
For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.

8015547/2013-05-06
Subject to change without notice

Detailed technical data

Features

	LECTOR®652 Flex	LECTOR®652 Dynamic Focus	LECTOR®654 Flex	LECTOR®654 Dynamic Focus
Focus	Manually adjustable focus (C-mount)	Dynamic focus control	Manually adjustable focus (C-mount)	Dynamic focus control
Sensor	CMOS matrix sensor, gray scale values			
Light source	Lighting LEDs: – (to be ordered separately as accessory) Aiming laser: visible red light (λ = 630 nm ... 680 nm)	Lighting LEDs: white (λ = 6000 ± 500 K) Feedback spot: visible green light (λ = 525 ± 15 nm) Aiming laser: visible red light (λ = 630 nm ... 680 nm)	Lighting LEDs: – (to be ordered separately as accessory) Aiming laser: visible red light (λ = 630 nm ... 680 nm)	Lighting LEDs: white (λ = 6000 ± 500 K) Feedback spot: visible green light (λ = 525 ± 15 nm) Aiming laser: visible red light (λ = 630 nm ... 680 nm)
Laser class	Complies with CFR 1040.10 except for the tolerance according to Laser Notice No. 50 from June 24, 2007 (IEC 60825-1 (2007-6))			
Scanning frequency	70 Hz, at 2 megapixels resolution	70 Hz, at 2 megapixels resolution	40 Hz, at 4 megapixels resolution	40 Hz, at 4 megapixels resolution
Code resolution	≥ 0.1 mm [1]	≥ 0.12 mm [2]	≥ 0.1 mm [1]	≥ 0.12 mm [2]

[1] Depends on lens used.

[2] Depends on distance.

Performance

Bar code types	GS1-128 / EAN 128, UPC / GTIN / EAN, Interleaved 2 of 5, Pharmacode, GS1 DataBar, Code 39, Code 128, Codabar, Code 32, Code 93
2D code types	Data Matrix ECC200, GS1 Data Matrix, PDF417, QR code, MaxiCode
Code qualification	On the basis of ISO/IEC 16022, ISO/IEC 15415, ICO/IEC 18004
Internal image storage	512 MB

Interfaces

Serial (RS-232, RS-422)	✔
Function	Host, AUX
Data transmission rate	300 Baud ... 115.2 kBaud, AUX: 57.6 kBaud (RS-232)
USB	✔, USB 2.0
Ethernet	✔
Function	Host, AUX, Image transmission
Data transmission rate	10/100/1,000 Mbit/s
Protocol	TCP/IP, FTP (image transmission), EtherNet/IP, PROFINET (optional via external connection module CDF600-2)
CAN bus	✔
Function	SICK CAN sensor network (Master/Slave, Multiplexer/Server)
Data transmission rate	20 kbit/s ... 1 Mbit/s
Protocol	CSN (SICK CAN Sensor Network)
PROFIBUS DP	✔, optional via external connection module (CDF600-2)
Switching inputs	4 (“Sensor 1”, “Sensor 2”, 2 inputs via optional CMC600 in CDB650/CDM420)
Switching outputs	6 (CDB650: “Result 1”, “Result 2”,“Result 3”, “Result 4”, 2 external outputs via CMC600 or CDM420: “Result 1”, “Result 2”, 2 external outputs via CMC600 or cable with open end: “Result 1”, “Result 2”,“Result 3”, “Result 4”)
Reading pulse	CAN, Ethernet, non-powered, switching inputs, serial interface, presentation mode, auto pulse

Optical indicators	21 LEDs (10 x status display, 10 x LED bar graph, 1 green feedback spot)
Acoustic indicators	Beeper/buzzer (can be switched off, can be assigned a function to signal the result status)
Control elements	2 buttons (choose and start/stop functions)
Memory card	MicroSD memory card (flash card) max. 32 GB, optional

Mechanics/electronics

	LECTOR®652 Flex	LECTOR®652 Dynamic Focus	LECTOR®654 Flex	LECTOR®654 Dynamic Focus
Electrical connection	1 x M12, 17-pin male connector (serial, CAN, I/Os) 2 x M12, 8-pin female connector (Ethernet, P1 not yet with function)			
Operating voltage	18 V DC ... 30 V DC			
Power consumption	18 W			
Housing	Die-cast aluminum			
Housing color	Light blue (RAL 5012)			
Protection class	III			
Weight	635 g	963 g	635 g	963 g
Dimensions	142 mm x 89 mm x 46 m [1]	142 mm x 89 mm x 106 m	142 mm x 89 mm x 46 m [1]	142 mm x 89 mm x 106 m

[1] Only housing without lens and protective hood.

Ambient data

Electromagnetic compatibility (EMC)	EN 61000-6-2 (2006-03) / EN 61000-6-2 (2009-05)
Shock resistance	EN 60068-2-6
Electrical safety	EN 60950-1 (2006-04) / EN 60950-1/A11 (2009-03)
Ambient operating temperature	0 °C ... +50 °C
Storage temperature	–20 °C ... +70 °C
Permissible relative humidity	± 90 %, non-condensing
Ambient light safety	2,000 lx, on code

Ordering information

- **Reading field:** side
- **Enclosure rating:** IP 65

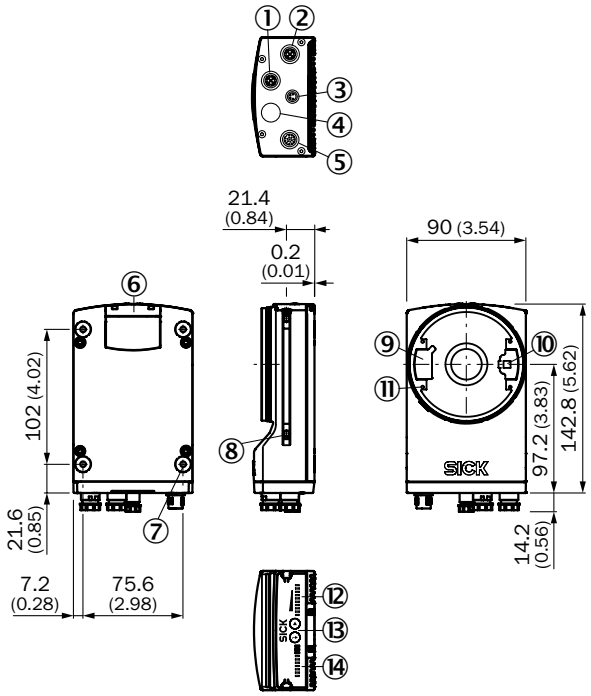
Version	Sensor resolution	Lens	Internal lighting	Model name	Part no.
LECTOR®652 Flex	2,048 px 1,088 px	Exchangeable (C-mount), to be ordered separately as accessory	–	V2D652R-MCXXA6	1063404
LECTOR®652 Dynamic Focus	2,048 px 1,088 px	Integrated	White	V2D652R-MEWHA6	1063405
LECTOR®654 Flex	2,048 px 2,048 px	Exchangeable (C-mount), to be ordered separately as accessory	–	V2D654R-MCXXA6	1060892
LECTOR®654 Dynamic Focus	2,048 px 2,048 px	Integrated	White	V2D654R-MEWHA6	1060893

E

Dimensional drawings

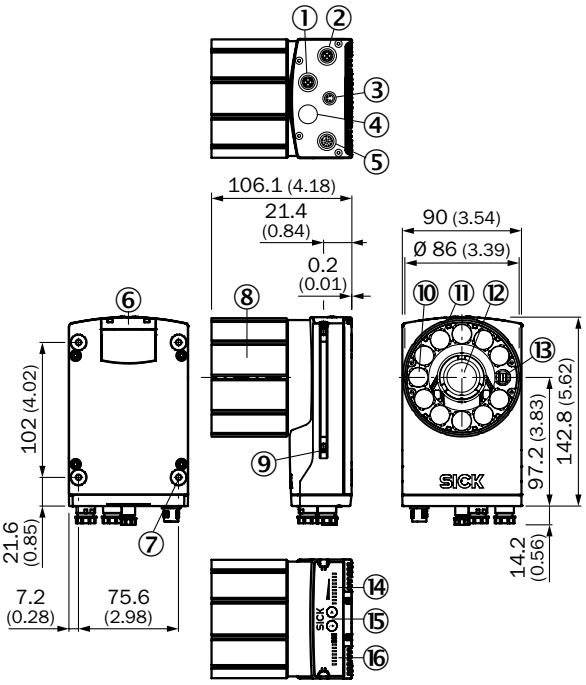
dimensions in mm (inch)

LECTOR®652 Flex
LECTOR®654 Flex



① P1 connection, no function, planned “Ethernet”, depending on type
② P3 connection “Ethernet”
③ X2 “USB” connection
④ P2 (no function)
⑤ X1 “Power/Serial Data/CAN/I/O” connection
⑥ Cover (flap) for the slot of the microSD memory card
⑦ Blind hole thread M5, 5 mm deep (4 x), for mounting
⑧ Sliding nut M5, 5.5 mm deep (2 x), for mounting
⑨ Plug connector for connecting the integrated lighting
⑩ Outlet, aiming laser
⑪ Blind hole thread M2.5, 5.5 mm deep (4 x), for mounting the lighting fixture
⑫ Bar graph display
⑬ Function button (2 x)
⑭ LED for status display (2 levels), 10 x

LECTOR®652 Dynamic Focus
LECTOR®654 Dynamic Focus



① P1 connection, no function, planned “Ethernet”, depending on type
② P3 connection “Ethernet”
③ X2 “USB” connection or “lighting connection”, depending on type
④ P2 (no function)
⑤ X1 “Power/Serial Data/CAN/I/O” connection
⑥ Cover (flap) for the slot of the microSD memory card
⑦ Blind hole thread M5, 5 mm deep (4 x), for mounting
⑧ Lens and lighting protective cover
⑨ Sliding nut M5, 5.5 mm deep (2 x), for mounting
⑩ Green feedback LED
⑪ Ring light
⑫ Lens
⑬ Outlet, aiming laser
⑭ Bar graph display
⑮ Function button (2 x)
⑯ LED for status display (2 levels), 10 x

E

Recommended accessories

Lens and accessories

	Description	Part no.	LECTOR®65x Flex	LECTOR®65x Dynamic Focus
	Optic kit 05 including lens with a focal length of 50 mm, white lighting, distance bracket and protective hood	1064776	●	–
	Optic kit 06 including lens with a focal length of 75 mm, white lighting, distance bracket and protective hood	1064777	●	–

Modules

Description	Model name	Part no.	LECTOR®65x Flex	LECTOR®65x Dynamic Focus
Connection device basic for connecting one sensor with 2 A fuse, 5 cable glands and RS-232 interface to sensor via M12, 17-pin female connector, all outputs available on screw/spring-loaded terminals, including trigger unit functionality for external illumination of LECTOR®65x	CDB650-204	1064114	●	●

Plug connectors and cables

Connection cable (male connector-male connector)

Signal type	Connection type head A	Connection type head B	Cable length	Part no.	LECTOR®65x Flex	LECTOR®65x Dynamic Focus
USB 2.0	Male connector, M8, 8-pin, straight, X-coded	Male connector, USB-A, 4-pin, straight	2 m	6051164	●	●
Ethernet	Male connector, M12, 8-pin, straight, X-coded	Male connector, RJ45, 8-pin, straight	2 m	6049728	●	●

Connection cable (male connector-female connector)

Connection type head A	Connection type head B	Description	Special feature	Authorizations	Cable length	Part no.	LECTOR®65x Flex	LECTOR®65x Dynamic Focus
Male connector, M12, 17-pin, straight, A-coded	Female connector, M12, 17-pin, straight	To connection module CDB650	Suitable for 2 A, adapted color coding of open conductor heads	Ecolab	3 m	6051194	●	●

→ **For additional accessories, please see page E-74**

E

E

Detect, distinguish and sorting colors

Inspect

Product description

The color vision sensors perform fast and reliable color detection within a large field of view compared to point color sensors. The CVS2 can store of up to fifteen reference colors for detection, sorting and identification. The 2-color match feature give a reliable inspection by securing that two pre-defined colors are present. The user-defined color thresholds do not only verify that the color is present but also ensure correct fill level of the color. The integrated color display makes it easy to supervise the configuration of the application. With some additional key clicks on the integrated keypad, it is easy to fine tune the color area and the color variance.

At a glance

- Color inspection and sorting on large fields of view
- Inspecting one color, minimum and maximum fill
- 2-color matching
- Sorting up to 15 colors
- Reference capacity of 15 color configurations
- Parameter up- and download to PC
- Compact IP-67 rated housing with integrated display for configuration and monitoring
- Different variants for different fields of view and working distances

Your benefits

- The support for large fields of view ensures reliable color sorting even if your part varies in position
- The minimum and maximum fill tolerance ensures you that there is always correct fill of color on your part before it leaves your line
- The 2-color matching ensures you reliable result on multi-colored objects
- The reference capacity of 15 color configurations gives you the most economic solution for batch production
- Store and restore the configuration from PC will save you time in every repetitive machine installation

Additional information

→ **www.mysick.com/en/CVS2**

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.

8015547/2013-05-06
Subject to change without notice

Detailed technical data

Features

Task	Inspection
Technology	2D, snapshot, image analysis, color
Toolset	Color inspection, color sort, 2-color match
Sensor	CMOS matrix sensor, color values
Focus	Fixed focus
Light source	White
LED class	Risk group 1 (low risk, IEC62471 : 2006)
Spectral range	Approx. 400 nm ... 750 nm
Offline support	Configuration

Performance

Maximum performance	200 frames/s
Typical performance	38 frames/s
Number of inspections	1
Reference images	15
Resolution	208 px x 236 px x 3 px (RGB)

Interfaces

Operator interfaces	External or integrated display
Configuration software	CVS device software, CVS2 Dataloader (PC)
Communication interface	RS-232
Digital inputs	HIGH (corresp. 8 V)
Configurable inputs	External trigger, reference object selection, external teach
Digital outputs	NPN / PNP (depending on type)
Configurable outputs	Auxiliary, sorting
Output current	< 100 mA
Default outputs	Pass
Control elements	5 buttons (setup)

Mechanics/electronics

Connectors	I/O + Vs: cable, 8-wire, 2 m, HRS, 6-pin for external lighting/monitor
Supply voltage min ... max	12 V ... 24 V
Ripple	< 5 V_{pp}
Current consumption	< 220 mA, (at 24 V), without output load
Enclosure rating	IP 67
Housing material	ABS, acryl glass, polycarbonate
Weight	180 g
Dimensions (L x W x H)	95 mm x 42 mm x 34 mm
Lens	Integrated

Ambient data

Ambient operating temperature	0 °C ... +40 °C [1]
Ambient storage temperature	–20 °C ... +70 °C [1]

[1] Rel. humidity: 35 % ... 85 %, 95 % at storage.

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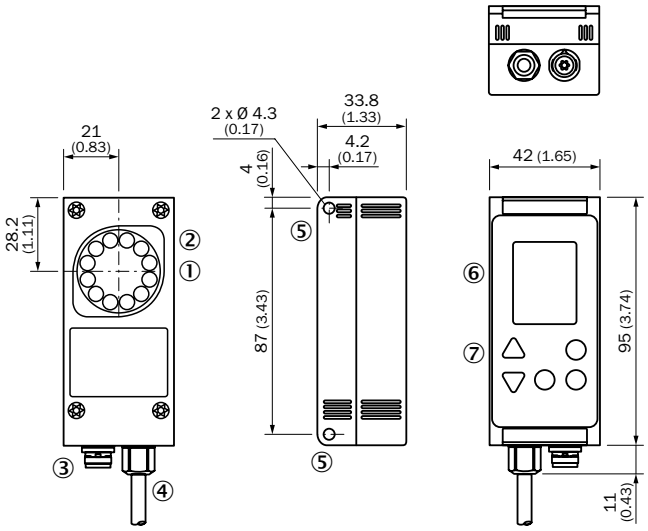
Ordering information

Digital outputs	Working distance internal illumination (min. ... max.)	Field of view internal illumination	Model name	Part no.
NPN	210 mm ... 270 mm	40 mm x 50 mm ... 55 mm x 65 mm	CVS2-N112	1027329
	90 mm ... 150 mm	40 mm x 50 mm ... 65 mm x 75 mm	CVS2-N122	1027330
	50 mm ... 100 mm	50 mm x 65 mm ... 100 mm x 115 mm	CVS2-N142	1027331
PNP	210 mm ... 270 mm	40 mm x 50 mm ... 55 mm x 65 mm	CVS2-P112	1027332
	90 mm ... 150 mm	40 mm x 50 mm ... 65 mm x 75 mm	CVS2-P122	1027333
	50 mm ... 100 mm	50 mm x 65 mm ... 100 mm x 115 mm	CVS2-P142	1027334

Dimensional drawing

dimensions in mm (inch)



① Front screen
② Lighting
③ Connection: External lighting/monitor/PC
④ Connection cable
⑤ Fixing hole
⑥ Color display
⑦ Input keypad

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Recommended accessories

Test and monitoring tools

	Description	Model name	Part no.
	Color vision monitor, external operating unit including keyboard and monitor with 1.5" LCD color display, Hirose plug connector to CVS	CVS-M1	1026355

Plug connectors and cables

Connection cable (female connector-female connector)

	Connection type head A	Connection type head B	Description	Cable length	Part no.
	Female connector, D-Sub, 9-pin, straight	Female connector, HRS, 6-pin, straight	Connection cable for CVS data transfer	2 m	6029801
	Female connector, HRS, 6-pin, straight	Male connector, HRS, 6-pin, straight	Extension cable for CVS-M1	3 m	6028659

→ **For additional accessories, please see page E-74**

Accessories

Device protection (mechanical)

Front screen protection

	Description	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR® 62x ECO	LECTOR® 62x	LECTOR® 65x Flex	LECTOR® 65x Dynamic Focus	CVS white
	Weld spark guard for direct mounting in front of front screen on device including fixing screws	2065807	–	–	–	●	●	–	–	–

Protective caps

	Description	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR® 62x ECO	LECTOR® 62x	LECTOR® 65x Flex	LECTOR® 65x Dynamic Focus	CVS white
	IP-65 sealing rubber for extension cables with 15-pin D-Sub plug connection (6010075 and 6020092)	4038847	–	–	–	●	●	●	●	–

Illuminations

LED

	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR® 62x ECO	LECTOR® 62x	LECTOR® 65x Flex	LECTOR® 65x Dynamic Focus	CVS white
	Ring lighting, bright field spot, white lighting color, lighting distance 100 mm ... 350 mm	ICL110-F142	1027286	●	●	●	–	–	–	–	–
	Ring lighting, bright field, red lighting color, lighting distance 0.2 m ... 1 m	ICL170-F222	1048371	●	●	●	●	●	–	–	–
	Ring illumination, bright field, red lighting color, lighting distance 200 mm ... 1.5 m	ICL260-F222	1052495	●	●	●	●	●	–	–	–
	Ring lighting, bright field, red lighting color, lighting distance 200 mm ... 1.1 m	ICL280-F222	1052472	●	●	●	●	●	–	–	–
	Ring lighting, bright field spot, infrared lighting color, lighting distance 0.2 m ... 2 m, temperature 0 ... +40 °C	ICL300-F202S01	1047957	–	●	–	●	●	–	–	–
	Ring lighting, bright field spot, red lighting color, lighting distance 0.2 m ... 2 m, temperature 0 ... +40 °C	ICL300-F222	1046820	●	●	●	●	●	–	–	–

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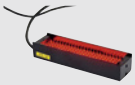
	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Integratable lighting, lighting color white, suitable for lenses with a focal length of 12.5 mm and 16 mm	Integratable lighting	On request	–	–	–	–	–	●	–	–
	Integratable lighting, lighting color white, suitable for lenses with a focal length of 25 mm and 35 mm	Integratable lighting	On request	–	–	–	–	–	●	–	–
	Integratable lighting, lighting color white, suitable for lenses with a focal length of 50 mm and 75 mm	VI83I-WH2023M0	2069099	–	–	–	–	–	●	–	–
	UV illumination, light source ultraviolet, 370 nm, external diameter 62 mm	VI35S-UV0015A2	6051200	–	–	–	●	●	–	–	–
	VLR Trigger Unit to connect and control VLR lights via camera	VLR Trigger unit	6037290	●	●	●	–	–	–	–	–
	Bar light, light source white, outer dimension 109 x 28 mm	VLR-10BR1111	6035959	●	●	●	●	●	●	●	–
	Spot lighting set, white lighting color, incl. 24 V power supply (in 24 V, out max. 7 V)	VLR-10PL1011P01	6037795	●	●	●	●	●	●	●	–
	Dark field light, light source white, outer dimension 138 x 102 mm	VLR-10RD1311	6037800	●	●	●	●	●	●	●	–
	Square ring light, light source white, outer dimension 70 x 70 mm	VLR-10RK0211	6035958	●	●	●	●	●	●	●	–
	Bar light, light source blue, 470 nm, outer dimension 109 x 28 mm	VLR-47BR1111	6035960	●	●	●	●	●	●	●	–
	Spot lighting set, blue lighting color, incl. 24 V power supply (in 24 V, out max. 7 V)	VLR-47PL1011P01	6037797	●	●	●	●	●	●	●	–
	Ring light, light source blue, 470 nm, outer diameter 90 mm	VLR-47RL0411	6037792	●	●	●	●	●	●	●	–
	Bar light, light source green, 525 nm, outer dimension 109 x 28 mm	VLR-52BR1111	6035961	●	●	●	●	●	●	●	–
	Spot lighting set, green lighting color, incl. 24 V power supply (in 24 V, out max. 7 V)	VLR-52PL1011P01	6037796	●	●	●	●	●	●	●	–
	Back light, light source red, 660 nm, outer dimension 60 x 58 mm	VLR-66BL0511	6041961	●	●	●	●	●	●	●	–
	Back light, light source red, 660 nm, outer dimension 120 x 118 mm	VLR-66BL1611	6041962	●	●	●	●	●	●	●	–
	Bar light, light source red, 660 nm, outer dimension 109 x 28 mm	VLR-66BR1111	6035962	●	●	●	●	●	●	●	–
	Coaxial light, light source red, 660 nm, outer dimension 73 x 70 mm	VLR-66CA0311	6035964	●	●	●	●	●	●	●	–
	Flat dome light, light source red, 660 nm, outer dimension 143 x 143 mm	VLR-66FD1511	6035965	●	●	●	●	●	●	●	–
	Spot lighting set, red lighting color, incl. 24 V power supply (in 24 V, out max. 7 V)	VLR-66PL1011P01	6037794	●	●	●	●	●	●	●	–
	Low angle light, light source red, 660 nm, outer diameter 134 mm	VLR-66RA1211	6035963	●	●	●	●	●	●	●	–

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	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Low angle light, light source red, 660 nm, outer diameter 208 mm	VLR-66RA2011	6037798	●	●	●	●	●	●	●	–
	Dark field light, light source red, 660 nm, outer dimension 138 x 102 mm	VLR-66RD1311	6037799	●	●	●	●	●	●	●	–
	Ring light, light source red, 660 nm, outer diameter 50 mm	VLR-66RL0111	6035957	●	●	●	●	●	●	●	–
	Ring light, light source red, 660 nm, outer diameter 90 mm	VLR-66RL0411	6037793	●	●	●	●	●	●	●	–

Lens and accessories

	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Interchangeable lens, focal length 6 mm, including distance ring	OBJ-B06025BA	2049668	●	●	●	–	–	–	–	–
	Interchangeable lens, focal length 8 mm, including distance ring	M12 lens focal length 8 mm	2056692	●	●	●	–	–	–	–	–
	Interchangeable lens, focal length 10 mm, including distance ring	OBJ-B10028BA	2049415	●	●	●	–	–	–	–	–
	Interchangeable lens, focal length 16 mm, including distance ring	OBJ-B16018BA	2049418	●	●	●	–	–	–	–	–
	Transparent front screen, glass	Front window, Inspector Flex (glass)	2052266	●	●	●	–	–	–	–	–
	Transparent front screen, PMMA	Front window, Inspector Flex (plastic)	2050690	●	●	●	–	–	–	–	–
	Tool for changing front screen and lens on Inspector Flex	Tool for front window, Inspector Flex	2050703	●	●	●	–	–	–	–	–
	Replaces the front window and creates even and homogeneous illumination. For shiny surfaces. Includes adapter ring and O-ring.	Inspector Flex Dome	2050678	●	●	–	–	–	–	–	–
	LECTOR®620 dome accessories for glossy and curved surfaces inclusive bracket and mounting material	Dome accessory	2063093	–	–	–	●	●	–	–	–

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	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
 Illustration may differ	Lens 1", focal length 16 mm, lens aperture 1.4 – 16	C-mount lens	5327523	–	–	–	–	–	●	–	–
	Lens 1", focal length 35 mm, lens aperture 1.4 – 16	C-mount lens	5327525	–	–	–	–	–	●	–	–
	Lens 1", focal length 25 mm, lens aperture 1.4 – 16	C-mount lens	5327524	–	–	–	–	–	●	–	–
	Lens 1", focal length 12.5 mm, lens aperture 1.4 – 16	C-mount lens	5327522	–	–	–	–	–	●	–	–
	Lens 1", focal length 75 mm, lens aperture 1.4 – 16	C-mount lens	5327527	–	–	–	–	–	●	–	–
	Lens 1", focal length 50 mm, lens aperture 1.4 – 16	C-mount lens	5327526	–	–	–	–	–	●	–	–
	Lens protective hood, enclosure rating IP 65, length 74.5 mm, glass window	Optic protective hood	2066565	–	–	–	–	–	●	–	–
	Optic kit 01 including lens with a focal length of 12.5 mm, white lighting, distance bracket and protective hood	Optic kit 01	1064791	–	–	–	–	–	●	–	–
	Optic kit 02 including lens with a focal length of 16 mm, white lighting, distance bracket and protective hood	Optic kit 02	1064792	–	–	–	–	–	●	–	–
	Optic kit 03 including lens with a focal length of 25 mm, white lighting, distance bracket and protective hood	Optic kit 03	1064793	–	–	–	–	–	●	–	–
	Optic kit 04 including lens with a focal length of 35 mm, white lighting, distance bracket and protective hood	Optic kit 04	1064794	–	–	–	–	–	●	–	–
	Optic kit 05 including lens with a focal length of 50 mm, white lighting, distance bracket and protective hood	Optic kit 05	1064776	–	–	–	–	–	●	–	–
	Optic kit 06 including lens with a focal length of 75 mm, white lighting, distance bracket and protective hood	Optic kit 06	1064777	–	–	–	–	–	●	–	–

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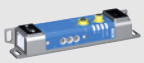
Modules

	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	I/O box extension with 2 ethernet ports enabling switch functionality, number of logical input = 4, output = 8 [1]	I/O box extension, 4 in/8 out	6037654	●	●	●	–	–	–	–	–
	I/O module to add logical output to the I/O box extension, number of logical output = 8, only usage with accessory 6037654	I/O extension module, 8 out	6037750	●	●	●	–	–	–	–	–
	I/O module to extend the number of digital inputs in combination with I/O box extension. Number of digital inputs = 2, only usage with accessory 6037654	I/O module, 2 extra digital inputs	6039038	●	●	●	–	–	–	–	–
 Illustration may differ	Small connection module for one sensor, 4 cable glands, base for CMC600	CDB620-001	1042256	–	–	–	●	●	–	–	–
	Small connection module for one sensor, 2 cable glands, 2 x M12 connector/female connector for CAN, base for CMC600	CDB620-101	1042257	–	–	–	●	●	–	–	–
	Small connection module for a sensor, 5 cable glands, female connector for CMC cloning module	CDB620-201	1042258	–	–	–	●	●	–	–	–
	Connection device basic for connecting one sensor with 2 A fuse, 5 cable glands and RS-232 interface to sensor via M12, 17-pin female connector, all outputs available on screw/spring-loaded terminals, including trigger unit functionality for external illumination of LECTOR®65x	CDB650-204	1064114	–	–	–	–	–	●	●	–
	Fieldbus proxy/gateway for connecting identification sensors to PROFIBUS-DP networks (PROFIBUS interface 2 x M12, male connector/female connector, 5-pin)	CDF600-2100	1058965	–	–	–	●	●	–	–	–
	Fieldbus proxy/gateway for connecting identification sensors to PROFIBUS-DP networks (PROFIBUS interface 1 x D-Sub, female connector, 9-pin)	CDF600-2103	1058966	–	–	–	●	●	–	–	–
	Modular connection module for one sensor	CDM420-0001	1025362	–	–	–	●	●	–	–	–
 Illustration may differ	Modular connection module for two sensors	CDM420-0004	1028487	–	–	–	●	●	–	–	–
	Modular connection module for one sensor, 2 A fuse	CDM420-0006	1058634	–	–	–	–	–	●	●	–

[1] Not supported by EtherCAT variant.

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	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
 Illustration may differ	Modular connection module for two sensors, 2 A fuse	CDM420-0007	1060324	–	–	–	–	–	●	●	–
	Modular connection module for one sensor, Host and AUX interface available on face plate	CDM420-0101	1025364	–	–	–	●	●	–	–	–
	Kit: modular connection module for one sensor, Host and AUX interface available on face plate, power supply CMP400, US power cord	CDM420-0102	1026220	–	–	–	●	●	–	–	–
 Illustration may differ	Modular connection module for one sensor, additional M12 female connector for PROFINET on face plate	CDM425-00034094	1048488	–	–	–	●	●	–	–	–
	Modular connection module for two sensors, additional M12 female connector for PROFINET on face plate. Reduction of cable glands from 6 to 4, M12 female connector for CAN bus and M12 male connector for connection to power supply on front side	CDM425-10234094	1050643	–	–	–	●	●	–	–	–

Mounting brackets/plates

Mounting brackets

	Description	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Mounting bracket Inspector, angled	2045167	●	●	●	–	–	–	–	–
	Bracket with adapter board	2042902	–	–	–	●	●	–	–	–
	Mounting bracket (simple bracket)	2020410	–	–	–	●	●	–	–	–
	Mounting bracket to mount the ICL illuminations	2063992	–	–	–	●	●	–	–	–
	Mounting bracket	2069169	–	–	–	–	–	●	●	–
	Distance bracket for mounting integratable lighting, length 51.3 mm	2069007	–	–	–	–	–	●	–	–

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Mounting plates

	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Standard bracket inspector for mounting the ICL illuminations or an external standard filter	BEF-AP-EPA	2045397	●	●	●	–	–	–	–	–
	Flat Inspector adapter plate with mounting holes matching both the Inspector vision sensor and the VLR-66BL1611 backlight. Additional holes for 2 x M6 and 2 x M8 screws.	BEF-AP-Inspector	2063780	●	●	●	–	–	–	–	–

Optical filters

	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Color filter/blue filter (468 nm ± 62 nm), PMMA	Inspector Flex blue color filter	2050676	●	–	–	–	–	–	–	–
	Color filter/green filter (544 nm ± 53 nm), PMMA	Inspector Flex green color filter	2050677	●	–	–	–	–	–	–	–
	Color filter/red filter (> 548 nm), PMMA	Inspector Flex red color filter	2050675	●	●	–	–	–	–	–	–
	Visible block filter (> 730 nm), PMMA	Inspector Flex visible block filter	2061248	–	●	–	–	–	–	–	–
	Optical NIR blocking filter to increase ambient light immunity	NIR blocking filter	2068812	–	–	–	–	–	●	–	–

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Other mounting accessories

Sliding nuts

	Description	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Sliding nut, M3, short	5324898	–	–	–	●	●	●	●	–
	Sliding nut, M4, short	5324897	–	–	–	●	●	●	●	–
	Sliding nut, M5, short	5324896	–	–	–	●	●	●	●	–

Plug connectors and cables

	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Black AS-i flat cable for looping in the power supply to ID*pro* Ethernet sensors, sold per meter	ASI-LTGE-MW	6022463	–	–	–	–	●	–	–	–
	M12 AS-i clip for connection on black AS-i flat cable	ASI-M12	6022472	–	–	–	–	●	–	–	–

Connecting cable (female connector-open)

- **Connection type head B:** cable

	Connection type head A	Special feature	Authorizations	Cable length	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
 Illustration may differ	Female connector, M12, 17-pin, straight	–	–	3 m	6042772	–	–	–	–	●	–	–	–
				5 m	6042773	–	–	–	–	●	–	–	–
				10 m	6048817	–	–	–	–	●	–	–	–
		Drag chain use	–	5 m	6045141	–	–	–	–	●	–	–	–
 Illustration may differ	Female connector, M12, 12-pin, straight	–	–	2 m	6036555	●	●	●	–	–	–	–	–
				5 m	6036556	●	●	●	–	–	–	–	–
				10 m	6037356	●	●	●	–	–	–	–	–
	Female connector, M12, 17-pin, straight, A-coded	Suitable for 2 A, adapted color coding of open conductor heads	Ecolab	3 m	2070425	–	–	–	–	–	●	●	–
				5 m	2070426	–	–	–	–	–	●	●	–
				10 m	2070427	–	–	–	–	–	●	●	–
	Female connector, M12, 12-pin, angled	–	–	5 m	6044448	●	●	●	–	–	–	–	–
	Female connector, D-Sub, 15-pin, straight	–	–	2 m	2043413	–	–	–	●	●	●	●	–

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Connection cable (female connector-female connector)

	Connection type head A	Connection type head B	Description	Cable length	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Female connector, D-Sub, 9-pin, straight	Female connector, HRS, 6-pin, straight	Connection cable for CVS data transfer	2 m	6029801	–	–	–	–	–	–	–	●
	Female connector, HRS, 6-pin, straight	Male connector, HRS, 6-pin, straight	Extension cable for CVS-M1	3 m	6028659	–	–	–	–	–	–	–	●

Connection cable (male connector-male connector)

	Signal type	Connection type head A	Connection type head B	Special feature	Authorizations	Cable length	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Ethernet	Male connector, M12, 4-pin, straight, D-coded	Male connector, RJ45, 8-pin, straight	–	–	2 m	6034414	●	●	●	–	●	–	–	–
						3 m	6044400	●	●	●	–	●	–	–	–
						5 m	6034415	●	●	●	–	●	–	–	–
						10 m	6030928	●	●	●	–	●	–	–	–
						20 m	6036158	●	●	●	–	●	–	–	–
	Ethernet	Male connector, M12, 4-pin, straight, D-coded	Male connector, RJ45, 8-pin, straight	Drag chain use	–	3 m	6029630	●	●	●	–	●	–	–	–
						5 m	6035389	●	●	●	–	●	–	–	–
	Ethernet	Male connector, M12, 4-pin, straight, D-coded	Male connector, RJ45, 8-pin, straight	Drag chain use	Ecolab	2 m	6050198	●	●	●	–	●	–	–	–
						3 m	6050199	●	●	●	–	●	–	–	–
						5 m	6050200	●	●	●	–	●	–	–	–
						10 m	6050201	●	●	●	–	●	–	–	–
	Ethernet	Male connector, M12, 4-pin, angled, D-coded	Male connector, RJ45, 8-pin, straight	–	–	5 m	6039488	●	●	●	●	●	–	–	–
	Ethernet	Male connector, M12, 4-pin, D-coded	Male connector, M12, 4-pin	–	–	2 m	6034420	●	●	●	–	●	–	–	–
						3 m	6034421	●	●	●	–	●	–	–	–
						5 m	6034422	●	●	●	–	●	–	–	–
	Ethernet	Male connector, M12, 8-pin, straight, X-coded	Male connector, RJ45, 8-pin, straight	–	–	2 m	6049728	–	–	–	–	–	●	●	–
						5 m	6049729	–	–	–	–	–	●	●	–
	USB 2.0	Male connector, USB-A	Male connector, Micro-B	–	–	2 m	6036106	–	–	–	●	●	–	–	–

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8015547/2013-05-06
Subject to change without notice

	Signal type	Connection type head A	Connection type head B	Special feature	Authorizations	Cable length	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	USB 2.0	Male connector, M8, 8-pin, straight, X-coded	Male connector, USB-A, 4-pin, straight	–	–	1.5 m	6051163	–	–	–	–	–	●	●	–
						2 m	6051164	–	–	–	–	–	●	●	–
						3 m	6051165	–	–	–	–	–	●	●	–

Connection cable (male connector-female connector)

	Connection type head A	Connection type head B	Description	Special feature	Authorizations	Cable length	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Female connector, M12, 12-pin, straight	Male connector, M12, 12-pin, straight	–	–	–	2 m	6041763	●	●	●	–	–	–	–	–
	Female connector, M8, 4-pin, straight	Male connector, M12, 8-pin, straight	–	–	–	2 m	6042080	●	●	●	–	–	–	–	–
 Illustration may differ	Female connector, M12, 17-pin, straight	Male connector, D-Sub, 15-pin, straight	To connection module CDx (except CDB650)	–	–	0.35 m	2056184	–	–	–	–	●	●	●	–
						0.9 m	2049764	–	–	–	–	●	●	●	–
						2 m	2055419	–	–	–	–	●	●	●	–
						3 m	2055420	–	–	–	–	●	●	●	–
						5 m	2055859	–	–	–	–	●	●	●	–
				Drag chain use		3 m	2061605	–	–	–	–	●	●	●	–
	Female connector, M12, 17-pin, straight	Male connector, M12, 4-pin, straight	4-pin for connecting one IDpro sensor, 17-pin to AS-i clip on black AS-i flat cable	Drag chain use	–	1 m	6044574	–	–	–	–	●	–	–	–
						2.5 m	6044575	–	–	–	–	●	–	–	–
 Illustration may differ	Female connector, D-Sub HD, 15-pin, straight	Male connector, D-Sub HD, 15-pin, straight	–	–	–	2 m	6034417	–	–	–	●	●	●	●	–
						3 m	6034418	–	–	–	●	●	●	●	–
	Male connector, M12, 17-pin, straight, A-coded	Female connector, M12, 17-pin, straight	To connection module CDB650	Suitable for 2 A, adapted color coding of open conductor heads	Ecolab	3 m	6051194	–	–	–	–	–	●	●	–
						5 m	6051195	–	–	–	–	–	●	●	–

E

Female connector (ready to assemble)

	Connection type head A	Connection type head B	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Connection inlay (female connector), D-Sub HD, 15-pin	-	6010019	–	–	–	●	●	●	●	–

Housing (ready to assemble)

	Connection type head A	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Connection housing (male connector), D-Sub HD, 9-pin, 15-pin	6009438	–	–	–	●	●	●	●	–

Male connector (ready to assemble)

	Connection type head A	Connection type head B	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Connection inlay (male connector), D-Sub HD, 15-pin	-	6010020	–	–	–	●	●	●	●	–

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Other connectors and cables

	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Converting 12-pin to 8-pin	T-splitter for Inspector	6034950	●	●	●	–	–	–	–	–

Signal converters

	Description	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Lighting trigger and NPN/PNP converter, to be installed in CDB620 and CDM420	2056990	–	–	–	●	●	–	–	–

Storage mediums

	Description	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
 Illustration may differ	MicroSD memory card with 2048 MB	4051366	–	–	–	–	●	●	●	–

Terminal and alignment brackets

	Description	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Quick-action lock system	2025526	–	–	–	●	●	–	–	–
	Quick-action lock system	2016110	–	–	–	–	–	●	●	–

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Terminal brackets

	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Bar bracket with clamp pieces, bar, and adapter plate Inspector, rotatable on two axes	Universal adapter for inspector	1048400	●	●	●	–	–	–	–	–

Universal bar clamp systems

	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Universal clamping bracket for rod mounting	Universal clamp bracket	2042802	–	–	–	●	●	–	–	–

Test and monitoring tools

	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Inspector Viewer for Inspector I-/P-/PI-series	VSPV-22222	2057556	●	●	●	–	–	–	–	–
	Color vision monitor, external operating unit including keyboard and monitor with 1.5" LCD color display, Hirose plug connector to CVS	CVS-M1	1026355	–	–	–	–	–	–	–	●

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Industrial vision cameras for flexible and powerful stand-alone solutions

SICK's line of IVC smart cameras are self-contained, stand-alone vision systems with an easy-to-use graphical user interface, enabling fast development for 2D and 3D applications. They combine imaging and analysis into one camera. These flexible, high-performance cameras provide tools for inspection, robot guidance, measuring and identification. With only one camera, you can perform any combination of advanced inspections and measurements to optimize production quality. The cameras support customized operator interfaces, and communication via I/O, serial and Ethernet.

Your benefits

- IVC-2D and IVC-3D are industrial, flexible, high-performance smart cameras. This gives you cost-efficient solutions to a vast spectrum of applications.
- IVC smart cameras are capable of advanced inspection, measurement and communication. This gives you reduced integration complexity and cost as one camera does it all.
- The graphical user interface is the same for both 2D and 3D, it is easy to use and is also available off-line. This saves you the cost for learning multiple software, shortens your application development time and makes support easy.
- IVC includes an OPC server and supports EtherNet/IP. This gives you simple interfacing with PLCs, robots and control systems.

Smart cameras

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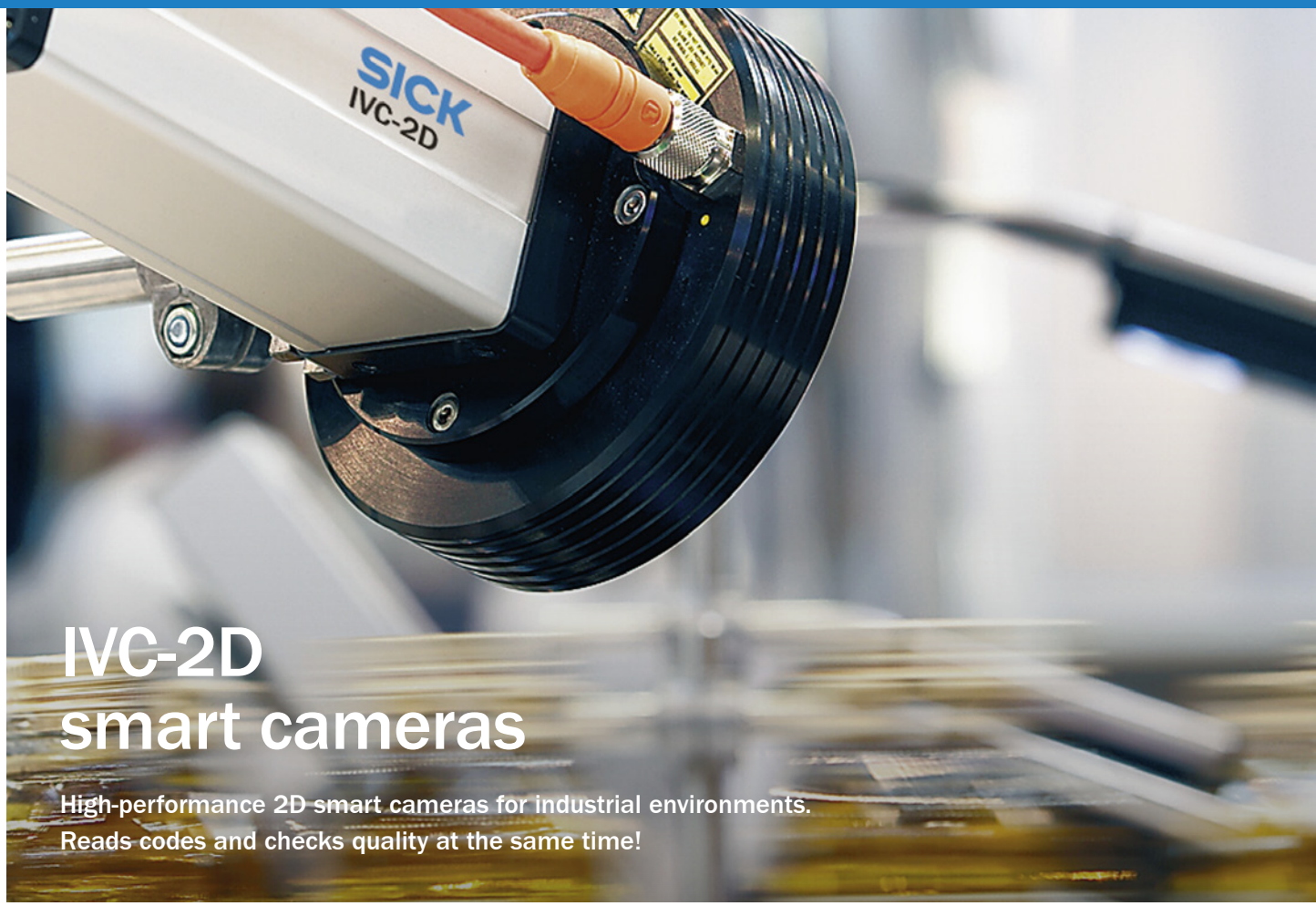

IVC-2D smart cameras

High-performance 2D smart cameras for industrial environments. Reads codes and checks quality at the same time!

Image acquisition and analysis in one camera housing

The IVC-2D is a high-performance smart camera for flexible automation solutions. Rapid prototyping is ensured by the user-friendly IVC Studio software, giving the user quick and easy access to more than 100 powerful image processing tools. The self-contained camera features with image acquisition and analysis in one camera housing. Once configured, the camera works in stand-alone mode, without the need for a PC.

Top performance meets production demands

A powerful processor, optimized pixel processing in FPGA and advanced vision tools ensure that you never fail to inspect the object in time, even at the highest production speed.

Benefits of the IVC-2D

Rugged design for industrial environments

- Equipped with industrial lighting modules
- Multiple inspections in one camera
- Industrial solutions with a complete set of accessories
- Sub-pixel measurements

Examples:

- Cap position and angle measurement
- Fill level inspection
- Precise measurements and verification of tolerances
- Packaging and printing checked in one step
- Type identification by bar code and 2D code tools

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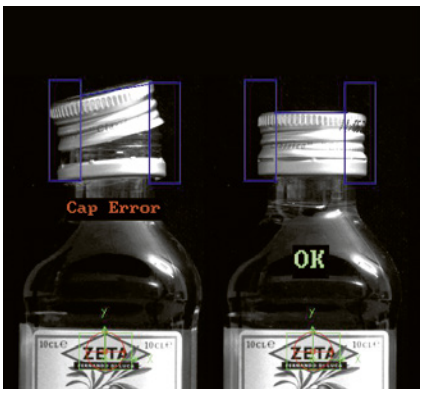
IVC-2D applications

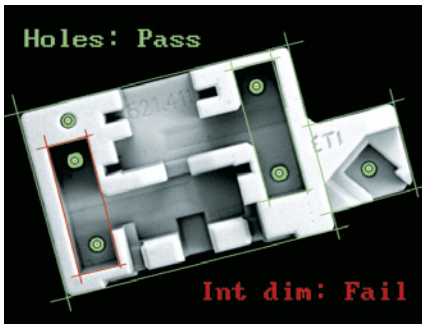
Thanks to the cross-functional toolboxes, the IVC-2D solves a wide range of applications in automotive, electronics assembly, pharmaceutical, food, and other industries.

Blisterpack inspection
Thanks to the ability to have any number of inspection regions, the smart camera is suitable for checking the shape of each pill in a blister pack.

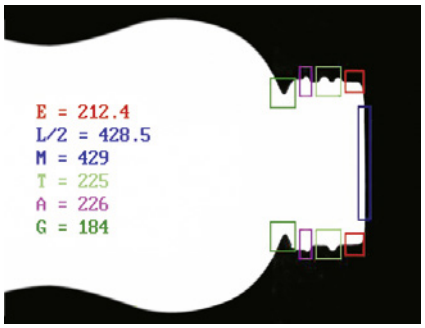
Cap inspection
Advanced pattern matching algorithms enable fast positioning and accurate inspection of printed caps. Both print position and quality are checked at the same time.



Multiple inspections
Flexible software enables multiple features to be inspected simultaneously, in this case cap tilt, fill level and label position.



Dimension control
Calibration and measurement tools allow accurate dimension measurements between edges, holes and other object features.



Precise measurements
Accuracy in the micrometer range can be reached using advanced sub-pixel measurement tools.

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IVC-3D smart cameras

Advanced 3D vision made easy

Industrially proven

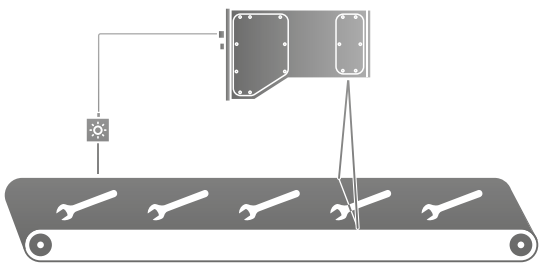
The IVC-3D is an industrially-proven smart camera designed to perform inspection, positioning and measuring of height profiles and 3D images. Applications where object contrast varies, or where height or volume is important can be reliably solved using the powerful and flexible toolbox.

A self-contained 3D camera

The IVC-3D is a self-contained, factory-calibrated smart camera that combines imaging, lighting and analysis into one rugged housing. The IVC-3D captures height differences, making it the preferred solution compared to traditional two-dimensional imaging for measurement or verification of non-flat dimensions and when the object and background have similar or varying colors.

Easy PC configuration and stand-alone operation

The IVC-3D is a smart camera in every aspect: easy configuration thanks to a graphical user interface, well-equipped toolbox and easy connection via I/O, serial and Ethernet interfaces. After programming, the IVC-3D can operate in stand-alone mode or as part of the factory network. The inspection results can be sent directly to the PLC or handling equipment and can be monitored via a web interface.



The IVC-3D scans height profiles into a 3D image as the objects move by on the conveyor.

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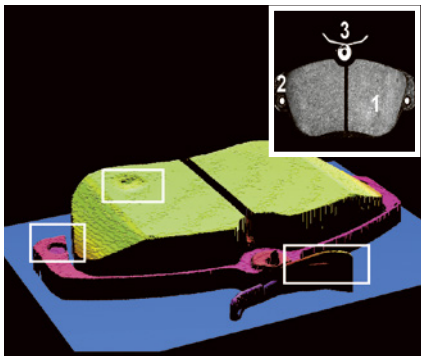
IVC-3D applications

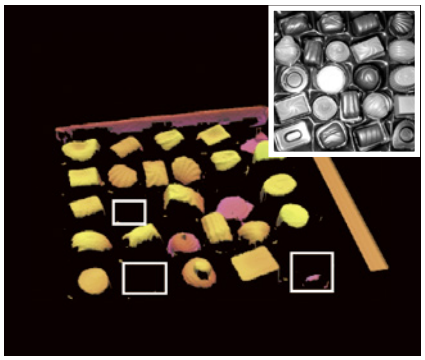
The IVC-3D is used to solve a large number of applications within factory and logistics automation. The smart camera captures and analyzes both 3D images and single height profiles.



True shape inspection
The brake pad application is an example of several inspections being performed at one time:

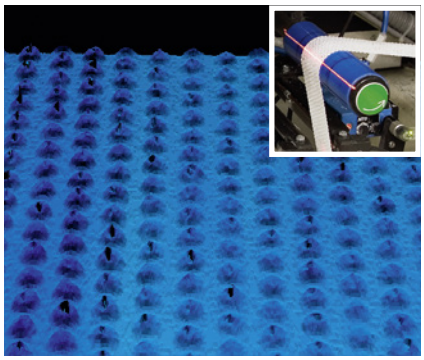
- Surface defects
- Height position of the plug
- Angle of the metallic spring

These features are very difficult to detect using 2D cameras, but with the IVC-3D the application is easy to solve in the graphical IVC Studio interface.



Contrast-independent inspection using 3D
Verifying the content of a box of pralines requires a system that can check dark objects on a dark background. The IVC-3D is superior when there is low contrast. The praline application is an example of:

- Correct 3D shape inspection
- Verification of individual praline position
- Missing praline detection by reliable height measurement



Calibrated 3D at production speeds
The factory-calibrated IVC-3D enables in-line inspection of continuous material flow. Special tools for height profile analysis make the solution accurate and fast. Verification of material position and product quality is done simultaneously with one stand-alone smart camera.

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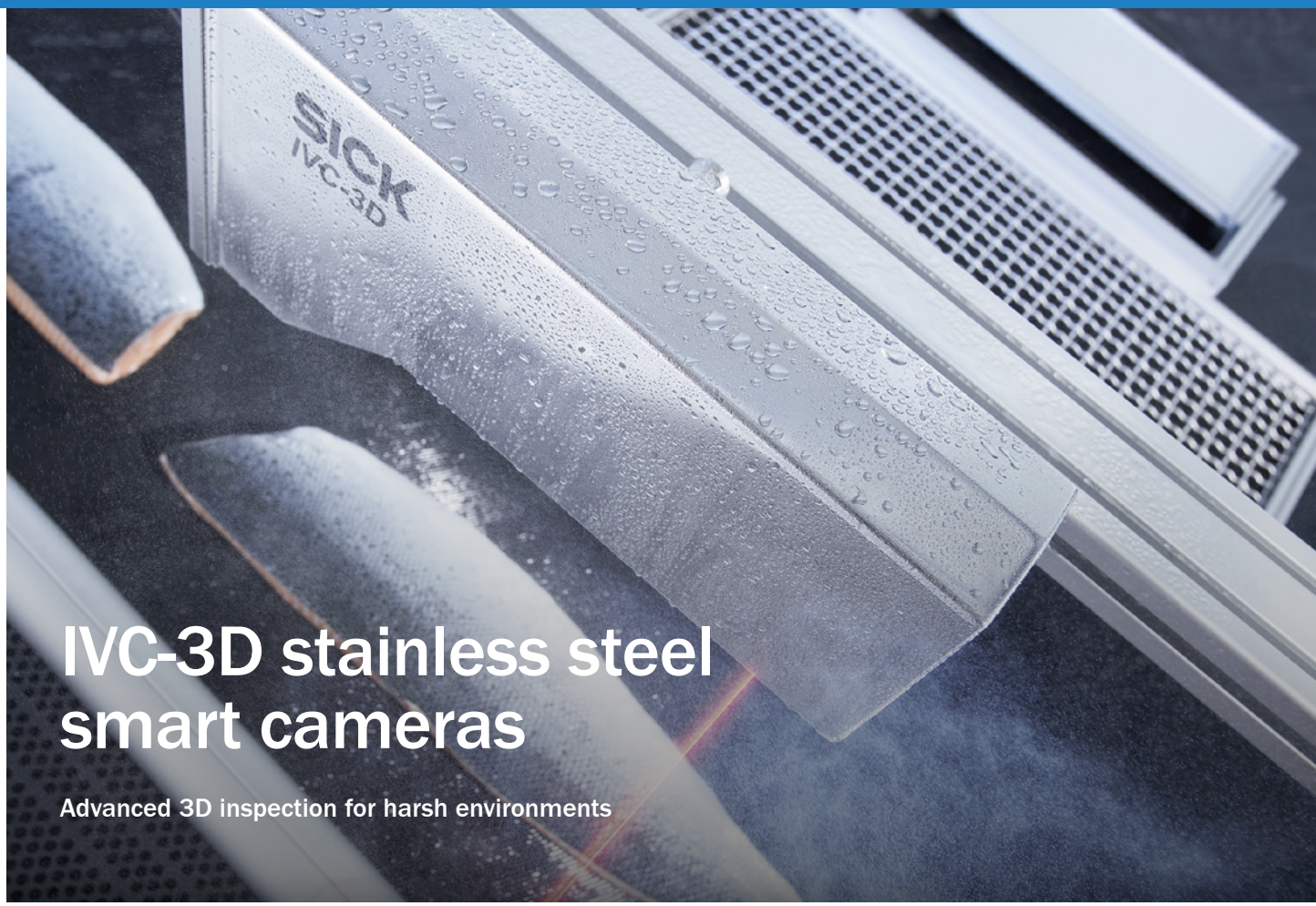

IVC-3D stainless steel smart cameras

Advanced 3D inspection for harsh environments

3D solution for food and beverage industry

The world's most proven 3D smart camera meets the tough challenges of the food and beverage industry. The IVC-3D stainless steel smart camera helps you ensure excellent product quality throughout the production process – even in harsh environments. This smart camera is specially designed for harsh environments and combines imaging, lighting and analysis in a single, rugged stainless steel housing.

Keep your lines up and running

The unique IVC-3D stainless steel smart camera enables your high-speed production processes to run smoothly, ensuring precise shape and volume measurements are obtained with instant response.

Easy to clean

Food grade stainless steel housing and PMMA windows make the IVC-3D stainless steel perfect for a wide range of applications in the pharmaceutical and food and beverage industries. The hygienic, IP 67-rated design is easy to clean. Integration is simple using the hose adaptor and hose accessories to cover the cables. ECOLAB certification ensures resistance to industrially used cleaning agents and disinfectants.

ECOLAB certification

- 28 days reaction time
- 20 °C temperature
- No swelling
- No embrittlement

ECOLAB®

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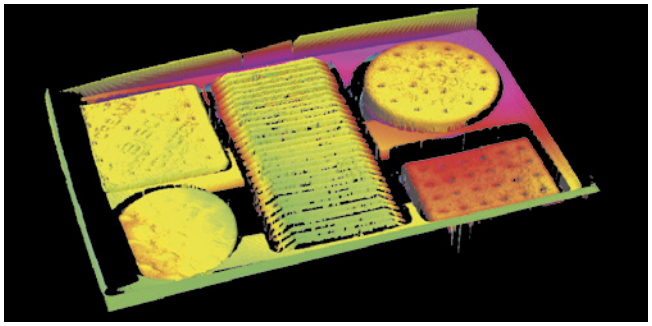
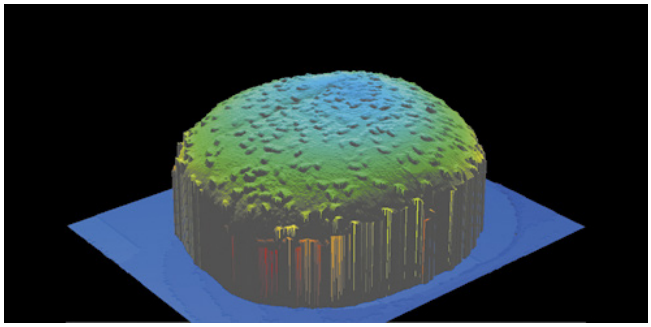
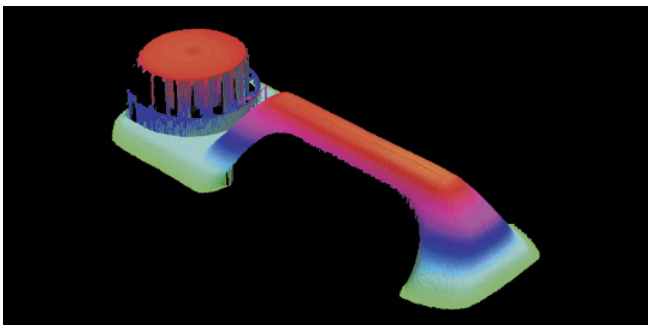
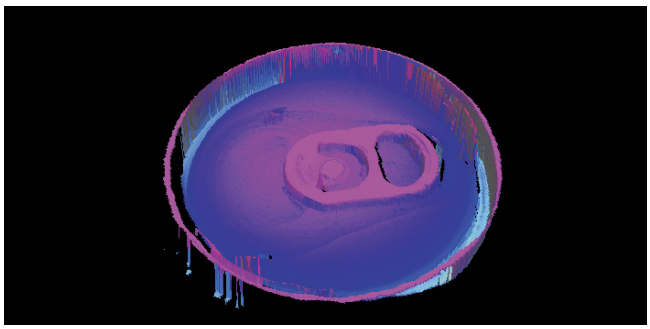
IVC-3D stainless steel applications

The IVC-3D stainless steel is used to solve applications in harsh environments within the food, beverage and pharmaceutical industries.

Rugged solutions for harsh operating conditions

3D imaging is ideal where height, shape and volume are important features in production. The IVC-3D makes high-speed production processes cost-effective and accurate.

High product quality and minimized packaging problems

The IVC-3D stainless steel is suitable for food production processes and easily measures features such as content, shape, volume and portions. With these unique capabilities, the IVC-3D enables manufacturers to optimize production costs and reduce waste.

Quality inspection

The IVC-3D smart camera records the 3D shape at high speed as the baked cakes pass by on the conveyor belt. The camera checks that there are no dents or missing chunks, and that the height, volume, roundness and diameter are correct. Fast detection of production errors enables production control, waste reduction and less downtime.

Reliable verification

The IVC-3D smart camera locates the cap and verifies that it is correctly assembled, independent of cap color. For many package types, the measurements in 3D can be made relative to the rest of the package. This gives a correct result even if the container itself is slightly tilted on the conveyor. The IVC-3D provides ruggedness that is superior to any 2D solution.

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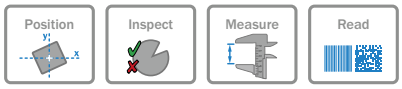
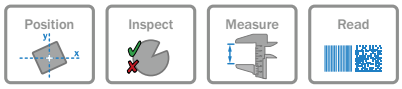
Product family overview

	IVC-2D	IVC-3D
		
	High-performance smart cameras for industrial environments	The world's first 3D smart camera makes advanced vision easy
Technical data overview		
Technology	2D, snapshot, image analysis	3D, LineScan, image analysis
Resolution	640 px x 480 px 1,024 px x 768 px 1,600 px x 1,200 px	–
Maximum performance	30 Hz 24 Hz 10 Hz	5,000 3D profiles/s
Communication interfaces	RS-485, Fast Ethernet (10/100 Mbit/s): TCP/IP, UDP/IP, EtherNet/IP, OPC server included	RS-485, Fast Ethernet (10/100 Mbit/s): TCP/IP, UDP/IP, EtherNet/IP, OPC server included
Configuration software	IVC Studio	IVC Studio
Operator interface	Application specific operator interfaces can be created using ActiveX (COM) or as web page. Included OPC server enables data exchange with e.g. SCADA systems.	Application specific operator interfaces can be created using ActiveX (COM) or as web page. Included OPC server enables data exchange with e.g. SCADA systems.
Offline support	Emulator	Emulator
Enclosure rating	IP 54 (IP 65 with lens protection hood)	IP 65 / IP 67
Housing material	Anodized aluminum	Anodized aluminum / stainless steel
At a glance		
		
	• Suitable for advanced inspections and measurements • Flexible working distance and field of view • Stand-alone operation, no PC needed • IP 65 rating • Easy-to-use interface with more than 110 software tools • Simple interfacing with PLCs, robots and control systems that support EtherNet/IP or OPC • Available in three different resolutions from fast VGA (0.3 MP) to high-resolution UXGA (1.9 MP)	• Easy 3D measurement – provides information about object height, shape and volume • Independent of contrast and color • Easy-to-use graphical user interface for fast application development • Simple connection of PLCs, robots, and other control systems, e.g., via EtherNet/IP or OPC • Scans up to 5,000 profiles per second • Industrial, robust metal housing
Detailed information	→ F-98	→ F-100

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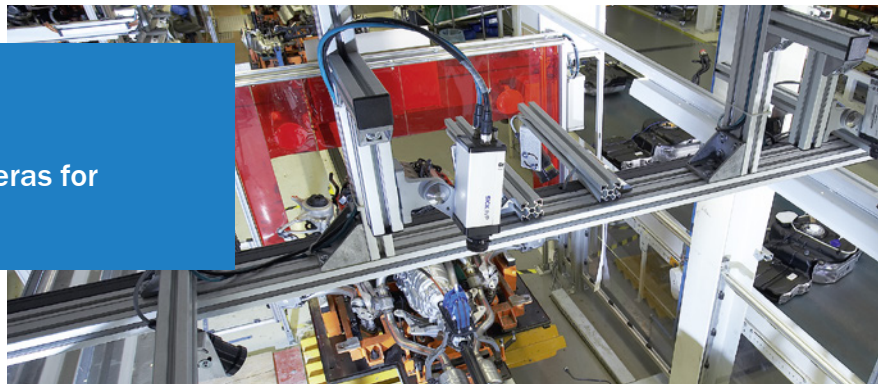
High-performance smart cameras for industrial environments



Product description

The IVC-2D is a high-performance smart camera ideal for a variety of inspection and quality control applications. It combines imaging and analysis into one housing. The IVC-2D offers tools for inspection, robot guidance, measuring and identification. You can perform any combination of advanced inspections and measurements to optimize production quality using only one camera. It is easy to integrate with external devices, such as light and trigger sources, using standard I/Os that are plug and play compatible with SICK sensors and camera accessories. For more complex applications, the camera can also send and receive data over RS-485, Ethernet and EtherNet/IP. The IVC-2D also supports customized operator interfaces using web, COM and an OPC server for easy monitoring. SICK also has a wide range of lighting modules for a complete solution.

At a glance

- Suitable for advanced inspections and measurements
- Flexible working distance and field of view
- Stand-alone operation, no PC needed
- IP 65 rating
- Easy-to-use interface with more than 110 software tools
- Simple interfacing with PLCs, robots and control systems that support EtherNet/IP or OPC
- Available in three different resolutions from fast VGA (0.3 MP) to high-resolution UXGA (1.9 MP)

Your benefits

- The IVC-2D's flexibility ensures optimal setup for individual application needs
- The 1.9 MP resolution enables inspection of fine details with high repeatability
- IP 65 rating makes the system suitable for industrial environments
- Easy-to-use interface ensures fast application development, saving time and reducing costs
- The camera's OPC server and EtherNet/IP interface enable easy integration with PLCs, robots and control systems
- Stand-alone operation reduces installation complexity compared to PC-based vision
- A wide range of camera-controlled lighting makes it easy to create a complete solution

Additional information

→ **www.mysick.com/en/IVC-2D**

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.

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Detailed technical data

Features

Task	Positioning, inspection, measuring, reading
Technology	2D, snapshot, image analysis
Spectral range	Approx. 400 nm ... 750 nm
Offline support	Emulator

Interfaces

Operator interface	Application specific operator interfaces can be created using ActiveX (COM) or as web page. Included OPC server enables data exchange with e.g. SCADA systems.
Configuration software	IVC Studio
Data store and retrieve	Images and data can be stored to and retrieved from flash and external FTP servers
Communication interfaces	RS-485, Fast Ethernet (10/100 Mbit/s): TCP/IP, UDP/IP, EtherNet/IP, OPC server included
Digital inputs	4 program controlled inputs (1 trigger input), HIGH = 10 V ... 28.8 V
Digital outputs	3 B-type program controlled outputs, trigger output, total output load < 100 mA

Mechanics/electronics

Connectors	Ethernet: M12, 4-pin female, D-coded, RS-485: M12, 8-pin female, Power I/O: M12, 8-pin male
Connector material	Nickel plated brass
Supply voltage	24 V DC, ± 20 %
Current consumption	< 400 mA without output load
Enclosure rating	IP 54 (IP 65 with lens protection hood)
Protection class	II, III
Weight	505 g
Dimensions (L x W x H)	161 mm x 60 mm x 55 mm
Optics	C or CS-mount

Ambient data

Ambient operating temperature	0 °C ... +50 °C [1]
Ambient storage temperature	–20 °C ... +70 °C [1]

[1] Rel. humidity: 35 % ... 85 %, 95 % at storage.

Ordering information

Accessories available at www.mysick.com/en/IVC-2D

- **Housing material:** Anodized aluminum

Processor	Memory	Image sensor	Resolution	Maximum performance	Product name	Type	Part no.
150 MHz	64 MB RAM, 16 MB flash	1/3" CCD, electronic shutter	640 px x 480 px	30 Hz	IVC-2D R	IVC-2DR1111	1040057
800 MHz	128 MB RAM, 16 MB flash	1/3" CCD, electronic shutter	640 px x 480 px	30 Hz	IVC-2D Standard	IVC-2DM1111	1027190
					IVC-2D Reader	IVC-2DM1112	1029135
			1,024 px x 768 px	24 Hz	IVC-2D HighRes	IVC-2DM1121	1028407
					IVC-2D HighRes Reader	IVC-2DM1122	1029136
		1/1.8" CCD, electronic shutter	1,600 px x 1,200 px	10 Hz	IVC-2D UXGA	IVC-2DM1131	1054511
					IVC-2D UXGA Reader	IVC-2DM1132	1054512

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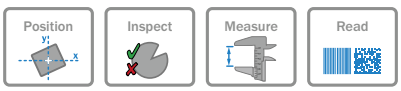
The world's first 3D smart camera makes advanced vision easy



Product description

The IVC-3D smart camera performs inspection, location, and measurement of objects in order to increase throughput, control production and perform quality control. Applications that once required complicated camera and illumination technology can now easily be completed with the world's first 3D smart camera. The factory-calibrated IVC-3D combines imaging, lighting and analysis into one housing. Using laser triangulation, the IVC-3D can see three dimensions. Highlighting surface defects is done during image capture with tools that measure height, volume, and shape independent of contrast and color. As a result, previously difficult measurement tasks are now easily solved. The IVC-3D is easily configured via a PC user interface, and has serial and EtherNet/IP interfaces. The IVC-3D needs no PC after configuration, and can operate stand-alone or as part of the factory network.

At a glance

- Easy 3D measurement – provides information about object height, shape and volume
- Independent of contrast and color
- Easy-to-use graphical user interface for fast application development
- Simple connection of PLCs, robots, and other control systems, e.g., via Ethernet/IP or OPC
- Scans up to 5,000 profiles per second
- Industrial, robust metal housing

Your benefits

- The IVC-3D makes advanced 3D shape inspections easy, enabling cost-efficient solutions
- Contrast-independent measurement provides greater reliability even at varying object color and when the object color is the same as the background
- Factory calibrated – instantly providing true metric dimensions at production speed
- The camera's OPC server and EtherNet/IP interface enables simple communication with PLCs, robots and control systems, making integration easy
- Stand-alone operation – no PC is needed after configuration

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ECOLAB

Additional information

→ **www.mysick.com/en/IVC-3D**

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.

8015547/2013-05-06
Subject to change without notice

Detailed technical data

Features

	IVC-3D 30	IVC-3D 50	IVC-3D 100	IVC-3D 200	IVC-3D 300
Task	Positioning, inspection, measuring, reading				
Technology	3D, LineScan, image analysis				
Working distance					
Anodized aluminum	208 mm ... 239 mm [1]	195 mm ... 279 mm [1]	265 mm ... 404 mm [1]	306 mm ... 683 mm [1]	282 mm ... 1,153 mm [1]
Stainless steel	–	189 mm ... 273 mm [1]	259 mm ... 398 mm [1]	300 mm ... 677 mm [1]	276 mm ... 1,147 mm [1]
Example field of view (H x W)	30 mm x 50 mm	50 mm x 150 mm	100 mm x 200 mm	200 mm x 600 mm	300 mm x 1,000 mm
Width at minimum working distance	53 mm	134 mm	179 mm	436 mm	417 mm
Width at maximum working distance	59 mm	174 mm	255 mm	810 mm	1,297 mm
Maximum height range	31 mm	84 mm	139 mm	377 mm	871 mm
Light source	Visible red light (laser, 658 nm, ± 15 nm)				
Laser class	2M (IEC 60825-1 : 2007)		2M (IEC 60825-1 : 2007) / 3B (IEC 60825-1 : 2007) (depending on type)	2M (IEC 60825-1 : 2007)	
Imaging angle	53°		61°	58°	60.5°
Offline support	Emulator				

[1] The specified values are valid for single device installations. Please see operating instructions for details.

Performance

	IVC-3D 30	IVC-3D 50	IVC-3D 100	IVC-3D 200	IVC-3D 300
Height resolution	0.015 mm	0.04 mm	0.05 mm	0.2 mm	1.2 mm
3D profile resolution	2,048 points				1,400 points

Interfaces

Operator interface	Application specific operator interfaces can be created using ActiveX (COM) or as web page. Included OPC server enables data exchange with e.g. SCADA systems.
Configuration software	IVC Studio
Data store and retrieve	Images and data can be stored to and retrieved from flash and external FTP servers
Communication interfaces	RS-485, Fast Ethernet (10/100 Mbit/s): TCP/IP, UDP/IP, EtherNet/IP, OPC server included
Digital inputs	3 program controlled inputs (1 trigger input), HIGH = 10 V ... 28.8 V
Digital outputs	3 B-type program controlled outputs, Total output load < 100 mA, trigger output
Encoder interface	RS-422
Maximum encoder frequency	2 MHz

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Mechanics/electronics

	IVC-3D 30	IVC-3D 50	IVC-3D 100	IVC-3D 200	IVC-3D 300
Connectors	Ethernet: M12, 4-pin female, D-coded, RS-485: M12, 8-pin female, Power I/O: M12, 8-pin male, Encoder: M12, 5-pin male				
Connector material					
Anodized aluminum	Nickel plated brass				
Stainless steel	–	Stainless steel			
Supply voltage	24 V DC, ± 20 %				
Ripple	< 5 V_{pp}				
Current consumption	< 1 A without output load				
Enclosure rating					
Anodized aluminum	IP 65				
Stainless steel	–	IP 67			
Protection class	II, III				
Weight					
Anodized aluminum	3.2 kg			4 kg	
Stainless steel	–	5.5 kg		6.7 kg	
Dimensions (L x W x H)					
Anodized aluminum	294 mm x 69 mm x 163 mm			387 mm x 69 mm x 163 mm	
Stainless steel	–	311 mm x 103 mm x 187 mm		404 mm x 103 mm x 187 mm	
Optics	Fixed				

Ambient data

Shock load	15 g, 3 x 6 directions
Vibration load	5 g, 58 Hz ... 150 Hz
Ambient operating temperature	0 °C ... +40 °C
Ambient storage temperature	–20 °C ... +70 °C

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Ordering information

Accessories available at www.mysick.com/en/IVC-3D

- **Processor:** 800 MHz
- **Memory:** 128 MB RAM, 16 MB flash
- **Image sensor:** CMOS
- **Maximum performance:** 5,000 3D profiles/s

Sub product family	Housing material	Window material	Product name	Type	Part no.
IVC-3D 30	Anodized aluminum	Safety glass	IVC-3D 30	IVC-3D31111	1041205
		PMMA	IVC-3D 30, plastic windows	IVC-3D31112	1046810
IVC-3D 50	Anodized aluminum	Safety glass	IVC-3D 50	IVC-3D21111	1027538
		PMMA	IVC-3D 50, plastic windows	IVC-3D21112	1041710
	Stainless steel	PMMA	IVC-3D 50, stainless steel	IVC-3D21113	1050157
IVC-3D 100	Anodized aluminum	Safety glass	IVC-3D 100	IVC-3D51111	1043579
		PMMA	IVC-3D 100, plastic windows	IVC-3D51112	1046912
		Safety glass	IVC-3D 100, class IIIb / 3B laser	IVC-3D51121	1046868
	Stainless steel	PMMA	IVC-3D 100, stainless steel	IVC-3D51113	1050158
IVC-3D 200	Anodized aluminum	Safety glass	IVC-3D 200	IVC-3D11111	1027539
		PMMA	IVC-3D 200, plastic windows	IVC-3D11112	1042152
	Stainless steel	PMMA	IVC-3D 200, stainless steel	IVC-3D11113	1048004
IVC-3D 300	Anodized aluminum	Safety glass	IVC-3D 300	IVC-3D41111	1041204
		PMMA	IVC-3D 300, plastic windows	IVC-3D41112	1048269
	Stainless steel	PMMA	IVC-3D 300, stainless steel	IVC-3D41113	1049024

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High-speed 3D for complete vision solutions in tough industrial environments

SICK high-end cameras are the ultimate cameras for the most versatile needs. With their unsurpassed 3D measurement speed combined with high data quality, and flexible MultiScan functionality, they are used in tough industrial environments worldwide. The high-end cameras provide vital object information, such as 3D shape, contrast, color, gloss, and surface defects – all at the same time – creating reliable solutions for demanding applications.

Your benefits

- High-speed and high-resolution measurement allow you to increase production throughput and still ensure product quality
- Get accurate size and position measurements in 3D regardless of an objects' height or color, ensuring reliable solutions
- Unique MultiScan technology lets one camera do the job of many, reducing costs for integration, maintenance, and accessories, creating cost-efficient solutions
- Designed for tough industrial environments to ensure a long and problem-free life time
- A wide product range allows you to optimize the performance and cost of your solutions

High-end cameras

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Ranger

3D and MultiScan technology for advanced industrial applications

Fast and Versatile

With its high speed and flexible configuration possibilities, the Ranger camera is a key vision component in 3D systems worldwide. It can be used to measure object height, shape and volume; to detect shape and contrast defects; or to provide all measurements needed for quality grading.

The Ranger generates 3D data at up to 35,000 profiles per second using laser triangulation and an external laser light source. The complete 3D calculation is done inside the camera and the ready-to-use 3D coordinates are sent directly to a PC. The field-of-view and height resolution are user-configurable by the selection of lens and laser arrangement. With an easy off-line procedure, the Ranger can be calibrated to deliver 3D measurements in millimeters for high-speed production.

The MultiScan technology allows one Ranger to do the job of several other cameras as it can measure a multitude of object features such as 3D, color, intensity, and laser scatter – all at the same time!

Typical applications

- Food portioning and grading
- Electronics assembly verification
- Components inspection
- Robot guidance
- Weld and glue bead inspection
- Tire inspection
- Road and railway inspection
- Board grading in sawmills

3D VISION

8015547/2013-05-06
Subject to change without notice

The Ranger family

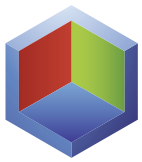
Ranger C
High-speed 3D and MultiScan camera with CameraLink interface. Up to 30,000 profiles/s with 1,536 px resolution in 3D mode. Several 3D algorithms and MultiScan measurements with up to 3,072 px resolution available. Highly configurable via software parameters.

Ranger D
Pure 3D camera with Gigabit Ethernet interface with mid-speed performance of up to 1,000 profiles/s and 1,536 px resolution. Uses a high precision 3D algorithm with few parameters.

Ranger E
High-speed 3D and MultiScan camera with Gigabit Ethernet interface. Up to 35,000 profiles/s with 1,536 px resolution in 3D mode. Several 3D algorithms and MultiScan measurements with up to 3,072 px resolution available. Highly configurable via software parameters.

ColorRanger E
High-speed 3D, Color, and MultiScan camera with Gigabit Ethernet interface. Simultaneous 3D and RGB color measurements at up to 11 kHz. Several 3D algorithms and MultiScan measurements with up to 3,072 px resolution available. Highly configurable via software parameters.

ColorRanger – High-speed 3D and color in one camera



3D & COLOR

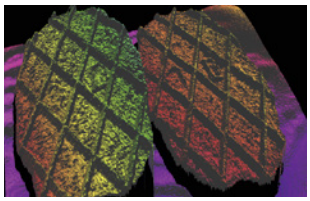
The ColorRanger provides more information about inspected parts than ever before. Knowing not only the 3D shape and the contrast of parts, but also their colors, allows for more reliable decisions and improved production quality. The ColorRanger combines the functionalities of a 3D camera and a LineScan color camera with on-chip white balancing and spatial correction for high-quality color images.

With the ColorRanger, all data needed comes from one single camera, which reduces hardware and integration costs. The ColorRanger is the ideal choice for applications where both 3D shape and color texture matter.

Application examples

Baked goods

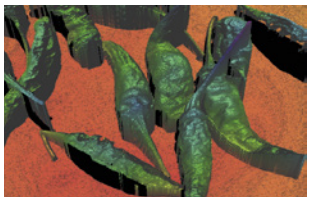
RGB color



3D image

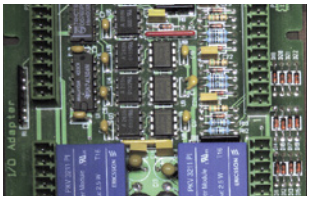
Fruits and vegetables

RGB color

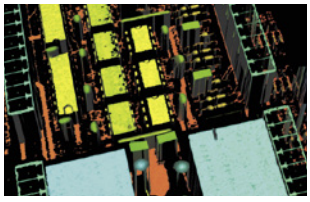


3D image

Electronics



RGB color



3D image

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Ruler

Gigabit 3D inspection for tough environments

Rugged and reliable

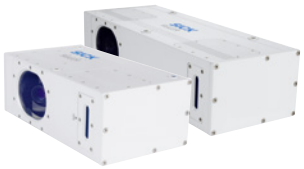
The Ruler camera is a perfect tool for in-line 3D-scanning applications and is used by machine builders and vision integrators in a wide range of industries. It has been designed for the tough environments of wood, steel and automotive and can operate down to a temperature of –30 °C. It provides reliable 3D measurements based on the laser triangulation principle. The Ruler comes with built-in laser and optics and is enclosed in a rugged IP 65 housing, which makes it very easy to install and integrate.

The Ruler is available with different predefined field-of-view and provides an optimal image quality without any adjustments to the lens or laser. It is factory calibrated with 3D data given in metrics (mm) and can, in addition to 3D, simultaneously measure intensity and laser scatter.

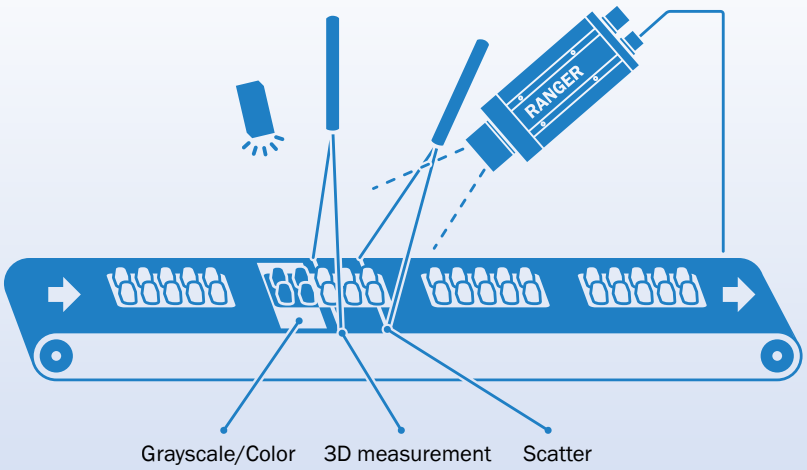
Typical applications

- Food portioning
- Random bin-picking
- Road and railway inspection
- Log sorting in sawmills
- Bulk volume measurement

3D VISION



Ruler E
Rugged camera with built-in laser source for factory calibrated 3D via Gigabit Ethernet interface. Several 3D algorithms, grayscale and laser scatter measurements are available. Up to 10,000 3D profiles/s. 24 V I/O and RS-422 for encoder input.



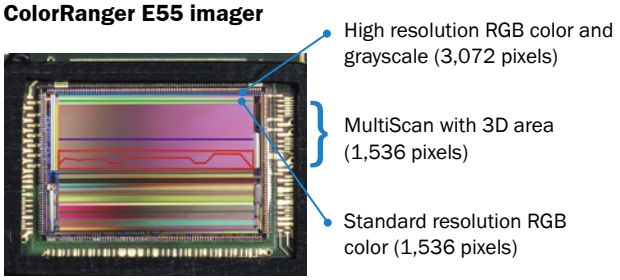
MultiScan – measure it all at once

SICK's MultiScan technology combines the benefits of 2D and 3D imaging in one single camera. It allows for a multitude of simultaneous measurements that can be configured to the exact needs of a certain application. The Ranger MultiScan offers measurements for 3D, RGB color, contrast, and laser scatter. For each component, an external light source with the appropriate light characteristics is needed. The Ruler also has MultiScan capability, but is limited to 3D, intensity and scatter measurements using the built-in laser only.

In the Ranger, the components can be combined in any way, for instance using two 3D components to remedy occlusion. Each component has its own set of parameters (e.g., exposure time, gain, and binning). Due to this, each component can be tuned independently from the others to provide optimal image quality.

A MultiScan configuration is defined in a readable XML-file with the desired measurement components listed. Based on this, the camera configures itself and dedicates one region of the sensor to each of the listed components. The specific data from each component is then provided in a multiple LineScan fashion.

ColorRanger E55 imager

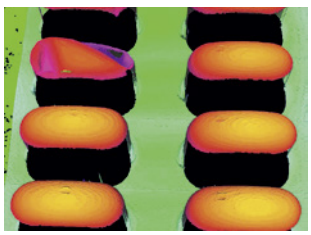


In MultiScan, different parts of the sensor are assigned to different measurement components by software configuration.

Blisterpack inspection using MultiScan technology

Grayscale image
For reading identification codes

Scatter image
For finding empty blisters



3D image
For finding blister shape defects

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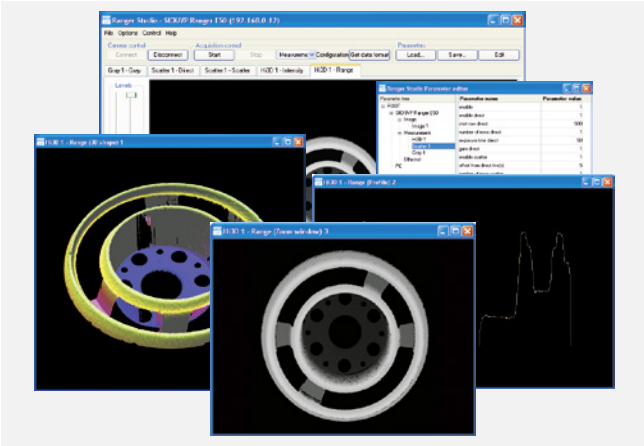
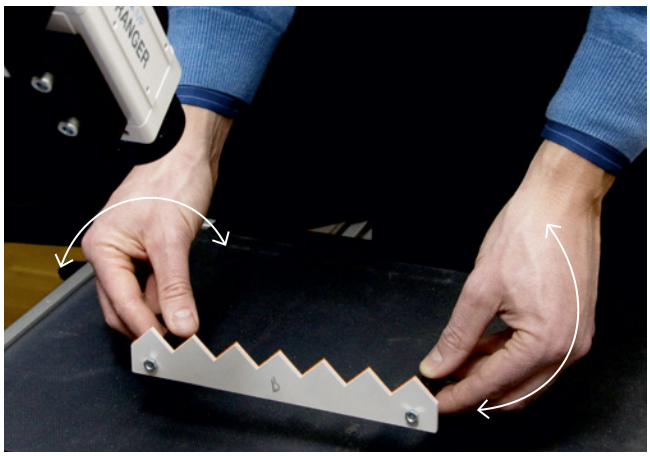
Software



Ranger Studio
The Ranger Studio is a graphical user interface for configuration and evaluation of the Ranger and Ruler. It offers functionality to acquire and visualize 3D and MultiScan data with tools for zooming, profile viewing and interactive 3D rendering. It can be used to adjust camera parameters for best speed and image quality and the settings can be saved to the camera memory or to the file for usage in the final application.



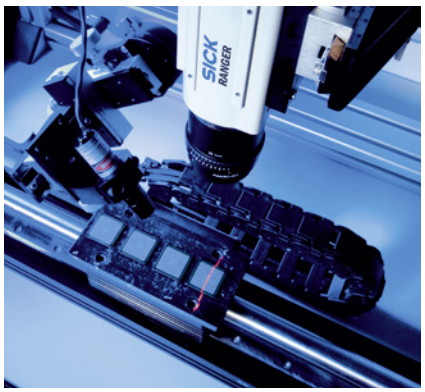
Coordinator
Coordinator is a software tool to calibrate the Ranger in order to get 3D data in a metric coordinate system. It guides the user through the hand-held calibration operation with instant feedback on calibration accuracy. After completion, the result can be stored in the flash memory of the Ranger. The calibration can be performed in a few minutes and compensates both for lens distortion and perspective view.

EASY 3D CALIBRATION

3rd party vision software
The Ranger and Ruler can be used with a wide range of software packages for development of vision applications, for example: HALCON, LabVIEW and Scorpion. These packages offer a direct interface to camera control and data. This often reduces the integration effort since less traditional programming is needed to make a complete solution.

3D Camera SDK
Software integration of Ranger and Ruler into vision applications can be done using the iCon API. This offers functionality to configure and control cameras, setup and access data in frame grabbers, pre-process 3D and MultiScan data, for example in terms of calibration, rectification, and RGB-color registration. The iCon API is included in the 3D Camera SDK, together with the Ranger Studio and user manuals.

Application examples



Shape and size control in 3D
3D data from the Ranger and Ruler is used to measure the size and shape of objects in a wide range of applications from large-scale applications down to detecting the finest details in the **Electronics industry**. The Ranger, for example, is used for component inspection to verify that each ball of the BGA is correct with micrometer precision.

Quality grading using MultiScan
In grading applications, it is very common that both shape and surface properties, such as contrast, gloss, scatter and color, need to be evaluated. In the **Wood industry**, the Ranger and Ruler are used for grading of boards and logs where they provide all measurements needed for both the dimension control and the detection of defects such as knots, cracks, and pitch pockets.

Object location in 3D
Finding the exact position of objects in a world coordinate system requires a 3D measurement system. Such information is essential for picking and guidance applications in the **Robotics industry**. The Ranger and Ruler are used for robot guidance and random bin-picking to get the picking coordinates in industries such as **Automotive** and **Logistics warehouses**.

Contrast-independent inspection
In applications with low contrast, such as on black rubber, or with a lot of contrast variation, the nearly contrast-independent 3D data from the Ranger and Ruler can simplify the image analysis dramatically. In the **Tire and Rubber industry**, the cameras are used for reliable detection of surface errors and verification of relief identification code on tires.

Volume and dimensioning
To optimize production lines to reduce waste and giveaway, the dimensions or the volume of the object need to be measured and controlled very precisely. Calibrated 3D measurements from the Ranger and Ruler are used in the **Food industry** for exact portioning of food such as meat and fish.

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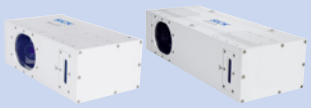
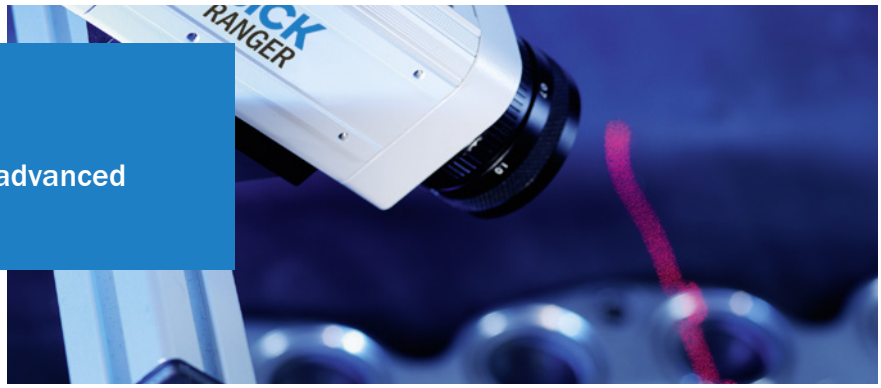
Product family overview

	Ranger	Ruler
		
	Fastest 3D and MultiScan for advanced industrial solutions	Gigabit 3D vision for tough environments
Technical data overview		
Maximum performance	1,000 3D profiles/s 30,000 3D profiles/s 35,000 3D profiles/s	10,000 3D profiles/s
Grayscale measurements	✔ / –	✔
Color measurements	Red / green / blue / monochrome (without IR content) / near infrared (approx. 750 nm ... 950 nm)	–
Scatter measurement	✔ / –	✔ / –
Light source	–	Visible red light (Laser, 660 nm, ± 15 nm)
Factory calibrated	–	✔
Enclosure rating	IP 20	IP 65
Operating system	Windows 7, Windows XP Pro	Windows 7, Windows XP Pro
At a glance		
		
	• High speed 3D at unmatched speed and quality • MultiScan technology to measure 3D, contrast, color and scatter at the same time • Sensor resolutions of up to 1,536 pixels in 3D and 3,072 pixels in gray scale and color • Full flexibility in configuration, working distance, and field of view • In-machine 3D calibration tool • Gigabit Ethernet and CameraLink interfaces	• Factory calibrated 3D in millimeters at full production speed • High accuracy 3D for measurement widths from 100 mm up to 1.5 m • Capture 3D, gray scale, and scatter at the same time • Easy to integrate without need for external lights • Rugged housing for tough environments and operation down to –30 °C • Remote operation over long cable distances with Gigabit Ethernet
Detailed information	➜ G-114	➜ G-118

Fastest 3D and MultiScan for advanced industrial solutions



Product description

Ranger offers full flexibility and can be configured for the most versatile needs. With its unsurpassed 3D measurement speed combined with high data quality, and flexible MultiScan functionality, it serves as a key vision component in inspection systems worldwide. Ranger extracts the true 3D shape of an object, regardless of its contrast or color. It is used to measure object height and volume, to detect shape defects, and for quality grading and size sorting. With its unique MultiScan tool, a multitude of object features, such as contrast, gloss, and scatter can be measured at the same time. This enables reliable inspection results and more cost-efficient solutions since it only takes one Ranger to perform it all!

At a glance

- High speed 3D at unmatched speed and quality
- MultiScan technology to measure 3D, contrast, color and scatter at the same time
- Sensor resolutions of up to 1,536 pixels in 3D and 3,072 pixels in gray scale and color
- Full flexibility in configuration, working distance, and field-of-view
- In-machine 3D calibration tool
- Gigabit Ethernet and CameraLink interfaces

Your benefits

- High-speed and high-resolution measurement allow you to increase production throughput and still ensure product quality
- Get accurate size and position measurements in 3D regardless of an objects' height or color, ensuring reliable solutions
- Fully flexible field-of-view in combination with in-machine 3D calibration, provides dimensions in millimeters
- Unique MultiScan technology lets one camera do the job of many, reducing costs for integration, maintenance, and accessories, creating cost-efficient solutions
- The high level of flexibility and versatility of Ranger makes it an ideal choice for the most challenging tasks

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Additional information

→ **www.mysick.com/en/Ranger**

For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.

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Detailed technical data

Features

	Ranger C	Ranger D	Ranger E	ColorRanger E
Task	Positioning, inspection, measuring			
Technology	3D, LineScan, MultiScan	3D, LineScan	3D, LineScan, MultiScan	3D, LineScan, MultiScan, Color
Example field of view	Free of choice by lens selection			
Data synchronization	Free running, encoder triggered, external enable			
Grayscale measurements	✔	–	✔	
Scatter measurement	✔	–	✔	
Color measurements				
No IR pass filter	–			Red, green, blue, monochrome (without IR content)
IR pass filter	–			Red, green, blue, monochrome (without IR content), near infrared (approx. 750 nm ... 950 nm)
Spectral range	400 nm ... 950 nm			

Performance

	Ranger C	Ranger D	Ranger E	ColorRanger E
Bit depth	8 bit			
Image sensor	CMOS			
Maximum performance	30,000 3D profiles/s	1,000 3D profiles/s	35,000 3D profiles/s	
Maximum color performance	–			13,000 RGB lines/s
Maximum 3D and color rate	–			11,000 scans/s
Maximum Hi-Res color rate	–			10,000 RGB lines/s
Sensor rows available for 3D				
No IR pass filter	0 ... 511			35 ... 511
IR pass filter	100 ... 511	–	100 ... 511	
Sensor resolution	512 px x 512 px / 1,536 px x 512 px (depending on type)			
3D profile resolution	512 px / 1,536 px (depending on type)			
Scatter resolution	512 px / 1,536 px (depending on type)	–	512 px / 1,536 px (depending on type)	
Standard color resolution	–			3 x 512 px / 3 x 1.536 px (depending on type)
Pixel size	9.5 µm x 9.5 µm			
Standard color row pitch	–			38 µm
Pixel matrix fill factor	60 %			
Maximum 3D height resolution	13 bits 1/16 pixel			
Optical center (row, column)				
C-Mount, 1/2"	(227, 256)			
C-Mount, 1"	(227, 768)			
Gray line resolution	512 px / 1,536 px (depending on type)			

	Ranger C	Ranger D	Ranger E	ColorRanger E
IR filter	No IR pass filter / IR pass filter [1] (depending on type)	No IR pass filter	No IR pass filter / IR pass filter [1] (depending on type)	
Hi-Res Gray resolution	3,072 px / – (depending on type)	–	3,072 px / – (depending on type)	
Hi-Res pixel size (H x V)	4.75 µm x 9.5 µm	–	4.75 µm x 9.5 µm	
Hi-Res pixel fill factor	80 %	–	80 %	
Hi-Res color resolution	–			3 x 3,072 px / – (depending on type)
Color Hi-Res pixel size (H x V)	–			4.75 µm x 20 µm
Color Hi-Res row pitch	–			42 µm

[1] Pass filter, cutoff at 740 nm; on rows 100-511.

Interfaces

	Ranger C	Ranger D	Ranger E	ColorRanger E
Configuration software	Ranger Studio			
Communication interface	CameraLink	Gigabit Ethernet		
Operating system	Windows XP Pro	Windows 7, Windows XP Pro		
Development environment	C++ (VS 2005/2008/2010) or C			
Programming interface	iCon API			
Digital inputs	5 x TTL	4 x HIGH = 10 V ... 28.8 V		
Digital outputs	1 x TTL	1 x TTL level, 2 x B-type, < 100 mA in total		
Encoder interface	5 V TTL	RS-422		
Maximum encoder frequency	2 MHz			
Control of external illumination	5 V TTL			

Mechanics/electronics

	Ranger C	Ranger D	Ranger E	ColorRanger E
Connectors	Power I/O: Lemo 14-pin female, Camera-Link: Mini D Ribbon (MDR, 26 pin), female	Power I/O: M12, 8 pin male, Encoder: M12, 8 pin female, Ethernet: RJ45		
Connector material	–	M12: nickel-plated brass		
Supply voltage	12 V DC ... 24 V DC	24 V DC, ± 20 %		
Ripple	< 5 V_{pp}			
Power consumption	8 W	7 W		
Current consumption	1.25 A	0.8 A		
Standards (ROHS)	–	✔		
Enclosure rating	IP 20			
Housing material	Aluminum			
Housing color	Gray, varnished			
Weight	390 g	360 g		
Dimensions (L x W x H)	109 mm x 50 mm x 50 mm	125 mm x 52 mm x 52 mm		
Optics	C-Mount, 1/2" / C-Mount, 1" (depending on type)			

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Ambient data

	Ranger C	Ranger D	Ranger E	ColorRanger E
Shock load	15 g, 3 x 6 directions			
Vibration load	5 g, 58 Hz ... 150 Hz			
Ambient operating temperature	+5 °C ... +50 °C [1) 2)]	0 °C ... +45 °C [1)]		
Ambient storage temperature	–20 °C ... +70 °C [1)]			

[1)] Non-condensing.

[2)] Camera housing temperature.

Ordering information

Accessories available at www.mysick.com/en/Ranger

Sub product family	Maximum perfor-mance	MultiScan Technology	Sensor resolution	Scatter measure-ment	Hi-Res Gray resolu-tion	IR filter	Product name	Type	Part no.
Ranger C	30,000 3D profiles/s	✔	512 px x 512 px	✔	–	No IR pass filter	Ranger C40	Ranger-C40412	1014218
			1,536 px x 512 px		–	No IR pass filter	Ranger C50	Ranger-C50412	1014216
						IR pass filter	Ranger C50 IR	Ranger-C50422	1014223
					3,072 px	No IR pass filter	Ranger C55	Ranger-C55412	1014217
						IR pass filter	Ranger C55 IR	Ranger-C55422	1014224
Ranger D	1,000 3D profiles/s	–	512 px x 512 px	–	–	No IR pass filter	Ranger D40	Ranger-D40213	1040383
			1,536 px x 512 px	–	–	No IR pass filter	Ranger D50	Ranger-D50213	1040384
Ranger E	35,000 3D profiles/s	✔	512 px x 512 px	✔	–	No IR pass filter	Ranger E40	Ranger-E40414	1040378
			1,536 px x 512 px		–	No IR pass filter	Ranger E50	Ranger-E50414	1040379
						IR pass filter	Ranger E50 IR	Ranger-E50424	1040381
					3,072 px	No IR pass filter	Ranger E55	Ranger-E55414	1040380
						IR pass filter	Ranger E55 IR	Ranger-E55424	1040382
ColorRanger E	35,000 3D profiles/s	✔	512 px x 512 px	✔	–	No IR pass filter	ColorRanger E40	Ranger-E40434	1050266
			1,536 px x 512 px		–	No IR pass filter	ColorRanger E50	Ranger-E50434	1050267
						IR pass filter	ColorRanger E50 IR	Ranger-E50444	1050269
					3,072 px	No IR pass filter	ColorRanger E55	Ranger-E55434	1050268
						IR pass filter	ColorRanger E55 IR	Ranger-E55444	1050270

Gigabit 3D vision for tough environments

Product description

Ruler E is a perfect tool for in-line 3D-scanning applications. It is designed for tough environments, such as the wood and mining industries and will provide accurate 3D measurements even if the temperature drops down to –30 °C. The Gigabit Ethernet interface makes it suitable for remote operation over long cable distances. With its built-in light source and factory calibrated 3D data, it instantly provides true millimeter measurements, which makes integration easier. In addition to high-speed 3D measurements, the Ruler E also provides gray scale intensity and laser scatter measurements that reveal more about objects, which allows for more reliable decisions. With a choice of analysis tools, PC performance, and combining data from several Rulers, you can adapt the solution cost and performance to your specific needs.

At a glance

- Factory calibrated 3D in millimeters at full production speed
- High accuracy 3D for measurement widths from 100 mm up to 1.5 m
- Capture 3D, gray scale, and scatter at the same time
- Easy to integrate without need for external lights
- Robust housing for tough environments and operation down to –30 °C
- Remote operation over long cable distances with Gigabit Ethernet

Your benefits

- High-speed measurement allows you to increase production throughput and still ensure product quality
- Accurate size and position measurement in 3D, regardless of an object's height or color, creating reliable solutions
- Simultaneously capturing 3D, scatter, and gray scale, allows for more reliable quality control and inspection
- Factory calibrated 3D with built-in lighting instantly provides results in millimeters, which makes integration easy
- Designed for tough industrial environments to ensure a long and problem-free life time

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Additional information

→ **www.mysick.com/en/Ruler**
For more information, just enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.

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Detailed technical data

Features

	Ruler E150	Ruler E600	Ruler E1200
Task	Positioning, inspection, measuring		
Technology	3D, LineScan		
Example field of view	50 mm x 150 mm	250 mm x 600 mm	250 mm x 1,200 mm
Field of view width	140 mm ... 185 mm	450 mm ... 820 mm	500 mm ... 1,550 mm
Working distance	160 mm ... 248 mm	415 mm ... 865 mm	280 mm ... 1,280 mm
Maximum height range	88 mm	450 mm	1,000 mm
Data synchronization	Free running, encoder triggered, external enable		
Grayscale measurements	✔		
Scatter measurement	–	– / ✔ (depending on type)	
Spectral range	Approx. 630 nm ... 690 nm		
Heating element	Without heating	Without heating / with heating (depending on type)	
Light source	Visible red light (Laser, 660 nm, ± 15 nm)		
Laser class	2M (IEC 60825-1 : 2008-01)	2M (IEC 60825-1 : 2008-01) 3B (IEC 60825-1 : 2008-01) (depending on type)	
Factory calibrated	✔		

Performance

	Ruler E150	Ruler E600	Ruler E1200
Image sensor	CMOS		
Maximum performance	10,000 3D profiles/s		
Typical height resolution	0.05 mm	0.2 mm	0.4 mm
Sensor resolution	1,536 px x 512 px		1,024 px x 512 px
3D profile resolution	1,536 px		1,024 px
Scatter resolution	–	1,536 px	1,024 px
Gray line resolution	1,536 px		1,024 px

Interfaces

Configuration software	Ranger Studio
Communication interface	Gigabit Ethernet
Operating system	Windows 7, Windows XP Pro
Development environment	C++ (VS 2005/2008/2010) or C
Programming interface	iCon API
Digital inputs	3 x HIGH = 10 V ... 28.8 V
Digital outputs	2 x B-type, < 100 mA in total
Encoder interface	RS-422
Maximum encoder frequency	2 MHz

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Mechanics/electronics

	Ruler E150	Ruler E600	Ruler E1200
Connectors			
Without heating	Ethernet connector: Harting Push Pull, Power I/O: M12, 8-pin male, Encoder: female connector M12, 8-pin		
With heating	–	Ethernet connector: Harting Push Pull, Power I/O: M12, 8-pin male, Encoder: female connector M12, 8-pin, Heating: M12, 4-pin male	
Connector material	M12: nickel-plated brass, Ethernet: thermoplast/anodized aluminum		
Supply voltage	24 V DC, ± 20 %		
Ripple	< 5 V_{pp}		
Power consumption	7 W		
Current consumption	< 1 A		
Enclosure rating	IP 65		
Housing material	Aluminum		
Housing color	Gray, varnished		
Window material	AR-coated, float glass		
Weight	5.1 kg	7 kg	
Dimensions (L x W x H)	295 mm x 107 mm x 163 mm	420 mm x 107 mm x 163 mm	

Ambient data

	Ruler E150	Ruler E600	Ruler E1200
Shock load	15 g, 3 x 6 directions		
Vibration load	5 g, 58 Hz ... 150 Hz		
Ambient operating temperature	0 °C ... +40 °C [1]	–30 °C ... +40 °C [1] (depending on type)	
Ambient storage temperature	–30 °C ... +70 °C [1]		

[1] Non-condensing.

Ordering information

Accessories available at www.mysick.com/en/Ruler

- **Maximum performance:** 10,000 3D profiles/second

Sub product family	Sensor resolution	Laser class	Heating element	Scatter measurement	Product name	Type	Part no.
Ruler E150	1,536 px x 512 px	2M	Without heating	–	Ruler E150	Ruler-E4111	1044434
Ruler E600	1,536 px x 512 px	2M	Without heating	–	Ruler E600	Ruler-E2111	1029237
				✔	Ruler E600 S	Ruler-E2112	1029238
		3B	Without heating	–	Ruler E600 B	Ruler-E2121	1028042
				✔	Ruler E600 SB	Ruler-E2122	1029239
			With heating	–	Ruler E600 HB	Ruler-E2221	1050303
Ruler E1200	1,024 px x 512 px	2M	Without heating	–	Ruler E1200	Ruler-E1111	1028041
				✔	Ruler E1200 S	Ruler-E1112	1029230
		3B	Without heating	–	Ruler E1200 B	Ruler-E1121	1029233
				✔	Ruler E1200 SB	Ruler-E1122	1029234
		2M	With heating	–	Ruler E1200 H	Ruler-E1211	1029231
				✔	Ruler E1200 SH	Ruler-E1212	1029232
		3B	With heating	–	Ruler E1200 HB	Ruler-E1221	1029235
				✔	Ruler E1200 SHB	Ruler-E1222	1029236

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Notes

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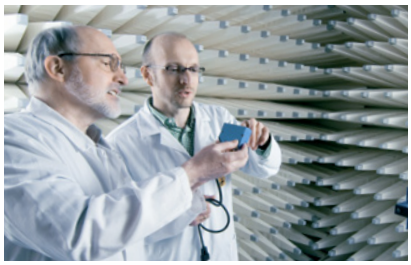
SICK at a glance



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