

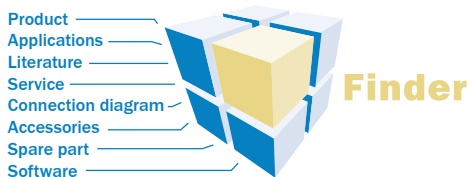


## Vision

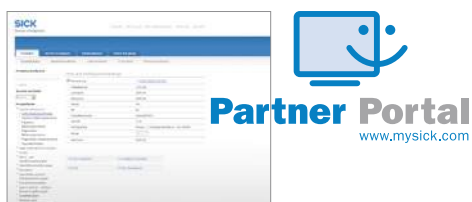
Vision sensors  
Smart cameras  
High-end cameras

## www.mysick.com – select and order online

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



**Efficiency – with the e-commerce tools from SICK**



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

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

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

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

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

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

## Navigation in the PDF document – Links to online ordering system

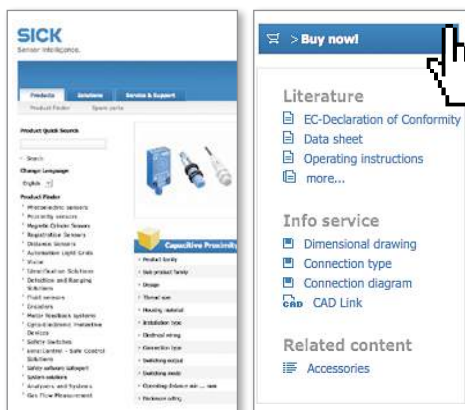
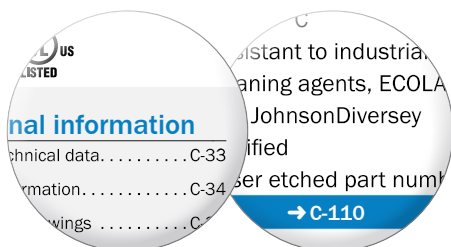
**By bookmarks and tables of contents**






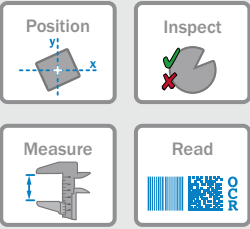

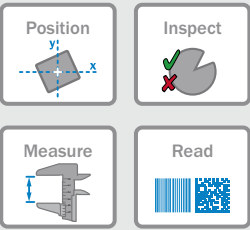

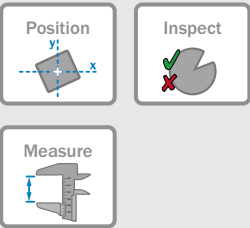

**By links, QR codes and part numbers**



**By page references**





	<p><b>General information</b> About SICK</p>	<p><b>A</b></p>
	<p><b>Vision technologies</b></p>	<p><b>B</b></p>
	<p><b>Typical applications</b></p>	<p><b>C</b></p>
	<p><b>SICK as a vision systems provider</b></p>	<p><b>D</b></p>
	<p><b>Vision sensors</b> Inspector, LECTOR®62x, LECTOR®65x, CVS2</p> 	<p><b>E</b></p>
	<p><b>Smart cameras</b> IVC-2D, IVC-3D</p> 	<p><b>F</b></p>
	<p><b>High-end cameras</b> Ranger, Ruler</p> 	<p><b>G</b></p>

## 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



C

## Typical applications

Recommended products for selected applications . . . . . C-24

### Automotive

#### Inspection | Positioning

Inline quality control during automotive final assembly. . . . . C-25

#### Reading

Identification of Data Matrix codes on circuit boards . . C-26

Identification of dot peened Data Matrix codes on engine blocks . . . . . C-27

#### Inspection | Measuring | Positioning

Checking brake pads using 3D vision . . . . . C-28

### Beverage

#### Inspection | Measuring | Positioning

Lid integrity inspection . . . . . C-29

### Electronics and solar

#### Inspection | Positioning

Solar wafer alignment and damage detection. . . . . C-30

#### Inspection

Inspection of press-fit assembled circuit boards . . . . C-31

#### Reading

Identification of Data Matrix codes on circuit boards . . C-26

### Food

#### Inspection | Measuring | Positioning

Bun inspection and robot picking . . . . . C-32

#### Inspection

Color and 3D quality inspection of food . . . . . C-33

### Pharma and cosmetics

#### Reading

Reading of Data Matrix codes on folded boxes for pharmaceutical preparations. . . . . C-34

### Traffic

#### Inspection | Measuring

3D vision for cost-efficient maintenance of rail networks. . . . . C-35

## Recommended products for selected applications

	Inspector	LECTOR®62x	IVC-2D	IVC-3D	Ranger	Ruler
<b>Automotive</b>						
<b>Inspection    Positioning</b> Inline quality control during automotive final assembly	■		■			
<b>Inspection    Measuring    Positioning</b> Checking brake pads using 3D vision				■	■	■
<b>Reading</b> Identification of Data Matrix codes on circuit boards		■	■			
<b>Reading</b> Identification of dot peened Data Matrix codes on engine blocks		■	■			
<b>Beverages</b>						
<b>Inspection    Measuring    Positioning</b> Lid integrity inspection				■		
<b>Electronics and solar</b>						
<b>Reading</b> Identification of Data Matrix codes on circuit boards		■	■			
<b>Inspection    Positioning</b> Solar wafer alignment and damage detection	■					
<b>Inspection</b> Inspection of press-fit assembled circuit boards					■	
<b>Food</b>						
<b>Inspection    Measuring    Positioning</b> Bun inspection and robot picking	■			■	■	■
<b>Inspection</b> Color and 3D quality inspection of food					■	
<b>Pharma and cosmetics</b>						
<b>Reading</b> Reading of Data Matrix codes on folded boxes for pharmaceutical preparations		■	■			
<b>Traffic</b>						
<b>Inspection    Measuring</b> 3D vision for cost-efficient maintenance of rail networks					■	■
<b>From page</b>	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](http://www.mysick.com/applications)

## 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.

sors 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.

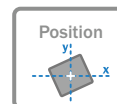
### Implementation

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

- For up-to-date application solutions, visit SICK's web site  
→ [www.mysick.com/applications](http://www.mysick.com/applications)
- The “Applications Finder” will lead you to further solutions that use SICK products

### Other applications

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

C

### Recommended products

Inspector .....	E-46
IVC-2D .....	F-98



Applications  Finder

- For up-to-date application solutions, visit SICK's web site  
→ [www.mysick.com/applications](http://www.mysick.com/applications)
- The "Applications Finder" will lead you to further solutions that use SICK products

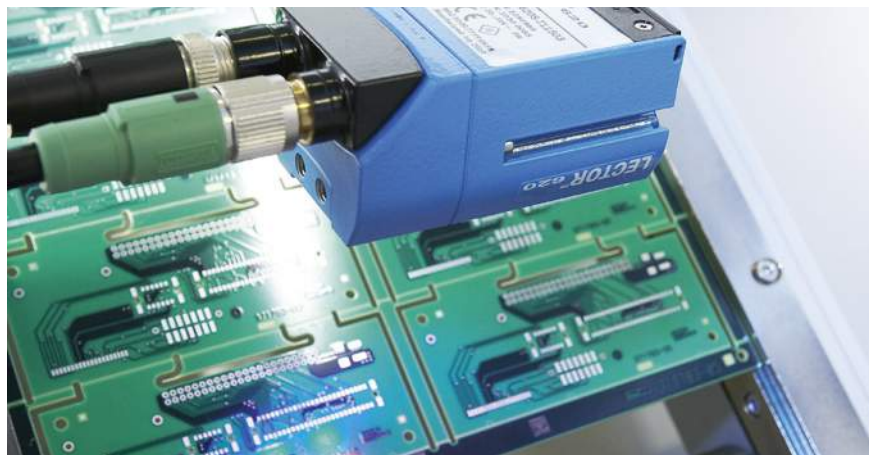
Other applications

- 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 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

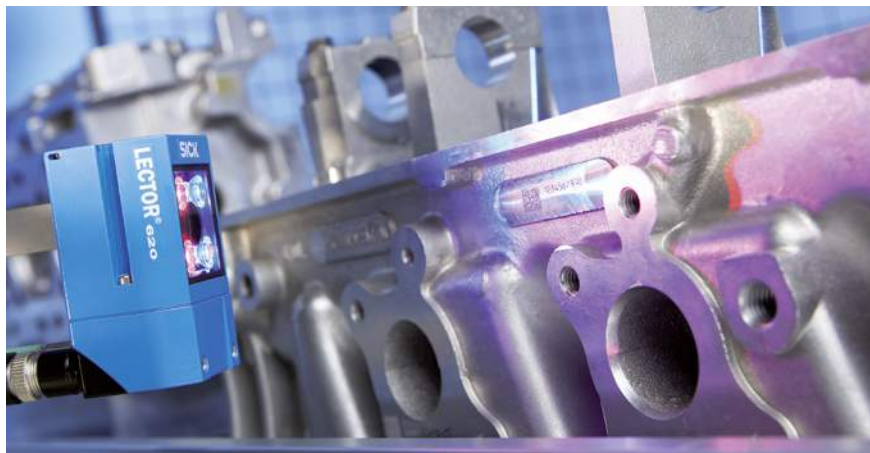
product suitable for all kinds of PCBs, including ceramic and aluminum boards. The codes can be positioned anywhere on the board as long as they pass through the readers field of view. In instances when inspection or positioning is needed in addition to code reading, the programmable IVC-2D smart camera, 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

C

## 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 sus-

pension, 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



### Applications Finder

- For up-to-date application solutions, visit SICK's web site  
→ [www.mysick.com/applications](http://www.mysick.com/applications)
- The "Applications Finder" will lead you to further solutions that use SICK products

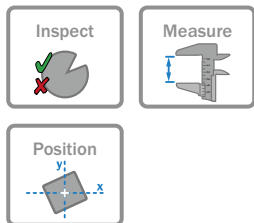
### Other applications

- 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



Applications  Finder

- For up-to-date application solutions, visit SICK's web site  
→ [www.mysick.com/applications](http://www.mysick.com/applications)
- The "Applications Finder" will lead you to further solutions that use SICK products

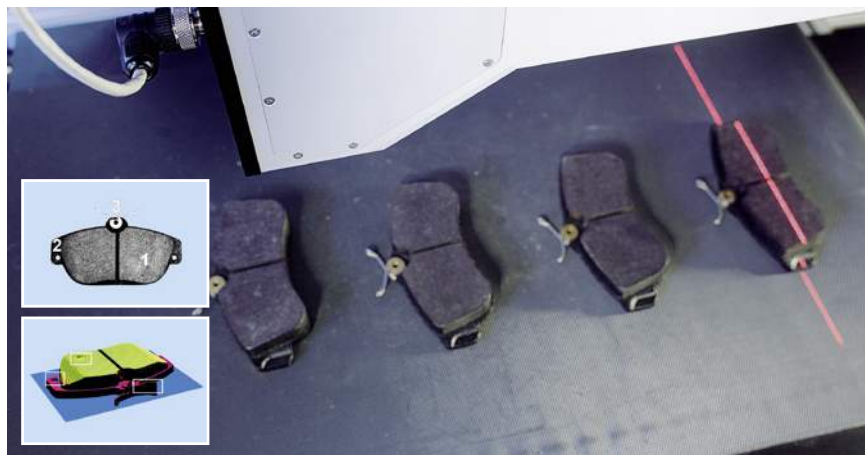
Other applications

- 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

IVC-3D .....	F-100
Ranger .....	G-114
Ruler.....	G-118

## 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 impor-

tant 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

C

## 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.

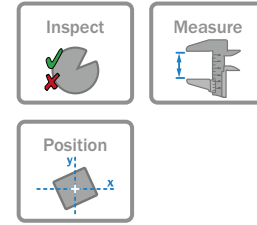
### Implementation

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



### Applications Finder

- For up-to-date application solutions, visit SICK's web site  
→ [www.mysick.com/applications](http://www.mysick.com/applications)
- The "Applications Finder" will lead you to further solutions that use SICK products

### Other applications

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

C

### Recommended products

IVC-3D .....F-100



**Applications  Finder**

- For up-to-date application solutions, visit SICK's web site  
→ [www.mysick.com/applications](http://www.mysick.com/applications)
- The "Applications Finder" will lead you to further solutions that use SICK products

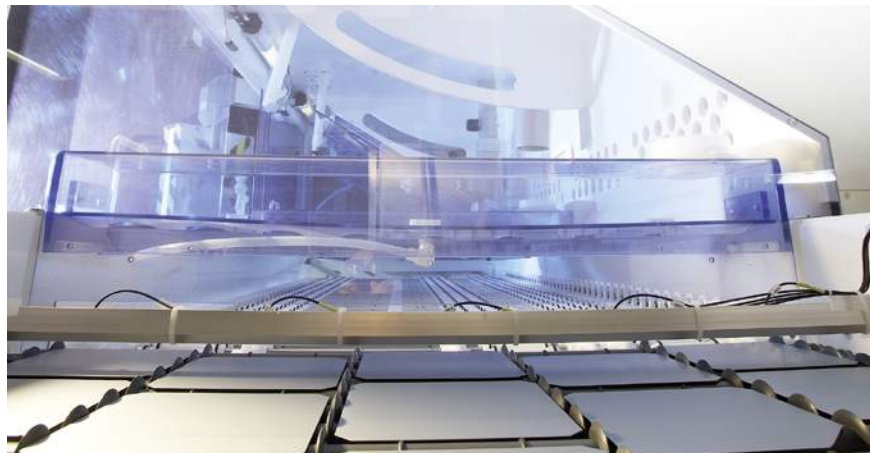
**Other applications**

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

**Recommended products**

Inspector .....E-46

**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

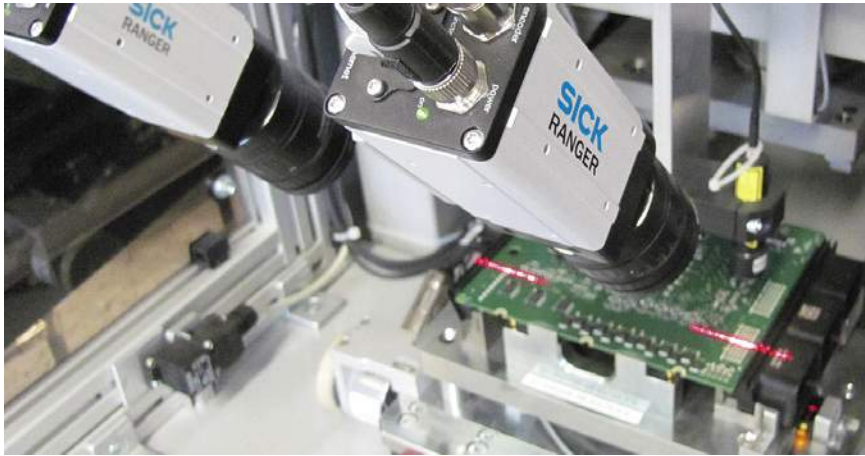
flexible connectivity concept ensures that data can be reported to a wide range of control systems. All this ensures a quick and easy installation.

**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

C

## 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
- Scalable solution – the system can be scaled in performance and cost by a wide range of Ranger models



### Applications Finder

- For up-to-date application solutions, visit SICK's web site  
→ [www.mysick.com/applications](http://www.mysick.com/applications)
- The "Applications Finder" will lead you to further solutions that use SICK products

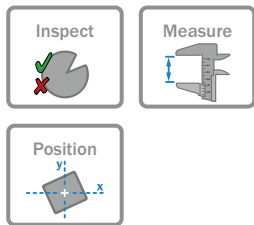
### Other applications

- 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

C

### Recommended products

Ranger ..... G-114



Applications  Finder

- For up-to-date application solutions, visit SICK's web site  
→ [www.mysick.com/applications](http://www.mysick.com/applications)
- The "Applications Finder" will lead you to further solutions that use SICK products

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

IVC-3D .....	F-100
Ranger .....	G-114
Ruler.....	G-118
Inspector .....	E-46

## Bun inspection and robot picking



### Short description

Quality inspection and automatic robot picking from conveyor belts in the pack-

aging 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

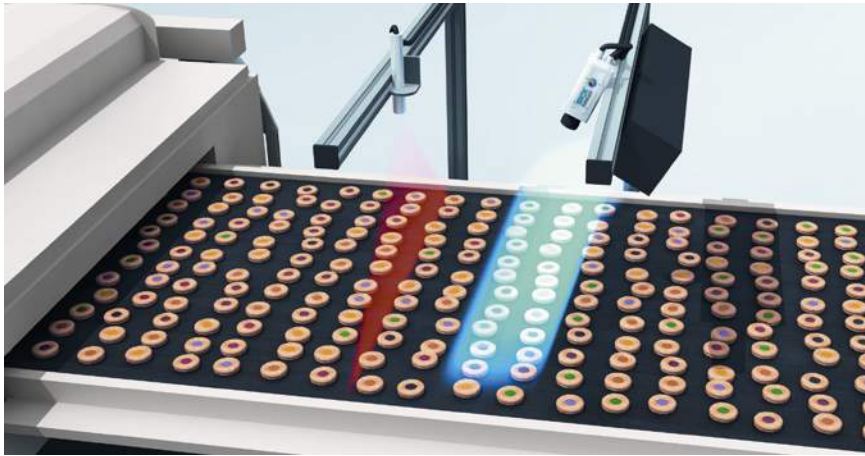
fall into a rejection basket. In instances when the object height is constant and the inspection features can be viewed in 2D grayscale, the IVC-2D smart camera or the Inspector vision sensor can be used. In addition, the Ranger camera is the high-end alternative for complete flexibility and highest 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

C

## 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



### Applications Finder

- For up-to-date application solutions, visit SICK's web site  
→ [www.mysick.com/applications](http://www.mysick.com/applications)
- The "Applications Finder" will lead you to further solutions that use SICK products

### Other applications

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

C

### Recommended products

ColorRanger E ..... G-114



Applications  Finder

- For up-to-date application solutions, visit SICK's web site  
→ [www.mysick.com/applications](http://www.mysick.com/applications)
- The "Applications Finder" will lead you to further solutions that use SICK products

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 al-

locatable, 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

C

## 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 regu-

lar 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.

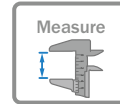
### Implementation

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](http://www.mysick.com/applications)
- The "Applications Finder" will lead you to further solutions that use SICK products

C

#### Recommended products

Ranger .....	G-114
Ruler .....	G-118



## The powerful simplicity of vision

---

**E** 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 requirements 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




Vision sensors

General information . . . . . E-40  
 Product family overview . . . . . E-44

 **Inspector.** . . . . . E-46  
 An intelligent vision solution in an easy-to-use sensor package

 **LECTOR®62x.** . . . . . E-52  
 Clever. Simple. Industrial.

 **LECTOR®65x.** . . . . . E-64  
 Nonstop code reading flexibility

 **CVS2.** . . . . . E-70  
 Detect, distinguish and sorting colors

 **Accessories** . . . . . E-74

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

<p>LECTOR®62x, LECTOR®65x</p>	<p>CVS2, Inspector I-series</p>	<p>Inspector PI-series</p>	<p>Inspector PIM-series</p>
<p>Read</p>	<p>Inspect</p>	<p>Inspect</p> <p>Position</p>	<p>Inspect</p> <p>Position</p> <p>Measure</p>



# Inspector

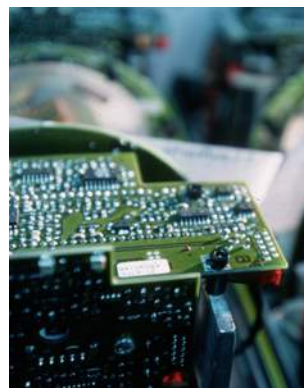
The intelligent vision solution in an easy-to-use sensor package



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.

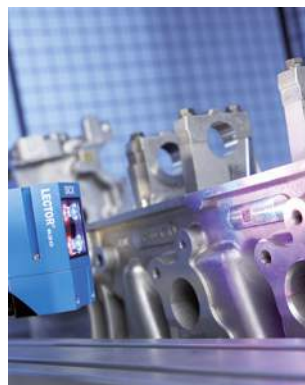
E



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

	 <p><b>Inspector</b></p>	 <p><b>LECTOR®62x</b></p>	
	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			
			
	<ul style="list-style-type: none"> <li>• High-speed positioning, inspection and measurement</li> <li>• Powerful “object locator” tool, independent of position, rotation and scale</li> <li>• Unique, interchangeable housing design supporting dome and various optical accessories</li> <li>• Simple step-by-step configuration in PC including emulator</li> <li>• Easy-to-use operator interfaces</li> <li>• Flexible machine and HMI design interfaces</li> </ul>	<ul style="list-style-type: none"> <li>• Decoding of most popular code types: 1D, 2D, direct part marking</li> <li>• Easy integration with industrial networks: serial, USB, several fieldbus technologies</li> <li>• Auto setup with function buttons, aiming laser, focus adjustment and green feedback LED – for quick setup without PC</li> <li>• Compact design and industrial housing</li> <li>• Analysis tools include live image capturing, code verification and read rate view</li> </ul>	
Detailed information	→ E-46	→ E-52	

E



**LECTOR®65x**

Nonstop code reading flexibility



**CVS2**

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	208 px x 236 px x 3 px (RGB)
2,048 px x 2,048 px	
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	95 mm x 42 mm x 34 mm
142 mm x 89 mm x 106 m	



- 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

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



### Additional information

Detailed technical data . . . . . E-47

Ordering information . . . . . E-48

Dimensional drawing . . . . . E-49

Field of view . . . . . E-49

Recommended accessories . . . . . E-50

→ [www.mysick.com/en/Inspector](http://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.



E

## Detailed technical data

### Features

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

### Performance

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

### Interfaces

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

	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, $\pm 20\%$		
Ripple	$< 5 V_{pp}$		
Current consumption	$< 450\text{ mA}$ , 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 <sup>1)</sup>
Ambient storage temperature	-20 °C ... +70 °C <sup>1)</sup>

<sup>1)</sup> Rel. humidity: 35 % ... 85 %, 95 % at operation.

## Ordering information

- Resolution: 640 px x 480 px

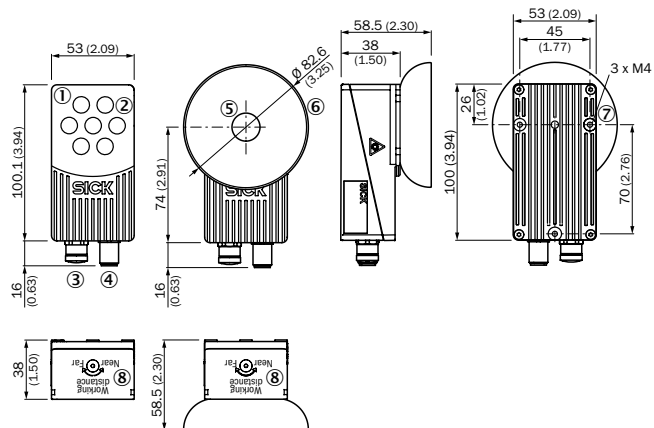
Sub product family	Light source	Product name	Model name	Part no.
Inspector I-series	White	Inspector I40	VSPI-4F2111	1047913
	Infrared	Inspector I40-IR	VSPI-4F2411	1054705
Inspector PI-series	White	Inspector PI50	VSP-5F2113	1056082
	Infrared	Inspector PI50-IR	VSP-5F2413	1057303
	White	Inspector PI50 EtherCAT	VSP-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

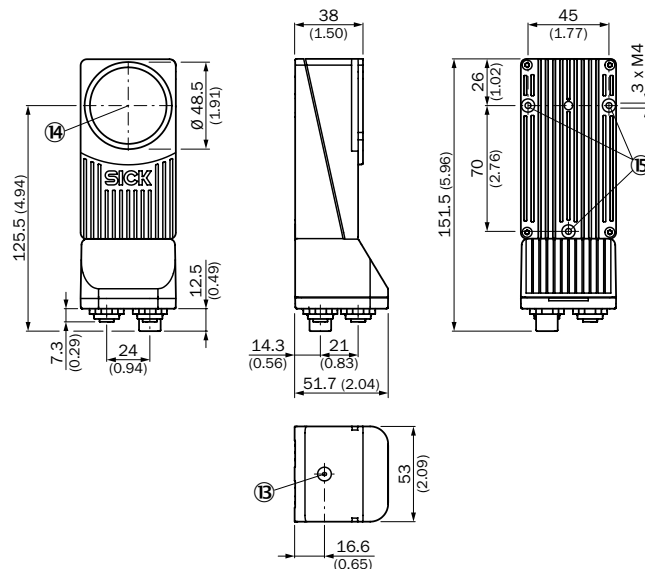
dimensions in mm (inch)

### 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

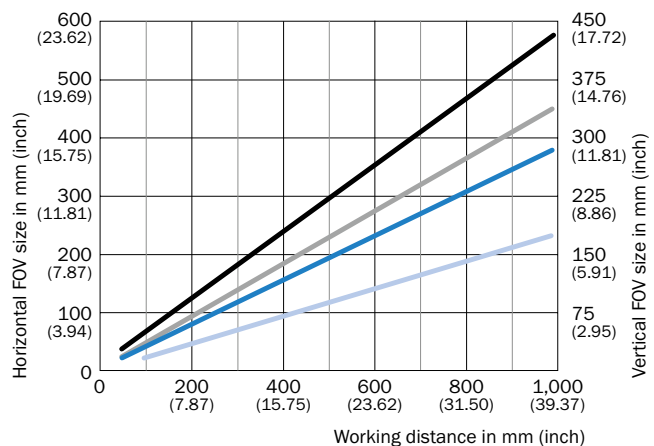
### EtherCAT



- Ⓑ Focus adjustment
- Ⓘ Front screen
- Ⓢ 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


## 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 <sup>1)</sup>	6037654	●	●	●

<sup>1)</sup> Not supported by EtherCAT variant.

### Mounting brackets/plates

#### Mounting brackets

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


E

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 conveyor 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
- ID*pro* 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



## Additional information

Detailed technical data.....	E-53
Ordering information.....	E-55
Dimensional drawings.....	E-56
Field of view.....	E-57
Reading field diagrams.....	E-59
Recommended accessories.....	E-61

→ [www.mysick.com/en/LECTOR62x](http://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.



E

## Detailed technical data

## Features

	LECTOR®620 ECO	LECTOR®620 Professional	LECTOR®620 High Speed	LECTOR®620 DPM Plus
<b>Focus</b>	Adjustable focus	Auto focus (during teach-in)		
<b>Sensor</b>	CMOS matrix sensor, gray scale values			
<b>Light source</b>	Lighting LEDs: visible red light ( $\lambda = 617 \pm 15$ nm) Feedback spot: visible green light ( $\lambda = 525 \pm 15$ nm)	Lighting LEDs: visible red light ( $\lambda = 617 \pm 15$ nm), visible blue light ( $\lambda = 470 \pm 15$ nm) Feedback spot: visible green light ( $\lambda = 525 \pm 15$ nm) Aiming laser: visible red light ( $\lambda = 630$ nm ... 680 nm) / lighting LEDs: invisible infrared light ( $\lambda = 850 \pm 25$ nm) Feedback spot: visible green light ( $\lambda = 525 \pm 15$ nm) Aiming laser: visible red light ( $\lambda = 630$ nm ... 680 nm) (depending on type)	Lighting LEDs: visible red light ( $\lambda = 617 \pm 15$ nm), visible blue light ( $\lambda = 470 \pm 15$ nm) Feedback spot: visible green light ( $\lambda = 525 \pm 15$ nm) Aiming laser: visible red light ( $\lambda = 630$ nm ... 680 nm)	Lighting LEDs: visible red light ( $\lambda = 617 \pm 15$ nm), visible blue light ( $\lambda = 470 \pm 15$ nm) Feedback spot: visible green light ( $\lambda = 525 \pm 15$ nm) Aiming laser: visible red light ( $\lambda = 630$ nm ... 680 nm) / lighting LEDs: visible blue light ( $\lambda = 470 \pm 15$ nm) Feedback spot: visible green light ( $\lambda = 525 \pm 15$ nm) Aiming laser: visible red light ( $\lambda = 630$ nm ... 680 nm) (depending on type)
<b>MTBF</b>	75,000 h			
<b>LED class</b>	1, radiance $L_B < 10$ kW/(m <sup>2</sup> sr) within 100 s, $L_R < 28/\alpha$ kW/(m <sup>2</sup> sr) within 10 s At distance > 200 mm (IEC 62471 (2006-07) / EN 62471 (2008- 09))	1, radiance $L_B < 10$ kW/(m <sup>2</sup> sr) within 100 s, $L_R < 28/\alpha$ kW/(m <sup>2</sup> sr) within 10 s At distance > 200 mm (IEC 62471 (2006-07) / EN 62471 (2008- 09)) 0, Irradiance: $E_{IR} < 100$ W/m <sup>2</sup> within 1,000 s at distance $\geq 200$ mm (IEC 62471 (2006-07) / EN 62471 (2008- 09)) (depending on type)	1, radiance $L_B < 10$ kW/(m <sup>2</sup> sr) within 100 s, $L_R < 28/\alpha$ kW/(m <sup>2</sup> sr) within 10 s At distance > 200 mm (IEC 62471 (2006-07) / EN 62471 (2008-09))	
<b>Laser class</b>	-	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))		
<b>Scanning frequency</b>	25 Hz, WVGA resolution	60 Hz, WVGA resolution		
<b>Code resolution</b>	$\geq 0.1$ mm <sup>1)</sup>			
<b>Reading distance (at code resolution)</b>	40 mm ... 1,500 mm (2.6 mm) <sup>1)</sup>		30 mm ... 500 mm (0.9 mm)	30 mm ... 500 mm (0.9 mm) <sup>1)</sup>

<sup>1)</sup> Valid for Data Matrix, PDF417 and 1D codes with good printing quality.

## Performance

	LECTOR®620 ECO	LECTOR®620 Professional	LECTOR®620 High Speed	LECTOR®620 DPM Plus
<b>Bar code types</b>	GS1-128 / EAN 128, UPC / GTIN / EAN, Interleaved 2 of 5, Pharmacode, GS1 DataBar, Code 39, Code 128, Codabar, Code 32, Code 93			
<b>2D code types</b>	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)	
<b>Code qualification</b>	–	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
<b>No. of codes per reading interval</b>	1 ... 50			
<b>No. of characters per reading interval</b>	500 (for multiplexer function in CAN operation)			
<b>Internal image storage</b>	135 MB			
<b>Transport speed</b>	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
<b>Serial (RS-232, RS-422)</b>	✓			
Function	Host, AUX			
Data transmission rate	300 Baud ... 115.2 kBaud, AUX: 57.6 kBaud (RS-232)			
<b>USB</b>	✓, USB 2.0			
<b>Ethernet</b>	–	✓		
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)		
<b>CAN bus</b>	✓			
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)			
<b>PROFIBUS DP</b>	✓, optional via external connection module (CDF600-2)			
<b>Switching inputs</b>	4 ("Sensor 1", "Sensor 2", 2 inputs via optional CMC600 in CDB620/CDM420)			
<b>Switching outputs</b>	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")		
<b>Reading pulse</b>	Switching inputs, non-powered, serial interface, CAN, auto pulse, presentation mode	Switching inputs, non-powered, serial interface, Ethernet, CAN, auto pulse, presentation mode		
<b>Optical indicators</b>	16 LEDs (5 x status display, 10 x LED bar graph, 1 green feedback spot)			
<b>Acoustic indicators</b>	Beeper/buzzer (can be switched off, can be assigned a function to signal the result status)			
<b>Control elements</b>	2 buttons (choose and start/stop functions)			
<b>Memory card</b>	–	MicroSD memory card (flash card) max. 32 GB, optional		



## 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 <sup>1)</sup>			

<sup>1)</sup> 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

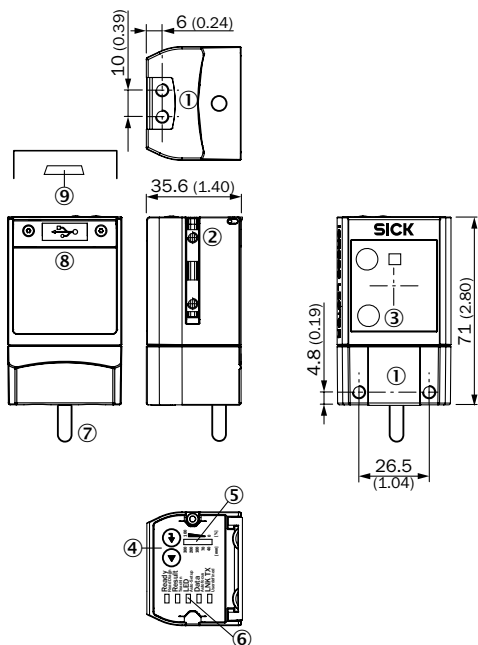
- **Reading field:** side
- **Sensor resolution:** 752 px 480 px WVGA
- **Lens:** integrated

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

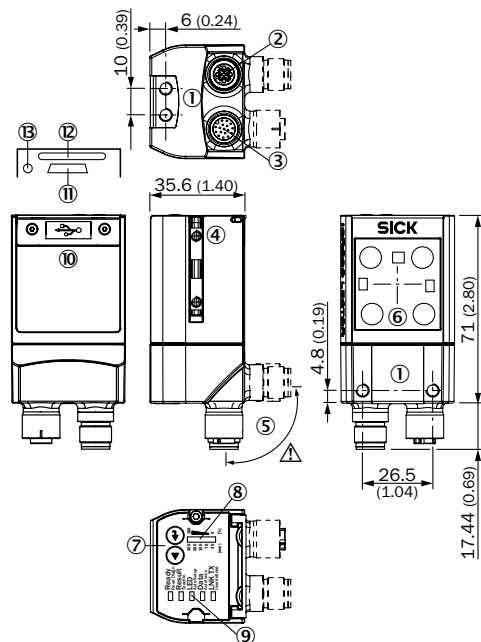
## Dimensional drawings

dimensions in mm (inch)

## LECTOR®620 ECO



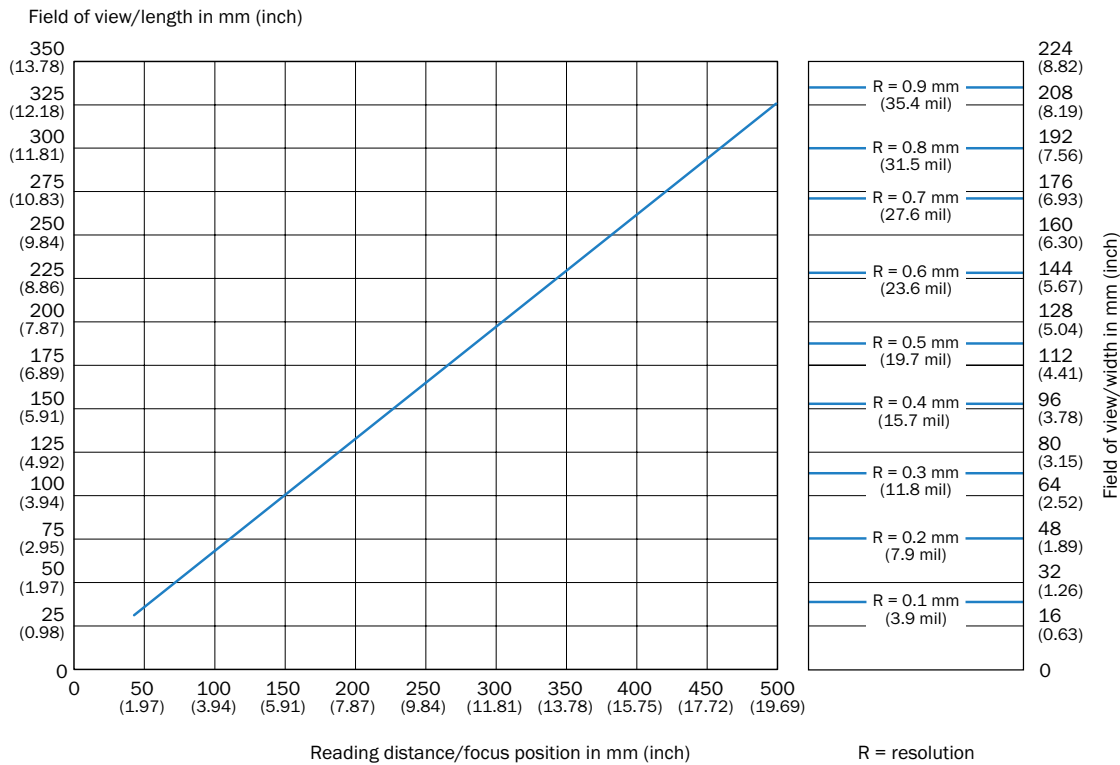
- ① Blind hole thread M5, 5 mm deep (4 x), for mounting
- ② Sliding nut M5, 5 mm deep (2 x), for mounting (as alternative)
- ③ Reading field
- ④ Function button (2 x)
- ⑤ Bar graph display
- ⑥ LED for status display (2 levels), 5 x
- ⑦ Cable with 15-pin D-sub HD male connector
- ⑧ Cover (flap)
- ⑨ "Micro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

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

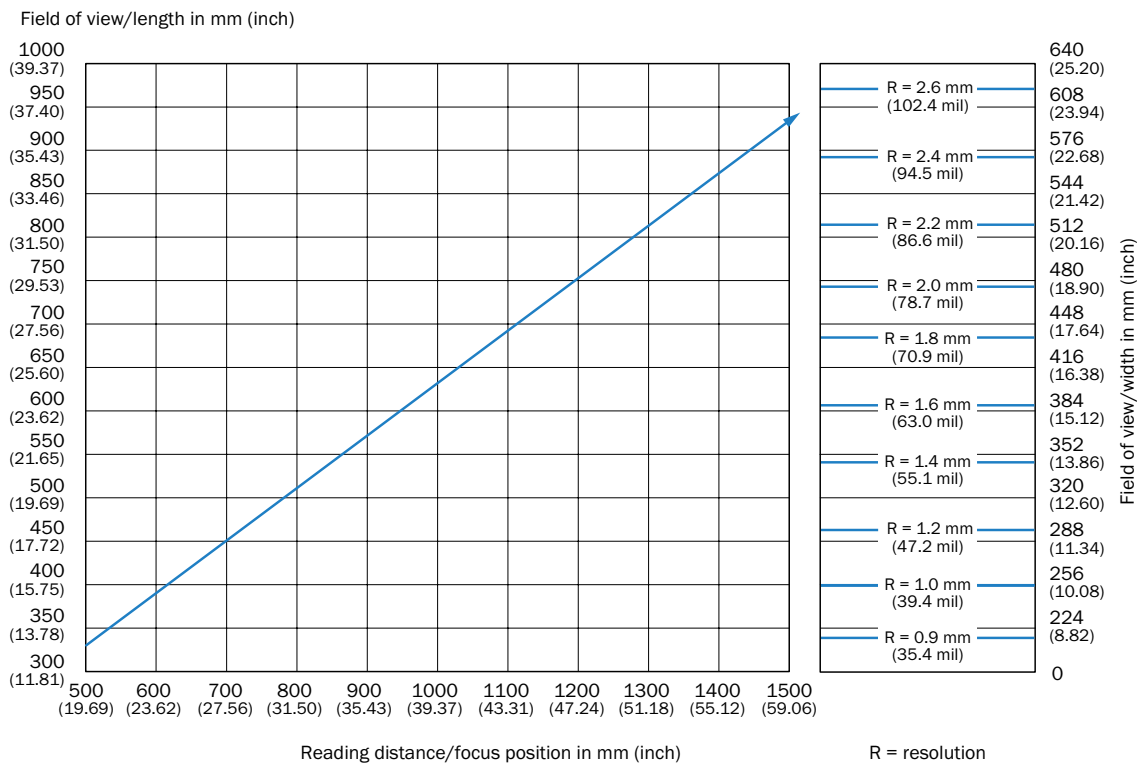
- ① Blind hole thread M5, 5 mm deep (4 x), for mounting
- ② "Ethernet" connection
- ③ "Power/Serial Data/CAN/I/O" connection
- ④ Sliding nut M5, 5 mm deep (2 x), for mounting (as alternative)
- ⑤ Swivel connector unit
- ⑥ Reading field
- ⑦ Function button (2 x)
- ⑧ Bar graph display
- ⑨ LED for status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

## Field of view

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

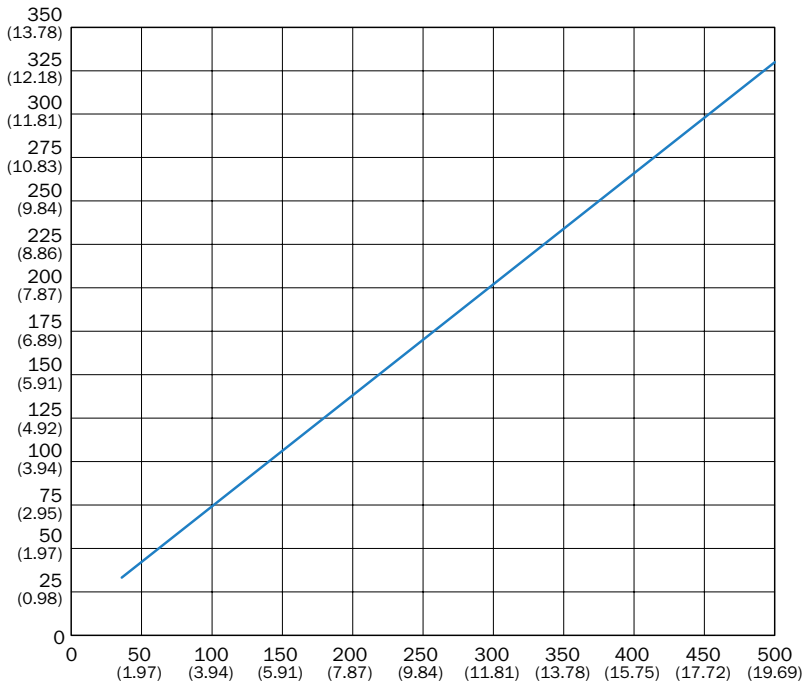


### LECTOR®620 ECO LECTOR®620 Professional (ICR620S-T11504, ICR620S-T11503)



**LECTOR®620 Professional (ICR620S-T16503)**

Field of view/length in mm (inch)



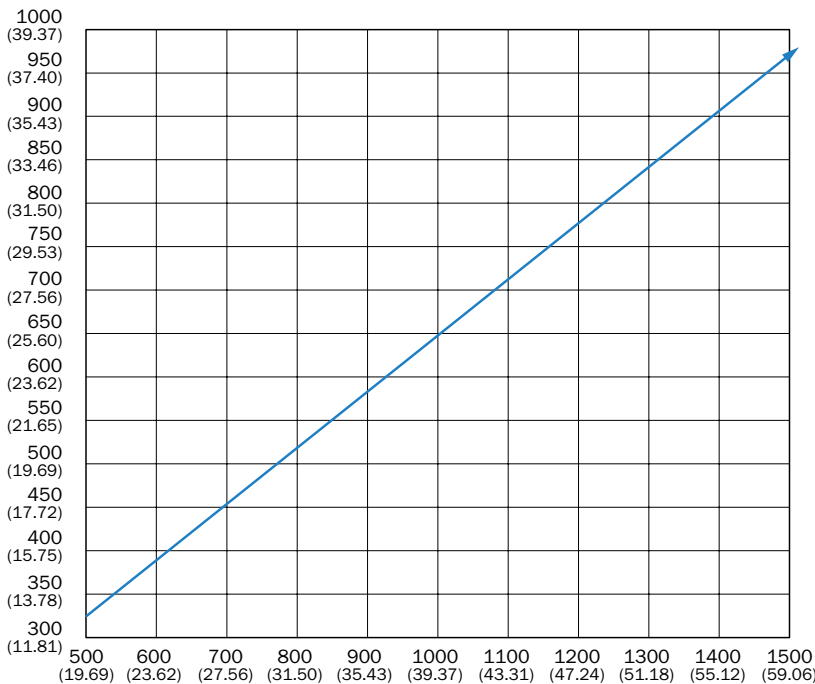
R = 1.3 mm (51.2 mil)	224 (8.82)
R = 1.2 mm (47.2 mil)	208 (8.19)
R = 1.1 mm (43.3 mil)	192 (7.56)
R = 1.0 mm (39.4 mil)	176 (6.93)
R = 0.9 mm (35.4 mil)	160 (6.30)
R = 0.8 mm (31.5 mil)	144 (5.67)
R = 0.7 mm (27.6 mil)	128 (5.04)
R = 0.6 mm (23.6 mil)	112 (4.41)
R = 0.5 mm (19.7 mil)	96 (3.78)
R = 0.4 mm (15.8 mil)	80 (3.15)
R = 0.3 mm (11.8 mil)	64 (2.52)
R = 0.2 mm (7.9 mil)	48 (1.89)
	32 (1.26)
	16 (0.63)
	0

Reading distance/focus position in mm (inch)

R = resolution

**LECTOR®620 Professional (ICR620S-T16503)**

Field of view/length in mm (inch)



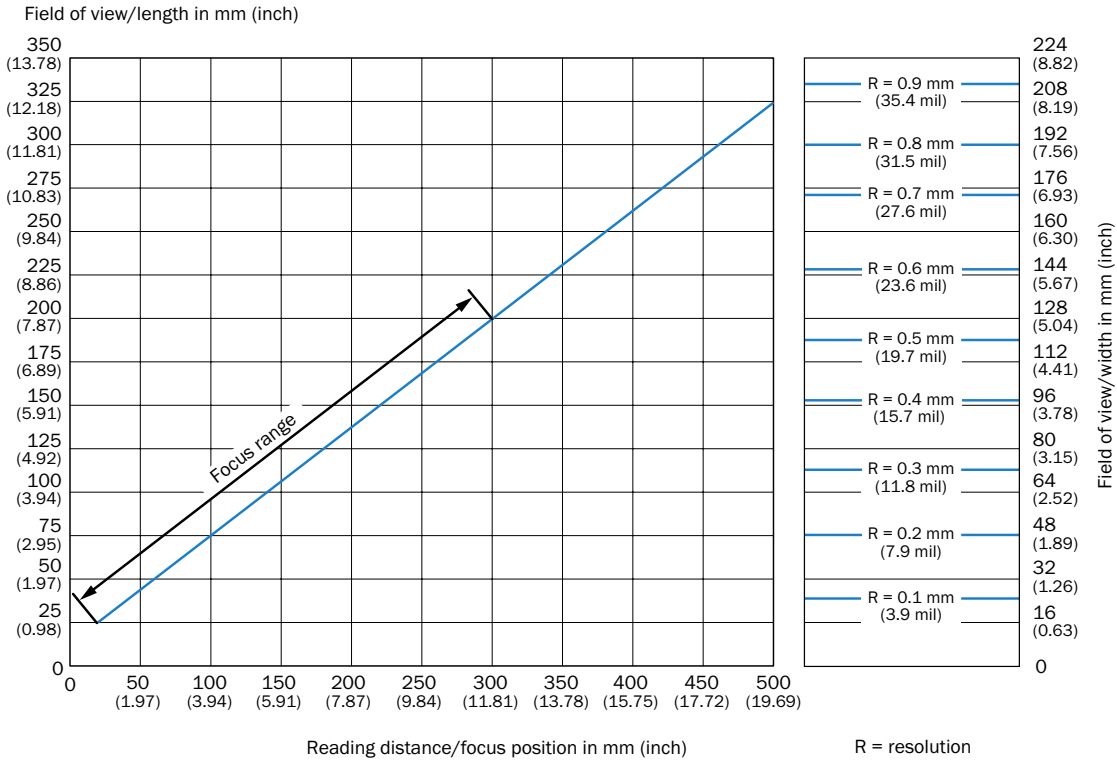
R = 3.6 mm (141.7 mil)	640 (25.20)
	608 (23.94)
	576 (22.68)
R = 3.4 mm (133.9 mil)	544 (21.42)
	512 (20.16)
R = 3.0 mm (118.1 mil)	480 (18.90)
	448 (17.64)
R = 2.6 mm (102.4 mil)	416 (16.38)
	384 (15.12)
R = 2.2 mm (86.6 mil)	352 (13.86)
	320 (12.60)
R = 1.8 mm (70.9 mil)	288 (11.34)
R = 1.6 mm (63.0 mil)	256 (10.08)
R = 1.4 mm (55.1 mil)	224 (8.82)
R = 1.3 mm (51.2 mil)	208 (8.19)
	192 (7.56)
	176 (6.93)
	160 (6.30)
	144 (5.67)
	128 (5.04)
	112 (4.41)
	96 (3.78)
	80 (3.15)
	64 (2.52)
	48 (1.89)
	32 (1.26)
	16 (0.63)
	0

Reading distance/focus position in mm (inch)

R = resolution

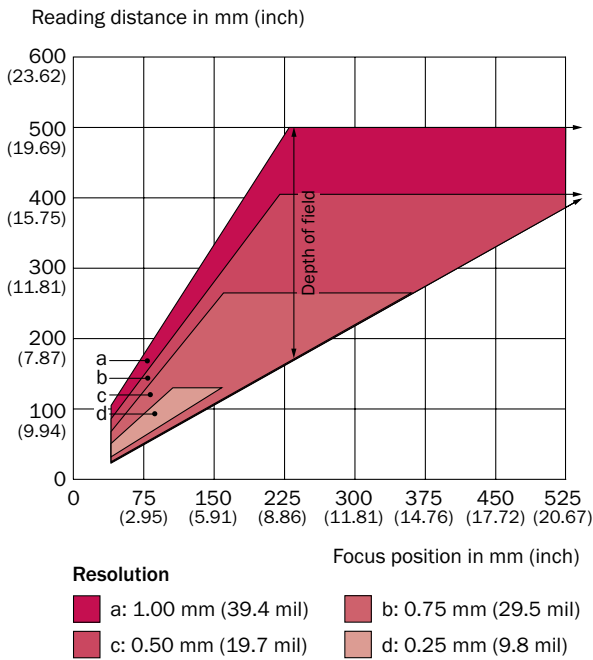
E

**LECTOR®620 High Speed**  
**LECTOR®620 DPM Plus**

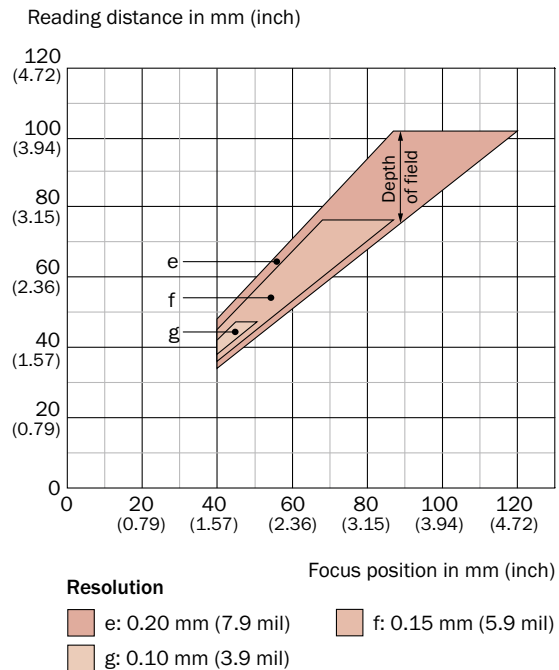


**Reading field diagrams**

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

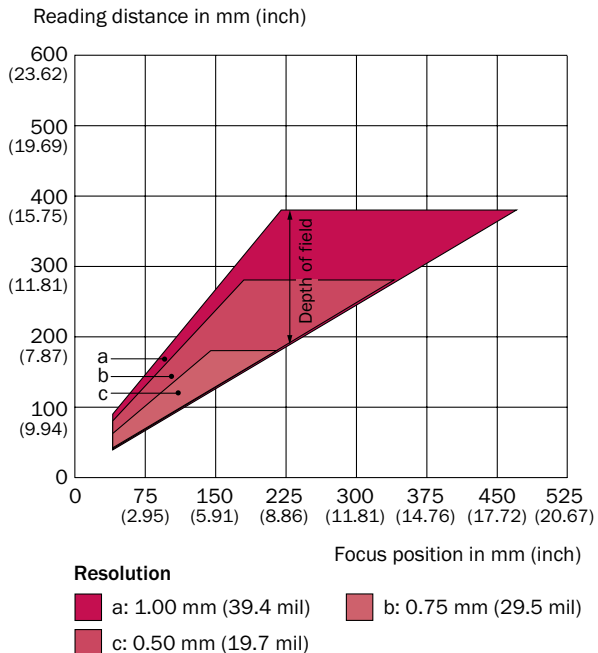


**LECTOR®620 ECO**  
**LECTOR®620 Professional**  
**(ICR620S-T11504, ICR620S-T11503)**

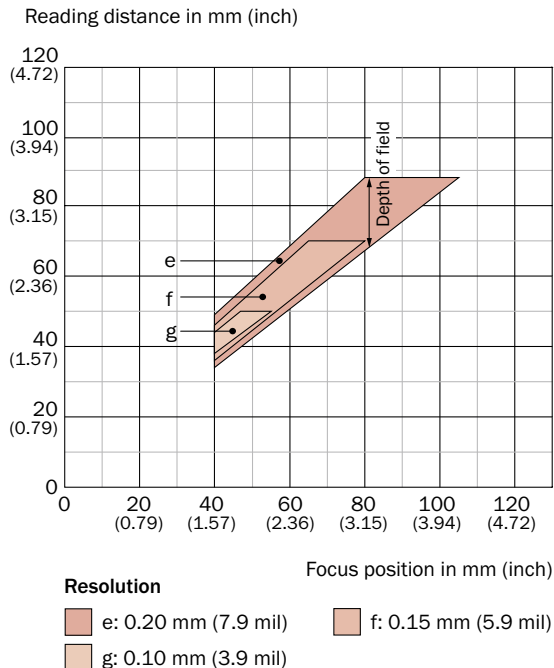


E

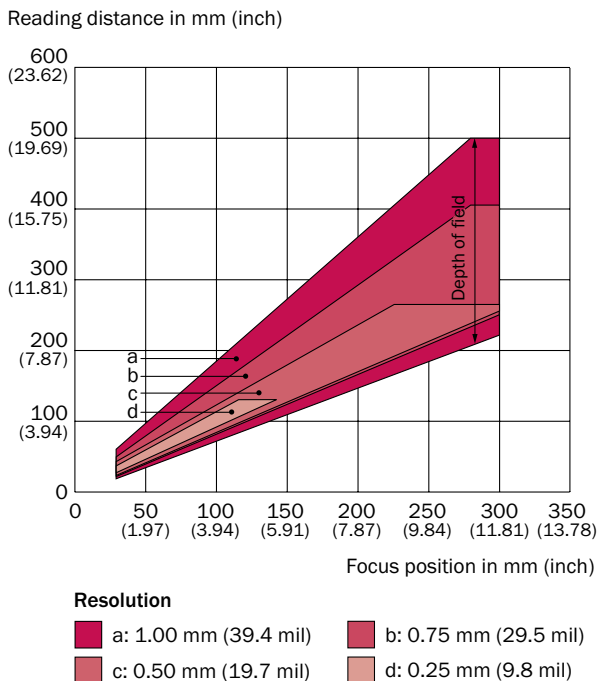
**LECTOR®620 Professional (ICR620S-T16503)**



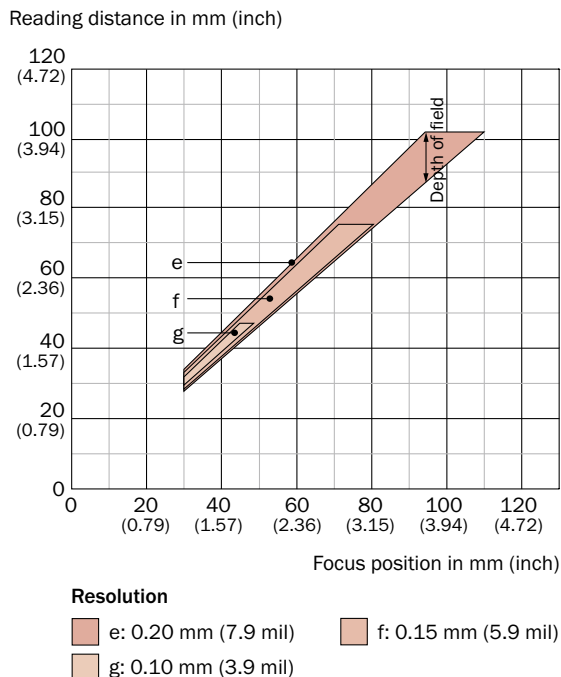
**LECTOR®620 Professional (ICR620S-T16503)**



**LECTOR®620 High Speed**

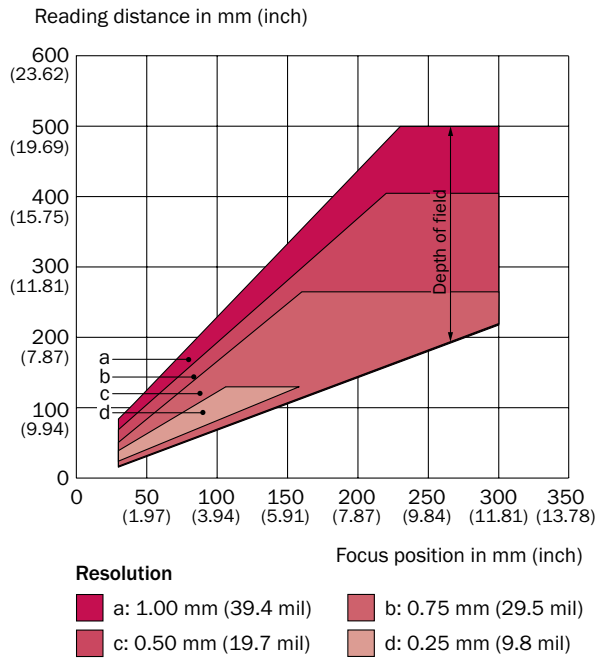


**LECTOR®620 High Speed**

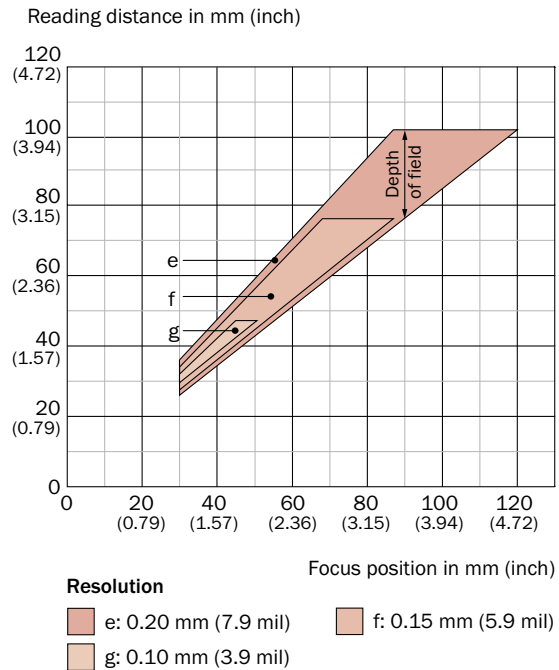


E

**LECTOR®620 DPM Plus**


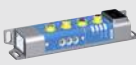



**LECTOR®620 DPM Plus**



**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	●	●


## 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**

## 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 *IDpro* 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 *IDpro* platform facilitates quick and easy integration into numerous industrial networks



### Additional information

Detailed technical data.....	E-65
Ordering information.....	E-66
Dimensional drawings.....	E-67
Recommended accessories.....	E-67

→ [www.mysick.com/en/LECTOR65x](http://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.



E

## Detailed technical data

### Features

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

<sup>1)</sup> Depends on lens used.

<sup>2)</sup> Depends on distance.

### Performance

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

### Interfaces

<b>Serial (RS-232, RS-422)</b>	✓
Function	Host, AUX
Data transmission rate	300 Baud ... 115.2 kBaud, AUX: 57.6 kBaud (RS-232)
<b>USB</b>	✓, USB 2.0
<b>Ethernet</b>	✓
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)
<b>CAN bus</b>	✓
Function	SICK CAN sensor network (Master/Slave, Multiplexer/Server)
Data transmission rate	20 kbit/s ... 1 Mbit/s
Protocol	CSN (SICK CAN Sensor Network)
<b>PROFIBUS DP</b>	✓, optional via external connection module (CDF600-2)
<b>Switching inputs</b>	4 ("Sensor 1", "Sensor 2", 2 inputs via optional CMC600 in CDB650/CDM420)
<b>Switching outputs</b>	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")
<b>Reading pulse</b>	CAN, Ethernet, non-powered, switching inputs, serial interface, presentation mode, auto pulse

<b>Optical indicators</b>	21 LEDs (10 x status display, 10 x LED bar graph, 1 green feedback spot)
<b>Acoustic indicators</b>	Beeper/buzzer (can be switched off, can be assigned a function to signal the result status)
<b>Control elements</b>	2 buttons (choose and start/stop functions)
<b>Memory card</b>	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
<b>Electrical connection</b>	1 x M12, 17-pin male connector (serial, CAN, I/Os) 2 x M12, 8-pin female connector (Ethernet, P1 not yet with function)			
<b>Operating voltage</b>	18 V DC ... 30 V DC			
<b>Power consumption</b>	18 W			
<b>Housing</b>	Die-cast aluminum			
<b>Housing color</b>	Light blue (RAL 5012)			
<b>Protection class</b>	III			
<b>Weight</b>	635 g	963 g	635 g	963 g
<b>Dimensions</b>	142 mm x 89 mm x 46 m <sup>1)</sup>	142 mm x 89 mm x 106 m	142 mm x 89 mm x 46 m <sup>1)</sup>	142 mm x 89 mm x 106 m

<sup>1)</sup> Only housing without lens and protective hood.

## Ambient data

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

## Ordering information

- Reading field: side
- Enclosure rating: IP 65

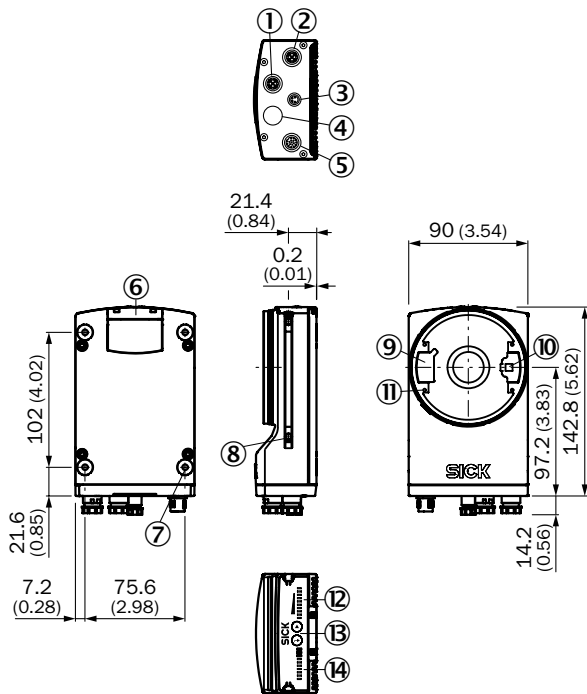
Version	Sensor resolution	Lens	Internal lighting	Model name	Part no.
LECTOR®652 Flex	2,048 px 1,088 px	Exchangeable (C-mount), to be ordered separately as accessory	-	V2D652R-MCXXA6	1063404
LECTOR®652 Dynamic Focus	2,048 px 1,088 px	Integrated	White	V2D652R-MEWA6	1063405
LECTOR®654 Flex	2,048 px 2,048 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-MEWA6	1060893

E

Dimensional drawings

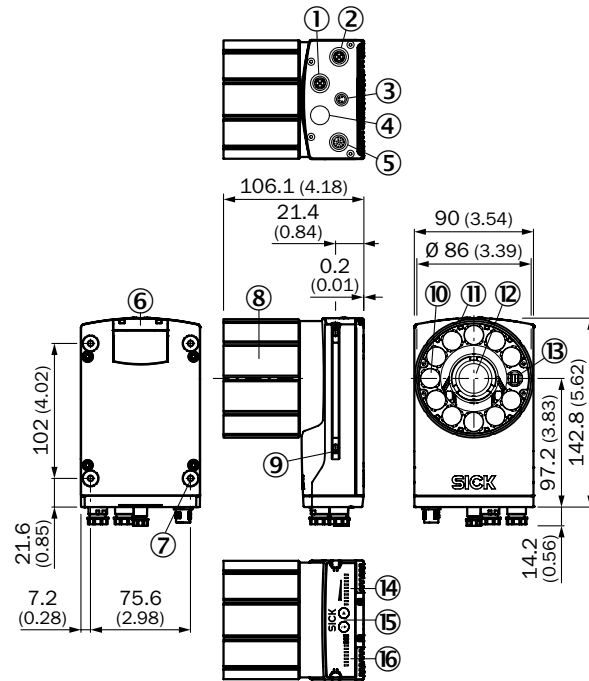
dimensions in mm (inch)

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

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



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 up to fifteen reference colors for detection, sorting and identification. The 2-color match feature gives 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 a 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

- Detailed technical data..... E-71
- Ordering information..... E-72
- Dimensional drawing ..... E-72
- Recommended accessories..... E-73

→ [www.mysick.com/en/ CVS2](http://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.



E

## Detailed technical data

### Features

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

### Performance

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

### Interfaces

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

### Mechanics/electronics

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

### Ambient data

<b>Ambient operating temperature</b>	0 °C ... +40 °C <sup>1)</sup>
<b>Ambient storage temperature</b>	-20 °C ... +70 °C <sup>1)</sup>

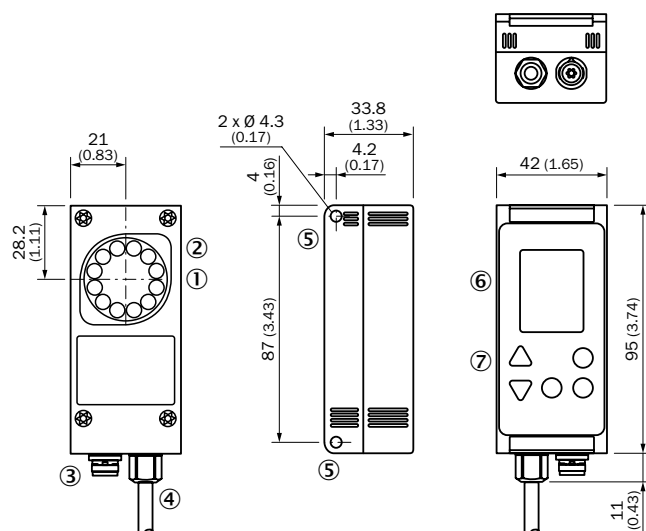
<sup>1)</sup> Rel. humidity: 35 % ... 85 %, 95 % at storage.

### 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





## 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	●	●	●	●	●	-	-	-





E

	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	●	●	●	●	●	●	●	-



	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





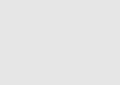



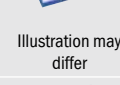
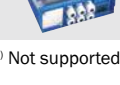
	Description	Model name	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
	Interchangeable lens, focal length 6 mm, including distance ring	OBJ-B06025BA	2049668	●	●	●	-	-	-	-	-
	Interchangeable lens, focal length 8 mm, 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	-	-	-	●	●	-	-	-

E

	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
 <p>Illustration may differ</p>	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	-	-	-	-	-	●	-	-





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 <sup>1)</sup>	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	●	●	●	-	-	-	-	-
	Small connection module for one sensor, 4 cable glands, base for CMC600	CDB620-001	1042256	-	-	-	●	●	-	-	-
Illustration may differ	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	-	-	-	-	-	●	●	-







<sup>1)</sup> Not supported by EtherCAT variant.

E

	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	-	-	-	-	-	●	-	-



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	-	-	-	-	-	●	-	-





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 IDpro 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






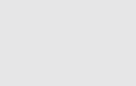

	Connection type head A	Special feature	Authorizations	Cable length	Part no.	Inspector white	Inspector infrared	Inspector UV	LECTOR®62x ECO	LECTOR®62x	LECTOR®65x Flex	LECTOR®65x Dynamic Focus	CVS white
 Illustration may differ	Female connector, M12, 17-pin, straight	-	-	3 m	6042772	-	-	-	-	●	-	-	-
		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



**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	-	-	-	●	●	-	-	

E


	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	-	-	-	●	●	●	●	-

E


**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	-	-	-	-	-	●	●	-





**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	-	-	-	-	-	-	-	●

E

**E**



## Industrial vision cameras for flexible and powerful stand-alone solutions

---

**F** 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

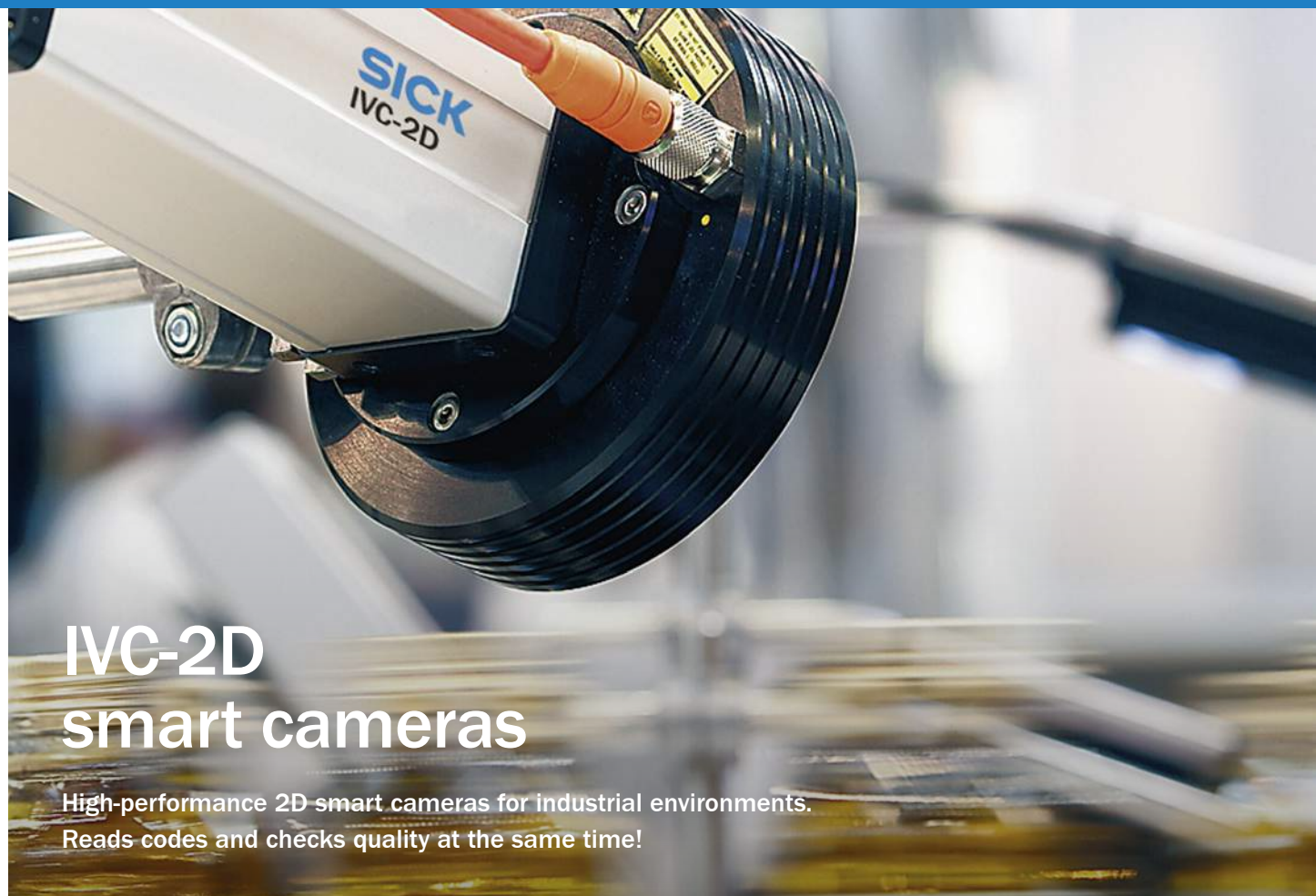
General information . . . . .	F-90
Product family overview . . . . .	F-97



<b>IVC-2D</b> . . . . .	<b>F-98</b>
High-performance smart cameras for industrial environments	



<b>IVC-3D</b> . . . . .	<b>F-100</b>
The world's first 3D smart camera makes advanced vision easy	



## 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

**F** 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

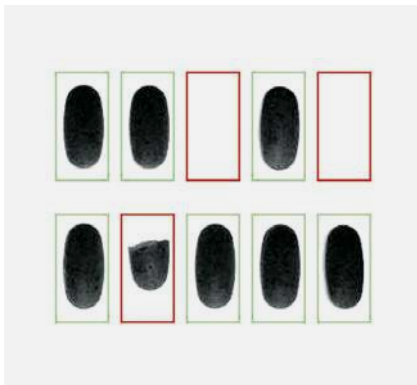
- Equipped with industrial lighting modules
- Multiple inspections in one camera
- Industrial solutions with a complete set of accessories
- Sub-pixel measurements

#### 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

## 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.



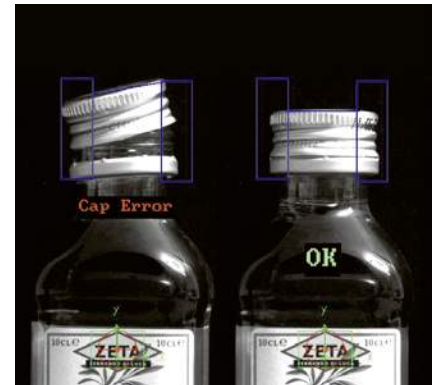
### Blisterpack inspection

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.



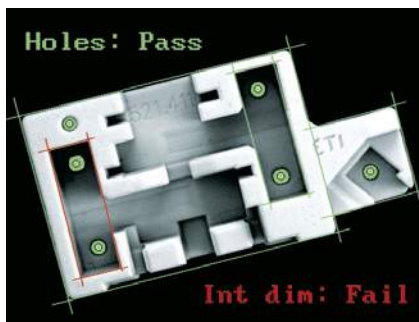
### Cap inspection

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



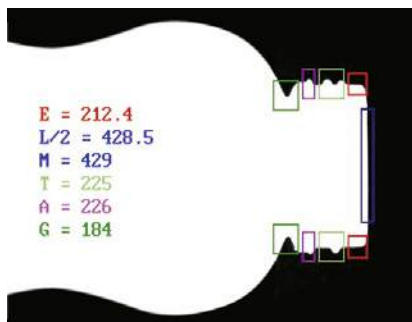
### Multiple inspections

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.



## IVC-3D smart cameras

Advanced 3D vision made easy

### Industrially proven

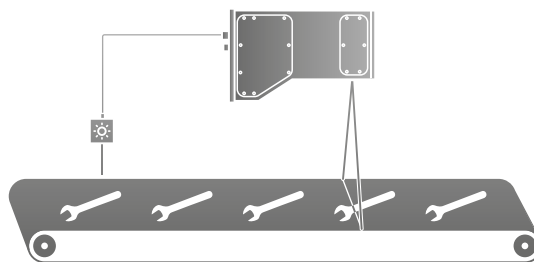
The IVC-3D is an industrially-proven smart camera designed to perform inspection, positioning and measuring of height profiles and 3D images. Applications where object contrast varies, or where height or volume is important can be reliably solved using the powerful and flexible toolbox.

### 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.

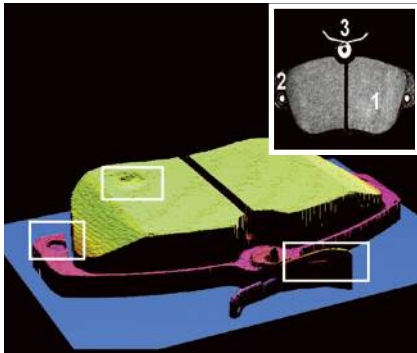


The IVC-3D scans height profiles into a 3D image as the objects move by on the conveyor.

F

## 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.

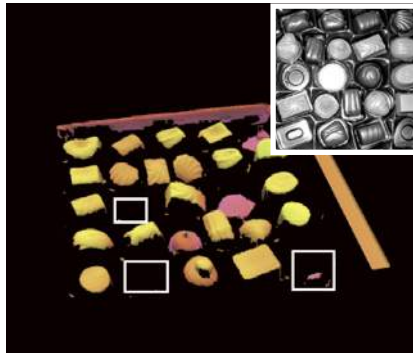


### True shape inspection

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

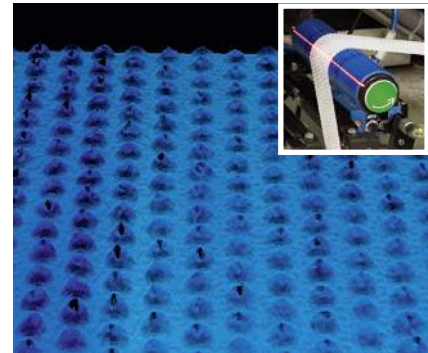
These features are very difficult to detect using 2D cameras, but with the IVC-3D the application is easy to solve in the graphical IVC Studio interface.



### Contrast-independent inspection using 3D

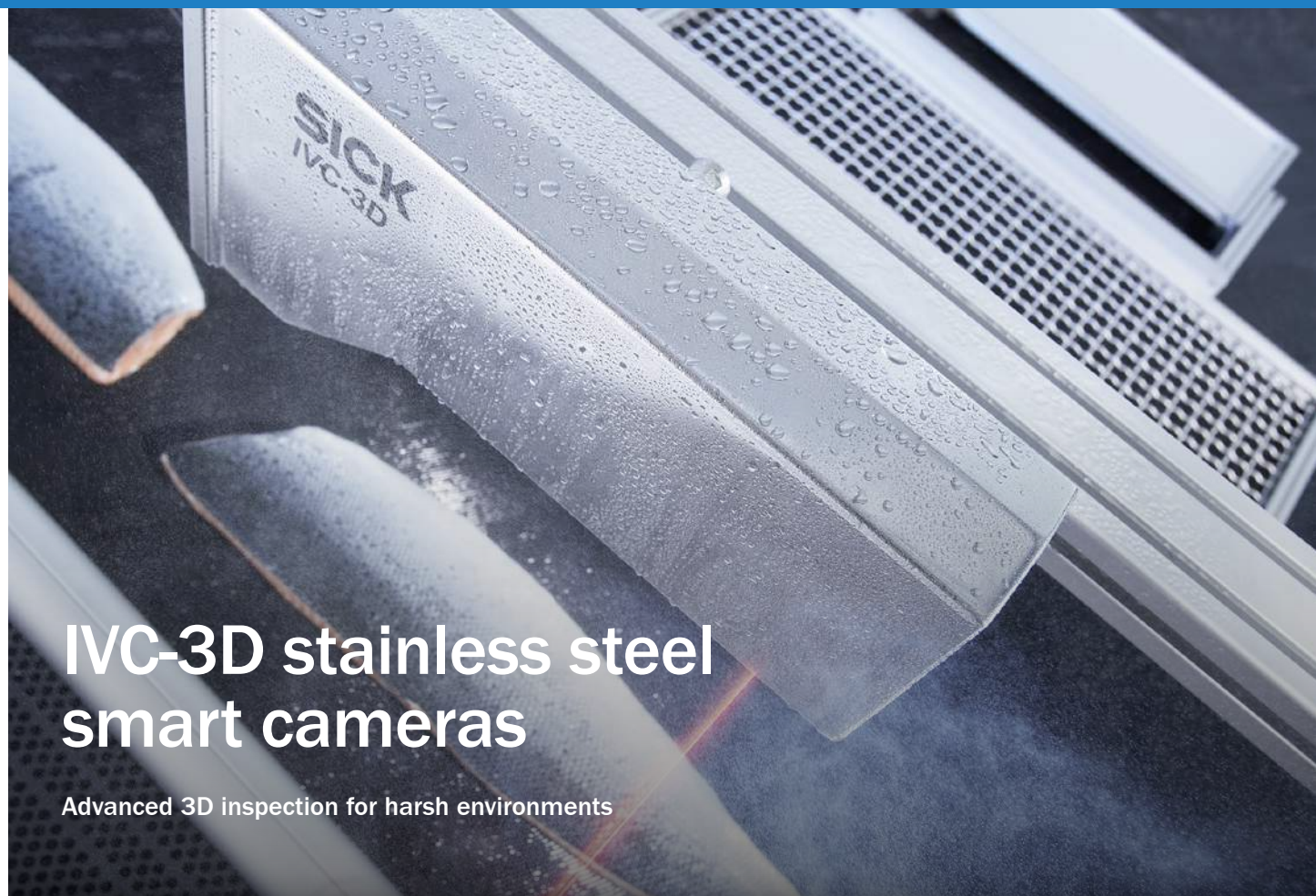
Verifying the content of a box of pralines requires a system that can check dark objects on a dark background. The IVC-3D is superior when there is low contrast. The praline application is an example of:

- 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.



# 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

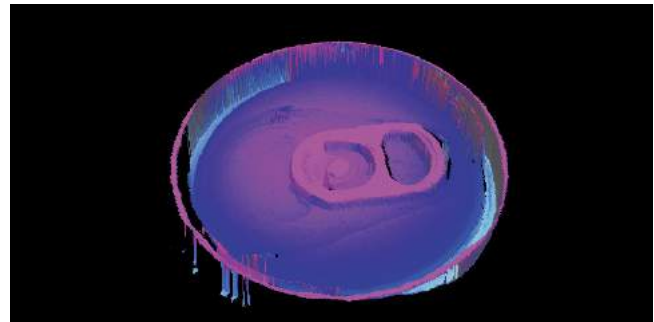
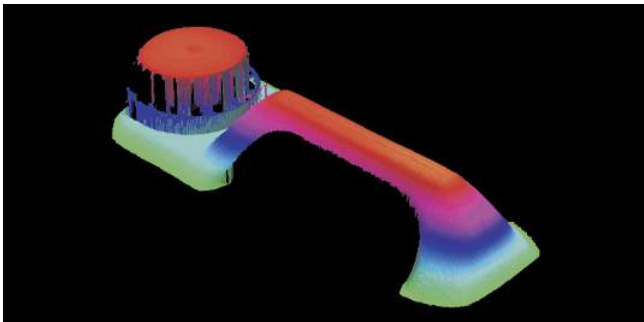
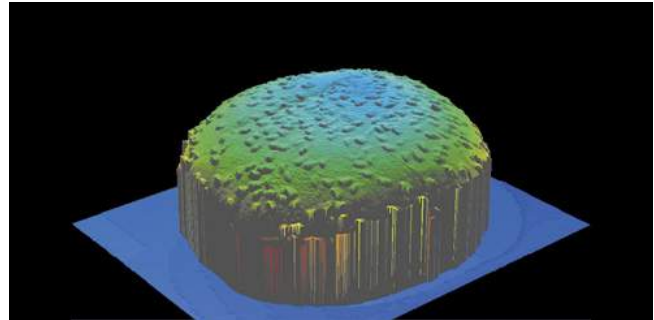
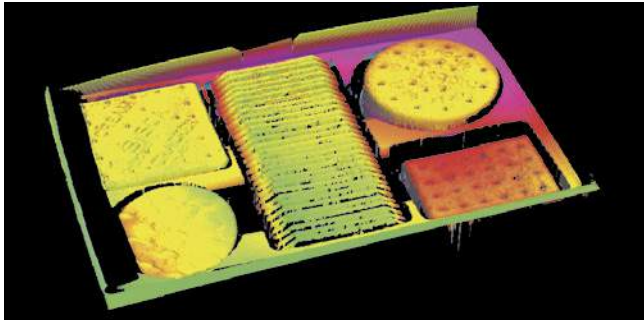
- 28 days reaction time
- 20 °C temperature
- No swelling
- No embrittlement



F

## 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.









F

F

Product family overview



Technical data overview		
<b>Technology</b>	2D, snapshot, image analysis	3D, LineScan, image analysis
<b>Resolution</b>	640 px x 480 px 1,024 px x 768 px 1,600 px x 1,200 px	-
<b>Maximum performance</b>	30 Hz 24 Hz 10 Hz	5,000 3D profiles/s
<b>Communication interfaces</b>	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
<b>Configuration software</b>	IVC Studio	IVC Studio
<b>Operator interface</b>	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.
<b>Offline support</b>	Emulator	Emulator
<b>Enclosure rating</b>	IP 54 (IP 65 with lens protection hood)	IP 65 / IP 67
<b>Housing material</b>	Anodized aluminum	Anodized aluminum / stainless steel

At a glance	
<div style="display: flex; justify-content: space-around; margin-bottom: 10px;"> <div style="text-align: center;"></div> <div style="text-align: center;"></div> <div style="text-align: center;"></div> <div style="text-align: center;"></div> </div> <ul style="list-style-type: none"> <li>• Suitable for advanced inspections and measurements</li> <li>• Flexible working distance and field of view</li> <li>• Stand-alone operation, no PC needed</li> <li>• IP 65 rating</li> <li>• Easy-to-use interface with more than 110 software tools</li> <li>• Simple interfacing with PLCs, robots and control systems that support EtherNet/IP or OPC</li> <li>• Available in three different resolutions from fast VGA (0.3 MP) to high-resolution UXGA (1.9 MP)</li> </ul>	<div style="display: flex; justify-content: space-around; margin-bottom: 10px;"> <div style="text-align: center;"></div> <div style="text-align: center;"></div> <div style="text-align: center;"></div> <div style="text-align: center;"></div> </div> <ul style="list-style-type: none"> <li>• Easy 3D measurement – provides information about object height, shape and volume</li> <li>• Independent of contrast and color</li> <li>• Easy-to-use graphical user interface for fast application development</li> <li>• Simple connection of PLCs, robots, and other control systems, e.g., via EtherNet/IP or OPC</li> <li>• Scans up to 5,000 profiles per second</li> <li>• Industrial, robust metal housing</li> </ul>

<b>Detailed information</b>	<a href="#">→ F-98</a> <span style="margin-left: 200px;"><a href="#">→ F-100</a></span>
-----------------------------	---



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

Detailed technical data..... F-99

Ordering information..... F-99

→ [www.mysick.com/en/IVC-2D](http://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.



F

## Detailed technical data

### Features

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

### Interfaces

<b>Operator interface</b>	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.
<b>Configuration software</b>	IVC Studio
<b>Data store and retrieve</b>	Images and data can be stored to and retrieved from flash and external FTP servers
<b>Communication interfaces</b>	RS-485, Fast Ethernet (10/100 Mbit/s): TCP/IP, UDP/IP, EtherNet/IP, OPC server included
<b>Digital inputs</b>	4 program controlled inputs (1 trigger input), HIGH = 10 V ... 28.8 V
<b>Digital outputs</b>	3 B-type program controlled outputs, trigger output, total output load < 100 mA

### Mechanics/electronics

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

### Ambient data

<b>Ambient operating temperature</b>	0 °C ... +50 °C <sup>1)</sup>
<b>Ambient storage temperature</b>	-20 °C ... +70 °C <sup>1)</sup>

<sup>1)</sup> Rel. humidity: 35 % ... 85 %, 95 % at storage.

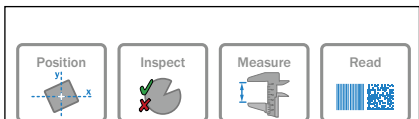
## Ordering information

Accessories available at [www.mysick.com/en/IVC-2D](http://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
		1/1.8" CCD, electronic shutter	1,024 px x 768 px	24 Hz	IVC-2D HighRes	IVC-2DM1121	1028407
					IVC-2D HighRes Reader	IVC-2DM1122	1029136
					IVC-2D UXGA	IVC-2DM1131	1054511
IVC-2D UXGA Reader	IVC-2DM1132	1054512					

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

F



### Additional information

Detailed technical data.....F-101

Ordering information.....F-103

→ [www.mysick.com/en/IVC-3D](http://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.



## Detailed technical data

### Features

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

<sup>1)</sup> 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
<b>Height resolution</b>	0.015 mm	0.04 mm	0.05 mm	0.2 mm	1.2 mm
<b>3D profile resolution</b>	2,048 points				1,400 points

### Interfaces

<b>Operator interface</b>	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.
<b>Configuration software</b>	IVC Studio
<b>Data store and retrieve</b>	Images and data can be stored to and retrieved from flash and external FTP servers
<b>Communication interfaces</b>	RS-485, Fast Ethernet (10/100 Mbit/s): TCP/IP, UDP/IP, EtherNet/IP, OPC server included
<b>Digital inputs</b>	3 program controlled inputs (1 trigger input), HIGH = 10 V ... 28.8 V
<b>Digital outputs</b>	3 B-type program controlled outputs, Total output load < 100 mA, trigger output
<b>Encoder interface</b>	RS-422
<b>Maximum encoder frequency</b>	2 MHz

## Mechanics/electronics

	IVC-3D 30	IVC-3D 50	IVC-3D 100	IVC-3D 200	IVC-3D 300
<b>Connectors</b>	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				
<b>Connector material</b>					
Anodized aluminum	Nickel plated brass				
Stainless steel	– Stainless steel				
<b>Supply voltage</b>	24 V DC, ± 20 %				
<b>Ripple</b>	< 5 V <sub>pp</sub>				
<b>Current consumption</b>	< 1 A without output load				
<b>Enclosure rating</b>					
Anodized aluminum	IP 65				
Stainless steel	– IP 67				
<b>Protection class</b>	II, III				
<b>Weight</b>					
Anodized aluminum	3.2 kg		4 kg		
Stainless steel	– 5.5 kg		6.7 kg		
<b>Dimensions (L x W x H)</b>					
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	
<b>Optics</b>	Fixed				

## Ambient data

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

## Ordering information

Accessories available at [www.mysick.com/en/IVC-3D](http://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



## 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

General information . . . . .	.G-106
Product family overview . . . . .	.G-113

 Ranger . . . . .	.G-114
Fastest 3D and MultiScan for advanced industrial solutions	

 Ruler . . . . .	.G-118
Gigabit 3D vision for tough environments	





# 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

## 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

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.



3D & COLOR

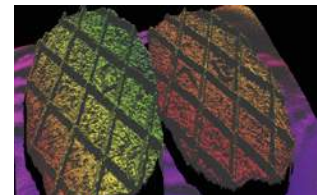
With the ColorRanger, all data needed comes from one single camera, which reduces hardware and integration costs. The ColorRanger is the ideal choice for applications where both 3D shape and color texture matter.

## Application examples

### Baked goods



RGB color



3D image

### Fruits and vegetables



RGB color

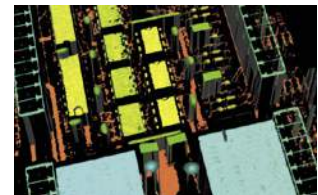


3D image

### Electronics



RGB color



3D image

# 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  $-30^{\circ}\text{C}$ . 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.



### Ruler E

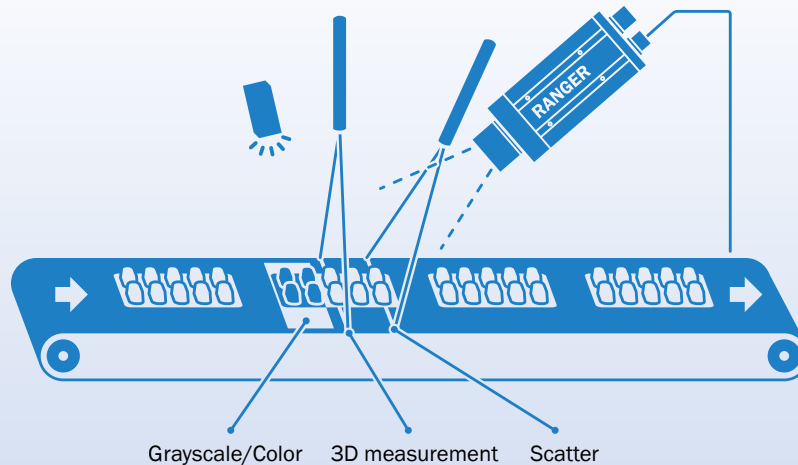
Rugged camera with built-in laser source for factory calibrated 3D via Gigabit Ethernet interface. Several 3D algorithms, grayscale and laser scatter measurements are available. Up to 10,000 3D profiles/s. 24 V I/O and RS-422 for encoder input.

## Typical applications

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



3D VISION



### MultiScan – measure it all at once

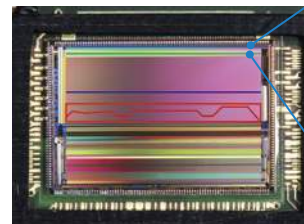
SICK’s MultiScan technology combines the benefits of 2D and 3D imaging in one single camera. It allows for a multitude of simultaneous measurements that can be configured to the exact needs of a certain application. The Ranger MultiScan offers measurements for 3D, RGB color, contrast, and laser scatter. 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



- High resolution RGB color and grayscale (3,072 pixels)
- MultiScan with 3D area (1,536 pixels)
- Standard resolution RGB color (1,536 pixels)

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

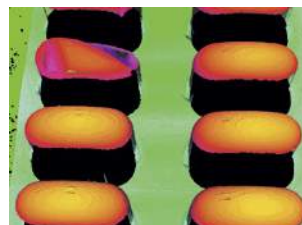
### Blisterpack inspection using MultiScan technology



**Grayscale image**  
For reading identification codes




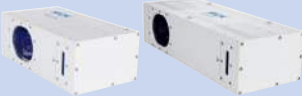






**Scatter image**  
For finding empty blisters



**3D image**  
For finding blister shape defects



Product family overview

	 <p style="text-align: center;"><b>Ranger</b></p>	 <p style="text-align: center;"><b>Ruler</b></p>
	<p style="text-align: center;">Fastest 3D and MultiScan for advanced industrial solutions</p>	<p style="text-align: center;">Gigabit 3D vision for tough environments</p>
<p><b>Technical data overview</b></p>		
<p><b>Maximum performance</b></p>	<p>1,000 3D profiles/s 30,000 3D profiles/s 35,000 3D profiles/s</p>	<p>10,000 3D profiles/s</p>
<p><b>Grayscale measurements</b></p>	<p>✓ / -</p>	<p>✓</p>
<p><b>Color measurements</b></p>	<p>Red / green / blue / monochrome (without IR content) / near infrared (approx. 750 nm ... 950 nm)</p>	<p>-</p>
<p><b>Scatter measurement</b></p>	<p>✓ / -</p>	<p>✓ / -</p>
<p><b>Light source</b></p>	<p>-</p>	<p>Visible red light (Laser, 660 nm, ± 15 nm)</p>
<p><b>Factory calibrated</b></p>	<p>-</p>	<p>✓</p>
<p><b>Enclosure rating</b></p>	<p>IP 20</p>	<p>IP 65</p>
<p><b>Operating system</b></p>	<p>Windows 7, Windows XP Pro</p>	<p>Windows 7, Windows XP Pro</p>
<p><b>At a glance</b></p>		
	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid gray; padding: 2px; text-align: center;">Position </div> <div style="border: 1px solid gray; padding: 2px; text-align: center;">Inspect </div> <div style="border: 1px solid gray; padding: 2px; text-align: center;">Measure </div> </div> <ul style="list-style-type: none"> <li>High speed 3D at unmatched speed and quality</li> <li>MultiScan technology to measure 3D, contrast, color and scatter at the same time</li> <li>Sensor resolutions of up to 1,536 pixels in 3D and 3,072 pixels in gray scale and color</li> <li>Full flexibility in configuration, working distance, and field of view</li> <li>In-machine 3D calibration tool</li> <li>Gigabit Ethernet and CameraLink interfaces</li> </ul>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid gray; padding: 2px; text-align: center;">Position </div> <div style="border: 1px solid gray; padding: 2px; text-align: center;">Inspect </div> <div style="border: 1px solid gray; padding: 2px; text-align: center;">Measure </div> </div> <ul style="list-style-type: none"> <li>Factory calibrated 3D in millimeters at full production speed</li> <li>High accuracy 3D for measurement widths from 100 mm up to 1.5 m</li> <li>Capture 3D, gray scale, and scatter at the same time</li> <li>Easy to integrate without need for external lights</li> <li>Rugged housing for tough environments and operation down to -30 °C</li> <li>Remote operation over long cable distances with Gigabit Ethernet</li> </ul>
<p><b>Detailed information</b></p>	<p style="text-align: center;"><a href="#">→ G-114</a></p>	<p style="text-align: center;"><a href="#">→ G-118</a></p>

**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



**Additional information**

Detailed technical data. . . . .G-115

Ordering information. . . . .G-117

→ [www.mysick.com/en/Ranger](http://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.



## Detailed technical data

## Features

	Ranger C	Ranger D	Ranger E	ColorRanger E
<b>Task</b>	Positioning, inspection, measuring			
<b>Technology</b>	3D, LineScan, MultiScan	3D, LineScan	3D, LineScan, MultiScan	3D, LineScan, MultiScan, Color
<b>Example field of view</b>	Free of choice by lens selection			
<b>Data synchronization</b>	Free running, encoder triggered, external enable			
<b>Grayscale measurements</b>	✓	-	✓	
<b>Scatter measurement</b>	✓	-	✓	
<b>Color measurements</b>				
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)
<b>Spectral range</b>	400 nm ... 950 nm			

## Performance

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

<sup>1)</sup> 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 <sub>pp</sub>			
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)			

## Ambient data

	Ranger C	Ranger D	Ranger E	ColorRanger E
<b>Shock load</b>	15 g, 3 x 6 directions			
<b>Vibration load</b>	5 g, 58 Hz ... 150 Hz			
<b>Ambient operating temperature</b>	+5 °C ... +50 °C <sup>1) 2)</sup>		0 °C ... +45 °C <sup>1)</sup>	
<b>Ambient storage temperature</b>	-20 °C ... +70 °C <sup>1)</sup>			

<sup>1)</sup> Non-condensing.

<sup>2)</sup> Camera housing temperature.

## Ordering information

Accessories available at [www.mysick.com/en/Ranger](http://www.mysick.com/en/Ranger)

Sub product family	Maximum performance	MultiScan Technology	Sensor resolution	Scatter measurement	Hi-Res Gray resolution	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	✓	3,072 px	No IR pass filter	Ranger C50	Ranger-C50412	1014216
						IR pass filter	Ranger C50 IR	Ranger-C50422	1014223
						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
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	✓	3,072 px	No IR pass filter	Ranger E50	Ranger-E50414	1040379
						IR pass filter	Ranger E50 IR	Ranger-E50424	1040381
						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
1,536 px x 512 px	✓	3,072 px				No IR pass filter	ColorRanger E50	Ranger-E50434	1050267
						IR pass filter	ColorRanger E50 IR	Ranger-E50444	1050269
						No IR pass filter	ColorRanger E55	Ranger-E55434	1050268
						IR pass filter	ColorRanger E55 IR	Ranger-E55444	1050270

## Gigabit 3D vision for tough environments



Position

Inspect

Measure

**Additional information**

Detailed technical data. . . . .G-119

Ordering information. . . . .G-120

### 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  $-30\text{ }^{\circ}\text{C}$ . 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  $-30\text{ }^{\circ}\text{C}$
- 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

→ [www.mysick.com/en/Ruler](http://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.



## Detailed technical data

### Features

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

### Performance

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

### Interfaces

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

## Mechanics/electronics

	Ruler E150	Ruler E600	Ruler E1200
<b>Connectors</b>	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
<b>Connector material</b>	M12: nickel-plated brass, Ethernet: thermoplast/anodized aluminum		
<b>Supply voltage</b>	24 V DC, ± 20 %		
<b>Ripple</b>	< 5 V <sub>pp</sub>		
<b>Power consumption</b>	7 W		
<b>Current consumption</b>	< 1 A		
<b>Enclosure rating</b>	IP 65		
<b>Housing material</b>	Aluminum		
<b>Housing color</b>	Gray, varnished		
<b>Window material</b>	AR-coated, float glass		
<b>Weight</b>	5.1 kg	7 kg	
<b>Dimensions (L x W x H)</b>	295 mm x 107 mm x 163 mm	420 mm x 107 mm x 163 mm	

## Ambient data

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

<sup>1)</sup> Non-condensing.

## Ordering information

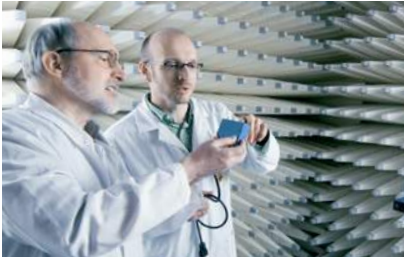
Accessories available at [www.mysick.com/en/Ruler](http://www.mysick.com/en/Ruler)

- 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
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		



## SICK at a glance



### Leading technologies

With a staff of more than 5,800 and nearly 50 subsidiaries and representations worldwide, SICK is one of the leading and most successful manufacturers of sensor technology. The power of innovation and solution competency have made SICK the global market leader. No matter what the project and industry may be, talking with an expert from SICK will provide you with an ideal basis for your plans – there is no need to settle for anything less than the best.



### Unique product range

- Non-contact detecting, counting, classifying, positioning and measuring of any type of object or media
- Accident and operator protection with sensors, safety software and services
- Automatic identification with bar code and RFID readers
- Laser measurement technology for detecting the volume, position and contour of people and objects
- Complete system solutions for analysis and flow measurement of gases and liquids



### Comprehensive services

- SICK LifeTime Services – for safety and productivity
- Application centers in Europe, Asia and North America for the development of system solutions under real-world conditions
- E-Business Partner Portal [www.mysick.com](http://www.mysick.com) – price and availability of products, requests for quotation and online orders

Worldwide presence with subsidiaries in the following countries:

Australia  
Belgium/Luxembourg  
Brasil  
Česká Republika  
Canada  
China  
Danmark  
Deutschland  
España  
France  
Great Britain  
India  
Israel  
Italia  
Japan

México  
Nederland  
Norge  
Österreich  
Polska  
România  
Russia  
Schweiz  
Singapore  
Slovenija  
South Africa  
South Korea  
Suomi  
Sverige  
Taiwan  
Türkiye  
Ukraine  
United Arab Emirates  
USA

Please find detailed addresses and additional representatives and agencies in all major industrial nations at [www.sick.com](http://www.sick.com)