Machine Vision Products

A New Dimension in Vision
Every day SICK sensor solutions simplify production for thousands of companies around the globe. Our industrial vision cameras bring you to a new dimension of flexible automation solutions.

With 20 years of vision experience SICK IVP is your partner of choice.

SICK IVP is a part of the SICK Group providing industrial vision cameras for factory automation.
Our Machine Vision cameras identify defective products before they reach your customer

What is Machine Vision?
Machine Vision replaces or complements manual inspection and measurement tasks using the latest digital imaging technology.

What our cameras will do for you:

Measure
- Length, width, height
- Area, volume, size
- Number of objects

Locate
- Presence
- Position [x,y], [x,y,z]

Inspect
- Correct assembly
- Shape

Identify
- Text and symbols
- Codes and patterns

Machine Vision solutions by SICK IVP save money by:
- Improving product quality
- Improving production yield
- Reducing cost of manual inspection
- Replacing complex sensor arrangement with one flexible camera
- Increasing customer satisfaction
Our customer's success ...

The IVC-3D smart camera brings the advantage of seeing all three dimensions for location and inspection in any part. True three-dimensional shape is the key for optimal picking precision and opens a new range of efficient robot solutions on the factory floor.

The SICK IVP Ranger performs a high-speed three-dimensional scan of the BGA surface and sends the recorded images to the connected PC, so no error goes undetected.

Ruler E is a perfect tool for in-line 3D-scanning applications. It is designed for tough environment of wood, steel and automotive industries.

The Ranger E camera measures 3D features at unmatched speed. In MultiScan mode it can capture 3D height measurements and also additional object features, such as intensity, gloss and scatter ...all at the same time!
... is the true measure of our products

The Inspector is an intelligent vision solution in an easy-to-use sensor package. No matter what angle or orientation your product comes down the line, the Inspector is up to the challenge – verifying completeness and quality.

The CVS4 vision sensor detects, recognises and if required counts characters. Furthermore the CVS4 can with advantage be used for batch code checking with it's support for count-up at trigger input.

The IVC-3D is a smart camera that combines imaging and analyses into one camera housing, using the same powerful image processing tools embraced for 2D cameras today.

The IVC-2D is a high performance smart camera for factory automation. It can read text, code and check quality at the same time.
Top Performance

The unsurpassed speed and performance is a result of SICK IVP’s patented CMOS sensor technology. The powerful image processor integrated on the sensor chip allows for extremely fast image processing.

Industrial Robustness

Our vision cameras are built for industrial environments. Every detail, from camera housings to cable connectors, are carefully designed with SICK’s long-time experience of industrial sensors for factory automation.

Getting the Third Dimension

Our 3D products are based on laser line triangulation, a very robust way of gathering height information.

2D & 3D Cameras

Some applications are best solved by 3D and some by 2D. Of course we offer both types to give you the optimal solution!

Grey scale image from a 2D camera

3D image where height is represented as intensity

WHAT IS THE DIFFERENCE?

Which connector pin is too low?

Which bracket is on top?

Which of them has a bad print?
We Do Even More!

Leading Support from SICK IVP’s Application Engineers

We strongly believe that support is one of the key factors to success in Machine Vision. Different companies have different experience in Machine Vision; we give a level of support to our OEMs and system integrators that match their own individual need. We support you with feasibility studies, application development, commissioning support and training.

Our Product Range:

Vision Sensors

- CVS
- Inspector

Smart Cameras

- IVC-2D
- IVC-3D

3D Cameras

- Ranger
- Ruler E
Vision Sensors

Application-Specific Vision Eyes!

The vision sensors of SICK are easy to use, rugged and reliable. They are designed to do application-specific tasks where a standard sensor would not work. SICK provides vision sensors for a various range of applications such as part inspection, OCR identification and colour sorting.

The SICK vision sensors are easy to set up and manage. With a teach-in and initial configuration, the devices are ready for immediate operation in the production line.
Inspector

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

The Inspector vision sensor inspects part details such as contour, contrast, and greyscale areas at any position or rotation of the part. It is a compact, user-friendly, and precise 2D vision sensor with integrated lighting, image evaluation, and Ethernet interface.

The Inspector can be used in many industries. Its robust and reliable design makes it perfect for the toughest environments, such as in the automotive industry. And, the Inspector’s intelligent and fast algorithms enable it to keep up with the speed of any production line in the packaging industry.

Fast logo inspection and date code presence on lotion

Inspector is ideally used for label inspection. It handles multi-inspections such as date code presence and logo identification simultaneous. Due to the sophisticated locator algorithm it finds the details of interest in any rotation of the lotion and at demanding production speeds. An additional advantage is the high-speed Ethernet interface which enables full production control by monitoring over network.

Robust ball bearing type verification

Inspector can with advantage be used for verifying that a specific ball bearing type is currently produced in a multi-type production line. Inspector distinguishes easily between the different in-prints, cavities and sizes of the ball bearing types. The memory of Inspector stores up to 16 different reference objects which are then selectable by the four input pins. A main advantage of Inspector on this type of application is the unique integrated dome light that overcomes the difficulties of reflective metallic surfaces.
Typical Inspector applications

Packaging

- Label position on bottles, cartons (vignette), cases, etc.
- Date code presence
- Cap inspection – presence, position, height, integrity or damage
- Blister packs – are all tablets in the blister, is the blister damaged, foil sealed
- Sterile soft bags – are all components inserted
- Level control of fluids where non-volumetric filling is applied
- Uniformity of positioning of packs in bulk

Small part assembly

- Bowl feeder inspection
- Verification of part assembly before next station
- Verify correct type in multi-type production lines
- Verify presence of holes, nuts, safety springs, and simmer rings
- Surface inspection for defects

Technical Data

<table>
<thead>
<tr>
<th>Interface</th>
<th>Ethernet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure rating</td>
<td>IP 67</td>
</tr>
<tr>
<td>Camera</td>
<td>Inspector i10</td>
</tr>
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| Nominal scanning distance/Field of view | Yes | -
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<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>50 ... 200 mm²/20 x 20 ... 72 x 72 mm²</td>
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<td>50 mm/ 30 x 30 mm²</td>
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<table>
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<table>
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<table>
<thead>
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<th>Number of referent objects</th>
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<table>
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<table>
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<td>-</td>
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<table>
<thead>
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<th>Dome light</th>
<th>-</th>
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<tr>
<td>-</td>
<td>Yes</td>
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<table>
<thead>
<tr>
<th>Supply voltage Vs</th>
<th>24 V ±20 % DC</th>
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<td>Yes</td>
<td>Yes</td>
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<table>
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<tr>
<th>Switching outputs</th>
<th>(B-type) 24 V</th>
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<tbody>
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<td>Yes</td>
<td>Yes</td>
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</table>

<table>
<thead>
<tr>
<th>- No object detected, object detected but fail, object detected and pass</th>
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<tbody>
<tr>
<td>Yes</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Trigger out to external light</th>
<th>5 V TTL</th>
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<th>Switching inputs</th>
<th>24 V</th>
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<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
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<table>
<thead>
<tr>
<th>- External trigger, Encoder, External teach, Reference object selection</th>
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<tbody>
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<td>Yes</td>
</tr>
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</table>

1) Focus up to 1000 mm distance possible but external illumination might be needed
CVS1 Easy and CVS2
- colour makes a difference!

The Colour Vision Sensors perform fast and reliable colour detection within a large field of view compared to point colour sensors. The CVS can store up to fifteen colours for detection, sorting and identification. The colour display integrated in the sensor device, makes it easy to supervise the teach-in and configuration of the application. With some additional key clicks on the integrated keypad, it is easy to fine tune the level of tolerance of the colour spot area and the tone of the colour.

Benefits with CVS from SICK:
- Fast and reliable colour identification and sorting
- Easy and fast set-up operation
- Flexible and customizable to batch production
- Matching of two colours

Examples:
- Sorting differently packed material
- Detect colour marks indicating defective parts on wood, plastics etc.
- Label presence
- Completeness of packages
- Matching of interior and package

Technical Data

| Working distances       | 210 ... 270 mm |
|                        | 90 ... 150 mm |
|                        | 50 ... 100 mm |
| Field of view          | 40 x 50 ... 55 x 65 mm² |
|                        | 40 x 50 ... 65 x 75 mm² |
|                        | 50 x 65 ... 110 x 115 mm² |
| Internal illuminations | 12 LEDs, white |
| Switching output       | 2 x PNP or NPN |
|                        | Serial Interface RS232 |
| Enclosure rating       | IP 67 |
Part verification by contour detection!
Contours, shapes and sizes are captured in fixed position – for scanning distances up to 150 mm and fields of view up to 65 x 75 mm². The intelligent Contour Vision Sensor CVS3 with integrated evaluation software differentiates between objects using shape or size; it detects the presence of, or damage to, printed labels and checks surfaces for contamination.

Benefits with CVS3 from SICK:
- Fast and reliable contour detection
- Object distinction according to shape or size
- Presence detection and damage control of printed labels
- Detection of contaminated surfaces
- Easy and fast commissioning

The CVS3 distinguishes objects using the taught-in contour.

Final checking of sunglasses. The CVS3 checks whether frames, lenses and ear pieces are where they belong.

Does the cap fit properly? The CVS3 ensures that only correctly assembled products are packaged.

Technical Data
- Working distances: 90...150 mm, 31...39 mm
- Field of view: 40 x 50...65 x 75 mm², 15 x 18...19 x 22 mm²
- Internal illuminations: 12 LEDs, white
- Switching output: 2 x PNP or NPN
- Serial interface: RS232
- Enclosure rating: IP 67
**CVS4**

**Date code inspection has never been easier!**

For scanning distances up to 150 mm and fields of view up to 79 x 76 mm², the CVS4 detects, recognises and, if required, counts characters. The CVS4’s integrated OCR evaluation software reads 60 characters on up to six lines. It has predefined formats for date and timecheck, and can be used for batch code checking with its support for count-up at trigger input.

**Benefits with CVS4 from SICK:**
- Fast and reliable character recognition and reading
- Detection of many different date and time formats, as well as of batch/serial numbers and freely defined strings
- Identification of rotated or slanted characters, tolerating different line thicknesses
- Easy and fast commissioning

**Technical Data**

<table>
<thead>
<tr>
<th>Working distances</th>
<th>90...150 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40...100 mm</td>
</tr>
<tr>
<td></td>
<td>44...56 mm</td>
</tr>
<tr>
<td></td>
<td>31...39 mm</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Field of view</th>
<th>53 x 25...79 x 76 mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>53 x 25...115 x 53 mm²</td>
</tr>
<tr>
<td></td>
<td>30 x 15...30 x 30 mm²</td>
</tr>
<tr>
<td></td>
<td>21 x 10...21 x 20 mm²</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Internal illuminations</th>
<th>12 LEDs, white</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Switching output</th>
<th>2 x PNP or NPN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial interface</td>
<td>RS232</td>
</tr>
</tbody>
</table>

| Enclosure rating  | IP 67          |

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Some products must be uniquely identifiable via a serial number. The CVS4 also counts the characters.

Attention to detail is essential for similar-looking but different products: The CVS4 ensures that the label shows what is inside.

The unique identification of a product is key in the food industry. The CVS4 checks if the batch number is correct and, by controlling the use-by date, ensures transparency for the customer.
Smart Cameras

IVC – Industrial Vision Cameras for Stand-Alone Solutions

The IVC-2D and IVC-3D smart cameras use a PC or laptop for application development and operate stand-alone or as part of the factory network. The inspection results can be sent directly to the PLC or handling equipment and also be monitored via Ethernet.
Graphical user interface for fast development!

Both IVC-2D and IVC-3D are configured using IVC Studio, a flexible software that gives the developer quick and easy access to more than 100 powerful image processing tools. Once configured, the cameras can work in stand-alone mode without the need for a PC or as part of a factory network, communicating results, data and images over Ethernet.

Flexible support for application designed user interfaces

Create tailor-made user interfaces making it easy for line operators and installation technicians to watch over the processes and do maintenance operations:

- **Special purpose user interfaces through ActiveX**
  Application designed user interfaces for HMI Controls can be created via Microsoft’s COM technology, running the IVC Studio in the background.

- **Visualization and operation via Web interfaces**
  The IVC Web interface enables creation of very flexible user interfaces that can be reached through standard web browsers.

- **Visualization and control through OPC**
  Windows client applications can communicate through OPC (OLE for process control). This is a straightforward way of data exchange between devices and SCADA visualization systems.
High Performance Smart Camera for industrial environment

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. Once configured the camera works in stand-alone mode, without the need for a PC.

Top-Performance to meet production demands of tomorrow

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

Benefits with IVC-2D:
- Robust 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
- Precision measurement and accurate verification of size
- Packaging and printing checked in one step

Packaging and printing checked in one step using OCR/OCV

The IVC-2D Industrial Vision Camera can not only check geometries, but also simultaneously detect and read figures, letters and bar codes, e.g. sell-by dates for food or batch numbers on pharmaceutical packages. The camera system thus becomes a complete solution for inspecting packaging and its printing in a single pass.
### Technical Data

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
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<tbody>
<tr>
<td><strong>Interface</strong></td>
<td>10/100 MB Fast Ethernet TCP/IP, UDP/IP</td>
</tr>
<tr>
<td><strong>Serial Interface</strong></td>
<td>RS 485</td>
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</table>
| **Digital I/O**                  | 4 program control inputs (1 trigger input)  
                                  | 3 program control outputs  
                                  | Illumination trigger output |
| **Enclosure rating**             | IP 65 with hood                      |
| **Options**                      | Stainless steel enclosure            |
| **Dimensions (L x H x D)**       | 161 x 55 x 60 mm                     |

<table>
<thead>
<tr>
<th>Camera Type</th>
<th>IVC-2DR1111</th>
<th>IVC-2D</th>
<th>IVC-2D HiRes</th>
<th>IVC-2D Reader</th>
<th>IVC-2D HiRes Reader</th>
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<tbody>
<tr>
<td><strong>Performance</strong></td>
<td>150 MHz</td>
<td>800 MHz</td>
<td>800 MHz</td>
<td>800 MHz</td>
<td>800 MHz</td>
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<td><strong>Memory RAM/Flash</strong></td>
<td>64 MB/16 MB</td>
<td>128 MB/16 MB</td>
<td>128 MB/16 MB</td>
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<tr>
<td><strong>Type</strong></td>
<td>IVC-2DR1111</td>
<td>IVC-2DM1111</td>
<td>IVC-2DM1121</td>
<td>IVC-2DM1112</td>
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<td><strong>Resolution</strong></td>
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<td>640 x 480</td>
<td>1024 x 768</td>
<td>640 x 480</td>
<td>1024 x 768</td>
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<tr>
<td><strong>OCR/OCV</strong></td>
<td>-</td>
<td>-</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td><strong>Bar codes/2D codes</strong></td>
<td>-</td>
<td>-</td>
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<td>Yes</td>
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</tr>
</tbody>
</table>

* For example: EAN-13, UPC-A, EAN-8, UPC-E, code 39, code 128, pharma code, i2of5, code 32, DATAMATRIX
The first 3D smart camera in the world!
The IVC-3D is the first smart camera in the world that is
designed to inspect and measure in three dimensions. With
tools that are designed to measure height, volume, shape and
profiles, 3D applications are now easily solved with the IVC-3D
smart camera.

IVC-3D is the key to true shape inspection
The break pad application is an example of several
inspections in one single shot:
- Surface defects
- Height position of the plug
- Angle of the metallic spring
All features are very difficult to detect by 2D cameras alone
but with IVC-3D the application is quickly developed in the
graphical IVC Studio user interface.

Contrast-independent inspection
by 3D measurement
The verification of praline box content requires a system that
can check dark objects on a dark background. 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 robust height measurement

Calibrated 3D inspection at
production speeds
With the factory-calibrated IVC-3D your glue string
inspection is done extremely fast and accurate. With a
conveyor speed of 1 meter/second the verification of the
glue string cross-section is done each half millimeter.
Image processing in the third dimension: the IVC-3D Industrial Vision Camera.

### Technical Data

#### Performance
- Up to 5000 profiles/second,
- 800 MHz processor and FPGA acceleration

#### Interface
- 10/100MB Fast Ethernet TCP/IP UDP/IP

#### Serial Interface
- RS 485

#### Digital I/O
- 3 program control inputs (1 trigger input)
- 3 program control outputs
- Trigger output

#### Encoder Interface
- RS 422

#### Enclosure rating
- IP 65

#### Laser class
- 2M/2

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<tr>
<th>Camera</th>
<th>IVC-3D 30</th>
<th>IVC-3D 50</th>
<th>IVC-3D 100</th>
<th>IVC-3D 200</th>
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<td>IVC-3D51111</td>
<td>IVC-3D11111</td>
<td>IVC-3D41111</td>
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<td>Example field of view (H x W)</td>
<td>30 x 60 mm</td>
<td>50 x 150 mm</td>
<td>180 x 270 mm</td>
<td>200 x 600 mm</td>
<td>250 x 1250 mm</td>
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<td>3D height resolution</td>
<td>0.015 mm</td>
<td>0.04 mm</td>
<td>0.05 mm</td>
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<td>2048 points</td>
<td>2048 points</td>
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<td>1400 points</td>
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<td>294 x 163 x 69 mm</td>
<td>294 x 163 x 69 mm</td>
<td>387 x 163 x 69 mm</td>
<td>387 x 163 x 69 mm</td>
</tr>
</tbody>
</table>

1) Front windows in PMMA
2) Typical - the height resolution depends on measurement setup
3D Cameras

High Speed 3D Cameras for Advanced Applications and Tough Industrial Environments!

Ranger and Ruler cameras measure 3D features at unmatched speed, producing series of profiles of the measured object. Providing a 3rd dimension adds height and shape measurement data, which is an advantage when correctly classifying an object. The Ranger and Ruler cameras are key components in many market-leading in-line inspection machines for 3D vision. The generated 3D data is distributed over standard interfaces, such as CameraLink and Gigabit Ethernet, to a PC for analysis.
Ranger Studio

Professional configuration and evaluation tool

Ranger Studio is an evaluation tool designed to familiarize new users with the possibilities of our 3D camera system. Ranger Studio is used to tune in geometrical and optical conditions, test the different configurations and evaluate which one is most suitable for the specific industrial application. Furthermore the result can be displayed in a number of different views, such as a normal sensor image, profile image and as a 3D image.
**Fastest 3D available!**

Ranger is the ultimate 3D camera for the most advanced needs. With its high speed and flexible configuration possibilities it is the key vision component in 3D scanners. It can be used to measure object height, shape and volume, to detect and locate shape defects, to make quality grading, etc.

The Ranger can acquire up to 35,000 profiles per second, each containing up to 1536 high quality 3D coordinates. The complete 3D calculation is done inside the camera and the ready-to-use 3D coordinates are sent directly to a standard PC via CameraLink or Gigabit Ethernet.

Besides 3D measurements, most Rangers can measure a multitude of other object features like, intensity, gloss, and scatter, at the same time! Hence, with the use of a single camera several different aspects of the object can be gathered to derive more robust results for decision making. This functionality is referred to as MultiScan.

**Major benefits:**
- The fastest 3D camera available: Up to 35,000 shape profiles/s!
- Measure several object features at the same time: More robust results using one single device
- Major standard vision interfaces supported: CameraLink and Gigabit Ethernet
- User configurable through software: Flexible solution for a wide range of applications
- Data from several Rangers can be combined: Complete true shape analysis
- Free choice of image analysis routines and PC power: Optimized application solutions using standard components
- Best market price/performance!

**Examples:**
- Volume measurement of solder paste
- Quality of substrates and components
- True shape of logs in sawmill
- Food portioning
- Glue string measurement
- Robot guidance
- Tire inspection
- Rail inspection

**Component Inspection**

**Board Inspection**
Ranger C  High speed 3D and MultiScan camera with CameraLink interface. Up to 30,000 profiles/s in 3D mode. Several 3D algorithms and MultiScan components available. Highly configurable via software parameters. I/O and encoder inputs at TTL level.

Ranger E  High speed 3D and MultiScan camera with GigaBit Ethernet interface. Up to 35,000 profiles/s in 3D mode. Several 3D algorithms and MultiScan components available. Highly configurable via software parameters. 24 V I/O and RS 422 (TTL level) for encoder input.

Ranger D  Pure 3D camera with GigaBit Ethernet interface with mid speed performance of 1,000 profiles/s. Uses a high precision 3D algorithm with few parameters. 24 V I/O and RS 422 (TTL level) for encoder input.

### Technical Data

<table>
<thead>
<tr>
<th>Camera</th>
<th>Ranger C</th>
<th>Ranger E</th>
<th>Ranger D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>Up to 30,000</td>
<td>Up to 35,000</td>
<td>Up to 1000</td>
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<tr>
<td>Interface</td>
<td>CameraLink</td>
<td>Gigabit Ethernet</td>
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<tr>
<td>Options</td>
<td>IR filter for increased robustness to ambient light disturbances</td>
<td>IR filter for increased robustness to ambient light disturbances</td>
<td></td>
</tr>
<tr>
<td>Host platform</td>
<td>PC, Windows XP for all cameras</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development environment</td>
<td>C++ (VS .NET 2003) or C (VS .NET 2003, VS6) for all cameras</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synchronisation of data</td>
<td>Free running, light switch enable, rotary encoder trig for all cameras</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Camera</td>
<td>Ranger C40</td>
<td>Ranger C50</td>
<td>Ranger E40</td>
</tr>
<tr>
<td>Grey line resolution</td>
<td>512</td>
<td>1536</td>
<td>512</td>
</tr>
<tr>
<td>3D profile resolution</td>
<td>512</td>
<td>1536</td>
<td>512</td>
</tr>
<tr>
<td>Maximum 3D height resolution</td>
<td>13 bits, 1/16 pixel for all cameras</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-mount optics</td>
<td>½ inch</td>
<td>1 inch</td>
<td>½ inch</td>
</tr>
</tbody>
</table>
MultiScan on Ranger

Measure it all at once!

Ranger supports MultiScan measurement – this means that the camera can acquire a number of properties (such as 3D, greyscale and scatter) of the measured object in the same scan.

One of the benefits of the MultiScan feature is a more robust result by combining 3D and other information for decision making. A second advantage is the need of only ONE camera, where in other cases there is need for one area camera and one or several line scan cameras to produce the same result.

Benefits with MultiScan on Ranger from SICK IVP:
- One camera instead of many
- Up to 1536 pixel 3D width
- Up to 3072 pixel greyscale line width
- Best market price/performance

Examples:
- Wood quality grading
- Ceramic tile quality grading
- Size and quality grading of fruits
- Rubber and plastic extrusion

High Speed 3D

Gloss Measurement

High Resolution Greyscale

Laser Scatter
The speed and performance is extremely high thanks to SICK IVP’s unique and patented sensor technology. MultiScan is the solution for any in-line inspection task where 2D or 3D alone does not solve the problem.

### Technical Data

<table>
<thead>
<tr>
<th>Camera</th>
<th>Ranger C</th>
<th>Ranger E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>Up to 30,000</td>
<td>Up to 35,000</td>
</tr>
<tr>
<td>Interface</td>
<td>CameraLink</td>
<td>Gigabit Ethernet</td>
</tr>
<tr>
<td>Dimensions (L x H x D)</td>
<td>110 x 50 x 50 mm</td>
<td>125 x 52 x 52 mm</td>
</tr>
<tr>
<td>Options</td>
<td>IR filter for increased robustness to ambient light disturbances</td>
<td>IR filter for increased robustness to ambient light disturbances</td>
</tr>
<tr>
<td>Host platform</td>
<td>PC, Windows XP for all cameras</td>
<td></td>
</tr>
<tr>
<td>Development environment</td>
<td>C++ (VS.NET 2003) or C (VS.NET 2003, VS6) for all cameras</td>
<td></td>
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</table>

### Camera

<table>
<thead>
<tr>
<th>Camera Type</th>
<th>HiRes grey line resolution</th>
<th>Grey line resolution</th>
<th>3D profile resolution</th>
<th>Maximum 3D height resolution</th>
<th>C-mount optics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranger C40</td>
<td>3072</td>
<td>512</td>
<td>512</td>
<td>13 bits, 1/16 pixel for all cameras</td>
<td>½ inch</td>
</tr>
<tr>
<td>Ranger C50</td>
<td>1536</td>
<td>512</td>
<td>1536</td>
<td></td>
<td>1 inch</td>
</tr>
<tr>
<td>Ranger C55</td>
<td>1536</td>
<td>1536</td>
<td>1536</td>
<td></td>
<td>1 inch</td>
</tr>
<tr>
<td>Ranger E40</td>
<td>3072</td>
<td>512</td>
<td>512</td>
<td></td>
<td>½ inch</td>
</tr>
<tr>
<td>Ranger E50</td>
<td>1536</td>
<td>1536</td>
<td>1536</td>
<td></td>
<td>1 inch</td>
</tr>
<tr>
<td>Ranger E55</td>
<td>1536</td>
<td>1536</td>
<td>1536</td>
<td></td>
<td>1 inch</td>
</tr>
</tbody>
</table>
Ruler E

Gigabit 3D for tough environments!

Ruler E is a perfect tool for in-line 3D-scanning applications. Our OEM customers and Vision Integrators use the Ruler E to build 3D scanners with the highest performance and accuracy on the market. It is designed for tough environment of wood, steel and automotive industries and with the heating option it can perform at a –30 °C temperature.

Ruler E is a camera with built-in laser and optics for a predefined field of view, which makes it very easy to install. The data output from the Ruler is calibrated world coordinates in mm which are delivered in a high speed Gigabit Ethernet interface. Application development is made in a high-level VB .Net or C++ programming environment.

Benefits with Ruler E from SICK IVP:
- Easy to integrate
- Data as world coordinates
- Robust housing
- Operates down to low temperature
- Best market price/performance

Examples:
- Log sorting
- Board optimization
- Pallet quality grading
- Bulk volume measurement
- Optimised meat portioning
**Technical Data**

<table>
<thead>
<tr>
<th>Performance</th>
<th>10,000 3D profiles per second</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Gigabit Ethernet</td>
</tr>
<tr>
<td>Host platform</td>
<td>PC, Windows XP</td>
</tr>
<tr>
<td>Development environment</td>
<td>Net Assembly or C++ (VS.NET 2003)</td>
</tr>
<tr>
<td>Synchronisation of data</td>
<td>Free running, light switch enable, rotary encoder trig</td>
</tr>
<tr>
<td>Dimensions (L x H x D)</td>
<td>420 x 163 x 105 mm</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>IP 65</td>
</tr>
<tr>
<td>Laser class</td>
<td>2M/2 (optionally 3B)</td>
</tr>
<tr>
<td>Options</td>
<td>Scatter measurement, 3B laser, heating</td>
</tr>
<tr>
<td>Camera</td>
<td>Ruler E1200 Ruler E600</td>
</tr>
<tr>
<td>Max profile width</td>
<td>1024</td>
</tr>
<tr>
<td>3D height resolution</td>
<td>0.4 mm 0.2 mm</td>
</tr>
<tr>
<td>Example field of view (H x W)</td>
<td>250 x 1200 mm 250 x 600 mm</td>
</tr>
</tbody>
</table>

![Field of view (mm)](image)
Other vision products

Cameras for code reading

**ICR 803**

**High performance at maximum compactness**
- 1D, stacked, and 2D code reading in one device
- Small housing of 49 x 40 x 25 mm, only 37 g
- Simple configuration and installation
- Presentation mode or serial, manual and hardware trigger

**ICR 840-2, ICR 845-2**

**New dynamic parameter switching for batches with differently marked codes!**
- Omnidirectional reading of 1D and 2D codes on objects which are standing still or moved fast
- Several optical versions, imager resolution, reading distances e.g. 50 mm, 80 mm, 115 mm, 145 mm
- Pre-defined parameter sets for direct part marking
- Comfortable visualisation of image and diagnostic data in the live image
- Ethernet interface for data and image transfer on board

**ICR 850-2, ICR 852-2, ICR 855-2**

**The solution for Data Matrix identification in movement!**
- High speed, omnidirectional 1D and 2D code reading!
- Wide reading field of 80 mm
- Several optical variants for different reading distances and code resolutions
- Reading of codes in motion up to 10 m/s
- Ethernet interface for data and image transfer on board

**ICR 860, ICR 862**

**Flexible, pre-configured vision system for your Data Matrix code applications!**
- Identifying of Direct Part Marking (DPM) codes
- Reading distances from 0.2 up to 2 m
- Compatible with CS- or C-mount lenses
- Pre-qualified illumination available
- Easy to use GUI - no additional programming
Cameras for code reading

ICR 890
Camera system for reading 1D and 2D codes with superb image quality!

- Image code reader
- Ideal for solution for all high-end applications in the area of linear and 2D code reading in transport and logistics processes
- Suitable for OCR and video coding applications
- Quick, reliable identification even of poorly printed codes
- Simple configuration using SOPAS engineering tool
- High reliability (50,000 h MTBF)

Safety camera systems

V4000 Press Brake
Increased machine efficiency due to fewer stops!

- Safety system for the protection of presses
- Safety camera system with continuously monitored and adjusted protective volume
- Optimised protection modes for the most common bending tasks
- Insensitive to vibration and contamination

Laser measurement sensor

Robust sensor for palletising and depalletising applications!

LMS 400 is a Perfect Line scanner for 3D profiling of objects at distances up to 3 m. It is a solid ‘eye’ for robots in handling and palletising/depalletising applications. The scanner is flexible in either mounting on or aside the robot. A 3D image can be done by either moving the product or the scanner.

- 2D distance data from 0.7 m to 3 m
- 70° scan view at 0.1° to 1° angular resolution
- Ideal to identify objects in crates, boxes or on pallets
- High ambient light immunity
- Reflectivity data for greyscale imaging
- No additional illumination necessary
Vision accessories

SICK offers a wide range of accessories to support a complete Machine Vision solution.

Light is used to illuminate an object in a proper way. All the necessary types of lights are found in the expanded SICK vision light portfolio. The lights are available in different colours and sizes, with or without diffuser:

- Direct front lights: ring light, bar light and spot light
- Indirect front lights: low angle light
- Coaxial lights: On axis light and flat dome light.
- Back light

The lights can be strobed and can be connected to the camera through a standard M12 industrial connector.

Lenses are important when working with different field of views and distances. SICK lenses can be found from 8 up to 25 mm. A filter in combination with the right lens can be used to block unwanted light to reach the sensor.

The laser module is a vital part in a 3D application. There are internal laser modules in the IVC-3D and the Ruler products, but there are also possibilities to add external laser modules in laser class 2M and 3B for all the vision products. If the application requires waterproof housings SICK offers IP 67 lasers.
Vision accessories

Cables in different lengths are provided by SICK to support the connection of the complete Machine Vision solution; power, I/O, Ethernet, encoder etc.

Frame grabbers are used for image acquisition for the 3D cameras and SICK offers versions for both single and dual camera set up.

A calibration object specially designed for IVC-3D to align the camera with a robot’s coordinate system.
FACTORY AUTOMATION

With its intelligent sensors, safety systems, and auto ident applications, SICK realises comprehensive solutions for factory automation.

- Non-contact detecting, counting, classifying, and positioning of any types of object
- Accident protection and personal safety using sensors, as well as safety software and services

LOGISTICS AUTOMATION

Sensors made by SICK form the basis for automating material flows and the optimisation of sorting and warehousing processes.

- Automated identification with barcode and RFID reading devices for the purpose of sorting and target control in industrial material flow
- Detecting volume, position, and contours of objects and surroundings with laser measurement systems

PROCESS AUTOMATION

Analyzers and Process Instrumentation by SICK MAIHAK provides for the best possible acquisition of environmental and process data.

- Complete systems solutions for gas analysis, dust measurement, flow rate measurement, water analysis or, respectively, liquid analysis, and level measurement as well as other tasks

Worldwide presence with subsidiaries in the following countries:

- Australia
- Belgium/Luxembourg
- Brasil
- Ceská Republika
- China
- Danmark
- Deutschland
- España
- France
- Great Britain
- India
- Israel
- Italia
- Japan
- Netherlands
- Norge
- Österreich
- Polska
- Republic of Korea
- Republika Slovenija
- România
- Russia
- Schweiz
- Singapore
- Suomi
- Sverige
- Taiwan
- Türkeiye
- USA/Canada/México

Please find detailed addresses and additional representatives and agencies in all major industrial nations at www.sick.com

Handed over by: