ELECTROMOBILITY AS DRIVER OF INNOVATION
SENSOR INTELLIGENCE IS PLAYING ITS PART

Solutions for more flexibility and efficiency

SICK
Sensor Intelligence.

ELECTRICITY DRIVES MOBILITY

More and more vehicles are relying on electric motors instead of combustion engines and "intelligence" is increasingly being built into vehicles. Developments in the area of electromobility are having a massive impact on industry as a whole. It is not only automakers and suppliers that are calling for new production concepts and processes. They are also being demanded by machine tool manufacturers, the handling and assembly technology, and the battery making industry. Sensor intelligence is playing its part in response to this.

EXAMPLES OF THE KINDS OF CHALLENGES ASSOCIATED WITH THE GROWTH OF ELECTROMOBILITY

Multimedia, communications, intelligence

The task:
Seamless traceability for electronic parts, components, and batches

The solution:
Compatible identification solutions such as bar code scanners, image-based code readers, and RFID

The task:
Automated and efficient quality control during the final assembly of electronic modules

The solution:
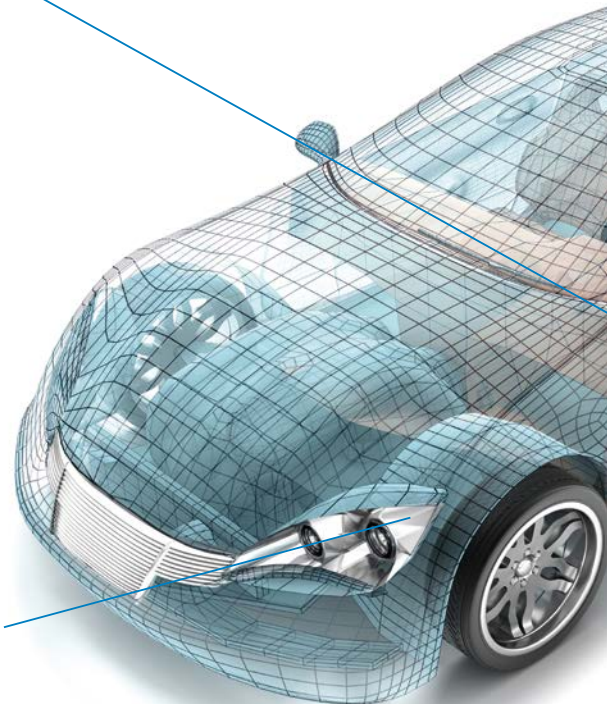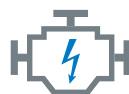Quality control systems such as Pinspector for optimizing PCB productionn

Engine production (electric and hybrid)

The task:
Safe and efficient human-robot collaboration at a robot-based handling workstation
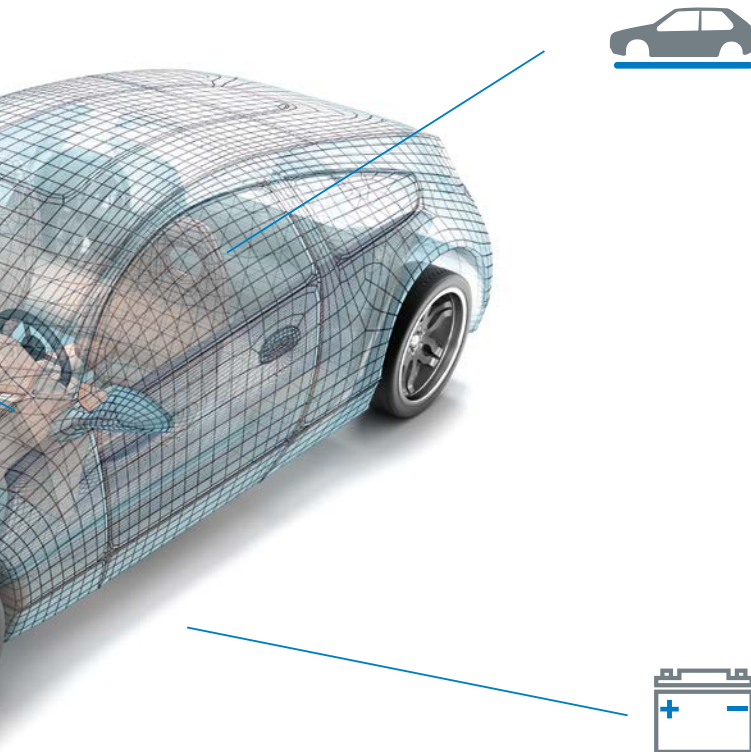
The solution:
A safety laser scanner (such as the microScan3) combined with a safety controller

Alternatives to the conventional combustion engine are now available – whether in the form of a fully electric solution, a hybrid drive, or a fuel cell. The economic and ecological advantages particularly in terms of zero local emissions) are obvious. The population growth we are seeing in megacities, the problems of climate change and a scarcity of resources, and – on top of that – changes in user habits are also revealing that the mobility solutions of the future will have to be more sustainable, more flexible, and more efficient. As a viable alternative, electromobility is proving to be a driver of innovation.

Automakers and their suppliers have to develop new knowledge and capabilities in addition to their established areas of expertise (such as interiors, tires, or body construction). New components – such as powerful batteries, electric motors, and the corresponding power electronics – are making their way into vehicles and have to be produced and assembled using a high degree of automation. At the same time, we are seeing a rise in the number of different components per car. However, this increase in components and parts also means that they have to be reliably detected, checked, and identified in larger quantities.

Design engineering, handling, robotics

The task:
Reliable detection of all kinds of materials (carbon, transparent materials)

The solution:
MultiTask photoelectric sensors such as PowerProx

The task:
Inline quality assurance testing of adhesive beads in CFRP body construction

The solution:
A complete solution comprising the Inspector PIM60 Bead 2D vision sensor, the illumination, and the brackets

Battery production

The task:
Automated checking of the battery module (from a straightforward presence check right through to inspection of the weld seam and contact)
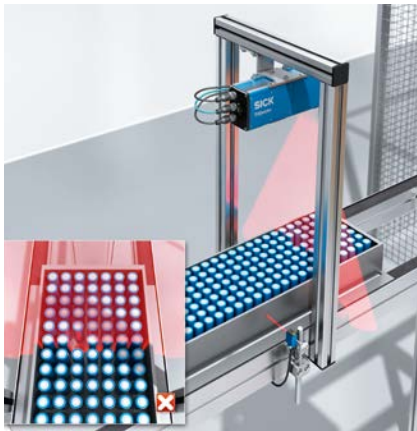
The solution:
3D vision sensors such as the TriSpector and IVC-3D

ELECTROMOBILITY: FROM CHALLENGES TO INNOVATIONS

Efficiency and high process quality in demand

The ability to produce high-quality parts efficiently in large quantities calls for a high degree of automation in the production process. As the significance of electromobility continues to grow, more and more is being demanded from one of the key components: the energy storage unit. Battery manufacturers have to make sure that their products meet stringent requirements concerning safety, performance, and service life. This demands the utmost reliability in production processes and imposes strict requirements on quality control. However, cost-effectiveness also has a role to play. A broad technology portfolio and the respective application knowledge are keys to implementing appropriate solutions for an efficient production process. For example, it is absolutely crucial to stack the electrode and separator sheets correctly during battery cell production. If, as a result of

Battery module: As a stand-alone solution, the TriSpector1000 enable reliable 3D inspection of the individual components in the battery module.

adhesion, several identical sheets are added at the same time, the resulting cell will be defective. A double-layer sensor can reliably detect any electrode sheets that are stuck together – thereby helping to minimize rejects. Depending on the application, vision sensors

The energy storage unit

A broad technology portfolio and the respective application knowledge are keys to implementing appropriate solutions for an efficient production process. An investment, that really pays off: energy storage units become less expensive and therefore interesting for use in other areas, for instance "home storage banks". They are used in combination with private photovoltaic systems.

However, "energy storage systems" (ESS) also make an important contribution to industrial applications: as emergency power supplies and for reducing energy and therefore production costs.

can also assist with quality control in addition to displacement measurement sensors. For instance, a straightforward check can be performed to see if the components are present within the battery module or a sophisticated 3D inspection can be carried out on weld seams or plug connectors. When combined in exactly the right way, the vision sensors, illumination, and bracket form an efficient complete solution that is easy to integrate, e.g., for the inline quality control of adhesive beads in CFRP body construction.

Flexible management of all kinds of components

Reliable identification of objects is a prerequisite for a smooth production flow, and forms the basis for traceability and – in turn – continuous quality improvements. The properties of the objects being detected can vary significantly. As a result, flexibility and precision are required. Miniature photoelectric
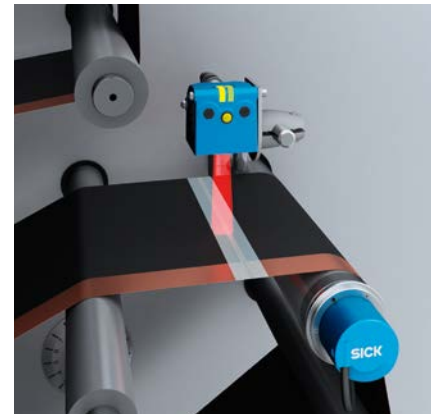

Always the right solution: Thanks to the broad technology portfolio, luminescent, colored, or partly transparent splicing tape can always be detected reliably according to the requierements.

sensors have an important role to play in this regard. They can reliably detect shiny jetblack objects or hard-to-detect materials such as carbon, and can communicate the resulting information. The ability to offer exactly the right identification solution for every stage of the production cycle is absolutely essential if the traceability of products, components, and batches is to be ensured. Not only is reliable data management an absolute necessity for potential product recalls; it also opens up new potential for optimizing processes. As a result, efficient detection of production data provides a major competitive edge. To cater for these requirements, SICK offers a wide range of both permanently installed and mobile readers for bar codes, 2D codes, and RFID technology. Because connectivity, the user interface, and the accessories are all standardized, customers can switch flexibly between the various technologies – a real advantage when it comes to security of investment and sustainability.

The simple, safe way to increase productivity

Safety solutions for machines and plants nowadays have to do more than "just" protect against accidents – we are increasingly seeing the need to offer added value with respect to automation engineering. Battery packs for the automotive industry consist of several individual battery modules that have to be fitted inside the vehicle in a particular way. A complete pack is too heavy to move manually. Consequently, AGVs are used to transport the packs from one loading station to the next. They then drive directly to the station where the installation process is performed.
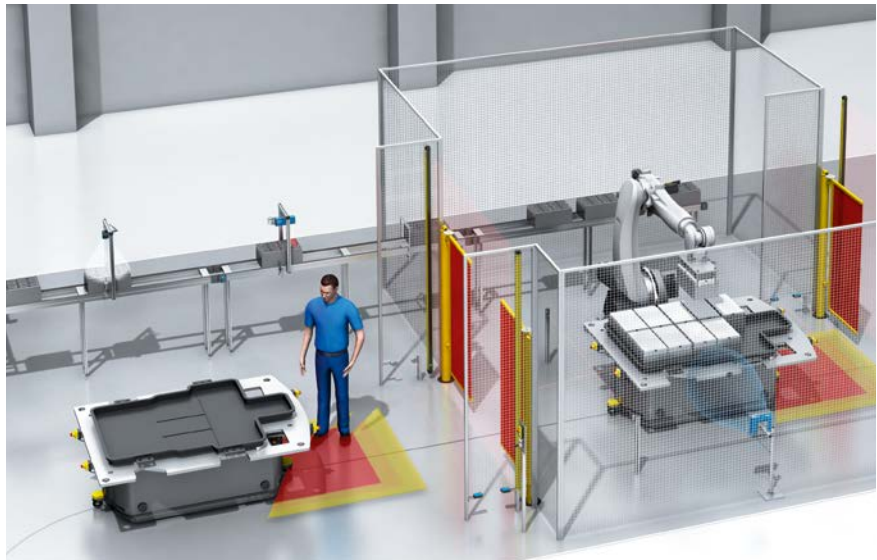
Using AGVs to produce battery packs for the automotive industry.

SICK ensures the safety of the AGVs by installing its S300 Mini Remote safety laser scanner in combination with the Flexi Soft safety controller, motion control module, DFS60S Pro safety encoder, and emergency stop safety command devices for the protection of humans and machines.

Competent sensors instead of drivers

With its experience of successful AGV projects, comprehensive understanding of overall intralogistic and industrial rocesses, and extensive technical knowledge, SICK is the obvious choice for solutions that are able to meet the growing demand for AGCs. At the center of all this lie its individually tailored advice services and customer-specific complete solutions for navigation, safety, and traceability.

More information:

➜ www.sick.com/electromobility

AUTOMOTIVE AND PARTS SUPPLIER

## Safe human-robot collaboration in the production of electric motors

When assembling electric motors, human-robot collaboration is used to boost productivity. A robot takes the electric motors from the conveyor belt and gives them to the worker for further processing. This person places a wiring harness in the designated place in the electric motor. The robot then places the workpiece back on the conveyor belt. In this way, the robot functions as a flexible production assistant that can help the worker with unergonomic, manual tasks. The safety solution at the workstation is implemented by means of a microScan3 safety laser scanner and the Flexi Soft safety controller.

Recommended products

Flexi Soft 20
microScan3 Core 20

Work station identification
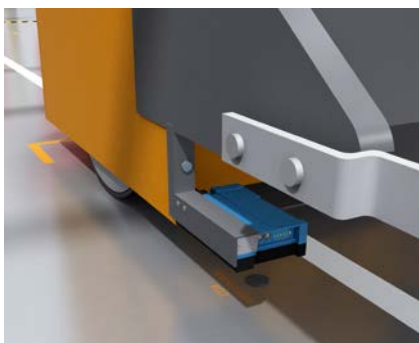
An automated guided vehicle (AGV) travels to a variety of work stations. The RFH620 RFID interrogator reads the ID number of the work station coded in the RFID transponder and forwards this to the system. The RFID technology is non-contact and therefore free of wear even in rough environments.

Recommended products

RFH6xx 26

Identifying printed circuit boards
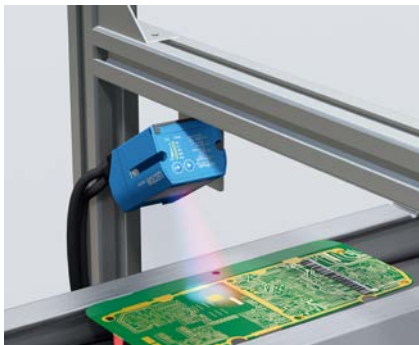
The Lector620 image-based code reader identifies the printed circuit board depending on the 1D or 2D codes applied. The Lector620 can read both types of codes in both directions due to its extremely compact housing design. The integrated laser aiming line makes it particularly user-friendly.

Recommended products

Lector62x 26

3D inspection at high speed

The amount of solder paste speci-fied and applied is checked at a high throughput rate and with a high reso-lution. The Ranger 3D camera offers a z-axis resolution of 5 µm at a speed of 90 cm^2/s. 3D inspection solutions from SICK support high production rates.

Recommended products

Ranger 32

Mobile identification of placement material

SICK's hand-held scanners demonstrate their strengths when equipping the feeder. Reconstruction algorithms reduce the manual input. Codes are identified fast with more than 500 scans per second. IDM hand-held scanners are available with Bluetooth or WLAN and have PS/2, USB or RS-232 interfaces.

Recommended products

High-precision pin inspection for the press-fit operations during the final assembly of electronic modules
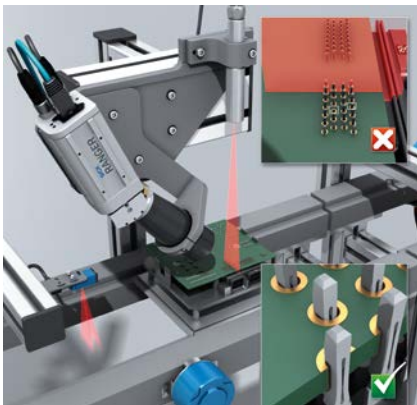
The Pinspector quality control system, which consists of a 3D streaming camera from the Ranger product family and laser technology, detects deviations from the defined quality standard for plug connectors and pins at the connection side of printed circuit boards. A three-dimensional, non-contact measurement function is used to check that the pins are correctly aligned with the designated through holes in the printed circuit board. After successful positioning, Pinspector gives the go-ahead for the press-fit operation. The same three-dimensional position measurement function is run after the press-fit operation to monitor the presence, height, and co-planarity of the pins.

Recommended products

ELECTRONICS

Multiple code reading on PCB panels

The Lector63x image-based code reader can identify all codes on a printed circuit board panel. The special software script makes it possible to selectively output or serialize individual codes according to customer requirements. The read rate can be raised considerably by recording several images from different angles. Thanks to its large field of view, the Lector63x can flexibly record codes regardless of their position, contrast ratios or conveyor speed. This means, for example, that retrofitting is no longer necessary when reading different E-card designs.

Recommended products

Lector63x 27

Reliable detection of PCBs

Switching errors in the detection of PCBs due to recesses or reflective surfaces can cause costly faults in the production process. The WTB2S-2 ultra-compact photoelectric proximity sensor with linear light spot overcomes these challenges even in the smallest of spaces.

Recommended products

W2S-2 16

Double layer detection of PCBs

Faults in the handling system can cause double layers in printed circuit boards, which result in costly consequential errors if undetected. The OD Mini displacement measurement sensor measures the printed circuit boards and uses integrated evaluation functions via a digital output to issue a warning if PCBs are lying on top of each other.

Recommended products

OD Mini 25

Reliable edge detection with ultrasonic technology

Objects in the background or movements of reflective machine parts often make precise and reliable edge detection of the printed circuit board difficult. The UC4 high-resolution, compact ultrasonic sensor only detects the PCB even if the placement head is only millimeters away from it, for instance.

Recommended products

UC4 28

## Reliable presence detection of printed circuit boards
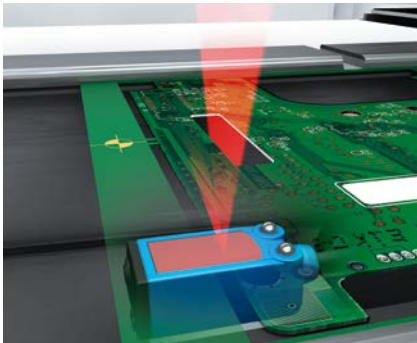
Printed circuit boards are now also customized from a mechanical perspective, meaning that PCB panels often contain large openings and holes. The W4-3 MultiLine photoelectric proximity sensor with two logically linked light lines tolerates large openings without switching errors, enhancing machine availability.

### Recommended products

Checking the profile of applied seals
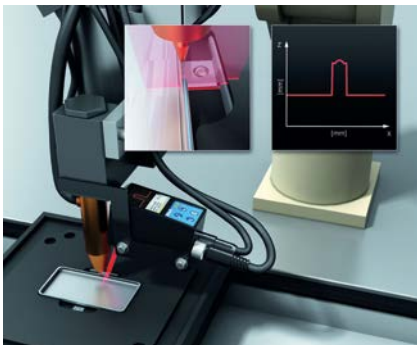
If seals are applied incorrectly or in the wrong positions during the production of electronic devices, significant defects can arise in the devices as a result. The Profiler2 laser profile sensor creates comprehensive and non-contact 2D profile analyses of sealing and adhesive beads during the production process, making a significant contribution to process reliability.

Recommended products

Intelligent access protection for maximum productivity
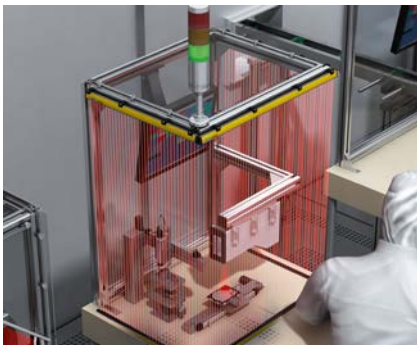
Ensuring maximum protection of people at assembly and test stations combined with minimum access restrictions requires an intelligent solution. With the miniTwin4 safety light curtain, straightforward, end-to-end protection over a U-shaped area can be achieved. The solution is cost-effective, as no additional safety components are required as a result of cascading.

Recommended products

Safely increase the productivity of work stations with PSDI function

PSDI functionality implemented with an opto-electronic protective device and a safety controller allows the worker to start the machine cycle by simply leaving the protective field after loading the machine. Two-hand control device and foot pedals are no longer needed. As there are fewer movements to perform by the worker, part cycle time decreases and daily productivity increases significantly. The work station is safeguarded according to European safety standards, so the worker can focus entirely on the assemblies at hand.

Recommended products

PCB inspection with SIM4000 and picoCam304x

There are many inspection and identification tasks to be done in the printed circuit board industry. Industrial image processing is used to ensure production quality and consistent traceability of all production steps - the SIM4000 Sensor Integration Machine and two pico-Cam304x streaming cameras are the perfect complements in these processes. The SIM4000 does both inspection and identification tasks with the help of HALCON procedures and transfers the results to the programmable logic controller. This solution can be scaled up by connecting additional cameras and expanding the sensor app.

Recommended products

SIM4000 29

picoCam. . . . . www.sick.com/picoCam

Robot guidance of a robot from Universal Robots made easy
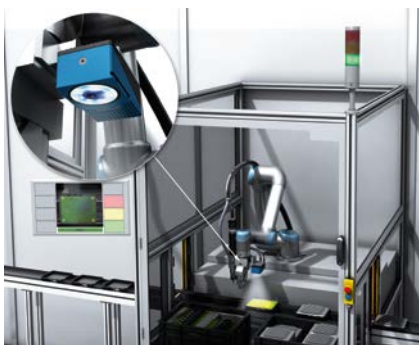
The URCap Inspector software enables simple integration of the PIM60 Inspector 2D vision sensor into a Universal Robots control. The live image from the sensor, calibration and alignment to robot coordinates as well as the setting of grip positions and changing of reference objects are now available in the Universal Robot control unit. A camera-based robot guidance system can thereby be created in just a few minutes. Other tool boxes for measurement and inspection tasks are also available and the range of applications is nearly limitless.

Recommended products

Inspector 29

## Safety solutions allowing automated guided carts to travel at high speeds

Automated guided carts (AGC) manage high speeds even when going around curves thanks to the switching of protective fields. Reliable detection of speed and direction of travel with safety solutions from SICK also reduces the number of components and thereby the required installation space in AGCs.

Recommended products

Flexi Soft 20

S300 Professional 21

DFS60S Pro. 24

Collision protection for automated guided carts implemented easily and at low cost
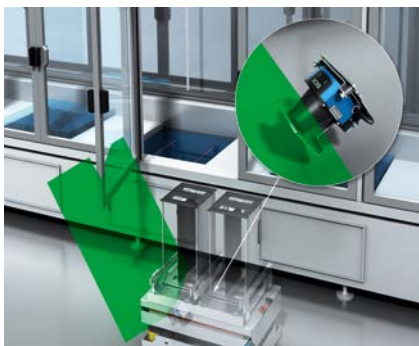
If an automated guided cart collides with protruding machine parts, major property damage results and the production line is stopped. 2D LiDAR sensors from the TiM series make the control of automated guided carts for preventing such collisions easy and cost-effective.

Recommended products

TiM1xx 31

TiM3xx 31

BATTERY

Access protection at the winding unit

The continuous action of winding up a film sheet represents a dangerous movement. The deTec4 Core safety light curtain reliably monitors access to the winding unit. When used in combination with the modular Flexi Soft safety controller, SICK offers a complete machine safety solution.

Recommended products

## Thickness control of electrode coating

The evenness of the electrode coating determines the future quality of the cell. When checking the coating thickness, measurement accuracies of a few micrometers must be achieved. The OD Precision displacement measurement sensor calculates the thickness of the coating using an external evaluation unit right after it is applied. This makes it possible to adjust it before the drying process, thereby minimizing rejects.

Recommended products

Double layer detection of battery cell stacks
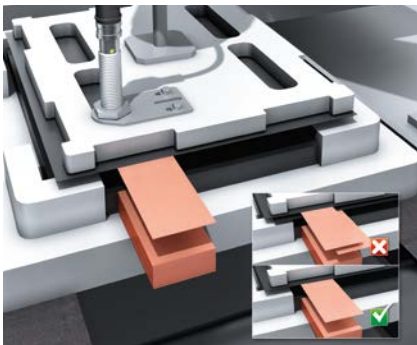
The stacking of the electrode and separator sheets is very important for the production of battery cells. If, as a result of adhesion, multiple identical sheets are added at the same time, the result is a defective cell. The IDF inductive proximity sensor reliably detects electrodes that are hanging onto one another, thereby minimizing rejects.

Recommended products

Positioning of electrode sheets

The Inspector 2D vision sensor detects whether electrode sheets are correctly positioned or rotated during the stacking process. The easy-to-use configuration using SOPAS, including the emulator for offline configuration and testing, minimizes downtimes.

Recommended products

Spliceband detection

When changing the roll, the beginning and end of two consecutive rolls are joined together using splicing tape. Color, contrast, luminescence, and glare sensors from SICK detect the tape. As a result, it can be removed when the film is processed further during cell production. A SICK encoder also increases the position detection accuracy.

Recommended products

CSM 18
KTX Prime 18
Glare 17
DBS36 Core 24

Filling level measurement

The UP56 ultrasonic level sensor from SICK provides non-contact and wear-free tote level measurement. Aggressive chemicals can also be measured using the PTFE-coated UP56 Pure sensor. As a result, SICK is able to offer level measurement solutions for electrolytes of varying compositions.

Recommended products

UP56 33
UP56 Pure 33

Protection of automated guided vehicles
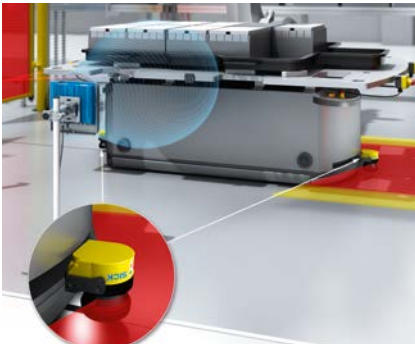
SICK offers an extensive portfolio of products for the protection of automated guided vehicles in the production of battery packs. When used in combination with a safety controller, safety encoder, and safety switch, the S300 Mini Remote safety laser scanner ensures protection of both human and machine.

Recommended products

Flexi Soft 20
S300 Mini Remote 21
RFU63x 32
DFS60S Pro. 24

HANDLING AND ASSEMBLY TECHNOLOGY

Worker guidance with pick-to-light
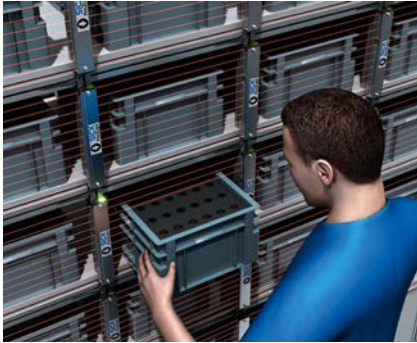
For many years, SICK has been a leader in the development of worker guidance systems. The PLG automation light grid guides the worker to the correct pickup shelf by means of the 360°-visible green job LED. If the worker reaches into the wrong shelf, the PLG triggers an acoustic signal. As an alternative, the slim SPL automation light grid and the TiM5xx or LMS1xx 2D laser scanner can also be used to guide the worker.

Patent EP 0994761 B1 is to be observed for the laser scanner solutions.

Recommended products

Hazardous area protection on a mobile robot

Flexible material transportation to the rotary machine is carried out using a mobile robot. Thanks to its compact dimensions, the S300 Mini safety laser scanner can be optimally integrated into small mobile units. The S300 Mini provides non-contact detection of any people or objects that are in the robot's path. As a result, the mechanical damage experienced when using switching strips and bumpers can be eliminated.

Recommended products

Stationary monitoring of adhesive beads

Once the joining process is complete, it is no longer possible to assess the quality of an object without damaging it. Using a pattern, optical monitoring systems compare the position, gaps in, and quality of the adhesive used in the joining process and document any errors. The Inspector PIM60 Bead 2D vision sensor allows complete contour inspection of the adhesive bead and workpiece quality control immediately after the adhesive is applied.

Recommended products

Networking 4Dpro devices in an assembly line
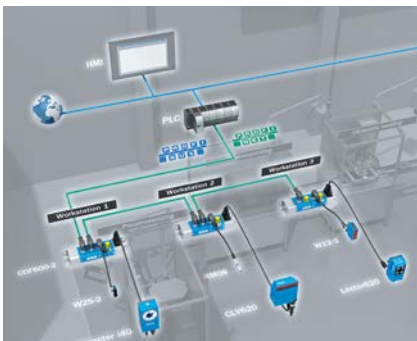
The CDF600 fieldbus module enables the networking of 4Dpro devices, such as bar code scanners, cameras, RFID systems, and hand-held scanners, in PROFIBUS, PROFINET-IO, or EtherCAT® networks. This ensures continuous communication by the individual devices with the higher-level control system of the assembly line. All 4Dpro devices are compatible and interchangeable through the standardized 4Dpro platform. As a result of the proxy operating mode integrated in the CDF600-2, only the 4Dpro device is visible to the control system, not the CDF600-2. This means that direct access to control of the devices is possible (GSD and GSDML configuration).

Recommended products

Hazardous point protection at a final inspection station

The deTec4 Core safety light curtain secures access at an assembly station for final inspection, since workers at this station are required to insert and then remove parts for the inspection process. With its small size, adjustable mount and lack of blind zones, the deTec4 Core is easily integrated into the assembly station. Used in combination with a safety relay or the Flexi Soft safety controller, it allows safety functions to be config-

ured easily. Where assembly or final inspection stations are designed to have intervention windows of differing sizes, the V300 WS Extended safety camera system is the perfect choice.

Recommended products

Monitoring of part picking during transport
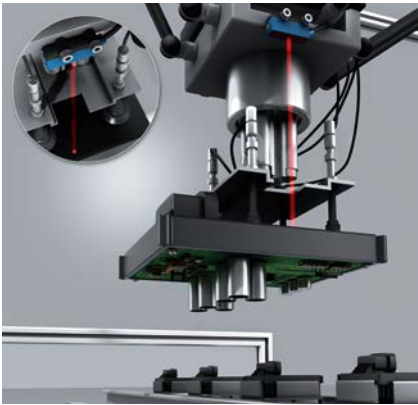
The PowerProx MultiTask photoelectric sensor monitors the part picking of a pick-and-place robot during transport until the safe placing of the workpiece. Thanks to its very small housing, the photoelectric sensor can be mounted above the tool flange in order to save space. This means the sensor does not also have to be replaced when exchanging the gripper. Despite its exceptional compact form, the sensor detects the presence of a workpiece up to 800 mm away.

Recommended products

INDUSTRIAL VEHICLES

Monitoring of direction of travel and speed for safe movement

The Drive Monitor extension module developed for the Flexi Soft safety controller monitors the direction of travel and speed parameters of the AGV very accurately. The FX3-MOC0 extension module provides the most common interfaces for incremental encoders. It is particularly suitable for use in combination with SICK's new, safe incremental encoder DFS60S Pro.

Recommended products

DFS60S Pro. 24

Flexi Soft Drive Monitor 20

Navigation in the warehouse with navigation scanners

The NAV350 is the first choice for precise and highly dynamic navigation in the warehouse. The sensor can detect natural and artificial (reflective tape) landmarks and use them to determine the absolute position of the automated guided vehicle. It works according to the time of light method: just three reflectors are sufficient for determining position.

Recommended products

NAV2xx. www.sick.com/NAV2xx

NAV3xx. 30

W2S-2 – At a glance

- Sensor with background suppression and without any significant black/white shift
- PinPoint 2.0 LED with extended sensing distances and high operating reserves
- A variety of application possibilities thanks to clearly-defined laser-like or line-shaped light spots

- Detection of highly-transparent and reflective objects using sensors with V-optics
- Photoelectric retro-reflective sensor with autocollimation and a clearly visible light spot

Your benefits

- Machine design flexibility: the ultra-compact sensors offer above-average sensing ranges and provide space-saving installation
- Remote setup: sensors installed in confined spaces can be set and monitored remotely via IO-Link
- High operational safety: ultrablack objects are detected with a reflectance of 1%
- Maximum reliability during object detection and option of a space-saving machine design without reflectors or through-beam systems
  → www.sick.com/W2S-2

- Quick and easy commissioning: the photoelectric retro-reflective sensor with autocollimation provides a clearly visible light spot for high process reliability
- Universal application possibility: wide range of models enclosed in a rugged housing
- Proven mounting and housing design

For more information, simply 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.

MultiLine – At a glance

- Two logical and intelligently linked sensors with background suppression in one miniature housing offer the highest ruggedness for object detection
- Consistent, reliable detection of structured and perforated objects such as PCBs

- Consistent, reliable detection of reflective and irregular objects such as coffee packs and soup sachets
- Effective operating range from 40 mm to 120 mm
- Simple adjustment via teach-in button

Your benefits

- The MultiLine sensor facilitates faster production sequences, since the distances between objects can be reduced
- The sensor position no longer needs to be modified for format changes, since the sensor is able to detect objects universally regardless of their position. This saves time and money
- The reliable sensor signal (from the leading to the trailing edge) places fewer demands on the control software, since it no longer needs to be debounced or evaluated

- The MultiLine sensor offers high process reliability because all objects are detected independently of their structure, geometry, and surface properties
- Placing the sensor into operation is as easy as pressing a button, meaning that fast and reliable commissioning without complicated operating algorithms is guaranteed

→ www.sick.com/MultiLine

For more information, simply 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.

PowerProx – At a glance

- Time-of-flight technology
- Laser class 1, red and infrared light
- Sensing range for object detection: 5 cm to 4 m
- Switching frequencies of up to 1,000 Hz
- Minimum distance between object and background: 6 mm
- VISTAL™ housing
- Up to 3 independently adjustable switching outputs or one analog output
- IO-Link available as an option (distance value, 8 switching points, smart sensor functions)

Your benefits

- Reliable object detection at high sensing ranges and large detection angles, e.g., even with shiny or jet-black surfaces
- Highly visible light spot simplifies alignment of the red-light versions
- Precise, simple adjustment with potentiometer, teach-in button, or display
- Laser class 1 and therefore eye-safe
- High levels of availability and durability. Rugged even when subjected to high mechanical loads thanks to VISTAL™ housing
- The world's smallest sensor housing ensures great flexibility when designing machines
- IO-Link extends functionality

➜ www.sick.com/PowerProx

For more information, simply 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.

Glare – At a glance

- Object detection and differentiation on the basis of surface gloss level
- Configurable in many different operating modes to meet the requirements of any application
- Integrated alignment aid
- Integrated automation functions
- Two digital push-pull outputs and one configurable input
- Sensitivity adjusts to object properties
- IO-Link provides easy data access from the PLC
- Quick and easy configuration

Your benefits

- Quick installation via alignment mode
- Integrated key lock reduces the risk of operating errors and tampering
- Sensitivity adjustments increase the system's operational safety
- Teach-in via the single teach-in button or SOPAS operating software facilitates quick and easy operation
- Reliable gloss identification regardless of color, labeling or structure
- increases operational safety
- State-of-the-art detection method makes it possible to conduct inspections at lower costs than with camera solutions
- Sensor's resistance to object fluctuations increases operational safety
- Flexible sensor settings, monitoring, advanced diagnostics, and visualization thanks to IO-Link

➜ www.sick.com/Glare

For more information, simply 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.

CSM – At a glance

- Color sensor in a new miniature housing
- Static and teach-in method for 1 color using control cable or control panel
- Over IO-Link up to 8 colors teachable
- Switching frequency: 1.7 kHz
- Sensing distance: 12.5 mm
- Compatibility with older color sensors thanks to cable with male connector M12

Your benefits

- Fast, seamless integration into existing applications thanks to a new miniature housing, saving time and money
- Increased switching frequency for improved machine productivity
- Flexible application possibilities thanks to a wide range of color tolerances
- Enhanced, intelligent diagnostics and visualization, as well as quick and easy format changes, thanks to IOLink function
- Quick and easy installation cuts down on installation time
- Sorting processes are simplified by the distinction of up to 8 colors in one job

➜ www.sick.com/CSM

For more information, simply 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.

KTX Prime – At a glance

- TwinEye-Technology for increased depth of field and sensing distance tolerance
- 50 kHz switching frequency and 5 µs jitter
- Large dynamic range means reliable detection of contrasts on glossy materials
- 7-segment display
- Color mode
- Assembly feedback
- IO-Link and automation functions
- Flexible sensor setting thanks to various sensor parameters

Your benefits

- 1:1 replacement for existing KT series - assembly compatibility
- TwinEye-Technology for better performance on glossy or jittering materials - less machine downtime and more process stability
- Multi-functional sensor adjustment for individual sensor adjustment
- Excellent contrast resolution and a large dynamic range for good performance on complex materials
- High flexibility thanks to a range of teach-in processes
- Integrated color mode - stable detection even with complex color differences
- Job storage in sensor - flexible process design and format change
- Diagnostics and visualization as well as easy format change via IO-Link

➜ www.sick.com/KTX_Prime

For more information, simply 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.

PLG – At a glance

- 360° visible job LED
- Scanning range up to 2 m
- Flexible monitoring heights from 120 mm to 420 mm
- Immune to reflected and ambient light
- Switchable job LED: permanently lit or flashing
- Optically confirms correct access

Your benefits

- The integrated job LED reduces the order picker's search time
- Low mounting costs thanks to the clever mounting concept
- High availability thanks to an integrated polarizing filter
- Robust aluminum housing ensures that sensor damage is kept to a minimum and helps save on repair costs
- Reflective tape on the sensor cuts out additional mounting and cabling costs

➜ www.sick.com/PLG

For more information, simply 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.

IDF – At a glance

- Sizes: M8 and M12
- Detection of metallic double films
- Electrical configuration: DC, 4-conductor
- Temperature range: −25 °C ... +70 °C
- Enclosure rating: IP68
- Detection regardless of the gripper position
- Teach-in via cable or IO-Link

Your benefits

- Detection is done directly when film is picked up by the gripper, which speeds up process times
- Improves process quality thanks to immediate detection of double layers
- Quick commissioning thanks to teach-in via cable or IO-Link
- Quick format change thanks to teach-in via cable or IO-Link
- Small size enables freedom with respect to machine design
- Thanks to diagnosis options via IO-Link, the IDF detects even double film layers which were very difficult to detect up to now. This improves the process stability.

➜ www.sick.com/IDF

For more information, simply 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.

Flexi Soft – At a glance

- Expansion modules, Motion Control modules, and gateways for all common fieldbuses
- Configuration data stored in the system plug
- Safe networking of up to 32 Flexi Soft stations
- Integration of sensor cascade
- Multi-language, license-free configuration software: exceptionally simple operation, plausibility check, simulation mode, wiring diagram, parts list, documentation, and data recorder

Your benefits

- Scalable for an efficient and cost-optimized safety application solution
- Cost savings: Flexi Soft offers a modular structure that is in line with your requirements, and thus offers an ideal level of granularity
- Intuitive configuration software featuring comprehensive functions enables continuous monitoring of the configuration
- Rapid verification of the safety application: The configuration software provides documentation and a wiring diagram
- Safety logic is easy to create thanks to ready-made, TÜV-certified function blocks
- The main module's diagnostics interfaces and the configuration storage facility in the system plug enable rapid commissioning, component replacement, and troubleshooting, resulting in minimum downtimes

→ www.sick.com/Flexi_Soft

For more information, simply 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.

microScan3 Core – At a glance

- Innovative safeHDDM® scanning technology
- High reliability even when exposed to dust and ambient light
- Up to 8 freely configurable fields
- Up to 4 simultaneous protective fields
- Protective field range 5.5 m; scanning angle 275°
- System plug with configuration memory and M12 plug connectors
- Safe communication via CIP Safety™ in EtherNet/IP™ network

Your benefits

- safeHDDM®: innovative scanning technology for an outstanding ratio between wide scanning range and compact design for simple integration in your machine
- Rugged design: developed for harsh industrial day-to-day work, the microScan3 is resilient and reliable, and increases productivity
- Smart connectivity: low cabling costs due to standardized interfaces, fast device change due to configuration memory, and safe integration into EtherNet/IP™ networks possible
- Intuitive operation: easy commissioning with the Safety Designer software and diagnostic options via the display, pushbuttons, or network

→ www.sick.com/microScan3_Core

For more information, simply 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.

S300 Mini Remote – At a glance

- Can only be used in EFI system network, e.g., with a Flexi Soft safety controller or another safety laser scanner
- Ultra-compact design
- 2 m or 3 m protective field range
- 270° scanning angle
- Up to 16 switchable field sets
- Selectable resolution for hand, leg or body detection
- Extended system solutions in combination with Flexi Soft safety controller

Your benefits

- Simple integration due to ultracompact design
- Easy installation, commissioning and maintenance for stationary and mobile applications
- Unbeatable cost-effectiveness – 270° scanning angle allows complete application protection with only two scanners
- Variety of field sets guarantees safety and productivity when protecting

vehicles or moving machine parts
- Easy modular expansions, simple cabling and additional functions using SICK safety controllers with EFI
- Decades of proven safety technology guarantee maximum reliability and availability – even under difficult conditions
- Simple alignment and safe operation in vertical mode

➜ www.sick.com/S300_Mini_Remote

For more information, simply 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.

deTec4 Core – At a glance

- Type 4 (IEC 61496), SIL3 (IEC 61508), PL e (EN ISO 13849)
- Absence of blind zones
- Resolution of 14 mm or 30 mm
- Protective field height of 300 mm to 2.100 mm
- Automatic calibration on the protec-
tive field width up to 10 m range
- Ambient operating temperature of –30 °C to +55 °C
- Enclosure rating IP 65 and IP 67
- Flexi Loop-compatible M12 male connector

Your benefits

- Simple assembly with innovative mounting and no blind zones
- Quick commissioning thanks to integrated LED display and automatic measurement of protective field range up to 10 m sensing range
- Simply safe: rugged and reliable thanks to enclosure rating IP67 and an ambient operating temperature

down to –30 °C, enabling use in harsh ambient conditions
- Intelligently standardized: M12 connectivity, 5-pin, for cost reductions and a safe series connection with Flexi Loop
- Basic function with minimal configuration effort enables quick replacement when servicing is required

➜ www.sick.com/deTec4_Core

For more information, simply 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.

miniTwin4 – At a glance

- Type 4 (IEC 61496), SIL3 (IEC 61508), PL e (EN ISO 13849)
- Compact cross section (15 mm x 32 mm) with no dead zones
- Cascadable twin stick design – sender and receiver in a single housing
- Customized protective field heights in 60-mm increments from 120 mm to 1,200 mm
- Typical scanning ranges 0 m ... 5 m
- Intelligent, software-free configuration of external device monitoring (EDM) and reset function (RES)
- M12, 5-pin device connection

Your benefits

- Cost-effective machine integration: the miniature design, cascading, and fine stepping of the protective field lengths enable flexible adaptation to the machine design
- Standardization saves time and resources by making logistics, order processing, and service more straightforward
- Exemplary handling: software-free, almost fully automatic commissioning and intuitive operation with sustainable optics
- LED-guided start-up together with colored LEDs for quick alignment and unequivocal protective field visualization ensure rapid diagnostics
- A continuous protective field for cascade applications eliminates blind zones, reduces the safety distance, and thereby increases productivity
- Application-specific brackets increase mounting flexibility, while reducing the mounting time

→ www.sick.com/miniTwin4

For more information, simply 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.
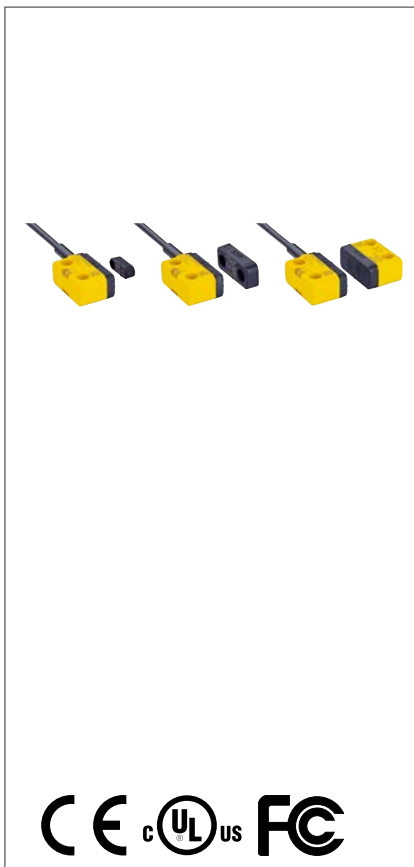
STR1 – At a glance

- Response range of up to 14 mm
- Small housing with flexible mounting options
- Sensor activation possible from three sides
- Three different actuators available
- Universally coded, uniquely coded, and permanently coded sensors
- PL e (EN ISO 13849), SIL3 (IEC 61508)
- Reliable series connection of up to 30 sensors possible

Your benefits

- High level of flexibility when mounting the sensor and actuator
- Reduced need for storage, as one sensor is suitable for a wide range of different applications
- High level of manipulation protection due to individually coded actuator
- High level of machine availability due to large door offset tolerance and high level of shock and vibration resistance
- Economical solution due to series connection of up to 30 sensors
- Fast diagnosis via LED status indicator
- Long product service life due to low-wastage and low-maintenance configuration

→ www.sick.com/STR1

For more information, simply 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.

i14 Lock – At a glance

- Compact plastic housing
- M20 x 1.5 cable entry gland
- Locked with spring force
- Lock monitoring
- LED locking indicator
- Mechanical unlocking mechanism on three sides

Your benefits

- Cost-effective solution for all standard safety applications
- LED status indicator offers improved diagnostics
- Easy access to wiring for installation and maintenance due to a hinged cover – access to the unlocking mechanism from three sides
- Small housing saves space and can be mounted in tight areas

➜ www.sick.com/i14_Lock

For more information, simply 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.

V300 Work Station Extended – At a glance

- Type 3 (IEC 61496), SIL2 (IEC 61508), PL d (EN ISO 13849)
- Protective field size from 0.4 m x 0.4 m to 1.5 m x 1.5 m
- Resolution 20 mm, 24 mm, and 30 mm
- One device only: integrated sender and receiver
- Intuitive one-button operation
- Automatic alignment
- Synchronization of 2 systems
- Restart/Reset, EDM integrated

Your benefits

- Individual definition of protective fields allows high flexibility for machine design
- Quick commissioning without additional software
- Intuitive, time-saving operation
- No variants: one-device concept for all aperture sizes
- Reduced storage, logistics and commissioning costs
- No expert knowledge for commissioning required
- High machine availability and simple maintenance

➜ www.sick.com/V300_Work_Station_Extended

For more information, simply 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.

DFS60S Pro – At a glance

- Encoders for functional safety technology: SIL2 (IEC 61508), SILCL2 (EN 62061), PL d (EN ISO 13849)
- Electrical interface: 4.5 V ... 32 V; sine/cosine 1 V$_{PP}$; 1,024 periods
- Clamping flange or servo flange, blind hollow shaft or through hollow shaft (assembly options with feather key)
- Universal cable outlet, M23 or M12 male connector, axial or radial
- Enclosure rating: IP 65
- Working temperature range: –30°C ... +95°C (depending on type)

Your benefits

- Certified safety products ensuring the best possible protection for persons, machinery, and systems
- Easy and practical handling of safety functions with all-in-one solutions from a single source, safety functions with the Flexi Soft drive monitor by SICK: safe stop 1 (SS1), safe stop 2 (SS2), safe operating stop (SOS), safe speed monitoring (SSM), safely limited speed (SLS), safe direction (SDI), safe brake control (SBC)
- Force fit and tight fit for mechanical reliability
- Certified safety products instead of standard products reduce the scope of safety engineering
- Versatile connection options for high levels of flexibility and straightforward implementation
- Compact installation depth for compatibility with applications in which installation space is limited

→ www.sick.com/DFS60S_Pro

For more information, simply 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.

DBS36 Core – At a glance

- Connection with universal cable outlet
- Designs with blind hollow shaft or face mount flange with solid shaft
- Face mount flange with 6 mounting hole patterns and servo groove
- Hollow shaft with universal stator coupling
- Compact housing diameter of 37 mm with compact construction depth,
- Electrical interfaces: TTL/RS-422, HTL/push pull and Open Collector NPN
- Number of lines: 10 to 2,500
- Temperature range: –20 °C ... +85 °C
- Enclosure rating: IP 65

Your benefits

- The universal cable outlet allows for use in tight spaces and for flexible cabling
- Face mount flange with various mounting hole patterns provides high flexibility when mounting in existing and new applications
- Face mount flange with servo groove makes mounting with servo clamps possible
- The universal stator coupling of the DBS36 Core allows for easy device replacement without adapting the application
- Shafts in metric and US design enable worldwide use
- The high flexibility of the mechanical interface of the encoder and the available accessories allow for the use of a single design in many applications
- Long-term and reliable operation thanks to a high enclosure rating, temperature resistance and bearing lifetime

→ www.sick.com/DBS36_Core

For more information, simply 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.

OD Precision – At a glance

- Numerous measuring ranges from 24 mm ... 26 mm to 300 mm ... 700 mm
- CMOS receiving element for measurement independent of surface
- Maximum measurement accuracy and frequency

- Glass thickness measurement with just one sensor head
- Various light spot sizes
- Integrated calculations for up to three sensors
- Stand-alone use via RS-422

Your benefits

- Non-contact measurement improves quality inspection during production
- Surface-independent measurement algorithms ensure minimum machine downtime, regardless of surface gloss or color
- Reduced processing times as a result of the high measuring frequency of up to 10 kHz
- Simple, cost-effective solution for challenging measuring tasks due to a variety of sensor models

- Optional stand-alone operation via RS-422 means the OD Precision offers maximum performance at lower investment costs
- High visibility LC display enables simple, cost-effective setup
- Many interfaces for simple integration into an existing production environment

→ www.sick.com/OD_Precision

For more information, simply 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.

OD Mini – At a glance

- Compact, rugged housing
- Stand-alone use or in combination with the OD Mini evaluation unit
- Display and LEDs on device for visualization of current status
- Different interfaces available

- Simple teach-in using display or external teaching input
- CMOS receiver unit for precise, fast measurement in the μm range
- Various measuring ranges: Measuring from 10 mm to 250 mm possible

Your benefits

- Cost-saving commissioning through simple operating concept and display
- Small installation size and low weight also allow use in highly dynamic applications
- Calculation of two sensorheads - easy possible over the external evaluation unit

- High machine throughput thanks to reliable measurement, regardless of brightness and color of surface
- The wide range of available interfaces enables simple integration into industrial networks
- Optimum performance even at high production speeds

→ www.sick.com/OD_Mini

For more information, simply 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.

RFH6xx – At a glance

- 13.56 MHz RFID write/read device for ranges up to 240 mm
- Transponder communication according to ISO/IEC 15693 standard
- Compact, industrial design with integrated antenna
- Embedded protocols allow interfacing with standard industrial field-bus technologies
- Powerful micro-processor executes internally configurable logic
- Flexible trigger control
- Supports parameter cloning via microSD memory card
- Built-in diagnostics

Your benefits

- Reliable identification ensures maximum throughput
- Adapts to changing needs, ensures investment over the long term
- Simple integration saves installation time
- A wide range of functionality ensures flexible solutions
- Maintenance-free
- Uses same connectivity and configuration software as SICK's bar code scanners and image-based code readers – compatible through standardized 4Dpro platform

→ www.sick.com/RFH6xx

For more information, simply 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.

Lector62x – At a glance

- Decoding of all common 1D, 2D, and stacked codes, as well as optical character recognition (depending on type)
- Flexible interfaces: serial interface, USB, and Ethernet
- Function buttons, aiming laser, focus adjustment, auto-setup, and green feedback LED
- Industrial, compact housing with swivel connector
- MicroSD memory card for storing images and backup copies of parameters

Your benefits

- Intelligent decoding algorithms ensure optimal reading performance, good read rates, and high throughput
- 4Dpro facilitates quick and easy integration into many industrial networks
- Intuitive setup with aiming laser, focus adjustment, and auto-setup reduces training and installation time and costs
- Simple mounting thanks to a compact housing and swivel connector, even when space is limited
- Quick and efficient analysis of reading performance and code quality
- Cloning systems create backup copies of parameters, ensuring short machine downtimes in the event of malfunctions
- Proven SICK LifeTime Services

→ www.sick.com/Lector62x

For more information, simply 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.

Lector63x – At a glance

- Code reader with 2-megapixel sensor
- Flexible optics and filter design
- Integrated, replaceable high-power illumination
- Intuitive user interface, with flexible result string with code analysis options
- Function buttons, aiming laser, acoustic feedback signal, and green feedback LED
- microSD memory card

Your benefits

- High-resolution sensor and intelligent processing ensure outstanding reading performance, even under difficult reading conditions
- Flexible optical design and high-power illumination enable small codes to be read at high speeds or in applications with a large reading distance
- Fast, straightforward commissioning thanks to the intuitive user interface; function button for rapid device setup; integrated illumination and aiming laser
- Direct results monitoring thanks to acoustic signal and colored feedback spot on the object
- Few machine downtimes in the event of faults on the production line, thanks to straightforward cloning function using microSD memory card

→ www.sick.com/Lector63x

For more information, simply 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.

IDM24x – At a glance

- Identification of all current 1D, stacked, and 2D codes
- Reliable, secure, and fast code reading
- Compact design, light housing
- Manual operation and hands-free operation in presentation mode
- Corded and cordless variants available

Your benefits

- Only one device for a wide range of different code types
- Fast and accurate identification without manual data entry
- Simple and ergonomic operation, even in scanning-intensive applications
- Flexible application possibilities due to various operating options
- Cordless variant ensures mobility in all applications

→ www.sick.com/IDM24x

For more information, simply 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.

UC4 – At a glance

- Reliable measurement, regardless of material color, transparency, gloss, or ambient light
- Ultrasonic technology in a small housing
- Detection, measurement, and positioning with ultrasonic technology
- Variants with PNP/NPN switching output, analog output or push-pull output with IO-Link
- Teach-in button
- Precise background suppression
- Immune to dirt, dust, humidity, and fog

Your benefits

- Mini housing allows for quick and easy integration, even in the most confined spaces
- Teach-in button for fast and easy commissioning
- Integrated temperature compensation ensures high measurement accuracy at all times for optimum process quality
- Various operating modes provide optimal application flexibility and solutions, which increase reliability and productivity
- Full mechanical compatibility to photoelectric sensors allows for the use of the suitable technology for every application without machine modification
- The sensor's immunity to optically difficult environment enables it to take accurate measurements even in dirty, dusty, humid, and foggy conditions

→ www.sick.com/UC4

For more information, simply 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.

CDF600-2 – At a glance

- Flexible mounting on all standard profiles
- Flexible fieldbus connection for PROFIBUS DP and PROFINET (depending on type)
- Code switch for setting node address and operating mode (depending on type)
- LEDs for status and diagnostics
- Plug-in electrical connections
- Integrated configuration memory for connected sensors
- Compact and flexible

Your benefits

- Sophisticated two-screw system for fast, flexible mounting on all standard profiles
- Choice of different versions for connecting to industrial field buses
- Code switch that is mounted so it is protected against accidental adjustment and is easily accessible from the outside for easy setup of bus address and operating mode without complex software
- Clear status LEDs that are identifiable on two sides from any viewing direction for simple and effective diagnosis (depending on type)
- Fast installation and easy replacement in the system thanks to plug-in connections
- Integrated cloning module for all configurations of the connected sensor enables very fast replacement time in case of faults
- Compact and rugged design with choice of horizontal or vertical cable direction

→ www.sick.com/CDF600-2

For more information, simply 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.

SIM4000 – At a glance

- Wide range of connections with 25 interfaces for Ethernet-based fieldbuses, cameras, illumination, sensors, encoders, and more besides
- 8-gigabit Ethernet interfaces for rapid image transmission
- Precise synchronization of input and output signals
- Illumination control and supply
- IO-Link master connections
- Enclosure rating IP 65

Your benefits

- Tailored application development with SICK AppSpace
- High-performance, innovative application solutions through merging of sensor and camera data
- The integrated HALCON library opens up a whole host of image processing possibilities for every industrial field of application
- Recording, evaluation, and archiving of data from multiple cameras and sensors, enabling quality control, process analysis, and predictive maintenance for vertical integration in Industry 4.0
- Real-time-capable hardware reduces integration work in, for example, time-critical robotics applications
- Quick and easy commissioning thanks to prefabricated cables with M12 connections

➜ www.sick.com/SIM4000

For more information, simply 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.

Inspector – At a glance

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

Your benefits

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

➜ www.sick.com/Inspector

For more information, simply 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.

Profiler – At a glance

- Measure complex profiles with just one laser line
- Analyze up to four areas at the same time
- More than 10 integrated measurement functions, e.g., height, width, and inclination
- Sensor head and evaluation unit in one device
- Commissioning via software or integrated display with operating elements
- High-quality CMOS receiver unit

Your benefits

- Measuring a 2D profile with just one sensor saves on hardware and installation costs
- Cost-effective solution for 2D profile measurement
- Real-time visualization of the measurement results via the integrated LC display
- Intuitive and quick commissioning via the software or display reduces installation time
- Thanks to the stand-alone concept of the Profiler 2, there is no need for cabling or to mount an additional evaluation unit
- Reliable measuring regardless of color, material, or shape
- More than 10 integrated measurement functions allow profiles to be measured and analyzed quickly

➔ www.sick.com/Profiler

For more information, simply 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.

NAV3xx – At a glance

- Mixed-mode navigation provides both spatial contour data and reflector data
- Long scanning range: up to 70 m on reflectors (up to 35 m on black targets)
- High internal computing power and individual AGV configuration
- Measurement, navigation, and determination of position with highest level of precision from three visible reflectors
- Angular resolution of up to 0.1 degrees
- Navigation, spatial and contour data, reflector marks, angular position and/or raw data collection

Your benefits

- Precise, fast collection of spatial contour data and/or simultaneous determination of reflector data (managing up to 12,000 reflectors) in real time
- Integrated evaluation of measured data reduces the computing load in the vehicle computer, minimizing power consumption and reducing operating costs
- High flexibility, since line guidance is also possible in areas without reflector marks, and routes can be easily modified using teach-in mode
- Precise measurements in harsh industrial environments thanks to IP65 housing for indoor applications
- High angular resolution for gap-free scanning even under difficult conditions
- Hardware synchronization output ensures precise control

➔ www.sick.com/NAV3xx

For more information, simply 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.

TriSpector1000 – At a glance

- 3D inspection of moving parts
- Intuitive user interface
- Embedded image analysis
- Easy replacement concept
- High resolution 3D image with intensity overlay

- Factory calibrated 3D data, true mm values in all dimensions
- Rugged IP67 metal housing

Your benefits

- Reliable 3D inspection even when part color, position and height varies
- Easy commissioning and operation thanks to an intuitive user interface
- Embedded image analysis for fast configuration
- Quick device replacement due to guaranteed field of view and re-use of saved settings

- Intensity data enhances 3D navigation, allows checking presence of label, printed pattern or object rotation.
- Factory calibrated data simplifies setup and reduces time and effort
- Withstands harsh or food processing environments

➜ www.sick.com/TriSpector1000

For more information, simply 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.

TiM1xx – At a glance

- Small, simple, and cost-effective sensor for area monitoring
- Monitoring of an area of up to 15.7 m^2
- Low weight of just 90 g
- Field evaluation using integrated software algorithms

- Low power consumption of typically 2.2 W
- Configuration and cloning using IO-Link
- Industrial design

Your benefits

- Low installation effort thanks to monitoring of a 200° field of view
- Low overall operating costs
- Low space requirements thanks to compact dimensions
- Rapid commissioning thanks to simple configuration of the detection zone with software

- Low installation costs and rapid replacement thanks to rotatable connector, IO-Link, and parameter cloning
- Particularly suitable for use in battery-operated vehicles thanks to low power consumption

➜ www.sick.com/TiM1xx

For more information, simply 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.

Ranger – At a glance

- Fast 3D measurement at high speed and quality
- MultiScan function for simultaneously measuring the 3D shape, contrast, color, and scatter
- Sensor resolutions of up to 1,536 pixels in 3D and 3,072 pixels in gray-scale and color
- High levels of flexibility in configuration, working distance, and field of view
- In-machine 3D calibration
- Gigabit Ethernet and CameraLink interfaces

Your benefits

- High-speed and high-resolution measurements allow you to increase production throughput, and still see fine details, thus ensuring production quality.
- Get accurate size and position measurements in 3D regardless of an object's height or color, ensuring reliable solutions
- High levels of flexibility in the field of view combined with the in-machine 3D calibration concept provides true millimeter dimensions
- Unique MultiScan technology enables one camera to do the work of many, reducing costs for integration, maintenance, and accessories, and creating cost-efficient solutions.
- The high level of flexibility and versatility of the Ranger makes it the ideal choice for challenging tasks

➔ www.sick.com/Ranger

For more information, simply 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.

RFU65x – At a glance

- Compact UHF RFID read/write device in accordance with ISO/IEC 18000-63
- Positioning and angle detection by RFID transponders
- Integrated algorithms deduce the direction of entry and movement based on numerous measured values
- Supports data and fieldbus interfaces that are typically used in the industry

Your benefits

- UHF RFID transponders demonstrate outstanding reading reliability thanks to correct transponder assignment, including integrated entry detection plus direction output.
- Space-saving, compact device that does not require any additional antennae
- Easy to integrate into industrial fieldbuses with 4Dpro connectivity
- Fulfills the requirements of the IP67 enclosure rating ("outdoor") and is rugged and durable
- Compatible with other SICK RFID read/write devices, making it highly flexible
- Additional software functions for the device can be programmed in the SICK software environment and integrated into the device

➔ www.sick.com/RFU65x

For more information, simply 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.
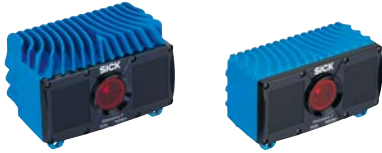
Visionary-T – At a glance

- Record up to 30 3D images per second
- Distance values: 144 x 176 pixels per snapshot
- Output 3D data via a Gigabit Ethernet interface
- Depth reproducibility of 3 mm and 30 mm at 1 m and 7 m distances respectively

- Temperature range: 0 °C to 50 °C or up to 45 °C (depending on the housing), Enclosure rating: IP67; light sensitivity: 0 klx ... 50 klx

Your benefits

- More than 25,000 distance and intensity values in a single recording. As a result, no actuator is required and 3D information is also available for stationary applications.
- Easy mounting and rapid sensor replacement
- Solutions which provide the exact information required for the application

- Programming interface for using 3D data for further analysis on an external host
- The Visionary-T AG product version supports intelligent data reduction

→ **www.sick.com/Visionary-T**

For more information, simply 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.

UP56 Pure – At a glance

- Ultrasonic level sensor with very high chemical resistance
- Non-contact measurement in immersion pipe of up to 1,500 mm
- PTFE-coated membrane and GF D40 process connection made of PTFE
- Pressure resistant up to 6 bar, temperature resistant up to 85°C

- Different sizes available
- Analog output selectable between 4 mA to 20 mA and 0 V to 10 V
- Switching output for monitoring the maximum and minimum limit

Your benefits

- Non-contact and non-wearing measurement reduces maintenance and servicing cost
- Sensor replacement possible even with chemicals present, thus saving time and increasing availability
- Universally applicable with acidic and alkaline processes
- Flexible measurement system for different container sizes provides cost reductions

- High accuracy measurements, even in liquids with density fluctuations
- Faultless operation with very limited installation space in the tote
- Switching output and analog output in a single sensor reduces time and money spent on wiring
- Simple and time-saving configuration with Connect+

→ **www.sick.com/UP56_Pure**

For more information, simply 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.

PAC50 – At a glance

- Electronic pressure switch for pneumatic applications
- Large display shows system pressure, output states and set switching points
- Three large function keys and intuitive menu navigation

- Measuring range for gauge pressure (vacuum and overpressure)
- Individually programmable switching outputs and optional analog output
- Installation on a mounting rail, wall or in a control panel
- IO-Link

Your benefits

- Bi-color display (green/red) clearly shows the output state to recognize whether the pressure is within the target range
- Quick overview of important system parameters due to advanced display functions
- Intuitive operation allows simple and quick commissioning
- Pressure connections on the back and bottom, various mounting options and configurable output signals provide installation flexibility

- High reliability due to the rugged design (IP 65/IP 67 enclosure rating) and proven technology
- Low storage costs since a few product variants are able to meet a broad range of application requirements
- Reduced downtime when changing the format or replacing the sensor thanks to IO-Link

→ www.sick.com/PAC50

For more information, simply 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.

Pinspector – At a glance

- Full-scale solution for the inspection of PCBs and pin connectors
- Autonomous modular system
- Rugged design suitable for industrial use

- Ranger cameras from SICK for high-precision 3D imaging
- Three versions – high value, fast inspection, and double-camera to prevent occlusion

Your benefits

- Prevention of inaccurately fitted pins on PCBs
- Optimization of manufacturing processes
- Cost savings thanks to fewer faulty products (no bended pins or cold joints)
- Fast and accurate inspection of x, y, z pin position

- One system inspects multiple PCBs and pin connectors
- User-friendly drag and drop interface with many possible measurement settings
- Low maintenance costs thanks to non-contact measurement
- History tracking – a wide range of logging and reporting options

→ www.sick.com/Pinspector

For more information, simply 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.

CE

PLB – At a glance

- Localization of parts in bins and boxes independent of part orientation
- 3D camera with superior image quality
- Reliable part localization, even under varying ambient conditions
- Part localization based on matching between CAD model of part and 3D image

- Verification that free space is available for the gripper in reported pick positions
- Complete solution comprising hardware and software preconfigured and tailored for the precise localization of parts in bins
- Integrated tools for coordinate alignment and communication with the robot

Your benefits

- The comprehensive, easy-to-use solution makes it possible to configure new applications quickly and efficiently
- PLB noticeably reduces the effort of analyzing and designing solutions for new applications
- PLB enables reliable robot-automated part-picking without the need for precise part placement in the bin or on the pallet, thereby maximizing part handling uptime

- Features tailored for the target applications ensure high part localization accuracy and short part picking cycle time
- With PLB, no machine vision expertise is needed in order to use and maintain the system
- CAD-based localization makes it easy to introduce new parts in production

➜ **www.sick.com/PLB**

For more information, simply 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.

SERVICES FOR MACHINES AND PLANTS: SICK LifeTime Services

Our comprehensive and versatile LifeTime Services are the perfect addition to the comprehensive range of products from SICK. The services range from product-independent consulting to traditional product services.

Consulting and design
Safe and professional

Product and system support
Reliable, fast, and on-site

Verification and optimization
Safe and regularly inspected

Upgrade and retrofits
Easy, safe, and economical

Training and education
Practical, focused, and professional

SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 8,000 employees and over 50 subsidiaries and equity investments as well as numerous agencies worldwide, we are always close to our customers. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in various industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services round out our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is "Sensor Intelligence."

Worldwide presence:

Australia, Austria, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Hong Kong, India, Israel, Italy, Japan, Malaysia, Mexico, Netherlands, New Zealand, Norway, Poland, Romania, Russia, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, United Arab Emirates, USA, Vietnam.

Detailed addresses and further locations ➔ **www.sick.com**

SICK
Sensor Intelligence.