

PART FEEDING

 **di-soric**

WELCOME TO DI-SORIC

ABOUT THE INVENTOR OF THE FORK LIGHT BARRIER: DI-SORIC.

For almost 40 years, di-soric GmbH & Co. KG has been producing and selling sensors featuring a wide variety of technologies. These sensors are used in industrial automation—primarily in assembly and handling technology, in the automotive, electronics and pharmaceutical industries and in packaging technology. Other important cornerstones of our product range are innovative vision sensors and code readers, high-quality LED lighting for machines and image processing, and products from the segment of safety technology.

di-soric Solutions GmbH & Co. KG focuses on components, customized complete solutions and vision system solutions that are ready to use immediately. Upon request, customers receive a comprehensively planned and implemented image processing system, including feasibility analyses, project planning and project implementation, system acceptance and a wide range of services after project completion.

We combine our resources to help our customers in precise and cost-effective production processes without problems—now and in the future.





DI-SORIC FACTS

■ **100% OWNER-MANAGED**

■ **HEADQUARTERS**

Urbach, Germany

■ **TECHNOLOGY AND PRODUCTION CENTER**

Lüdenscheid, Germany

■ **REPRESENTATIVES AND BRANCH OFFICES**

in more than 40 countries

■ **CERTIFICATIONS**

IQNet, DQS - ISO 9001:2015, UL, RoHS

OUR PROMISE TO YOU:

SOLUTIONS.
CLEVER.
PRACTICAL.



SOLUTIONS.

**To us, finding solutions means
providing you with exactly the right solution
for the job.**

- Solution-oriented consultation and implementation
- Product portfolio for numerous application areas
- Engineered solutions for industrial image processing



CLEVER.

To us, being clever means **finding new, smart, unconventional and therefore more effective solutions.**

- Added value for product and application
- Efficient in function and application
- Openness and flexibility for the best solutions

PRACTICAL.

To us, being practical means **being available, taking a straightforward approach and communicating as partners.**

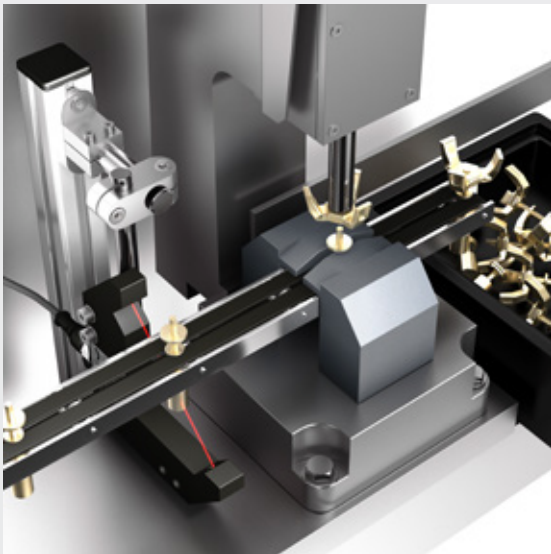
- Solution-oriented consultation and technical expertise
- Straightforward, cooperative and dynamic approach
- Address what is important and forget about unnecessary factors.

SENSOR AND IMAGE PROCESSING SOLUTIONS FOR RELIABLE PART FEEDING

As an upstream process for assembly, machining and packaging processes, reliable feed of parts is essential. di-soric offers various solutions for the correct storage, feed and provision of the components—each of them adequate for the individual requirement of the application.

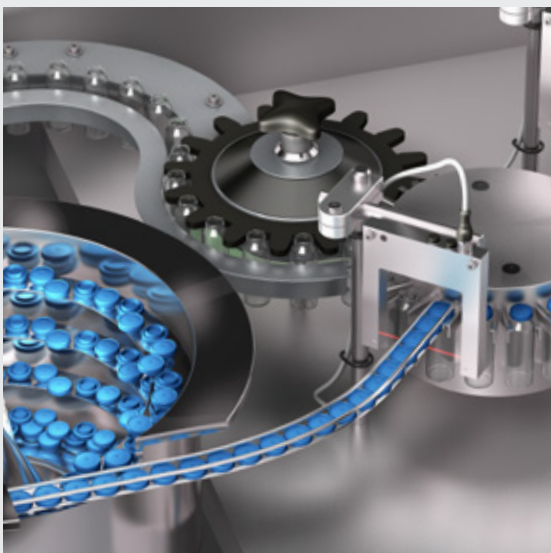
Limited installation space, a wide variety of materials and sizes, high speeds and the increasing use of robots pose particular challenges to the control and monitoring of part feeding.

Compact designs and a high availability of the sensors, vision sensors and safety technology are required.



ASSEMBLY AND HANDLING TECHNOLOGY

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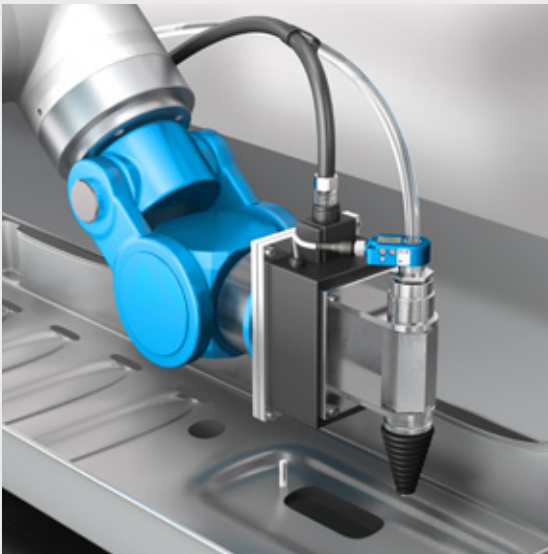


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In addition to the suitable product solution, easy integration into the system is also important for ensuring a reliable process. For this purpose, our products are equipped with industrial interfaces such as Ethernet TCP/IP, PROFINET and IO-Link, thereby supporting optimized adjustment, maintenance and monitoring of the entire system.

Also you can efficiently prevent machine downtimes caused by empty storage, material accumulation and incorrect orientation of components with di-soric sensors and solutions. It does not matter whether the application uses linear part feeding, step feeders, circular or vibratory feeders, feeding in tubes or manual feed—our solutions ensure flawless and safe operation of your system.



ROBOTICS

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Sensors and safety in robot-assisted processes

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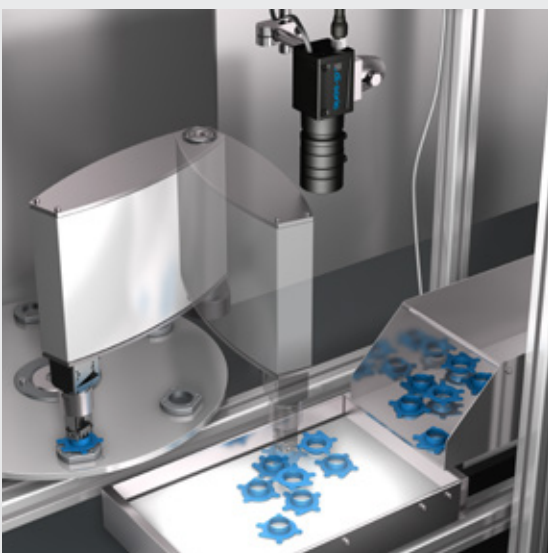


IMAGE PROCESSING

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Image processing solutions for complex processes

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STORAGE OF COMPONENTS AND MATERIAL

In the segment of feeding in assembly and handling technology, components must always be available in sufficient quantity in circular or step feeders for further processing. Our optical sensors and ultrasonic sensors monitor reliably—without contact or wear.



Fill level monitoring in the step feeder

The US Q12 M 400 FP G3-T4 ultrasonic sensor detects even shiny parts such as nuts and bolts without problems. If the fill level falls below the target value, the sensor switches, and material is refilled. This target value can be set intuitively using a potentiometer. This solution is extremely reliable thanks to its narrow sound beam and the specific fill level evaluation.



Ultrasonic sensor
US Q12 M 400 FP G3-T4



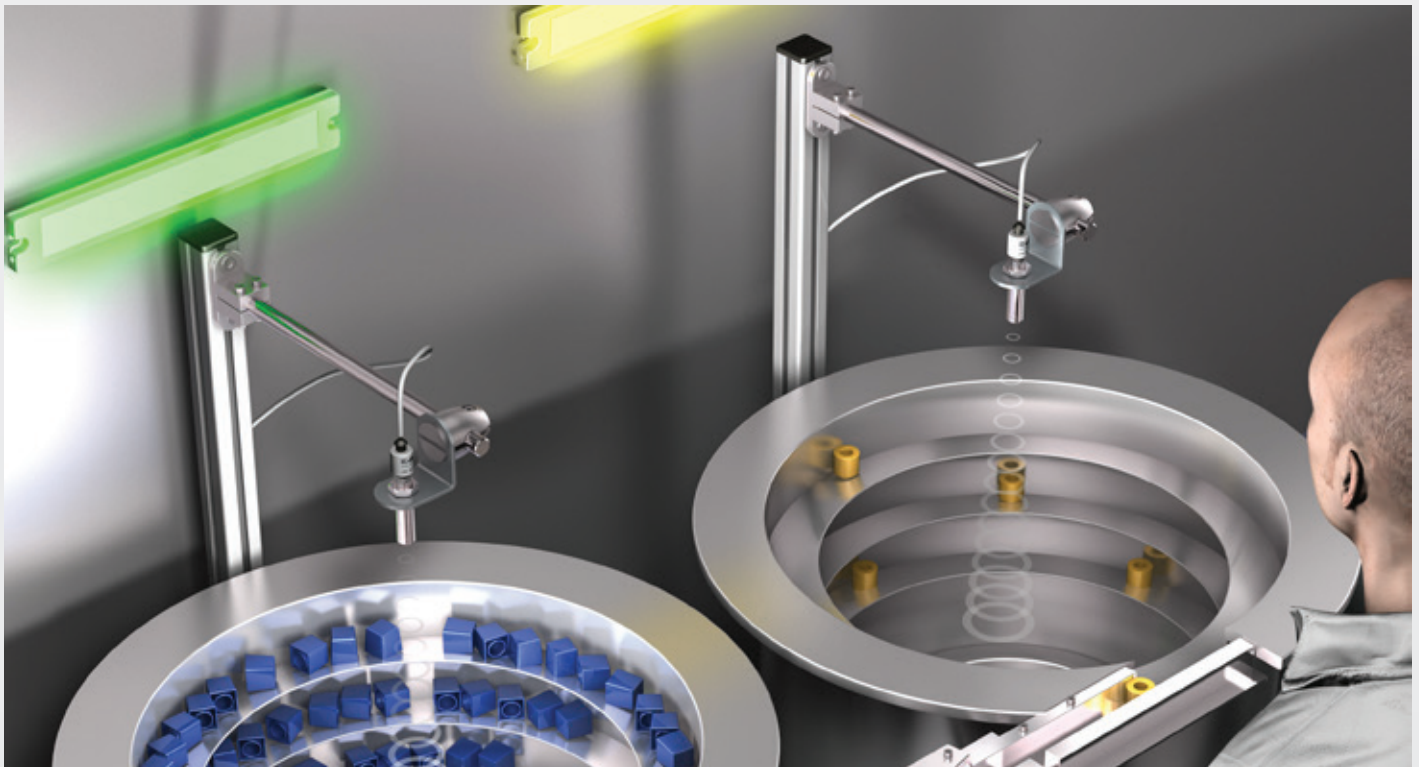
Fill level monitoring in a small circular feeder

Our diffuse sensors from the 30 series with background suppression are the economical solution for close-range fill level detection. In the OH 30 K 400 P3-T4, the target fill level is set using a potentiometer. Once the fill level falls below the target, the sensor switches and material is refilled. The maximum scan width of 400 mm enables safe detection; the small design allows for installation in constrained spaces.



Optical sensor
OH 30 K 400 P3-T4

Depending on the degree of automation, it is possible to carry out automatic or manual refilling in a timely manner—and while minimizing downtimes—when the level falls below a target value.



Fill level monitoring and signaling in larger circular feeder

Fill level monitoring in large circular feeders can be optimally implemented using a US M18 series ultrasonic sensor in combination with SB-RGB signal lighting. M18 ultrasonic sensors are suitable for larger working distances and for detecting shiny and even transparent components. Using IO-Link, the exact switch point of the sensor can be defined. This setting is tamper-proof.

If the fill level falls below the target value, the switching output of the sensor switches and the yellow light of the signal lighting indicates that material must be refilled.

Ultrasonic sensor
US 18 M 800 G3-B4

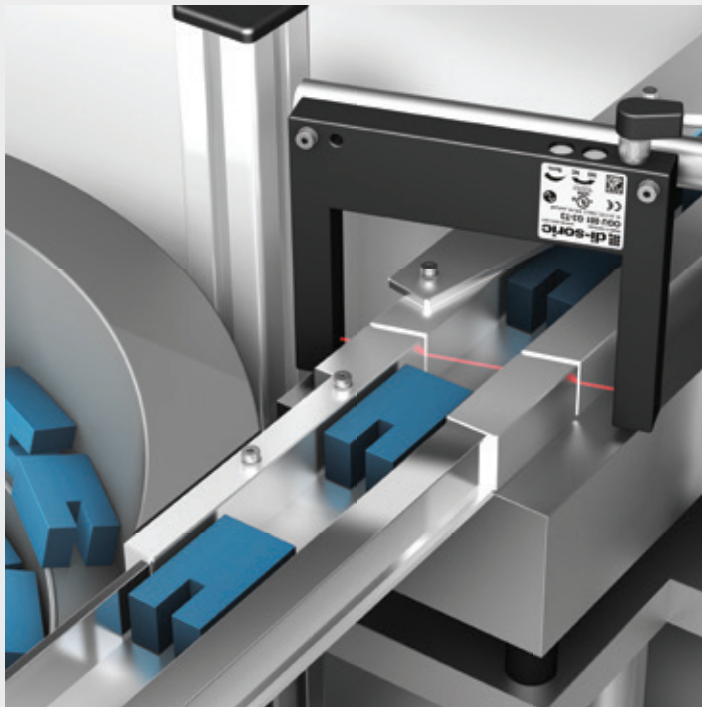


Signal lighting
SB-RGB



LINEAR PART FEEDING

Our sensors reliably control the continuous material feed of the downstream assembly. It does not matter whether parts are being fed on rails, belts, workpiece carriers, pallet or chain feeders. Our sensors feature accumulation and feed control that ensures

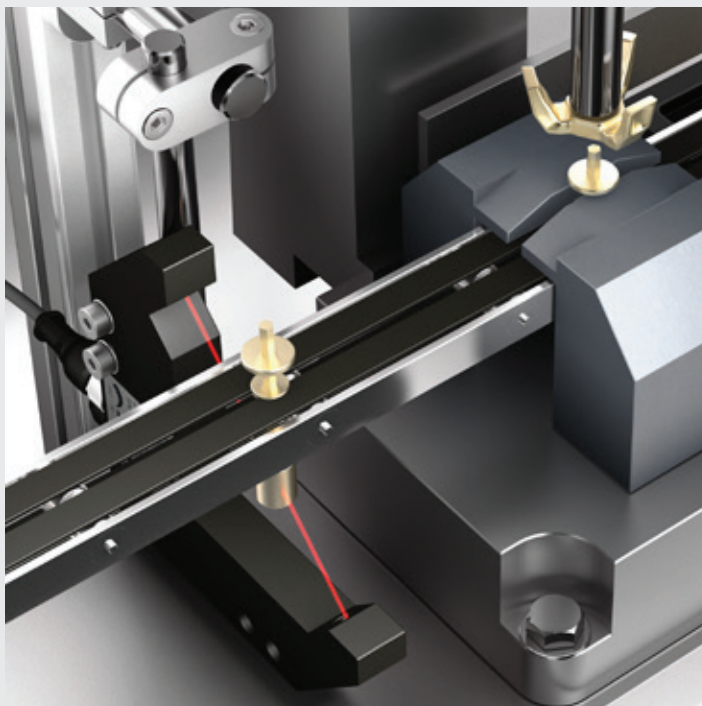


Accumulation monitoring in the feeder rail

Our fork light barriers of the OGU series provide functionally reliable accumulation monitoring with fork openings from 5 to 250 mm. This forward-thinking solution makes handling easy—in both assembly and start-up. If the products accumulate in the rail, the OGU 051 switches and the feed stops.

Integrated IO-Link allows for configurations to be stored and extensive diagnostic options and ensures high system availability.

Fork light barrier OGU 051 G3-T3



Feed control of small parts in constrained installation spaces

In constrained installation situations, our angled light barriers of the OGL series, which are open on two sides, control the feed of components reliably. The small, clearly visible LED light spot allows for fast, very precise adjustment and alignment. The high resolution ensures the safe detection of objects from a diameter of 0.2 mm.

Four sensor modes can be configured via IO-Link. They allow for optimization of the OGL for individualized applications.

Angled light barrier OGL 081 G3-T3



maximum availability and functional reliability in downstream processing steps such as pressing, assembling, forming or closing. The wide range of solutions from di-soric offers a suitable solution for every type of linear material feed.

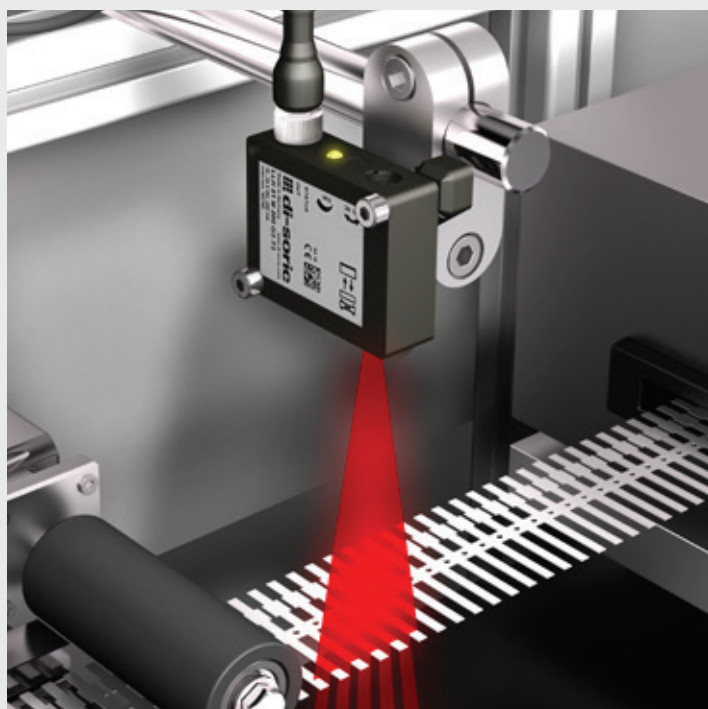


Accumulation monitoring of containers guided by rail

If the structural conditions do not allow for the use of light barriers, our fiber optics, which are extremely robust and long-lasting thanks to their kink protection, are the ideal solution—for example, the KLER-M4-T.

The OLK 71 amplifier is simply installed in a place where more installation space is available. The switchover value is set intuitively using +/- buttons. The switchover point and signal value are indicated by two LED displays.

Fiber-optic sensors
**OLK 71 with
KLER-M4-T2-1**



Monitoring of continuous belt feeding

To guarantee continuous belt feeding, the presence of stamped contacts must be checked.

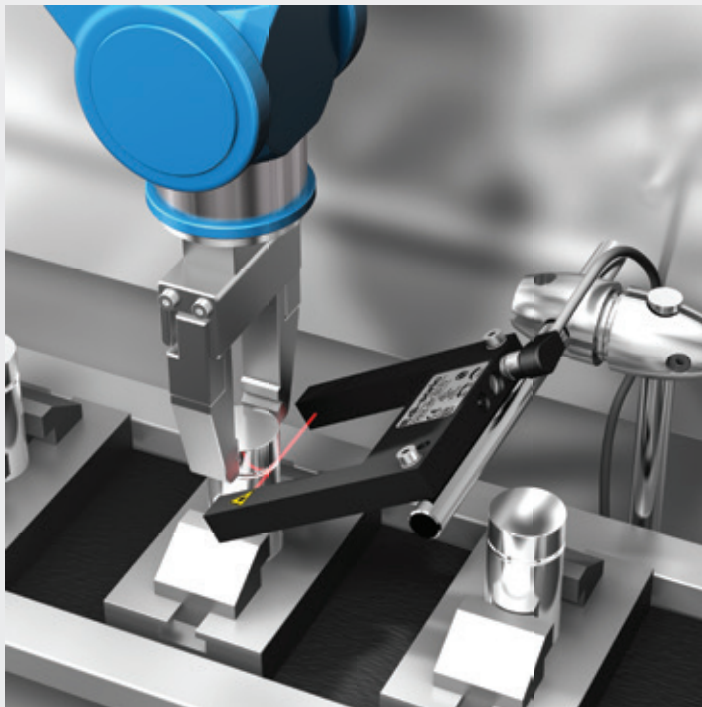
The LLH 51 is the right solution thanks to its widened laser line with a size of 30 x 1.5 mm (at a distance of 200 mm). Thanks to the functional scanning principle with background suppression, the LLH 51 allows for monitoring moving stamped contacts while saving space.

Laser line diffuse sensor
LLH 51 M 200 G3-B4



POSITION MONITORING OF PART FEEDING

Components must be checked for their position and completeness before they are fed to assembly machines. For this purpose, di-soric has a wide selection of product solutions that increase productivity, minimize machine downtimes and even prevent machine damage.



Position monitoring: groove present?

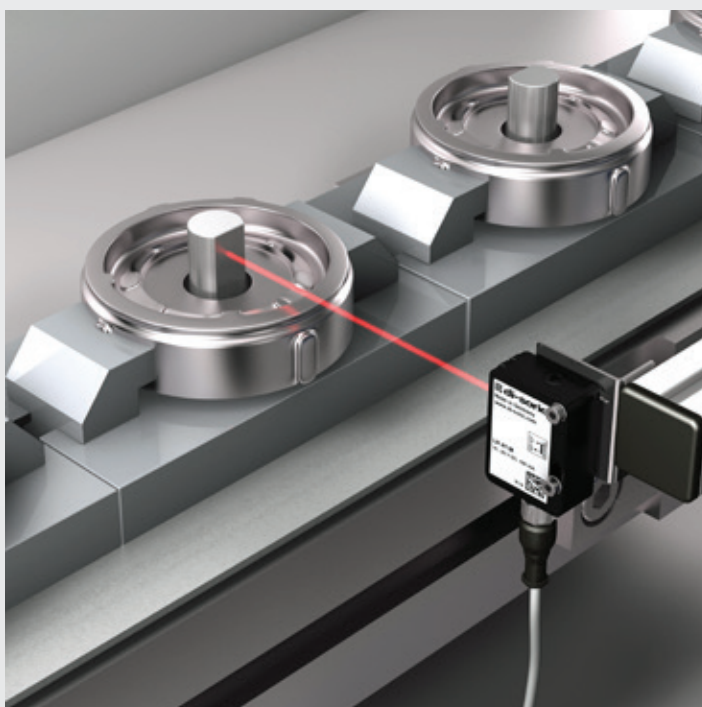
The correct position of cylindrical components is verified by checking for the presence of a small groove. Our OGUL laser fork light barrier features a clearly visible laser beam and completes this task with functional reliability. In the NC position of the potentiometer, the switching output is switched off if no groove is present and the product can be rejected.

The high-resolution OGUL detects even extremely small objects, down to a diameter of 0.05 mm.

Laser fork light barrier
OGUL 051 G3-T3*



*available as of the fourth quarter of 2019



Monitoring: position of a shaft

The laser diffuse sensor with background suppression of the LH 41 series reliably detects the correct position of a shaft on a workpiece carrier system.

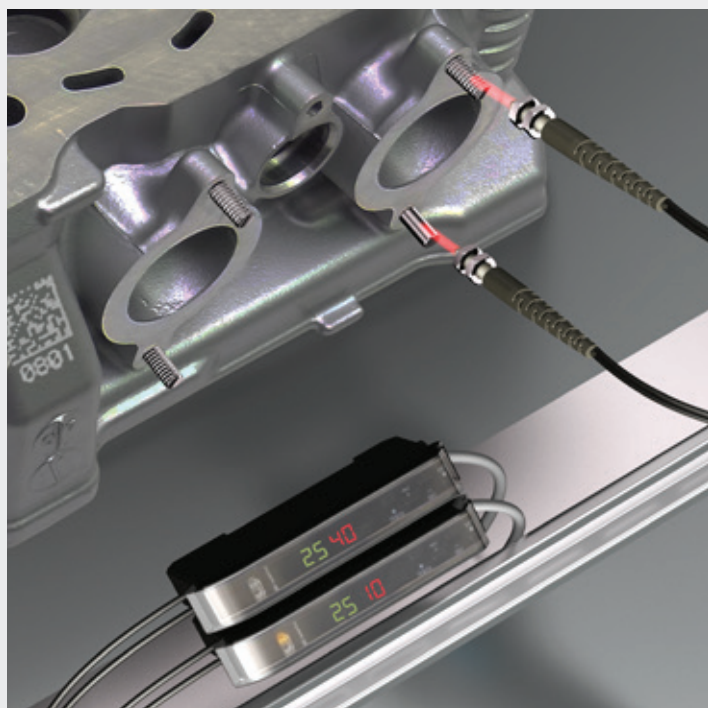
Thanks to its broad scan width range of 30 to 350mm, it is possible to position the sensor both near the shaft and away from it.

The switch point can be adjusted easily, precisely and protected from vibrations by means of a 10-turn potentiometer.

Laser diffuse sensor
LH 41 M 350 G4L-T4



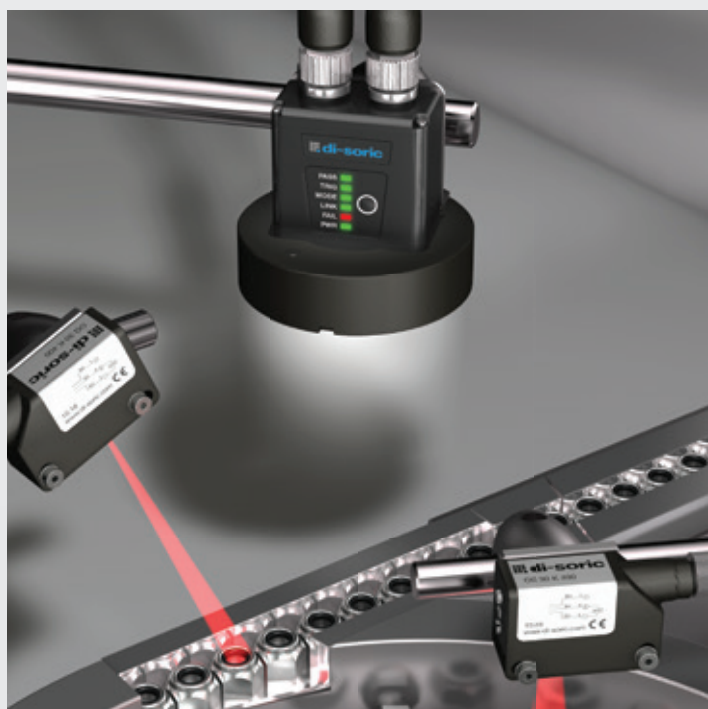
Our high-resolution laser sensors for the detection of the smallest features or fiber-optic sensors in constrained installation spaces are excellently suited to these tasks. If entire areas must be checked, our vision sensors are used.



Check: thread present?

The OLK 71 checks the presence of an outside thread on a pre-assembled bolt on a workpiece carrier. Fiber optics positioned at an angle with the VOM4 attachment optics enable the detection at a working distance of up to 8 mm. Adjustment works by simple teach-in at the fiber-optic amplifier.

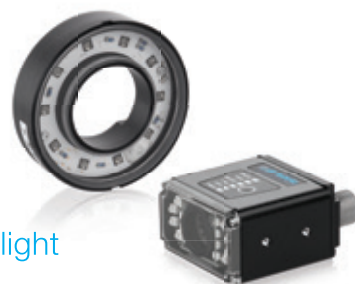
Fiber-optic sensors
OLK 71 with
KLT-M4-T2-0.5K
attachment optics
VOM4



Monitoring: position of a nut

Our CS 50 Vision Sensor works in combination with a matching ringlight to check whether nuts being fed by a circular feeder are facing the right way. The configuration is done easily and quickly by teaching in an image processing tool.

Upside-down nuts are blown back into the bowl.



Vision sensor, ringlight
CS 50, BEK-R33

FEEDING PARTS IN A TUBE

Components such as screws, springs, washers or welding bolts are fed to the assembly process by means of tubes. For this purpose, di-soric has a wide selection of optical ring light barriers and inductive ring and tube sensors with dynamic and static detection.



Accumulation detection of studs in a tube

The easiest solution for detecting an accumulation in a tube is our tube sensors from the IS series with static operating principle. The flat, space-saving sensor is simply attached to the feeding tube using cable ties. It reliably detects metal bolts and screws.

Tube sensor
IS 70 PSK-TSSL



Detecting screws

Our IRB 15 inductive ring sensor without setting elements functions according to the static operating principle. It detects metal objects in a feeding tube in a way that is reliable and tamper-proof.

The cost-effective ring sensors of the IRB series can be used for the widespread tube diameters of 10 to 27 mm.

Ring sensor
IRB 15 PS-B3



For feeding both metal and plastic objects, our portfolio provides the suitable ring sensor in various sizes. Our tube sensors are suitable for flexible attachment to various tube diameters.

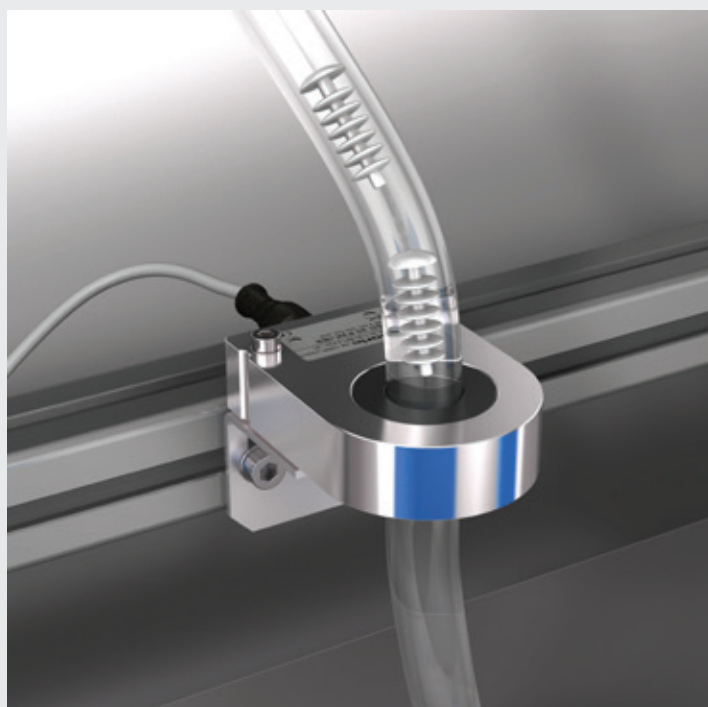


Detection of springs in a tube

The IRD 6 PSOK-IBS inductive ring sensor is excellently suited for the detection of small, fast-moving coil springs in a tube. This solution even detects very small objects moving at a speed of 35 m/s and with low metal content. The sensitivity and pulse stretching can be easily adjusted by means of a screwdriver.

Ring sensors with a static operating principle are alternatively available for accumulation detection.

Ring sensor
IRD 6 PSOK-IBS



Detecting metal and non-metal parts

Our ORSD ring light barrier detects not only metal objects but also non-transparent objects made of plastic down to a diameter of 1.5 mm in the feeding tube.

The ORSD allows for both static and dynamic operating mode and can be intuitively adjusted using a potentiometer.

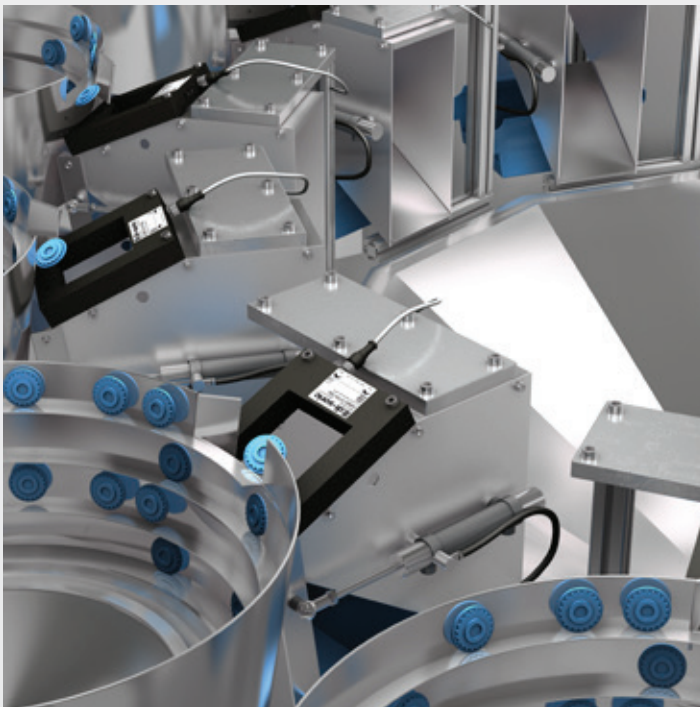
Ring light barrier
ORSD 20 P2K-IBS



TUBULAR BAG MACHINE AND SEALING MACHINE

In packaging processes, frequent product changes, varying objects and designs call for safe object detection. In addition, large production quantities impose the highest demands on the inspection rate of the sensors in packaging technology.

For this purpose, di-soric provides sensors that can be adjusted quickly and easily and solutions for object detection at very high speeds.

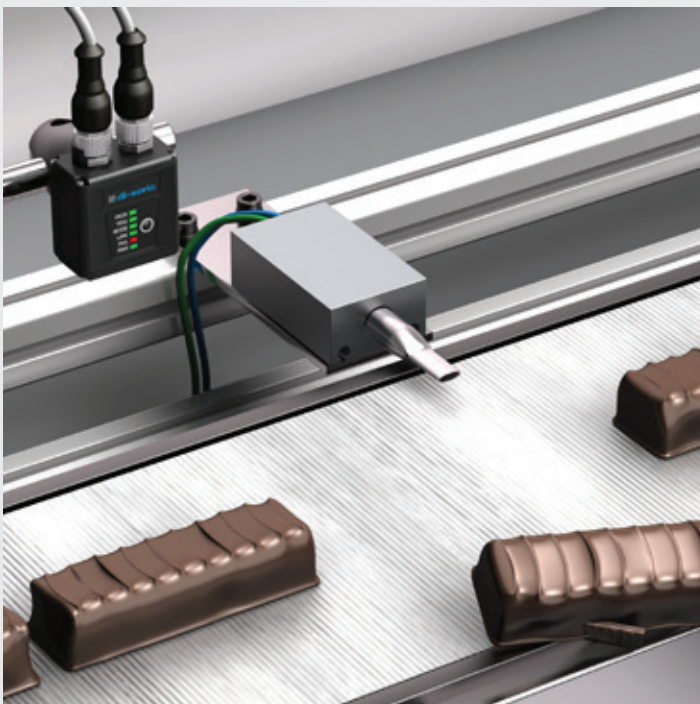


Counting parts in a tubular bag machine

The frame light barriers of the OGWSD series, which are available in many sizes, are suitable for counting the parts. Parts falling at a high speed are safely detected in the complete range of the frame light barrier. Adjustable pulse stretching ensures error-free counting processes. In this way, target specifications for the number of parts within a bag can be easily implemented.



Frame light barrier
OGWSD 070 P3K-TSSL



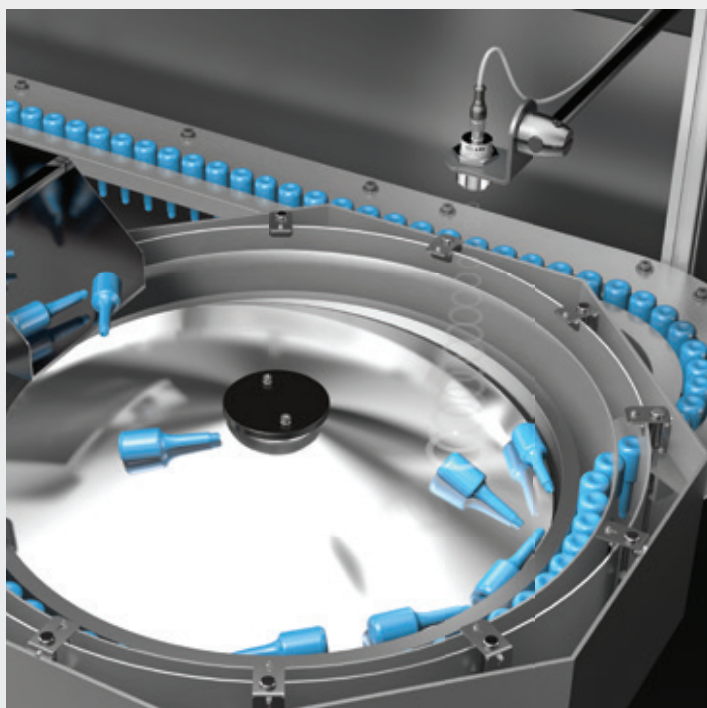
Monitoring the feed into tubular bags

Due to the narrow inlet of a tubular bag packaging machine, the correct position of chocolate bars must be monitored. Our CS 50 Vision Sensor monitors the fast-moving bars, checking their orientation and dimensions to prevent rejects and machine downtimes.



Vision Sensor
CS 50

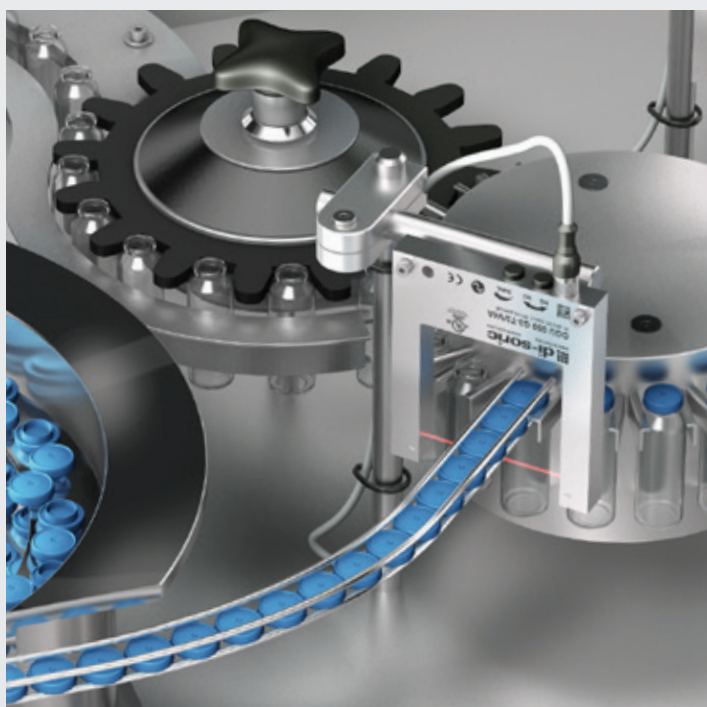
If tasks become too complex to be handled by sensor technology alone, our vision sensors with their easily configurable tools are often the suitable solution. Furthermore, our specialists for industrial image processing and identification from di-soric Solutions can handle even the most complex applications, for example in part tracking, quality checks and verification.



Fill level monitoring in the centrifugal feeder

Our M30 series ultrasonic sensors provide high functional reliability, which is required for fill level monitoring down to the millimeter in large containers. The wide sound beam means that larger objects can be detected as well. If the fill level falls below the target value, the centrifugal feeder is refilled from the hopper. As a result, parts for the sealing machine are continuously available.

Ultrasonic sensor
US 30 M 3000 G3-B4



Accumulation monitoring in sealing machine

Where there are enhanced requirements for hygiene and resistance to cleaning agents, our OGU V4A stainless steel fork light barriers can be used.

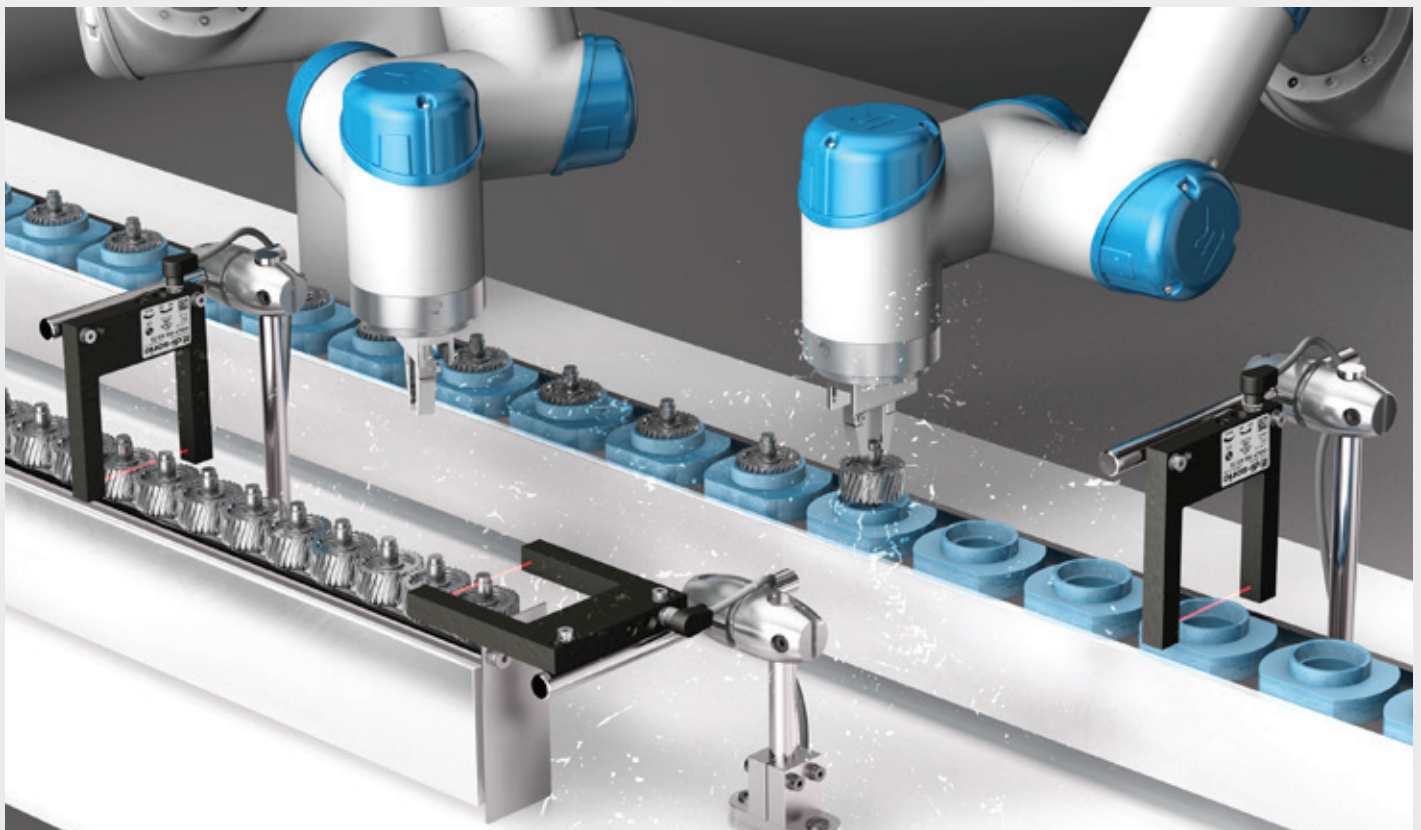
In the event of an accumulation in the feed to the sealing machine, there is a reliable stop. Batch changes and modifications to production parameters can be implemented easily, quickly and in a reproducible manner using the IO-Link configuration.

Fork light barrier
OGU 051 G3-T3/V4A



SENSORS AND SAFETY IN ROBOT-ASSISTED PROCESSES

In robot cells, sensors can be used to handle an extremely wide variety of challenges. Our sensors and vision sensors function as the sensory organs of the robot. They ensure material detection and monitor the flow of parts reliably.



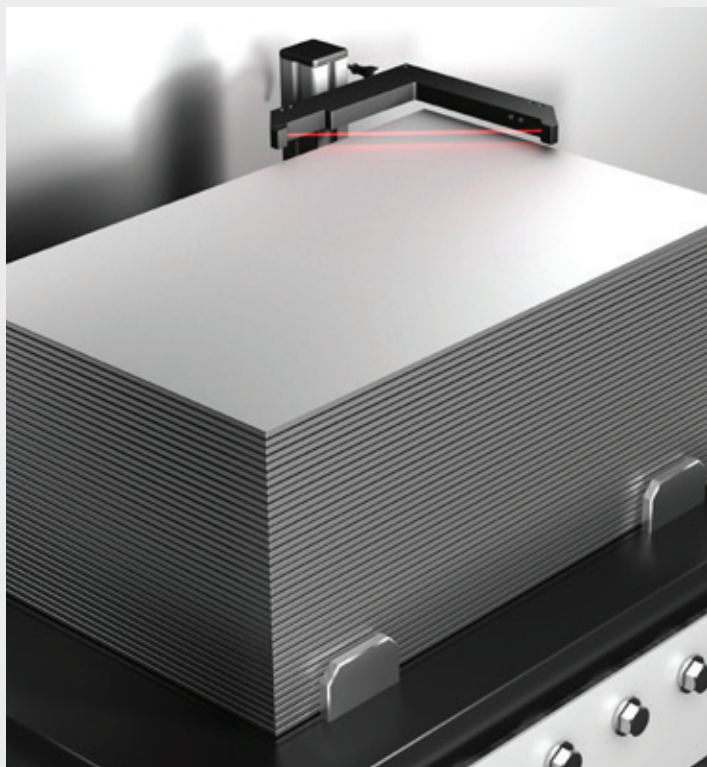
Linear supply technology in the robot cell

The fork light barriers from our OGUP series are particularly well suited for use in contaminated environments, e.g. for feeding components in a robot cell, thanks to their high function reserve and high switching precision at the same time. The OGUP 050 G3-T3 is equipped with infrared high-performance LEDs, allowing cleaning cycles in contaminated environments to be minimized. Function reserve and degree of contamination of the fork light barrier can be easily monitored using IO-Link.

High-performance fork light barrier
OGUP 050 G3-T3



However, the main concern is the protection of the operating personnel from injuries caused by the robots. We guarantee this protection by implementing our safety light grids and curtains at the highest safety level: Type 4.



Stack monitoring in robot cell

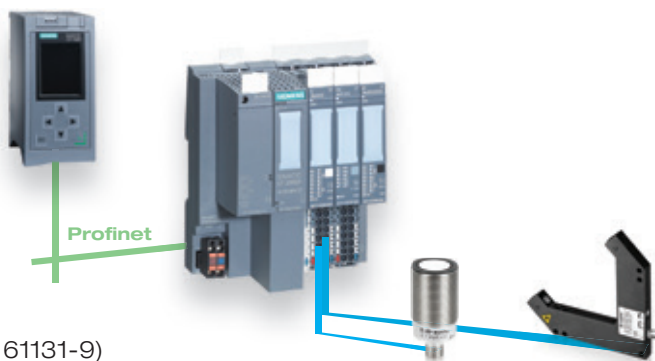
A robot in a robot cell always picks up the top sheet from a magazine for further processing.

Thanks to the OGL angled light barrier with high switching precision and reproducibility down to 0.03 mm, the next sheet is repositioned. During this, the OGL also checks the removal of the sheet and switches off accordingly. Configuration and diagnostics are carried out via IO-Link. This means that no access to the dangerous area of the robot cell is necessary.

Angled light barrier
OGL 121 G3-T3



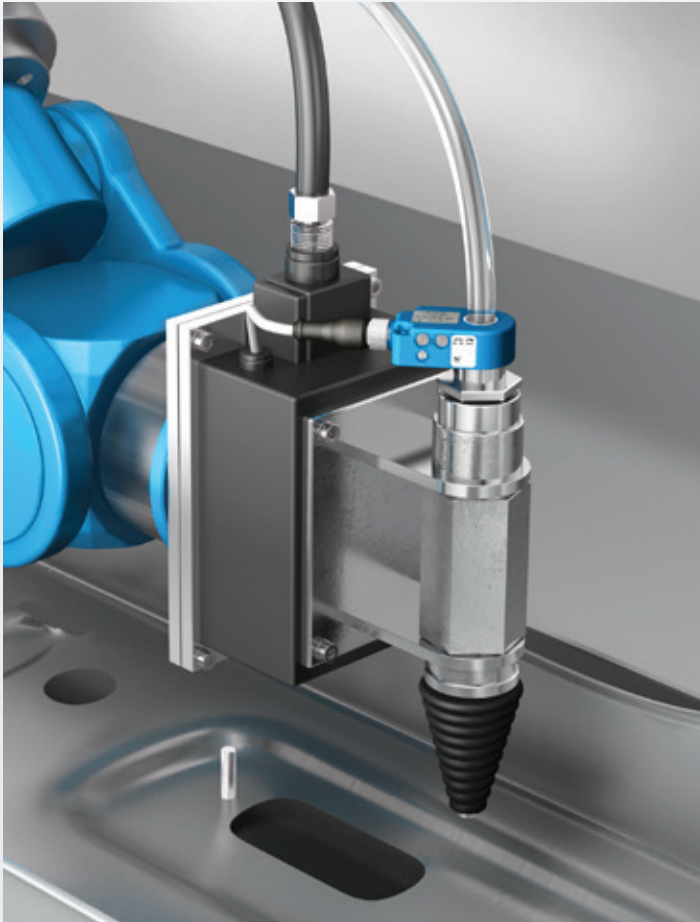
 IO-Link



5 REASONS FOR IO-LINK

(STANDARDIZED IN ACCORDANCE WITH IEC 61131-9)

1. **Cost reduction** thanks to reduced stockkeeping
2. **Implementation of innovative machine concepts** thanks to consistent communication
3. **Shortened commissioning times** with cabling according to standards
4. **Increased machine productivity** through independent configuration and identification
5. **Revolutionizing maintenance** through self-diagnostics

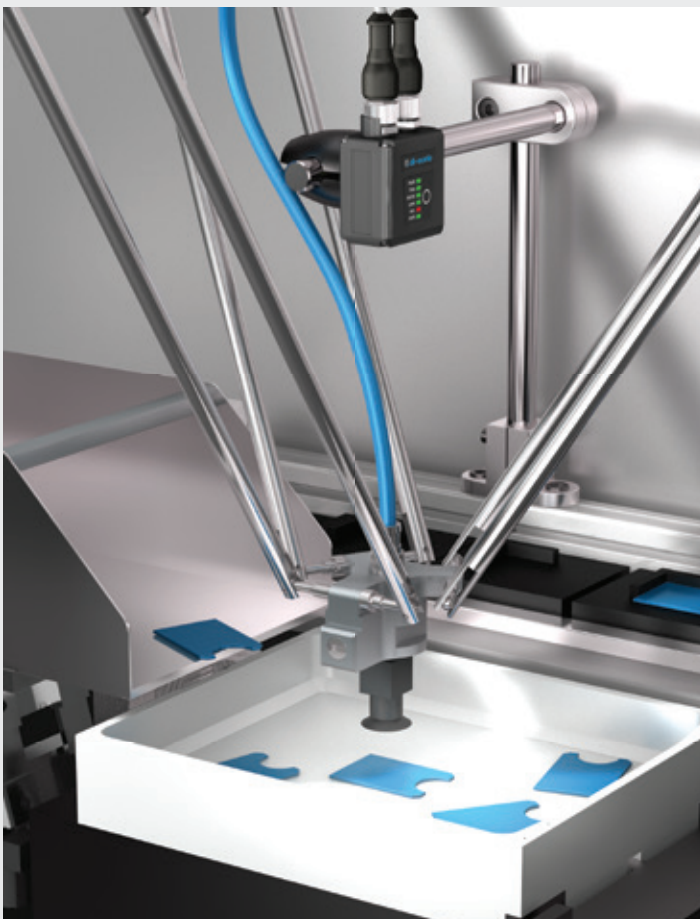


Accumulation detection of welding bolts in a tube

The body is a central element in the construction of automobiles. Robot-assisted welding systems for welding bolts guarantee high-strength and durable connections in a joining process. Our inductive ring sensors are particularly robust and long-lasting. As a result, they detect the welding bolts in the feeding tube close to the welding tool in robot-assisted welding systems. When parts are being fed very quickly, the integrated pulse stretching generates an output signal that can be safely analyzed.



Ring sensor
IR 25 PSOK-IBS

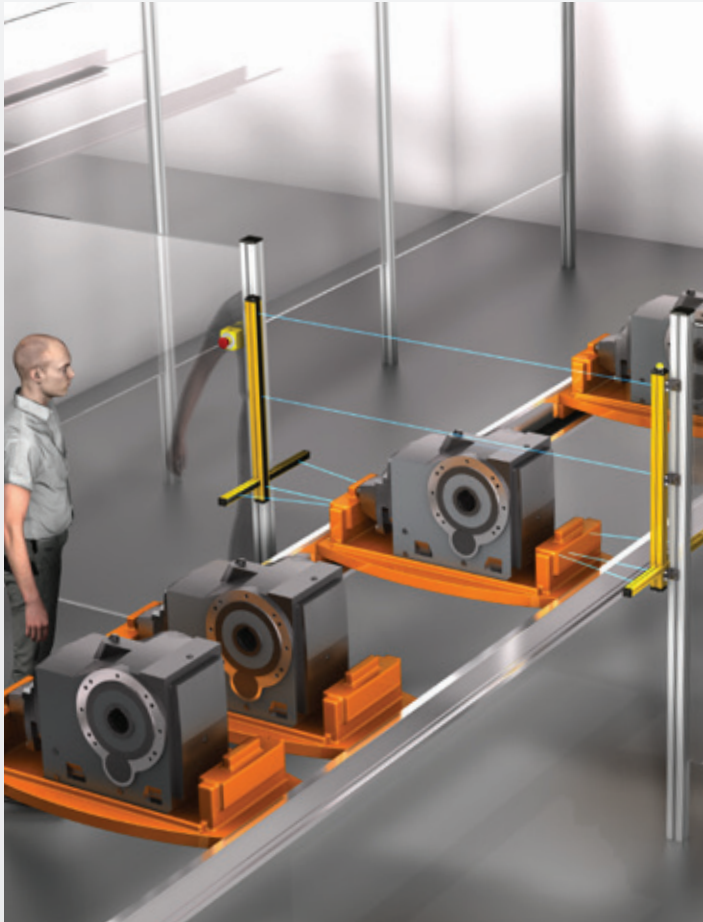


Locating and gripping

Vision sensors are even suitable for position detection of objects located on a vibrating plate lighted from behind. The first step is to teach in the CS 50 Vision Sensor to an object. The CS 50 determines and transmits the X and Y coordinates and the orientation of the most suitable object to a robot. The robot grips the object and sets it down via PROFINET, Ethernet TCP/IP or RS 232. If the CS 50 does not find any more parts in the operating range that can be located, new objects are fed by the conveyor system.



Vision Sensor
CS 50



Personnel/body protection with muting at a robot cell

A carrier with workpieces is inserted into a robot cell for processing and assembly.

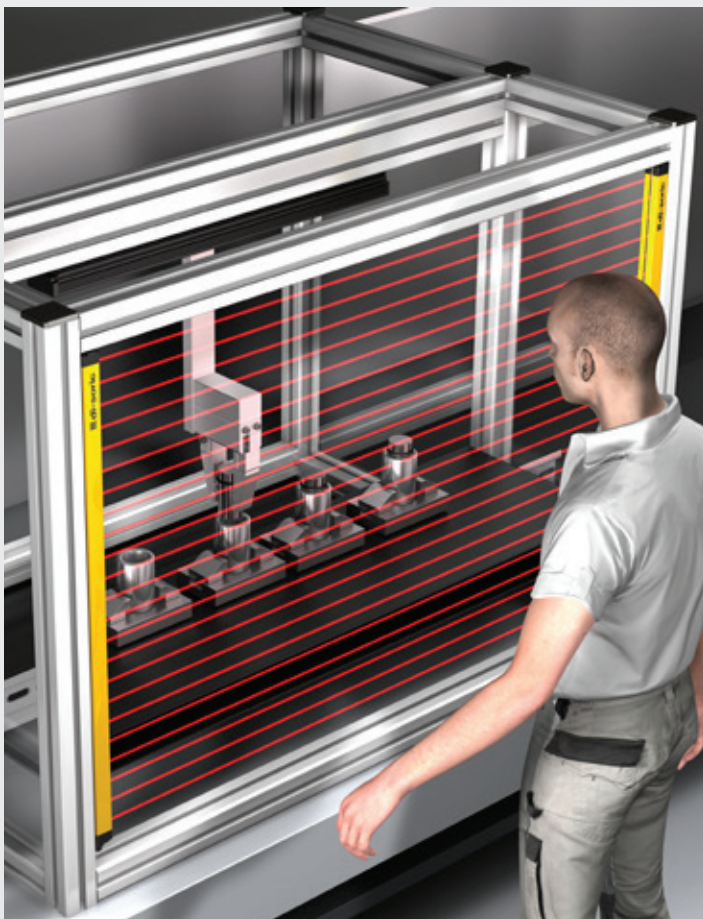
Our SLM4 safety light curtain, featuring muting arms that can be integrated and wire configuration, makes it possible to achieve fast integration and material transport into the danger zone through short-term interruption of the safety function.

The integrated muting light indicates active muting.



Safety
light curtain
SLM40-3B
with **MZ-T2X***

* available as of the fourth quarter of 2019



Hand protection in robot cell

Robot cells with manual part feed by operating personnel are used in many industrial production processes. The operator positions the components and parts accurately so that they can be processed by the robot. It must be ensured that there is no risk during the processing.

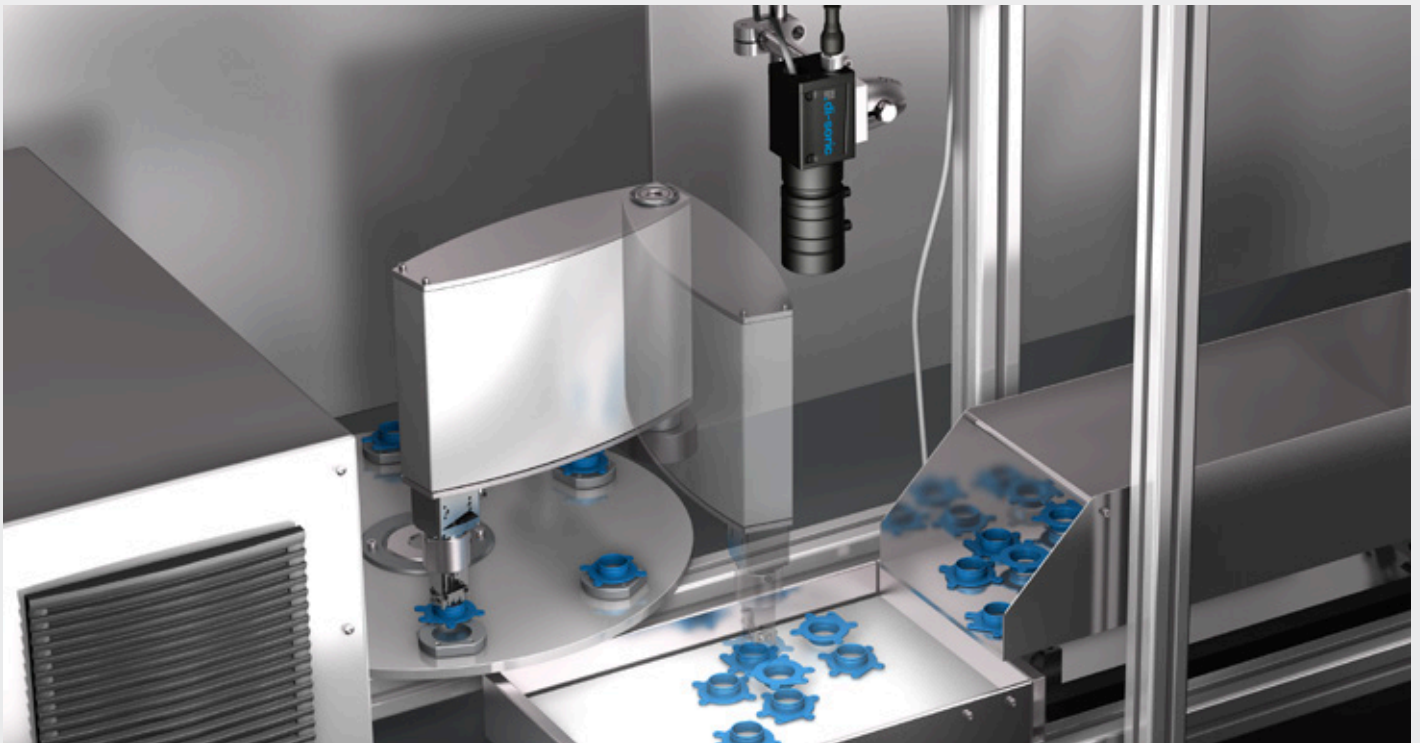
Here, our SLB4 safety light curtains with the highest protection level Type 4 are used. They are easy to connect and configure. As a result, hands are reliably protected while reaching into the dangerous area.



Safety
light curtain
SLB4-753

IMAGE PROCESSING SOLUTIONS FOR COMPLEX PROCESSES

di-soric Solutions is a part of the di-soric group of companies. It focuses on products for image processing as well as the consultation, project engineering and integration of automation solutions using image processing and industrial identification. It ensures the quality of products manufactured in automated processes and provides for complete traceability during the individual process steps.



Pick & Place of parts, feeding using a feeder module

Our vision system solution reliably detects the bent sheet metal parts being chaotically fed by a vibrating feeder module. Blue background lighting on the drop-off position emphasizes the contours of the parts so that they can be detected by a GigE camera. Our nVision software determines the best possible match and transmits it to the robot for gripping, along with the coordinates and the rotation angle.

Thanks to the intuitive teach-in mode, a wide variety of parts can be taught in quickly and easily. There is no need for specially trained or experienced personnel.

nVision detects the geometrical properties and stores them in the newly created database.

Using these trained properties, gripping the parts is accelerated significantly. Parts not matching are detected and repositioned by vibratory pulses.

For the intuitive operation of the image processing system, a specially developed HMI is used.

You can obtain more information on this solution directly from our vision specialists at di-soric Solutions.

di-soric Solutions works with powerful systems and collaborates with you to determine the most effective and efficient solution. Continuous further development of the products and services, constant awareness of quality and expert advice ensure that your processes deliver the highest quality.



Checking electronic connectors during feeding

This fully automated in-line check of connectors consists of two stations—there is no traditional stand-alone check. At the first station, the connectors are fed to the camera unit using a belt conveyor system in an intake on a workpiece carrier and briefly stopped there. The check includes the alignment in the X and Y directions and of the swash circumference at an accuracy of 0.1 mm as well as the measurement of the pins relative to a specific reference mark.

Product output increases massively, rejects decrease, and product quality is enhanced as the system provides its recorded measurements directly via CSV table, ensuring certified quality documentation. For each connector produced, corresponding measured values can be presented, which reassures customers that they have made a high-quality purchase.

At the second station, a 3D-system solution measures the heights of the individual pins within the connector relative to a fiducial marker. Thanks to this automated 3D measurement, the heights of the individual pins can be measured and the correct function of the plug connection can be ensured. The respective measurements of the individual pins and their shoulders are processed as a measured value file and assigned to each individual connector via ID. Each individual connector receives a measurement log of the X and Y positions of the pins, a swash circumference check and a pin height measurement.

You can obtain more information on this solution directly from our vision specialists at di-soric Solutions.

nVISION THE CORE PIECE OF OUR AND YOUR IMAGE PROCESSING SYSTEMS



CORE TASKS OF IMAGE PROCESSING

LOCALIZATION

Positioning parts is important in many Machine Vision applications. It is not always possible to position parts with precision by mechanical means, which means that the image processing software must compensate for the position. Based on the results of the position correction, the part feed can be readjusted or additional inspection tools can be controlled.

The tools for measuring and position correction are able to work more precisely if the camera system including the lens is calibrated.

IDENTIFICATION

Tracking parts is a core Machine Vision task. It requires markings to be recognized on parts, text to be provided in plain text and barcodes or matrix codes to be decoded.

Time pressure and high complexity are core problems in image processing projects. Our nVision software combines speed, performance capacity and custom adjustment options to give you the perfect solution. The solution features a pioneering, intuitive and visually attractive user interface and reliable software.

The versatile software is used in the areas of industrial Machine Vision applications and scientific image analysis. The price/performance ratio has already proven to be outstanding for many companies in a variety of industries. With runtime licenses individually adjusted to the demands of the respective application, customers acquire a software package that is precisely tailored to their requirements.

Furthermore, we provide consultation during the feasibility analysis, undertake project implementation and continue to support you after the project is done by providing service and further developments.

Our services range from visualization in the field of scientific research using interactive image analysis systems to fully automated Machine Vision applications, e.g. parts inspection, counting, measuring, barcode and matrix code decoding as well as OCR (optical character reading).

Thanks to nVision, your projects can be implemented better and more quickly, making them both more efficient and profitable.

CHECKING

Checking parts is an important task of Machine Vision systems. Image processing allows a large number of properties to be checked: completeness, dimensional accuracy, color, surface quality.

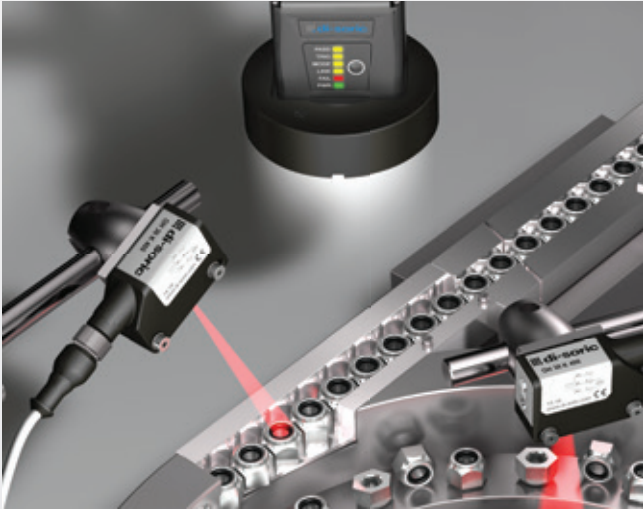
nVision allows you to increase your production quality standards effortlessly.

MEASURING

When calibrated Machine Vision systems are used, lengths, angles and areas in 2D and 3D can be measured without making contact. Thanks to our algorithms, which are precise down to a fraction of a pixel, you can reach the required level of precision and reduce tolerances in your production.

In addition to the geometric variables, the image processing function can also measure densitometric values that depend on brightness or color.

SOLUTIONS. CLEVER. PRACTICAL. TEAMWORK BY DI-SORIC

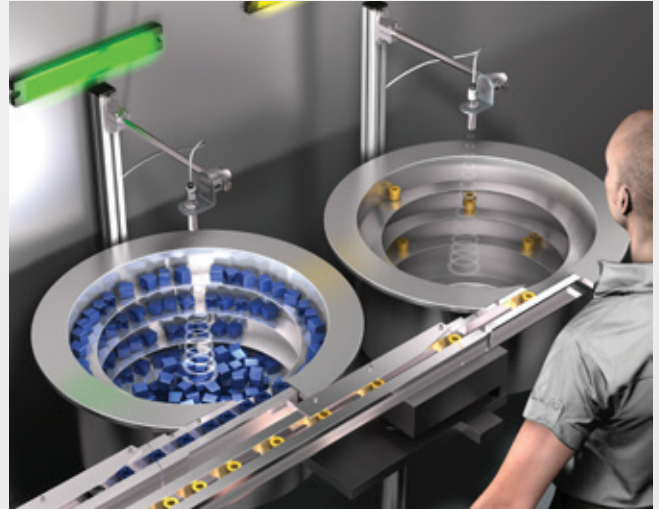


VISION SENSOR SAFELY TRIGGERED

As the nuts can follow each other in a tightly packed manner, without a gap, it is not possible to use a fork light barrier or retroreflective light barrier as the trigger for the vision sensor.

For this reason, an OH 31 K 200 P3-T4 was set up facing the nuts at an angle from above and configured in such a way that it switches whenever the inside thread reflects light.

Thanks to the tilted position, the view of the CS 50 Vision Sensor onto the nuts is not disturbed.



SOLUTIONS WITH IO-LINK

If the fill level falls below the target value, the switching output switches and the connected signal lighting lights up in yellow. The color and brightness of the light can be configured individually via IO-Link.

With IO-Link, sensors and lightings in the Industry 4.0 environment become capable of communicating. IO-Link allows for transmitting and evaluating information on identification, configuration and sensor state.

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