



DISTANCE MEASUREMENT IN AUTOMATION

WELCOME TO DI-SORIC

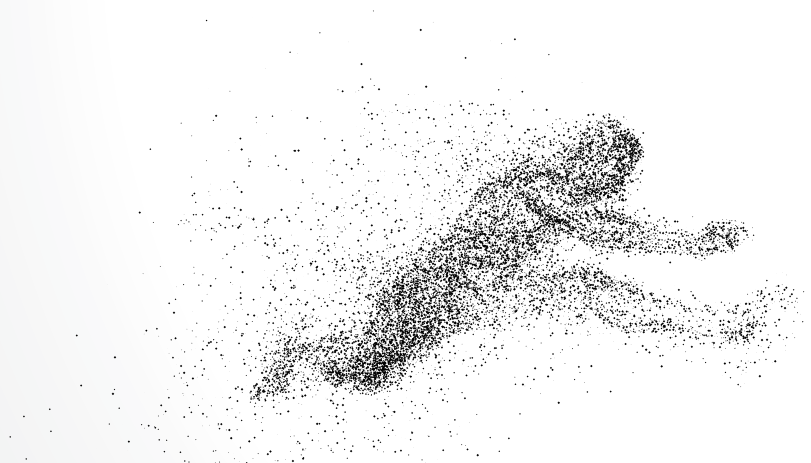


- **100% owner-managed**
- **Headquarters**
Urbach, Germany
- **Technology and production center**
Lüdenscheid, Germany
- **Representatives and branch offices**
in more than 40 countries
- **Certifications**
IQNet, DQS - ISO 9001:2015, UL, RoHS

For over 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.

Our own ambition is to benefit you. When we develop products and solutions to handle your tasks, we always strive to make them both as simple and as practical as possible.

We draw upon our high level of technical know-how and a clear view of the developments of tomorrow to support our customers – today and in the future – with precise, non-disruptive and efficient production processes.



OUR PROMISE TO YOU:

SOLUTIONS.

To us, finding solutions means:

- Targeted consultation and technical expertise for efficient product solutions
- A very broad, high-performance product range

CLEVER.

To us, being clever means:

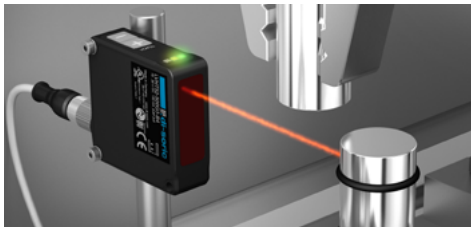
- Developing products with clear benefits
- Products that are easy to use thanks to clever functions
- Joint dialog for the most efficient and most suitable solution

PRACTICAL.

To us, being practical means:

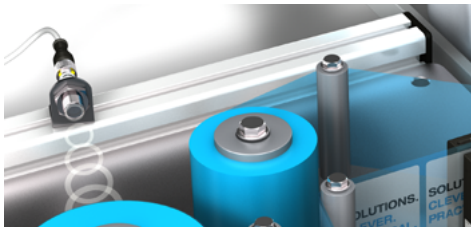
- Solution expertise with the best possible functionality at affordable prices
- Cooperative and straightforward working relationships for mutual success
- Focus on the key issues for greater efficiency

OVERVIEW OF INDUSTRIES



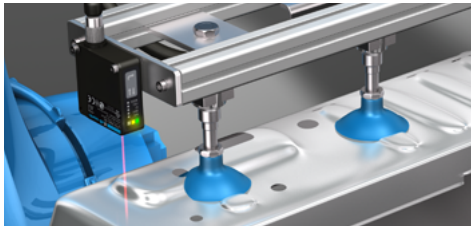
ASSEMBLY AND HANDLING TECHNOLOGY

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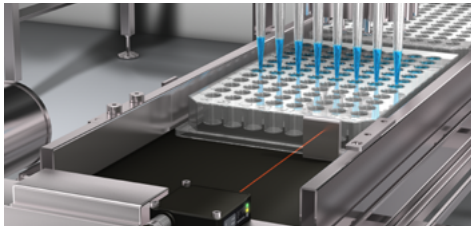
PACKAGING

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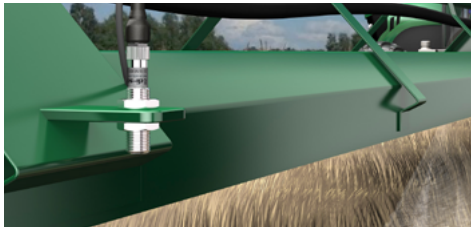
ROBOTICS

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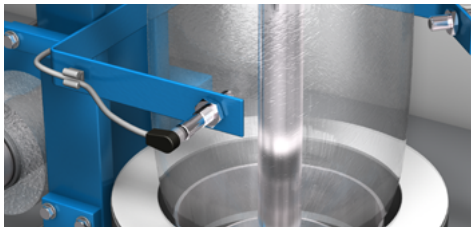
LABORATORY AUTOMATION

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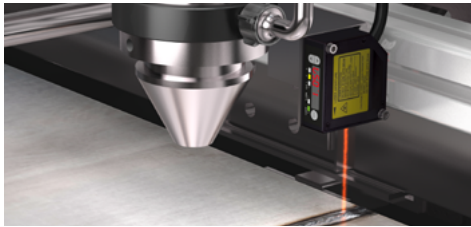
MOBILE EQUIPMENT

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RUBBER AND PLASTICS

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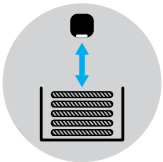
MACHINE TOOLS

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OPTIMAL DISTANCE MEASUREMENT IN AUTOMATION

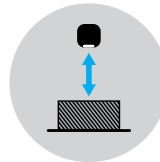
In automation, there are the most diverse application scenarios: from measurements of fill level, object positioning, to quality control. The diverse requirements, e.g. in relation to the object surface quality or the necessary precision, result from the specific application task. High resolutions,

Fill level



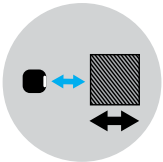
- Height distance measurement of individual materials or stacked objects
- Objects with similar properties

Distance



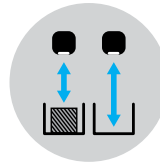
- Distance measurement for detecting the object location or regulating processes
- Direction of movement of the objects in the direction of the detection axis of the sensor

Positioning



- Positioning of objects with identical properties
- Direction of movement of the objects in the direction of the detection axis of the sensor

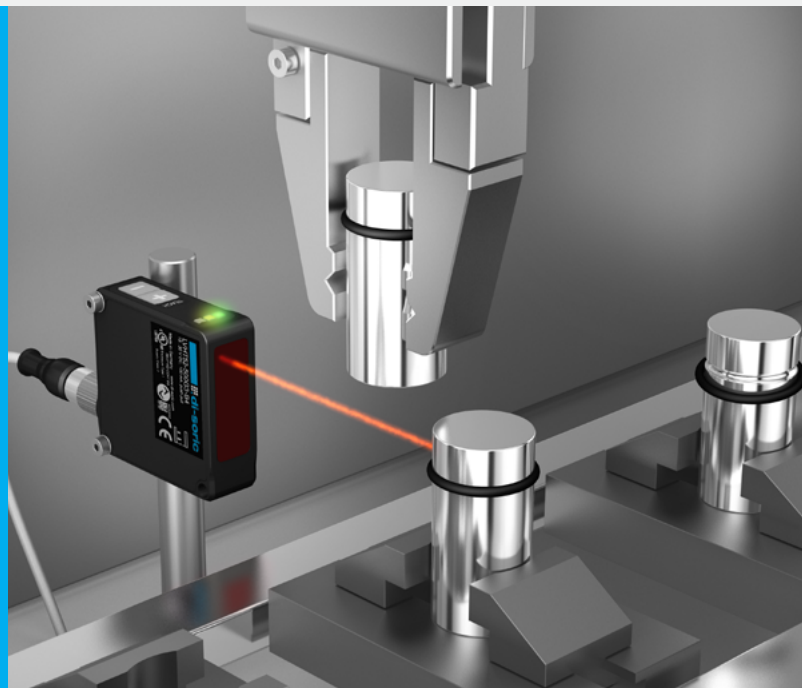
Quality control



- Presence check for objects as part of quality control
- Location check for objects

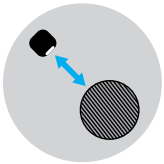
APPLICATION EXAMPLES FOR THE SELECTION OF THE OPTIMAL SENSOR

- Maximum distance to the object
- Object surface (quality, color, glossiness)
- Accuracy
- Measuring frequency
- Ambient conditions



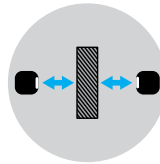
measurements on shiny or dark objects, long ranges and high ambient light immunity – the selection of the appropriate sensor plays a decisive role here. di-soric offers the perfect sensors for contactless distance measurement for these applications in automation.

Diameter



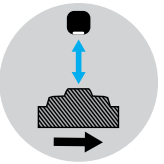
- Determination of object diameter for the regulation of production sequences
- Objects with strongly varying properties

Thickness measurement



- in the case of moving objects, even at high speeds
- Direction of movement of the objects across the detection axis of the sensor

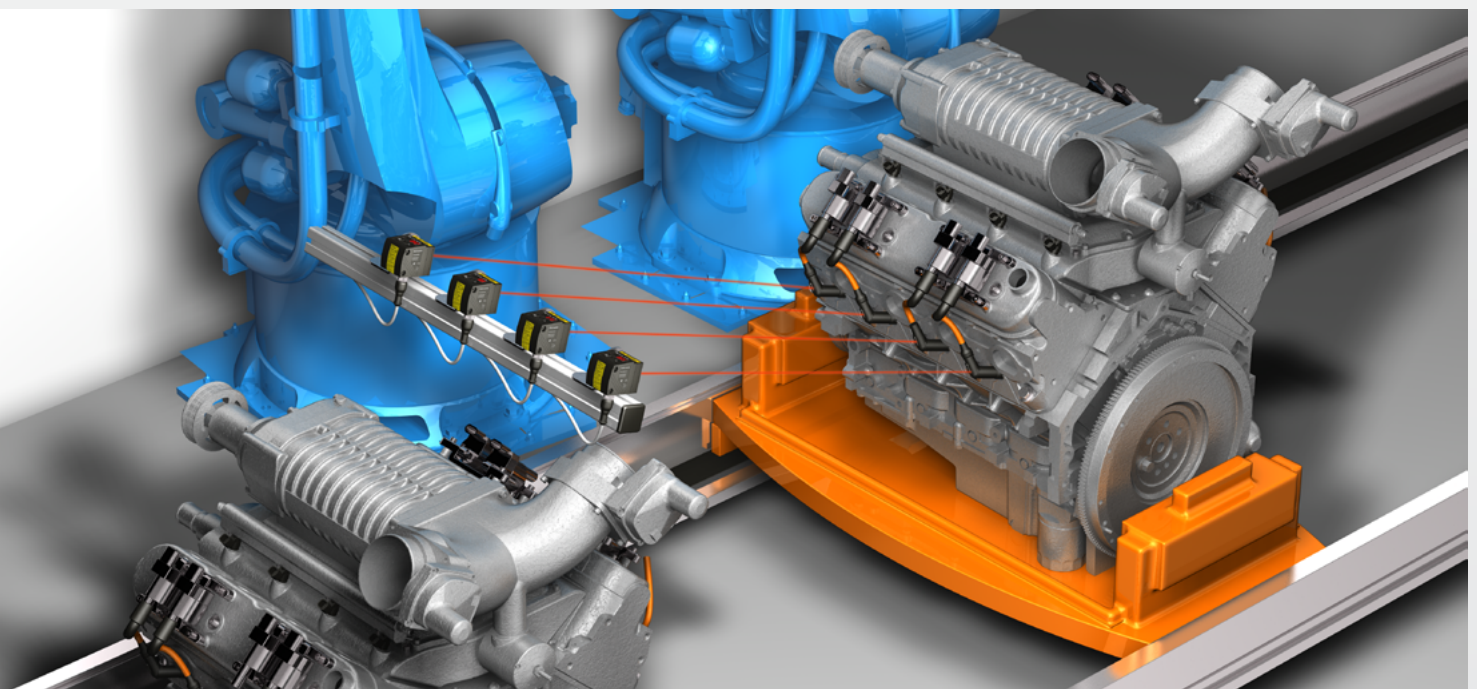
Profile



- Profile and contour measurement of moving objects
- Direction of movement of the objects across the detection axis of the sensor

You are looking for intelligent solutions, appropriate for another use case?

At www.di-soric.com/int-en/Solutions you will find numerous application examples for our sensors.



STRONG PERFORMANCE CHARACTERISTICS FOR CONTACTLESS DISTANCE MEASUREMENT

di-soric's portfolio includes various product series of optical distance sensors and ultrasonic sensors that are designed for contactless distance measurement. Our sensors impress with their innovative IO-Link functions, various sizes and strong performance characteristics in all technologies.

The implemented, innovative IO-Link functions make certain measuring tasks, such as thickness measurement or the avoidance of mutual influencing of several sensors, possible in one application in the first place.

US-M12, US-Q12, US-M18, US-M30

- Extremely small model up to 6m range
- Stable processes thanks to high precision
- Ensured detection of small objects due to higher sensitivity
- Simple commissioning through IO-Link
- Self-sufficient sensor multiplex operation for avoiding mutual influence
- Self-sufficient sensor sync operation for thickness measurements



US-M8

- Smallest ultrasound sensor on the market with up to 100 mm range
- Transfer of distance information via IO-Link
- Can be flexibly used through configurable operating modes
- Stable processes thanks to a high resolution of 0.1 mm
- Low influence from the environment due to the narrow sound beam



LAT-52 Compact

- 30 - 500mm
- For precise distance measurement
- Universal through 3 measuring ranges
- Sensor modes, filters for optimal measuring results
- Operation using keys or via IO-Link

LVHT-52 Compact switching

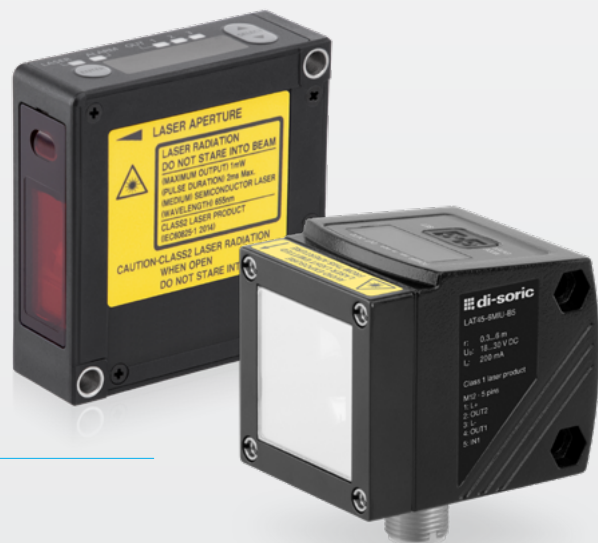
- 50 - 500mm
- For precise distance detection
- Compact, large measuring range
- Foreground and background suppression
- Operation using keys or via IO-Link

LAT-61 Precise

- 26 - 180mm
- For highly precise, quick measurements
- Resolution in the micrometer range
- Up to 5,000 measurements per second
- Operation with keys and displays

LAT-45 Long Range

- 200 -10,000mm
- Can be used anywhere
- Ideal for dark surfaces
- High ambient light immunity
- Operation with keys, using a display or via IO-Link



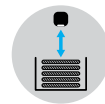
ASSEMBLY AND HANDLING TECHNOLOGY

In assembly machines, individual parts are supplied, assembled and joined in an automated fashion. Each processing step is monitored. Our sensors ensure the measurement of distances in the mm or μm range, control fill levels and positioning processes, monitor size accuracy and the presence of objects. In this way, di-soric makes its contribution to the assembly of components and in the production of new products in the electronics, medical or automotive industries.

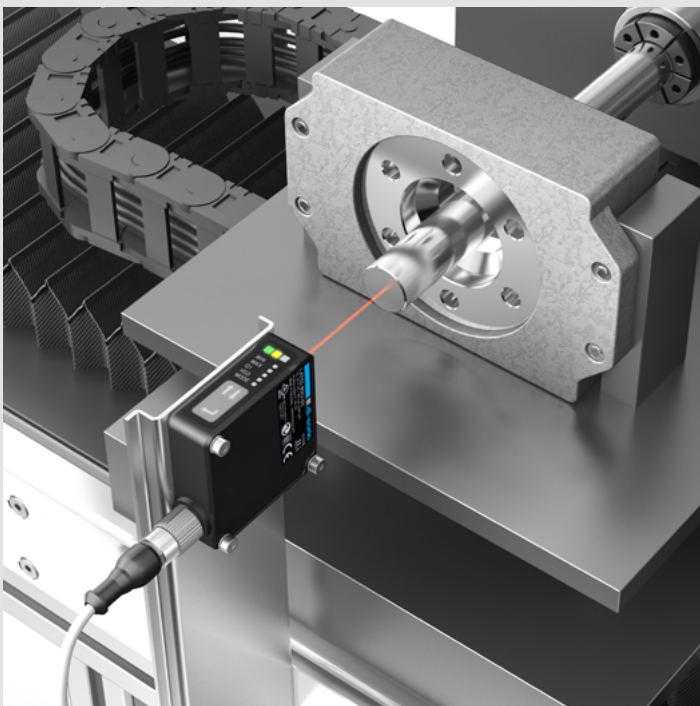


Height control in containers with step feeders

The US Q12 M 400 XP 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.

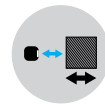


Ultrasonic sensor
US Q12 M 400 XP G3-T4



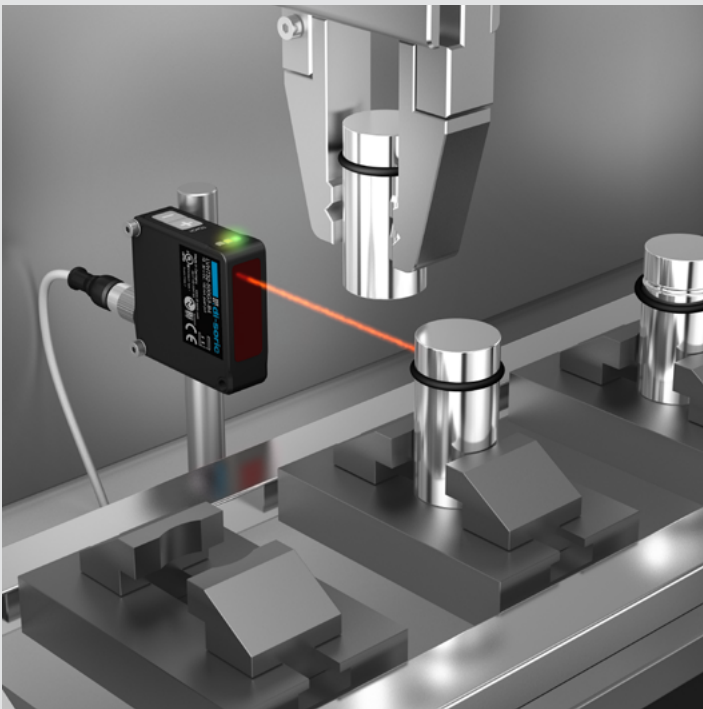
Positioning of a linear axis in pressing processes

In an assembly process, the impression depth must be determined with high precision. The high-resolution variant LAT52-80 with a measuring range starting at 30mm ensures space-saving installation.



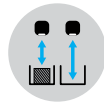
Optical distance sensor
LAT52-80IU-B5



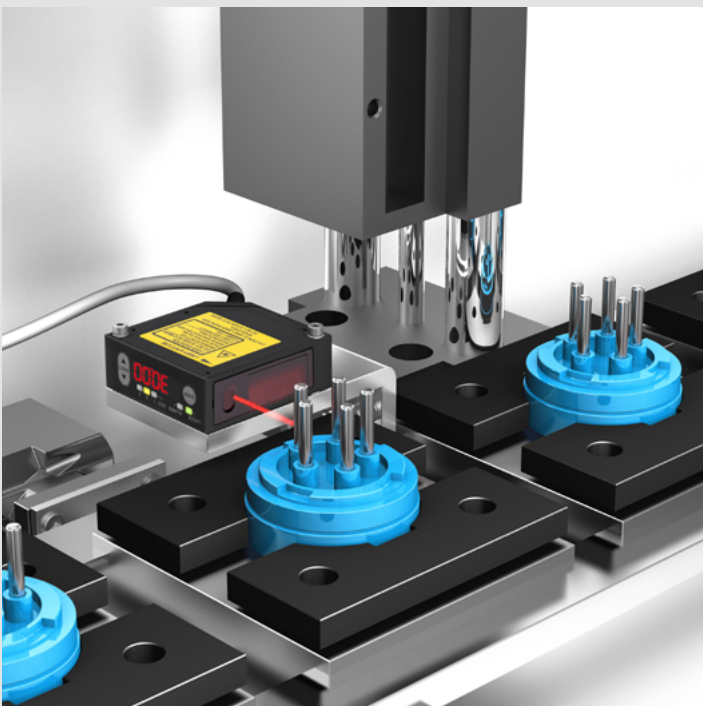


Presence check for O-ring

The LVHT-52 is versatile thanks its large detection range and safely detects the presence of an O-ring via the switching point precisely taugth with the plus/minus keys.

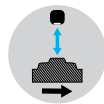


Optical distance sensor
LVHT52-500G3-B4



Measuring of assembled plug contacts

High current plug contacts are mounted in a plastic carrier. The LAT-61 is moved with a linear axis and detects the position of the contacts with high precision.

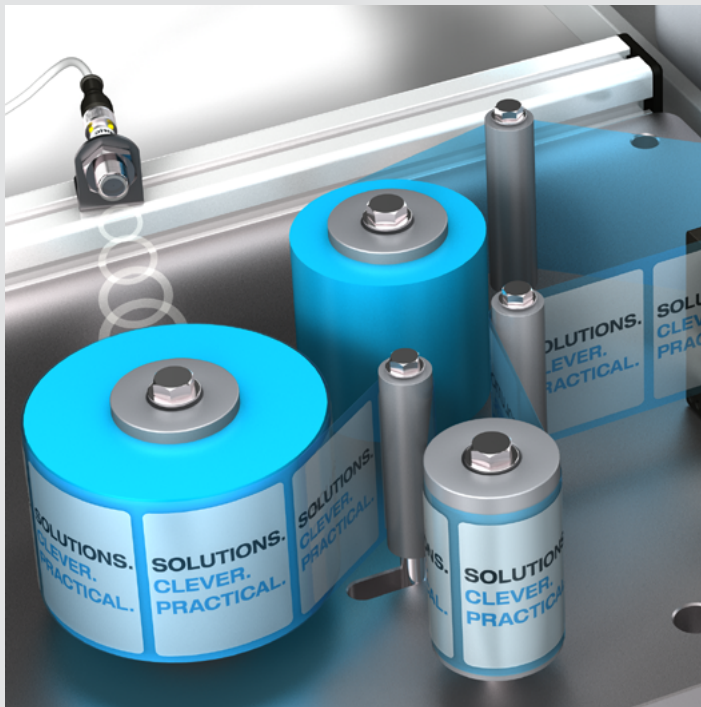


Optical distance sensor
LAT 61 K 30/8 IUPN



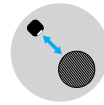
PACKAGING

The packaging industry requires sensors and sensor systems which are tailored to complex, frequently changing tasks. Distance sensors from di-soric are used for controlling manufacturing processes, the monitoring of the actual packaging processes and also for quality control of the manufactured products.

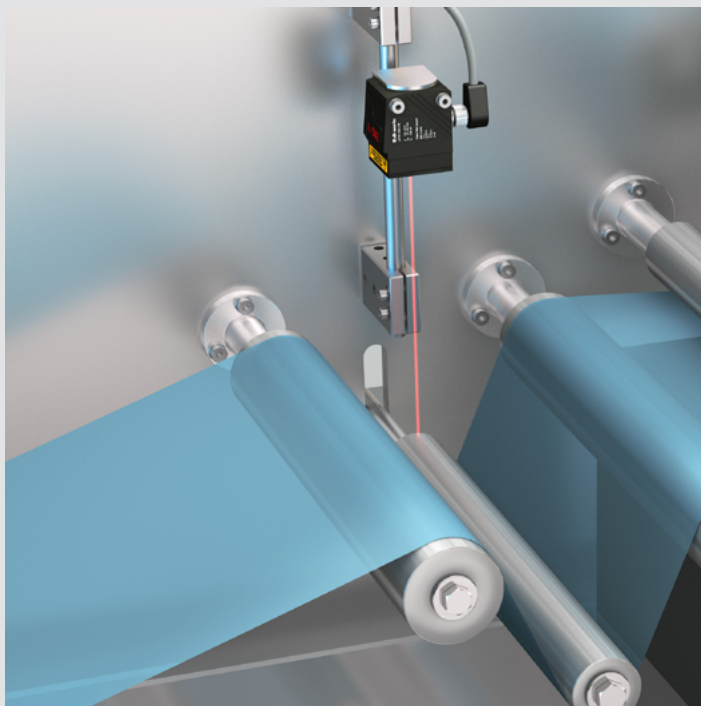


Measurement of roll diameter for unwinding control

In the case of high-performance labelers with large roll diameter, the rotational speed of the label roll is controlled. The US 12 M 400 JU-B4 measures the outer diameter of the label material; the determined measured value allows for the rotational speed of the roller to be adjusted continuously in the process.

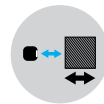


Ultrasonic sensor
US 12 M 400 IU B4



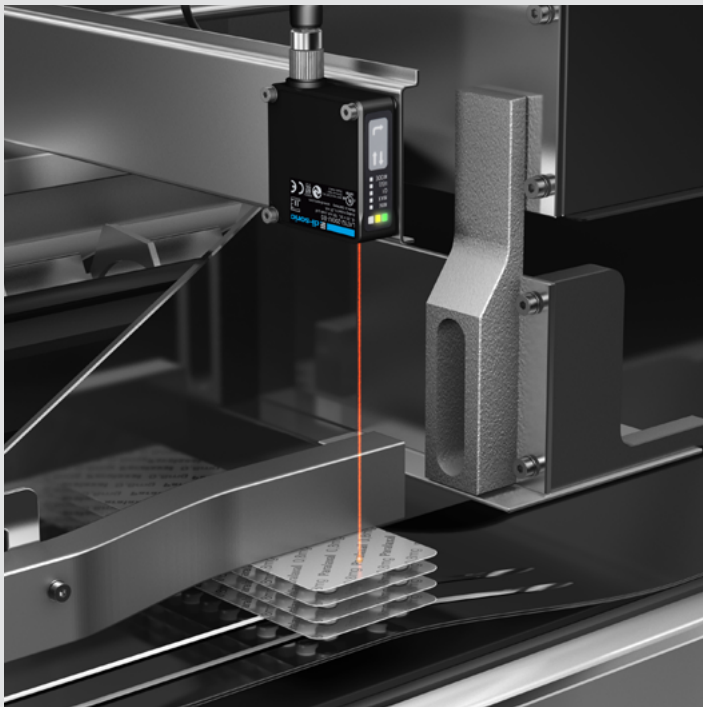
Loop control with label printing machines

In a label printing machine, the passage control of the label strip is performed with a dancer roll. The LAT-45 detects the distance and thus enables the ideal strip tension.



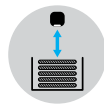
Optical distance sensor
LAT45-10MIU-B5



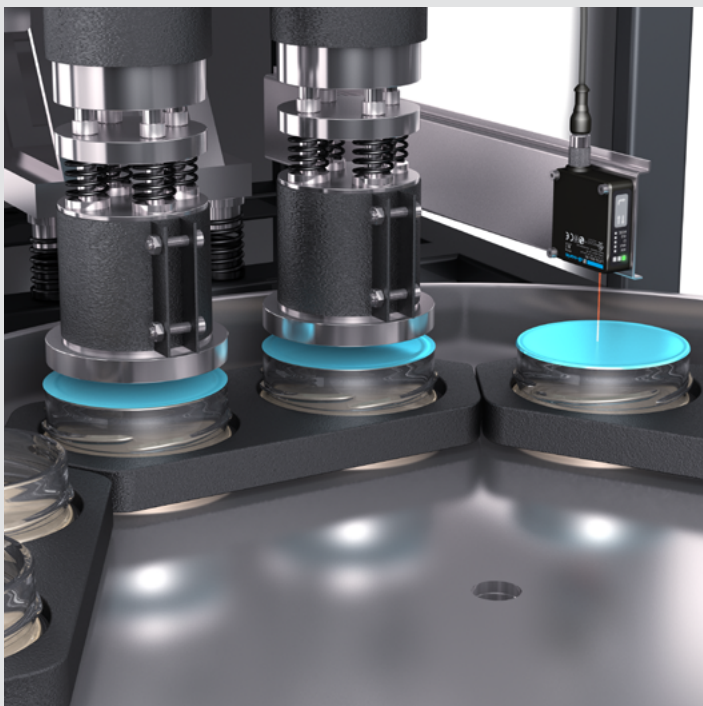


Stack control for blisters in cartoning machines

In the cartoning machine, several blisters and the packing insert are introduced into the carton. Before the carton is filled, it must be ensured that the correct number of blisters were provided. The LAT-52 measures the height of the blister stack and thereby controls the number of the blisters shortly before the fusion process.

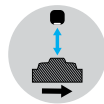


Optical distance sensor
LAT52-200IU-B5



Closure control for filling and sealing machines

In a cup-filling machine, liquid products (e.g. yogurt) are filled in containers and sealed with a printed cover film. After sealing, a LAT-52 high-resolution laser distance sensor checks the sealing film at a high measuring rate for size accuracy in order to detect faulty sealing.

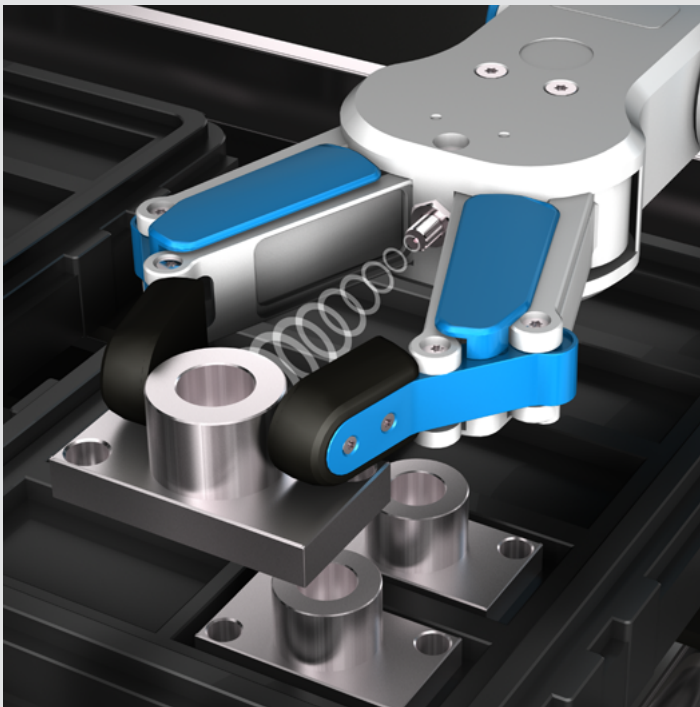


Optical distance sensor
LAT52-80IU-B5



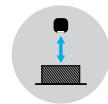
ROBOTICS

Modern industrial robots require not only cameras as eyes, but precise sensors for detecting distances are also fundamental. Our distance sensors with laser or ultrasonic technology are predestined for sensor-guided movements in the mm and sub-mm range and therefore make control of fusion and assembly processes possible.

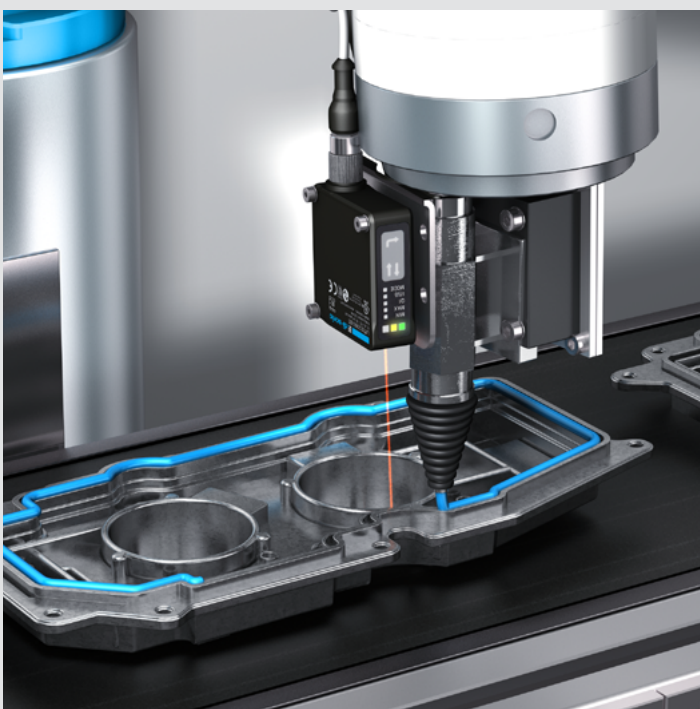


Detection of objects in a gripper

Distance sensors act in robots as sensory organs. In order to avoid damage, an ultrasonic sensor checks whether an object is located in the gripper before the gripper closes. The US 08 M 100 G3-T4 is especially suited for this with its small design as well as its ability to detect transparent objects in particular.

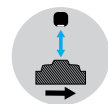


Ultrasonic sensor
US 08 M 100 G3-T4



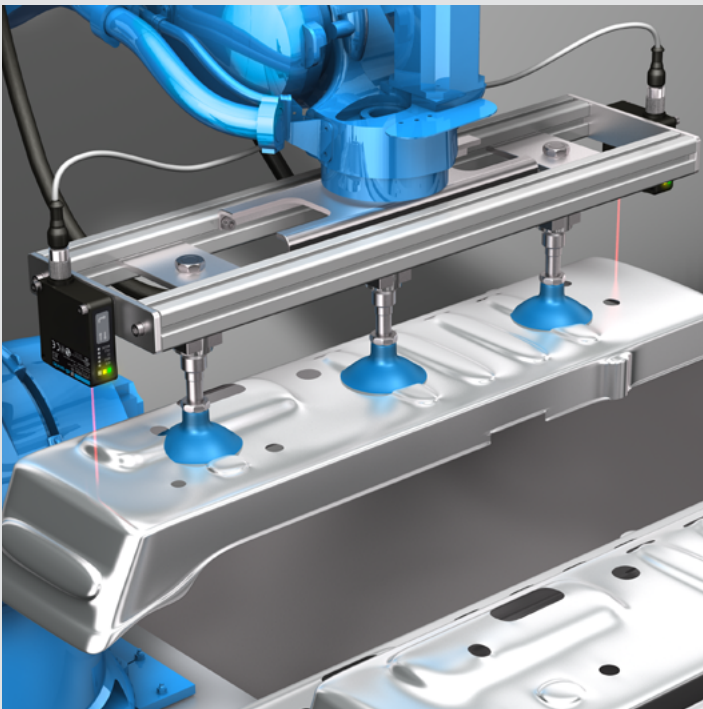
Distance regulation in the adhesion process

Robot-controlled adhesion is becoming increasingly important. In order to ensure high quality and shelf life, the distance of the adhesive nozzle from the object during application of the adhesive must always be optimal. Distance detection in the sub-mm range is performed with an optical distance sensor. Due to its compact design, the LAT-52 can be mounted close to the adhesive nozzle.



Optical distance sensor
LAT52-200IU-B5

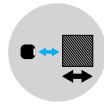




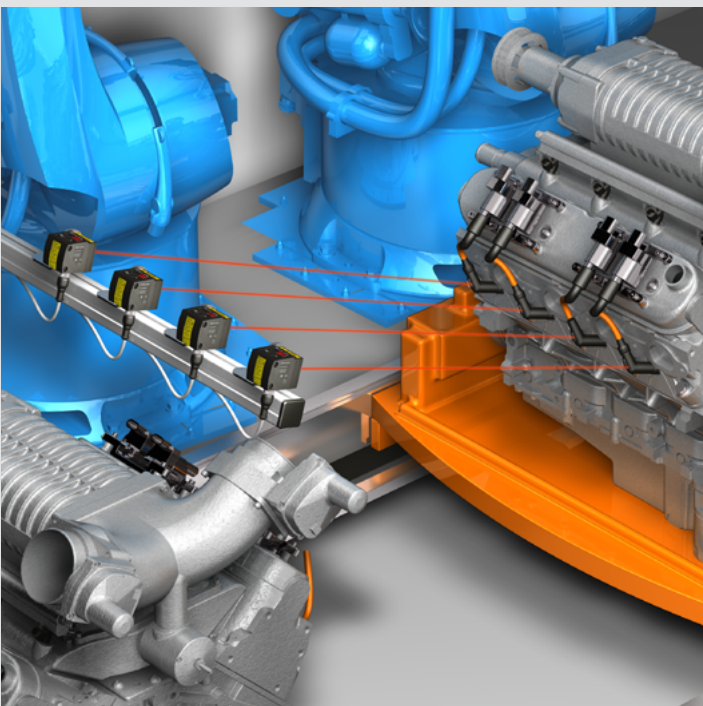
Distance measurement in the gripper

Two LAT-52 distance sensors are installed in a suction gripper in order to detect the distance to the top sheet metal part.

With the detected distances of the sensors, the location of the gripper in relation to the plate and the approaching speed of the robot is controlled and the timing of the gripping process is thus optimized.

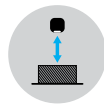


Optical distance sensor
LAT52-500IU-B5



Presence control for spark plug connector in an engine block

In a robotic cell for final assembly of an engine block, the presence of four spark plug connectors needs to be checked. The LAT-45 has a small laser spot and a high functional reserve. Dark plugs at a far distance can thereby be reliably detected even in a tilted position.



Optical distance sensor
LAT45-10MIU-B5



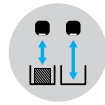
LABORATORY AUTOMATION

Laboratory automation enables, independent of the number of the samples, valid and fast analysis results. Distance sensors within analysis machines can ensure that samples are correctly prepared for further processes – reliable in their function and with high availability.

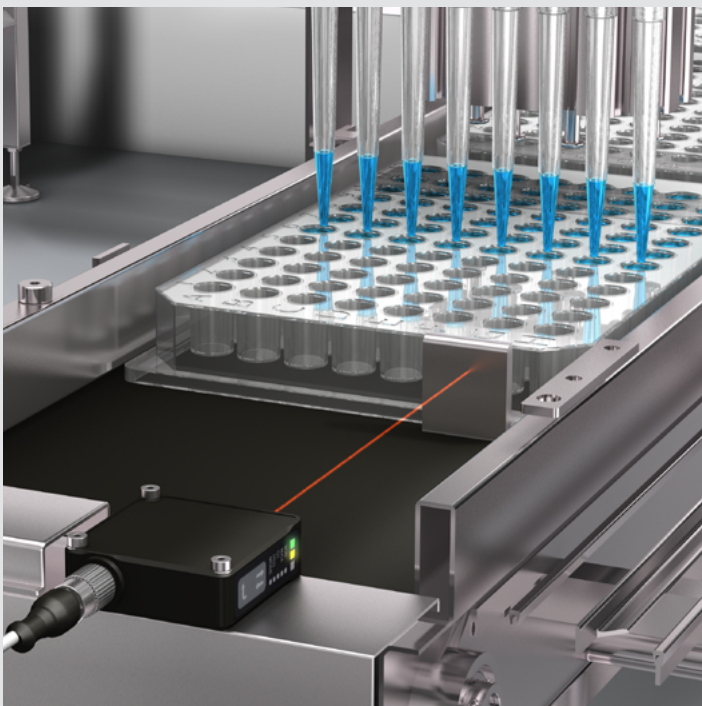


Checking screw tops on tubes

To avoid possible contamination, the colored screw tops in tube handling must always be present. The LVHT-52 satisfies the high requirements of detection security and checks the presence of the colored caps. Switching output and hysteresis can be reliably adjusted via IO-Link in a grid of 0.1 mm.

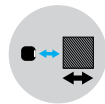


Optical distance sensor
LVHT52-500G3-B4



Linear positioning of pipettors

The precise transfer of samples in small dosing quantities is performed with a pipetting robot. In this process, the associated laboratory vessels for pipetting become smaller and smaller. There are high requirements for positioning of the pipette tips. The positioning of the target vessel is performed with the LAT-52 laser distance sensor.



Optical distance sensor
LAT52-500IU-B5



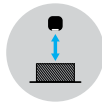
MOBILE EQUIPMENT

Mobile equipment has a broad range of application, both in agriculture and forestry and in materials handling. Optical sensors and ultrasonic sensors from di-soric can be used in a need-specific way for the regulation of distances and positioning tasks. The measurement of distances of the most diverse kinds objects is performed simply and reliably.



Measurement of boom height on sprayers

In agricultural machine technology, sprayers are used for sustainable food security. The booms are guided at a preset height by monitoring the field contours using US 30 M 3000 IU-B4 ultrasonic sensors, so that the needed settings of the boom can be made.

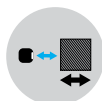


Ultrasonic sensor
US 30 M 3000 IU-B4



Positioning of a lifting platform

A lifting system must be positioned with respect to height. For this, a LAT-45 distance sensor is used. The LAT-45 is ideally suited for this use due to the robust metallic housing, the high functional safety and a temperature range for operation of up to +60°C.

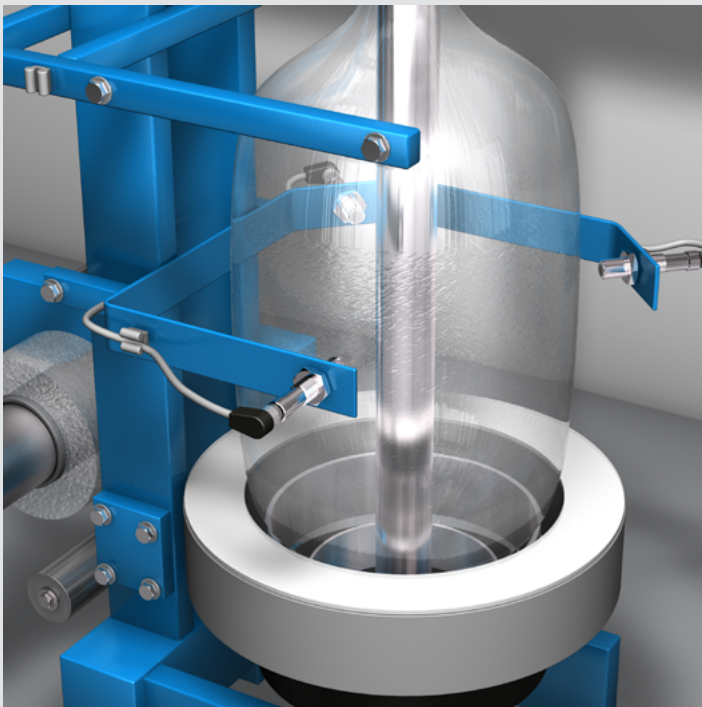


Optical distance sensor
LAT45-10MIU-B5



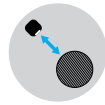
RUBBER AND PLASTICS

Distance measurement sensors are used in the processing of raw material and in the downstream processing and refinement of plastics. Distance measurement of the most diverse materials monitors fill levels and regulates various production processes.



Diameter control on a film extruder

Packaging films are produced through film extrusion. In order to keep the diameter constant in blown film extrusion or perform the desired diameter changes, a regulating unit is installed. The diameter of the blown film is measured here with three US 12 M 400 G3-B4 offset ultrasonic sensors with IO-Link. The regulator controls the air supply and thus the diameter of the blown film.

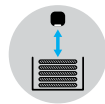


Ultrasonic sensor
US 12 M 400 G3-B4



Checking granulate fill level

The LAT-45 optical distance sensor detects fill levels of granulate. When the target fill level falls below a certain value, the switching output switches and material is added, and an analog output or IO-Link enables a continuous monitoring of the fill level. An operating temperature of up to +60°C enables continuous use in the proximity of hot injection molding machines.

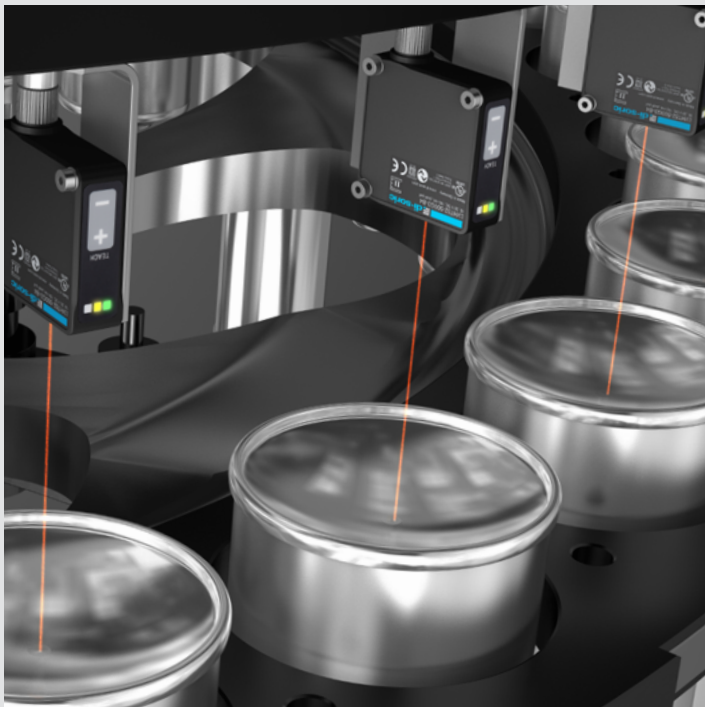


Optical distance sensor
LAT45-10MIU-B5



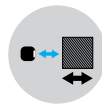
MACHINE TOOLS

A high degree of precision and measuring rate, coupled with absolute reliability are a must for sensors in modern machine tools. di-soric laser distance sensors also offer the necessary robustness. They detect distances and positions with a high degree of precision and enable high performance in the case of chipping, casting and reshaping production processes.



End position control in can production

During the mechanical processing of the spray can, it must be checked at the processing sites whether the spray can is located in the correct position. An LVHT-52 sensor checks the distance of the spray can from the floor. The switching output of the sensor works with a window function which can be configured or learned in a 0.1 mm grid via IO-Link.

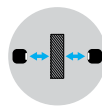


Optical distance sensor
LVHT52-500G3-B5



Detection of weld seams

The high-precision distance measurement of the LAT-61 enables the detection of weld seams. With its high measuring frequency of 5000 Hz, the LAT-61 is suited for the measurement of moving objects. The small laser spot enables the precise detection of the positions of small objects.



Optical distance sensor
LAT 61 K 50/20 IUPN



MORE FLEXIBLE, MORE TRANSPARENT, MORE EFFICIENT PRODUCTION PROCESSES WITH IO-LINK

IO-Link is a worldwide communication standard according to IEC 61131-9. Sensors and actuators with an immense range of functions and capabilities become intelligent and active process devices in the field with IO-Link. Production processes thereby become more flexible, more transparent, more efficient and more cost-efficient. IO-Link transforms sensors into digital products and enables Industry 4.0 systems designs.

DI-SORIC PRODUCTS AND THEIR IO-LINK BENEFITS

1 Configuration instead of specific hardware



Using a configuration coordinated with the application case, the productivity of sensors in machines and systems can be optimized without additional hardware expense. In LAT-52 optical distance sensors, the sensor modes Power (for measuring on dark objects) and Speed (for quick measurements) or additional measuring filters make optimal measured values possible.

Speed sensor mode "Closure control for filling and sealing machines"
> see page 11

Power sensor mode "Presence check for O-ring"
> see page 9

Filter function "Positioning of a linear axis in pressing processes"
> see page 8

2 Digital measured values without losses



A 3-pin, unshielded standard cable is sufficient for the lossless transfer of digital measured values via IO-Link. The transfer is performed digitally without a signal conversion, which improves the quality of the signals in the control system. With the Smart Sensor profile, measured values are transferred directly to the unit, e.g. mm, and function components make further processing very easy for users.

3 Preventive maintenance through diagnosis



Valid, reliable measured values are of the greatest importance in automation. IO-Link distance sensors from di-soric detect diagnostic values such as receiving level and the variance of measured values. If the objects or ambient conditions change, an assessment of the sensor function is possible. Diagnosis enables optimized commissioning, coordinated service cycles and the use of remote maintenance.

4 Parallel operation: Fast signals and IO-Link communication



An LAT-52 optical distance sensor detects the number of blisters in a high-performance cartoning machine. The fast switching output is connected directly to the cartoning machine. Measured values are cyclically transferred simultaneously to Pin4 via IO-Link. The configuration of the switching output is done via IO-Link in a 0.01 mm grid. Due to parallel operation of fast switching signals and IO-Link, a change in format can be efficiently implemented and thus a process diagnosis is always possible during running operation.

“Stack control for blisters in cartoning machines”

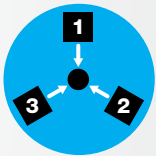
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5 Multi-I/O: Simple wiring in ultrasonic sensors



Ultrasonic sensors with Multi-I/O from di-soric extend the task spectrum for 4-pin sensors. For the first time, the full function is covered by a 4-pin cable instead of a 5-pin cable. With Multi-I/O, Pin 4 can be used alternatively as a switching output, for IO-Link communication or as a binary input. This makes diverse sensor configurations possible, such as line teaching or even multiplex and synchronous operation with standardized 4-pin connection lines.

6 Multiplex operation of ultrasonic sensors



Three ultrasonic sensors offset by 120° continually measure the diameter of a film. The sensor control and measurement is done completely via IO-Link. In order to prevent mutual influence of the sensors, the sensors are switched on and off with IO-Link in a targeted manner. Measurement takes place in an alternating manner. Costly process controls and wiring solutions can be avoided with IO-Link.

“Diameter control on a film extruder”

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PARAMETERIZATION DEVICES IO-LINK

IOL PORTABLE

handheld operation without PC



- App-based, no prior knowledge necessary
- Touchscreen, battery and WLAN-integrated
- Connection: M12, M8 3-, 4-pin, terminals
- For devices with port class A, version V1.1
- For devices with a maximum of 80 mA

IOL-MASTER

Operation on PC via USB



- Universal IO-Link Master with PC software
- Scope of delivery IO-Link Master, USB cable, power supply
- Connection: M12, power supply
- For devices with port class A, version V1.01, V1.1
- For devices with a maximum of 80 mA, 1A (with power supply)

SOLUTIONS. CLEVER. PRACTICAL.

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