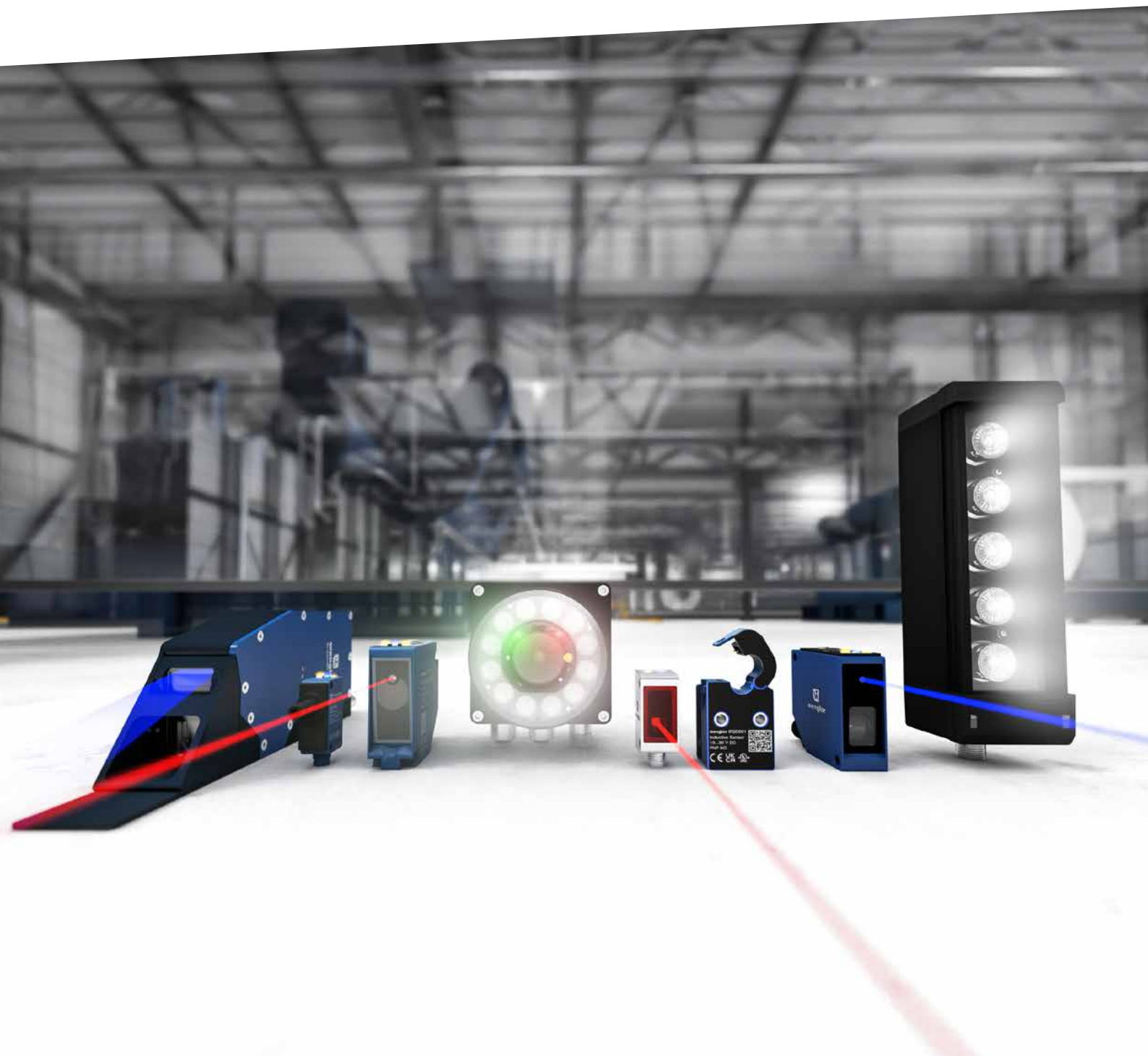


# Quality Meets Diversity

## **Product Portfolio**



# the innovative family



## Preface

Intelligent sensor technologies, safety and 2D/3D image processing systems – we have been shaping the future of the automation industry with innovative individual and system solutions for over 40 years.

Our products aim to solve existing challenges in industry and automate the processes of our customers. It is important for us to be on the pulse of the times, to take up new approaches and trends in the industry and to always act in a solution-oriented, customer-focused and innovative manner.

As an innovative family, we value respectful interaction with each other and the family feeling between wenglor employees worldwide. We believe in our employees; everyone has the opportunity to take responsibility if they are willing. Ideas are the basis for new innovations, which is why we give all employees the freedom to experiment and contribute ideas.

Fabian Baur

Rafael Baur

Management of the wenglor sensoric group

# Who We Are

## wenglor – the innovative family

wenglor is one of the most successful medium-sized companies for smart sensor and image processing technologies. Our product and system solutions with multiple patents are used in countless automated industrial applications around the world.

The innovative family business was founded in 1983 by Dieter Baur in Tettnang on Lake Constance in the German state of Baden-Württemberg. Under the leadership of Fabian and Rafael Baur, wenglor has grown

into a global player in the fields of sensors and image processing and has become an indispensable part of the world of automation.

Our intelligent products enable efficient production processes and sustainably improve the performance of our customers. Continuous growth, innovative top products and excellent corporate management qualify wenglor as a top employer among SMEs and a technology leader in many categories.



## We Are Moving the Future with Innovative Technologies

With groundbreaking technologies such as the first sensor with red light and background suppression, the laser light barrier, the BS40 vision sensor, the wintec and the introduction of the new P3 series triangulation laser distance sensor, we have shaped the sensor market impressively and are now considered an industry

standard in sensor and image processing. Our range includes intelligent sensor technologies, safety and 2D/3D image processing systems with which we can detect, inspect and measure objects and communicate and evaluate the collected data via suitable interfaces.



### Sensors

Sensors are the sensory organs of smart machines. Thanks to a wide range of functional principles, they solve a wide variety of automated applications quickly, safely and sustainably. In addition to the wide range of functional principles, users also benefit from the broad selection of designs that enable the sensors to be installed in any industrial system.



### Machine Vision

In the field of machine vision, wenglor offers outstanding quality for the highest demands in industrial image processing. Users benefit in particular from the integrated ecosystem, where all image processing components work together optimally and can be intuitively combined.



### Connection and Network Technology

Connection, network and fieldbus components as well as evaluation technology enable wenglor products to be integrated into automation processes, as well as communication of products and the evaluation of results in real time. Thanks to Industrial Ethernet or IO-Link, data can be exchanged or transmitted for further processing.



### Accessories

Accessories are used to integrate sensor and image processing products into any production facility. Patented mounting technologies, protective housings, mounting brackets and alignment tools provide the mechanical basis for precise, electronic measurements. Selected materials ensure stability.

# What We Are Best Known For

The first successful project: The sanitary sensor makes the first contactless toilet flushing system for public sanitary facilities possible.

Small industrial revolution with miniature design: A powerful photoelectronic sensor is barely bigger than the Enter key on a keyboard.

With the introduction of the laser light barrier, even the smallest objects can be reliably detected and very accurate and highly precise measurement results can be achieved.

1985

1988

1991

1994

1997

The first sensor with red light and background suppression allows users to adjust and suppress disturbing factors precisely and easily for the first time.

Innovation in conveyor technology: For the first time, sensors can be installed directly between the rollers of conveyor systems.



The laser distance sensors with wintec (wenglor interference-free technology) revolutionize photoelectronic sensors.

The new MLZL 2D/3D profile sensor from the weCat3D series combines precision and profile quality for optical weld seam tracking in welding applications in combination with wenglor's uniVision software.

PNG//smart sensors combine communication and performance. The range includes different light sources, housing designs and functional principles with the latest communication interfaces.

2005

2009

2013

2017

2021

2022

2023

The first BS40 vision sensor: To this day, state-of-the-art smart cameras and image processing systems are based on this technology.

The new generation of time-of-flight laser distance sensors with wintec is characterized by integrated DS technology. This means that these sensors once again set standards in terms of precision, performance, interference immunity and robustness.

To mark the company's 30th anniversary, wenglor creates a new image with the claim "the innovative family", symbolizing the family-based corporate culture. Mikroelektronik GmbH and its expertise in the field of 2D/3D sensors is integrated into the group of companies as wenglorMEL.

wenglor presents three major product innovations this year: the P3 series triangulation laser distance sensors, the next generation of ShapeDrive G4 3D sensors and the B60 smart camera.





**Photoelectronic Sensors**



**Ultrasonic Sensors**



**Inductive Sensors**



**Fluid Sensors**



**Safety Technology**



**Industrial RFID**



**Software**

## **Sensors**

Sensors are the sensory organs of smart machines. Thanks to a wide range of functional principles, they solve a wide variety of automated applications quickly, safely and sustainably. The comprehensive portfolio offers the right solution for any type of factory automation, from photoelectronic sensors to ultrasonic sensors, in-

ductive sensors, fluid sensors and safety technology, as well as industrial RFID to software solutions for sensor operation and parameterization. In addition to the wide range of functional principles, users also benefit from the broad selection of designs that enable the sensors to be installed easily in any industrial system.

# Photoelectronic Sensors

Sensors in this category can use light to detect or count objects contactlessly, measure distances and detect light, color, gloss or luminescence. Photoelectronic sensors are not only characterized by their functionality, but also by their space-saving design. The additional connection of special fiber-optic cables permits their use in extreme conditions such as cold, hot or tight spaces.

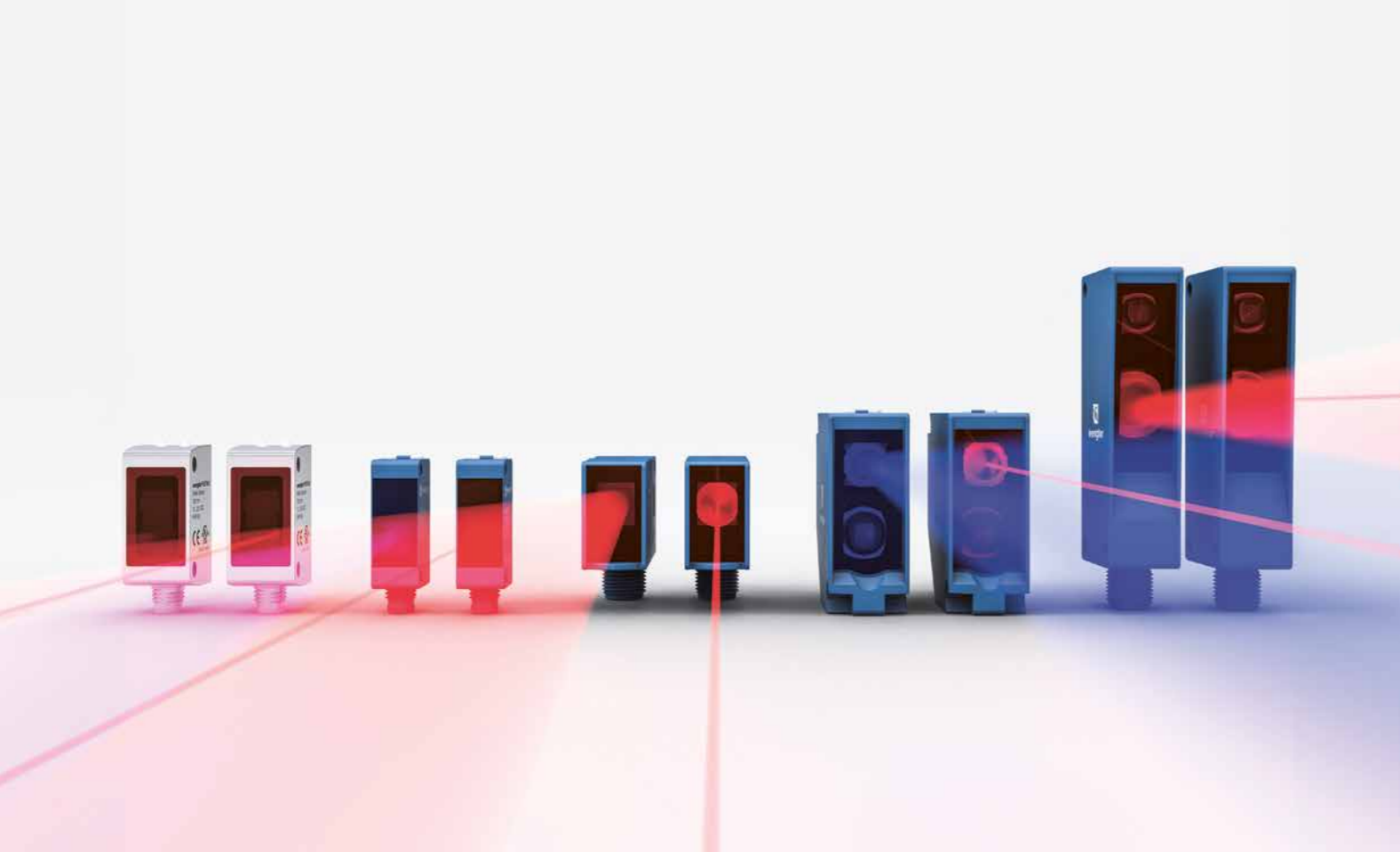
The broad portfolio of photoelectronic sensors is divided into 15 product categories to meet the require-

ments of a wide range of applications. Each category offers a variety of solutions to ensure the right sensor size is available for each specific application.

The designs include cubic, metric and hybrid shapes in plastic, aluminum or stainless steel housings. The optical sensors operate reliably in a temperature range of -50 to +250 °C and offer a detection range of 0 to 100,000 mm.



Laser Sensors for Distance Measurement	Reflex Sensor	Reflex Light Barriers	Retro-Reflex Sensors	Through-Beam Sensors
Fork Sensors	Fiber-Optic Sensors	Light Curtains	Retro-Reflex Sensors with Light Band	Sensors for Roller Conveyor Systems
Contrast Sensors	Color Sensors	Luminescence Sensors	Gloss Sensors	Temperature Sensors for Contactless Measurement



### System Integration and Communication

wenglor offers numerous interfaces for the parameterization of sensors, including PROFINET, EtherNet/IP, EtherCAT, IO-Link, Bluetooth and NFC. Particularly noteworthy is the weCon app, which enables mobile parameterization and data transfer of the P3 laser distance sensors.

With the weCon app, the sensors can be conveniently configured via Bluetooth, which is a huge relief, especially for sensors that are difficult to access or installed in large numbers. The individual sensors can thus be parameterized quickly and efficiently.

### Cleaning-Resistant and Robust Sensors

Photoelectronic sensors in stainless steel 316L housing offer the ideal solution for complex industrial applications. Thanks to their robust stainless steel housing, they can withstand intensive high-pressure cleaning up to 100 bar at temperatures up to 80 °C, aggressive cleaning agents, coolants and lubricants, as well as mechanical influences and corrosion. They are able to measure distances, detect objects and communicate intelligently via IO-Link.

### Blue Laser Light for Challenging Surfaces

Photoelectronic sensors with blue diode are very well suited for red-hot or organic surfaces, polished metals, shiny plastic surfaces or gloss paints. The short-wave blue laser light does not penetrate as deeply into the surface, resulting in high accuracy.



### PNG//smart

PNG//smart stands for “Photoelectronic Next Generation” – sensors from this series are a unique combination of precise wenglor technology and an intelligent interface. They flexibly exchange process and parameter data and, thanks to accurately targeted optics and a balanced switching point, they transmit highly precise results in real time.

### Standard designs

wenglor’s photoelectronic sensors are available in a wide range of designs, including K, N, P and M. Thanks to the different housing shapes, the sensors can be precisely adapted to the relevant requirements, be it different mounting options, space restrictions or ambient conditions. This not only ensures a high degree of flexibility, but also enables efficient integration into existing systems.

### der wintec.

Time-of-Flight laser distance sensors with wintec (wenglor interference-free technology) have played a formative role in countless industries worldwide for over ten years. Thanks to integrated “Dynamic Sensitivity” technology (DS), the new generation of these sensors once again sets standards in terms of precision, performance, interference immunity, communication capability and robustness. The sensors detect objects regardless of color, gloss, surface texture and inclination angle.



**der wintec.**

# Applications



## Presence Check of Goods via Sensors for Roller Conveyor Systems

In logistics centers, dark packaging or bags must also be reliably detected on scissor roller conveyors to safeguard the flow of material. Sensors for roller conveyor systems with integrated accumulation logic switch off unused roller segments and reduce both energy consumption and maintenance. Thanks to the NFC interface, the sensors can be configured conveniently via the weCon app when de-energized.



## Width Measurement of Parquet Floorboards through Triangulation Laser Distance Sensors

Boards must be milled precisely to the correct width when making parquet floors. Two opposing triangulation laser distance sensors measure the exact width without an analysis module or control unit. The measured value is transmitted via analog output or IO-Link to quickly detect deviations and reject faulty planks.

## Leading Edge Detection of Polybags with Retro-Reflex Sensors with Light Band

In the food industry, filled packaging such as plastic bags, also called polybags, in various colors, shapes, surfaces and transparencies must be reliably detected for quality control on conveyor belts. A side-mounted retro-reflex sensor with light band detects objects of this type along the entire width from the leading edge.



## Detection of Euro Pallets with Retro-Reflex Sensors

Smooth flow of goods on roller conveyors requires reliable detection of pallets. For objects conveyed in the same direction and position, a retro-reflex sensor installed on the side of the conveyor line is ideal. Thanks to its single-lens optics with no blind spot, it enables precise point scanning.



## Length Measurement of Logs with Light Curtains

In the wood industry, the length of tree trunks must be determined. For this purpose, light curtains on the conveyor belts detect the trunk cross-section and generate a signal as soon as the leading edge interrupts the beams. The length of the log can then be calculated from the duration of the switching signal in combination with the speed of the conveyor belt.



## Anti-Collision Protection for Overhead Cranes via Time-of-Flight Laser Distance Sensors

In the steel industry, overhead cranes are used to convey sheet metal coils. To avoid collisions, time-of-flight laser distance sensors are attached to the opposite crane with a reflector. They measure the distance up to 100 m and transmit it to the controller to detect dangerous approaches and adjust the crane movements.



Find out more about our wide range of photoelectronic sensors >>







**Position Control of Dark Fabric Plates with Reflex Sensors with Background Suppression**

Fabric plates are automatically pressed in robot cells for trunk trims. Reflex sensors with background suppression check the position of the deep black carpet. The miniature sensors in the 1K housing are ideal for integration into metal profiles of the gripper. Following position confirmation by the sensors, the robot continues the folding process to the hot surface.



**Material Separation in Reverse Vending Machines using Through-Beam Sensors**

In deposit machines, the relevant material must be determined immediately after inserting the objects. A specially developed through-beam sensor is installed directly behind the feed opening. The sensors can also be used as triggers for downstream processes (e.g. sleep mode).

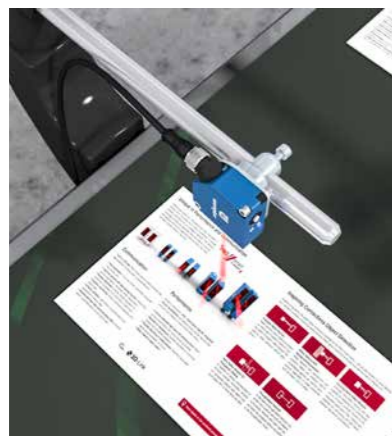
**Detection of Contrast Marks via Contrast Sensors**

Packaging for loose products, granules or difficult-to-process products is produced in vertical packaging machines. To ensure that a product line has the same package size, contrast marks are applied to the foil material. Contrast sensors detect the contrast marks and can thus control the packaging process by sealing.



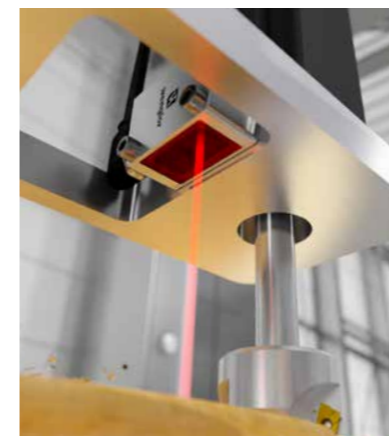
**Precise Positioning of Skid Carriers by Triangulation Laser Distance Sensors**

In the automotive industry, skid beams must be positioned in front of a press tool so that the sheet metal parts can be pressed precisely. A triangulation laser distance sensor measures the distance with micrometer accuracy and transmits the data in real time via EtherCAT interface to the control system. An additional cooling unit protects the sensor at high temperatures.



**Detection of Paper Sheets via Reflex Light Barrier**

In the printing industry, printed products are conveyed via sheet-fed application machines. A PNG//smart reflex light barrier with teach-in installed above the conveyor reliably detects leading edges by using the moving conveyor as a background. This means that objects with contrast or height differences are detected without the need for reflectors.



**Distance Calculation for Cheeses with Time-of-Flight Laser Distance Sensors**

During the production and processing of cheeses, the rind is removed in a robot-assisted process and the cheese is freshly coated. A time-of-flight laser distance sensor in the stainless steel 316L housing determines the exact distance. The ECOLAB approval and IP69K degree of protection make it ideal for washdown areas. Even shiny and wet objects at an angle are reliably detected.



Find out more about our wide range of photoelectronic sensors >>





## Ultrasonic Sensors

Ultrasonic sensors offer versatile applications for detecting transparent, dark, glossy, reflective or porous surfaces as well as detecting objects or liquids, even under adverse conditions such as contamination, dust, mist or ambient light. The measurement is carried out by transmitting and receiving ultrasonic waves, the results of which are either output as an analog or switching output or transmitted via IO-Link.

The sensors can be used in various operating modes, such as synchronous, multiplex, reflex or through-beam mode. In synchronous mode, up to 40 sensors can be used together depending on the sensor type and thus cover a larger area. Multiplex mode prevents mutual interference between adjacent or opposing sensors. Depending on the application, ultrasonic sensors are available in different housing formats, from the space-saving cylindrical or cubic format to the fork format.



### Narrowing of the Sonic Cone by Soundpipe

The soundpipe is used to reduce the sonic cone of the U1KT sensors. Via IO-Link, the sonic cone width can be parameterized quickly and easily, enabling flexible and precise adaptation to different application scenarios. The main advantage is that objects of different sizes and shapes are reliably detected. This not only improves efficiency, but also application flexibility in various industrial applications.

### Ultrasonic Sensor Formats

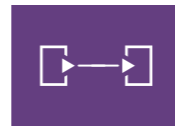
Ultrasonic sensors are available in different housing designs depending on the application. There are sensors with space-saving design (cylindrical or cubic), through to fork designs. From robust and hygienic to as compact as possible – wenglor offers a wide range of designs in its ultrasonic portfolio. This means there is a suitable solution for every requirement, even in demanding industrial environments or hygienically sensitive areas.



### Versatile Operating Modes

In synchronous mode, the ultrasonic sensors transmit their ultrasonic pulses simultaneously. This makes it possible to detect one or more objects on a larger surface. This is particularly beneficial in applications with large or complex detection areas. In multiplex mode, ultrasonic sensors emit their pulses alternately. This prevents mutual interference between the sensors and thus ensures precise and reliable detection, even when several sensors are installed in close proximity to each other.

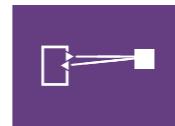
Through-beam sensors



Synchronous mode



Reflex sensor



Multiplex mode



## Applications

### Presence Check of Wooden Panels with Ultrasonic Distance Sensors

In the furniture industry, wooden panels with different colors, shapes, degrees of gloss and surfaces are conveyed on roller conveyor belts to the next process step. Precise presence check is crucial. Ultrasonic sensors in metric format enable fully automatic monitoring, independent of dust and chips, and reliably detect the panels.



### Fill-level Measurement of Spices with Ultrasonic Distance Sensors

Frozen pizzas are produced in highly automated production facilities. An ultrasonic distance sensor in the hygienic stainless steel 316L housing monitors the fill level of the spices, which are sprinkled directly over the conveyor belt on the pizzas. The analog output enables continuous monitoring and timely filling of the container.

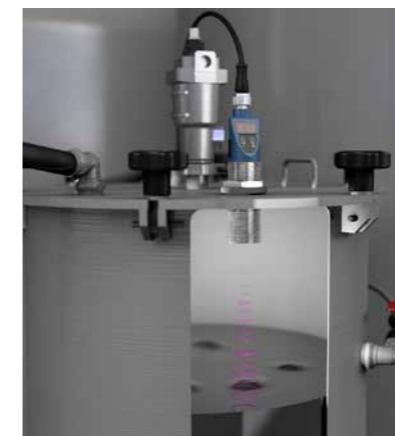


### Presence and Position Check of Labels with Ultrasonic Fork Sensor

When manufacturing care products, labels must be applied to the packaging at high speed. Before application, the labels are fed to products on transparent carrier materials. An ultrasonic fork sensor checks the correct placement of the labels. The sensor detects 120 to 160 labels per minute, regardless of color, transparency or thickness.

### Film Tear and Fill-Level Monitoring with Ultrasonic Distance Sensor

Colorful, glossy or transparent films are used in packaging plants to ensure that products are airtight and securely packed. Ultrasonic distance sensors monitor the roll diameter, report low film levels and empty rolls. They also check the film for continuity and cracks to ensure a continuous flow of material.



### Fill-Level Measurement in a Storage Container with Ultrasonic Distance Sensor

In the automotive industry, primer liquids are used as a primer for plastic parts in storage containers at production plants. Ultrasonic distance sensors in the stainless steel housing monitor the minimum fill level, regardless of the structure, color or degree of gloss of the liquid. If the level falls below the set level, the sensor switches and the ball valve is opened for refilling.

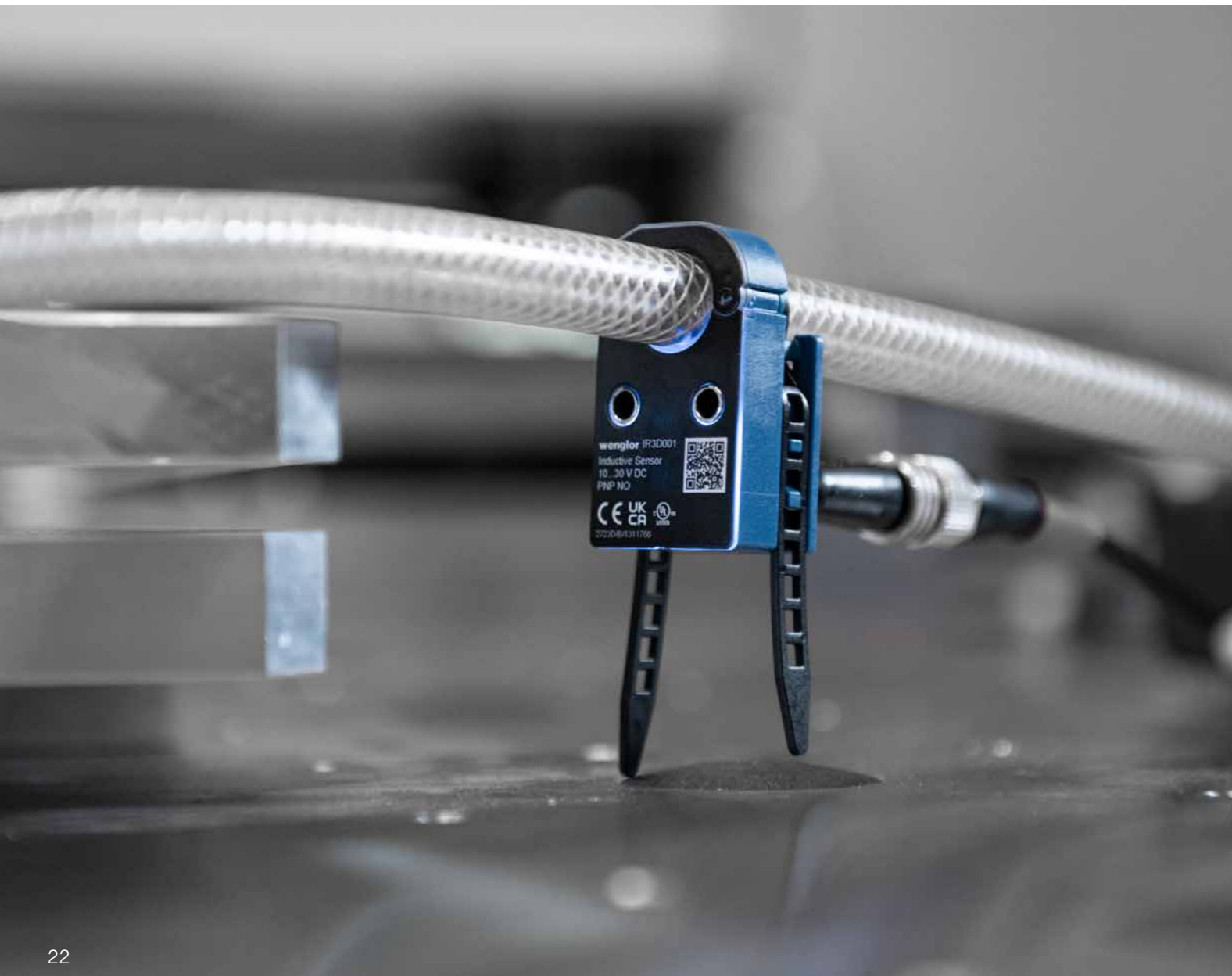


[Find out more about our wide range of ultrasonic sensors >>](#)

# Inductive Sensors

Inductive sensors detect metallic objects through electromagnetic induction. They can accurately measure distances and thicknesses, making them ideal for use in harsh industrial environments. They ensure reliable position monitoring of metallic objects and work reliably even under difficult conditions. Because no moving parts are used in inductive sensors, they are maintenance-free, waterproof and impervious to contamination and impacts.

They offer a wide range of applications due to their resistance to vibrations, their diverse designs and robust housing materials as well as their long switching distances.



<p>Inductive Sensors with Standard Switching Distances</p>	<p>Inductive Sensors with Increased Switching Distances</p>	<p>Inductive Sensors with IO-Link</p>	<p>Inductive Sensors with Full-Metal Housing</p>	<p>Inductive Sensors with Analog Output</p>
<p>Inductive Sensors Welding Field Resistant with Correction Factor 1</p>	<p>Inductive Sensors with Selective Performance</p>	<p>Inductive Sensors for Extreme Temperature Ranges</p>	<p>Inductive Ring Sensors</p>	



## weproTec

weproTec is the abbreviation for wenglor proximity switch technology, a wenglor technology for inductive sensors. Inductive sensors with weproTec can be mounted very close next to each other, or opposite one another.

The sensors do not influence each other in this range. This is achieved by the sensors synchronizing with each other and pulsed with a time delay.





### Inductive Ring Sensors with Separable Housing

The inductive ring sensors enable reliable presence and jam control of small parts in feed hoses and precise size differentiation and wire break detection. The split housing significantly reduces assembly and disassembly times when servicing the supply lines and allows mounting anywhere on the hoses.

### High Temperature Inductive Sensors

The inductive sensors for the high temperature range are distinguished by their robust and particularly heat-resistant housing design, which is designed for temperatures of -10 to 250 °C. This allows the sensors to be mounted in systems with high ambient temperatures – for example in the automotive, glass or steel industry.



### Position Sensing of the Gripper Jaws with Miniature Inductive Sensor

In the automotive industry, robots grip parts at high speed. Due to the limited space in the grippers, miniature inductive sensors are integrated. They detect whether the grippers are open or closed. The switching distance of 1 mm simplifies adjustment and enables flush mounting, so that the grippers remain protected from damage.

## Applications

### Detection of Metallic Objects in Feed Hoses by Inductive Ring Sensors

In screwing and feeding technology, fasteners such as screws, nuts or rivets are automatically conveyed, sorted, separated and then supplied to the screw system via feed hoses by compressed air. Inductive ring sensors are mounted on the hose in order to reliably detect objects guided at high speed. Thanks to the separable housing, the sensors can be mounted and dismantled quickly.



### End Position Check in Carriage by Means of a Weld-Resistant Inductive Sensor with Correction Factor 1

In plant engineering, it is necessary to determine the exact position of carriages – in end positions, for example. This end position monitoring must be reliable, repeatable and feasible for both stainless steel (V2A) and aluminum. A weld-resistant inductive sensor is used for this purpose, which reliably switches to various materials with correction factor 1 and high switching frequencies.



### Skid Position Detection in Drying Ovens with Inductive Sensors for Extreme Temperature Ranges

In the automotive industry, bodyshells must be dried after painting in long drying ovens at extreme temperatures of several hundred degrees Celsius. In order to reliably detect the position of the skid beams along the conveyor belt and thus ensure continuous transport, inductive sensors for extreme temperature ranges are installed on the side of the skid lifting device.



### Detection of Rivets by Inductive Ring Sensors

In the automotive industry, aluminum body parts are joined using rivets. The objects are conveyed to the punching device via compressed air through plastic hoses. An inductive ring sensor is installed to check that it is correctly guided through the hose. Thanks to the correction factor 1 and the adjustable sensitivity, objects of different sizes and alloys can be reliably detected.



[Find out more about our wide range of inductive sensors >>](#)



## Fluid Sensors

Whether pressure, flow, fill level or temperature – wenglor fluid sensors reliably record all relevant values in processes with liquid or gaseous media. Highly precise measurement data and digital interfaces permit accurate process monitoring and data analysis in real time, to optimize sequences and reduce the consumption of resources.

The range includes models with or without integrated temperature measurement, display versions for reading process values and sensors in stainless steel or plastic housing. Various output combinations are also available, which are equipped with an IO-Link interface depending on the variant.



### weFlux<sup>2</sup>

weFlux<sup>2</sup> stands for fluid sensors in small format. These sensors are distinguished by multifunctionality and innovative functions. Some of our weFlux<sup>2</sup> devices combine flow or pressure measurement with temperature measurement. This allows multiple process values to be determined by a single sensor.

### Continuous Fill-Level Measurement

wenglor offers solutions for both fill-level measurement and limit value recording. LevelTech fill-level sensors can be used in a wide range of media thanks to innovative frequency-stroke technology and reliably monitor limit values in tanks, containers or pipes. Pressure sensors that measure the hydrostatic pressure enable continuous level detection.



### Diverse Product Portfolio

wenglor offers a wide range of solutions for reliable measurement of pressure, flow, temperature and fill levels. The innovative sensors are designed to provide precise and reliable data in a wide range of applications and industries. Depending on the product variant, weFlux<sup>2</sup> and UniFlow sensors enable simultaneous recording of several process values, which increases efficiency and reduces installation effort.



### Monitoring of Cooling Circuits via Pressure Sensors

The cooling of molds during the casting process is crucial for achieving a uniform cooling rate of the melt. Pressure sensors are installed flush with the front and measure pressure and temperature simultaneously in each return line. This allows the thermal conductivity of cast iron to be controlled precisely to ensure fine solidification of the objects.

## Applications

### Flow and Temperature Monitoring with Fluid Sensors

In water-cooled generators, closed cooling circuits ensure that the units do not overheat. When cooling stators and rotors, the temperature and flow velocity must therefore be monitored. For this purpose, fluid sensors are installed in the lines independently of the flow direction, which simultaneously record the temperature and flow velocity.



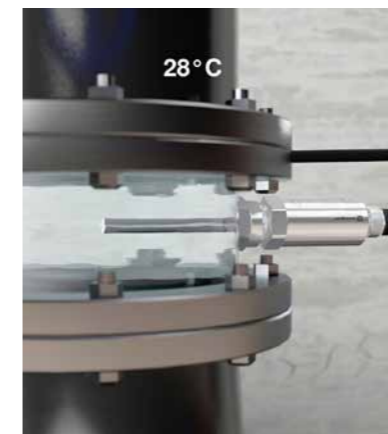
### Pressure Monitoring of Lubricants with Pressure Sensors

Automated lubrication systems are used to lubricate ball bearings, chains, gears and linear guides. Grease is pumped to the desired position under pressure via a pump. Tiny pressure sensors (Ø 14 mm) monitor the pressure at the lubrication points and report the status to the control system via an analog signal.



### Vacuum Level Control via Fill-Level Sensors

In the perfume industry, it is critical to accurately detect the presence and fill levels of flavor precursors in pressure vessels. Sensors in metric stainless steel housings automatically monitor the level at two independent measuring points. The sensors detect the medium regardless of viscosity, density or color. The visible LED indicates the defined levels.



### Temperature Measurement of Swimming Pool Water with Temperature Sensors

In swimming pools, the water temperature is monitored. Laser-welded stainless steel temperature sensors monitor the flow and return of heat exchangers. Another sensor with immersion sleeve is mounted directly in the pool for accurate and fast temperature measurements. The immersion sleeve keeps the tank leak-tight when the sensor is removed.



[Find out more about our wide range of fluid sensors >>](#)

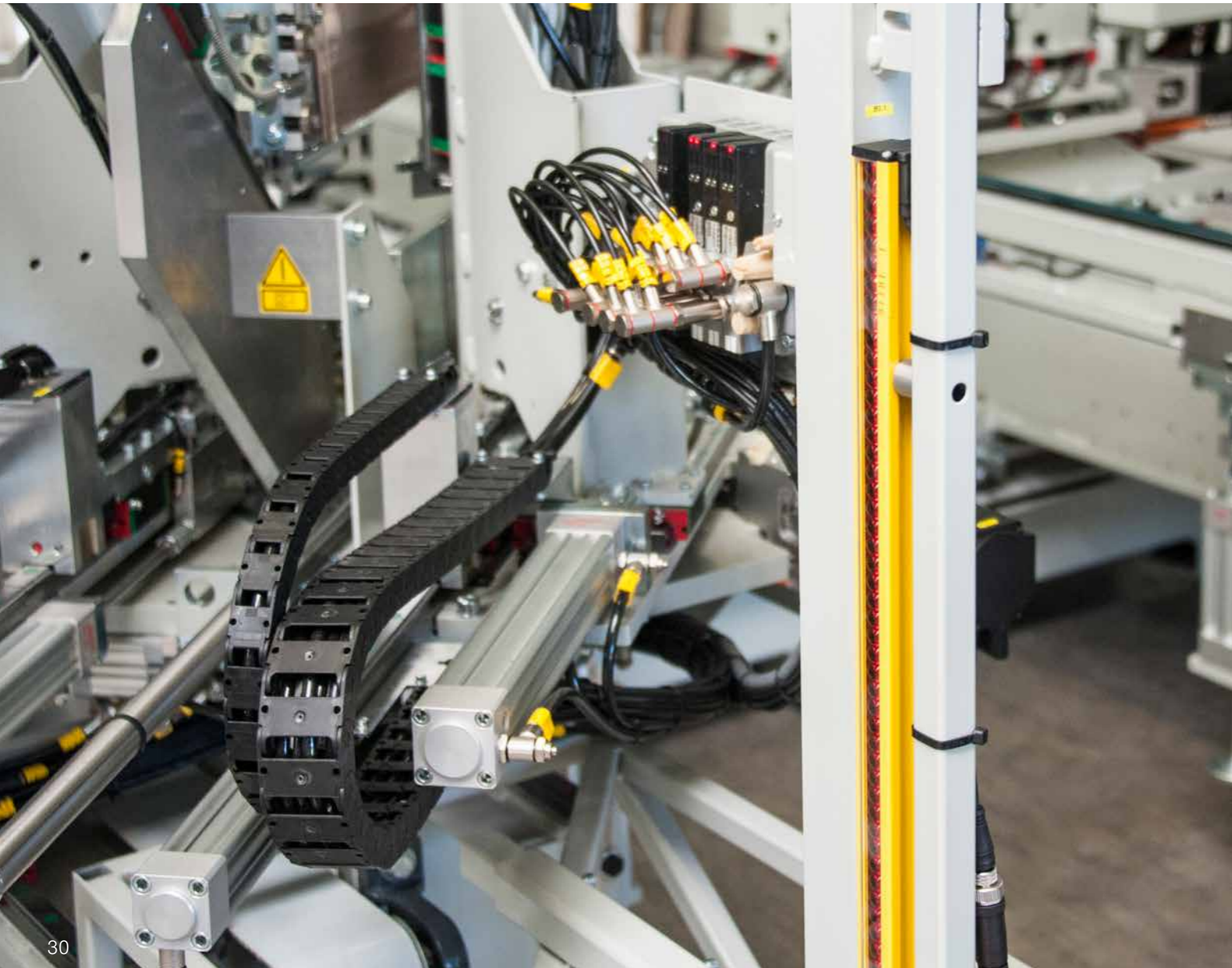







# Safety Technology

Safety technology for body, hand and finger protection is used to protect both people and machine. wenglor's safety technology ensures compliance with legal requirements and meets the highest standards in occupational safety.

Certified according to international standards, light barriers and curtains with or without muting functions, safety switches, locking devices, emergency stops, relays and protection columns protect all production systems. This creates a safe working environment, reduces downtime and increases the efficiency of production processes.

Safety switches and guard locking devices ensure that machines can only be operated if all safety requirements are fulfilled. They prevent unintentional start-up of machines and protect against potential hazards. Emergency stop switches and safety relays enable immediate shutdown in an emergency and ensure the safety of personnel. Safety columns provide additional protection and clearly mark safe areas, helping to prevent accidents.



Electro-Sensitive Protective Equipment	Command Devices	Safety Guards	Safety Relays and Analysis Modules	Muting Sets
				



## Safety Technology for Body, Hand and Finger Protection

Safety light curtains and safety light arrays for wenglor are suitable for versatile use in any industrial environment. Visible red light and a signal strength indicator permit easy and precise alignment. The settings can be made either via the integrated display or via IO-Link with the wenglor wTeach2 software. A microSD card enables settings to be copied to other products quickly and easily.

## Wide Range of Products

wenglor's safety technology ensures the protection of both people and machines in accordance with international standards. The comprehensive portfolio in the field of safety technology offers a variety of solutions, including protective devices, command devices, separating protective devices, safety relays, analysis modules and muting sets. These technologies play a key role in ensuring safety and efficiency in industrial applications.





### Safety Light Curtains for Hand and Finger Protection

The SEMG series of safety light curtains offers TÜV-certified safety at the highest level. With Performance Level e in accordance with EN ISO 13849-1, these light curtains reliably protect people and machines in hazardous areas.

The Type 4 contactless protective devices ensure optimum hand protection with a resolution of 30 mm and thus increase safety and efficiency in the working environment.



### Stepping Behind Protection on Assembly Turntables via Safety Light Curtain with Hand Protection

In industrial production processes, the movement of assembly turntables is a hazard. To secure this area for workers, a stepping behind protection is set up by installing several safety light curtains. Interruption of the safety field automatically stops the system. The turning process cannot be started until the entire zone is free again.

## Applications

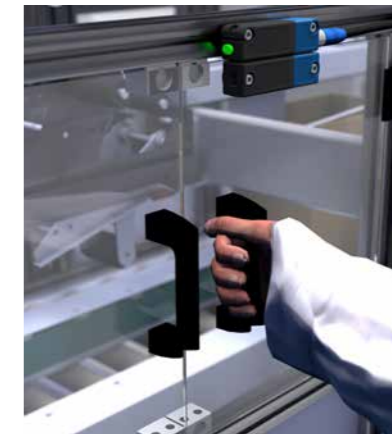
### Access Control on Palletizing Systems with Safety Light Curtains

In intralogistics centers, empty wooden pallets are loaded fully automatically at palletizing stations. Horizontal safety light curtains with reduced resolution are installed to provide safe access to these zones during operation. The pallet feet are not detected, so the system remains in operation. Only when a worker interrupts the defined number of beams by accessing the area is the palletizer switched off.



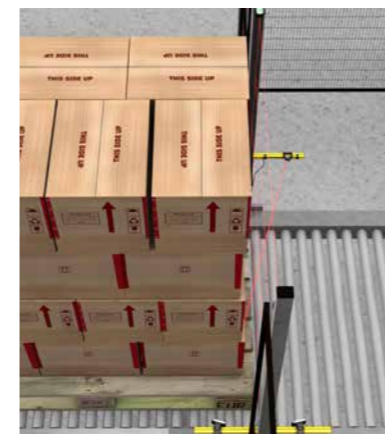
### Door Monitoring on Packaging Lines via RFID Safety Switch

Protective doors or service hatches on packaging machines can be opened manually to reduce downtime. The machine cannot be started until the safety guard is properly closed. RFID-coded safety switches ensure that the doors close correctly and prevent accidental opening via a permanent magnet in the event of vibrations.



### Access Protection on a Stacking Device with Multi-Beam Safety Light Arrays

Safety zones are defined for the safety of workers during automated loading and unloading of palletizing stations. These are monitored by multi-beam safety light curtains of up to 50 meters. Deflection mirrors make it possible to secure entire areas over corners. As soon as a worker enters the zone, the system shuts down immediately.



### Zone Protection in Stretch Film Systems with Safety Light Arrays

When packing cartons on Euro pallets, it is necessary to transport the goods out of the danger zone. Safety light arrays with muting are installed on the conveyor belt for this purpose. With muting activation, the safety light curtain is bridged for a short time, so that the pallets can be safely moved in and out for the wrapping process.



Find out more about our wide range of safety technology products >>



## Industrial RFID

Industrial RFID readers in the high-frequency (HF) range are a fast and reliable identification solution for short ranges – even in harsh process environments thanks to their high degree of protection and temperature resistance. Thanks to an IO-Link interface, parameters can be changed easily and process data can be transmitted efficiently. Robust designs and flexible functions enable the unique identification, assignment

and tracking of tagged objects – even in challenging process environments. Depending on the desired application, the portfolio of Industrial RFID readers includes cubic and metric designs with different working ranges and types of protection.



[Find out more about our industrial RFID products >>](#)

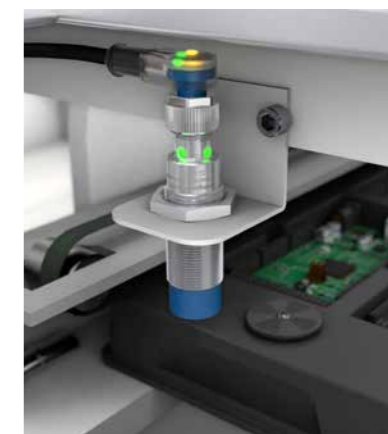


### Track & Trace with RFID Readers

In the food industry, traceability of products must be ensured at every stage of the manufacturing and processing process. RFID transponders are mounted on food trays for this purpose. RFID readers fitted between the roller conveyors register the transponders on the passing trays and read and write new data on them.

### Detection and Control of Workpiece Carriers via RFID Readers

In special machine construction, RFID readers reliably detect and identify workpiece carriers at various system stations. The transponder mounted on the workpiece carrier is recorded and read and can be written with new process information to trigger subsequent processes. The compact format allows mounting in tight or harsh environments.



# Software

Software products for sensors make it easy to set up and parameterize single or multiple sensors from a central controller. They also make it possible to carry out instrument-independent calculations, maintain sensors remotely, and provide remote access to equipment in the event of support.



Find out more about our software product range >>



## Configuration Software for Photoelectronic Sensors

During installation, wTeach software automatically detects all compatible sensors which are connected to the system via the corresponding interface. This allows the parameters of the sensors to be conveniently configured via the graphical user interface.



## weCon App for Sensors with NFC or Bluetooth

The weCon app offers a solution for mobile parameterization and data transfer of sensors. Whether via Bluetooth or NFC, the app allows easy access to the sensor settings. Settings can be made via an intuitive user interface and transferred to the sensors. Existing configurations can also be read directly from the sensors.





**Machine Vision Software**



**Machine Vision Controllers**



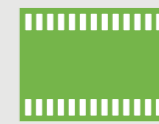
**Machine Vision Cameras**



**2D/3D Profile Sensors**



**3D Sensors**



**Smart Cameras and Vision Sensors**



**Illumination Technology**



**1D/2D and Barcode Scanners**



## Machine Vision

In the field of machine vision, wenglor offers outstanding quality for the highest demands in industrial image processing. From intelligent camera systems with machine vision cameras and smart cameras, vision sensors, 1D/2D code readers, 2D/3D profile sensors and high-precision 3D sensors to modular machine vision

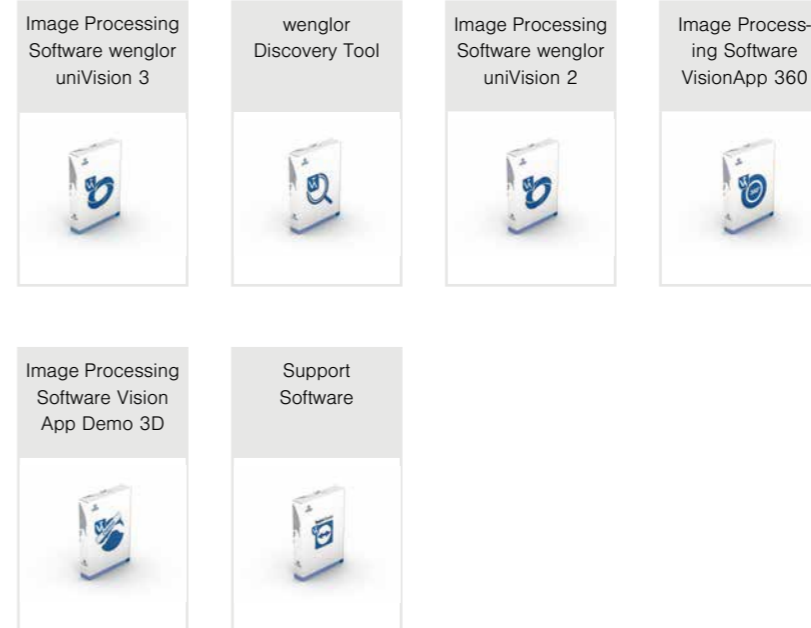
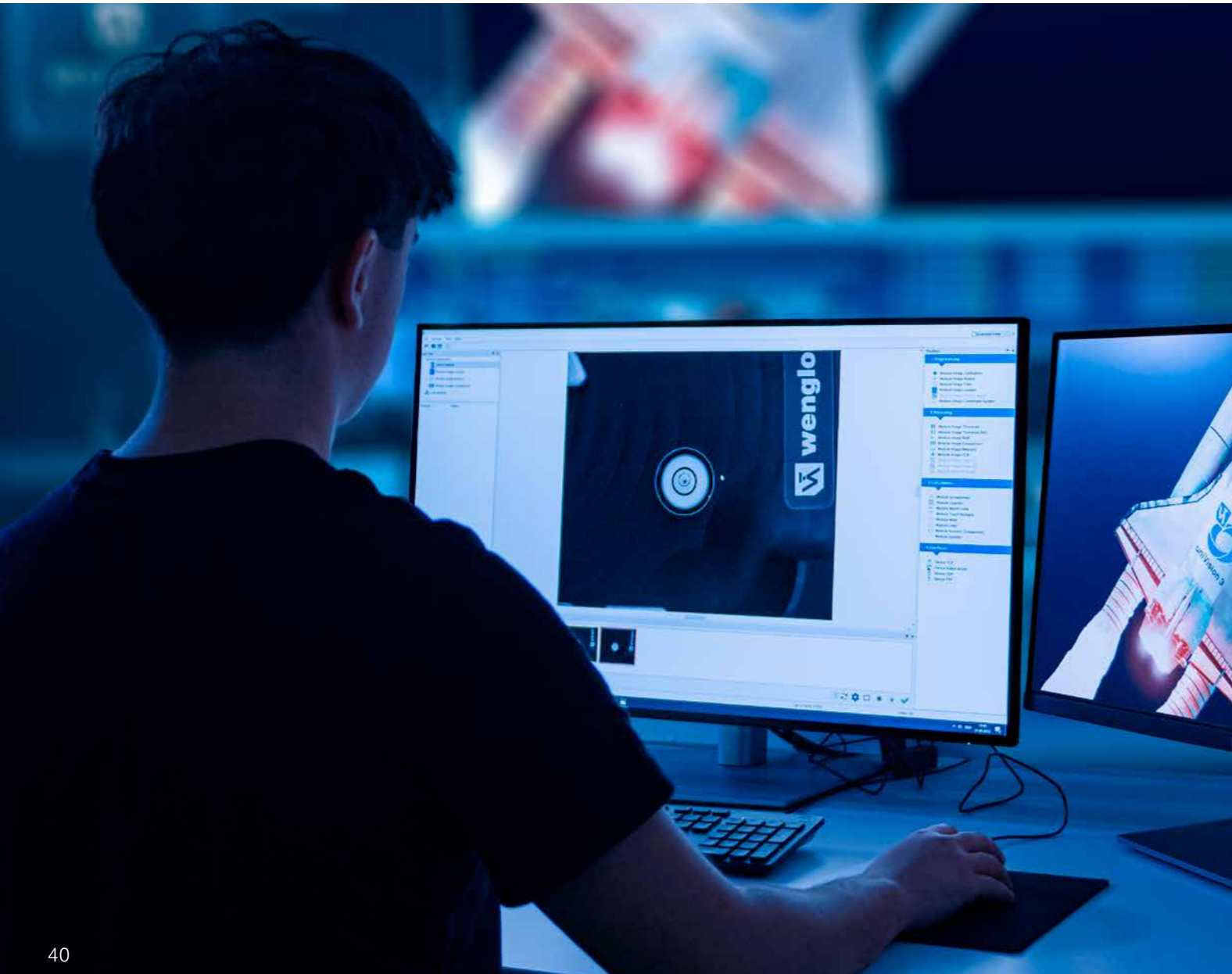
software solutions – the comprehensive portfolio offers the right solution for all types of factory automation. Users benefit in particular from the integrated ecosystem, where all image processing components work together optimally and can be intuitively combined.

# Machine Vision Software

Software for image processing technologies is used to parametrize and evaluate smart cameras, image processing systems, 2D/3D profile sensors and 3D sensors. They allow adjustment and maintenance work to be carried out regardless of location.

The software portfolio supports both rule-based image processing algorithms and advanced deep learning technologies, such as Deep OCR for optical character recognition. The intuitive user interface makes it quick and easy for new users to get started. Additional support is provided by templates and examples of common standard applications to help you get started.

For experienced users, the software offers not only parameterization of image and profile modules, but also programming using HALCON Script, making it a flexible and powerful solution for a wide range of industrial applications. It also has common industrial interfaces to programmable logic controllers and robots. Additional software tools enable searching and finding of machine vision devices in the network as well as 360-degree profile recognition and display of height profiles and point clouds.



### All Your Needs in One Place

wenglor uniVision 3 machine vision software offers an all-in-one environment for the combined use of 2D/3D profile sensors and 2D image processing products such as smart cameras and machine vision

cameras. When a machine vision controller is used, up to 16 machine vision devices can be connected, parameterized and operated simultaneously in any combination.





### Wide Range of Tools

The wenglor uniVision 3 software toolbox contains numerous modules which can be used to extract information from the recorded data or for further processing of results. In addition to simple parameterization, the software also enables seamless integration of HALCON scripts via the “HALCON Script module”.

### Common Industrial Interfaces for Easy Integration

Thanks to the standard interfaces such as Ethernet TCP/IP, PROFINET, EtherNet/IP, EtherCAT and Robotic Vision, wenglor uniVision 3 machine vision software can be integrated quickly and easily into any infrastructure – whether PLC, robot or superordinate environment.

## wenglor uniVision3

### Smartly Sorted Toolbox for Intuitive Operation

The wenglor uniVision 3 machine vision software toolbox contains numerous software modules which can be used to extract information from the recorded data or for further processing of results. The arrangement of the modules is adapted to the individual work steps that must be carried out when creating a uniVision job. In addition, the uniVision Assistant supports you in setting up the most important modules. This enables intuitive operation of the software and simple parameterization of the machine vision application.

### Simple Initial Start-Up and Adjustment via uniVision Simulator

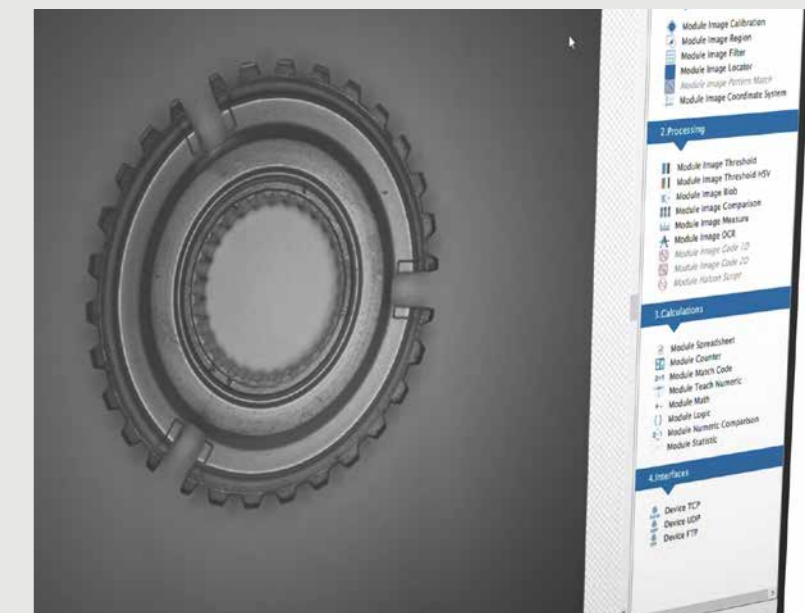
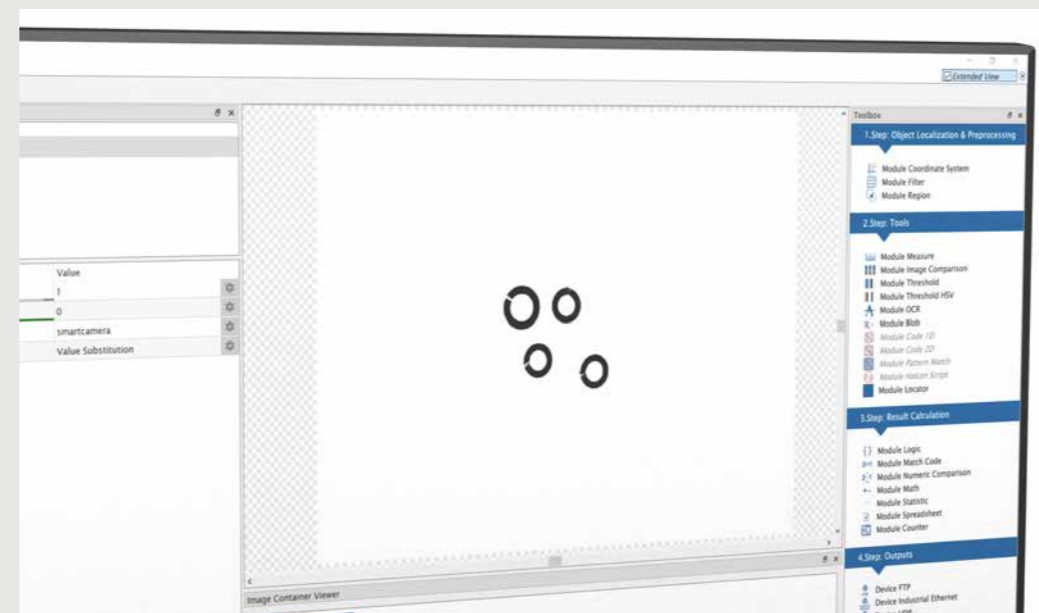
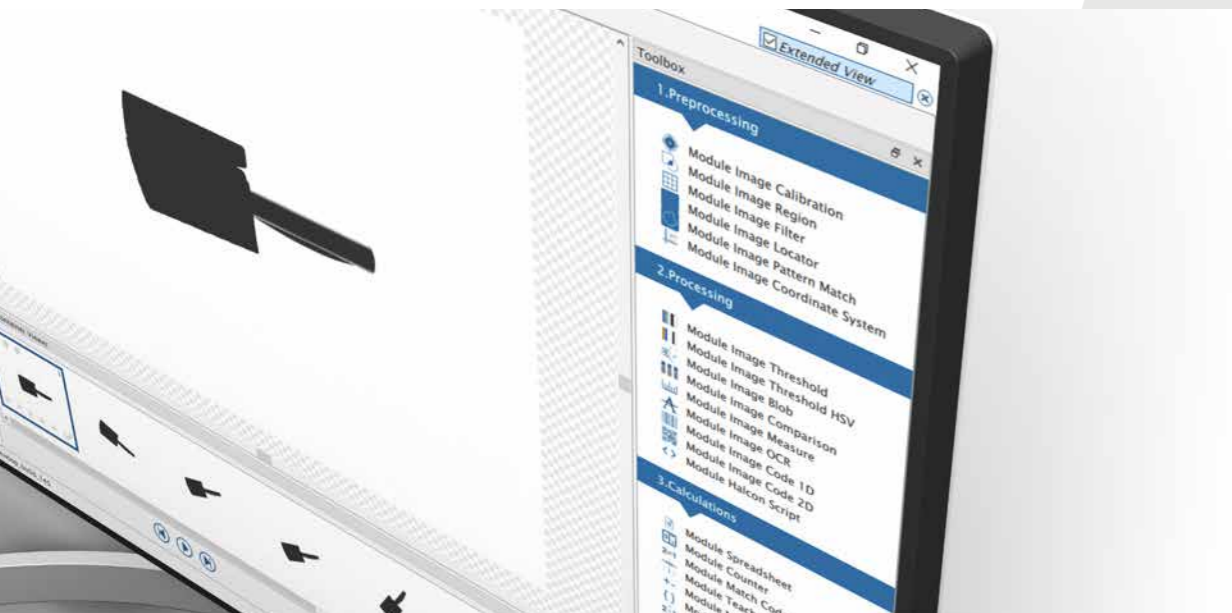
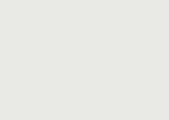
A large amount of good and bad data is required to parametrize a uniVision job during initial start-up or for adjustment during operation. These images can be easily captured and evaluated using the Teach+ function. The uniVision Simulator enables location-independent and time-independent setup and optimization of the uniVision job. The optimized job can then be loaded directly onto the uniVision product.

### “Deep OCR” Module

The “Deep OCR” module uses advanced deep learning technology to reliably recognize letters and numbers. Thanks to a pre-trained neural network, there is no need to create your own training data and the module can be used right away with just a few settings. Unlike traditional OCR, it can therefore accurately identify even hard-to-read or specially designed prints and labels.

### “Locator” Module

The “Locator” module enables detection and tracking of objects and contours based on feature points and thus the teaching of up to ten different objects and contours with a single image capture. By default, the module automatically calculates the accuracy when learning models. The accuracy can be adjusted manually by fine-tuning parameters; for example, shorter process times can be achieved by reducing accuracy.



## Industrial Interfaces to Controls

Process data can be sent via TCP/IP, UDP or FTP protocols with the “Device TCP”, “Device UDP” and “Device FTP” modules. The “Industrial Ethernet device” module is also available with the standard interfaces such as PROFINET, EtherNet/IP and EtherCAT. This enables easy integration of the Machine Vision software into any infrastructure. The uniVision 3 object for Nexeed Automation makes it possible to integrate the devices into the Bosch Nexeed environment without problems.

## Interfaces to Robots

The uniVision 3 machine vision software offers direct interfaces to common robot manufacturers to implement applications such as pick and place and optical weld seam tracking.

The “Robotic Vision” device enables the direct connection of machine vision products to UR and KUKA robots. As an official UR+ partner, the URCap makes it possible to use it on robot systems from Universal Robots without any programming knowledge or major effort. This means that pick-and-place applications, for example, can be implemented quickly, easily and flexibly without having to develop specific interfaces or use other hardware such as PLCs.

Further robot interfaces from popular manufacturers such as ABB, Fanuc, KUKA, Yaskawa and Kawasaki are available specifically for optical welding seam tracking, in which the robot path is corrected during the welding process by detecting the seam.

## “Measure” Module

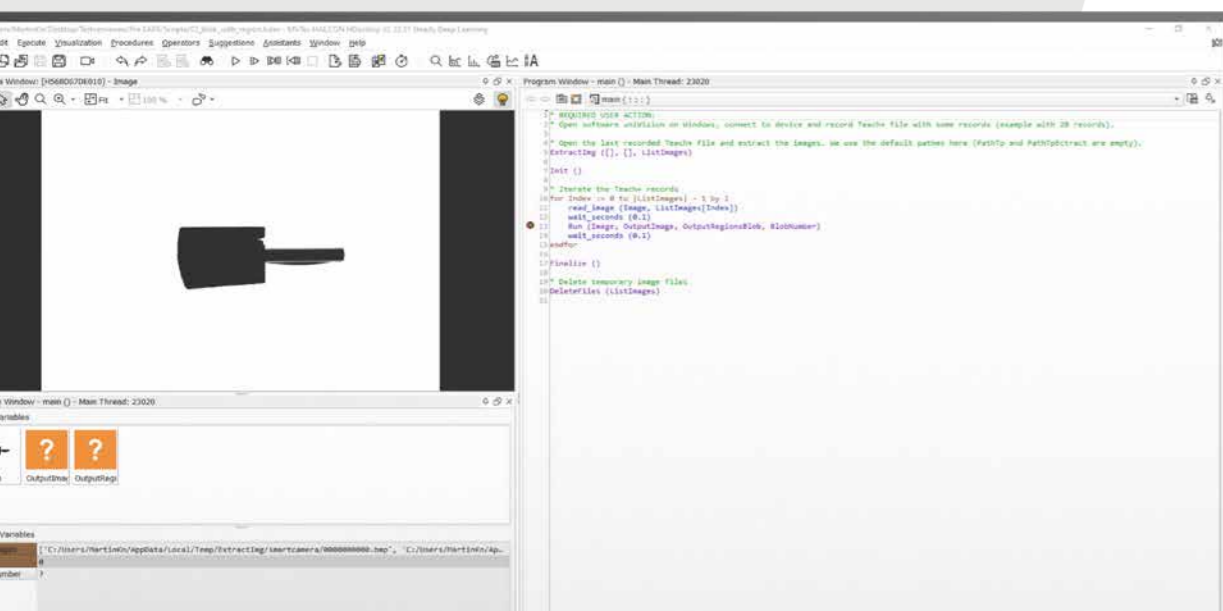
The “Measure” module allows lines, circles or arcs or segments on lines, circles or arcs to be found in order to measure resulting angles and distances or to find specific points. The easy-to-parameterize module can be used very flexibly and delivers precise measurements in just a few clicks. In combination with the calibration module, accurate measurements in millimeters are also possible.

## “Spreadsheet” Module

The “Spreadsheet” module allows you to carry out calculations and comparisons with multiple results in one spreadsheet directly in the software environment. The calculation results can be used as inputs for further modules. Thanks to the integrated spreadsheet, separate calculation tools are no longer necessary, so users do not have to leave the software environment.

## “HALCON Script” Module

The “HALCON Script” module enables HALCON scripts to be added to the uniVision job in order to use the HALCON software’s flexible programming options for advanced job configuration. Users are therefore not limited to the functions of the uniVision toolbox, but have access to the extensive functions of the established HALCON image processing library for complex applications. This openness of the uniVision ecosystem creates the necessary flexibility required by the dynamic demands in image processing projects.



# Applications



## Angle Measurement of Metal Parts in Brake Presses

In brake presses, the exact angle between the die and the metallic work-piece is measured using a 2D/3D profile sensor to ensure that each pressing process delivers the same results and that each component has the same bending angle. The measurement results are evaluated over the entire web width in the uniVision software.

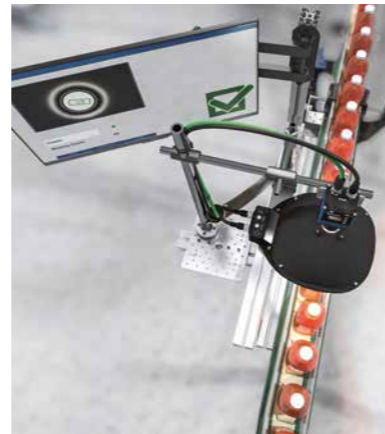


## Clamping Depth Inspection of Pipe Connections

In the production of passenger car air conditioning systems, pipes are connected with clamp connections. To ensure the leak-tightness of the system, the clamping depth of the pipe flange is measured with a 2D/3D profile sensor that rotates around the pipe. The uniVision 3 software evaluates the height profiles created and also checks the ovality of the tubes and the movement of the X-axis.

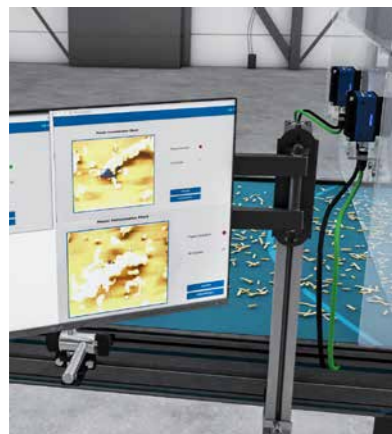
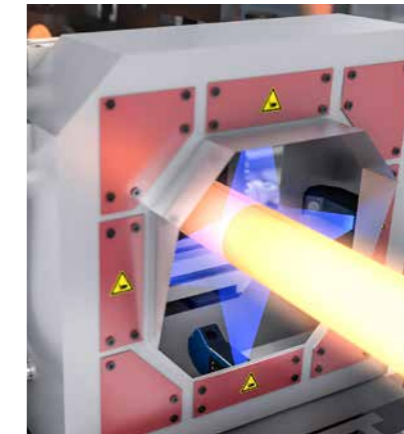
## Check of the Expiry Date on PET Bottles

To check the expiry date in the food and beverage industry, the image taken by the camera at high belt speeds is processed with the "Deep OCR" module in the uniVision 3 software, a deep-learning-based approach to OCR reading. Batches with missing or incorrect information are sorted out.



## Coarse Wire Measurement in Steel Mills

In steelworks, the coarse wire is inspected for geometric quality features such as diameter, ovality, rolling or surface defects after rolling. Specially developed measuring systems with four 2D/3D profile sensors each enable a 360° profile of the wire with micrometer-precision. In the uniVision software, a wide range of measuring tasks can be parameterized with the "Measure" module, among other things.



## Plastic Detection in Grated Cheese

Two B60 smart cameras inspect the falling cheese for foreign bodies to ensure that there are no blue packaging parts inside before the grated cheese is packaged. In the uniVision 3 software, different blue tones are taught in with the "Threshold HSV" value module, and the size of the blue objects to be detected is determined with the "Blob" module.



## Measuring the Diameter of Calottes

For quality assurance when punching body parts, the diameters of the calottes produced must be measured. A machine vision camera creates a sharp image contour of the hole punching in the through-beam process. The exact diameter in millimeters is then calculated with the "Measure" module in combination with the "Calibration" module of the uniVision 3 software.



[Learn more about our wide range of machine vision software >>](#)





## Machine Vision Controllers

Machine vision controllers are analysis modules for processing images and 2D height profiles, as well as for result output. In combination with machine vision cameras and 2D/3D profile sensors, they are the heart of various vision systems and are used in numerous image processing applications.

The compact design with fanless cooling allows high performance and offers maximum flexibility for easy

and space-saving installation. Quick and easy initial start-up is made possible by the pre-installed uniVision software packages. Different model variants offer connections for up to 16 devices at the same time. Various interfaces ensure ideal connectivity.



[Find out more about our machine vision controller product range >>](#)



### Dimensional Accuracy Check on Plastic Profiles

Four circumferential 2D/3D profile sensors measure plastic profiles for windows or doors to the exact micrometer. On the machine vision controller, the individual 2D height profiles are combined with the uniVision and VisionApp 360 image processing software, joined to form a 360° profile, analyzed and compared with defined geometry data.

### Visual Quality Assurance for Oil Canisters

During quality control of injection molded parts, geometry, color, inclusions or sprue separations are checked. The image taken by the camera is evaluated with the uniVision image processing software on the machine vision controller, the inspection results are displayed via web-based visualization and defective parts are rejected.



# Machine Vision Cameras

Machine vision cameras from wenglor deliver high image quality in a compact housing format. The cameras can be integrated into any system easily and flexibly thanks to the small and robust housing and the standardized C mount threaded connection for lenses.

State-of-the-art CMOS sensor technology ensures high resolution and optimum image quality without noise

even in difficult lighting conditions. Thanks to image chips in monochrome or color as well as with rolling shutter or global shutter technology, high-resolution recordings are possible in static and dynamic applications. The machine vision camera can be flexibly adapted to individual application requirements by mounting various filters that reduce reflections, increase contrast or protect against interference.



## Impressive Performance

Thanks to the high resolution of up to 24 megapixels, wenglor machine vision cameras offer outstanding image quality. Dynamic images can be taken at a high frame rate of up to 71.6 frames per second.

## High Flexibility

The large selection of matching lenses and filters, which can be quickly mounted with the C mount threaded connection, as well as the standardized M12 and M8 connection, enable a high degree of application flexibility in a wide range of image processing applications.

## Sturdy and Compact Design

With their sturdy aluminum housing and IP67 degree of protection, the machine vision cameras are characterized by high stability and robustness against environmental influences. They also deliver reliable results in extreme temperature ranges from  $-20$  to  $+55$  °C. The compact housing is particularly suitable for tight installation environments.



### Versatile Industrial Interfaces

The cameras have a high degree of standardization through Gigabit Ethernet and GigE Vision Standard, which facilitates integration into existing systems. Thanks to the bandwidth of 1 Gbit/s, the machine vision cameras also enable short transmission and response

times. It is also possible to connect the machine vision camera via a cable using PoE (Power over Ethernet), which means that both power supply and data transfer take place via a single connection.

## Applications

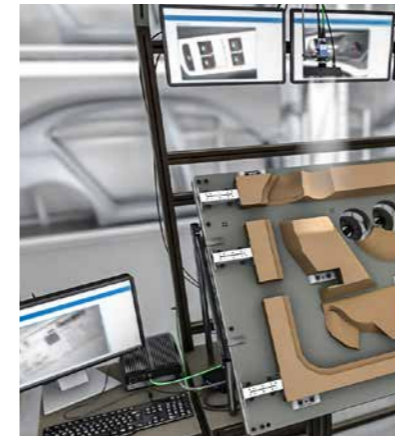
### Position Check of PCBs

Before assembling SMD systems, PCBs must be brought into the correct position and fed into the system. A vision system with machine vision camera performs the position check with a crosshair printed on the PCB as a reference point. The PCB is also uniquely identified by the vision system via decoding of a data matrix code.



### Robot-Guided Quality Inspection of Car Dashboards

When installing car dashboards, a machine vision camera installed on a cobot checks for the presence and position of components. The camera reliably captures curved areas as well as different materials and colors such as chrome or black in just one work step thanks to appropriate illumination.



### Visual Quality Inspection of Car Interior Doors

In the quality inspection of passenger car interior doors of different types, individual components are inspected using a vision system consisting of several cameras, lenses, lighting and a machine vision controller. After the doors have been positioned in a negative shape and uniquely identified. The correct test program is loaded and the inspection starts.

### Label Check on Spreadable Cheese Packaging

When filling different types of spreadable cheese, it must be ensured that the correct lid is applied to each packaging – even if the type is changed multiple times a day. A machine vision camera above the conveyor line automatically checks and compares several hundred lids per minute, regardless of their position on the conveyor belt.



### “End-of-Line” visual quality inspection

During engine production, a visual, fully automated “End of Line” quality control is carried out to prevent faulty engines from leaving the line. For this purpose, a vision system consisting of multiple cameras is installed on several robot arms. Each generated image is evaluated by uniVision software and the results are sent to a higher-level control system.



[Find out more about our machine vision camera product range >>](#)



<p>2D/3D Profile Sensors MLSL</p> 	<p>2D/3D Profile Sensors MLWL</p> 	<p>2D/3D Profile Sensors MLZL</p> 	<p>2D/3D Profile Sensors Stainless Steel</p> 
<p>2D/3D Profile Sensors Safe Laser Shutdown</p> 	<p>2D/3D Profile Sensors for Bending Machines</p> 	<p>2D/3D Profile Sensors Special Solutions</p> 	

## 2D/3D Profile Sensors

2D/3D profile sensors measure objects 360° all the way around, precisely control the positions of robots and inspect surfaces with micrometer accuracy. They use the principle of laser triangulation to create 2D height profiles and 3D point clouds. Various interfaces guarantee quick integration of the weCat3D sensors into complex systems.

Various model variants offer precise resolution in a compact housing design and unbeatable profile quality thanks to optimized high-quality optics. Variants for specific applications enable use in harsh welding environments, precision bending machines or washdown areas.



### Comprehensive Portfolio for Every Application

The portfolio of 2D/3D profile sensors is characterized by its wide variety, which provides the right solution for every requirement. In addition to different designs, various measuring ranges and resolutions as well as different types of light (red, blue and ultraviolet laser light) and laser classes (2, 3R and 3B) are available.

### High Profile Quality on Different Surfaces

The 2D/3D profile sensors offer numerous features for optimizing the point cloud, such as high dynamic range, subsampling or automatic exposure time control. This ensures high profile quality on even the most difficult surfaces.

### Versatile Application Options

The 2D/3D profile sensors can be used for various operating modes:

1. Smart 2D/3D profile sensor with uniVision software installed directly on the device. The 2D/3D profile sensor records the profiles and carries out the evaluation.

2. 2D/3D profile sensor with additional machine vision controller on which the uniVision software is installed. The profiles are recorded on the 2D/3D profile sensor, the evaluation takes place on the connected Machine Vision Controller.
3. 2D/3D profile sensor with SDK or GigE Vision interface. This operating mode enables integration into third-party software or proprietary software.

### Application-Specific Designs

The weCat3D series includes specially developed model variants for various application areas. In addition to stainless steel sensors with IP69K degree of protection and ECOLAB certification for the food and beverage industry, the portfolio also includes the MLZL series for fully automated weld seam tracking. Other models offer safe laser shutoff or UV wavelength for profiling transparent materials.



### Positioning of Liquid Steel Tubes at 1,300 °C

In the quality control of steel tubes in foundries or blast furnaces, a robotic arm with 2D/3D profile sensor tracks the tube to the exact micrometer. A cooling housing enables precise measurement at material temperatures of up to 1,300 °C. Thanks to the certified laser shutoff, the sensor remains switched on when the safety circuit is broken and only the laser switches off. This avoids long restart times.

### Car Seat Contour Measurement

When manufacturing car seats, it is important to ensure that the position of the side cushions and spine cushions is identical on each seat and conforms to the specifications. A 2D/3D profile sensor measures the seats from top to bottom and thus enables the evaluation of the symmetry, the measurement of the contours and the position of the seams.

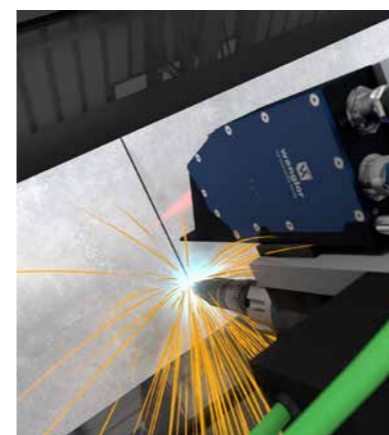


## Applications



### Best-Fit Assembly in Bodyshell Construction

In bodyshell construction for passenger cars, detachable parts must be placed and assembled fully automatically in the body by robots. 2D/3D profile sensors support this so-called "best-fit" process in order to achieve uniform circumferential gap dimensions. Six to eight profile sensors per robot measure the position of the parts relative to each other, and the software calculates the optimum installation position and thus the even distribution of the gap dimensions.



### Welding Seam Tracking in Robot Cells

In fully automatic robotic welding cells, the exact position of joints is determined before the welding process. The 2D/3D profile sensor mounted directly in front of the welding torch on the robot detects the seam by laser triangulation, after which the robot can perform a path correction and precisely place the weld seam.



[Find out more about our wide range of 2D/3D profile sensors >>](#)



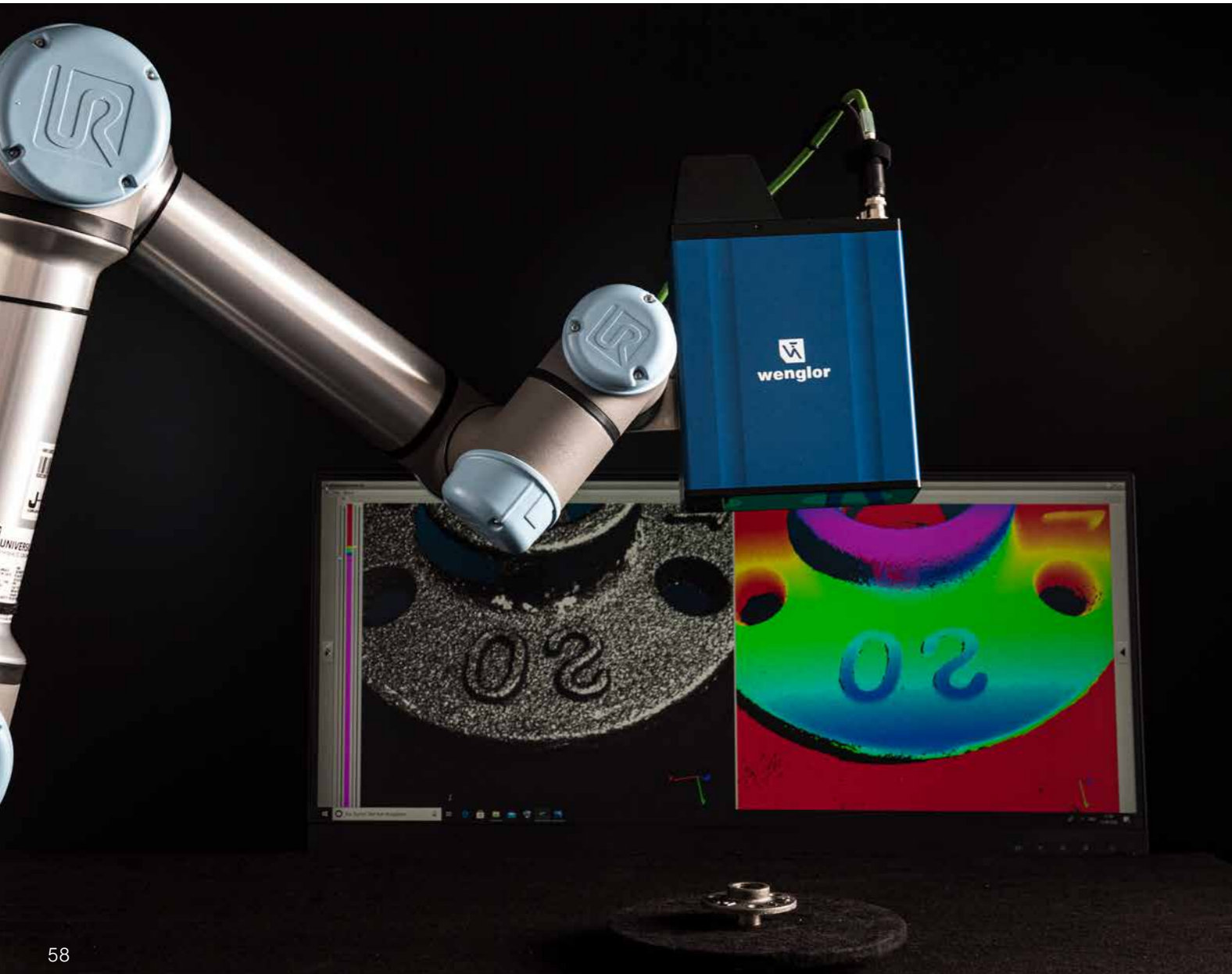
# 3D Sensors

3D sensors perform three-dimensional completeness, dimensional accuracy and surface checks. They enable the control of robots, for example in depalletization or bin picking applications.

The camera-based 3D sensors work in accordance with the structured light principle. They project several light patterns onto the components to be detected; a camera in the sensor records these light patterns and digitizes the components into a 3D point cloud. The method allows you to create complete 3D point clouds

of stationary objects in a single shot. The extremely fast calculation of the point cloud takes place directly in the sensor. Software development kits (SDK) or standardized interfaces such as GigE Vision are used for easy integration.

The different models are equipped with a high-resolution camera with a resolution of 5 or 12 MP. Six selectable measuring ranges and extensive accessories ensure perfect integration into industrial systems – both in factory automation and intralogistics.



### Excellence Through 3D Point Cloud

The 3D point cloud meets the highest demands thanks to the sophisticated algorithm combined with the quality of the hardware. This minimizes or eliminates noise and other artifacts.

### Stability Through Temperature Management

In addition to high-quality components, all ShapeDrive G4 sensors have active temperature management. This ensures that the sensor delivers stable and reproducible results, even under fluctuating external conditions.



### Uniformity Through Interface Concept

The ShapeDrive G4 sensors can be integrated in third-party software via an SDK or a GigE Vision interface. The sensor is connected to the software and ready for immediate use in just a few steps. The integrated web server simplifies handling and configuration.

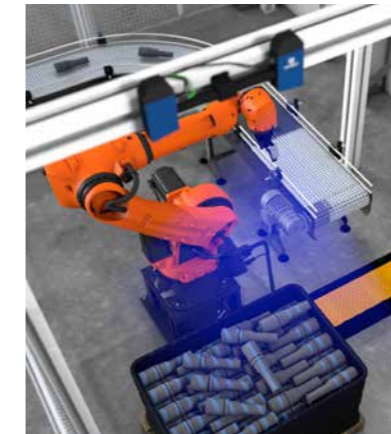
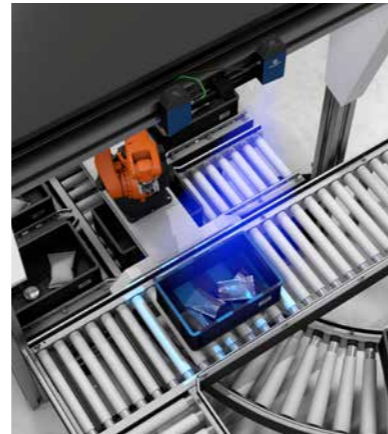
### Flexibility Thanks to a Wide Range of Models

There are various ShapeDrive G4 sensors that cover measuring ranges from a few centimeters for the inspection of the smallest components up to over one meter, for example for the detection of Euro pallets. For extreme requirements, there are also sensors with a camera resolution of 12 MP that accurately capture even the smallest details.

## Applications

### Bin Picking at Picking Stations in Logistics Centers

In large goods distribution centers, goods are identified at automated picking locations, picked and moved using robot grippers. The chaotically arranged objects are detected by a stationary 3D sensor, which uses structured light to generate a 3D point cloud from which the position and size data of the objects can be determined.



### Bin Picking with Metal Components

During fully automatic gripping and moving of metal parts by a robot gripper, the 3D sensor first creates a point cloud using structured light, from which a three-dimensional model of the surface is then generated. Thanks to high point densities, the robots can detect and reliably grip surfaces, openings or grooves of even the smallest components.

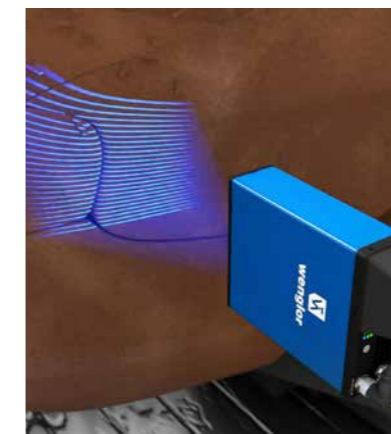
### 3D Surface Inspection of Die Cast Motor Housings

The high-precision quality inspection of die-cast aluminum housings is carried out by robot-guided measuring systems. 3D sensors record shrinkages, distortions, wall thicknesses, sink points and many other geometric parameters fully automatically using structured light. The visualized 3D point clouds provide information about all test values of the object.



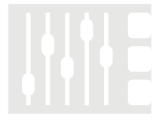
### Depalletization of Boxes on Pallets

Fully automatic robot systems are used for depalletizing in large logistics centers. A 3D sensor above the pallet detects the exact position of objects of different sizes using structured light and thus enables the robot gripper to grip securely.



### Contour Measurement of Car Design Models

The life-size 3D models of concept vehicles are designed fully automatically in milling portals from easily formable clay. To accurately determine the trajectory of the milling heads, 3D sensors measure the design models to the exact micrometer with structured light, capturing digital data in the form of point clouds that can be compared to the original CAD data.



[Find out more about our range of 3D sensors >>](#)



## Smart Cameras and Vision Sensors

Smart cameras and vision sensors solve a wide range of industrial image processing tasks and combine image recording, image evaluation and interfaces in one housing. The highly modular hardware platforms in combination with high-performance uniVision machine vision software enable tailored adjustment for all machine vision applications. Variants with auto-focus or C mount are available.

As a complete image processing system in sensor format, smart cameras and vision sensors allow for easy setup of an image processing application. With intuitive operation and maximum functionality, a wide range of industrial image processing tasks can be carried out without the complexity of assembling and setting up a PC-based vision system.



### High Flexibility

The smart cameras and vision sensors are available as auto-focus or C mount. Thanks to the wide portfolio of accessory products such as lighting modules, angle changers, lenses, optical filters and heat sinks, they score points with their high application flexibility in a wide range of image processing applications.

### Piezo auto-focus

The auto-focus variants of the B60 feature piezo technology. Piezoelectric materials have the property of deforming when an electrical voltage is applied. In the case of auto-focus, the piezoelectric effect is used to move the lenses of the lens practically silently. Users benefit from high accuracy, combined with high speed and temperature independence.





### Multiple Interfaces and Easy Wiring

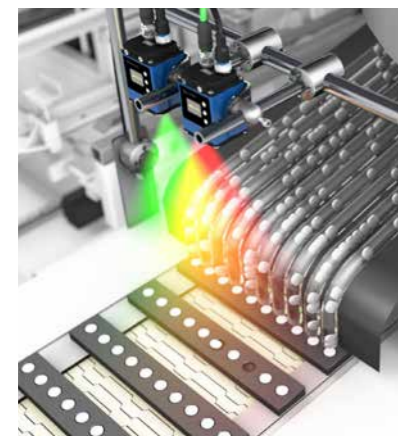
Power over Ethernet (PoE) requires only one cable to operate the camera. Thanks to numerous industrial interfaces such as Ethernet TCP/IP, UDP, FTP, sFTP, PROFINET, EtherNet/IP, Robot Vision, the cameras

have a high degree of integration. The industry standard M12 connector plugs enable easy installation with standard cables in a wide range of designs.

## Applications

### Presence Check of Labels with B60 Smart Camera

After the labels have been affixed to car windows, the presence, position and quality of the stickers must be checked. Two smart cameras with integrated image processing software check the presence and quality of the label applied directly to the glass, the position of which can vary slightly. If a defect is identified, a signal is output to trigger the ejection process.



### Checking the Correct Number of Tablets via Vision Sensors

To ensure that the correct amount of tablets is present in each carrier unit before packaging, they must be counted. Two vision sensors detect the presence of objects on the tray. When the correct number is confirmed, the tablets fall via a hopper to the final packaging; if the number is incorrect, the carrier unit is ejected.

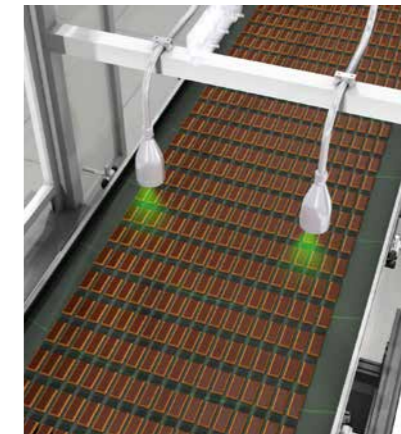


### Precise Rack Positioning of Rack Feeders with Vision Sensors

To ensure the precise storage and retrieval of containers via rack operators in high-bay warehouses with aisles up to 40 m high, precise specialist positioning is required. For this purpose, vision sensors with external lighting are used, which enable precise positioning via hole detection on the metal struts in the X/Y direction.

### Color Control of Baked Goods with Vision Sensor

For quality control of baked goods with covers, two vision sensors in a hygienic stainless steel 316L protective housing check the color of the objects over the entire web width. If the cameras with integrated analysis module detect too many bright pixels, there is not enough chocolate coating on the biscuit and the baked goods are ejected.



### Robotic Pick and Place with Smart Camera

Flexible infeed systems with gripper unit, smart camera and illumination are used to separate components in bulk containers. With each image captured, the camera records several objects and transmits the position and orientation of the parts directly to the robot. The gyroscope installed in the camera detects changes in position, thus ensuring the robustness of the calibration.

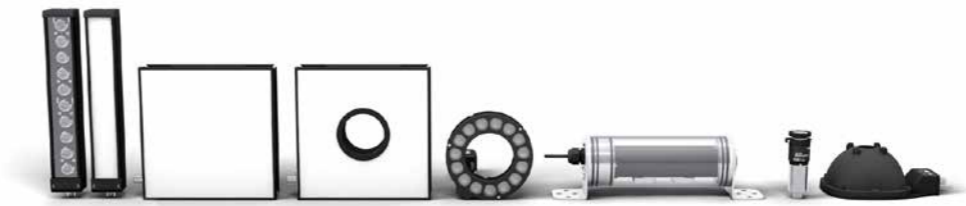









[Learn more about our range of smart cameras and vision sensors >>](#)

# Illumination Technology

Illumination is an important component in industrial image processing. The broad portfolio of different lighting solutions and technologies includes bar lights, ring lights, dome lights, flat dome lights, flat lights, and spot lights. Different types of light are available depending on the format: white light, red light, infrared light, red-cyan light, white-infrared light, as well as multi-UV and white light.

The illumination portfolio is rounded off by a wide range of accessories for every application. This means that the lighting solutions can be adapted individually to the application requirements with filters, angle changers and focuses.



<p>Bar Lights</p> 	<p>Ring Lights</p> 	<p>Dome and Dome Lights</p> 	<p>Flat Lights</p> 
<p>Flat Dome Lights</p> 	<p>Spot Lights</p> 	<p>Illumination Kit</p> 	



### Large Beam Angles thanks to Angle Changer

Angle changers are robust light diffusers that can be mounted directly on bar lights. By increasing the beam angle, angle changers scatter the light and thus

contribute to a better homogeneity of the field of view. They also enable the curve effect.



### Flexible Adjustment of Machine Vision Illumination

The illumination portfolio offers various options for flexible adaptation of the illumination technology to the application challenge. Models are available with switchable wavelengths, sector illumination or lockable zoom lens.

### Integrated Flash Controller with Overdrive Function

The strobe overdrive mode refers to a mode of operation for LED illumination that allows increased luminosity of the LEDs within a defined duty cycle. All wenglor LED luminaires with overdrive have an internal controller for controlling the duty cycle. This protects the product.



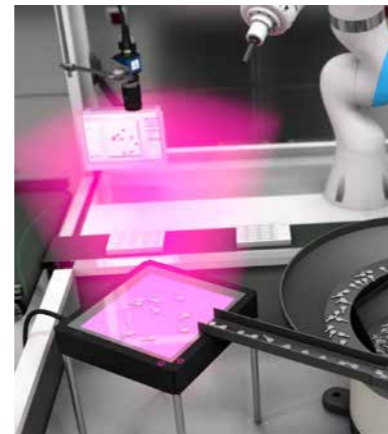
### Homogeneous Illumination of 1D and 2D Codes on Boxes

1D and 2D codes are used to identify cardboard packaging in logistics centers. To ensure that they have a high contrast and can be read reliably, a flat dome light illuminates the codes evenly with homogeneous white light even from varying distances.

## Applications

### Illuminating Key Blanks for Pick and Place Applications

During key production, the blanks must be separated, gripped correctly and deposited. An image processing system creates an image of the blanks on a transparent disk, which is illuminated from below by an infrared flat light. This highlights the contour of the keys, which increases the quality of the recording.



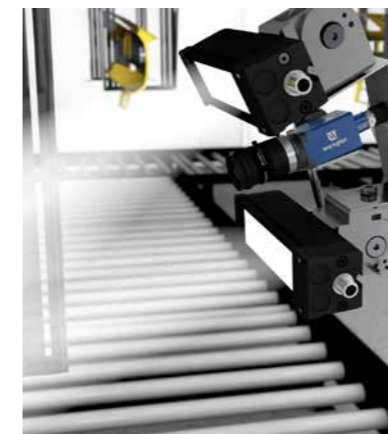
### Flat Dome Light for Pick and Place Feed Solution

When separating objects in pick and place applications, homogeneous illumination of all parts is necessary in order to identify their exact position and alignment. A flat dome light with high light homogeneity installed as an incident light enables the inspection of individual objects of different material properties.



### Illumination of Internal Seals in Plastic Caps

Beverage caps must be checked for injection molding defects on the inside before use. A smart camera with dome light also generates uniform, homogeneous illumination at full depth in order to create sufficient contrast to details such as sealing rings inside the closures even at high line speeds.

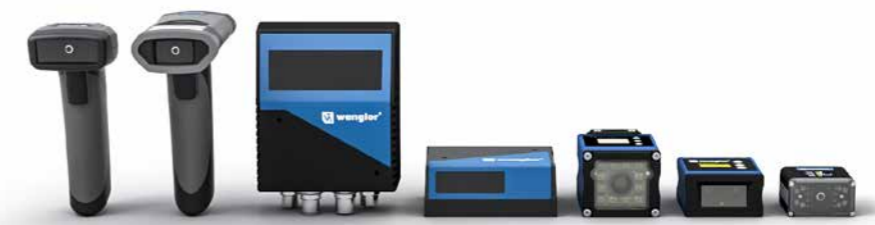






### Diffuse Illumination for Robot-Guided Quality Inspection

When assembling car fittings, components must be checked for presence and position. Bar lights installed on a cobot with diffuse white light enable the camera-based system to reliably detect curved areas as well as different materials and colors in a single operation.



Find out more about our wide range of illumination technology >>



1D Code Scanners	1D/2D Code Scanners	1D/2D Handheld Scanners	Configuration Software for Code Scanners
			



## 1D/2D and Barcode Scanners

1D/2D and barcode scanners reliably process simple barcodes with high data density, all the way up to complex 2D codes, which are marked directly on the respective parts (DPM codes). The stationary and mobile code readers use different types of light and functional principles such as CCD and CMOS lines or liquid lens auto-focus.

With its comprehensive scanner portfolio, wenglor offers the right technology and solution for every type of code and application – including for the detection of needle-punched, printed, lasered or etched codes on glossy or curved materials.



**Comprehensive Portfolio for Every Code Reading**  
The portfolio of 1D/2D and barcode scanners is characterized by its wide variety, which provides the right solution for every application challenge. This allows codes of different sizes to be read reliably on different materials and difficult surfaces.

**Reliable Recognition of DPM Codes**  
DPM codes present a particular challenge for code scanners. Various functional principles enable reliable decoding of the needle-punched, etched or lasered codes.



### Automated Code Queries with Multishot Configuration Database

The C5PC series Multishot Configuration Database is an integrated database in the sensor that drastically reduces manual programming requirements. The settings stored there are processed automatically by a trigger signal and the result is output as soon as a

setting results in a successful read. It is useful in applications where, for example, a code requires different settings for decoding, codes are displayed at different depths, or multiple codes with the same data or in a specific order must be read.



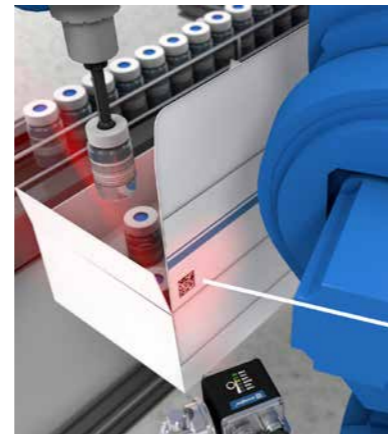
### Automatic Tracking of Large Packages

In intralogistics, large packages are transported on roller conveyors. Sweep raster scanners are mounted on both sides of the conveyor lines to detect the packages. Thanks to the laser lines moving up and down, large-area barcodes of different sizes, positions or arrangements are reliably identified.

## Applications

### Code Reading of Drug Vials and Packaging

Various codes are used in the pharmaceutical industry to correctly assign ampoules and packaging – 1D codes are usually found on the ampoules, and the cardboard packaging often have 2D codes. Side-mounted 1D/2D code scanners reliably detect and decode both types of code by capturing and processing up to 32 codes simultaneously.



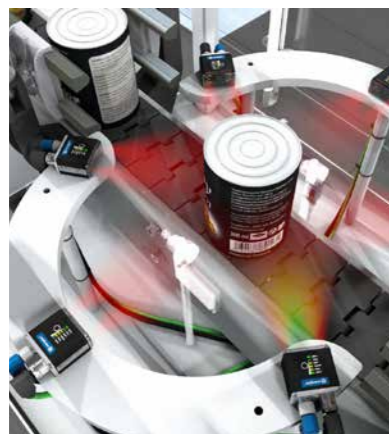
### Reading of Needle Punched 2D Codes on Round and Glossy Components

In the automotive industry, the smallest components must be identified and made traceable. For this purpose, needed DataMatrix codes are directly applied to the high-gloss and round metal parts, which are particularly difficult to detect. The handheld scanners with integrated illumination technology capture the codes quickly and reliably.



### 360-Degree Code Scanning on Canned Foods

For the traceability and identification of canned foods, all batches must be barcoded after the filling process. Networked 1D/2D code scanners mounted around the conveyor belt reliably and synchronously read the codes on the cans of different sizes, regardless of the code position.



[Find out more about our wide range of 1D/2D and barcode scanners >>](#)

# Industries



## Automotive Industry

In the automotive industry, sensors ensure safe, fast and flexible vehicle production. From the press shop to body construction, paint shop, battery and power unit production to assembly – the comprehensive product range offers solutions for a wide range of applications.

## Woodworking Industry

Whether thickness measurement, precise positioning, identification of scrap parts or comprehensive quality control and access protection – wenglor offers innovative sensors and machine vision products for a wide range of applications in the wood industry.

## Food Industry

Strict hygienic requirements and high standards apply in the food processing industry. The wenglor portfolio offers robust and resistant sensors that are not impaired by chemical cleaning and disinfecting agents or by high-pressure cleaning, high water temperatures or strong temperature fluctuations.

## Electronics Industry

The challenges faced in the electronics industry are flexible production lines and little downtime. The comprehensive range of innovative product solutions supports error-free and reliable production of electronic products and ensures smooth operations.

## Logistics

When it comes to automating logistics processes, wenglor's broad product portfolio ensures process reliability, high plant availability and increased efficiency along the entire process chain. We offer solutions for a wide range of applications, such as autonomous transport systems, shelf operators, for order picking or in incoming and outgoing goods.

## Packaging Industry

Smooth production processes and precise quality controls are of great importance in the packaging industry. wenglor sensors reliably detect object positions even at high belt speeds, measure volumes and fill levels precisely, evaluate labels and much more.

## Recycling

Numerous processes in reverse vending machines for reverse vending can be automated using intelligent sensors from wenglor. This enables valuable resources to be recycled, throughput times shortened and processes designed to be reliable, cost-effective and safe.

## Other Industries

The ability to reliably detect transparent objects or the smallest parts makes wenglor sensors ideal for use in the pharmaceutical, perfume, plastics, consumer goods and glass industries. They also meet the strict hygiene standards of the pharmaceutical and perfume industry.

In the railway, printing, metal, welding and steel industries, the automation technology used is exposed to extreme ambient conditions. wenglor offers a wide range of sensors, Machine Vision products and safety technology that withstand these requirements and also ensure product quality and human safety.



# Quality Meets Diversity

## Product Portfolio



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