Redefining Flexibility.

IO-Link

R10x and R20x Series
Photoelectric Sensors

All functional principles in standard housings with high-performance sensor technologies and IO-Link in every model.

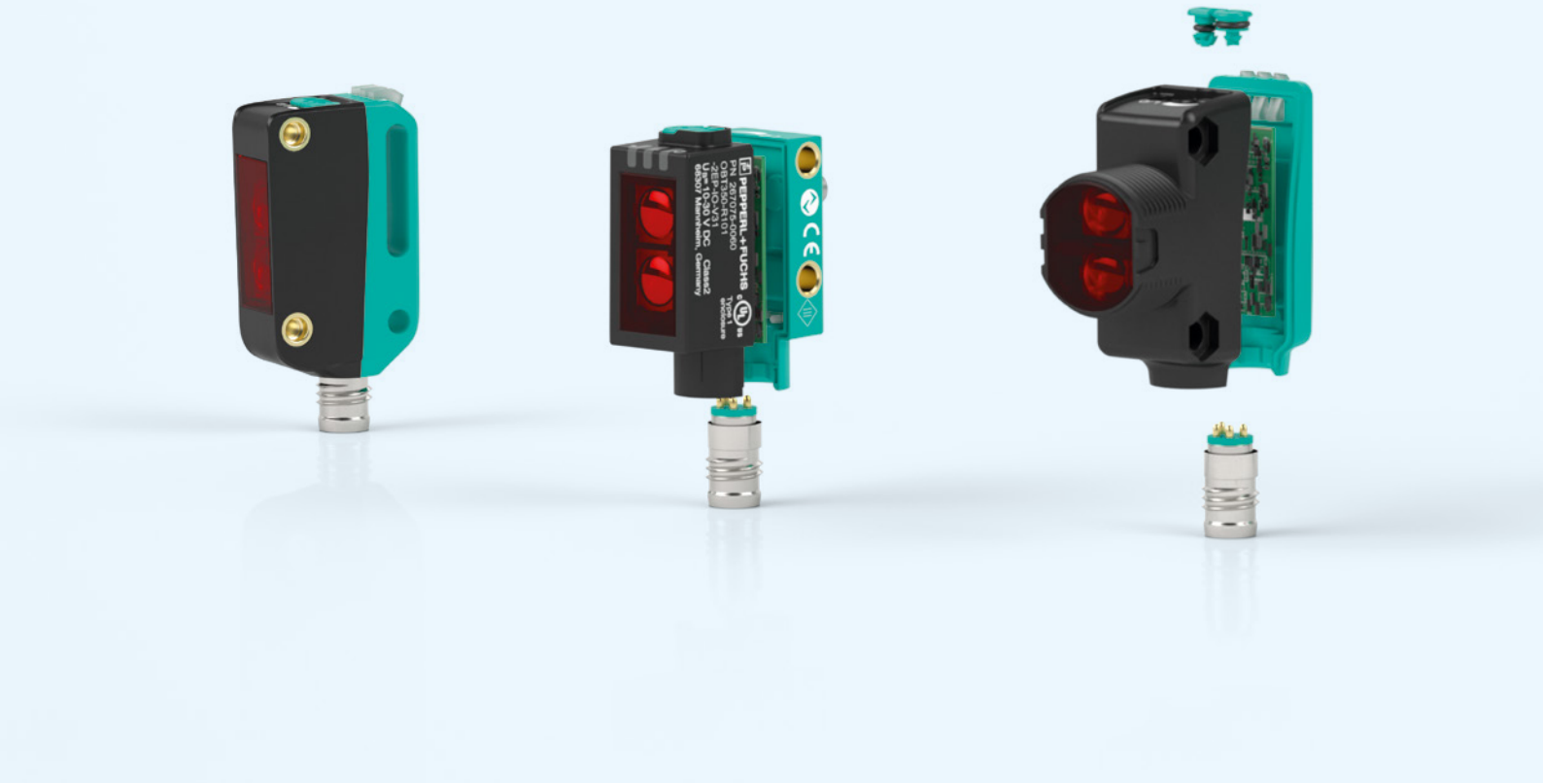
Your automation, our passion.

PEPPERL+FUCHS

Product Design

Forward-Thinking for Endless Application Possibilities

Five standard designs, all sensing modes, one user interface, powerful sensor technologies, and IO-Link in every model. The forward-thinking design of Pepperl+Fuchs' R100, R101, R103, R200, and R201 series stands for simple integration and commissioning as well as maximum efficiency and planning security.



Versatility Meets Simplicity

These innovative sensor families combine all photoelectric sensing modes in five standard housing shapes. The R100, R101, and R103 series are ideal for close-range applications, while the new R200 and R201 series are perfect for longer-range sensing. The R200 sensor series with Pulse Ranging Technology (PRT) enables high-precision distance measurements up to 10 m, and up to 60 m in the version with a reflector. Together, they offer unparalleled flexibility, regardless of the application or installation requirements. A single user interface across all families ensures efficiency. And a standardized IO-Link interface with a Smart Sensor Profile provides a future-oriented solution.

For more information, visit
pepperl-fuchs.com/pf-rx

Highlights

- All photoelectric sensing modes in standard housing styles for maximum flexibility and more integration possibilities
- Simple installation and setup with one user interface for all housing styles and sensing modes
- IO-Link and Smart Sensor Profile in every sensor: standardized communication down to the sensor level as the basis for Sensorik4.0®
- Precise and reliable distance measurement at close and long range with multipixel and Pulse Ranging Technology
- Innovative DuraBeam laser technology for an exceptionally long service life and increased operating temperature range

Product Design

Five Housing Styles, One User Interface

All R10x and R20x sensors in all sensing modes have the same user interface. The intelligent combination of a multiturn potentiometer and push-button control enables intuitive adjustment of all functions and simplifies setup.

Simple and Intuitive Configuration

The R10x and R20x series are designed to minimize complexity. Retroreflective, diffuse mode, and measuring sensors alike have the same simple user interface and are configured the same way. In addition to the user interface, IO-Link can also be used for configuration. IO-Link and Smart Sensor Profiles increase efficiency and reduce the complexity of sensor integration.

Installation without Limitation

Each R10x and R20x sensor offers several mounting patterns in one industry-standard housing style. Compatibility with a variety of common solutions on the market gives users the freedom to adapt to virtually any installation requirement. New R20x sensors for longer range sensing also feature rotatable connectors, which allows flexible installation, even in space-restricted applications.

IO-Link-Technology

Future-Oriented with IO-Link

Smart Sensor Profiles for simple integration and a reliable investment—Pepperl+Fuchs is a pioneer in the integration of the new standard and paves the way to Industry 4.0.

Uniform Structures Ensure Efficiency

Every IO-Link device that incorporates Smart Sensor Profiles is developed to follow a general specification and structure. The same device information is always stored and available anytime, and the pin layout and available operating modes are also identical in every device. This standardization ensures efficient machine design—and compatibility with Industry 4.0.

For more information, visit
pepperl-fuchs.com/pf-sensorik40

Smart Sensor Profiles: Finding a Common Denominator

To achieve true standardization, data transfer, data structures, and data content must be clearly defined for all manufacturers. Smart Sensor Profiles have been developed for this purpose. They divide all sensors into types that are not determined by manufacturer or sensing mode but by the signal that a sensor transmits. Profile-specific function blocks exist for each profile class to make integration quick and easy for users. Once a device from a specific profile class is initially integrated into a control system, the integration of additional devices from the same profile is simple.

This makes it possible to quickly replace a photoelectric distance sensor with a sensor from another manufacturer or with a measurement sensor that uses another sensing technology, such as an ultrasonic sensor. Pepperl+Fuchs is pioneering the integration of Smart Sensor Profiles in current and future product development projects, paving the way for international standardization and Industry 4.0.

Sensorik 4.0

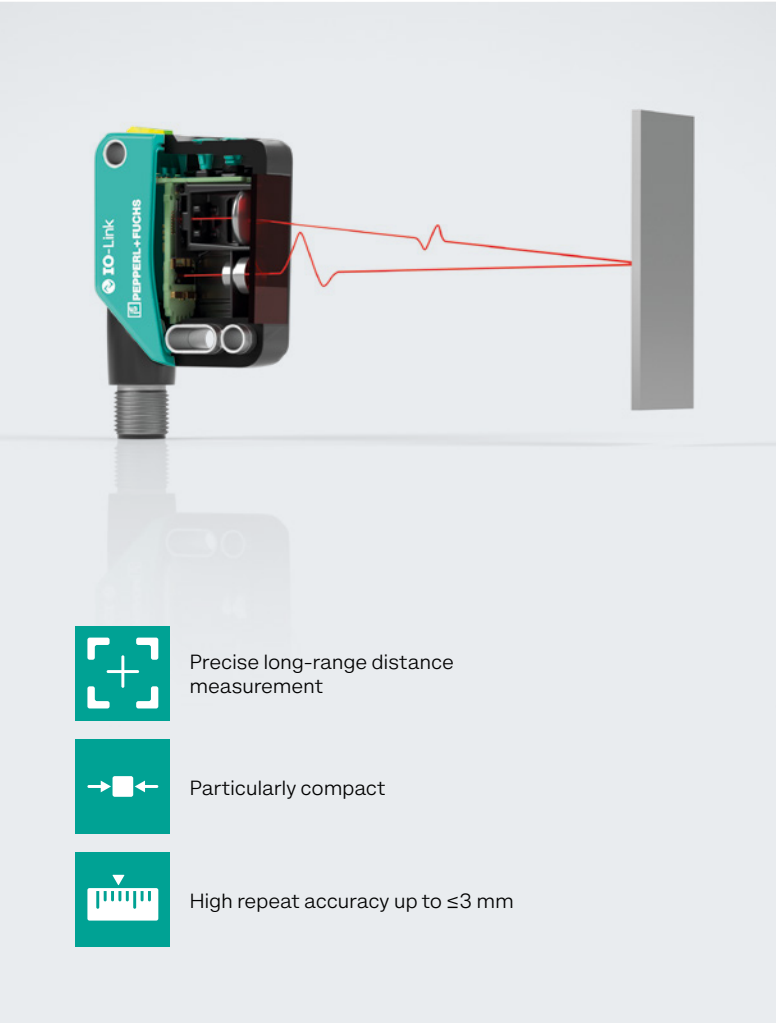
Sensorik4.0®—Paving the Way for the Smart Factory

IO-Link sensors pave the way for the Fourth Industrial Revolution. In the Industry 4.0 future of fully networked production systems, communication-ready sensors play a vital role: they send and receive sensor data within production processes and to higher-level local or cloud-based information systems.

To pave the way for Industry 4.0, Pepperl+Fuchs is providing innovative sensor technologies with Sensorik4.0®. They use the standard IO-Link interface to support the digitization of industrial applications.

Unique Technologies, Absolute Reliability

Maximum performance due to DuraBeam. High-precision distance measurement at close and long range with multipixel (MPT) and Pulse Ranging Technology (PRT). Innovations from Pepperl+Fuchs that make your applications even more efficient.



Precise long-range distance measurement

Particularly compact

High repeat accuracy up to ≤3 mm

Pulse Ranging Technology: Intelligent Technology for a High Level of Precision

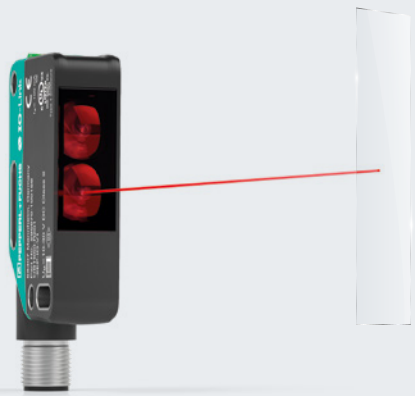
Pulse Ranging Technology (PRT) was specially developed by Pepperl+Fuchs for highly precise distance measurement. It can measure distances ranging from a few centimeters to several hundred meters with the utmost precision.

Pulse Ranging Technology uses a powerful light source to emit short pulses of light. These pulses are reflected off the target object and detected with a high level of accuracy by a light-sensitive receiver. The exact distance to the target object is then calculated on the basis of the recorded values and the speed of light. This not only makes it possible to achieve higher detection ranges, but also effectively suppresses interference from ambient light and different object properties.

In contrast to triangulation, the measuring range of PRT is not limited by the geometrical layout of the optics. Even in relatively small housings, PRT sensors can still provide significantly larger measuring ranges and meet high requirements in terms of quality of measured values.

DuraBeam: Higher-Performance Laser Technology

Eye-safe DuraBeam laser from Pepperl+Fuchs combines the advantages of an LED emitter—long service life and extended temperature range—with the strengths of laser diodes—long detection and sensing ranges as well as a more intense beam quality. As a result, R10x and R20x laser sensors are more energy-efficient and last longer without compromising on performance, even at extreme operating temperatures. Another benefit of DuraBeam laser sensors is their special beam profile, which casts a sharp, circular light spot on an object. This makes them ideal for extremely precise detection and distance measurement of small objects.



- Long service life
- Sharp light spot
- Higher temperature range

MPT: State-of-the-Art Distance Measurement

Multipixel technology (MPT) from Pepperl+Fuchs uses the advantages of geometric triangulation for distance measurement, enabling highly precise, reliable measurement even at close range. The sensor's light source creates an extremely bright, high-energy light spot on the object and therefore a reflection that is precisely reproduced on the receiving multipixel array. Intelligent software algorithms calculate the exact distance to the object from the position of the reflectance center on the array. This enables the measuring and switching R10x and R20x sensors to precisely measure the position of an object and clearly distinguish it from the background.

- Interference-free distance measurements in the near range
- Proven technology in small housing design
- Precise object detection

R10x Series at a Glance

All Functional Principles in a Small Housing Design

IO-Link

Small-sized

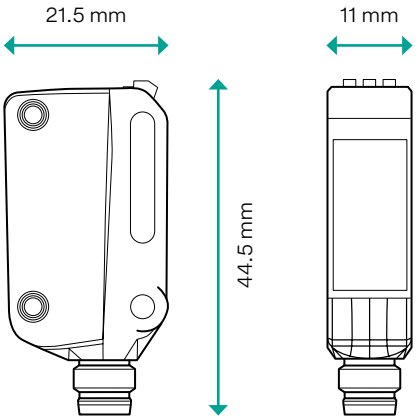
IR
Infrared
R100, R101

R100, R101, and R103 Series

Maximum performance in space-saving housings—that's what the sensors of the R10x series offer. There are three different standardized designs available across all functional principles. Depending on the installation and mounting situation, the sensor present in the application can be used exactly. In addition to PowerBeam LED and DuraBeam laser, special infrared variants are also available if required.

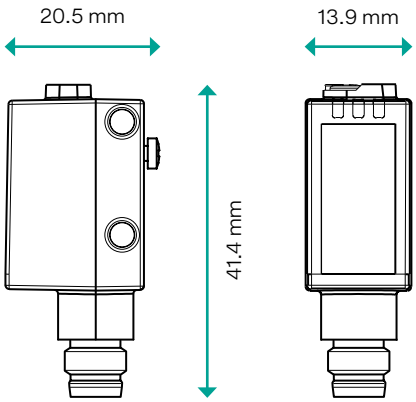
R100/R101/R103 Series Sensing Modes	Type Code	LED, IO-Link Detection/Sensing Range	DuraBeam Laser, IO-Link Detection/Sensing Range
Thru-beam sensor	OBE*-R100*; OBE*-R101* OBE*-R103*	0 ... 12 m 0 ... 20 m (IR) 0 ... 10 m	0 ... 20 m 0 ... 20 m
Retroreflective sensor with polarization filter	OBR*-R100*; OBR-R101* OBR*-R103*	0.03 ... 7.5 m 0.03 ... 6 m	0.2 ... 12 m 0.25 ... 12 m
Retroreflective sensor without polarization filter	OBR*-R100*; OBR*-R101*	0.03 ... 7 m (IR)	
Retroreflective sensor for clear object detection	OBG*-R100*; OBG*-R101* OBG*-R103*	N: 0 ... 5 m CI-III: 0 ... 3.5 m 0 ... 4 m 0 ... 3.5 m	
Diffuse mode sensor	OBD*-R100*; OBD*-R101* OBD*-R103*	2 ... 1000 mm 2 ... 1100 mm (IR) 2 ... 800 mm	
Diffuse mode sensor with background suppression	OBT*-R100*; OBT*-R101* OBT*-R103*	5 ... 350 mm 5 ... 350 mm (IR) 5 ... 300 mm	7 ... 100 mm 7 ... 300 mm 7 ... 250 mm
Diffuse mode sensor with background evaluation	OBT*-R100*-1T; OBT*-R101*-1T OBT*-R103*-1T	5 ... 350 mm 5 ... 350 mm (IR) 5 ... 300 mm	7 ... 100 mm 7 ... 300 mm 7 ... 250 mm
Measuring sensor with multiple switch points	OQT*-R100*; OQT*-R101* OQT*-R103*	5 ... 150 mm 5 ... 150 mm (IR) 5 ... 300 mm	8 ... 150 mm 8 ... 120 mm
Distance sensor	OMT*-R100*; OMT*-R101* OMT*-R103*	20 ... 50 mm 40 ... 100 mm 60 ... 200 mm 15 ... 45 mm 40 ... 100 mm 60 ... 150 mm	20 ... 50 mm 40 ... 100 mm 60 ... 150 mm 15 ... 45 mm 40 ... 120 mm

R100 Series



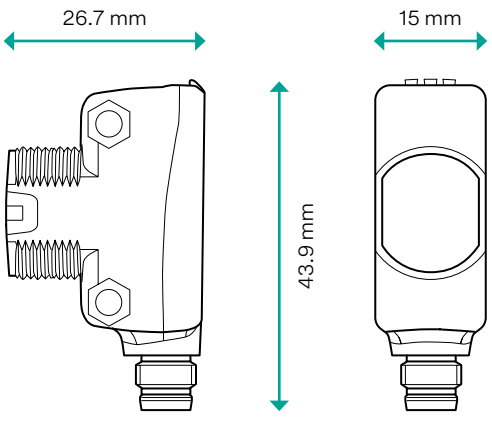
Technical product information:
pepperl-fuchs.com/pf-r100

R101 Series



Technical product information:
pepperl-fuchs.com/pf-r101

R103 Series



Technical product information:
pepperl-fuchs.com/pf-r103

R10x Series Applications

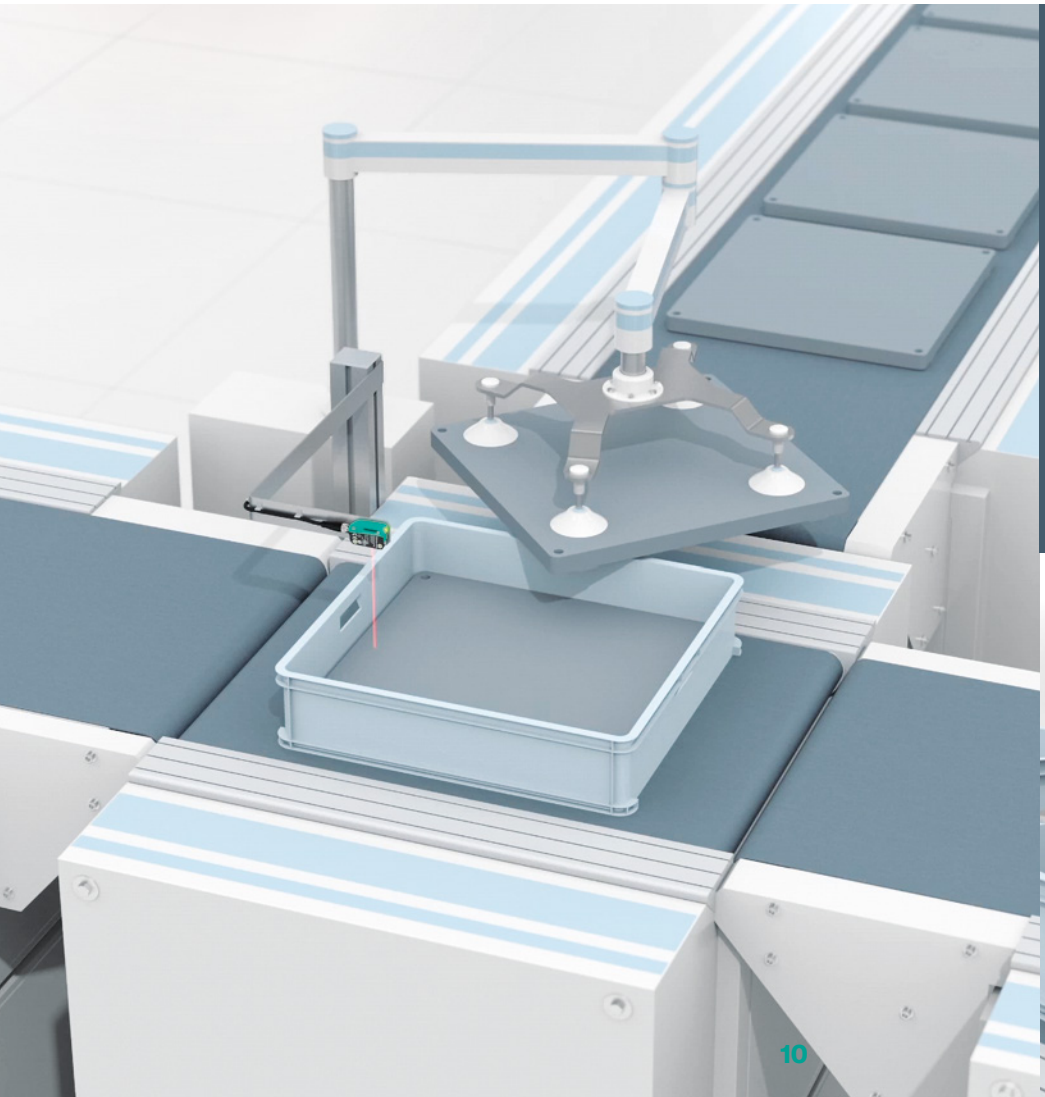
Solutions for Tight Spaces

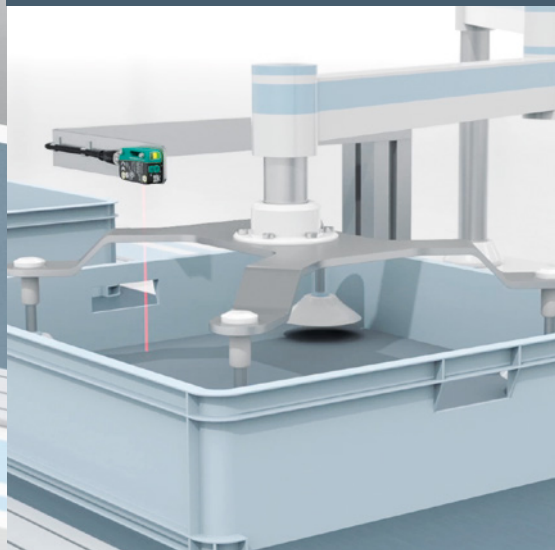
The industrial-grade, easy-to-install housing designs with DuraBeam and multipixel technology (MPT) make the R10x series perfect for a variety of applications that require versatility, reliable detection, and precise measurements.

Precise Detection and Measurement of Small Objects

The quality of automated processes in many applications depends on reliable detection and measurement of small objects or object features. Missing parts can interrupt assembly or packaging processes, and position errors prevent further automated processing steps.

Small R10x series distance sensors solve these kinds of challenges with maximum reliability. Their DuraBeam laser technology creates a sharp, circular light spot that reliably detects even the smallest objects. MPT enables distance measurement accurate down to the micrometer, detecting even miniature product features and the slightest position deviations.



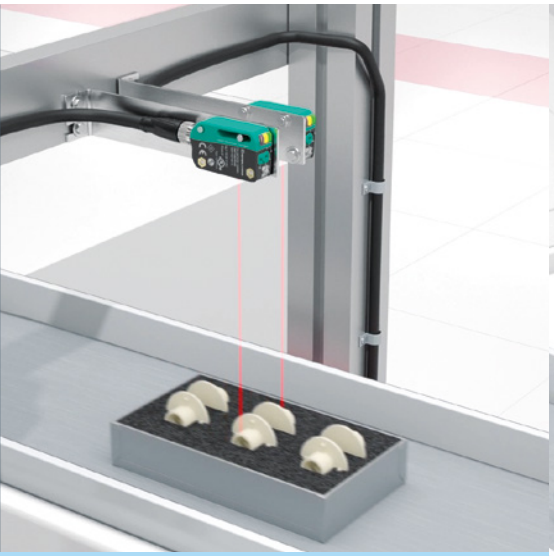


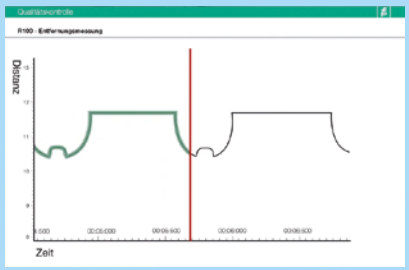
Two Switch Points—One Sensor for Material Handling

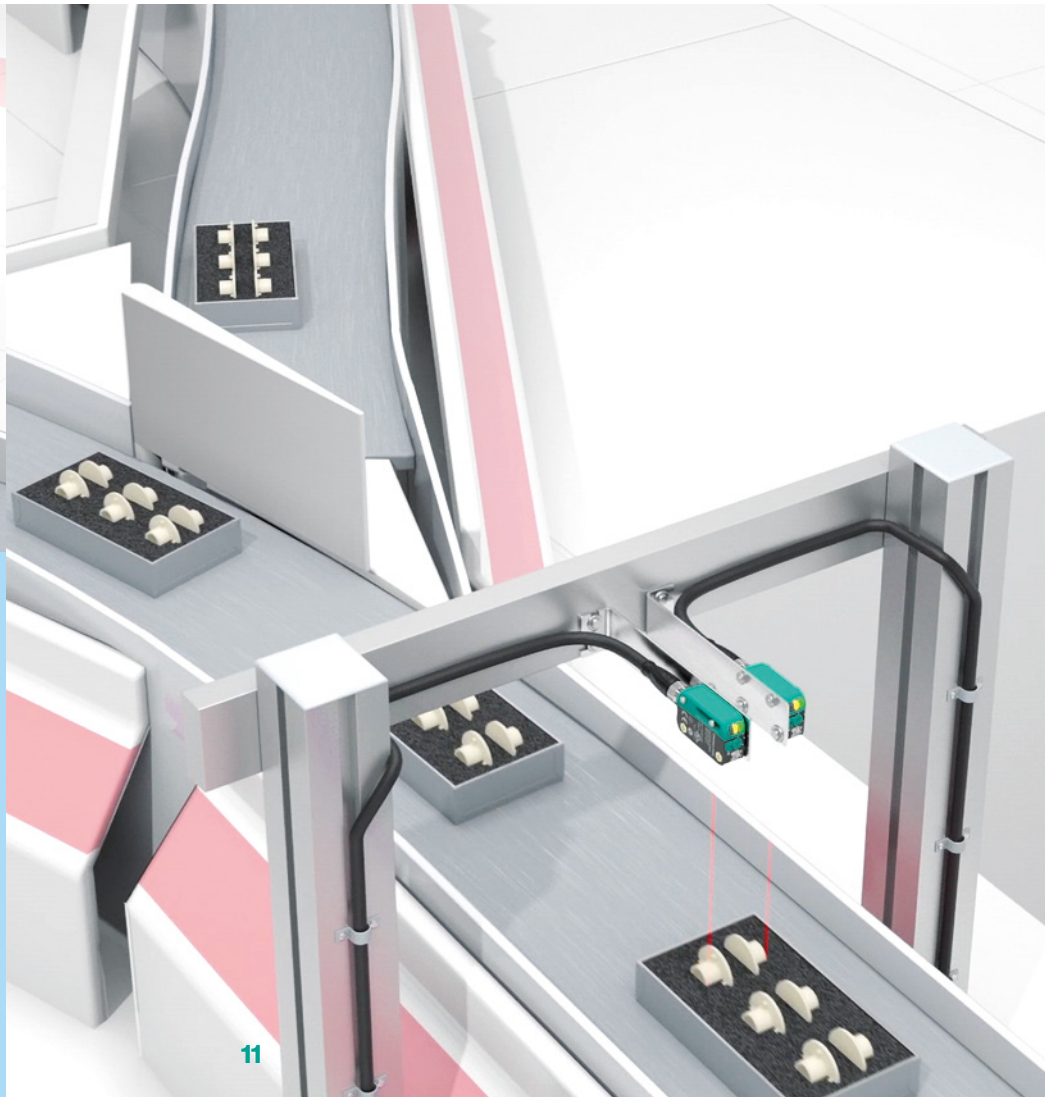
Detecting the stack height in a container and simultaneously triggering the next container—R10x switching sensors with measurement core and MPT make it possible to automate two process steps with one device. This increases efficiency in a number of processes while cutting hardware, cabling, and setup costs in half.

These sensors' compact measurement core makes the double detection possible. It allows two separate distance inputs to be evaluated and then output as independent switching points. IO-Link and a wide range of operating modes add flexibility—advantages that mid-sized R20x series sensors also offer.

For more information, visit
pepperl-fuchs.com/pf-rx







R20x Series at a Glance

All Functional Principles in a Medium Housing Design

IO-Link

Medium-sized

Swivel connector

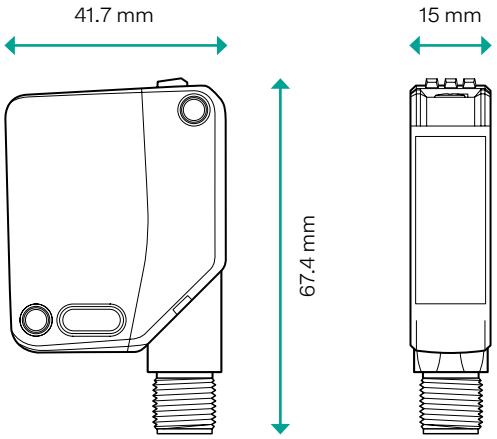
R200 and R201 Series

All functional principles, uniform operation concept, high-performance sensor technology, and IO-Link in every version—identical to the R10x sensors, the medium-sized sensors R200 and R201 also offer this. The extended detection and sensing ranges and the swivel connector also allow even more flexibility and extended application possibilities.

The OMD and OMR versions of the R200 extend the performance range of the mid-range models with high-precision Pulse Range Technology. It enables reliable distance measurement up to 10 m, and even up to 60 m in the version with a reflector. Due to its particularly compact design, the R200 can be easily integrated into confined machine constructions, so that even demanding measuring tasks can be solved in the smallest of spaces.

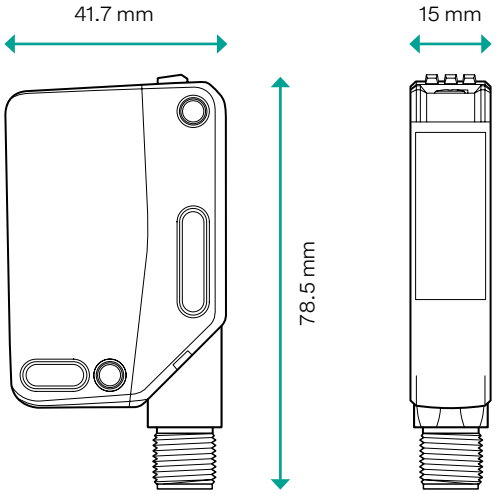
R200/R201 Series Sensing Modes	Type Code	LED, IO-Link Detection/Sensing Range	DuraBeam Laser, IO-Link Detection/Sensing Range
Thru-beam sensor	OBE*-R20*	25 m	40 m
Retroreflective sensor with polarization filter	OBR*-R20*	15 m	25 m
Retroreflective sensor for clear object detection	OBG*-R20*	8 m	
Diffuse mode sensor	OBD*-R20*	1400 mm	
Diffuse mode sensor with background suppression	OBT*-R20*	650 mm	600 mm
Diffuse mode sensor with background evaluation	OBT*-R20*-1T	650 mm	600 mm
Measuring sensor with multiple switch points	OQT*-R20*	400 mm	60 ... 350 mm
Distance sensor	OMT*-R20*	550 mm	100 ... 300 mm 100 ... 600 mm
	OMD10M-R200-*		30 ... 10000 mm
	OMR60M-R200*		200 ... 60000 mm

R200 Series



Technical product information:
pepperl-fuchs.com/pf-r200

R201 Series



Technical product information:
pepperl-fuchs.com/pf-r201

R20x Series Applications

Medium-Sized Sensors—Maximum Performance

The R200 and R201 series are the latest additions to the forward-thinking family of photoelectric sensors from Pepperl+Fuchs. Identical to the R10x series in terms of technologies and sensing modes, these medium-sized sensors are designed for longer-range applications.

Versatility for Automotive Assembly (1)

In automotive plants, robots assemble side panels on bodies that are transported into a production cell on skids. Only one skid can be in the robot cell at a time and incoming skids must be stopped in front of it. Side panels are supplied on racks and removed by handling robots.

Reliable Skid Control (2)

The skids being guided to the robot cell are controlled by R20x series retroreflective sensors. The sensor is equipped with a polarization filter that ensures reliable detection despite all the reflective surfaces and extraneous light. As soon as a skid passes the first sensor, its speed is reduced. When it reaches the second sensor, the skid is stopped.

Position Verification (3)

To enable the handling robot in the production cell to grip the side panels correctly and remove them from the rack, R20x series distance sensors first measure the distance to the side panel—with extreme precision due to high-resolution multipixel technology (MPT).

Detection of Microparts (4)

After position verification, R20x diffuse mode sensors with background suppression verify the presence and proper attachment of screws to the B and C columns. The small, sharp light spot made possible by DuraBeam ensures reliable verification of even the smallest components on the side panels.

For more information, visit
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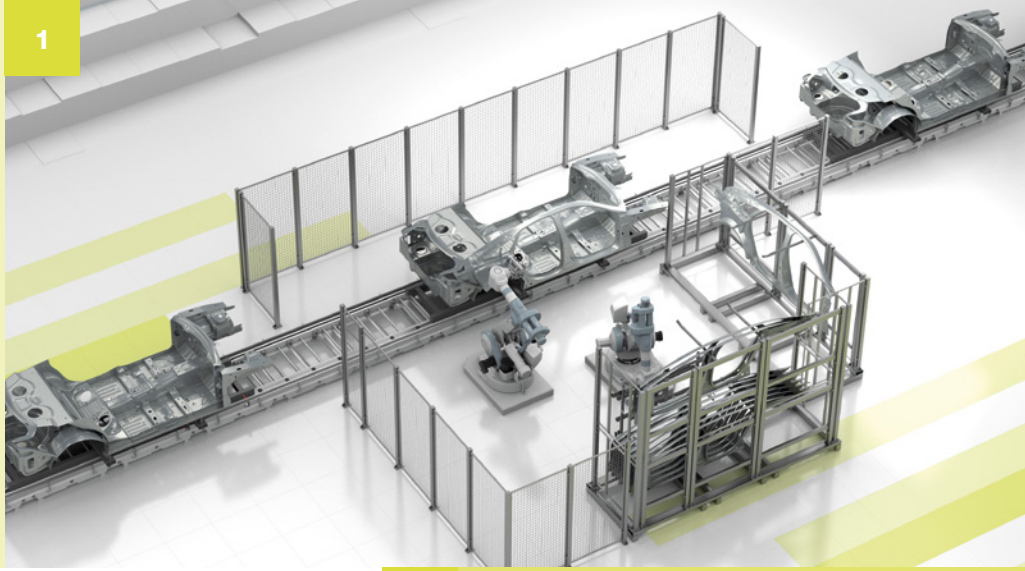

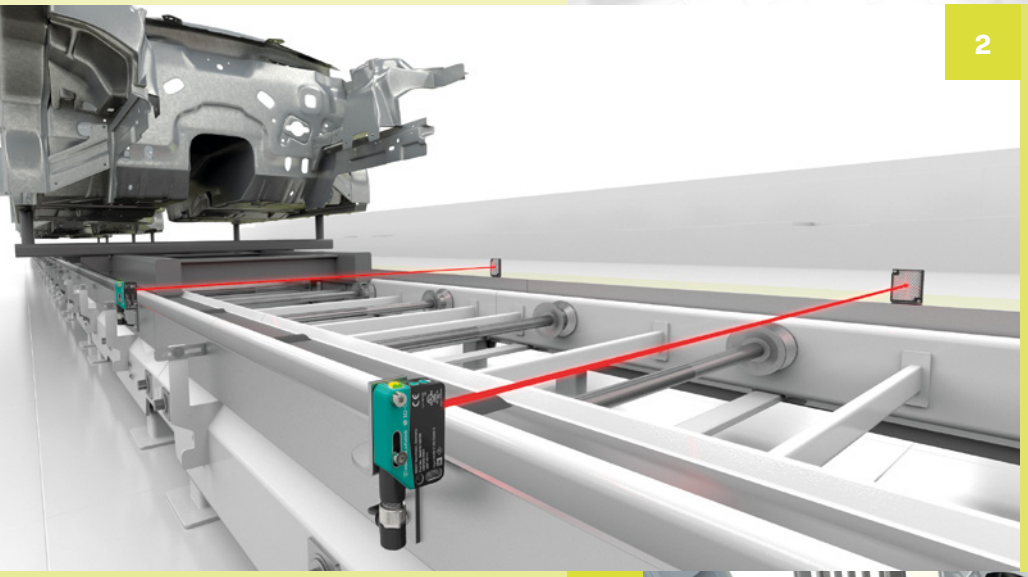

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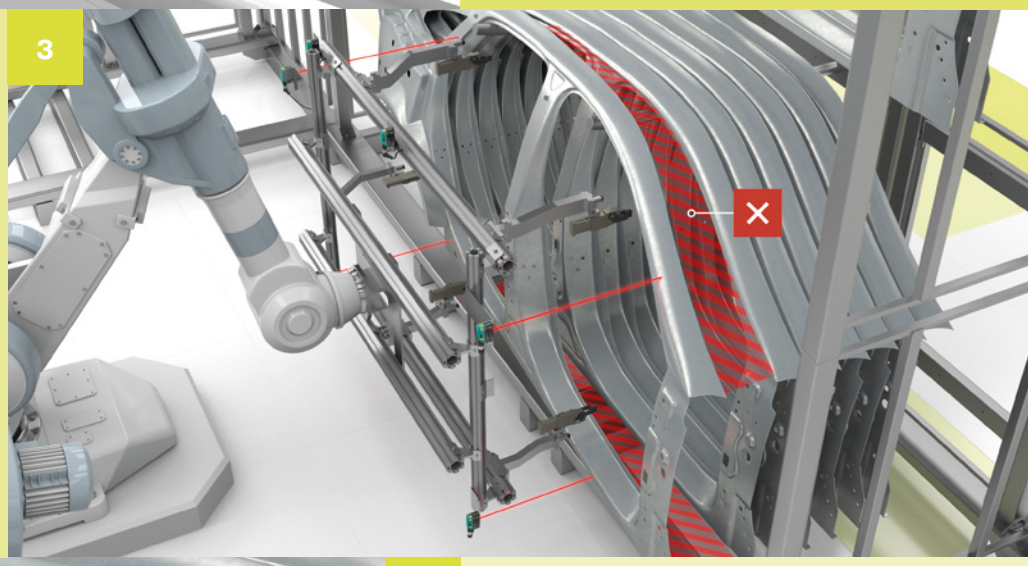

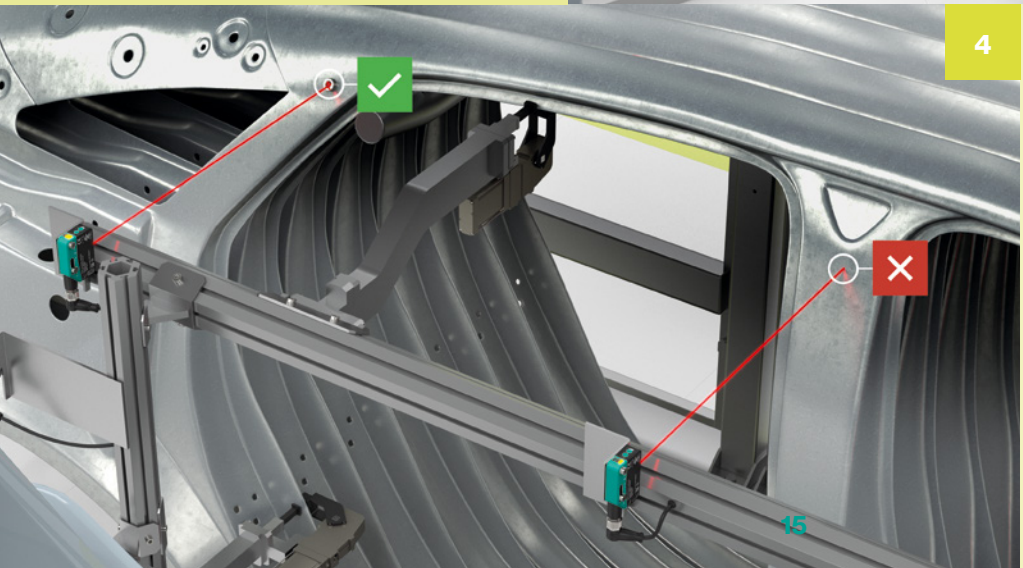

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Reliable Detection at Every Stage of Bottling

Tens of thousands of bottles are filled per hour in high-capacity bottling plants. Since any incorrect or missing switching signal can seriously disrupt the filling and packaging process, reliable detection is a must.

Detecting Transparent Objects (1)

Reflections and other effects caused by shiny, curved surfaces are significant challenges for photoelectric sensors used to detect PET and clear glass bottles. R20x series retroreflective sensors detect and count clear glass bottles with extreme reliability to prevent false trips or incorrect counting in filling lines, and gaps in the bottle flow are detected reliably.

A Pepperl+Fuchs sensor system for detecting transparent objects is used when packs of finished bottles are wrapped. It consists of a retroreflective sensor and a reflector with circular polarization filter and uses depolarization to increase detection reliability. This sensor system provides reliable presence control of the transparent stretch film.

Monitoring Bottle Cap Feed (2)

To seal bottles after filling, R20x series distance-based diffuse mode sensors monitor the automated bottle cap feeding process. Multipixel technology (MPT) makes it possible to monitor several points simultaneously with one sensor: correct cap feed, cap in the incorrect rotary position, and cap with damage. This ensures the accuracy and reliability of the capping process.

Flexibility for All Installation Requirements

While medium-sized R20x series sensors are perfect for bottling plants or automotive assembly, among other applications, R10x series miniature sensors offer the same functionality and solutions for space-restricted installations.

For more information, visit
pepperl-fuchs.com/pf-rx

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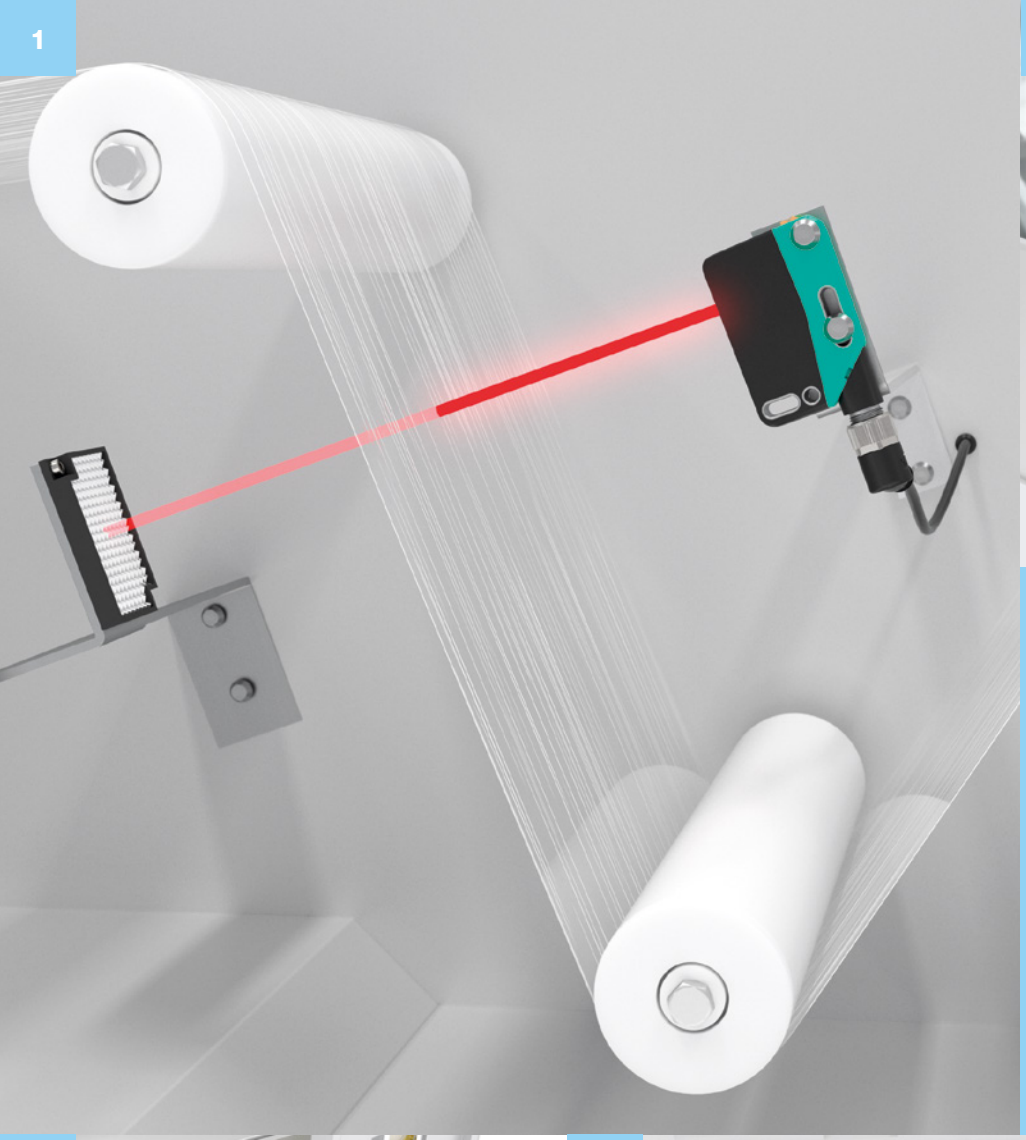

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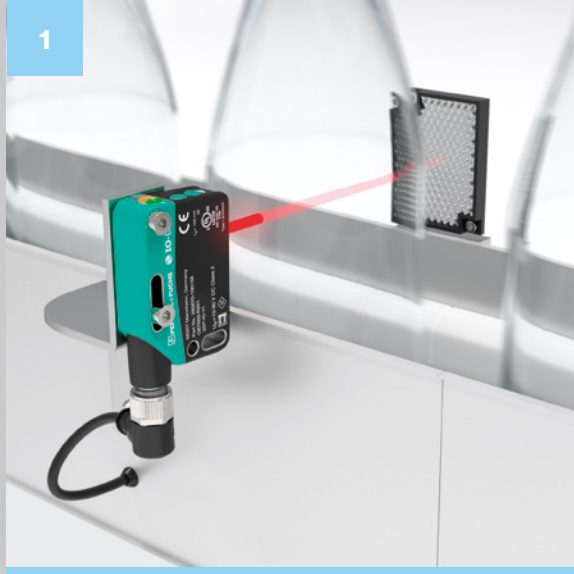

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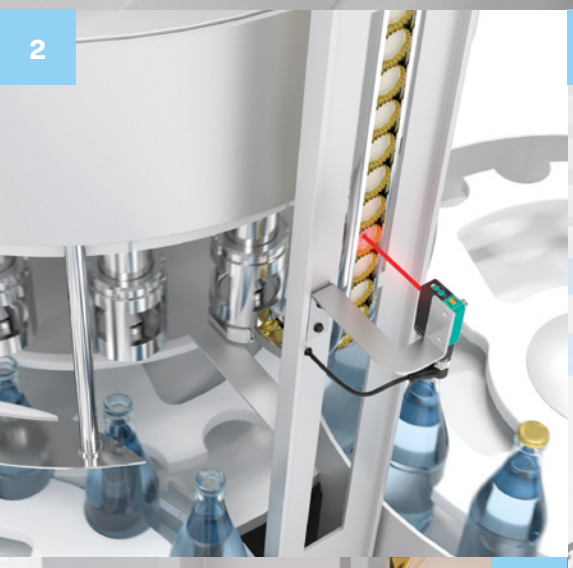

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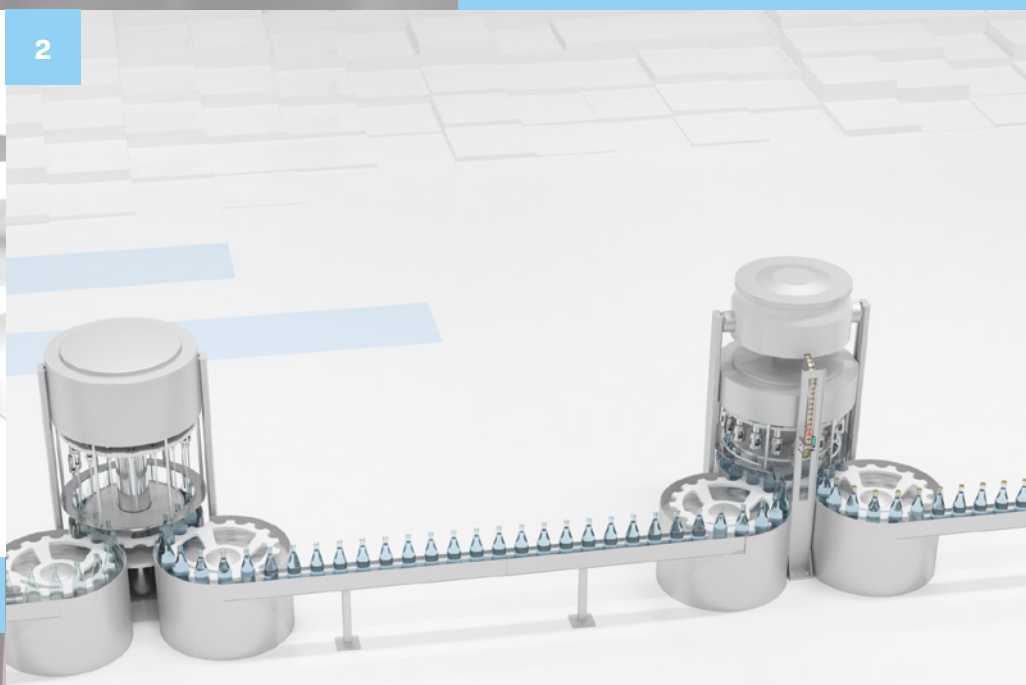

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Efficient Goods Handling

From warehouse and conveyor technology to the automotive industry, there are many different applications that require precise distance measurement over long distances. This task poses a particular challenge when the sensor must not take up much space due to the installation situation.

Reliable Charge Detection (1)

In large warehouses, goods need to be distributed efficiently. Automated shuttles transport goods on pallets with absolute precision. The particularly compact distance sensors of the R200 series with PRT are ideal for integration into so-called warehouse shuttles.

They perform a wide range of measuring and detection tasks. For example, two R200 sensors check the correct position of a pallet during load control. If the front and rear ends are detected at the correct distance, the shuttle can continue its journey and transport the load to its destination. If the load is not positioned correctly, the shuttle has to repeat the process.

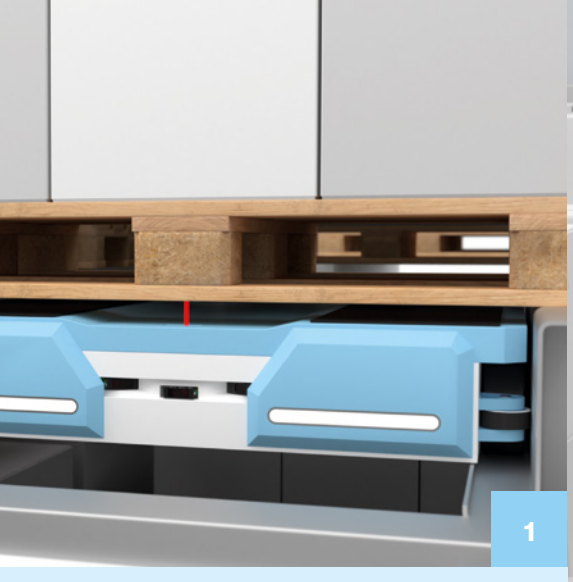
Safe Collision Avoidance (2)

Due to the large dimensions of the warehouses, there are many aisles and intersections that have to be passed. To avoid collisions, the shuttles are equipped with several R200 sensors. They ensure that a shuttle only departs when an aisle or intersection is clear and not occupied by other shuttles. This way, the sensors ensure an efficient and smooth material flow without interruptions.

Precise Measurement of the End Position (3)

The aisles in warehouses often extend over many meters. It is therefore important to determine the exact position of the shuttles. The R200 series sensors are ideal for measuring the distance to the end position or any other position. As a variant with a reflector, a distance measurement of up to 60 m is possible (OMR variant), without a reflector up to 10 m (OMD variant). The measurement is carried out with absolute precision thanks to the Pulse Ranging Technology.

For more information, visit
www.pepperl-fuchs.com/pf-rx



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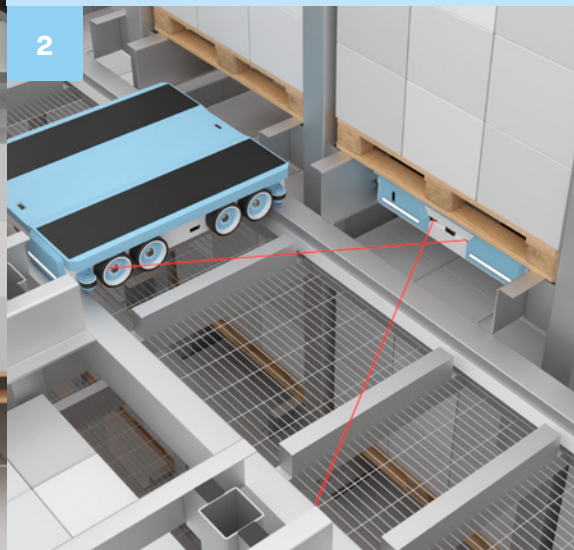

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