FACTORY AUTOMATION – SENSING YOUR NEEDS

Pepperl+Fuchs sets the standard in quality and innovative technology for the world of automation. Our expertise, dedication, and heritage of innovation have driven us to develop the largest and most versatile line of industrial sensor technologies and interface components in the world. With our global presence, reliable service, and flexible production facilities, Pepperl+Fuchs delivers complete solutions for your automation requirements – wherever you need us.

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www.pepperl-fuchs.com
Pepperl+Fuchs provides perfectly matched components to set up a high-performance RFID system that can be quickly adapted to new requirements. The building blocks of any RFID system are the RFID read/write heads, tags and control units.

Our RFID heads are easy to integrate, for instance as a small threaded cylinder or in a flat, compact, or long conveyer housing. Choose from a broad spectrum of sensing ranges, data transfer rates and designs of our RFID systems with 125 kHz, 13.56 MHz and UHF operating frequencies.

**TAGS FOR 125 kHz OPERATING FREQUENCIES**
- Robust housings
- Not sensitive to electro-magnetic influences
- Large variety of tags

**TAGS FOR 13.56 MHz OPERATING FREQUENCIES**
- Fast data transfer
- Small and thin design
- Self-adhesive labels

**TAGS FOR ULTRA HIGH FREQUENCY (UHF)**
- Sensing ranges up to 8 m
- High data transfer rates

For on-site data acquisition we also offer battery-powered read/write solutions, e.g. industrial handhelds.

**IDENTification Control**
- Act as the gateway to the control, communication, and power supply of the read/write heads
- Filter read data
- Feature interfaces for all common industrial bus systems, such as PROFIBUS, PROFINET, Ethernet, EtherNet/IP, Modbus/TCP etc.

**RFID TECHNOLOGY SELECTION GUIDE**

### RFID Heads

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RT120</td>
<td>125 kHz</td>
</tr>
<tr>
<td>RT350</td>
<td>13.56 MHz</td>
</tr>
<tr>
<td>RTU100</td>
<td>13.56 MHz</td>
</tr>
<tr>
<td>RTU200</td>
<td>13.56 MHz</td>
</tr>
<tr>
<td>RTU300</td>
<td>13.56 MHz</td>
</tr>
<tr>
<td>RTU400</td>
<td>13.56 MHz</td>
</tr>
</tbody>
</table>

### Tags

<table>
<thead>
<tr>
<th>Operating Frequency</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>125 kHz</td>
<td>Robust, not sensitive to EMF, high variety</td>
</tr>
<tr>
<td>13.56 MHz</td>
<td>Fast data transfer, small, thin, self-adhesive</td>
</tr>
<tr>
<td>UHF</td>
<td>Sensing up to 8 m, high data rates</td>
</tr>
</tbody>
</table>

### Accessories

- **Compact Interfaces**
  - Used as the gateway to control, communication, and power supply of read/write heads
  - Filter read data
  - Feature interfaces for all common industrial bus systems

### Contact Information

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BLISTER PACKAGING MACHINE 4

TUBE FILLING MACHINE 6

BOTTLE FILLING MACHINE 8

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SENSORS FOR THE PACKAGING INDUSTRY 21
**FILLING LEVEL MEASUREMENT**

**UMC3000 ULTRASONIC SENSOR**
- Sensor with hygienic design according to the EHEDG* guidelines
- Extensive range of hygiene-compliant installation materials available
- Survives high pressure, high temperatures and washdowns typical in food and beverage processing environments, IP68/IP69K protection
- Smooth, gap-free housing surface, surface roughness $R_a < 0.8 \, \mu m$
- Detection range 200 mm ... 3000 mm

* European Hygienic Engineering & Design Group

**PRODUCT PRESENCE MONITORING**

**SU18 FIBER OPTIC SENSOR**
- Precise object detection in extremely confined mounting conditions
- Switching frequency up to 3 kHz
- Protection against mutual interference
- Easy handling and self-diagnostics
ADHESIVE STRIP DETECTION

UGB-18GM ULTRASONIC SENSOR
- Detects adhesive strips and torn films
- Detection regardless of color, transparency or surface finishes of film
- Suitable for high speeds

CONTENT MONITORING

ML6 MINIATURE BACKGROUND SUPPRESSION SENSOR
- Sharp background suppression enables precise detection of product in the blister
- Object detection regardless of color
- Clearly visible LED function displays
- Secure mounting with metal-reinforced bushings

WEB EDGE MONITORING

ML6 MINIATURE BACKGROUND SUPPRESSION SENSOR
- Dual sensor with two independent outputs for edge guiding
- Precise background suppression
- Insensitive to ambient light and protected against mutual interference
- Miniature enclosure with metal-reinforced mounting holes
**FILL LEVEL MONITORING**

**UB120 ULTRASONIC SENSOR**
- Fill level detection regardless of color, transparency or consistency of content
- Narrow projection cone especially suitable for fill level monitoring in small, narrow containers
- Insensitive to wetting due to self-cleaning sensor surface

**PRODUCT PRESENCE MONITORING**

**M7/MV7 THRU-BEAM SENSOR**
- Highly reliable sensing, even at high speeds
- Insensitive to ambient light and highly reflective objects
- Compact design facilitates mounting in restricted spaces
- Certified in accordance with ECOLAB
REGISTRATION MARK DETECTION

DK12-IO CONTRAST SENSOR
- Reliable detection of print marks, even with low contrasts and reflective surfaces
- Precise switching, even at high speeds
- Modern IO-Link interface for configuration from a central controller
- Additional designs and stainless steel version available

POSITION DETECTION

RVI58 INCREMENTAL ROTARY ENCODER
- Detection of rotation and output of rectangular or sine/cosine signals
- Also available in safety version up to SIL3/PLe
- High reliability and long service life
- Various mechanical and electric designs and a wide range of pulse counts per revolution
**Non-Contact Positioning**

**PMI-F110 Inductive Positioning System**
- Inductive measuring for accurate position measurement
- High measurement accuracy
- Wear-free non-contact measurement
- Robust housing

**Bottle Presence Monitoring**

**UME1000-18H Ultrasonic Sensor**
- Sensor with hygienic design according to the EHEDG* guidelines, ECOLAB-certified
- Survives high pressure, high temperatures and washdowns typical in food and beverage processing environments, IP69K protection degree
- The specially shaped housing surface with no dirt-collecting edges facilitates residue-free cleaning
- Smooth, gap-free, corrosion-resistant stainless steel housing, surface roughness $R_{\alpha} < 0.8 \, \mu m$

**Transparent Bottle Counting**

**MLE76-54-G Retroreflective Sensor**
- Sensor with hygienic design according to the EHEDG* guidelines, ECOLAB-certified
- Survives high pressure, high temperatures and washdowns typical in food and beverage processing environments, IP69K protection degree
- The specially shaped housing surface with no dirt-collecting edges facilitates residue-free cleaning
- Smooth, gap-free, corrosion-resistant stainless steel housing, surface roughness $R_{\alpha} < 0.8 \, \mu m$

* European Hygienic Engineering & Design Group
CONNECTION TECHNOLOGY G11 AS-INTERFACE

■ Round, compact design enables free alignment of the flat cable to any position
■ Various IO models available using flat cable or M12 network connections
■ Connection of 2-, 3-, and 4-wire sensors
■ IP68/IP69K protection degree

SEALING CAP PRESENCE MONITORING

DK10-LAS LASER CONTRAST SENSOR
■ Large depth of field from 3 mm ... 800 mm
■ Adjustable sensitivity
■ Very high switching speed
■ Eye-safe laser class 2

SEALING CAP COLOR MONITORING

DFE20 STAINLESS STEEL COLOR SENSOR
■ Teach-in process for automatic threshold adjustment
■ High color detection performance with different LED colors (red, green, blue)
■ Very high switching speed
■ Lens can be moved 90°

MACHINE CONTROL

NMB*GH50 INDUCTIVE PROXIMITY SENSOR
■ Stainless steel housing with hygienic design
■ Mechanically robust and washdown-capable design, IP68/IP69K
■ Smooth, gap-free housing surface, surface roughness $R_t < 0.8 \mu m$
LABEL PRESENCE MONITORING ON CARRIER STRIP

UGB ULTRASONIC SENSOR

- High detection reliability, even with transparent labels and carrier strips
- Insensitive to colors, marking or reflective surfaces
- Suitable for high speeds
- Insensitive to dust and liquids due to self-cleaning sensor surface

LABEL STRIP TENSION MONITORING

PMI-F130 INDUCTIVE POSITIONING SYSTEM

- Inductive angular positioning system for determining position with 360° measuring range
- Analog output signal and two programmable digital outputs, e.g. for displaying end positions
- Wear-free non-contact measurement
- IP67 protection degree
**LABEL MONITORING VIA RFID**

**RFID READ/WRITE HEAD IQH1-FP**
- High frequency read/write head
- Fast detection of smart labels
- Operating frequency 13.56 MHz
- Connects to IDENTControl or IDENTControl Compact

**CONNECTION TECHNOLOGY IDENTControl COMPACT**
- LED status display for connected read/write heads and bus communication
- Robust metal enclosure, IP67 protection degree
- Optimum EMC characteristics
- Conversion of data signals on all common interfaces and industrial bus systems such as Ethernet, PROFIBUS, CANopen or DeviceNet, etc.

---

**LABEL MONITORING VIA CODE READING**

**MAC400 MULTI-CODE READER FOR 1D, 2D AND PHARMACODES**
- Evaluation of all common 1D barcodes and 2D codes
- Accurate detection, even at high speeds
- Web interface or graphic user interface
- Ethernet and RS-232 interface as well as optional VGA monitor output
- Robust metal enclosure

---

**LABEL FEED-RATE MONITORING**

**DK12-IO CONTRAST SENSOR**
- Reliable detection of colored print marks, even with low contrast and reflective surfaces
- Accurate switching, even at high speeds
- Modern IO-Link interface for configuration from a central controller
- Additional designs and stainless steel version available

---

**MONITORING LABEL ROLL**

**ML6 MINIATURE RETROREFLECTIVE SENSOR**
- Retroreflective sensor for checking roll thickness
- Compact sensor with up to 4 m effective operating distance
- Insensitive to ambient light
- IP67 protection degree

---

**IO-Link**
CARTONING MACHINE

FLAP DETECTION

GLY18 BACKGROUND SUPPRESSION SENSOR
- Mechanically adjustable detection range
- Reliable detection, regardless of color, surface and background
- Robust plastic enclosure with IP67 protection degree
- Short cylindrical enclosure with diameter of 18 mm, flush enclosure mounting possible

STACK HEIGHT DETECTION

VDM28 DISTANCE SENSOR
- Accurate detection of blister stack height via distance measurement with Pulse Ranging Technology (PRT)
- Highly repeatable, regardless of color and finish of surface
- Optional programmable switching outputs or analog output
- Compact plastic enclosure with IP65 protection degree
- Configurable via IO-Link

IO-Link
PRODUCT PRESENCE MONITORING

RL31 RETROREFLECTIVE SENSOR
- Polarization filter prevents erroneous detection of shiny objects
- Detection range from 0 m ... 9 m
- Compact and robust plastic enclosure with IP67 protection degree
- High-visibility LED display

PARTS EJECTION

RLG28 RETROREFLECTIVE AREA SENSOR
- Retroreflective area sensor with 6 beams for reliable detection of objects
- Detection range up to 4 m with 60 mm field height
- Standard photoelectric sensor housing with IP67 protection degree

WIRELESS ENERGY AND SIGNAL TRANSMISSION

WIS WIRELESS INDUCTIVE SYSTEM
- Wireless transmission system for power and sensor signals
- Replace reject container with the sensor, without detaching cables
- Wear- and maintenance-free operation
- Up to 8 sensors can be supplied per transmission unit

PRODUCT IDENTIFICATION VIA CODE READING

MAC400 MULTI-CODE READER FOR 1D, 2D AND PHARMACODES
- Evaluation of all common 1D barcodes and 2D codes
- Accurate detection, even at high speeds
- Web interface or graphic user interface
- Ethernet and RS-232 interface as well as optional VGA monitor output
- Robust metal enclosure
IDENTIFICATION OF PACKAGED GOODS VIA CODE READING

VB14 BARCODE SCANNER
- Barcode reading at up to 800 scans per second
- Integrated text mode, code optimization and code reconstruction
- Raster version available for extended scan range
- Networking of up to 32 scanners
- Robust aluminum enclosure with IP65 protection degree

PALLET HEIGHT MEASUREMENT

VDM28 DISTANCE SENSOR
- Accurate detection of pallet height via Pulse Ranging Technology (PRT) distance measurement
- High repeatability regardless of color and finish of surface
- Optional programmable switching outputs or analog output
- Compact plastic enclosure with IP65 protection degree
- Configurable via IO-Link

PALLET DETECTION

RLG28 RETROREFLECTIVE AREA SENSOR
- Retroreflective area sensor with 6 beams for reliable detection of objects
- Detection range up to 4 m with 60 mm field height
- Standard photoelectric sensor housing with IP67 protection degree
PERSONNEL SAFETY, ACCESS PROTECTION

SLPCM SAFETY LIGHT GRID
- Safety light grid for protection of fingers, hands and body
- Self-monitoring for type 2 and type 4 categories according to IEC 61496-1
- Display for simple error diagnosis
- Suitable for muting applications
- OSSD safety outputs, semiconductor or relay

PALLET IDENTIFICATION VIA RFID

F97 RFID READ/WRITE HEAD
- Low frequency read/write head
- Reliable read performance across entire length and width
- Guide elements for container positioning are eliminated
- Mounting between or along the side of conveyor rollers
- Connection to IDENTControl or IDENTControl Compact

CONNECTION TECHNOLOGY IDENTControl
- Connect 4 read/write heads or 2 read/write heads and 2 trigger sensors
- Pushbutton and LED status display for local diagnostics, web interface reduces commissioning time
- Conversion of data signals on all common interfaces and fieldbuses such as Ethernet, PROFIBUS, CANopen or DeviceNet, etc.
When designing packaging machines, increasingly stringent requirements must be implemented in order to ensure hygienic processing and packaging. In the food and beverage as well as pharmaceutical industries, machines and components must often withstand aggressive cleaning agents and steam jets.

Complete your machine with our unique, comprehensive range of ultrasonic, photoelectric and inductive sensor solutions, designed in accordance with the EHEDG (European Hygienic Engineering & Design Group) guidelines.

- Smooth stainless steel housing with no dirt-collecting edges minimizes the risk of contamination
- Robust design survives high pressure, high temperatures and washdowns typical in food and beverage processing environments
- Perfectly matched sensor and mounting solution

Pepperl+Fuchs develops the right solution for you in close collaboration with machine and plant engineers, manufacturers of cleaning agents and specialists in both the European Hygienic Engineering & Design Group and the US Food and Drug Administration (FDA).

- ECOLAB-certified resistance of sensors and accessories against aggressive cleaning agents and disinfectants

Sensors are especially adapted for:

- **Product-contact zone**
  sensors and mounting solutions with hygienic design
- **Splash zone**
  guaranteed impermeability for cleaning cycles
- **Product-free zone**
  choose from our standard product portfolio
SAFETY TECHNOLOGY

Safety means protection against danger. Protecting people and preventing accidents is increasingly important in automated processes.

Pepperl+Fuchs offers a comprehensive range of non-contact protective devices and cost-effective safety-related system solutions to prevent machine-related risks.

From single beam safety photoelectric sensors to light curtain arrays for machine protection – our products support effective solutions for functional safety. The modular SafeBox and AS-Interface Safety at Work control unit complete the range.

DATA MATRIX

The two-dimensional Data Matrix code is an intelligent enhancement of the one-dimensional barcode. Data Matrix technology used for identification is based on modern image processing and is distinguished by:

- Extremely high data reliability
- Storage of high data volumes with minimal space requirements
- High read speed

From stationary code readers for high-speed reading to handheld readers for industry, Pepperl+Fuchs offers you a complete product portfolio of 1D and 2D code identification. All Data Matrix readers support automatic error correction without loss of data.
COMMUNICATION AND DATA TRANSMISSION

**IO-LINK**

**IO-Link**

IO-Link technology represents a new dimension of communication from and with sensors. It enables continuous communication to the sensor level for the first time.

IO-Link offers many advantages during commissioning:
- Sensor parameters can be conveniently transmitted to other similar sensors with one central tool
- No teach-in or adjustment of an individual device is required
- Significant reduction of interface diversity through analog sensor inputs and complex installation

From the outset, Pepperl+Fuchs has played a leading role in the specification of IO-Link in several working groups of the IO-Link consortium.

**AS-INTERFACE**

The Actuator Sensor Interface (AS-Interface) with special yellow flat cable supplies power to the sensors and actuators and enables data transfer to a maximum of 62 nodes per AS-Interface network.

The installation time and costs are much lower compared to conventional wiring technology. AS-Interface transfers data reliably, is extremely resistant to electromagnetic interference, has a diagnostic function and can detect faults such as short circuits.

Pepperl+Fuchs offers you a wide range of products for your AS-interface network:
- Masters and gateways for connecting to higher-level fieldbuses
- Large variety of slaves and power supplies
- Sensors with integrated AS-Interface chip
- Components for AS-Interface Safety at Work
- Versatile connection and mounting sets
Pepperl+Fuchs is a leading developer and manufacturer of electronic sensors and components for the global automation market. We continuously set new standards in quality and innovative technology. When it comes to speed, reliability and accuracy, Pepperl+Fuchs is your trusted partner.

Whether it is the pharmaceutical, cosmetic, food or consumer goods industry – packaging requirements are as varied as the products we deal with every day. Our wide range of solutions offer benefits for every stage of your automated packaging process – from fast feeding and accurate filling and dispensing to reliable packaging and cartoning.

Pepperl+Fuchs sensors ensure the highest accuracy when identifying objects and solving the most demanding quality assurance tasks. We offer packaging solutions with intelligent wiring for space-constrained applications. We also provide solutions for occupational and personal safety and a range of photoelectric safety sensors with compatible control units.

Our experts will help you select the appropriate sensing technologies for your specific application. You can choose from a broad product range from a single source. Additionally, we offer you a comprehensive selection of industrial and mechanical accessories.

With locations on six continents, our global presence enables Pepperl+Fuchs to offer the best of both worlds: extremely high engineering and service standards combined with flexible manufacturing capabilities. We have the expertise you need to make your systems efficient, rugged, and reliable.

Our specialists will be glad to help you.

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Our RFID heads are easy to integrate, for instance as a small threaded cylinder or as flat, compact, or long conveyor housing. Choose from a broad spectrum of sensing ranges, data transfer rates and designs of our RFID systems with 125 kHz, 13.56 MHz and UHF operating frequencies.

TAGS FOR 125 kHz OPERATING FREQUENCIES
- Robust housings
- Not sensitive to electro-magnetic influences
- Large variety of tags

TAGS FOR 13.56 MHz OPERATING FREQUENCIES
- Fast data transfer
- Small and thin design
- Self-adhesive labels

TAGS FOR ULTRA HIGH FREQUENCY (UHF)
- Sensing ranges up to 8 m
- High data transfer rates

For on-site data acquisition we also offer battery-powered read/write solutions, e.g. industrial handhelds.

IDENT Control and IDENT Control Compact interfaces
Act as the gateway to the control, communication, and power supply of the read/write heads.
Filter read data
Restore interfaces for all common industrial bus systems, such as PROFINET, PROFINET EtherCAT, EtherCAT® 309, Modbus TCP, etc.
**ROTARY ENCODERS**

**SERIES RVI58, RVS58S, CVM58**
- Positioning tasks and detection of rotational movements
- Incremental and absolute rotary encoders
- Single-turn and multi-turn versions
- Certified functional safety for plants up to SIL3 and PLe

**ULTRASONIC SENSORS**

**SERIES UB, UMC, UME, UGB**
- Non-contact distance measurement
- Robust design
- Immune to dirt
- Analog or switching outputs
- “Hygienic design” sensors for the food and beverage industry designed according to the EHEDG* guidelines

**AUTOMATION LIGHT GRID**

**LGS SERIES**
- Presence checks and position measurement
- Contour and height detection, even with reflective objects
- Sensing ranges up to 8 m
- Software-free configuration via touch field or external input

**SENSORS FOR THE PACKAGING INDUSTRY**

**STANDARD PHOTOELECTRIC SENSORS**

**SERIES ML100, RL28, RL29, RL31**
- Precise and non-contact detection, acquisition and monitoring
- Reflective and thru-beam sensors
- Background suppression sensors
- “Hygienic design” sensors for the food and beverage industry designed according to the EHEDG* guidelines
- Wide range of designs and models
- Wide range of designs and models
- ”Hygienic design” sensors for the food and beverage industry designed according to the EHEDG* guidelines

**CONTRAST SENSORS AND COLOR SENSORS**

**SERIES DK, DKE, DF, DFE**
- Reliable registration and color mark detection
- Adhesive strip detection
- Reflective sensor
- Servo-controlled
- Very fast switching speeds
- Large variety of models, including versions with interchangeable lenses and rotates steel versions
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- Large variety of models, including versions with interchangeable lenses and rotates steel versions

**PHOTOELECTRIC SAFETY SENSORS**

**SLCS, SLCT AND SAFEBOX SERIES**
- Single-beam safety thru-beam sensors
- Plastic mirror or diffuse sensor
- Integrated safety light curtain
- Protective functions up to category 4
- Certified according to the IEC 61496-1 guidelines
- Wide range of designs and models

**RFID IDENTIFICATION**

**IQH, F97, IQC, IQT-HH, IDENT**
- Read/write heads
- Large variety of tags
- Handheld readers
- Control interfaces
- IDENT Control
- IDENT Control Compact
- Support for all RFID frequencies
- Interfaces for all common industrial bus systems

**INDUCTION SENSORS**

**SERIES N1, N3, N5, N6, N7, VARISONT**
- Robust design
- Magnetic “Hygienic design” sensors for the food and beverage industry designed according to the EHEDG* guidelines
- Wide range of designs and models

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**SENSORS FOR THE PACKAGING INDUSTRY**

**ROTARY ENCODERS**
- **Series RVI58, RVS58S, CVM58**
- Positioning tasks and detection of rotational movements
- Incremental and absolute rotary encoders
- Single-turn and multi-turn versions
- Certified functional safety for plants up to SIL3 and PLe

**ULTRASONIC SENSORS**
- **Series UB, UMC, UME, UGB**
- Non-contact distance measurement
- Robust design
- Immune to dirt
- Analog or switching outputs
- “Hygienic design” sensors for the food and beverage industry designed according to the EHEDG* guidelines

**AUTOMATION LIGHT GRID**
- **LGS Series**
- Presence checks and position measurement
- Contour and height detection, even with reflective objects
- Sensing ranges up to 8 m
- Software-free configuration via touch field or external input

**STANDARD PHOTOELECTRIC SENSORS**
- **Series ML100, RL28, RL29, RL31**
- Precise and non-contact detection, acquisition and monitoring
- Retroreflexion and thru-beam sensors
- Background suppression sensors
- Magnetic design® sensors for the food and beverage industry designed according to the IEC61491 guidelines
- Wide range of designs and models

**CONTRAST SENSORS AND COLOR SENSORS**
- **Series DK, DKE, DF, DFE**
- Reliable registration and color mark detection
- Adhesive strip detection
- Magnetic design® sensors for the food and beverage industry designed according to the IEC61491 guidelines
- Very fast switching speeds
- Large variety of models, including versions with interchangeable lenses and stainless steel versions

**PHOTOELECTRIC SAFETY SENSORS**
- **SLCS, SLCT and SAFEBOX Series**
- Safety light curtains
- Finger protection, hand protection and body protection
- Integrated evaluation or evaluation using SafeBox

**CONTRAST SENSORS AND COLOR SENSORS**
- **Series IQH, F97, IQC, IQT-HH, IDENT Control**
- Read/write heads
- Large variety of tags
- Handheld readers
- Control interfaces
- IDENT Control, IDENT Control Compact
- Support for all RFID frequencies
- Interfaces for all common industrial bus systems

**INDUCTIVE SENSORS**
- **Series M4, M5, M8, M12, VARIKONT**
- Robust design
- Protection degree up to IP68 and IP69K
- “Hygienic design” sensors for the food and beverage industry designed according to the EHEDG* guidelines
- Wide range of designs and models

**SENSORS FOR THE PACKAGING INDUSTRY**

Pepperl+Fuchs sets the standard in quality and innovative technology for the world of automation. Our expertise, dedication, and heritage of innovation have driven us to develop the largest and most versatile line of industrial sensor technologies and interface components in the world. With our global presence, reliable service, and flexible production facilities, Pepperl+Fuchs delivers complete solutions for your automation requirements – wherever you need us.

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