

**Redefining precision.  
Increasing efficiency.  
Optimizing space.**

R2 and R3 Series  
Photoelectric Miniature Sensors



Your automation, our passion.

**pf PEPPERL+FUCHS**

# Flexibility for Efficient Engineering

Four housing designs, three sensing modes, two technologies—our portfolio of miniature photoelectric sensors offers unique flexibility and helps you find the perfect solution for your application. With all sensing modes available in each housing design, it's easy to design an efficient system.

## More Installation Possibilities

Our portfolio of miniature photoelectric sensors has a total of four series: the R2, R3, R2F, and R3F series. The only difference between these series is the housing design—regardless of the housing, the same sensing modes can be selected based on the application: thru-beam, retroreflective, or diffuse mode with background suppression.

You can choose between space-saving models with M2 mounting options or standard versions with M3 mounting, and LED and DuraBeam are options in every one of these sensors.

## Standard Product Design Enhances Efficiency

Regardless of the sensing mode needed for your application, the dimensions, wiring, and mounting are identical throughout the series. This allows you to install different sensors in identical mounting locations using the same accessories—with no further adjustments required.

It is now possible to plan your system without having to take into account different dimensions for different sensing modes, greatly increasing efficiency when it comes to designing and commissioning machines.



# Maximum Precision on the Smallest Scale

Long service life, an operating temperature up to 60 °C, and a sharp, circular light spot: our new DuraBeam technology combines the advantages of LED and laser sensors and makes them available in the smallest housings.

## DuraBeam: The Best of Both Worlds

Laser sensors that are as easy to use as LED sensors—this is now possible with DuraBeam, our powerful new class 1 laser technology that combines the strengths of LEDs and lasers for the first time. DuraBeam offers an exceptionally long service life and opens up new applications, even at high ambient temperatures.

Another feature of this technology is the special beam profile, which always casts a sharp, circular light spot on an object. This is ideal for precise small-object detection and distance measurement.

DuraBeam technology is available across the entire R2 and R3 portfolio—even in the flat R2F and R3F models.



Longer service life



More precise light spot



Higher operating temperature range

## Highlights

- A comprehensive family of miniature photoelectric sensors makes it easy to design the perfect solution for a wide range of applications
- Innovative DuraBeam laser technology for increased durability and a broader operating temperature range
- Diffuse mode sensors with true background suppression reliably detect objects while ignoring the background
- Retroreflective sensors reduce wiring costs and offer a cost-effective alternative to thru-beam sensors
- Abrasion-resistant and antistatic glass front provides durability against occasional contact and prevents dirt and dust accumulation



Select your photoelectric miniature sensor here:

[www.pepperl-fuchs.com/r2r3](http://www.pepperl-fuchs.com/r2r3)



## R2 and R3 Series Tough Miniature Sensors

Durability and flexibility packed into a miniature housing design. The R2 and R3 series feature an abrasion-resistant antistatic glass front and provide reliability, even in dusty environments or in close proximity to moving objects.

### Glass Front Ensures Durability

When sensors are mounted close to the objects being detected, vibration can lead to contact. Traditional miniature sensors have plastic fronts that can easily be damaged, resulting in machine downtime. Plastic is also not suitable for dusty applications, such as in the print and paper industry, where static can attract dust to the lens.

Such conditions are no problem for the R2 and R3 series, which have an abrasion-resistant, antistatic glass front. This allows the sensors to be mounted close to moving parts and perform reliably in dusty environments.

### Flexible Mounting with a 45° Cable Outlet

R2 and R3 series sensors also make mounting easier: an angled cable outlet gives you room to mount the sensors in a variety of orientations, even in extremely tight spaces.



		R2 and R3		
Sensing Modes	Type Code	PowerBeam LED	DuraBeam Laser	
<b>Thru-beam sensor</b>	OBE*-R2*	0 ... 2,000 mm	0 ... 1,000 mm	
	OBE*-R3*		0 ... 10 m	
<b>Retroreflective sensor</b>	OBR*-R2*	40 ... 1,000 mm	40 ... 2,000 mm	
	OBR*-R3*			
<b>Diffuse mode sensor with background suppression</b>	OBT*-R2*	2 ... 15 mm	7 ... 15 mm	
	OBT*-R3*		1 ... 30 mm	7 ... 30 mm
			3 ... 50 mm	7 ... 50 mm
			15 ... 80 mm	20 ... 80 mm



## R2F and R3F Series Power Packed into a Flat Housing Design

Suitable for a wide range of applications, the R2F and R3F series are versatile, high-performance sensors: equipped with DuraBeam lasers, they are the world's flattest laser sensors. Thru-beam, retroreflective, and diffuse mode with true background suppression are all available in these miniature housings.

### The World's Flattest Laser Sensors

The R2F and R3F series are extremely flat models in Pepperl+Fuchs' photoelectric sensor portfolio. Front mounting is also possible with the available M2 or M3 connectors. Despite the ultra-compact design, all three sensing modes are available—thru-beam, retroreflective, or diffuse mode with true background suppression.

Innovative DuraBeam laser technology ensures the highest precision for small part detection and helps make the R2F and R3F series the flattest laser sensors in the world.



		R2F and R3F	
Sensing Modes	Type Code	PowerBeam LED	DuraBeam Laser
<b>Thru-beam sensor</b>	OBE*-R2F*	0 ... 500 mm	0 ... 500 mm
	OBE*-R3F*		0 ... 1,500 mm
<b>Retroreflective sensor</b>	OBR*-R2F*		60 ... 1,500 mm
	OBR*-R3F*		
<b>Diffuse mode sensor with background suppression</b>	OBT*-R2F*	1 ... 15 mm	2 ... 15 mm
	OBT*-R3F*	1 ... 30 mm	3 ... 30 mm

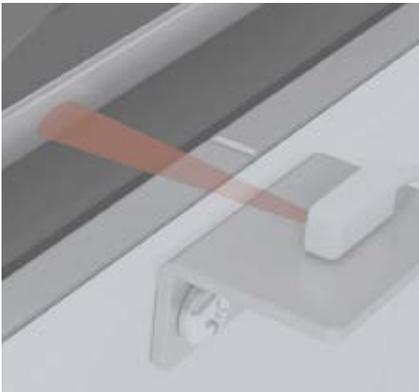
# More Efficient Applications

No two applications are alike: Pepperl+Fuchs' portfolio of miniature sensors offers a range of unique benefits and all the sensing modes required for efficient applications.

## Object Detection Independent of Sensor Orientation

Photoelectric sensors with conventional laser diodes emit an oval light spot that increases with distance from the sensor. Because of this, the orientation of the sensor has to be taken into consideration and adjusted depending on the shape of the object being detected. If the orientation is not right, it can lead to false detections.

With DuraBeam technology, this isn't a problem. Regardless of the sensor orientation, a sharp, circular light spot is emitted, ensuring reliable detection.



Conventional solution with traditional laser

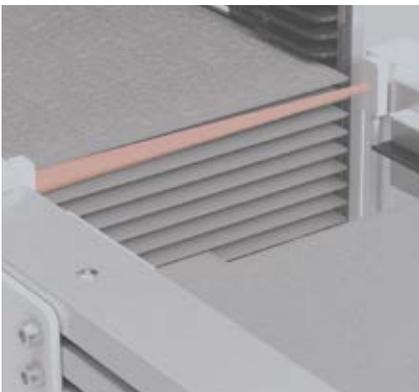


Flexible solution with DuraBeam laser

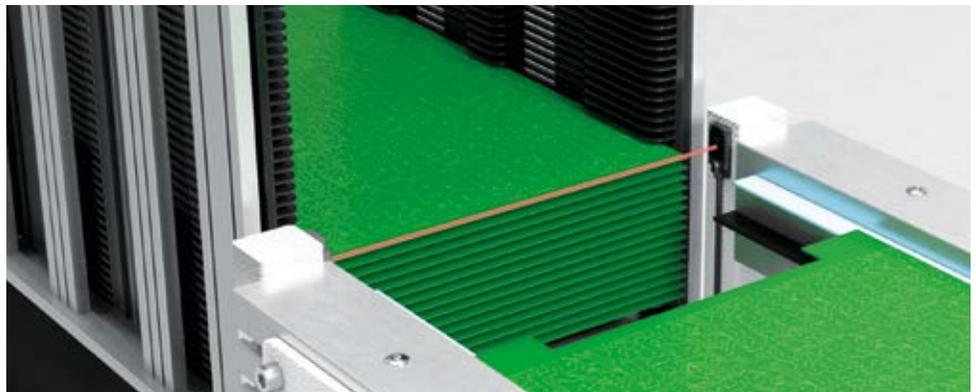
## Higher Throughput with DuraBeam

DuraBeam laser sensors increase throughput and maximize machine efficiency. This pays off in small-parts detection, because it allows objects to be detected more quickly. For example, in order to count PCBs, conventional LED sensors require a significant amount of space between every piece.

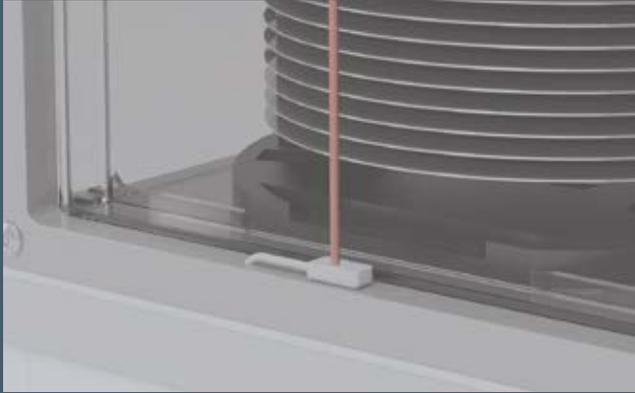
With their small light spot and quick response time, DuraBeam sensors need far less space between the parts being detected. This allows you to pack items closely together, which means that objects can be detected quickly and efficiently.



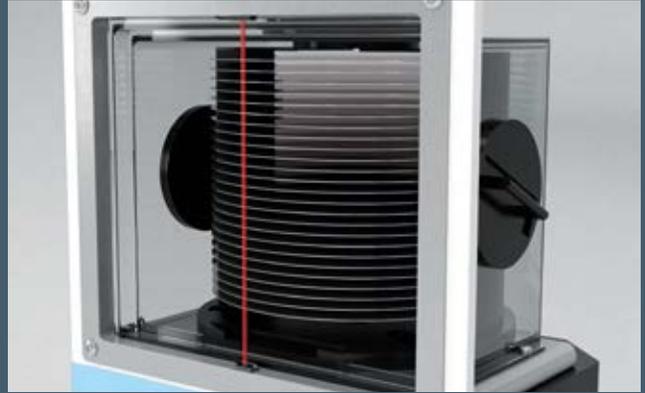
Conventional solution with LED sensor



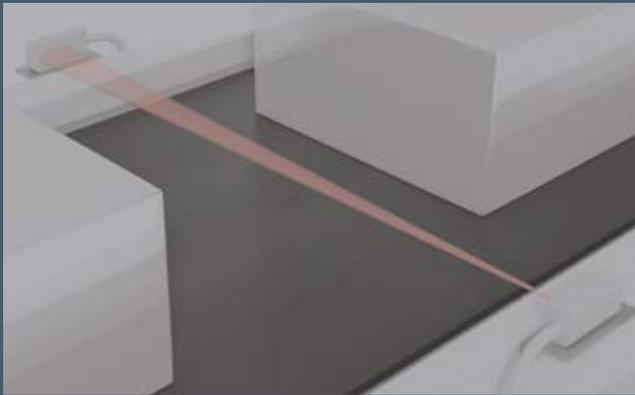
Efficient solution with DuraBeam laser



Conventional solution with a thru-beam sensor



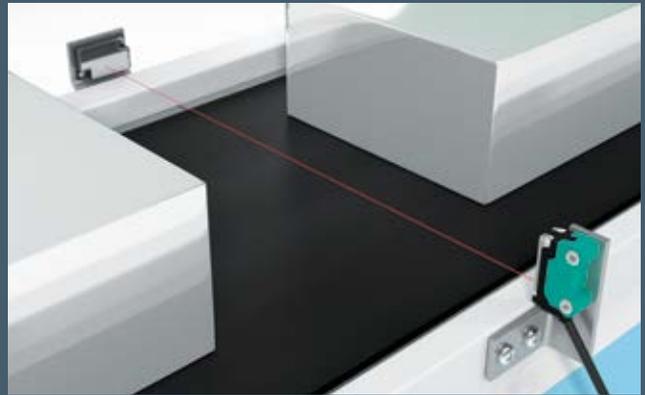
Efficient solution with a retroreflective sensor



### **Simpler Wiring with Retroreflective Sensors**

Thru-beam sensors are commonly used to detect small, highly reflective objects. They provide reliable detection but require some effort to set up—the transmitter and receiver must be wired individually and precisely aligned.

With retroreflective sensors, just the individual sensor has to be mounted and aligned to a reflector, saving you time and money.



### **Reliable Detection of Reflective Objects**

With an integrated polarization filter, our miniature retroreflective sensors can be used everywhere that highly reflective objects need to be detected. For example, reflective semiconductor wafers can be detected reliably.

### **Triangulation sensors with background suppression enable color-independent object detection**

Problems often arise when objects need to be detected directly in front of a surface. When it is not possible to use a thru-beam sensor, a diffuse-mode sensor with background suppression can be used. With background suppression, even extremely small objects can be detected reliably and independent of color, increasing reliability.

# Your automation, our passion.

## Explosion Protection

- Intrinsically Safe Barriers
- Signal Conditioners
- Fieldbus Infrastructure
- Remote I/O Systems
- HART Interface Solutions
- Surge Protection
- Wireless Solutions
- Level Measurement
- Purge and Pressurization Systems
- Industrial Monitors and HMI Solutions
- Electrical Explosion Protection Equipment
- Solutions for Explosion Protection

## Industrial Sensors

- Proximity Sensors
- Photoelectric Sensors
- Industrial Vision
- Ultrasonic Sensors
- Rotary Encoders
- Positioning Systems
- Inclination and Acceleration Sensors
- Fieldbus Modules
- AS-Interface
- Identification Systems
- Displays and Signal Processing
- Connectivity