# **VAUTOMATION DIRECT**

















**D**(Sense

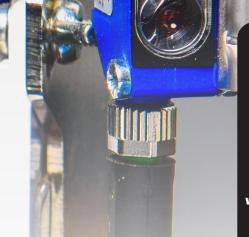








# **Photoelectric Sensors**



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## **Photoelectric Sensors**

presence or distance using light. These sensors use a light source from an emitter and a receiver that detects changes depending on the specific photo eye technology employed. in light intensity reflected or interrupted by the target object.

Photoelectric sensors, also called photo eyes, detect object. With no physical contract required, photo eyes can detect objects at extremely close range or out to a meter or more,





### What type of photoelectric sensor is best for me?

There are many different styles of photoelectric sensors, describes some advantages and disadvantages of each but really only four basic technologies: through-beam, reflective, diffuse, and background suppression. The chart

technology.

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Туре	Operation	Advantages	Disadvantages
Through-beam		<ul><li>Most accurate</li><li>Longest sensing range</li><li>Very reliable</li></ul>	Must install at two points on system: emitter and receiver     Costly - must purchase both emitter and receiver
Reflective	30000000 G 10100101000 10100101000 1010010100	<ul> <li>Cost less than through-beam</li> <li>Only slightly less accurate than through-beam</li> <li>Sensing range better than diffuse</li> <li>Very reliable</li> </ul>	Must install at two points on system: sensor and reflector     Slightly more costly than diffuse     Sensing range less than through-beam
Diffuse		Only install at one point     Cost less than through-beam or reflective	Less accurate than through-beam or reflective     More setup time involved
Background Supression		· Effective with reflective backgrounds	<ul> <li>Cost more than diffuse, reflective or through-beam</li> <li>Most setup time required</li> </ul>

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## **Photoelectric Sensor Types**

Photoelectric sensors allow non-contact detection of material, sensing distance, and the output signal required objects using red or infrared light, or lasers. A variety of sensor types are available, depending on the target

for the application.



For the latest prices, please check AutomationDirect.com.

#### **General Purpose**

General purpose photoelectric sensors allow non-contact detection of objects using red or infrared guided light. IP69K sensors are rated for harsh duty (food grade/washdown) applications.



Clear object detection sensors are a special type of retroreflective photoelectric sensor that can detect transparent objects such as glass or plastic.



## **Distance Measuring**

Distance measuring sensors can measure the distance of objects at long ranges using a time of transit calculation. For shorter distances, high-resolution CMOS technology models offer greater precision.

#### **Discrete Distance**

Discrete distance sensors are diffuse laser sensors that detect presence via reflected laser light from the target object and use time-of-light distance calculations for background suppression. These sensors operate consistently regardless of the object's material, color, or brightness.





## **Dark & Shiny Object Detection**

Dark objects absorb light instead of reflecting it, making it difficult for standard diffuse photoelectric sensors to detect. Shiny objects overly reflect and can cause objects to be detected more than once. Dark and shiny object detection sensors use blue light, which is less likely to be absorbed by a dark object and is less likely to cause multiple reads or misdetections from shiny objects.

mPHS-3 **Photoelectric Sensors** www.automationdirect.com/photoelectric

## Photoelectric Sensor Types (continued)

#### **Fiber Optic Sensors**

Fiber optic sensors typically consist of two devices specified separately: the photoelectric amplifier and the fiber optic cable. The fiber cable includes the optic sensor head and cabling needed to transmit light to and from the amplifier. Because the amplifier is separate from the sensor head, these sensors work well in tight spots and applications with high electrical noise.





#### Color Sensors

Color sensors use pre-defined reference colors to reliably select colored objects in high-speed automation processes. They are capable of evaluating up to 3 colors simultaneously.



Contrast print mark sensors determine contrast by sensing reflected light to detect the difference in the wavelength of the reflected light between the mark and background.





#### **Fork Sensors**

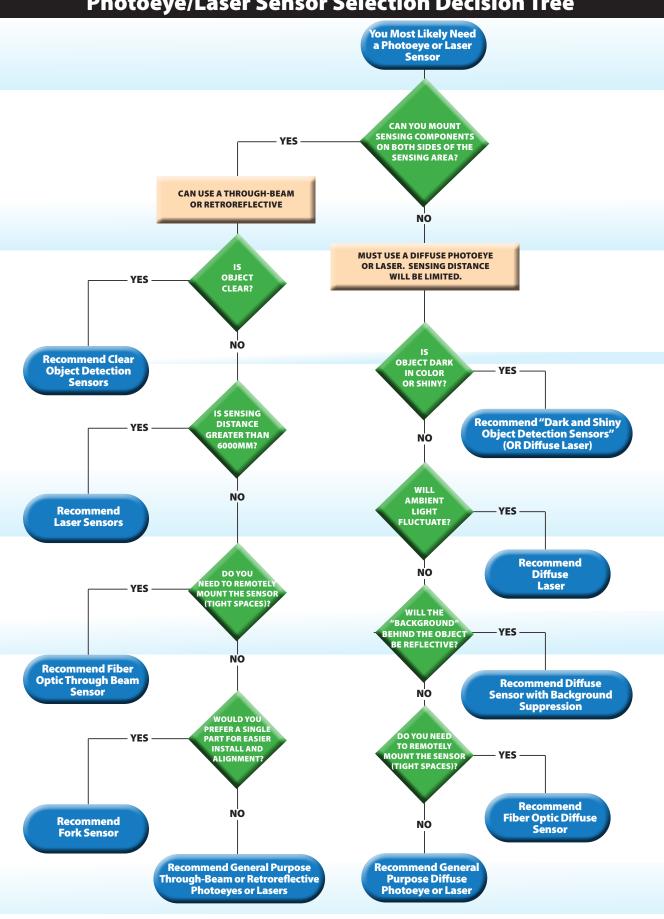
Fork sensors (also called slot sensors or "U" sensors) offer advantages over standard through-beam sensors including identical mechanical/optical axis, operational reliability and repeatability with transmitter and receiver built into the same housing.

### **Light Grids**

Industrial light grids, also known as measuring light curtains, light barriers, or area sensors, are optoelectronic sensors used in industrial automation for a variety of applications. Unlike safety light grids, which focus on protecting personnel from hazardous machinery, industrial light grids focus on object detection, measurement, and control. These non-contact sensors have high accuracy, a fast response time, and are built to withstand harsh industrial environments.







# **General Purpose Photoelectric Sensors**

General-purpose photoelectric sensors, in tubular or rectangular body styles, are suitable for many presence sensing applications. They use infrared or visible red light technology and are available in diffuse, diffuse with background suppression, retroreflective, and throughbeam sensing styles.

### 4mm and 5mm Tubular

## **CONTRINEX** D04 and M5 Series Stainless Steel

- 4 and 5mm diameters
- · Diffuse and through-beam styles
- IO-Link v1.0 on select PNP models









- · Stainless steel housing
- IP67 protection rating



### 8mm Tubular

#### ▼AUTOMATIONDIRECT HE Series Stainless Steel

- 8mm diameter
- · Through-beam sensing style
- 10 kHz switching frequency





- 1m sensing distance
- · Stainless steel housing
- IP67 protection rating



## Or Sense ProSense F8 Series Stainless Steel

- · 8mm diameter
- · Diffuse, diffuse with background suppression, polarized retroreflective, and through-beam sensing styles
- · Sensing distances up to 2.2m
- · Stainless steel housing
- IP67 protection rating



## 12mm Tubular Achie Ve™ FDM Series Metal

- 12mm diameter
- · Diffuse, polarized retroreflective, and through-beam sensing styles
- Teach function or potentiometer sensitivity adjustment



- Sensing distances up to 4m
- · Nickel-plated brass housing
- IP67 protection rating



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### 12mm Tubular (continued)

## **CONTRINEX**) M12 Series Metal

- 12mm diameter
- Diffuse, retroreflective, and through-beam sensing styles
- IO-Link V 1.0 on PNP models











### 18mm Tubular

#### ▼AUTOMATIONDIRECT FA Series Laser Metal/Plastic

- 18mm diameter
- · Diffuse, diffuse with background suppression, polarized retroreflective, and through-beam sensing styles
- Axial or right-angle optical head models



· Sensing distances up to 50m

· Sensing distances up to 10m

· Chrome-plated brass housing

· IP67 protection rating

- Nickel plated brass or PBT housings
- IP67 protection rating



## ▼AUTOMATIONDIRECT FB Series M18 Plastic

- 18mm diameter
- · Diffuse, polarized retroreflective, and through-beam sensing styles
- · Potentiometer sensitivity adjustment on diffuse models



- Sensing distances up to 8m
- · ABS plastic housing
- IP65 or IP67 protection rating





### VAUTOMATION DIRECT C18 Series Metal

- 18mm diameter
- · Diffuse, diffuse with background suppression, polarized retroreflective, and through-beam sensing styles
- · Axial or right-angle optical head models



- Sensing distances up to 6m
- · Chrome-plated brass housing
- IP67 protection rating





### 18mm Tubular (Continued)

#### ▼AUTOMATIONDIRECT FF Series Stainless Steel

- 18mm diameter
- Diffuse, polarized retroreflective, and through-beam sensing styles
- Sensing distances up to 20m
- 316L stainless steel housing
- IP68/69K protection rating





#### ▼AUTOMATIONDIRECT FFRS Series Stainless Steel

- 18mm diameter
- Diffuse with background suppression sensing style

- · Sensing distances up to 130mm
- 316L stainless steel housing
- IP68/69K protection rating





#### ▼AUTOMATIONDIRECT® MQ Series AC Powered Plastic

- 18mm diameter
- Diffuse with background suppression sensing style
- 20-253 VAC operating voltage





- · Sensing distances up to 100mm
- PBT housing
- IP67 protection rating





#### ▼AUTOMATIONDIRECT MV Series AC Powered Plastic

- 18mm diameter
- · Diffuse, polarized reflective, and through-beam sensing styles
- 20-253 VAC operating voltage





- Sensing distances up to 16m
- PBT housing
- IP67 protection rating



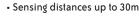


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## CONTRINEX

#### **M18 Series Plastic**

- 18mm diameter
- · Diffuse, diffuse with background suppression, polarized retroreflective, and through-beam sensing styles
- IO-Link v1.0 on PNP models



- · ABS plastic housing
- IP67 protection rating





## **CONTRINEX** M18 Series Stainless Steel

- 18mm diameter
- · Diffuse, diffuse with background suppression, polarized retroreflective, and through-beam sensing styles
- IO-Link v1.0 on PNP models
- Sensing distances up to 30m
- · Stainless steel housing
- IP67 protection rating





## **Dranse** F18 Series 18mm Plastic

- 18mm diameter
- · Diffuse, diffuse with background suppression, polarized retroreflective, and through-beam sensing styles

- · Sensing distances up to 25m
- PBT housing
- IP67 protection rating





### 30mm Tubular

### E58 Series Stainless Steel

- 30mm diameter
- Diffuse reflective with background suppression, retroreflective, polarized reflective, and through-beam sensing style
- · High excessive gain





- · Sensing distances up to 800ft
- 303 stainless steel housing
- IP69 protection rating







## Rectangular Sensors

### ▼AUTOMATIONDIRECT GX Series Plastic

- Diffuse with background suppression, polarized retroreflective, and through-beam sensing styles
- 18mm diameter threaded lens with mounting hex nut included

- Sensing distances up to 20m
- 52.6 X 19.1 X 36.1mm LCP and PEI plastic housings
- IP67 protection rating



#### ▼AUTOMATIONDIRECT® QM Series Plastic

- · Diffuse, diffuse with background suppression, polarized retroreflective, and through-beam sensing styles
- Sensing distances up to 30m

- 21 X 12.8 X 31.2mm PA66 plastic housing
- IP67 protection rating





#### ▼AUTOMATIONDIRECT CX Series Plastic

- Diffuse, diffuse with background suppression, polarized retroreflective, and through-beam sensing styles
- · Sensing distances up to 6m
- 30 X 15 X 30mm plastic housings
- IP65 protection rating







#### ▼AUTOMATIONDIRECT FM Series Stainless Steel

· Diffuse, diffuse with background suppression, polarized retroreflective, and through-beam sensing styles



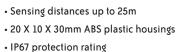


- Sensing distances up to 10m
- 21 X 34.8 X 13mm 316L stainless steel housings
- IP65/67/68/69K protection rating



## **CONTRINEX** C23 Series Plastic

- · Diffuse, diffuse with background suppression, polarized retroreflective, and through-beam sensing styles
- IO-Link v1.0 on select models
- Ecolab approved for use in hygienic















- Diffuse, through-beam, and polarized reflective sensing styles
- AC/DC output choices include robust 3A SPDT relays





- · Sensing distances up to 500ft
- 73 X 48.5 X 46mm fiberglassreinforced plastic housings
- IP67 protection rating



### **Leuze** 28 Series Plastic

- · Diffuse, polarized retroreflective, and through-beam sensing styles
- 31.8 X 15 X 57.7mm ABS plastic housings
- · Sensing distances up to 10m
- IP67 protection rating





## Orsense RW Series Plastic

- · Diffuse, diffuse with background suppression, polarized retroreflective, and through-beam sensing styles
- IP65/67 protection rating
- · Sensing distances up to 3m
- Compact 14.4 X 8.1 X 28.1mm ABS plastic housings





### Sense F16 Series Die-Cast Zinc

- · Diffuse, diffuse with background suppression, polarized retroreflective,
- and through-beam sensing styles

- · Sensing distances up to 2.2m
- 8 X 8 X 44mm die-cast zinc housings
- IP67 protection rating



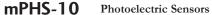


## wenglor OPT Series Plastic

- Diffuse, diffuse with background suppression, polarized retroreflective, and through-beam sensing styles
- IO-Link v1.1 compatibility
  - **IO**-Link
- Sensing distances up to 20m
- 50 X 50 X 20mm plastic housings
- IP67/68 protection rating









# **Clear Object Detection Sensors**

Clear-object photoelectric sensors detect presence when a clear object interrupts light rebounding off a fixed reflector (sold separately) or when used as part of a

through-beam pair. These sensors use infrared visible, red light, or UV light sources and offer detection ranges up to 4.2 meters.

#### ▼AUTOMATIONDIRECT® FFRL Series Stainless Steel

- 18mm diameter
- Retroreflective for transparent objects
- 316L stainless steel housing





- 1m sensing distance
- IP68/69K protection rating





## **CONTRINEX**

### **C23 Series Plastic**

- Retroreflective for transparent objects
- IO-Link V 1.0 on PNP models
- · Models with UV light offer easy sensitivity adjustment
- · Sensing distances up to 4200mm
- 20 X 10 X 30mm ABS plastic housings
- · Ecolab approved for use in hygienic areas
- IP67 protection rating









#### ▼AUTOMATIONDIRECT® QM Series Plastic

- Retroreflective for transparent objects
- 21 X 12.8 X 31.2mm PA66 plastic housings
- Sensing distances up to 4m
- IP67 protection rating







- Retroreflective for transparent objects
- IO-Link v1.1 compatibility
- · Potentiometer sensitivity adjustment







- Sensing distances up to 2.6m
- 50 X 50 X 20mm plastic housings
- IP67/68 protection rating



### Enhanced 50 Series Plastic

- Retroreflective for transparent objects
- NPN/PNP, solid-state relay, or SPDT EM relay outputs
- AC or DC operating voltages
- · 45in sensing distance
- 73 X 79.5 X 46mm fiberglassreinforced plastic housings
- IP67 protection rating



## **Distance Measuring Sensors**

Short-range, high-precision laser sensors measure down to an 8 micrometer resolution using CMOS technology; long-range models use time of flight (measuring transit time of the reflected light) to measure distances up to

100 meters. Employing Class 1 or 2 lasers (depending on model), these DC-powered units support analog outputs of 4-20 mA or 0-10 VDC.



## **OPT Short Range CMOS Series**

- Diffuse laser distance sensing style with CMOS technology
- · Class 1 and 2 lasers available
- High resolution down to 8µm
- 4-20 mA or 0-10 VDC output





- · Sensing distances up to 350mm
- 50 X 50 X 20mm polycarbonate housings
- High response times down to 660µs
- IP67 protection rating







#### **OPT Long Range Transit Time Series**

- Diffuse and retro-reflective (transit time) sensing styles
- · Measured value independent of material, color, and brightness
- · Class 1 and 2 lasers available







- · Sensing distances up to 100m
- · Analog or switching output options
- 50 X 50 X 20mm or 81 X 55 X 30mm polycarbonate housings
- IP68 protection rating







## **Discrete Distance Sensors**

Discrete distance sensors are diffuse laser sensors that detect presence via reflected laser light from the target object and use time-of-light distance calculations for

background suppression. These sensors operate consistently regardless of the object's material, color, or brightness.



## wenglor OPT Short Range CMOS Series

- Diffuse laser distance sensing style with CMOS technology
- Measured value independent of material, color, and brightness
- 60-660mm sensing distance
- 50 X 50 X 20mm polycarbonate housings
- IP68 protection rating







#### **OPT Long Range Transit Time Series**

- Diffuse and retro-reflective (transit time) sensing style
- Measured value independent of material, color, and brightness

- · Sensing distances up to 3m
- 50 X 50 X 20mm polycarbonate housings
- · IP68 protection rating









## wenglor OPT Compact Long Range Transit Time Series

- Diffuse and retro-reflective (transit time) sensing style
- Measured value independent of material, color, and brightness



- Sensing distances up to 1m
- 32 X 22 X 12mm polycarbonate or plastic housings
- IP67 protection rating





## **Dark and Shiny Object Detection Sensors**

Dark and shiny object detection photoelectric sensors detect presence of objects that other sensors fail to detect

or erroneously detect multiple times because they are either very dark or shiny.



#### **OPT Series Blue Light**

- · Diffuse with background suppression sensing style
- Potentiometer sensitivity adjustment
- IO-Link V1.1





- Sensing distances up to 400mm
- 50 X 20 X 50mm or 32 X 12 X 16mm plastic housings
- IP67/68 protection rating





# **Fiber Optic Sensors**

Fiber optic sensors provide a remotely mounted electronics and optics package with fiber optic extensions to the sensing area, perfect for extremely tight locations, or where even low power electronics are not allowed.

Glass and cuttable plastic fiber optic cables are also available (sold separately), with sensing distances up to

#### ▼AUTOMATIONDIRECT® **DFT Series Plastic**

- · Sensing distances and styles are dependent on the optical fiber
- Compact 10 X 31 X 60mm PAT housings





- · Teach-in sensitivity adjustment
- · Bar graph signal-strength indicator
- IP64 protection rating





### ▼AUTOMATIONDIRECT **DFP Series Plastic**

- · Sensing distances and styles are dependent on the optical fiber
- · Compact 10 X 31 X 60mm PBT housings





- · Potentiometer sensitivity adjustment
- IP64 protection rating





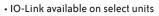


#### ▼AUTOMATIONDIRECT®

## Fiber Optic Sensors (continued)



- Diffuse and through-beam sensing styles
- Sensing distances are dependent on the optical fiber
- Plastic housings in various sizes



- Teach-in sensitivity adjustment
- Bar graph signal-strength indicator
- IP65 or IP50 protection rating











#### Micro Detectors SSF Series 18mm Tubular Plastic

- 18mm diameter
- Sensing distances and styles are dependent on the optical fiber
- Teach-in sensitivity adjustment
- PBT housings
- IP67 protection rating





## **Color Sensors**

Color sensors are used for colored object detection, quality control, and print accuracy applications. The Wenglor OPT2023 color sensor can evaluate up to

3 colors simultaneously and has a variety of mounting accessories.



## wenglor OPT2023 Color Series

- Capable of evaluating up to 3 colors simultaneously
- · White light source
- Three switching outputs



- 40mm sensing distance
- 50 X 50 X 20mm plastic housing
- IP68 protection rating





## **Contrast Sensors**

Contrast print mark sensors determine contrast by detecting the difference in the wavelength of reflected light from the mark and background. Contrast sensors

offer detection ranges up to 40mm, with quick-disconnect termination.



## wenglor OPT Series Plastic

- 12 to 18mm sensing distance
- · White light emission
- Teach-in sensitivity adjustment

- 54.5 X 27 X 16mm plastic housings
- IP67 protection rating





### **CONTACOGIC** S8 Series Stainless Steel/Plastic

- 6 to 12mm sensing distance
- RGB light emission
- Teach-in sensitivity adjustment







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- 316L stainless steel or plastic housings in various sizes
- IP67/69K protection rating





### **ODATALOGIC** TL Series Metal

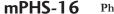
- 6 to 12mm sensing distance
- RGB light emission
- Teach-in sensitivity adjustment



- 81.5 X 31.9 X 60.7mm aluminum housings
- IP67 protection rating







## **Fork Sensors**

Fork sensors (also called slot sensors) use through-beam photoelectric technology to detect objects passing through the slot. The rugged one-piece housing keeps the emitter and receiver in alignment, and a convenient, single-cable

connection is provided. A variety of light sources are available for specialty sensing applications, with sensing distances up to 250mm.

#### ▼AUTOMATIONDIRECT PS Series Metal

- U-frame models in fork openings from 5 to 220mm
- L-frame models in fork openings from 60 to 160mm
- Visible red, infrared, and laser light options
- Up to 5kHz switching frequency



- Light-on/Dark-on selectable
- Rugged one-piece die-cast zinc or stainless steel housings
- Models for clear object and liquid detection
- Up to IP69K protection rating



## di-SOric OGU Series Metal

- U-frame models in fork openings from 5 to 250mm
- Standard, high-resolution, power, or speed sensor modes
- $\bullet \ \ Visible \ red \ and \ infrared \ light \ options$
- Up to 14kHz switching frequency





- Light-on/Dark-on selectable
- Sensitivity adjustment via potentiometer or IO-Link
- IO-Link v1.1 compatibility
- 10 to 30 VDC operating voltage
- IP67 protection rating



# **Light Grids**

Light grids are multi-beam arrays of photoeyes used to detect presence anywhere within the controlled height of the sensor array. These sensors are perfect for detecting various sized and shaped objects at random positions as they pass through the (2D) target area (not for use as safety light curtains).

### **Detection Light Grids**





#### **Micro Detectors CX0 Series Light Grids**

Micro Detectors CXO series detection light grids are easy to install and feature a fast response time with high accuracy and repeatability.

- Operating distance up to 6m
- 160 and 320mm detection heights
- 5 or 10mm resolution
- 16.8-30 VDC operating voltage
- Discrete PNP output
- Teach-in sensitivity adjustment
- Painted aluminum housings
- IP67 protection rating



#### **Micro Detectors BX Series Light Grids**

Micro Detectors BX80 series detection light grids feature rugged thermoplastic housings and are designed for industrial applications such as conveyor belt monitoring, packaging machines, and access control.

- · Operating distance up to 2m
- 70mm detection height
- 6mm resolution
- 12-24 VDC operating voltage
- Discrete NPN or PNP output
- Adjustable sensitivity
- Plastic housings
- IP67 protection rating



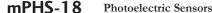
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#### **ProSense FLG Series Light Grids**

ProSense FLG series light grids offer a cost-effective solution for object detection, featuring a simple setup with no programming required. They have no dead zone on the full detection height and are suitable for a variety of applications, such as material handling, counting, and warehousing.

- 0.1-10m operating distance
- 220 to 1580mm detection heights
- 20 or 40mm resolution
- 24 VDC operating voltage
- Discrete NPN or PNP output
- Rugged aluminum housings
- IP67 protection rating





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## **Detection Light Grids (cont.)**



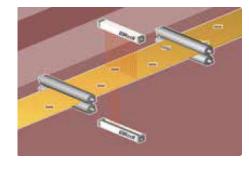


## ReeR Micron Series Light Grids with Push-Pull Complementary Outputs

ReeR Micron series light grids with push-pull complementary outputs provide a simple way to determine whether or not an object is present in the light grid's field of view. The outputs can be used to activate or stop a machine, or trigger an alarm.

- 0-10m operating distance
- 120 to 740mm detection heights
- 10 or 30mm resolution
- 24 VDC operating voltage

- Software configurable
- Rugged anodized aluminum housings
- IP65/67 protection rating



Quality Control: verification of presence/absence/position of holes

## Measuring Light Grids





### Micro Detectors

#### **Micro Detectors CX2 Series Light Grids**

The blanking function of the CX2 series provides flexible configuration options by allowing the height of the active optic window to be adapted to an application by eliminating pairs of beams.

- Operating distance up to 6m
- Detection height up to 960mm
- $\bullet$  5 or 10mm resolution
- Parallel beams and floating crossbeams with variable amplitude
- 16.8-30 VDC operating voltage
- PNP NO/NC configurable output
- 4-20mA or 0-10 VDC output
- Painted aluminum housings
- IP67 protection rating

### Measuring Light Grids (cont.)

## **∠**REER

#### ReeR Micron Series Light Grids with Analog Outputs

ReeR Micron series light grids with analog outputs are compact sensing devices for precision measurement and positioning tasks. They are configurable via easy-to-use software that offers an extensive parameter selection.

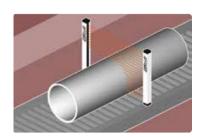
- 0-10m operating distance
- 270 to 1490mm detection heights
- 10 or 30mm resolution
- 24 VDC operating voltage
- Two 4-20mA outputs

- Two discrete push-pull outputs
- Software configurable
- Rugged anodized aluminum housings
- IP65/67 protection rating

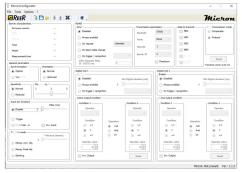








**Measurement and Identification** 



**Configurator Software** 



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#### **ReeR Micron Series Light Grids with IO-Link Compatibility**

ReeR Micron series IO-Link compatible light grids are versatile industrial devices for precise object detection, measurement, and identification. They offer flexible setup with protected heights and beam spacings to suit a variety of applications.

- 0-10m operating distance
- 270 to 1490mm detection heights
- 10 or 30mm resolution
- 24 VDC operating voltage

- Output via IO-Link v1.1.2
- Configurable via IO-Link
- $\bullet \ {\tt Rugged \ anodized \ aluminum \ housings}$
- IP65/67 protection rating