



## PD30 Series - Photoelectric Sensors

**Sense**

# PD30 Series

## Miniature photoelectric sensors

This new range of miniature high performance sensors comes in two complete product lines: a cost-effective PD30 BASIC family with potentiometer adjustment and a refined PD30 ADVANCED family with teach-in function, dust warning and options for muting and remote teaching.

The PD30 sensor family combines excellent sensing abilities with an optimized compact housing design. With a housing size of only 10.8 x 20 x 30 mm, it follows international industry standards.

In addition, the PD30 family covers a wide variety of sensing principles to fit requirements of virtually any application: diffuse-reflective, background suppression, retro-reflective with or without polarization even for transparent objects as well as through-beam.

These PD30 sensors are eminently suited for applications where space saving and high accuracy in detection are of vital importance.



### World standard housing design

The compact and robust sensor housing in ABS-PMMA offers a high level of water and dust protection (IP 67).

### High EMC performance

The microprocessor technology and the compact design ensure excellent EMC performance.

### Environmentally friendly

This lead-free sensor is designed according to the RoHS directive. The highly advanced microprocessor design optimizes power consumption, allowing a 20% energy reduction compared to other sensors.

### Simplified setup

Distance and sensing functions are easily set via the teach button or the remote teach wire on the PD30 ADVANCED sensors and via the freely adjustable potentiometer on the PD30 BASIC sensors.

### Space optimization

Despite its small size, PD30 offers the longest sensing range, managing distances formerly reached only by larger sensors.

### Tamper proof (PD30 ADVANCED series)

Connecting the remote teach wire to the power supply disables the pushbutton and makes the sensor tamper proof.

### Diagnostic warning (PD30 ADVANCED series)

Two options are available: a 'dust output' that monitors the sensing performance and sends a signal if the sensor gets dirty and a 'mute input' that allows a PLC to check the application for proper sensing operations.

### Approvals

CE (EN60947-5-2)  
cULus (UL508)



## General features and functions

### Electrical and optical design

An optimized aspherical lens design allows for both a wide sensing angle and a long sensing range.

A PCB "sandwich construction" together with microprocessor technology and a solid, functional analogue design provide optimized sensing and EMC performances, exceeding requirements from IEC.

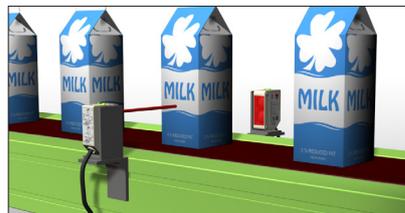


PD30 is a sensor optimized for industrial environments!

### Product types

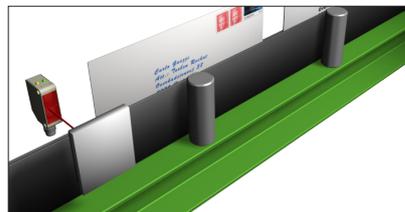
#### Through-Beam

Separate emitter and receiver in separate housing. A sensing distance of 15 m enables the sensor to be used in industrial settings where reliable detection is of primary importance. With a powerful infrared light-beam the sensor can see through various materials and determine whether content is present or not.



#### Retro-Reflective and Polarized Reflective

Separate emitter and receiver in one single housing. The signal from the emitter is sent to a reflector/passive device, and the need for wiring is reduced to one side of the application. The infrared retro-reflective sensor is primarily used in applications where the light beam must be invisible - for instance in entrance systems/doorways. The polarized reflective sensors are also able to detect objects with bright shiny surfaces.



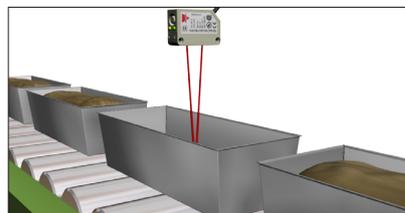
#### Diffuse-Reflective

Separate emitter and receiver in one single housing. A diffuse-reflective sensor without background suppression only measures energy returned from objects, which makes it ideal for structured surfaces because the sensor detects an average amount of light reflected.



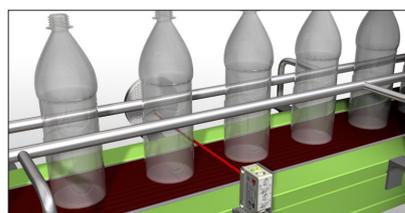
#### Background Suppression

A background suppression sensor detects an object by means of triangulation. Unlike a diffuse-reflective sensor it is not colour-sensitive and is therefore capable of detecting a black object in front of, for instance, a white background.



#### Retro-Reflective for Transparent Objects (Only ADVANCED types)

Like retro-reflective sensors - but optimized to detect transparent objects such as PET bottles. The PD30 sensor features a long range version suitable for supervising the jamming zone on both narrow and wide conveyor belts.



# PD30 Series

## Miniature photoelectric sensors

### PD30 ADVANCED - features and functions

#### Yellow LED

Target detected

#### Green LED

Power supply and signal stability

#### Large lens

ensures long sensing range



#### Built-in mounting holes

2 x M3 for fast mounting  
Spacing: 25.4 mm (0.1")

#### 4-pin M8 plug connector

to meet most connection requirements



#### Teach-in button

- Distance setting
- Sensing overhead
- Normally open/ Normally closed teach-in
- Setup while in operation

#### 4-wire PVC cable

Ø 3.3 mm to meet most connection requirements

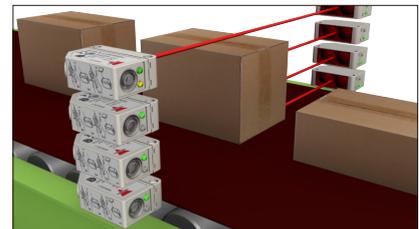
### Your benefits

The teach-in function on the PD30 ADVANCED sensors offers extensive possibilities of monitoring and changing the sensor functions and of protecting the sensors against tampering. Maintenance planning is made easy and equipment failure can be prevented before it occurs.

#### Mute function (sensor blanking)

When more than one set of through-beam sensors are mounted close to each other, mutual interference might occur. Controlling the mute function - for instance from a PLC - can form a multiplex system where only one set of sensors is active at a time and neighbouring interference is avoided.

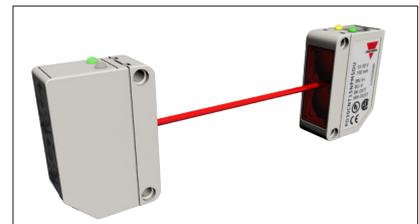
The mute function is also used to check the sensor for malfunctions or disconnections. If the emitter is turned on and off periodically, any malfunction will be detected as early as possible and costly breakdowns are prevented.



#### Half mute function (> 3 sec.)

When manually aligned sensors are used over a long distance, condensation or dust can cause false signals. Activating the half mute function (> 3 sec.) will set the

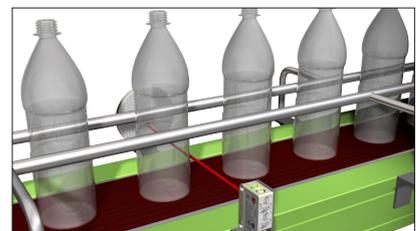
emitter to half power. Aligning the sensor at half power ensures enough energy to make the sensor function properly when switching back to full power.



#### Dust alarm output

In order to avoid downtime, sensors have to be kept clean when used in dirty or dusty environments. The sensor will send an alarm signal on the dust output if it receives a low level signal

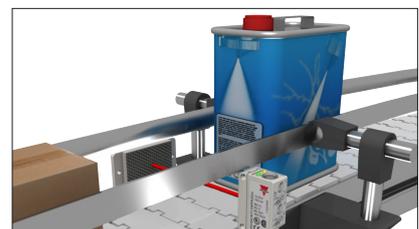
for more than 20 ms. This will prevent unnecessary machine downtime and ensure that dirty sensors are cleaned only when needed.



#### Remote teach

Using a sensor for the detection of varied objects may require modification of the sensor settings such as distance, sensing overheads etc. Connecting the remote teach in-

put to a PLC enables changing the sensor settings while in operation. The teach procedure is identical to the one used for manual teach via the teach button.



## PD30 ADVANCED - specifications

PD30CN..			Diffuse reflective		Retroreflective			Through beam	
			Background suppression	Energetic	Standard	With Polarization filter	For Transparent Objects	Receiver	Emitter
Cable	NPN	Remote teach	..B15NPRT	..D10NPRT	..R06NPRT	..P06NPRT	..G02NPRT	..T15NPRT	
		Dust alarm		..D10NPDU	..R06NPDU	..P06NPDU		..T15NPDU	
		Mute function			..R06NPMU	..P06NPMU	..G02NPMU		..T15NPMU
	PNP	Remote teach	..B15PPRT	..D10PPRT	..R06PPRT	..P06PPRT	..G02PPRT	..T15PPRT	
		Dust alarm		..D10PPDU	..R06PPDU	..P06PPDU		..T15PPDU	
		Mute function			..R06PPMU	..P06PPMU	..G02PPMU		..T15PMU
Plug	NPN	Remote teach	..B15NPM5RT	..D10NPM5RT	..R06NPM5RT	..P06NPM5RT	..G02NPM5RT	..T15NPM5RT	
		Dust alarm		..D10NPM5DU	..R06NPM5DU	..P06NPM5DU		..T15NPM5DU	
		Mute function			..R06NPM5MU	..P06NPM5MU	..G02NPM5MU		..T15NPM5MU
	PNP	Remote teach	..B15PPM5RT	..D10PPM5RT	..R06PPM5RT	..P06PPM5RT	..G02PPM5RT	..T15PPM5RT	
		Dust alarm		..D10PPM5DU	..R06PPM5DU	..P06PPM5DU		..T15PPM5DU	
		Mute function			..R06PPM5MU	..P06PPM5MU	..G02PPM5MU		..T15PM5MU
Rated operating distance (S <sub>r</sub> )			150 mm 5.9 inches	1 m 3.3 feet	6 m 9.8 feet	6 m 9.8 feet	2 m 6.6 feet	15 m 49.2 feet	
Hysteresis (H)			≤ 10%						-
Rated operational voltage			10 to 30 V DC, Ripple P-P ≤ 10%						
No load supply current (I <sub>0</sub> )			≤ 32 mA @ 24 V DC	≤ 30 mA @ 24 V DC				≤ 30mA	≤ 25mA
Output			Open collector, NPN or PNP by sensor type						-
Output function			N.O. (light switching) or N.C. (dark switching)						-
Output current (I <sub>o</sub> )			≤ 100 Ma (max. Load capacity 100 nF)						-
Minimum operational current			≤ 0,5 mA						-
Off-State current (I <sub>r</sub> )			≤ 100 µA						-
Voltage drop (U <sub>d</sub> )			≤ 2.5 V DC @ 100 mA						-
Sensor protection			Shortcircuit (A), reverse polarity (B) and transients (C)						B + C
Response time			≤ 0,5 mS						-
Power on delay (t <sub>r</sub> )			≤ 400 mS	≤ 300 mS					
Led indications			Target detected (Yellow LED), Signal stability and Power ON (Green LED)						Power ON
Sensitivity control			Teach-In programming						
Degree of protection			IP67 (IEC 60529; 60947-1)						
Ambient temperature			-25 to +55°C (-13 to +131°F) no condensation, Storage -40 to +70°C (-40 to +158°F)						
Ambient humidity			35 to 85 % RH, storage: 35 to 85 % RH						
Ambient light			≤ 10.000 Lux						
CE marking			According to EN 60947-5-2						
Approvals			cULus (UL508)						
Installation category			III (IEC60664/60664A; 60947-1)						
Pollution degree			3(IEC60664/60664A; 60947-1)						
Vibration			10 to 150 Hz, (1,0 mm/15G; IEC 60068-2-6) in X,Y and Z direction						
Shock			30G /11 mS. 3 positive and 3 negative in X,Y and Z direction						
Emitting light source			Red LED	Infrared LED	Red LED	-	Infrared LED		
Material			Body, ABS light grey; Frontglass, PMMA red; Trimmer shaft, POM dark grey						
Cable			PVC, black, 2 m, 4 x 0.14mm <sup>2</sup> , Ø=3.3 mm						
Connector			4-pin M8						
Dimensions			10.8 x 20 x 30 mm						
Weight incl. packaging			Cable version ≤ 40 g, Plug version ≤ 10 g						
Accessories			Mounting bracket: APD30-MB1						
Accessories, additional			"Mounting bracket: APD30-MB2 Connectors: CONM54NF-... Types"						

# PD30 Series

## Miniature photoelectric sensors

### PD30 BASIC - features and functions

#### Yellow LED

Target detected

#### Green LED

Power supply and signal stability

#### Large lens

ensures long sensing range



#### Built-in mounting holes

2 x M3 for fast mounting  
Spacing: 25.4 mm (0.1")

#### 4-pin M8 plug connector

to meet most connection requirements



#### Potentiometer

- Manual setting
- Larger adjustability
- Easily set distance

#### 4 Wire PVC Cable

Ø 3.3 mm to meet most connection requirements

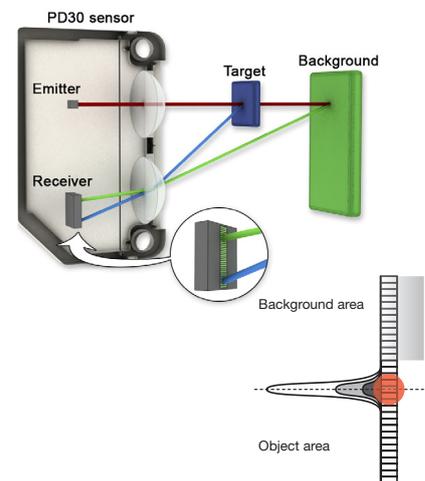
### New background suppression principle

The new PD30 BASIC background suppression sensor (BGS) is based on a brand-new sensing principle. This considerably increases the sensing distance (200 mm) and improves the detection accuracy of different colours, suppressing the background even more efficiently.

This revolutionary sensing technology uses an Active Pixel Sensor (APS) CMOS array of 64 x 1 sensors, where each pixel represents a specific position. It takes advantage of the fact that the reflected light hits the APS array at exactly the same

position. This way, the object's mass centre can be found regardless of the energy of the received light. Using this technology, grey, black and white objects are detected at almost exactly the same distance.

Furthermore, unlike traditional CCD arrays, the CMOS array benefits from being immune to the blooming effect - not letting the light bleed onto other pixels and disturbing the detection.



### Applications

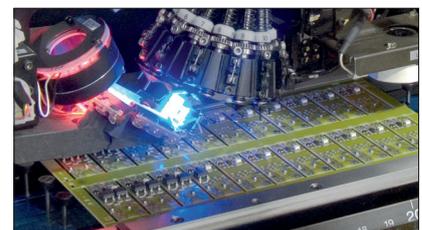
#### Printed circuit board manufacturing

In the PCB Industry considerable problems can arise when it comes to detecting black components on a PCB.

##### Our solution

The PD30 BASIC background suppression sensor is positioned below the PCBs which are detected

when passing. Since the background suppression is based on triangulation, the component colours will not affect the detection. To protect operators on the assembly line from being blinded by an upwardly directed sensor, the infrared PD30 sensor is the obvious choice.



#### Coffee vending machines

In vending machines sensors often confuse cups and backgrounds such as a person drawing a cup of coffee.

##### Our solution

The PD30 BASIC background suppression sensor enhances the overall ease

of use of the vending machine. By means of the new BGS technology it is able to detect cups in different colours equally well and to ignore people and irrelevant background noise in front of the machine.



## PD30 BASIC - specifications

PD30CN..		Diffuse-reflective			Retroreflective		Through-beam	
		Background suppression		Energetic	Standard	With Polarization filter	Receiver	Emitter
Cable	NPN	..B2ONASA	..B2ONAIS	..D1ONASA	..R06NASA	..P06NASA	..T15NASA	..T15
	PNP	..B2OPASA	..B2OPAIS	..D1OPASA	..R06PASA	..P06PASA	..T15PASA	
Plug	NPN	..B2ONAM5SA	..B2ONAM5IS	..D1ONAM5SA	..R06NAM5SA	..P06NAM5SA	..T15NAM5SA	..T15M5
	PNP	..B2OPAM5SA	..B2OPAM5IS	..D1OPAM5SA	..R06PAM5SA	..P06PAM5SA	..T15PAM5SA	
Rated operating distance (S <sub>n</sub> )		200 mm 7.9 inches		1 m 3.3 feet	6 m 9.8 feet	6 m 9.8 Feet	15 m 49.2 feet	
Hysteresis (H)		≤ 10%			5% to 20%		< 10%	-
Rated operational voltage		10 to 30 V DC, Ripple P-P ≤ 10%						
No load supply current (I <sub>o</sub> )		≤ 30 mA @ U <sub>b</sub> min ≤ 20 mA @ U <sub>b</sub> max		≤ 25 mA				≤ 20mA
Output		Open collector, NPN or PNP by sensor type						-
Output function		N.O. (light switching) and N.C. (dark switching)						-
Output current (I <sub>o</sub> )		≤ 100 Ma (max. Load capacity 100 nF)						-
Minimum operational current		≤ 0,5 mA						-
Off-State current (I <sub>o</sub> )		≤ 100 µA						-
Voltage drop (U <sub>d</sub> )		≤ 2 V DC @ I <sub>o</sub> max						-
Sensor protection		Shortcircuit (A), reverse polarity (B) and transients (C)						B + C
Response time		≤ 1 mS	≤ 0.5 mS			≤ 1 mS	-	
Power on delay (t <sub>v</sub> )		≤ 200 mS						
Led indications		Target detected (Yellow LED), Signal stability and Power ON (Green LED)						Power ON
Sensitivity control		Potentiometer 210° electrical, incorporatet on receiver for through-beam type						
Degree of protection		IP67 (Iec 60529; 60947-1)						
Ambient temperature		-25 to +60 °C (-13 to +140 °F) no condensation, storage -40 to +70 °C (-40 to +158 °F )						
Ambient humidity		35 to 85 % RH, storage: 35 to 85 % RH						
Ambient light		≤ 10.000 Lux						
CE marking		According to EN 60947-5-2						
Approvals		cULus (UL508)						
Installation category		III (IEC60664/60664A; 60947-1)						
Pollution degree		3(IEC60664/60664A; 60947-1)						
Vibration		10 to 150 Hz, (1,0 mm/15G; IEC 60068-2-6) in X,Y and Z direction						
Shock		30G /11 mS, 3 positive and 3 negative in X,Y and Z direction						
Emitting light source		Red Led	Infrared LED	Red LED	Infrared LED	Red LED	-	Infrared LED
Material		Body, ABS light grey; Frontglass, PMMA red; Trimmer shaft, POM dark grey						
Cable		Pcv, black, 2 m, 4 x 0.14mm <sup>2</sup> , Ø=3.3 mm						
Connector		4-pin M8						
Dimensions		10.8 x 20 x 30 mm						
Weight incl. packaging		Cable version ≤ 50 g, Plug version ≤ 20 g						
Accessories		Screwdriver						-
Accessories, Additional		Mounting bracket: APD30-MB1 or APD30-MB2 Connectors: CONM54NF... Types						

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