PD
Технические характеристики

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PD30 series
IO-Link smart photoelectric sensors

The PD30 IO-Link smart sensors are highly flexible multifunction sensors in a compact housing.
The PD30 IO-Link smart sensors offer; Background suppression, Foreground suppression, PointSpot versions with sensing distances up to 350 mm. Diffuse reflective variants with IR- or Red emitter and 1 m sensing distance and Retro-reflective sensors with Polarized- or PointSpot light source with sensing distance up to 6 m.
The PD30 IO-Link smart sensors has besides the many other fantastic IO-Link options also 4 unique application functions: Speed and length, Patterne recognition, Divider and Object and gap monitoring.
The PD30 IO-Link smart sensors are available in two housing styles, an AISI316L stainless steel version with IP69K and ECOLAB approvals designed for use in harsh or hygienic environments and an ABS plastic version with IP 67 approval.

Universal, smart and easy

Data availability down to the field level
Using IO-Link, the sensors can deliver their data directly into the control system very efficiently.

Device identification
Each IO-Link sensor has an IODD (IO Device Description), which describes the sensor, its capabilities and parameters, process data, diagnosis data and user interface configuration. Furthermore, each sensor is equipped with an internal ID.

Automatic parameter settings
Initial setup of a new sensor is smooth and easy using previously stored parameters. Once a sensor has been replaced, the IO-Link master simply transmits parameters stored from the old sensor.

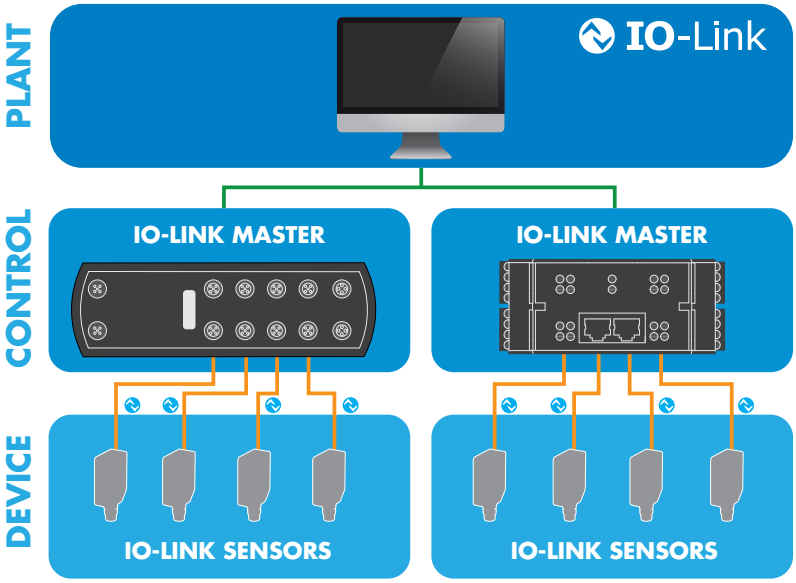
Centralised configuration and data management
IO-Link enables fast configuration and dynamic change of the sensor parameters on the fly, which considerably reduces downtime in case of product changeover and increases flexibility and diversity of the installation.

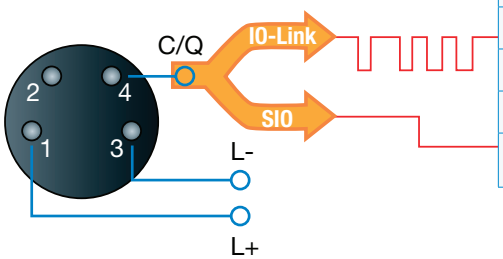
Universal, smart and easy

Simplified installation
An IO-Link system requires just standard, unshielded 3-wire cables, and a standardised uniform interface for sensors and actuators drastically reduce the complexity of the installation process. In addition, the automated parameter reassignment simplifies sensor replacement in case of defects and prevents incorrect settings. The IO-Link-enabled sensor acts as a standard sensor when installed in a non-IO-Link system, so the same sensor can be stocked for both standard I/O (SIO) applications and IO-Link applications.

Simplified configuration with the Handheld IO-Link SCTL55 smart configurator
By using the Handheld IO-Link SCTL55 smart configurator from Carlo Gavazzi it is very smart and easy to configure your IO-Link sensor. When the SCTL55 automatic has downloaded the sensors IODD file you are ready to configure.

IO-Link





Pin	Signal	Remarks
1	L+	24 V
2	OUT	Sensor dependent
3	L-	Ground
4	C/Q	Communication/ switching signal

What is IO-Link?
IO-Link is a universal, open communication standard protocol that allows IO-Link-enabled devices to exchange, collect and analyse data and convert it into actionable information.
IO-Link is recognised worldwide as an international standard (IEC 61131-9), and it is today considered as the "USB interface" for sensors and actuators in the industrial automation environment.

Plug and play
When the IO-Link sensor is connected to an IO-Link port, the IO-Link master sends a wake-up request to the sensor, which automatically switches to IO-Link mode, and a point-to-point bidirectional communication automatically starts between the master and the sensor.

Operating modes
The IO-Link-capable sensor can operate in two different modes; SIO mode (standard I/O) or IO-Link mode.

- SIO mode: the sensor works as a traditional sensor, and pin 4 acts as an ordinary digital output. SIO mode ensures backwards compatibility with standard sensor systems.

- IO-Link mode: exchange of data between sensor and IO-Link master takes place, and pin 4 is used for the transmission of IO-Link-related data.

PD30 series
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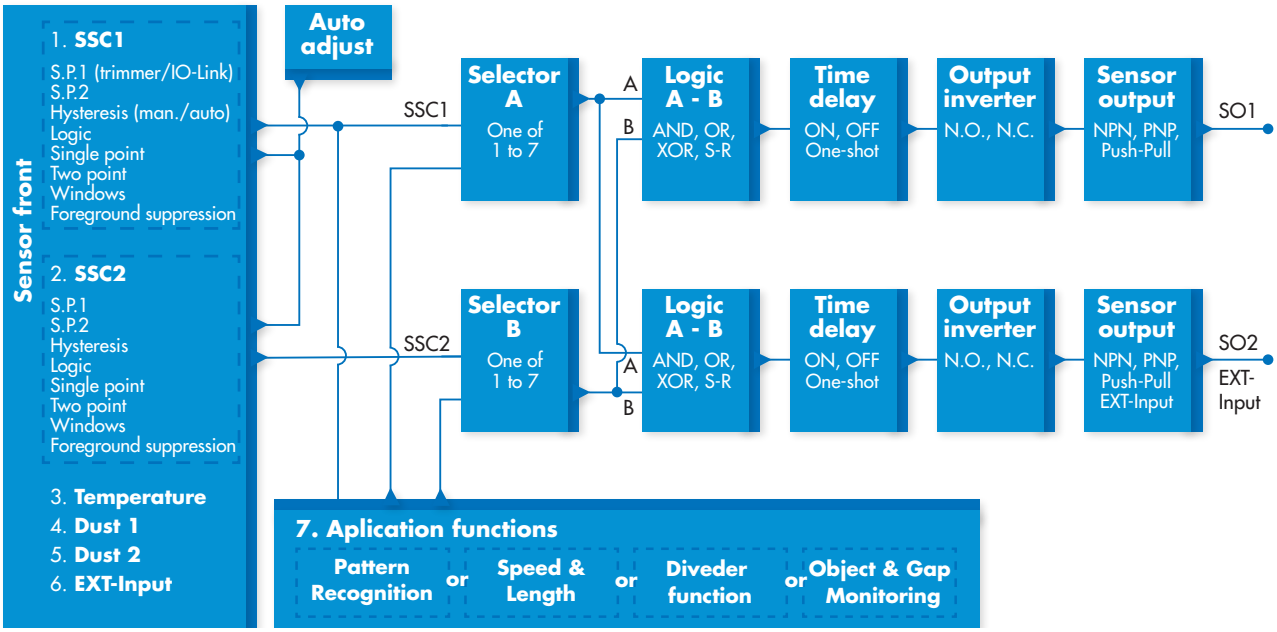
IO-Link functions

Highly flexible sensors

IO-Link provides the first globally standardised interface for communication with the sensor. Once you have connected the sensor to the IO-Link port, you can access a multitude of configuration parameters and advanced functionalities. This way, the sensor can be tailored to meet your individual needs and requirements at a given time. The settings can also be stored in a master and can always be changed if the need occurs, or they can be smoothly transferred to a new sensor in case of sensor replacement.



Sensor front

The Diffuse Reflective sensor emits light towards a target and measures the light level reflected from the target.

The (Polarized) Retro-reflective sensor emits light towards a target (Corner cube reflector) and measure the light level reflected from it.

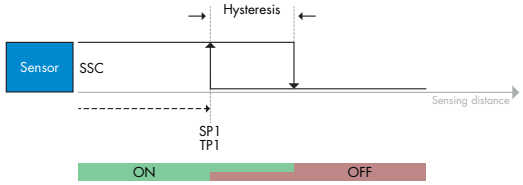
The Background Suppression (BGS) sensor emits light towards a target and measure the position of the light reflected from the target.

SSC1and SCC2 (Switching Signal Channel)
Detection modes

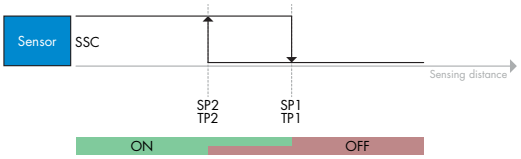
Each SSC channel can be set and operate in 4 detection modes or be disabled. The Switchpoint mode setting can be used to create more advanced output behaviour. The following switchpoint modes can be selected for the switching behaviour of SSC1 and SSC2.

Single-point mode, two-point mode, windows mode and Foreground suppression Mode (only BGS).

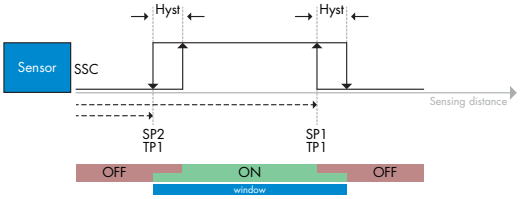
Single point mode



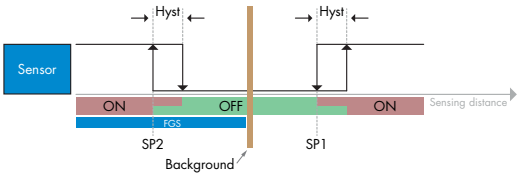
Two point mode



Windows mode



Foreground suppression mode (only BGS)



Hysteresis Settings

The hysteresis can be set automatically or manually for SSC1 and manually only for SSC2. The hysteresis is set as a percentage of the set value chosen for SP1 and SP2.

Automatic hysteresis

Automatic hysteresis will guarantee stable operation for most application.

IO-Link functions

Manual hysteresis
When manual hysteresis is selected, the hysteresis can be changed between 5 … 99%

Temperature alarm
The sensor can be configured to give an alarm if the temperature exceeds or drops below a preset value (Tmax or Tmin).

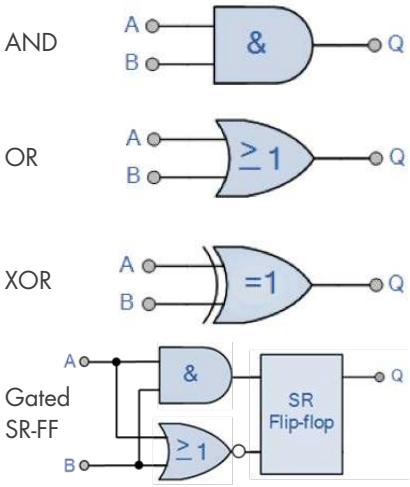
Dust alarm 1 and Dust alarm 2
The sensor can be configured to give an alarm even with a slightly buildup of dust.

External input
The output 2 (SO2) can be configured as an external input allowing external signals to be fed into the sensor.

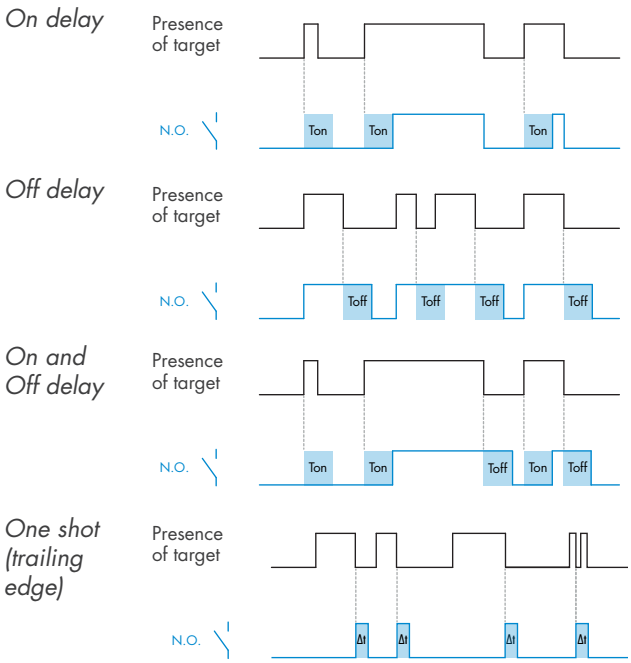
Auto adjust (not BGS sensor versions)
Auto adjustment function can be enabled to compensate for buildup of dust or water drops.
Based upon an preset setpoint from the trimmer, with IO-Link parameters SSC1_SP1 / SSC2_SP1 or by Teach, the sensor continuously monitors the received signals from the target and background, and adjusts the setpoint up or down if a stable ON or OFF state cannot be reached.
Dust alarm is activated if Auto adjust has reached its maximum sensibility and cleaning is needed.
Water drop alarm is activated if Auto adjust has reached its minimum sensibility and cleaning is needed.

Selector
This function block allows the user to select any of the signals from the "sensor front" to the Channel A or B.
Channels A and B: can select from SSC1, SSC2, Temperature alarm, Dust alarm 1, Dust alarm 2 and External input.

Logic
In the logic function block the selected signals from the input selector can be added a logic function directly without using a PLC – making decentral decisions possible.
The logic functions available are: AND, OR, XOR and Gated SR-FF.



Time delay
It is possible to activate different timer functions: ON delay, OFF delay, ON and OFF delay or one shot (leading edge or trailing edge).



Output inverter
The output can be configured to normally open or normally closed.

Sensor output
The I/O terminals can be configured as: NPN, PNP, push-pull or external input (only output 2).

Outputs/inputs
The sensor has two I/O terminals SO1 and SO2.

Application functions
4 unique application functions can be selected via IO-Link only.
- Pattern Recognition.
- Speed and Length.
- Divider.
- Object and Gap Monitoring.

Predictive maintenance
QoR (Quality of Run) from 0 to 255%
QoT (Quality of Teach) from 0 to 255%
Operation hours, hourly data saved in sensor internal memory.
Operating cycles for SSC1, sensor logs SSC1 detections.
Power cycles, number of ON/OFF switchings of the sensor.
Dust alarm, variable safe limits from 0 … 100%.
Temperature alarm, separate setpoints for high and low temperature alarm settings.

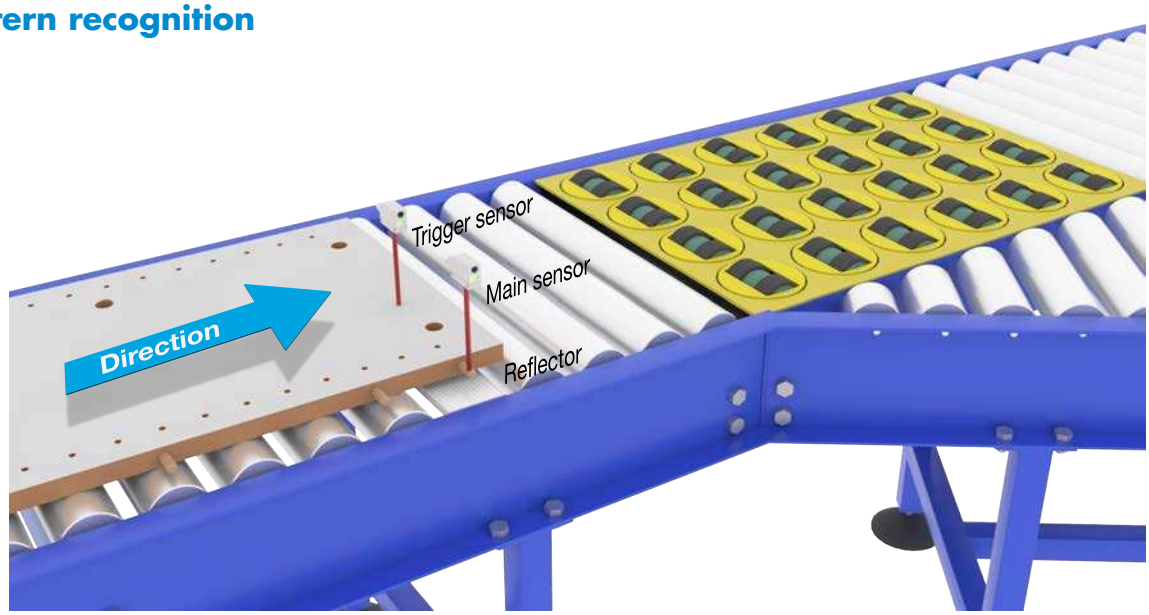
PD30 series

IO-Link smart photoelectric sensors

Application functions

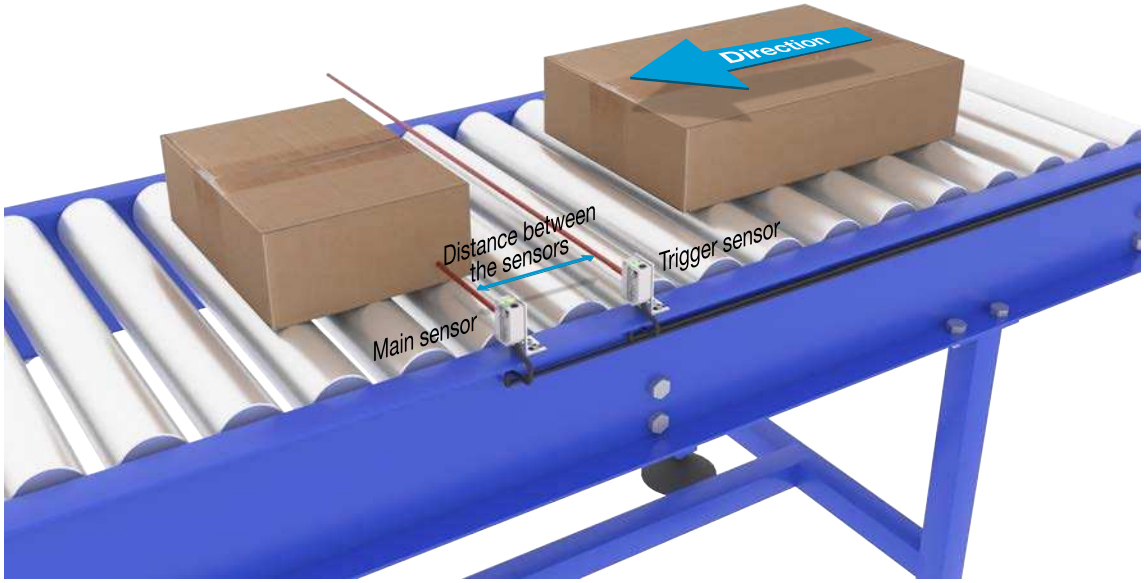
Optimized design for applications like automatic conveyor systems or packaging machinery, the PD30 IO-Link smart sensors provides four new unique predefined and selectable application functions: Speed and length, Pattern recognition, Divider function and Object and gap monitoring. These embedded functions help the customer with additional data, decentralized controls, very important to optimize the production process, and simplification of the machine control system layout.

Pattern recognition



The pattern recognition function is used to verify if a manufactured part has all the e.g. holes or taps as expected and that the parts are made according to the specification.

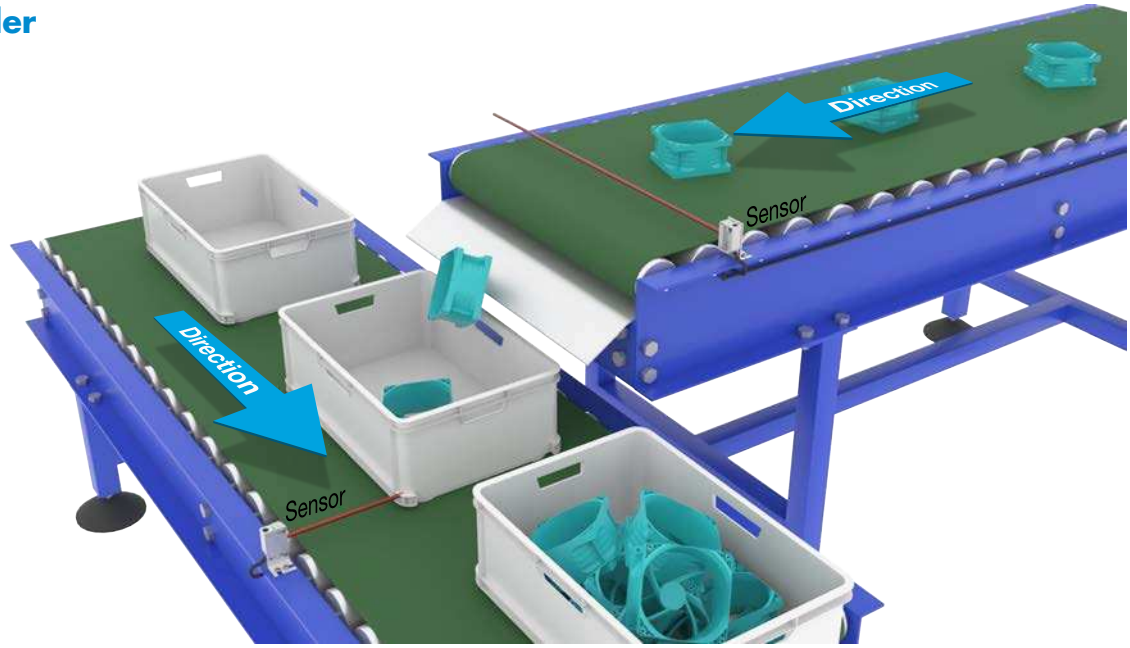
Speed and Length



Monitor the speed and length of an object on a conveyour for e.g. sorting on size.
With this unique function it is possible to monitor the speed and length of an object on a conveyour for e.g. sorting on size.

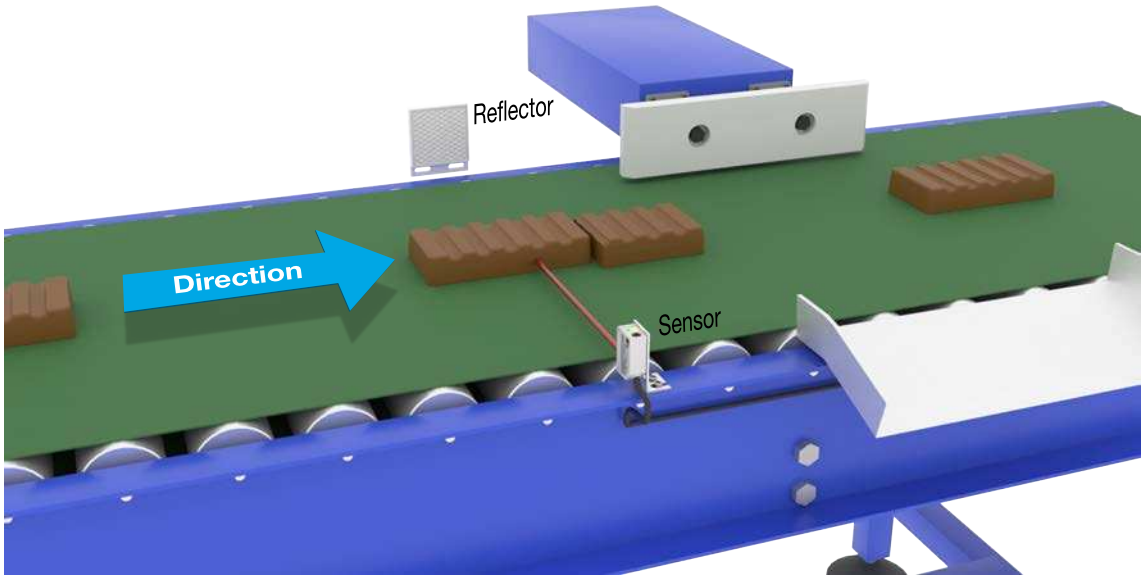
Application functions

Divider



A decentral counting function that gives a signal when a preset count level is reached e.g. when a certain items are packed in a carton box it ask for a new box.

Object and Gap Monitoring



This function is designed to monitor that the length of an objects and the gap between the following object on a conveyor belt are within certain limits.

PD30 series
IO-Link smart photoelectric sensors

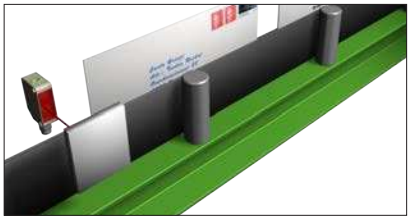
The sensing principle

Diffuse-Reflective

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

Retro-Reflective and Polarized Reflective

Emitter and receiver in one and the same 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.

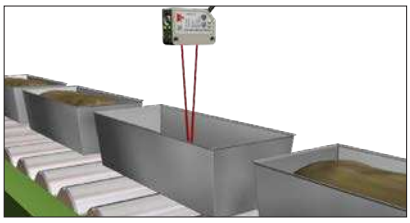


Retro-Reflective *PointSpot*

Emitter and receiver in one and the same 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 retro-reflective *PointSpot* sensor emits a highly visible and well-defined light spot without any disturbing "halo".
The polarized reflective sensors are also able to detect objects with bright shiny surfaces.

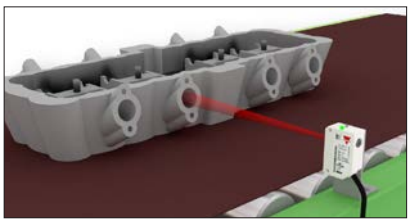
Background Suppression

A background suppression sensor detects an object using 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.

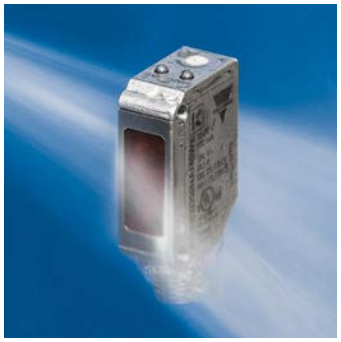


Background Suppression PointSpot

A background suppression sensor detects an object using triangulation.
The background suppression PointSpot sensor has an excellent colour variation suppression (same distance on all colours). In addition, the *PointSpot* sensor emits no disturbing halo light but produces a well-defined, visible light spot.



The advantages of the PD30 series in stainless steel



Highest degree of protection

The IP69K rating is for applications where high pressure and high temperature wash-down is used to sanitize equipment.

The PD30 Stainless steel housing withstands high-pressure cleaning processes with chemicals, and the sensor's object detection is continuous and reliable even in the harshest conditions. Certified by Ecolab.

PD30 photoelectric IO-Link Diffuse reflective types

Housing	Plastic (ABS)		Stainless steel (AISI316L)	
Connection	Plug	Cable	Plug	Cable
Infrared light (850 nm)	**PD30CTDI10BPM5IO**	**PD30CTDI10BPA2IO**	**PD30ETDI10BPM5IO**	**PD30ETDI10BPA2IO**
Red light (617 nm)	**PD30CTDR10BPM5IO**	**PD30CTDR10BPA2IO**	**PD30ETDR10BPM5IO**	**PD30ETDR10BPA2IO**
Sensing distance	100 ... 1000 mm			
Rated operating distance (S_n)	≤ 1000 mm			
IO-Link	Transmission type: COM2 (38.4 k Baud), Revision: 1.1, SDCI standard: IEC 61131-9, Profiles: Smart sensor (Process Data Variable; Device Identification), SIO mode: Yes, Required master port type: A, Min. process cycle time [ms]: 5			
Selectable function output 1	NPN, PNP or Push-Pull			
Selectable function output 2	NPN, PNP, Push-Pull, External input or External teach			
Diagnostic	Operation hours, Power cycles, Detection cyclesmax. and min. Temperatures, Short-circuit, No of Parameter change.			
Logic functions	AND, OR, X-OR, Gated SR-FF			
Timer functions	ON Delay. OFF delay, ON+OFF delay and One shot			
Sensitivity control	Trimmer input, Teach by wire or by IO-Link			
Rated operational voltage (U_B)	10 to 30 V DC (ripple included)			
No load supply current (I_o)	≤ 30 mA @ U_B min, ≤ 15 mA @ U_B max			
Minimum operational current (I_m)	> 0.5 mA			
Off-State current (I_r)	≤ 50 µA			
Voltage drop, digital (U_d)	≤ 1.0 V DC @ 100 mA DC			
Capacitive load	100 nF @ 100 mA, 24 VDC			
Frequency of operating cycles (f)	≤ 1000 Hz			
Response time t_{ON} or t_{OFF}	≤ 500 µs			
Power on delay (t_v)	≤ 150 ms			
Hysteresis (adjustable by IO-Link)	Manual: 1 ... 100% Automatic: Typical 5% ... 10% / Max. 15%			
Led indications	Yellow LED steady: Output ON and signal stability. Yellow LED flashing: Output short-circuit, timer indication and teach. Green LED steady: Power ON and signal stability. Green LED flashing: IO-Link mode. Yellow LED and green LED flashing: Find my sensor			
Sensor protection	Shortcircuit (A), reverse polarity (B) and transients (C)			
Electrostatic discharge	Contact discharge: ±4 kV. Air discharge: ±8 kV (IEC 61000-4-2; EN60947-1)			
Electrical fast transients/burst	±2kV/5kHz (IEC 61000-4-4; EN60947-1)			
Surge	1kV (with 500 Ω)			
Wire conducted disturbances	10 Vrms (IEC 61000-4-6; EN60947-1)			
Power - frequency magnetic fields	30 A/m, 38 µ tesla (IEC 61000-4-8)			
Radiated RF electromagnetic fields	10 V/m (IEC 61000-4-3)			
Vibration	10 to 150 Hz, 1 mm/15G in X,Y and Z direction (EN 60068-2-6)			
Shock	30G /11 mS. 6 positive and 6 negative in X,Y and Z direction (EN 60068-2-27)			
Drop test	2 times from 1m, 100 times from 0,5m (EN 60068-2-31)			
Degree of protection	IP67 (IEC60539; EN60947-1)		IP67, IP68, IP69K (IEC60539; EN60947-1; DIN40050-9)	
NEMA type	1 (NEMA 250)		1, 2, 4, 4X, 5, 6, 6P, 12 (NEMA 250)	
Ambient temperature	Operating: -25 to +50°C (-13 to +122°F). Storage: -40 to +70°C (-40 to +158°F)			
CE marking	According to EN 60947-5-2			
Approvals	cULus (UL508)		cULus (UL508), ECOLAB	
Overvoltage category	III (IEC60664; EN 60947-1)			
Pollution degree	3 (EN60947-1)			
$MTTF_d$	138.5 years @ 40°C (104°F)			
Material	Body: ABS. Front glass: PMMA, red. Trimmer shaft: POM, grey.		Body: Stainless steel, AISI316L. Front glass: PPSU, red. Trimmer shaft: PEEK, light grey.	
Cable	PCV, black, 2 m, 4 x 0.14 mm², Ø=3.3 mm			
Connector	M8, 4-pin, male			
Dimensions	Cable and Plug: 10.8 x 30 x 20 mm		Cable and Plug: 11 x 31.5 x 21 mm	
Weight incl. packaging	Cable version ≤ 50 g, Plug version ≤ 20 g		Cable version ≤ 100 g, Plug version ≤ 65 g	
Accessories, additional	Connectors: CO..54NF-... -series. Mounting brackets: APD30-MB1 or APD30-MB2		Connectors: CO..54NF-..W -series. Mounting brackets: APD30-MB1 or APD30-MB2	

*) Stainless Steel sensors

PD30 series
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PD30 photoelectric IO-Link Retro-reflective types

Housing	Plastic (ABS)		Stainless steel (AISI316L)	
Connection	Plug	Cable	Plug	Cable
Red light (620 nm)	**PD30CTRR60BPM5IO**	**PD30CTRR60BPBPA2IO**	**PD30ETRR60BPM5IO**	**PD30ETRR60BPBPA2IO**
Red light Polarized (620 nm)	**PD30CTPR60BPM5IO**	**PD30CTPR60BPBPA2IO**	**PD30ETPR60BPM5IO**	**PD30ETPR60BPBPA2IO**
Red light Polarized + Pointspot (620 nm)	**PD30CTPS50BPM5IO**	**PD30CTPS50BPBPA2IO**	**PD30ETPS50BPM5IO**	**PD30ETPS50BPBPA2IO**
Sensing distance	PD30xTxR60: 1.7 ... 6 m; PD30xTPS50: 2.5 ... 5 m			
Rated operating distance (S_n)	PD30xTxR60: ≤ 6 m (ER4, Ø80), ≤ 4 m (ER4060); PD30xTPS50: ≤ 5 m (ER4, Ø80), ≤ 3 m (ER4060)			
IO-Link	Transmission type: COM2 (38.4 k Baud), Revision: 1.1, SDCI standard: IEC 61131-9, Profiles: Smart sensor (Process Data Variable; Device Identification), SIO mode: Yes, Required master port type: A, Min. process cycle time [ms]: 5			
Selectable function output 1	NPN, PNP or Push-Pull			
Selectable function output 2	NPN, PNP, Push-Pull, External input or External teach			
Diagnostic	Operation hours, Power cycles, Detection cyclesmax. and min. Temperatures, Short-circuit, No of Parameter change.			
Logic functions	AND, OR, X-OR, Gated SR-FF			
Timer functions	ON Delay. OFF delay, ON+OFF delay and One shot			
Sensitivity control	Trimmer input, Teach by wire or by IO-Link			
Rated operational voltage (U_B)	10 to 30 V DC (ripple included)			
No load supply current (I_o)	≤ 30 mA @ U_B min, ≤ 15 mA @ U_B max			
Minimum operational current (I_m)	> 0.5 mA			
Off-State current (I_r)	≤ 50 µA			
Voltage drop, digital (U_d)	≤ 1.0 V DC @ 100 mA DC			
Capacitive load	100 nF @ 100 mA, 24 VDC			
Frequency of operating cycles (f)	≤ 1000 Hz			
Response time t_{ON} or t_{OFF}	≤ 500 µs			
Power on delay (t_v)	≤ 150 ms			
Hysteresis (adjustable by IO-Link)	Manuel: 1% - 100% Automatic: Typ. 5% - 10%/ Max. 15%			
Led indications	Yellow LED steady: Output ON and signal stability. Yellow LED flashing: Output short-circuit, timer indication and teach. Green LED steady: Power ON and signal stability. Green LED flashing: IO-Link mode. Yellow LED and green LED flashing: Find my sensor			
Sensor protection	Shortcircuit (A), reverse polarity (B) and transients (C)			
Electrostatic discharge	Contact discharge: ±4 kV. Air discharge: ±8 kV (IEC 61000-4-2; EN60947-1)			
Electrical fast transients/burst	±2kV/5kHz (IEC 61000-4-4; EN60947-1)			
Surge	1kV (with 500 Ω)			
Wire conducted disturbances	10 Vrms (IEC 61000-4-6; EN60947-1)			
Power - frequency magnetic fields	30 A/m, 38 µ tesla (IEC 61000-4-8)			
Radiated RF electromagnetic fields	10 V/m (IEC 61000-4-3)			
Vibration	10 to 150 Hz, 1 mm/15G in X,Y and Z direction (EN 60068-2-6)			
Shock	30G /11 mS. 3 positive and 3 negative in X,Y and Z direction (EN 60068-2-27)			
Drop test	2 times from 1m, 100 times from 0,5m (EN 60068-2-31)			
Degree of protection	IP67 (IEC60539; EN60947-1)		IP67, IP68, IP69K (IEC60539; EN60947-1; DIN40050-9)	
NEMA type	1 (NEMA 250)		1, 2, 4, 4X, 5, 6, 6P, 12 (NEMA 250)	
Ambient temperature	Operating: -25 to +60°C (-13 to +140°F). Storage: -40 to +85°C (-40 to +185°F)			
CE marking	According to EN 60947-5-2			
Approvals	cULus (UL508)		cULus (UL508), ECOLAB	
Overvoltage category	III (IEC60664; EN 60947-1)			
Pollution degree	3 (EN60947-1)			
$MTTF_d$	138.5 years @ 40°C (104°F)			
Material	Body: ABS. Front glass: PMMA, red. Trimmer shaft: POM, grey.		Body: Stainless steel, AISI316L. Front glass: PPSU, red. Trimmer shaft: PEEK, light grey.	
Cable	PCV, black, 2 m, 4 x 0.14 mm², Ø=3.3 mm			
Connector	M8, 4-pin, male			
Dimensions	Cable and Plug: 10.8 x 30 x 20 mm		Cable and Plug: 11 x 31.5 x 21 mm	
Weight incl. packaging	Cable version ≤ 50 g, Plug version ≤ 20 g		Cable version ≤ 100 g, Plug version ≤ 65 g	
Accessories, additional	Connectors: CO..54NF-... -series. Mounting brackets: APD30-MB1 or APD30-MB2		Connectors: CO..54NF-..W -series. Mounting brackets: APD30-MB1 or APD30-MB2	

c UL us CE ECOLAB *) IP69K *) IO-Link

*) Stainless Steel sensors

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PD30 photoelectric IO-Link Background suppression types

Housing	Plastic (ABS)		Stainless steel (AISI316L)	
Connection	Plug	Cable	Plug	Cable
Infrared light (850 nm)	**PD30CTBI20BPM5IO**	**PD30CTBI20BPA2IO**	**PD30ETBI20BPM5IO**	**PD30ETBI20BPA2IO**
Red light (620 nm)	**PD30CTBR20BPM5IO**	**PD30CTBR20BPA2IO**	**PD30ETBR20BPM5IO**	**PD30ETBR20BPA2IO**
Red light long range (620 nm)	**PD30CTBR35BPM5IO**	**PD30CTBR35BPA2IO**	**PD30ETBR35BPM5IO**	**PD30ETBR35BPA2IO**
Red light pointspot (620 nm)	**PD30CTBS25BPM5IO**	**PD30CTBS25BPA2IO**	**PD30ETBS25BPM5IO**	**PD30ETBS25BPA2IO**
Sensing distance	PD30xTBx20: 25 ... 200 mm; PD30xTBR35: 25 ... 350 mm; PD30xTBS25: 25 ... 250 mm			
Rated operating distance (S_n)	PD30xTBx20: ≤ 200 mm; PD30xTBR35: ≤ 350 mm; PD30xTBS25: ≤ 250 mm			
IO-Link	Transmission type: COM2 (38.4 k Baud), Revision: 1.1, SDCI standard: IEC 61131-9, Profiles: Smart sensor (Process Data Variable; Device Identification), SIO mode: Yes, Required master port type: A, Min. process cycle time [ms]: 5			
Selectable function output 1	NPN, PNP or Push-Pull			
Selectable function output 2	NPN, PNP, Push-Pull, External input or External teach			
Diagnostic	Operation hours, Power cycles, Detection cyclesmax. and min. Temperatures, Short-circuit, No of Parameter change.			
Logic functions	AND, OR, X-OR, Gated SR-FF			
Timer functions	ON Delay. OFF delay, ON+OFF delay and One shot			
Sensitivity control	Trimmer input, Teach by wire or by IO-Link			
Rated operational voltage (U_B)	10 to 30 V DC (ripple included)			
No load supply current (I_o)	≤ 30 mA @ U_B min, ≤ 15 mA @ U_B max			
Minimum operational current (I_m)	> 0.5 mA			
Off-State current (I_r)	≤ 50 µA			
Voltage drop, digital (U_d)	≤ 1.0 V DC @ 100 mA DC			
Capacitive load	100 nF @ 100 mA, 24 VDC			
Frequency of operating cycles (f)	≤ 1000 Hz			
Response time t_{ON} or t_{OFF}	≤ 500 µs			
Power on delay (t_v)	≤ 150 ms			
Hysteresis (adjustable by IO-Link)	Manual: PD30xTBx20: 2 ... 225 mm; PD30xTBS25: 2 ... 275 mm; PD30xTBR35: 2 ... 375 mm Automatic: PD30xTBx20: 14 mm (Factory settings (FS)); PD30xTBS25: 17 mm (FS); PD30xTBR35: 24 mm (FS)			
Led indications	Yellow LED steady: Output ON and signal stability. Yellow LED flashing: Output short-circuit, timer indication and teach. Green LED steady: Power ON and signal stability. Green LED flashing: IO-Link mode. Yellow LED and green LED flashing: Find my sensor			
Sensor protection	Shortcircuit (A), reverse polarity (B) and transients (C)			
Electrostatic discharge	Contact discharge: ±4 kV. Air discharge: ±8 kV (IEC 61000-4-2; EN60947-1)			
Electrical fast transients/burst	±2kV/5kHz (IEC 61000-4-4; EN60947-1)			
Surge	1kV (with 500 Ω)			
Wire conducted disturbances	10 Vrms (IEC 61000-4-6; EN60947-1)			
Power - frequency magnetic fields	30 A/m, 38 µ tesla (IEC 61000-4-8)			
Radiated RF electromagnetic fields	10 V/m (IEC 61000-4-3)			
Vibration	10 to 150 Hz, 1 mm/15G in X,Y and Z direction (EN 60068-2-6)			
Shock	30G /11 mS. 6 positive and 6 negative in X,Y and Z direction (EN 60068-2-27)			
Drop test	2 times from 1m, 100 times from 0,5m (EN 60068-2-31)			
Degree of protection	IP67 (IEC60539; EN60947-1)		IP67, IP68, IP69K (IEC60539; EN60947-1; DIN40050-9)	
NEMA type	1 (NEMA 250)		1, 2, 4, 4X, 5, 6, 6P, 12 (NEMA 250)	
Ambient temperature	Operating: -25 to +50°C (-13 to +122°F). Storage: -40 to +70°C (-40 to +158°F)			
CE marking	According to EN 60947-5-2			
Approvals	cULus (UL508)		cULus (UL508), ECOLAB	
Overvoltage category	III (IEC60664; EN 60947-1)			
Pollution degree	3 (EN60947-1)			
$MTTF_d$	138.5 years @ 40°C (104°F)			
Material	Body: ABS. Front glass: PMMA, red. Trimmer shaft: POM, grey.		Body: Stainless steel, AISI316L. Front glass: PPSU, red. Trimmer shaft: PEEK, light grey.	
Cable	PCV, black, 2 m, 4 x 0.14 mm², Ø=3.3 mm			
Connector	M8, 4-pin, male			
Dimensions	Cable and Plug: 10.8 x 30 x 20 mm		Cable and Plug: 11 x 31.5 x 21 mm	
Weight incl. packaging	Cable version ≤ 50 g, Plug version ≤ 20 g		Cable version ≤ 100 g, Plug version ≤ 65 g	
Accessories, additional	Connectors: CO..54NF-... -series. Mounting brackets: APD30-MB1 or APD30-MB2		Connectors: CO..54NF-..W -series. Mounting brackets: APD30-MB1 or APD30-MB2	

c UL us CE ECOLAB *) IP69K *) IO-Link

*) Stainless Steel sensors

Photoelectrics
Retro-reflective, Polarized, for Transparent Objects
Type PD 60 CNG..BP.. T

CARLO GAVAZZI

- **Range 80 cm or 140 cm**
- **Modulated, visible red light, polarized**
- **High immunity to shiny surfaces**
- **Teach-in (keyboard or remote setup)**
- **Keyboard setup and multifunction LED**
- **Keyboard lock**
- **Microprocessor controlled and EEPROM parameter storage**
- **Operational voltage 10 - 30 V DC**
- **Output 100 mA, NPN and PNP**
- **Light or dark switching selectable**
- **Cable or M8 standard plug**
- **IP67 proctection**
- **Timer: ON-delay or OFF-delay**
- **cUL and CE approved**

Product Description

The PD60CNG is a retro-reflective, polarized amplifier made specific for detecting transparent objects such as glass, PET etc. The sensor is microprocessor based and has built-in programmable functions such as Teach-In for fast sensing distance optimising, NO or NC output, time delay ON or OFF. The sensor output is a push-pull output that performs both a NPN and PNP output which are fully protected against short-circuit, transients and wrong polarity. The sensor housing is a strong 13 x 30 x 60 mm polycarbonate housing and ready for DIN-rail mounting.
The sensor works with one optical axis which gives a more precise detection. The sensor is designed for use in the material handling and packaging industry as well as the plastic and rubber industry.

Ordering Key

PD 60 CNG 14 BP M5 T

Type
Housing style
Housing size
Housing material
Not used
Transparent object detection
Sensing distance cm
Output type
Output configuration
Connection type
Teach-In mode

Type Selection

Housing W x H x D	Range S_n (ER 5060 reflector)	Ordering no. NPN and PNP cable Make or break switching	Ordering no. NPN and PNP plug Make or break switching
13 x 30 x 60 mm	80 cm	**PD 60 CNG 08 BP T**	**PD 60 CNG 08 BP M5 T**
	140 cm	**PD 60 CNG 14 BP T**	**PD 60 CNG 14 BP M5 T**

Note: Reflectors to be ordered separately

Specifications

Rated operating distance (S_n)	Up to 80 cm or 140 cm with ER 5060 reflector
Sensitivity	
Teach-In	Automatic threshold set-up
Manual fine tune	Sensitivity increase or sensitivity decrease
Temperature drift	< 0.4%/C°
Hysteresis (H)	
Differential travel	< 4%
Rated operational volt. (U_B)	10 to 30 VDC (ripple included)
Ripple (U_{rpp})	≤ 10%
Output current	
Continuous (I_e)	100 mA
Short-time (I)	100 mA
No load supply current (I_o)	≤ 45 mA
Voltage drop (U_d)	
I_L = 100 mA	≤ 2 VDC
I_L = 10 mA	≤ 1 VDC
Remote input	
ON	≤ 1.4 VDC
OFF	≥ 3.0 VDC
Timer	
Range programmable	0 to 5 s in 11 steps
First step	40 ms
Following step	500 ms
Protection	Short-circuit, reverse polarity, transients
Light source	GaAlAs, LED 660 nm
Light type	Red modulated
Ambient light	
Incandescent light	10'000 Lux
Sunlight	20'000 Lux

CARLO GAVAZZI

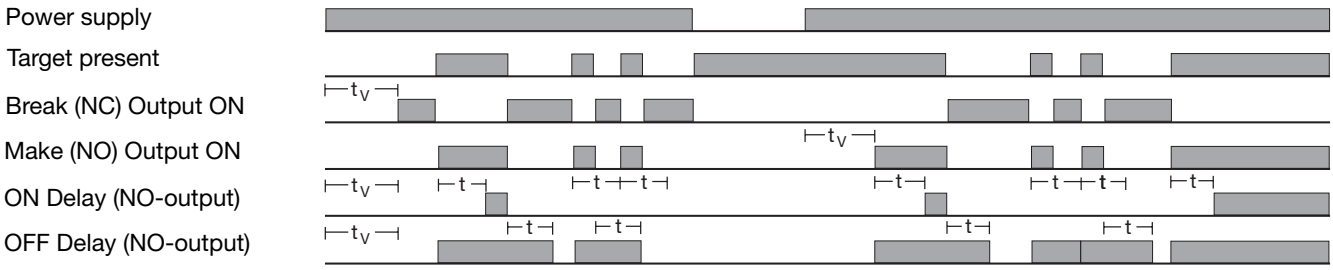
Specifications (cont.)

Operating frequency	1 KHz
Response time	
OFF-ON (t_{ON})	≤ 500 µS
ON-OFF (t_{OFF})	≤ 500 µS
Power ON delay (t_v)	≤ 300 mS
Output function	
NPN and PNP	Available (Push-pull output)
Make or break	Programming by keyboard
Indication function	Target detected, timer ON, sensitivity, alignment, low signal, keyboard lock, short circuit
Environment	
Installation category	I (IEC 60664/60664A;60947-1)
Pollution degree	3 (IEC 60664/60664A;60947-1)
Degree of protection	IP 67 (IEC 60529; 60947-1)

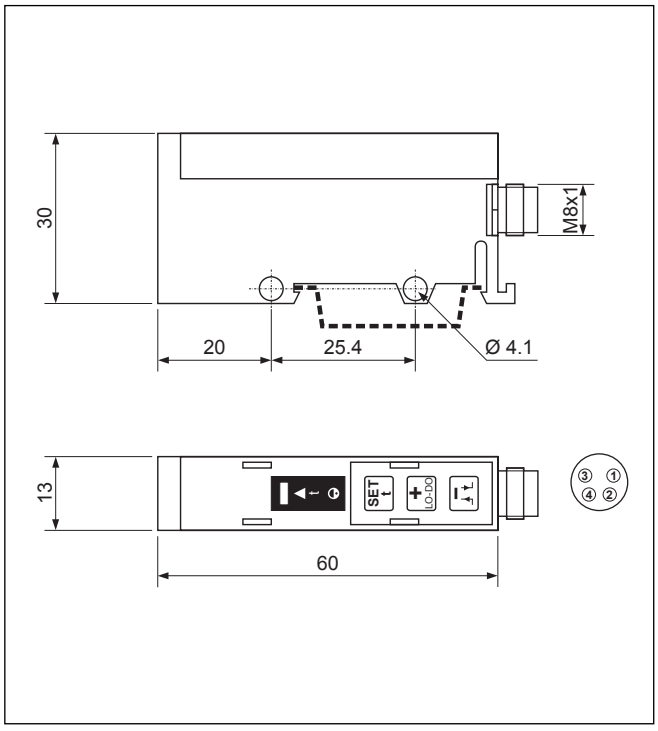
Temperature	
Operating	0° to +50°C (32° to +122°F)
Storage	-20° to +80°C (-4° to +176°F)
Vibration	10 to 150 Hz, 0.5 mm/7.5 g (IEC60068-2-6)
Shock	2 x 1 m & 100 x 0.5 m (IEC 60068-2-6, 60068-2-32)
Rated insulation voltage	50 VAC (rms)
Housing material	
Body	Polycarbonate
Connection	
Cable	PVC, grey, 2 m, 4 x 0,25 mm²
Plug	NPB, M8 x 1
Cables for plug (M5)	CONG5A-series
Weight	24 g
Approvals	cUL
CE-marking	Yes

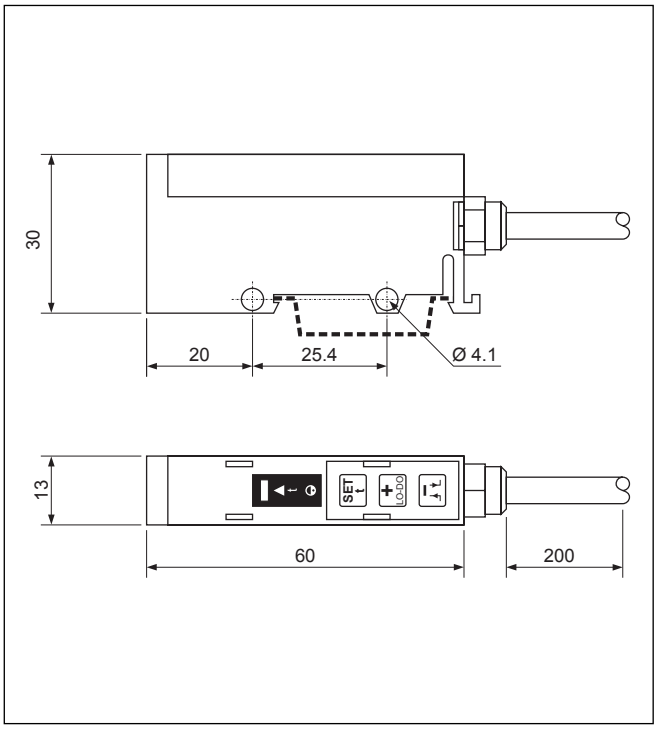
Operation Diagram

tv = Power ON delay



Dimensions





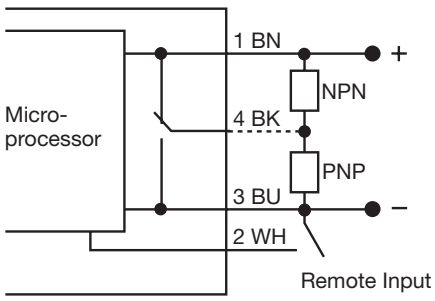
CARLO GAVAZZI

Programming Functions

Keyboard	
Unlock	Press LO-DO & ▽ for 4 sec. and the indicator turn OFF ○
Lock	Press LO-DO & ▽ for 4 sec. and the indicator turn ON ○
Self-Teach operation	
Coarse set-up mode	Press SET t one time
Fine set-up mode (Similar to Remote Input)	Press SET t two times
Sensitivity adjustment	
To increase	Press LO-DO N time
To decrease	Press ▽ N times
Light or dark operation	
Change the output function	Press LO-DO for 4 sec.

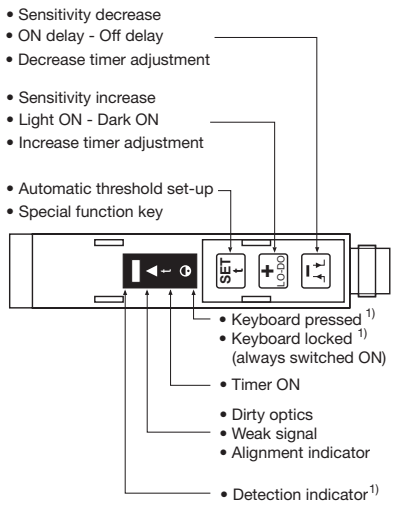
Timing functions	
ON delay	Press SET t for 4 sec.
Set timer (timer ON)	Until the △ flashes
Increase time (500 mS/step)	Press LO-DO N times
Decrease time (500mS/step)	Press ▽ N times
ON or OFF delay (toggle)	Press ▽ for 4 sec.
Reset timer (timer OFF)	Press SET t
Exit timer setting	Press SET t for 4 sec.
Alignment help	
Enter alignment help	Press SET t for 4 sec. Until the △ flashes Three frequences proportional to the signal strength
Exit alignment help	Press SET t for 4 sec.

Wiring Diagram



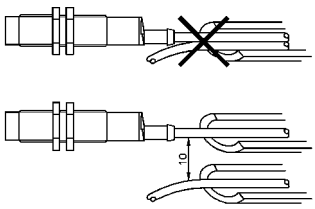
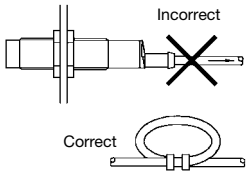
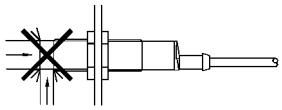
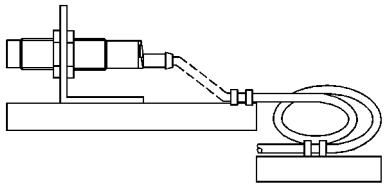
When remote input is not used, connect the (2 WH) wire to the +input (1 BN)

Keyboard and LED



1) The LED's flash if a short-circuit occurs on the static output and emitter is turned off.

Installation Hints

To avoid interference from inductive voltage/ current peaks, separate the prox. switch power cables from any other power cables, e.g. motor, contactor or solenoid cables	*Relief of cable strain*	*Protection of the sensing face*	*Switch mounted on mobile carrier*
			
	The cable should not be pulled	A proximity switch should not serve as mechanical stop	Any repetitive flexing of the cable should be avoided

Delivery Contents

- Photoelectric switch: PD60CNG..BP..T
- Installation instruction
- **Packaging:** Cardboard box

Accessories

- Reflector ER series

For further information refer to “Accessories”

Photoelectrics, Fibre Optic Sensor
Glass Fibres
Type PD 60 CNV 20 BP ..

- **Range: Fibre dependent**
  - **Diffuse Reflective typ. 80 mm**
  - **Through Beam typ. 200 mm**
- **Manual distance set-up by keyboard +/-**
- **Sensitivity bar graph LEDs**
- **Microprocessor controlled and EEPROM parameter storage**
- **Operational voltage 10 - 30 VDC**
- **Output 100 mA, NPN and PNP**
- **Light or dark switching selectable**
- **IP65 protection**

Product Description

The PD60CNV20BP.. is a fibre optic amplifier made specific for glass fibres up to 250° C. The sensor is microprocessor based and has a manual distance set-up by keyboard. NO or NC (light or dark mode) output are selectable by wiring. The sensor output is build as a Push-pull output that performs both a NPN and PNP output which are fully protected against short-circuit, transients and wrong polarity. The sensor is build in a strong 13 x 30 x 60 mm polycarbonate housing for DIN-rail mounting.
The sensors are suitable for applications that require little space and high accuracy such as: Small part detection, tight locations, checking parts, counting, precise part positioning, material handling and assembly and robotics

Ordering Key

PD 60 CNV 20 BP M5

- **Type**
- **Housing style**
- **Housing size**
- **Housing material**
- **Not used**
- **Glass fibres**
- **Sensing distance cm**
- **Output type**
- **Output configuration**
- **Connection type**

Type Selection

Housing W x H x D	Range S_n (Fibre dependent)	Ordering no. NPN and PNP cable Make or break switching	Ordering no. NPN and PNP plug Make or break switching
13 x 30 x 60 mm	80 mm diffuse mode 200 mm through beam mode	**PD 60 CNV 20 BP**	**PD 60 CNV 20 BP M5**

Specifications

Rated operating distance (S_n)	See optical fibre table
Diffuse mode	Up to 80 mm
Through beam mode	Up to 200 mm
Sensitivity	
Manual distance setup	Sensitivity increase or decrease by pressing + or - keyboard
Temperature drift	< 0,4%/C°
Hysteresis (H)	
Differential travel	≤ 5%
Rated operational volt. (U_B)	10 to 30 VDC (ripple included)
Ripple (U_{rpp})	≤ 10%
Output current	
Continuous (I_e)	100 mA
Short-time (I)	100 mA
No load supply current (I_o)	≤ 40 mA
Voltage drop (U_d)	
I_L = 100 mA	≤ 2 VDC
I_L = 10 mA	≤ 1 VDC
Remote input	
ON	≤ 1.4 VDC
OFF	≥ 3.0 VDC
Protection	Short-circuit, reverse polarity, transients
Light source	GaAlAs, LED 660 nm
Light type	Red modulated
Ambient light	
Incandescent light	10'000 Lux
Sunlight	20'000 Lux
Operating frequency	1 KHz
Response time	
OFF-ON (t_{ON})	≤ 500 µs
ON-OFF (t_{OFF})	≤ 500 µs
Power ON delay (t_v)	≤ 300 ms

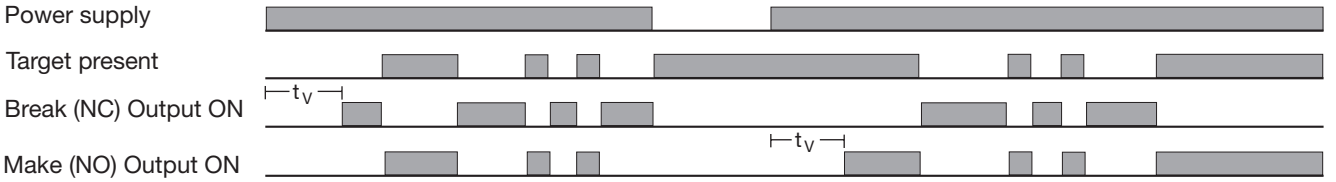
Specifications (cont.)

Output function	
NPN and PNP	Available (Push-Pull output)
Make or break	Programming by wiring
Indication function	
Output	Green LED
Sensitivity	Bar graph, red
Environment	
Installation category	I (IEC 60664/60664A;60947-1)
Pollution degree	3 (IEC 60664/60664A;60947-1)
Degree of protection	IP 65 (IEC 60529; 60947-1)
Temperature	
Operating	0° to +60°C (32° to +140°F)
Storage	-20° to +80°C (-4° to +176°F)

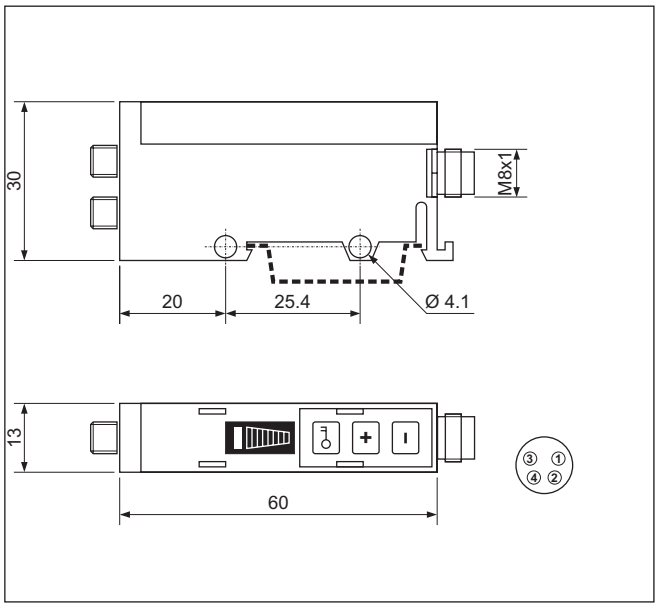
Vibration	10 to 150 Hz, 0.5 mm/7.5 g (IEC60068-2-6)
Shock	2 x 1 m & 100 x 0.5 m (IEC 60068-2-6, 60068-2-32)
Rated insulation voltage	50 VAC (rms)
Housing material	
Body	Polycarbonate
Connection	
Cable	PVC, grey, 2 m, 4 x 0,25 mm^2
Plug	NPB, M8 x 1
Cables for plug (M5)	CONG5A-series
Weight	24 g
Approvals	cUL
CE-marking	Yes

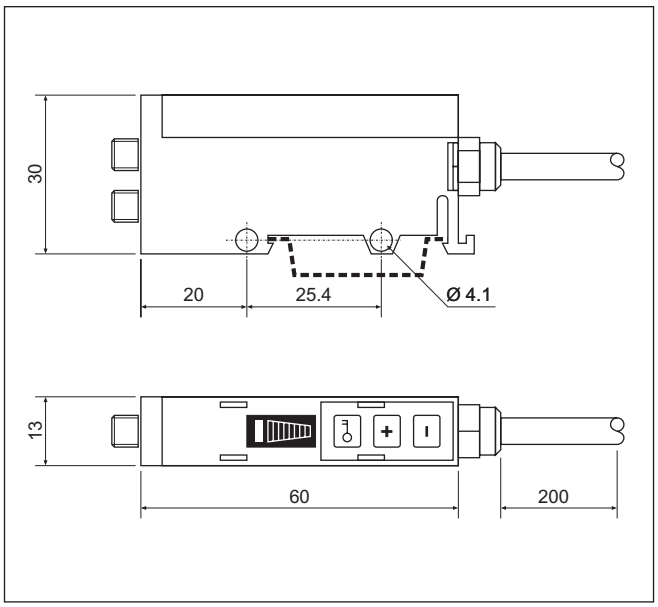
Operation Diagram

tv = Power ON delay



Dimensions





CARLO GAVAZZI

Programming Functions

Keyboard

Unlock — Press [⊓O] for 3 sec. until the bar graph stops flashing

Lock — Press [⊓O] for 3 sec. until the bar graph stops flashing

Sensitivity adjustment

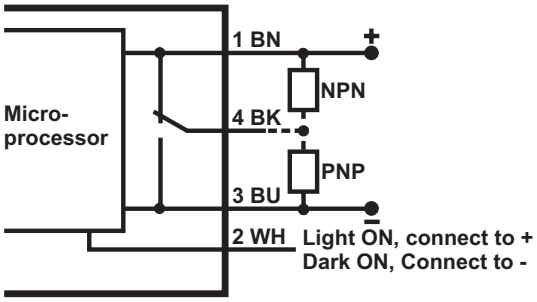
To increase — Press [+] step by step or continuous action.

Upper LED will flash (2 sec.) when maximum sensitivity is reached.

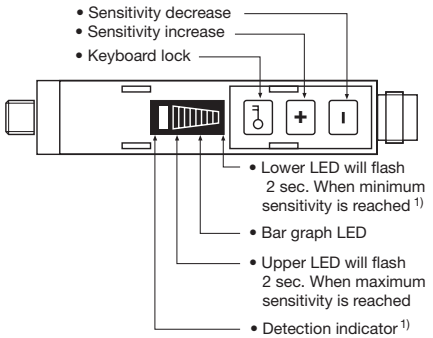
To decrease — Press [−] step by step or continuous action

Lower LED will flash (2 sec.) when minimum sensitivity is reached

Wiring Diagram



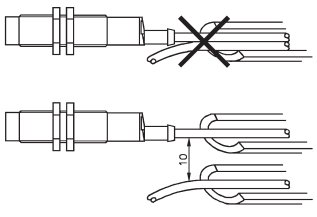
Keyboard and LED



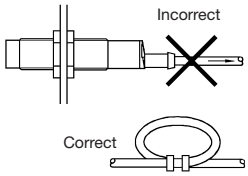
1) The LED's flash if a short-circuit occurs on the static output and emitter is turned off.

Installation Hints

To avoid interference from inductive voltage/ current peaks, separate the prox. switch power cables from any other power cables, e.g. motor, contactor or solenoid cables

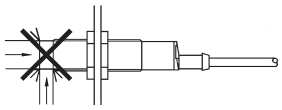


Relief of cable strain



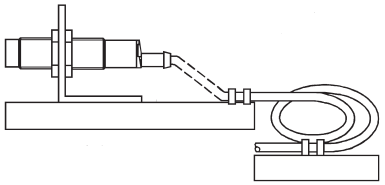
The cable should not be pulled

Protection of the sensing face



A proximity switch should not serve as mechanical stop

Switch mounted on mobile carrier



Any repetitive flexing of the cable should be avoided

Delivery Contents

- Photoelectric switch: PD60CNV20BP..
- Installation instruction
- **Packaging:** Cardboard box

Accessories

- Plastic fibres type FGD.., FGT..
- Connector type: CONG5A../CON.54NF

For further information refer to “Accessories”

Photoelectrics, Fibre Optic Sensor
Glass Fibres
Type PD 60 CNV 20 BP .. T

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- **Range: Fibre dependent**
  - **Diffuse Reflective typ. 80 mm**
  - **Through Beam typ. 200 mm**
- **Teach-In (keyboard or remote setup)**
- **Microprocessor controlled and EEPROM parameter storage**
- **Operational voltage 10 - 30 V DC**
- **Output 100 mA, NPN and PNP**
- **Light or dark switching selectable**
- **IP65 proctection**
- **Timer: ON-delay or OFF-delay**

Product Description

The PD60CNV20BP.. T is a fibre optic amplifier made specific for glass fibres with temperature up to 250° C. The sensor is microprocessor based and has a build in programmable functions such as Teach-In function for fast sensing distance optimising, NO or NC output, Time delay ON or OFF The sensor output is build as a Push-pull output that performs both a NPN and PNP output which are fully protected against short-circuit, transients and wrong polarity. The sensor is build in a strong 13 x 30 x 60 mm polycarbonate housing for DIN-rail mounting.
The sensors are suitable for applications that require little space and high accuracy such as: Small part detection, tight locations, checking parts, counting, precise part positioning, material handling and assembly and robotics

Ordering Key

PD 60 CNV 20 BP M5 T

- **Type**
- **Housing style**
- **Housing size**
- **Housing material**
- **Not used**
- **Glass fibres**
- **Sensing distance cm**
- **Output type**
- **Output configuration**
- **Connection type**
- **Teach-In mode**

Type Selection

Housing W x H x D	Range S_n (Fibre dependent)	Ordering no. NPN and PNP cable Make or break switching	Ordering no. NPN and PNP plug Make or break switching
13 x 30 x 60 mm	80 mm diffuse mode 200 mm through beam mode	**PD 60 CNV 20 BP T**	**PD 60 CNV 20 BP M5 T**

Specifications

Rated operating distance (S_n)	See optical fibre table
Diffuse mode	Up to 80 mm
Through beam mode	Up to 200 mm
Sensitivity	
Teach-In	Automatic threshold set-up
Manual fine tune	Sensitivity increase or sensitivity decrease
Temperature drift	< 0,4%/C°
Hysteresis (H)	
Differential travel	≤ 5%
Rated operational volt. (U_B)	10 to 30 VDC (ripple included)
Ripple (U_{rpp})	≤ 10%
Output current	
Continuous (I_e)	100 mA
Short-time (I)	100 mA
No load supply current (I_o)	≤ 40 mA
Voltage drop (U_d)	
I_L = 100 mA	≤ 2 VDC
I_L = 10 mA	≤ 1 VDC
Remote input	
ON	≤ 1.4 VDC
OFF	≥ 3.0 VDC
Timer	
Range programmable	0 to 5 s in 11 steps
First step	40 ms
Following step	500 ms
Protection	Short-circuit, reverse polarity, transients
Light source	GaAlAs, LED 660 nm
Light type	Red modulated
Ambient light	
Incandescent light	10'000 Lux
Sunlight	20'000 Lux

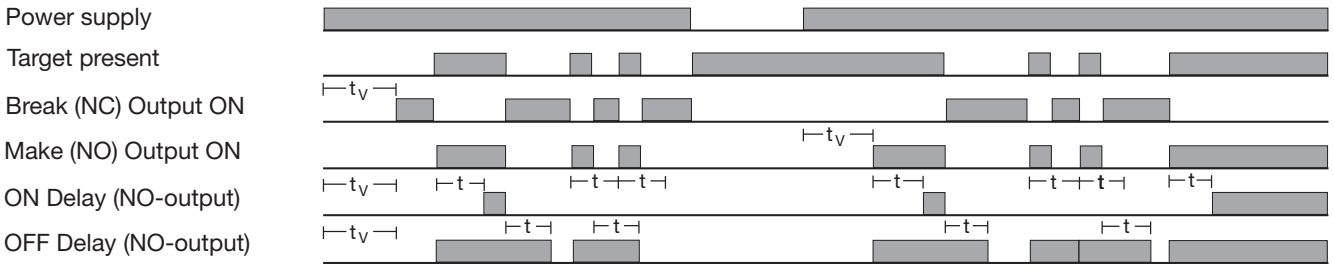
Specifications (cont.)

Operating frequency	1 KHz
Response time	
OFF-ON (t_{ON})	≤ 500 µS
ON-OFF (t_{OFF})	≤ 500 µS
Power ON delay (t_v)	≤ 300 mS
Output function	
NPN and PNP	Available (Push-pull output)
Make or break	Programming by keyboard
Indication function	Target detected, timer ON, sensitivity, alignment, low signal, keyboard lock, short circuit
Environment	
Installation category	I (IEC 60664/60664A;60947-1)
Pollution degree	3 (IEC 60664/60664A;60947-1)
Degree of protection	IP 65 (IEC 60529; 60947-1)

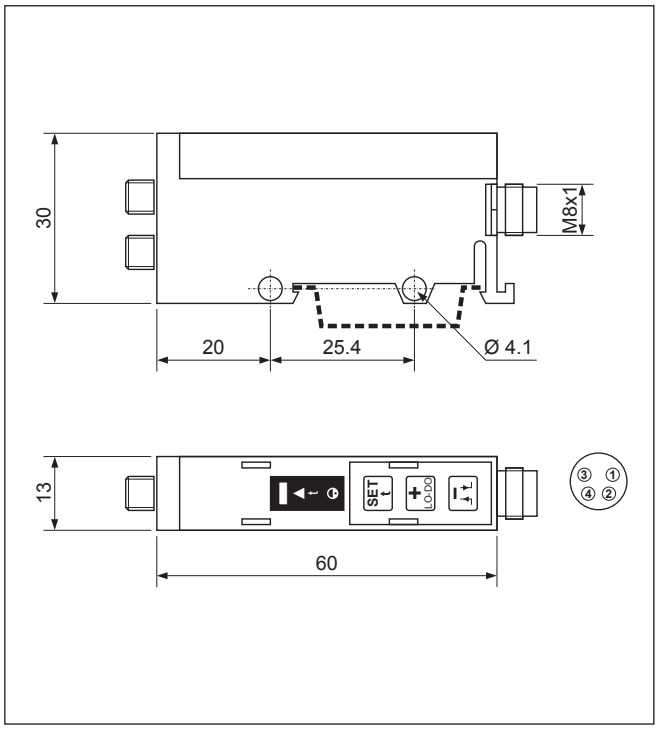
Temperature	
Operating	0° to +60°C (32° to +140°F)
Storage	-20° to +80°C (-4° to +176°F)
Vibration	10 to 150 Hz, 0.5 mm/7.5 g (IEC60068-2-6)
Shock	2 x 1 m & 100 x 0.5 m (IEC 60068-2-6, 60068-2-32)
Rated insulation voltage	50 VAC (rms)
Housing material	
Body	Polycarbonate
Connection	
Cable	PVC, grey, 2 m, 4 x 0,25 mm²
Plug	NPB, M8 x 1
Cables for plug (M5)	CONG5A-series
Weight	24 g
Approvals	cUL
CE-marking	Yes

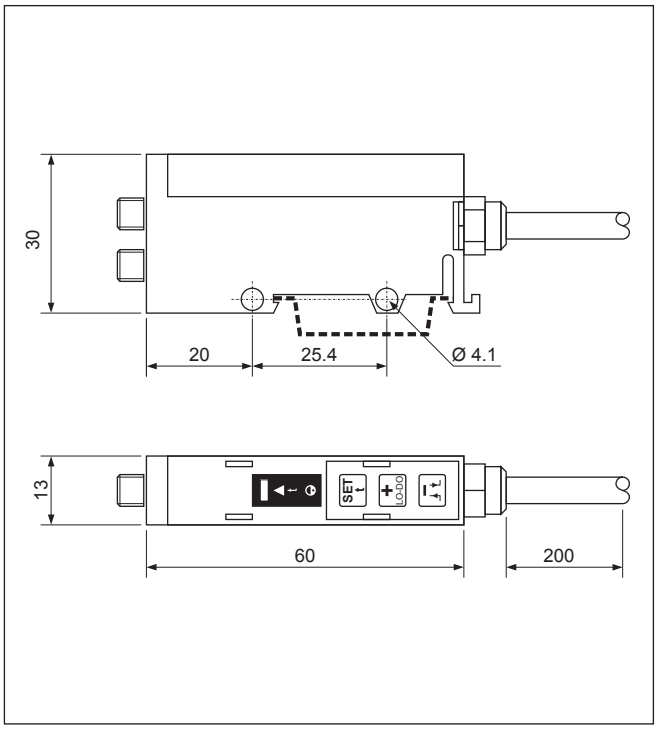
Operation Diagram

tv = Power ON delay



Dimensions





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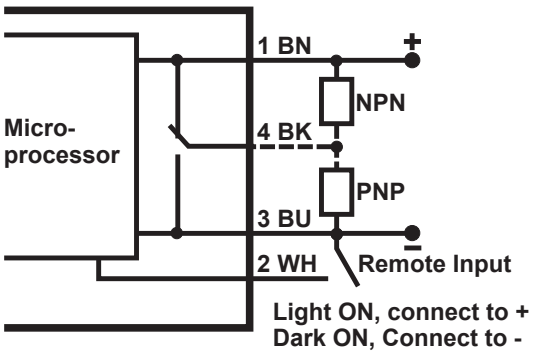
Programming Functions

Keyboard	
Unlock	Press [+ LO-DO] & [⊓] for 4 sec. and the indicator turn OFF ○
Lock	Press [+ LO-DO] & [⊓] for 4 sec. and the indicator turn ON ○
Self-Teach operation	
Coarse set-up mode	Press [SET t] one time
Fine set-up mode (Similar to Remote Input)	Press [SET t] two times
Sensitivity adjustment	
To increase	Press [+ LO-DO] N time
To decrease	Press [⊓] N times
Light or dark operation	
Change the output function	Press [+ LO-DO] for 4 sec.

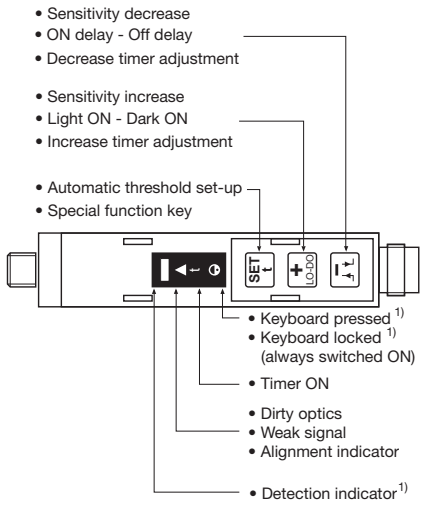
Timing functions	
ON delay	Press [SET t] for 4 sec.
Set timer (timer ON)	Until the △ flashes
Increase time (500 mS/step)	Press [+ LO-DO] N times
Decrease time (500mS/step)	Press [⊓] N times
ON or OFF delay (toggle)	Press [⊓] for 4 sec.
Reset timer (timer OFF)	Press [SET t] once
Exit timer setting	Press [SET t] for 4 sec.
Alignment help	
Enter alignment help	Press [SET t] for 4 sec.
	Until the △ flashes Three frequences proportional to the signal strength
Exit alignment help	Press [SET t] for 4 sec.

Wiring Diagram



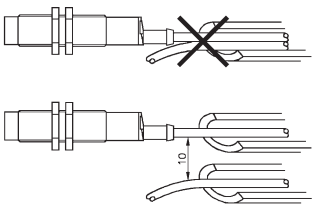
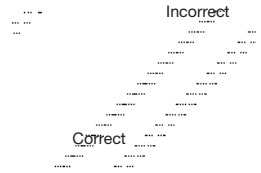
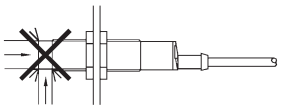
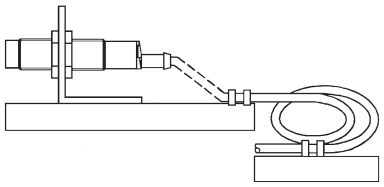
When remote input is not used, connect the (2WH) wire to the +input (1BN)

Keyboard and LED



1) The LED's flash if a short-circuit occurs on the static output and emitter is turned off.

Installation Hints

To avoid interference from inductive voltage/ current peaks, separate the prox. switch power cables from any other power cables, e.g. motor, contactor or solenoid cables	*Relief of cable strain*	*Protection of the sensing face*	*Switch mounted on mobile carrier*
			
	The cable should not be pulled	A proximity switch should not serve as mechanical stop	Any repetitive flexing of the cable should be avoided

Delivery Contents

- Photoelectric switch: PD60CNV20BP..T
- Installation instruction
- **Packaging:** Cardboard box

Accessories

- Plastic fibres type FGD.., FGT..
- Connector type: CONG5A../CON.54NF

Photoelectrics, Fibre Optic Sensor
Plastic Fibres
Type PD 60 CNX 20 BP .. T

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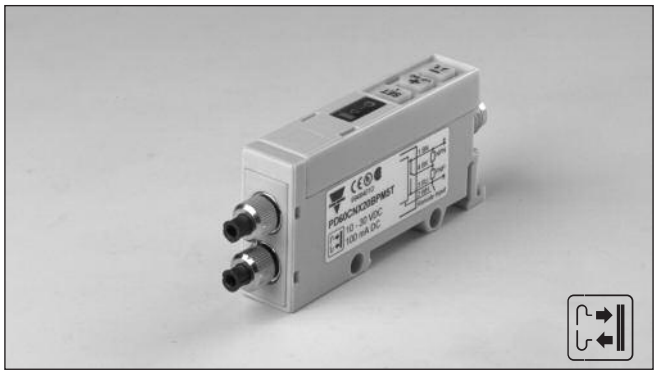


- **Range: Fibre dependent**
  - **Diffuse Reflective typ. 80 mm**
  - **Through Beam typ. 200 mm**
- **Teach-In (keyboard or remote setup)**
- **Microprocessor controlled and EEPROM parameter storage**
- **Operational voltage 10 - 30 V DC**
- **Output 100 mA, NPN and PNP**
- **Light or dark switching selectable**
- **IP65 proctection**
- **Timer: ON-delay or OFF-delay**

Product Description

The PD60CNX20BP.. T is a fibre optic amplifier made specific for plastic fibres. The sensor is microprocessor based and has a buildin programmable functions such as Teach-In function for fast sensing distance optimising, NO or NC output, Time delay Onor OFF. The sensor output is build as a Push-pull output that performs both a NPN and PNP output which are fully protected against short-circuit, transients and wrong polarity. The sensor is build in a strong 13 x 30 x 60 mm polycarbonate housing for DIN-rail mounting.
The sensors are suitable for applications that require little space and high accuracy such as: Small part detection, tight locations, checking parts, counting, precise part positioning, material handling and assembly and robotics

Ordering Key

PD 60 CNX 20 BP M5 T

- **Type**
- **Housing style**
- **Housing size**
- **Housing material**
- **Not Used**
- **Plastic fibres**
- **Sensing distance cm**
- **Output type**
- **Output configuration**
- **Connection type**
- **Teach-In mode**

Type Selection

Housing W x H x D	Range S_n (Fibre dependent)	Ordering no. NPN and PNP cable Make or break switching	Ordering no. NPN and PNP plug Make or break switching
13 x 30 x 60 mm	80 mm diffuse mode 200 mm through beam mode	**PD 60 CNX 20 BP T**	**PD 60 CNX 20 BP M5 T**

Specifications

Rated operating distance (S_n)	See optical fibre table
Diffuse mode	Up to 80 mm
Through beam mode	Up to 200 mm
Sensitivity	
Teach-In	Automatic threshold set-up
Manual fine tune	Sensitivity increase or sensitivity decrease
Temperature drift	< 0,4%/C°
Hysteresis (H)	
Differential travel	≤ 5%
Rated operational volt. (U_B)	10 to 30 VDC (ripple included)
Ripple (U_{rpp})	≤ 10%
Output current	
Continuous (I_e)	100 mA
Short-time (I)	100 mA

No load supply current (I_o)	≤ 40 mA
Voltage drop (U_d)	
I_L = 100 mA	≤ 2 VDC
I_L = 10 mA	≤ 1 VDC
Remote input	
ON	≤ 1.4 VDC
OFF	≥ 3.0 VDC
Timer	
Range programmable	0 to 5 s in 11 steps
First step	40 ms
Following step	500 ms
Protection	Short-circuit, reverse polarity, transients
Light source	GaAlAs, LED 660 nm
Light type	Red modulated
Ambient light	
Incandescent light	10'000 Lux
Sunlight	20'000 Lux

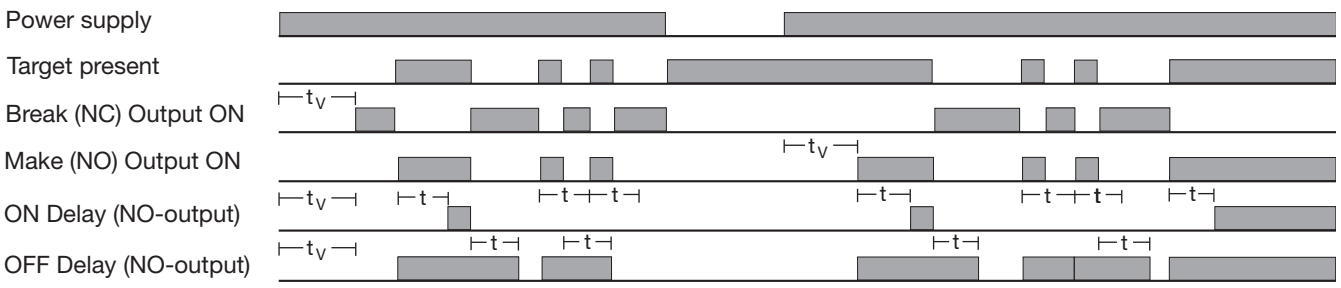
Specifications (cont.)

Operating frequency	1 KHz
Response time	
OFF-ON (t_{ON})	≤ 500 µs
ON-OFF (t_{OFF})	≤ 500 µs
Power ON delay (t_v)	≤ 300 ms
Output function	
NPN and PNP	Available (Push-pull output)
Make or break	Programming by keyboard
Indication function	Target detected, timer ON, sensitivity, alignment, low signal, keyboard lock, short circuit
Environment	
Installation category	I (IEC 60664/60664A;60947-1)
Pollution degree	3 (IEC 60664/60664A;60947-1)
Degree of protection	IP 65 (IEC 60529; 60947-1)

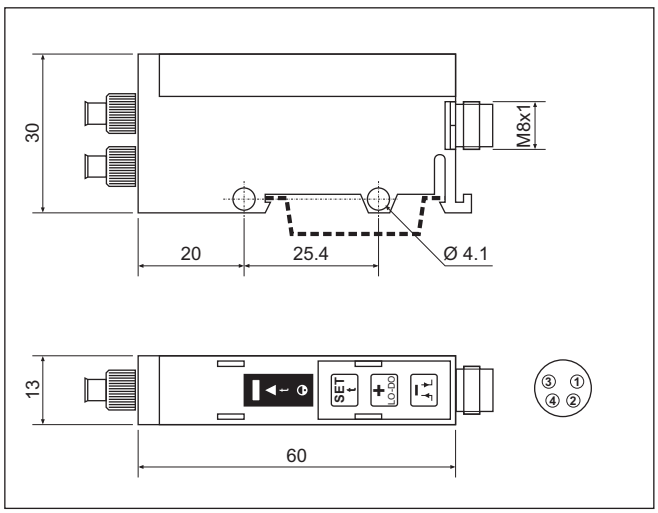
Temperature	
Operating	0° to +60°C (32° to +140°F)
Storage	-20° to +80°C (-4° to +176°F)
Vibration	10 to 150 Hz, 0.5 mm/7.5 g (IEC60068-2-6)
Shock	2 x 1 m & 100 x 0.5 m (IEC 60068-2-6, 60068-2-32)
Rated insulation voltage	50 VAC (rms)
Housing material	
Body	Polycarbonate
Connection	
Cable	PVC, grey, 2 m, 4 x 0,25 mm²
Plug	NPB, M8 x 1
Cables for plug (M5)	CONG5A-series
Weight	24 g
Approvals	cUL
CE-marking	Yes

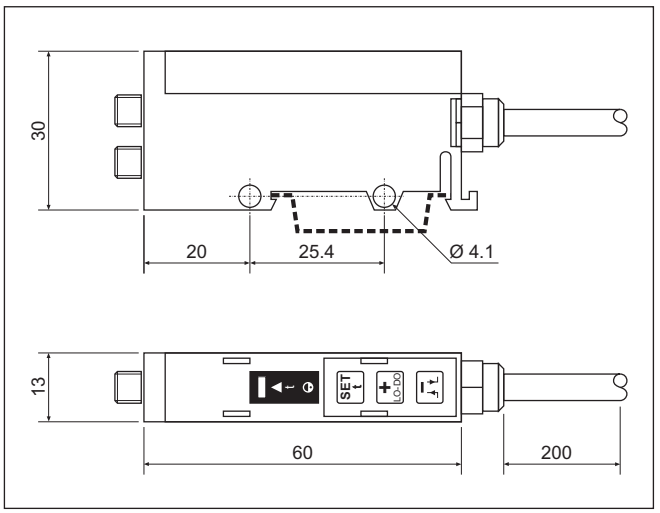
Operation Diagram

tv = Power ON delay



Dimensions





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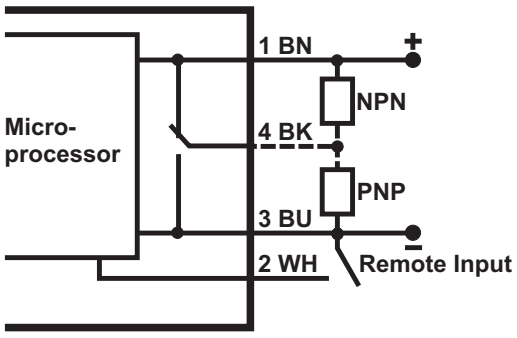
Programming Functions

Keyboard	
Unlock	Press + LO-DO & − for 4 sec. and the indicator turns OFF
Lock	Press + LO-DO & − for 4 sec. and the indicator turns ON
Self-Teach operation	
Coarse set-up mode	Press SET t one time
Fine set-up mode (Similar to Remote Input)	Press SET t two times
Sensitivity adjustment	
To increase	Press + LO-DO N time
To decrease	Press − N times
Light or dark operation	
Change the output function	Press + LO-DO for 4 sec.

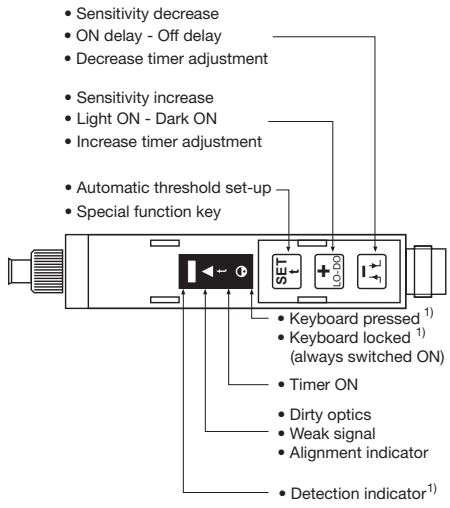
Timing functions	
ON delay	Press SET t for 4 sec.
Set timer (timer ON)	Until the △ flashes
Increase time (500 mS/step)	Press + LO-DO N times
Decrease time (500 mS/step)	Press − N times
ON or OFF delay (toggle)	Press − for 4 sec.
Reset timer (timer OFF)	Press SET t once
Exit timer setting	Press SET t for 4 sec.
Alignment help	
Enter alignment help	Press SET t for 4 sec.
	Until the △ flashes Three frequencies proportional to the signal strength
Exit alignment help	Press SET t for 4 sec.

Wiring Diagram



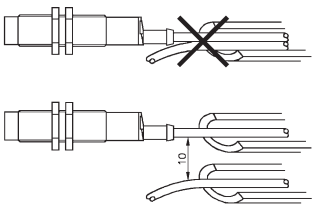
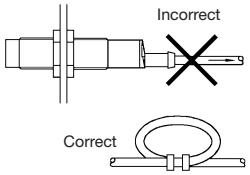
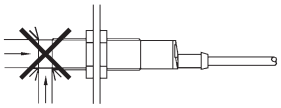
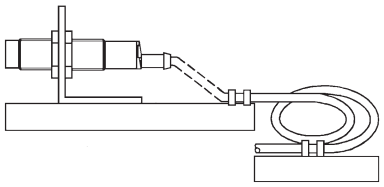
When remote input is not used, connect the (2WH) wire to the +input (1BN)

Keyboard and LED



1) The LED's flash if a short-circuit occurs on the static output and emitter is turned off.

Installation Hints

To avoid interference from inductive voltage/ current peaks, separate the prox. switch power cables from any other power cables, e.g. motor, contactor or solenoid cables	*Relief of cable strain*	*Protection of the sensing face*	*Switch mounted on mobile carrier*
	 The cable should not be pulled	 A proximity switch should not serve as mechanical stop	 Any repetitive flexing of the cable should be avoided

Delivery Contents

- Photoelectric switch: PD60CNX20BP..T
- Installation instruction
- **Packaging:** Cardboard box

Accessories

- Plastic fibres type FPD.., FPT..
- Connector type: CONG5A../CON.54NF

For further information refer to “Accessories”

PD140FNT60QMU-02C

Through Beam

Description

The PD140 sensor consists of an emitter, which sends out invisible, infrared light, and a receiver, capable of detecting the light from the emitter.
The sensor is encapsulated in a robust, vandal-proof aluminium/polycarbonate housing.
The lenses are adjustable in both ±100° horizontal and ± 15° vertical directions, which allows flexible mounting, even when emitter and receiver are mounted at different heights.
The aspherical lens design gives a superior homogeneous light beam over the total beam angle.
- Sensor test function: the emitter has a built-in test input designed to mute the emitter and thus evaluate the sensor function. The test function is to be controlled and monitored by the door controller.

Main features

- Designed for Industrial doors and gates
- ESPE type 2, Performance level d
- For door or gate widths up to 60 m
- Modulated, infrared light
- Supply voltage: 12 to 24 VAC/DC
- 1 A, SPDT relay output
- Analogue voltage output or flashing LED indication for optical alignment help
- Built-in holder for green laser alignment accessory tool
- Yellow LED for output indication
- Green LED indication for power ON
- Connection: self-lifting terminal block, 1,5 mm^2 (AWG 16)
- Emitter test input
- Robust vandal-proof aluminium/polycarbonate housing
- IP65, NEMA 1. 2. 3. 3R. 3RX. 3SX. 3X. 5. 12. 12K rating
- CE, EN12453, EN12978, UL325 and UL508 approved

Main functions

- Designed for domestic and industrial doors and gates
- Detects presence or absence of persons or vehicles by interruption of the light beam from the emitter to receiver

References

Product selection key

PD140FNT60 □ -02C

Enter the code option instead of □

Code	Option	Description	-
P	-	Photoelectric sensor	
D	-	Rectangular housing	
140	-	Length of housing	
F	-	Aluminium	
N	-	Not used	
T	-	Through-beam	
60	-	Distance [m]	
□	QMU	Matched sensor set (Receiver and Emitter)	
	Q	SPDT relay (Receiver)	Sensor is only available as a matched set
	MU	Mute input (Emitter)	Sensor is only available as a matched set
-02C	-	Black	

Type selection

Function	-	Code
Receiver and Emitter	Sensor set	**PD140FNT60QMU-02C**
Receiver	Not available	**PD140FNT60Q-02C**
Emitter	Not available	**PD140FNT60MU-02C**

Structure

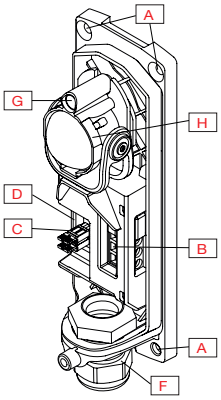


Fig. 1 *Emitter*

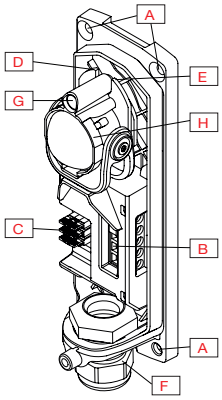


Fig. 2 *Receiver*

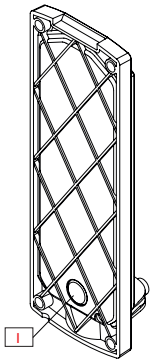


Fig. 3 *Rear view*

Element	Component	Element	Component
A	Fixing holes for sensor mounting	**F**	Cable gland for cable entry
B	Terminal block	**G**	Hole for laser adjustment tool
C	Jumpers	**H**	Lens adjustment
D	Green LED	**I**	Alternative cable entry
E	Yellow LED		

Sensing

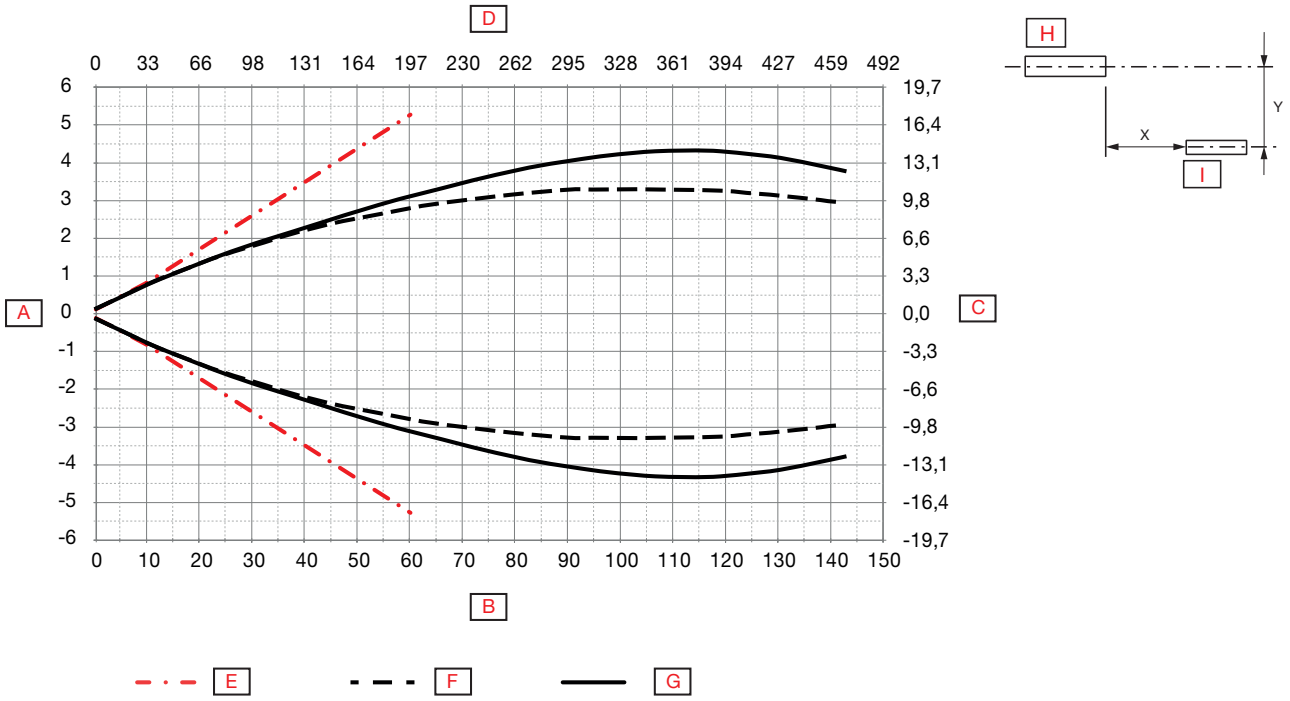
Detection

Rated operating distance (S_n)	≤ 60 m	@ target, PD140 emitter and excess gain 4
Sensitivity adjustment (Receiver)	12 m ... 60 m	Jumper pos 1
	6 m ... 12 m	Jumper pos 2
	0.6 m ... 6 m	Jumper pos 3
Blind zone	0.6 m	
Hysteresis	10 ... 20%	
Light source	850 nm	Infrared
Light type	Infrared modulated	
Detection angle	≤ ± 5°	
Emitter beam angle	≤ ± 5°	
Light spot size	3.7 m	@30 m (half sensing distance)
Lens adjustment	± 100°	Horizontal
	± 15°	Vertical

Accuracy

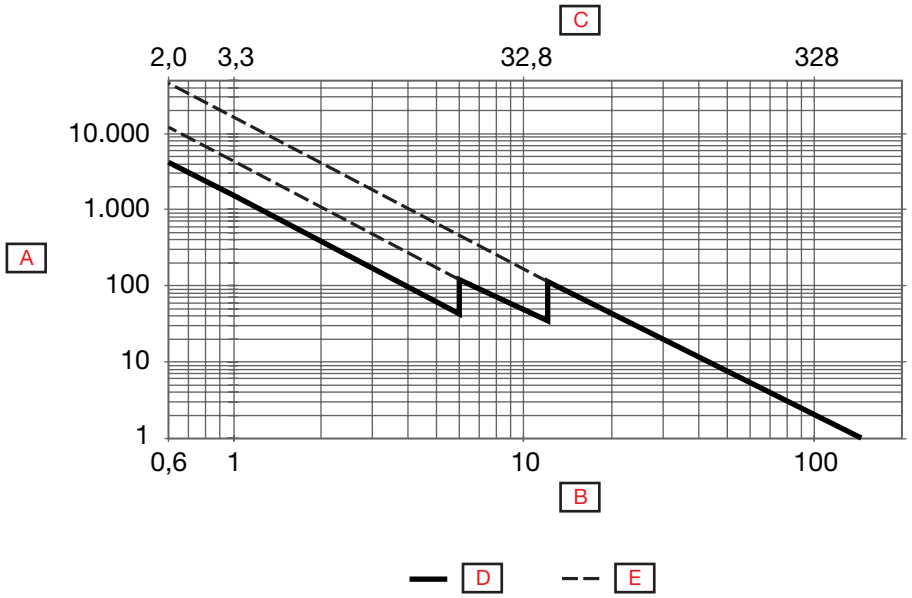
Temperature drift	≤ 0.3%/°C
Repeatability	< 5%

Detection diagram



A	Detection width [m]	**F**	OFF
B	Sensing range [m]	**G**	ON
C	Detection width [feet]	**H**	Emitter
D	Sensing range [feet]	**I**	Receiver
E	Limits		

Excess gain



A	Excess gain	**D**	ESPE 2, legal detection angle [5]
B	Sensing range [m]	**E**	ESPE 2, illegal detection angle [5]
C	Sensing range [feet]		

[5] See detection diagram

Features

Power Supply

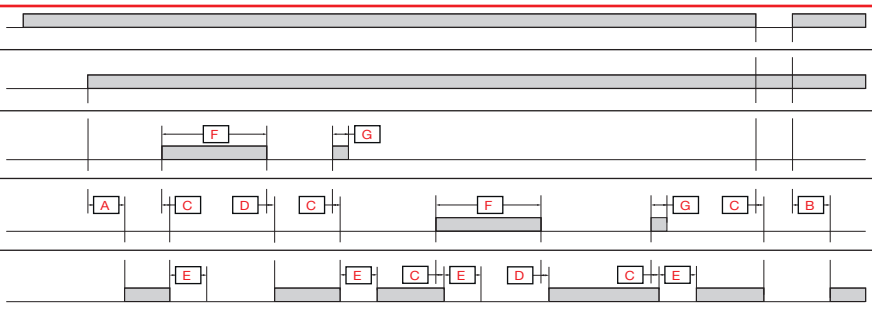
Rated operational voltage ($U_{e\text{-}min}$ - $U_{e\text{-}max}$)	12 ... 24 V AC/DC (ripple included)	
Rated operational voltage (U_B)	10.2 ... 35 V DC	
	10.2 ... 26.4 V AC	
Ripple (U_{rpp})	Within limits of U_B min	
No load supply current (I_o) DC	≤ 55 mA @ U_B max	Emitter
	≤ 50 mA @ U_B max	Receiver
No load supply current (I_o) AC	≤ 100 mA @ U_B max	Emitter
	≤ 100 mA @ U_B max	Receiver
Power-ON delay (t_v)	≤ 200 ms	Emitter
	≤ 200 ms	Receiver

Outputs

Output functions	SPDT relay	
Output switching function	N.O. and N.C.	
Output current	< 1 A / 30 VDC	Continuous(I_e)
	< 0.5 A / 50 VAC	Continuous(I_e)
Minimum operational current (I_m)	≥ 1 mA @ 5 V	
Mechanical lifetime	≥ 5 000 000 cycles	
Electrical lifetime (typical)	> 100 000 cycles @ Resistive load AC-1 and DC-1	
Protection	reverse polarity and transients	Emitter and Receiver
Utilization category	AC-1	Non-inductive or slightly inductive loads, resistive load EN 60947-4-1
	DC-1	
	AC-14	Control of small electromagnetic loads EN 60947-5-1
	DC-13	Control of electromagnets EN 60947-5-1 (with freewheeling diode)

Operation diagram

Emitter supply	ON	
Receiver Supply	ON	
Object	Break beam	
Mute/Test input	Active	
Make output (N.O.)	ON	



A	Receiver startup time (150 ms)	**E**	OFF Hold Time (80 ms)
B	Emitter startup time (150 ms)	**F**	Beam obstruction / mute active > 80 ms
C	Break response time (8 ms)	**G**	Beam obstruction / mute active < 80 ms
D	Make response time (8 ms)		

Response times

Operating frequency (f)	10 impulses / sec.	
Response times	t_{ON} (ON-OFF)	< 8 ms
	t_{OFF} (OFF-ON)	< 8 ms
	OFF Hold time	> 80 ms

Indication

Receiver

Green LED	Yellow LED	Power	Output
ON	OFF	ON	OFF
ON	ON	ON	ON
ON	Flash[1)]	ON; EG ≥ 4	OFF / Alignment mode
OFF	Flash[1)]	EG < 4	OFF / Alignment mode

[1)] Slow flashing or OFF = Not aligned, Higher flash rate= Better optical alignment
EG = Excess gain

Emitter

Green LED	-	Power	Emitting
ON	-	ON	Yes
OFF	-	ON	No (muted)

Environmental

Ambient temperature	-25°... +60°C (-13°... +140°F)	Operating [2) 3)]
	-40° ... +70°C (-40° ... +158°F)	Storage [2)]
Ambient light	≥ 100 000 lux	Incandescent light @ 3000 … 3200 °K (EN 60947-5-2)
	≥ 10 000 lux [4)]	Incandescent light 3200 °K (EN 61496-2)
	≥ 3 000 lux [4)]	Fluorescent light (EN 61496-2)
	0.05 J @ 200 Hz to 0.5 J @ 5 Hz [4)]	Stroboscopic light (EN 61496-2)
	3 to 5 J @ 0.5 to 2 Hz [4)]	Flashing beacon light (EN 61496-2)
Vibration	10 ...150 Hz, 1.0 mm/15 g	EN 60068-2-6
Shock	30 g_n / 11ms, 6 pos, 6 neg per axis	EN60068-2-27
Drop test	2 x 1 m and 100 x 0.5 m	EN 60068-2-31
Rated insulation voltage (U_i)	50 VDC	
Dielectric insulation voltage	≥ 4000 VAC rms	50/60 Hz for 1 min.
Rated impulse withstand voltage	≥ 2 kV	1.2/50 µs
Pollution degree	3	EN60947-1
Overvoltage category	III	IEC60664; EN60947-1
Degree of protection	IP65	IEC60539; EN60947-1
NEMA Enclosure Types	Indoor + outdoor: 3, 3R, 3RX, 3SX, 3X	NEMA 250
	Indoor: 1, 2, 5, 12, 12K	NEMA 250
Ambient humidity range	RH < 50% @ 70°C [2)]	
	RH < 90% @ 20°C [2)]	

[2)] With no icing or condensation
[3)] UL325 -25°... +55°C
[4)] Failure to danger (worst case alignment)

EMC

Electrostatic discharge immunity test	± 8 kV @ air discharge	IEC 61000-4-2
	± 15 kV @ contact discharge (Closed sensor with aluminium housing)	
	± 8 kV @ contact discharge (during installation)	
Radiated radio-frequency electromagnetic field immunity test (80 MHz ... 1 GHz and 1.4 GHz ... 2 GHz)	10 V/m	IEC 61000-4-3
Electrical fast transient/Burst immunity test	4 kV / 5 kHz using the capacitive coupling clamp	IEC 61000-4-4
Conducted disturbances induced by radio-frequency fields immunity test (150 kHz ... 80 MHz)	10 V rms	IEC 61000-4-6
Power frequency magnetic field immunity test	300 A/m	IEC 61000-4-8

Mechanics/electronics

Connection

Cable diameter	Ø 5 ... 10 mm	
Connection	3-pole screw terminal	Emitter
	5-pole screw terminal	Receiver
Terminal	Self-lifting terminal block, 1.5 mm² (AWG 16) ☐ 2.6 x 2 mm	

Wiring

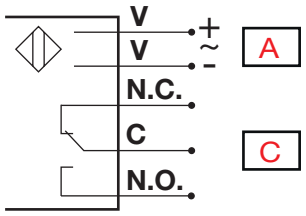


Fig. 4 *Receiver*

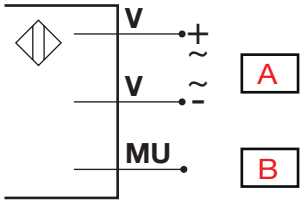


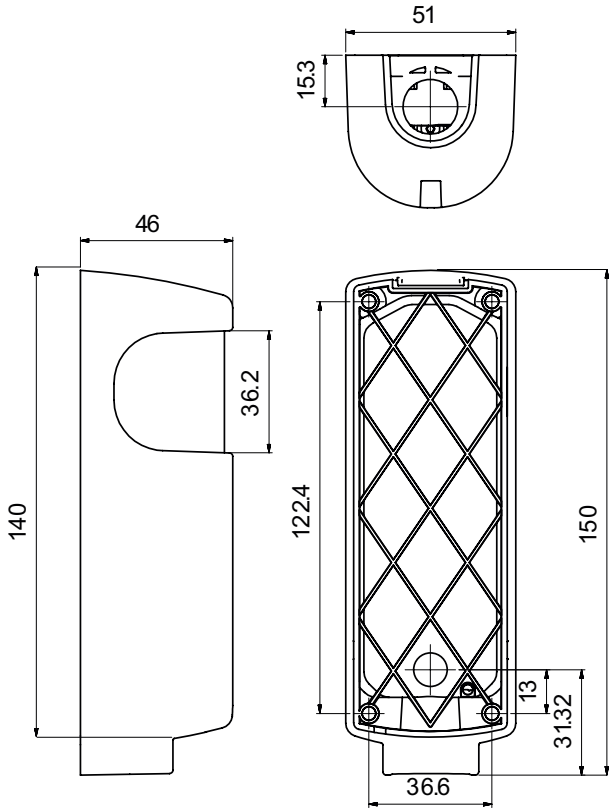
Fig. 5 *Emitter*

A	B	C
Power supply	Mute input (Test input)	Relay contacts

Housing

Cover	Aluminium, Black
Window	PC, Black
Back part	PBT, Black
Sealing	Neoprene
Cable gland	PA6, Light grey
Dimensions	140 x 51 x 46 mm
Weight	≤ 460 g (matched set)

Dimensions (mm)



Compatibility and conformity

Approvals and markings

General reference	Sensor designed according to EN60947-5-2	
$MTTF_d$ related to product life time	49.9 years @ 40°C (+104°F)	EN ISO 13849-1 (Parts count method, annex D.1), SN 29500
$MTTF_d$ related to safety device, performance $level_d$	1332 years @ 40°C (+104°F)	EN ISO 13849-1, SN 29500
CE-marking	CE	
Approvals	c US (UL325) c UL us (UL508 + C22.2)	
ESPE category	2	EN61496-2
Performance level (PL)	d	EN12453
PFH_d	8.57 x 10^{-8} Errors per hour	EN ISO 13849-1
Mission Time	20 years	EN ISO 13849-1

Delivery contents and accessories

Delivery contents

- Photoelectric sensor set: PD140FNT60Q-02C + PD140FNT60MU-02C
- Accessory bag (Screws, plugs, blind caps, cable glands)
- Packaging: Card board box

Accessories

- Laser alignment tool: APD140-LA01
- Laser alignment tool without batteries (Battery: DL1/3N, CR1/3N 3V - Lithium): APD140-LA02
- Alignment test cable: APD140-TC01

Photoelectrics
Through-beam, Relay Output, Battery Powered
Type PD180CBT30Q/MU

- **Designed for industrial doors and gates**
- **ESPE type 2, Performance level C**
- **Range 15 m or 30 m**
- **Modulated, infrared light**
- **Supply voltage: 12 to 24 VAC/DC (receiver)**
- **Supply voltage: 2 x ER14505 3.6 VDC size AA Lithium batteries (emitter)**
- **SPST relay output**
- **SPST relay low battery**
- **LED for output indication**
- **Connection, terminal block**
- **Emitter test input**
- **CE (EN 12453, EN 12978) and UL325 approved**

Product Description

The PD180CBT30Q/MU sensor is developed specifically for the domestic and industrial door market. The sensor meets the regulations for industrial doors in Europe and North America. The robust polycarbonate housing allows flexible installation as the lenses are adjustable both in horizontal and vertical direction. The sensor is easy to use and no sensitivity adjustments are necessary. The aspherical lens design is superior to previous design of sensors with built-in parabolic reflectors that had corrosion and dust problems.
Increased safety by build-in:
- Sensor test function; the emitter has a built-in test input designed to mute the emitter and thus evaluate the sensor function. Test function is to be activated by the door controller or the door function can be activated by a limit switch, magnet sensor or a safety edge profile.

The receiver works with a power-supply from 12 to 24 VAC/DC and the emitter is designed to use 2 x ER14505 3.6 VDC size AA Lithium batteries.

Ordering Key

PD180CBT30Q/MU

- **Type**
- **Housing style**
- **Housing size**
- **Housing material**
- **Battery operated**
- **Detection principle**
- **Sensing distance**
- **Output type**
- **Output configuration**
- **Mute function**

Type Selection

Housing size	Range S_n	Ordering no. Emitter	Ordering no. Receiver
180 x 51 x 49 mm	**30 m**	**PD180CBT30MU**	**PD180CBT30Q**

Specifications Emitter

Rated operating dist (S_n)	15 m with jumper not activated 30 m with jumper activated
Rated operational volt. (U_e)	2 x ER14505 3.6 VDC size AA ≥2700 mAh Lithium batteries
Battery lifetime Jumper not active Jumper active	 15m => 2.5 years 30m => 1.5 years
Supply current With Mute active (I_o)	 Typ. 29 µA
Protection	Reverse polarity, transients

Mute input Normal operation Mute	 > 6 KΩ < 4 KΩ
Light source	LED, 850 nm
Light spot size @ 15 m setting @ 30 m setting	 1.2 m @ 7.5 m 2.4 m @ 15 m
Light type	Infrared, modulated
Optical angle	± 4.1°

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Specifications Receiver

Rated operating dist. (S_n)	15 or 30 m dependent on emitter settings
Blind zone	None
Temperature drift	≤ 0.4%/°C
Hysteresis (H)	3 - 20%
Rated operational volt. (U_e)	Supply class 2 12 to 24 VDC, -15% +10%
AC: 45 Hz - 65 Hz	12 to 24 VAC, -15% +10%
Ripple (U_{rrp})	≤ 10%
Output	
Contact ratings	AgPd-Au
Resistive loads AC 1	0.5 A/30 VAC
DC 1	1 A/30 VDC
Mechanical life (typical)	≥ 10 000 000 cycles
Lifetime contacts (typical)	
AC 1	0.5 A/30 VAC 100 000
DC 1	1 A/30 VDC 100 000
Minimum load power	1 mW
No load supply current (I_o)	≤ 36 mA DC (relay ON)
+ Battery low alarm	≤ 55 mA DC (both relays ON)

Ambient light	
Incandescent light @ 3000 … 3200 °K	≥ 100 000 lux (EN 60947-5-2)
Incandescent light 3200 °K	≥ 10 000 lux* (EN 61496-2)
Fluorescent light	≥ 3 000 lux* (EN 61496-2)
Stroboscopic light	0.05 J @ 200 Hz to 0.5 J @ 5 Hz* (EN 61496-2)
Flashing beacon light	3 to 5 J @ 0.5 to 2 Hz* (EN 61496-2)
Optical angle	± 4.7°
Protection	Reverse polarity, transients
Operating frequency (f)	25 Hz
Response time OFF-ON (t_{ON})	≤ 20 ms
ON-OFF (t_{OFF})	≤ 20 ms
Power ON delay (t_v)	≤ 300 ms
Indication function	
Power ON	LED, green
Output ON	LED, yellow

* Failure to danger (worst case alignment)

General Specifications

Environment	
Overvoltage category	III (IEC 60664/EN 60947-1)
Pollution degree	3 (IEC 60664/EN 60947-1)
Degree of protection	IP 55 (IEC 60529; 60947-1)
Temperature	
Operating	-25° to +55°C (-13° to +131°F)
Storage	-25° to +80°C (-13° to +176°F)
Vibration	10 to 150 Hz, 0.5 mm/7.5 g (EN 60068-2-6)
Drop test	2 x 1 m & 100 x 0.5 m (IEC 60068-2-31)
Lens adjustment	
Adjustable optics	Horisontal 200° Vertical ±30°
Rated insulation voltage	50 VDC
Housing material	
Front	PC black
Backpart	PC black
Connection	
Emitter	2 pole terminal block
Receiver	6 pole terminal bock

Weight	
Emitter	270 g
Receiver	230 g
UL-Approval cURus	UL325, CSA-C22.2 No.247
CE-marking	Yes EN 12453, EN 12978, EN 61496-1, Type 2 ESPE
General reference	Sensor designed according to EN 60947-5-2
MTTFd related to combined product life time (Rx+Tx)	110 years @ 40°C (+104°F) (EN ISO 13849-1 (Parts count method, annex D.1), SN 29500)
ESPE architecture (Cat.)	2 (EN ISO 13849-1)
Performance level (PL.)	C (EN ISO 13849-1)
PFHd	1.04×10^{-6} Errors per hour (EN ISO 13849-1)
Mission Time	20 years (EN ISO 13849-1)

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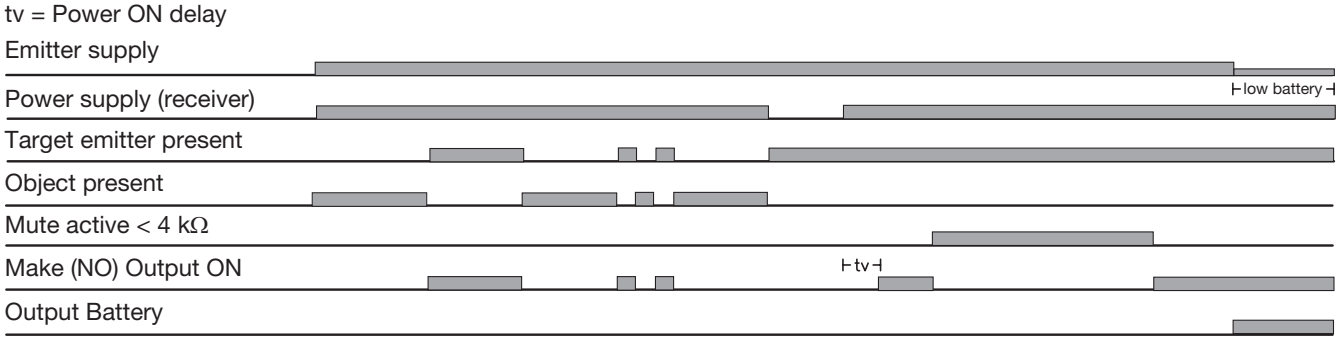
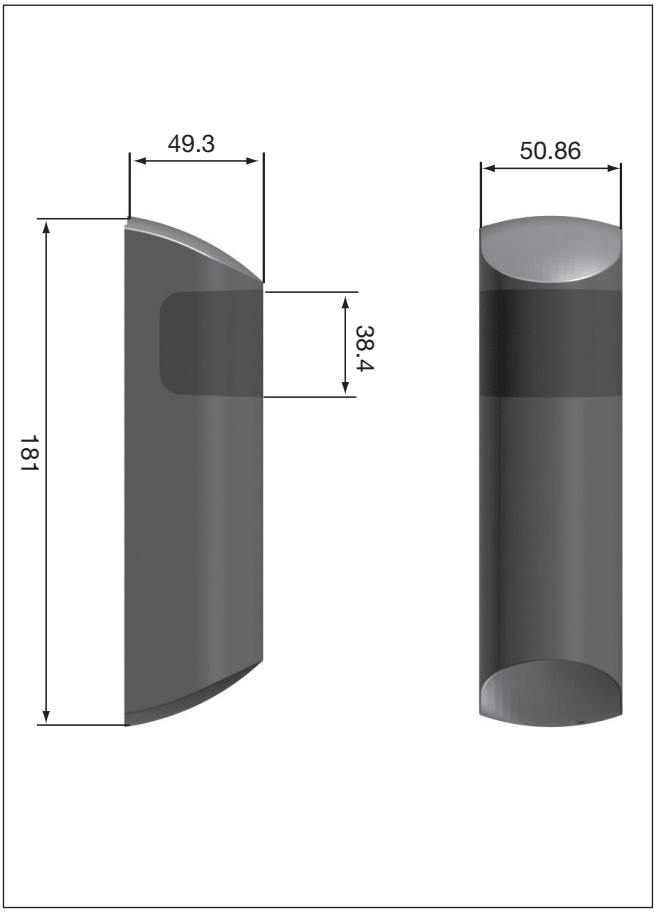
Operation Description

- The sensor shall be mounted with the draining hole facing down.
- The cable must be mounted pointing downwards to avoid water entering the sensor (See Dimensions).
- This product can only be used to detect direct interruption between Tx and Rx; it must not be reflected
- The sensors must be mounted on a hard vibration-free surface
- In order to obtain an “ESPE type 2” safety device, the sensors must be connected to a control system fittet with “Photo test” or similar sensor verification function.

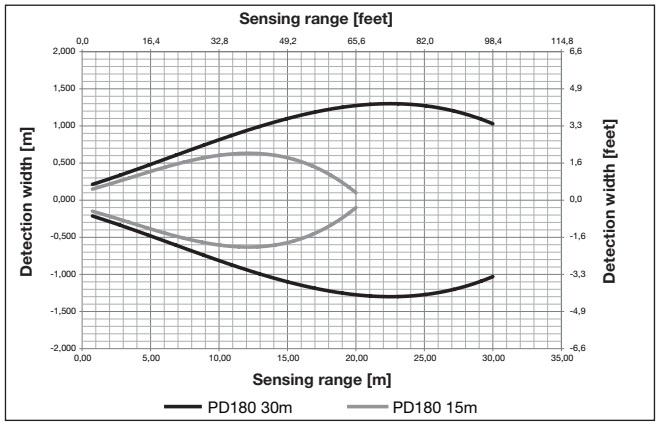
Operation Diagram



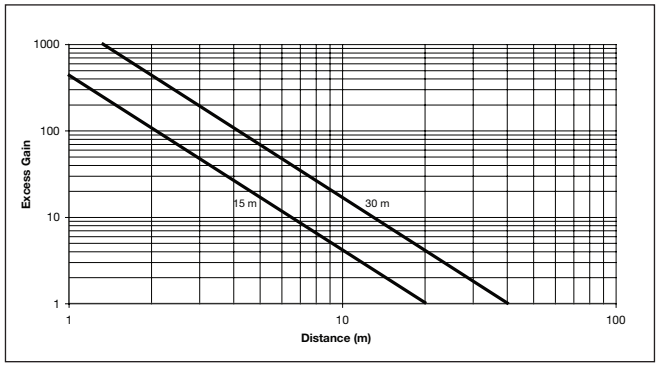
Dimensions



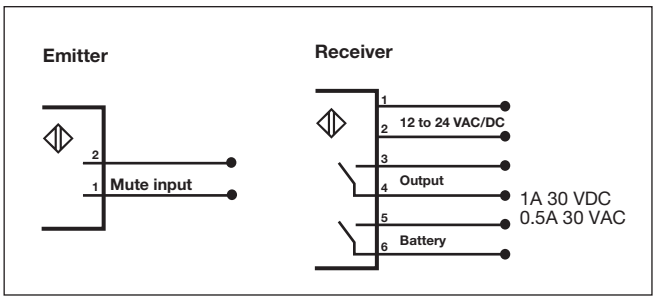
Detection Diagram



Excess Gain



Wiring Diagram

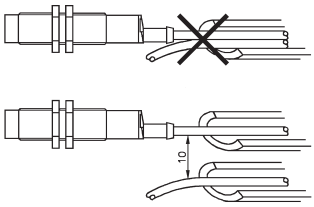


Delivery Contents

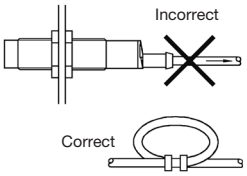
- PD180 emitter or receiver (separate box)
- Installation instruction in emitter box
- **Packaging:** Cardboard box
- 2 x 3 screws for raw plugs ø2.9 x 25 DIN 7981C
- 2 x 3 raw plugs for 8 mm hole
- 2 x 1 Strain releif
- 2 x 2 Screws for strain releif M3 x 12 mm
- 2 x 1 Cable gland

Installation Hints

To avoid interference from inductive voltage/ current peaks, separate the prox. switch power cables from any other power cables, e.g. motor, contactor or solenoid cables

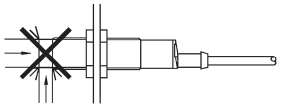


Relief of cable strain



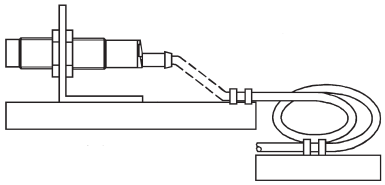
The cable should not be pulled

Protection of the sensing face



A proximity switch should not serve as mechanical stop

Switch mounted on mobile carrier



Any repetitive flexing of the cable should be avoided

По вопросам продаж и поддержки обращайтесь:

Алматы (7273)495-231
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Брянск (4832)59-03-52
Владивосток (423)249-28-31
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