# Photoelectrics
# Background Suppression
# Type PD112CNB25BP..

CARLO GAVAZZI



- **Range: 2500 mm**
- **Accurate & stable distance adjustment**
- **Modulated, infrared light 850 nm**
- **Supply voltage: 10 to 30 VDC**
- **Output: 200 mA, NPN or PNP preset**
- **Make or break switching function selectable**
- **Adjustable ON- / OFF delay, 1 – 16 sec.**
- **LED indication for output and power ON**
- **Protection: reverse polarity, short circuit and transients**
- **Cable and plug versions**
- **Excellent EMC performance**
- **Remote test feature (mute)**

## Product Description

The PD112CNB25 sensor comes in a 112 x 45 x 25 mm strong polycarbonate (PC) housing. The sensors are useful in applications where long range and high accuracy detection is required.
Robust housing, a sophisticated mechanical design and high power LED for excellent performance in harsh environments.
The sensor has a test input, for door mode, designed to remotely disable (mute) the emitter and thereby evaluate the sensor function from a door controller or e.g. a PLC.
The output type is preset (NPN and PNP) with selectable switching function NO/NC.
2 selectable modes are built in: "Industrial" for general automation and "Door" specifically for control of doors & gates.

## Ordering Key

**PD112CNB25BPM1**

- **Type**
- **Housing style**
- **Housing size**
- **Housing material**
- **Housing length**
- **Detection principle**
- **Sensing distance**
- **Output type**
- **Output configuration**
- **Connection type**

## Type Selection

| Housing<br>W x H x D | Range<br>$S_n$ | Connection | Ordering no.<br>NPN and PNP<br>Make or break switching |
|---|---|---|---|
| 25 x 107.5 x45 mm | 500 - 2500 mm | Cable | **PD 112 CNB 25 BP** |
| 25 x 107.5 x45 mm | 500 - 2500 mm | Plug | **PD 112 CNB 25 BPM1** |

## Specifications

| | |
|---|---|
| **Rated operating distance** ($S_n$) | 50 to 2500 mm, referece target Kodak test card R27, white, 90% reflective, 200 x 200 mm |
| **Background adjustment** | 500 to 2500 mm (28 turns calibration screw) |
| **Blind zone** | 50 mm |
| **Temperature drift** | ≤ 0.2%/°C |
| **Rated operational volt.** ($U_B$) | 10 to 30 VDC (ripple included) |
| **Ripple** ($U_{rpp}$) | ≤ 10% |
| **Output current** Continuous ($I_e$) | ≤ 200 mA (max. load capacity 100 nF) |
| **No load supply current** ($I_o$) | ≤ 40 mA @ 24 VDC |
| **Minimum operational current** ($I_m$) | 0.5 mA |
| **OFF-state current** ($I_r$) | ≤ 100 µA |
| **Voltage drop** ($U_d$) | ≤ 2.5VDC @ 200 mA |
| **Protection** | Short-circuit, reverse polarity and transients |
| **Light source** | GaAlAs, LED, 850 nm |

| | | |
|---|---|---|
| **Light type** | | Infrared, modulated |
| **Sensing angle** | | |
| Industry | | ± 1.9° |
| Door | | ± 2.6° |
| **Ambient light** | | 10,000 lux |
| **Light spot** | | 60 mm @ 1.5 m |
| **Operating frequency** | | |
| | Industry | 250 Hz |
| | Door | 16.7 Hz |
| **Response time** | | |
| OFF-ON ($t_{ON}$) | Industry | ≤ 2 ms |
| ON-OFF ($t_{OFF}$) | Industry | ≤ 2 ms |
| OFF-ON ($t_{ON}$) | Door | ≤ 30 ms |
| ON-OFF ($t_{OFF}$) | Door | ≤ 30 ms |
| **Power ON delay** ($t_v$) | | ≤ 50 ms |
| **Output delay** | | |
| ON-delay | | 1-16 s |
| OFF-delay | | 1-16 s |
| **Output function** | | |
| NPN and PNP | | Preset |
| NO/NC switching function | | Selectable by DIP switch |



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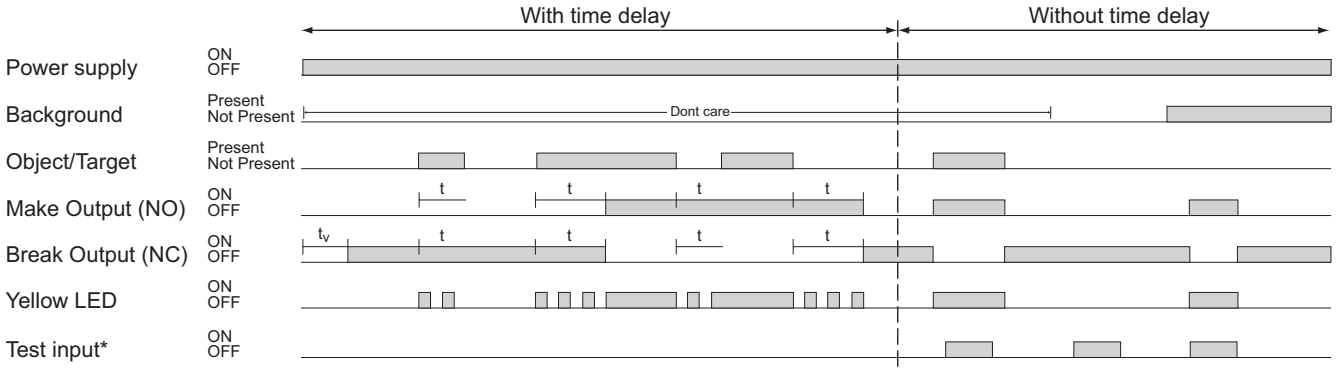
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## Specifications (cont.)

| | |
|---|---|
| **Test input** | |
| Door mode | |
| Emitter off (voltagelevel) | < 1 VDC, NPN (No pull-up resistor) or > 9 VDC PNP (No pull-down resistor) |
| Input current | < 3 mA DC |
| Industrial mode | Not avaliable |
| **Indication** | |
| Output ON | LED, yellow |
| Power ON | LED, green |
| **Environment** | |
| Installation category | III (IEC 60664/60664A; 60947-1) |
| Pollution degree | 3 (IEC 60664/60664A; 60947-1) |
| Degree of protection | IP 67 (IEC 60529; 60947-1) |
| **Ambient 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 (IEC 60068-2-6) |
| **Shock** | 2 x 1 m, 100 x 500 mm (IEC 60068-2-32) |
| **Rated insulation voltage** | 2 kV (rms) |
| **Housing material** | |
| Body | PC (polycarbonate), black |
| Cover | PC (polycarbonate), clear |
| **Connection** | |
| Cable | PVC, black, 2 m 5 x 0.34 mm², Ø = 5.2 mm |
| Plug | M12, 5-pin (CON.15NF..series) |
| **Weight** | With cable: 160 g With plug: 80 g |
| **CE-marking** | Yes |
| **Approvals** | cULus (UL508) |

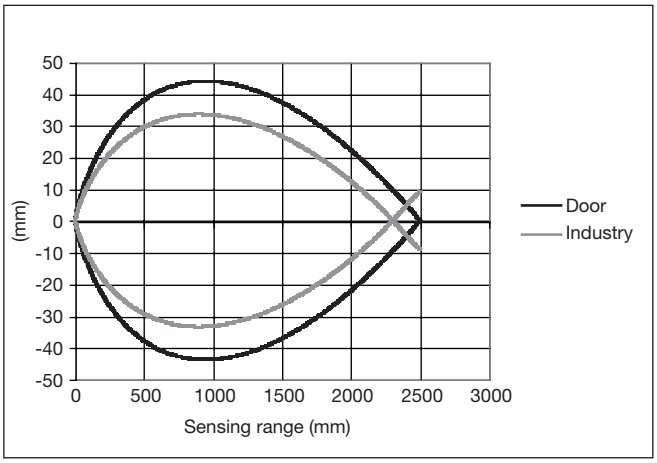
## Operation Diagram



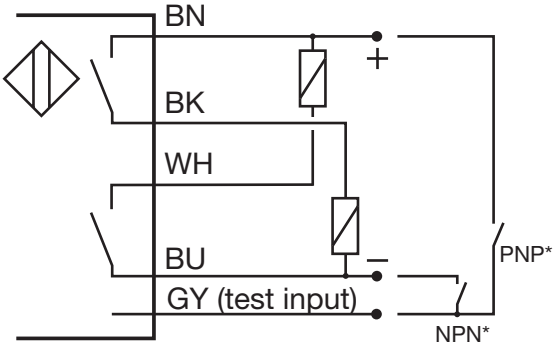

$t_v$ = Power on delay, t = Time delay (delay on operate and delay on release)

* Only active in Door Mode

## Detection Diagram




## Wiring Diagrams



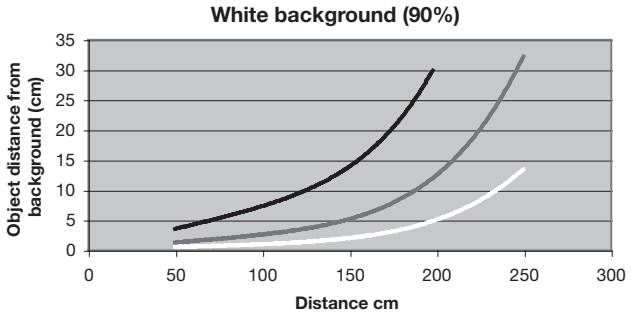

* or potential free contact



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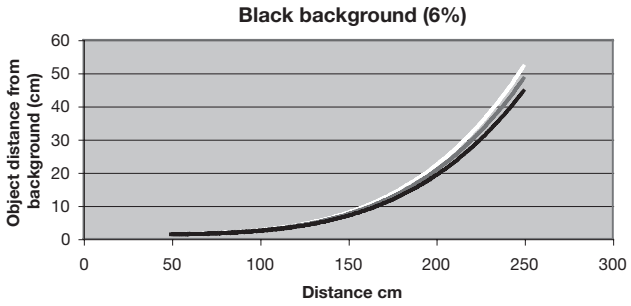
## Sensing Conditions “Industrial” mode




In this mode the maximum operating frequency is set to 250 Hz and detection is optimized for objects close to the background for top performance in general industry automation applications such as pallet wrapping machines, airport baggage conveyors, wood planks handling/stacking.

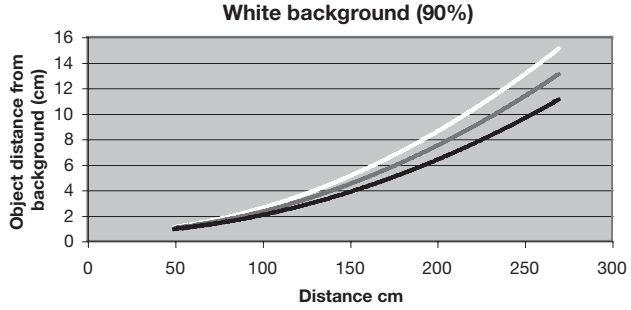
White object (90%)
Grey object (18%)
Black object (6%)

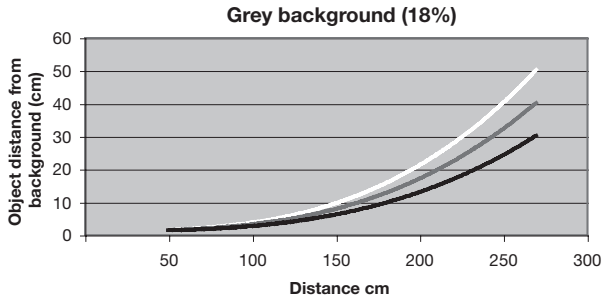
## Sensing Conditions “Door” mode



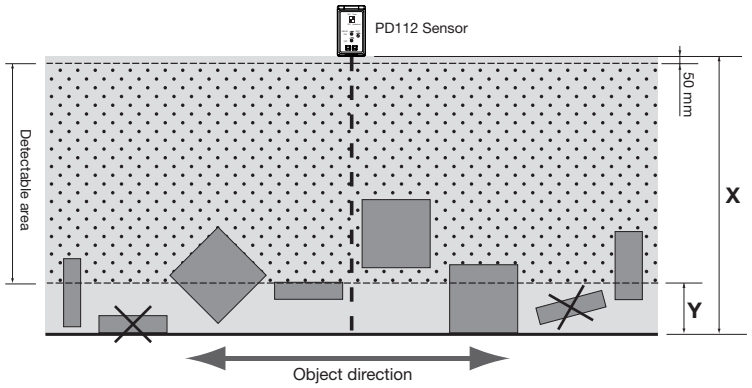

In this mode various parameters are optimized for monitoring and control of doors, from a position above the door/in the ceiling. Maximum operating frequency is set to 16.7 Hz, adapting to moving persons, and the test input – for evaluation of the sensor functioning through muting of the emitter – is enabled for use by a door controller or e.g. a PLC.

White object (90%)
Grey object (18%)
Black object (6%)




## Detection Principle




**X** = Distance to background
**Y** = Object distance (min.) from background
= Detectable objects
= Not detectable objects



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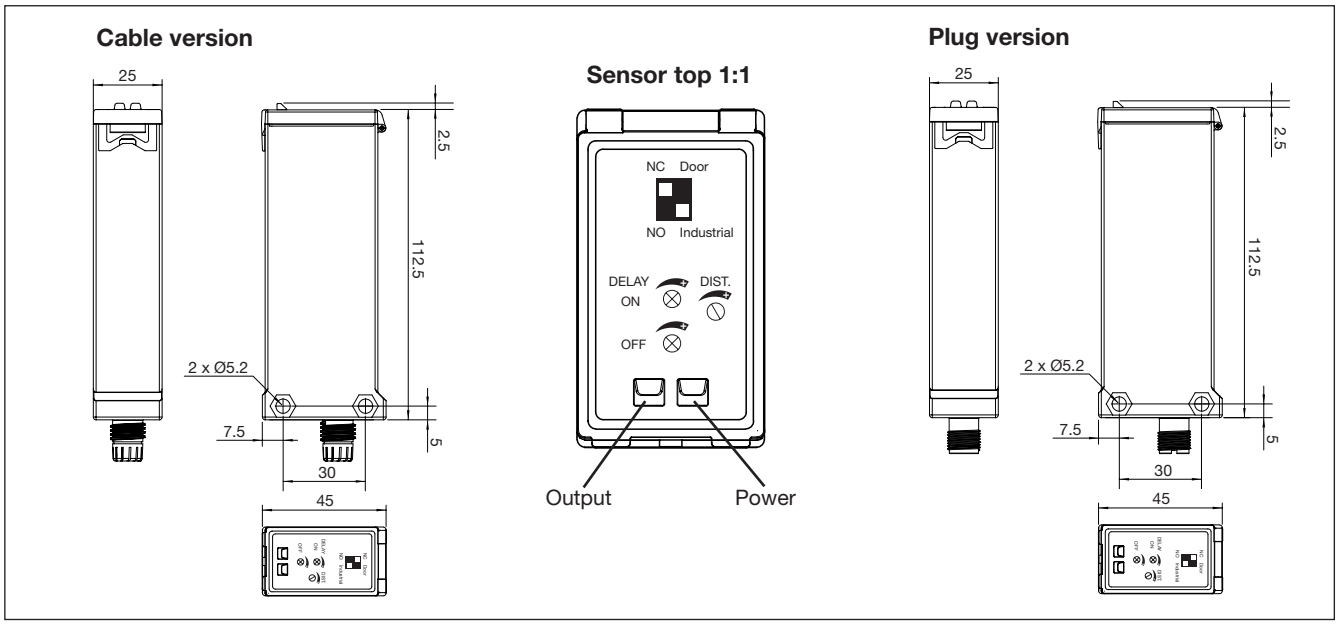
## Adjustment

Background suppression adjustment*
1. Align the sensor at the background
2. Turn distance calibration screw (28 turns) clockwise until yellow led is ON
3. Turn distance calibration screw (28 turns) counter clockwise until yellow led turns OFF
4. Background is now neglected

Object detection adjustment
1. Align the sensor at the background
2. Turn distance calibration screw (28 turns) counter clockwise until yellow led turns OFF
3. Turn distance calibration screw (28 turns) clockwise until yellow led turns ON
4. The object can now be detected

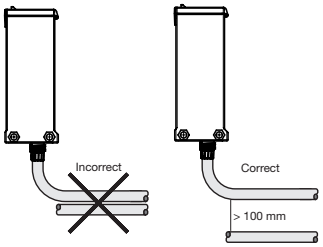
*If no background exists a white cardboard can be used as background.

## Dimensions (mm)

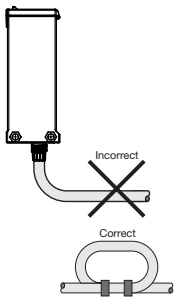



## Installation Hints

*To avoid interference from inductive voltage / current peaks, separate the proximity switch cables from any other power cables. E.g. Engine, contactor or solenoid cables*

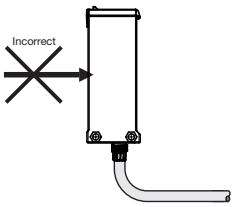



*Relief of the cable strain*



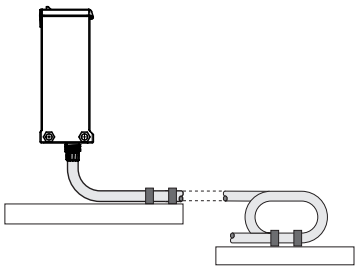

*The cable should not be pulled*

*Protection of the sensing face*




*A proximity switch should not serve as mechanical stop*

*Sensor mounted on a mobile carrier*



*Any repetitive flexing of the cable should be avoided*

## Delivery Contents

- Photoelectric switch: PD 112 CNB 25 BP..
- Screwdriver for adjustment: 77-005
- Installation instruction
- **Packaging:** Cardboard box

## Accessories

- Connector type CON.15NF.. series



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