

# PD30ETD02xxWE



## Photoelectrics, Extreme wide angle - Diffuse reflective



### Main features

- Miniature sensor range
- Sensing range: 200 mm
- Sensitivity adjustment by potentiometer
- Modulated, red light 617 nm
- Supply voltage: 10 to 30 VDC
- Output: 100 mA, NPN or PNP preset
- Make and break switching function
- LED indication for output, stability and power ON
- Protection: reverse polarity, short circuit and transients
- Cable and plug versions
- Excellent EMC performance
- The visible red light makes alignment very easy
- The extremely wide-angled light beam eliminates false detection due to e.g. large holes in a PCB
- Ecolab

### Description

The PD30ET... stainless steel sensors are built with high-quality materials and designed for harsh environments.

They are designed for use in environments where high-pressure cleaning, cleaning agents and disinfectants are used on a daily basis.

The strong stainless steel (AISI316L) together with high-quality plastic materials like PEEK, PPSU, and PES sealings of FKM ensure a safe and excellent mechanical resistance.

The compact sensor design is ideally suited to confined spaces.

### Main functions

- Detects presence or absence of objects by detecting reflected light energy from the object

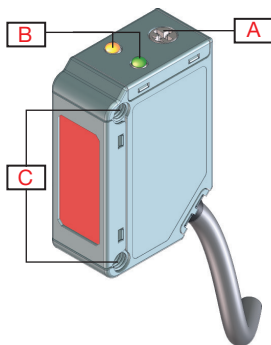


Fig. 1 Cable

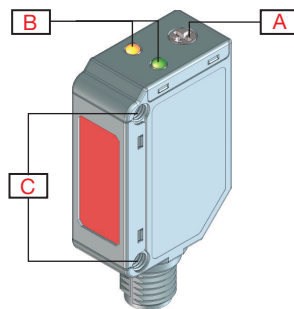


Fig. 2 Plug

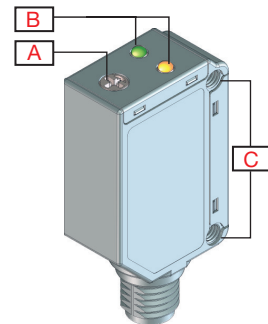


Fig. 3 Back

| Element | Component     | Function   |
|---------|---------------|--|
| A       | Potentiometer | Adjustment   |
| B       | 2 LEDs        | Green LED: Power ON / Signal stability. Yellow LED: Output |
| C       | 2 M3          | Fixing holes for sensor mounting                           |



# Sensing

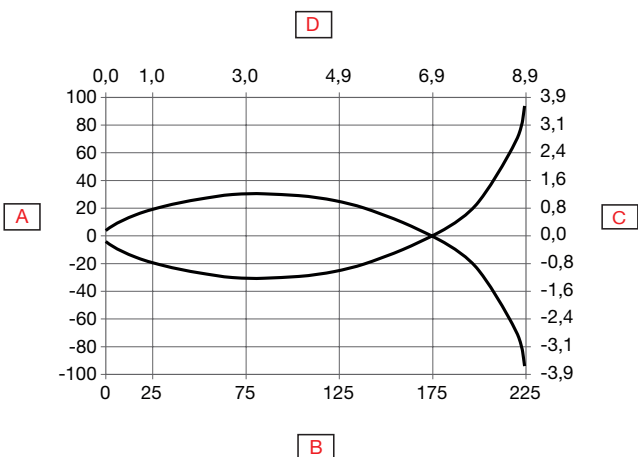
## Detection

|  |                             |   |
|--|-----------------------------|---|
| Rated operating distance (S <sub>n</sub> ) | ≤ 200 mm                    | Reference target, white paper with 90 % reflectivity, Size 200x200 mm |
| Sensitivity adjustment                     | 20 mm ... 200 mm            | Single turn potentiometer   |
|  | 210°                        | Electrical adjustment   |
|  | 240°                        | Mechanical adjustment   |
| Blind zone                                 | ≤ 0 mm @ S <sub>n</sub> max | Reference target, white paper with 90 % reflectivity, Size 200x200 mm |
| Hysteresis                                 | 5% ... 20%                  |   |
| Light source                               | 617 nm                      | Red   |
| Light type                                 | Red modulated               |   |
| Detection angle                            | ± 20°                       | @ 100 mm (half sensing distance)                                      |
| Light spot size                            | 85 mm                       | @ 100 mm (half sensing distance)                                      |
| Emitter beam angle                         | ± 23.0°                     | @ 100 mm (half sensing distance)                                      |

## Accuracy

|                   |           |
|-------------------|-----------|
| Temperature drift | ≤ 0.2%/°C |
|-------------------|-----------|

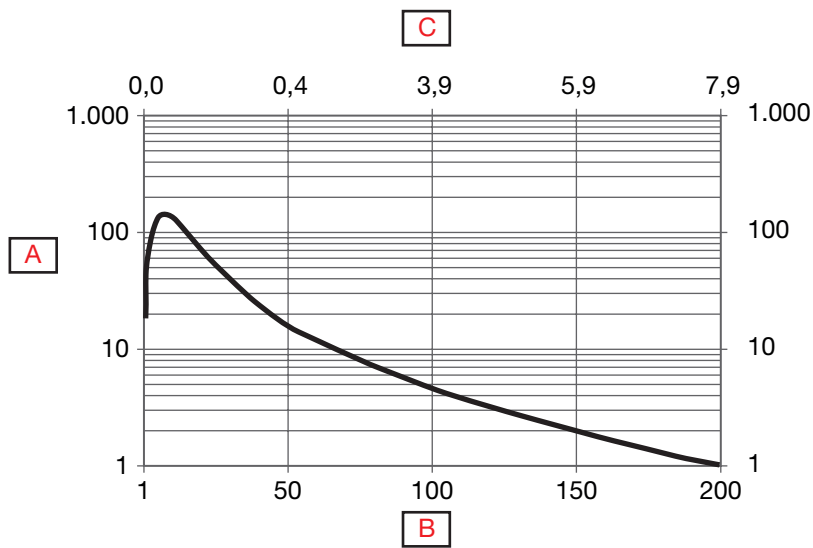
## Detection diagram





|          |                          |          |        |
|----------|--------------------------|----------|--------|
| <b>A</b> | Detection width (mm)     | <b>E</b> | Sensor |
| <b>B</b> | Distance (mm)            | <b>F</b> | Object |
| <b>C</b> | Detection width (inches) |          |        |
| <b>D</b> | Distance (inches)        |          |        |

**Excess gain**



|          |               |          |                   |
|----------|---------------|----------|-------------------|
| <b>A</b> | Excess gain   | <b>C</b> | Distance (inches) |
| <b>B</b> | Distance (mm) |          |                   |



# Features

## Power Supply

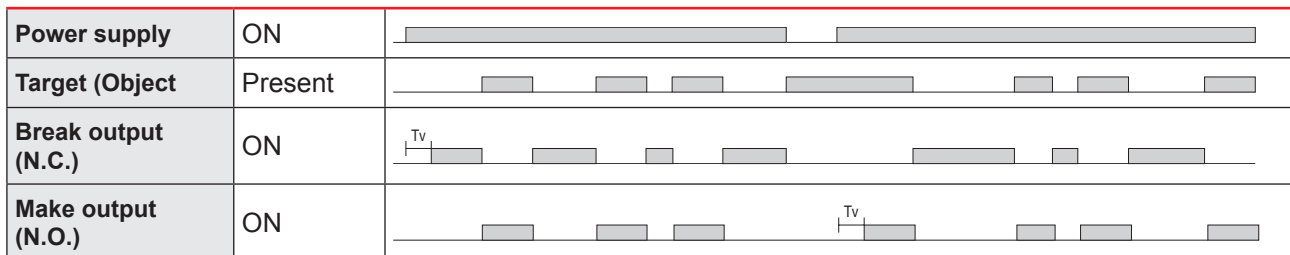
|                                     |                                 |
|-------------------------------------|---------------------------------|
| Rated operational voltage ( $U_B$ ) | 10 ... 30 VDC (ripple included) |
| Ripple ( $U_{rpp}$ )                | $\leq 10\%$                     |
| No load supply current ( $I_o$ )    | $\leq 25$ mA @ $U_B$ max        |
| Power ON delay ( $t_v$ )            | $\leq 30$ ms                    |

## Outputs

|                                       |  |   |
|---------------------------------------|--|---|
| Output functions                      | NPN or PNP by sensor type                      | Open collector  |
| Output switching function             | N.O. and N.C.                                  |   |
| Output current                        | $< 100$ mA                                     | Continuous( $I_e$ )   |
|                                       | $\leq 100$ mA @ Load: 100 nF                   | Short-time (I)  |
| Minimum operational current ( $I_m$ ) | 0.5 mA   |   |
| OFF-state current( $I_r$ )            | 100 $\mu$ A                                    |   |
| Voltage drop ( $U_d$ )                | 2 VDC @ ( $I_e$ ) max.                         |   |
| Protection                            | Short circuit, reverse polarity and transients |   |
| Utilization category                  | DC-12  | Control of resistive loads and solid state loads with optical isolation |
|                                       | DC-13  | Control of electromagnets   |

## Operation diagram

$T_v$  = Power ON delay





**Response times**

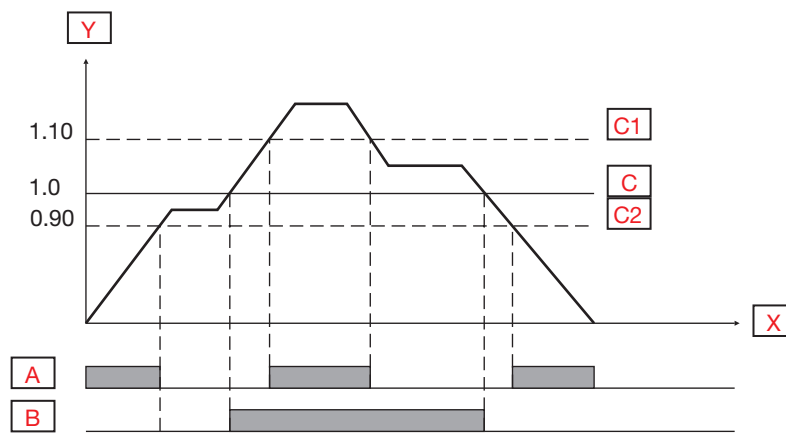
|                         |           |                           |
|-------------------------|-----------|---------------------------|
| Operating frequency (f) | ≤ 1000 Hz |                           |
| Response times          | ≤ 0.5 ms  | OFF-ON (t <sub>ON</sub> ) |
|                         | ≤ 0.5 ms  | ON-OFF (t <sub>ON</sub> ) |

**Indication**

| Green LED | Yellow LED | Power     | Output        |
|-----------|------------|-----------|---------------|
| ON        | OFF        | ON        | OFF (stable)* |
| OFF       | OFF        | ON or OFF | OFF           |
| OFF       | ON         | ON        | ON            |
| ON        | ON         | ON        | ON (stable)*  |

\*See signal stability curve

**Signal stability indication**



|          |                |           |                        |
|----------|----------------|-----------|------------------------|
| <b>A</b> | Green LED ON   | <b>C1</b> | Operation level x 1.10 |
| <b>B</b> | Yellow LED OFF | <b>C</b>  | Operation level        |
| <b>X</b> | Time           | <b>C2</b> | Operation level x 0.90 |
| <b>Y</b> | Excess gain    |           |                        |



**Environmental**

|   |   |  |
|---|---|--|
| <b>Ambient temperature</b>                      | -25° ... +60°C (-13° ... +140°F)                | Operating, Cable version <sup>1)</sup> |
|   | -40° ... +60°C (-40° ... +140°F)                | Storage Plug version <sup>1)</sup>     |
|   | -40° ... +70°C (-40° ... +158°F)                | Storage                                |
| <b>Ambient light</b>                            | ≤ 10 000 lux                                    | @ 3000 ... 3200 °K                     |
| <b>Vibration</b>                                | 10 ...150 Hz, 1.0 mm/15 g                       | EN 60068-2-6                           |
| <b>Shock</b>                                    | 30 g <sub>n</sub> / 11ms, 6 pos, 6 neg per axis | EN60068-2-27                           |
| <b>Drop test</b>                                | 2 x 1 m and 100 x 0.5 m                         | EN 60068-2-31                          |
| <b>Rated insulation voltage (U<sub>i</sub>)</b> | 50 VDC  |  |
| <b>Dielectric insulation voltage</b>            | ≥ 500 VAC rms                                   | 50/60 Hz for 1 min.                    |
| <b>Rated impulse withstand voltage</b>          | ≥1 kV   | 1.2/50 μs                              |
| <b>Pollution degree</b>                         | 3   | EN60947-1                              |
| <b>Overvoltage category</b>                     | III   | IEC60664; EN60947-1                    |
| <b>Degree of protection</b>                     | IP68 @ 2m and 20 h                              | IEC60539; EN60947-1                    |
|   | IP69K   | DIN 40050-9                            |
| <b>NEMA Enclosure Types</b>                     | 1, 2, 4, 4X, 5, 6, 6P                           | NEMA 250                               |
| <b>Ambient humidity range</b>                   | 35% ... 95%                                     | Operating <sup>2)</sup>                |
|   | 35% ... 95%                                     | Storage <sup>2)</sup>                  |

<sup>1)</sup> Do not bend the cable in temperatures below -10°C

<sup>2)</sup> With no icing or condensation

**EMC**

|   |   |               |
|---|---|---------------|
| <b>Electrostatic discharge immunity test</b>  | ± 8 kV @ air discharge or<br>± 4 kV @ contact discharge | IEC 61000-4-2 |
| <b>Radiated radio-frequency electromagnetic field immunity test (80 MHz ... 1 GHz and 1..4 GHz ... 2 GHz)</b> | 10 V/m  | IEC 61000-4-3 |
| <b>Electrical fast transient/Burst immunity test</b>  | 2 kV / 5 kHz<br>using the capacitive coupling clamp     | IEC 61000-4-4 |
| <b>Conducted disturbances induced by radio-frequency fields immunity test (150 kHz ... 80 MHz)</b>            | 10 Vrms   | IEC 61000-4-6 |
| <b>Power frequency magnetic field immunity test</b>   | 30 A/m 38 μT  | IEC 61000-4-8 |

## Mechanics/electronics

### Connection

|       |   |
|-------|---|
| Cable | 2 m, 4-wire 4 x 0.14 mm <sup>2</sup> , Ø = 3.3 mm, PVC, Black |
| Plug  | M8, 4-pin, male   |

### Wiring

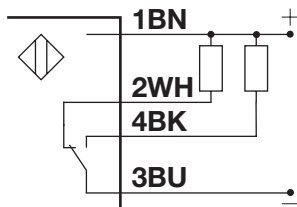


Fig. 4 NPN

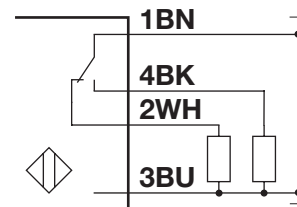


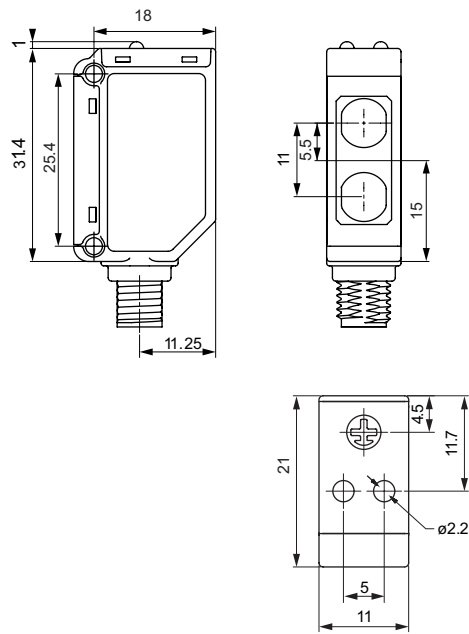
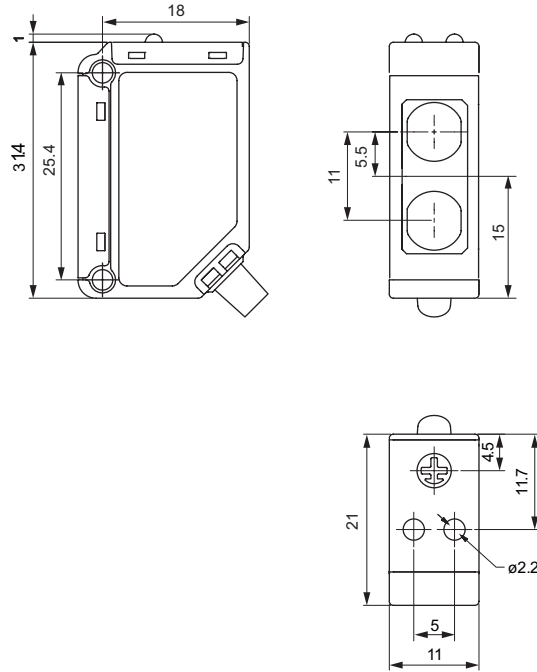
Fig. 5 PNP

| Colour code |       |    |       |    |       |    |      |
|-------------|-------|----|-------|----|-------|----|------|
| BN          | Brown | WH | White | BK | Black | BU | Blue |

### Housing

|               |                           |                  |
|---------------|---------------------------|------------------|
| Body          | Stainless steel, AISI316L |                  |
| Front glass   | PPSU, Red                 |                  |
| Trimmer shaft | PEEK, Light grey          |                  |
| Indication    | PES,<br>Transparent       | Polyethersulfone |
| Sealing       | FKM                       | Fluoroelastomer  |
| Cable gland   | FKM                       | Fluoroelastomer  |
| Dimensions    | 11 x 31.5 x 21 mm         |                  |
| Weight        | ≤ 100 g                   | Cable version    |
|               | ≤ 65 g                    | Plug version     |

Dimensions







## Compatibility and conformity

### ▶ Approvals and markings

|                          |  |  |
|--------------------------|--|--|
| <b>General reference</b> | Sensor designed according to EN60947-5-2 |  |
| <b>MTTF<sub>d</sub></b>  | Emitter: 496.2 years @ 40°C (+104°F)     | ISO 13849-1, SN 29500  |
|                          | Receiver; 171.9 years @ 40°C (+104°F)    |  |
| <b>CE-marking</b>        |  |  |
| <b>Approvals</b>         | (UL508 + C22.2)                          |  |
| <b>Other Approvals</b>   |  | Topax 56, Topaz AC1, Topaz MD3, Topaz CL1, Topactiv OKTO, P3-hypochloran |



## References

**Product selection key**

PD30ETD02  A  WE

Enter the code entering the corresponding option instead of

| Code                     | Option | Description           |
|--------------------------|--------|-----------------------|
| P                        | -      | Photoelectric sensor  |
| D                        | -      | Rectangular           |
| 30                       | -      | Length of housing     |
| E                        | -      | Stainless steel       |
| T                        | -      | Top trimmer           |
| D                        | -      | Diffuse reflective    |
| 02                       | -      | Distance [dm]         |
| <input type="checkbox"/> | N      | NPN                   |
|                          | P      | PNP                   |
| A                        | -      | Output: N.O. and N.C. |
| <input type="checkbox"/> | -      | Cable, 2 m            |
|                          | M5     | Connector M8          |
| WE                       | -      | Extreme wide angle    |

**Type selection**

| Connec-<br>tion | Output | Code            |
|-----------------|--------|-----------------|
| Cable           | NPN    | PD30ETD02NAWE   |
|                 | PNP    | PD30ETD02PAWE   |
| Plug            | NPN    | PD30ETD02NAM5WE |
|                 | PNP    | PD30ETD02PAM5WE |

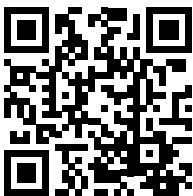
## Delivery contents and accessories

### Delivery contents

- Photoelectric switch: PD30ETD02...
- Screwdriver
- Packaging: Carton box
- Mounting bracket: APD30-MB1

### Accessories

- Mounting bracket: APD30-MB2 to be purchased separately
- Connector type: CO..54NF... series to be purchased separately



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