

# Photoelectrics Diffuse-reflective Type PH18CND..., DC

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- Miniature sensor range
- Range: 1 m
- Sensitivity adjustment by potentiometer
- Modulated, red light 625 nm
- Supply voltage: 10 to 30 VDC
- Output: 100 mA, NPN or PNP, N.O & N.C.
- Degree of protection IP67, IP69K
- LED indication for output, stability and power ON
- Protection: reverse polarity, short circuit and transients
- Cable, plug and pigtail versions
- Excellent EMC performance



## Product Description

The PH18CND10... is part of a family of inexpensive general purpose diffuse reflective sensors in industrial standard 18 mm cylindrical and square ABS housing. The sensors are useful in applications where high-accuracy detection as well as small size is required.

Compact housing and high power LED for excellent performance-size ratio. The potentiometer used for adjustment of the sensitivity makes the sensors highly flexible. The output type is NPN or PNP and the output switching function is NO and NC.

## Ordering Key

**PH18CND10PAM1SA**

|                      |       |
|----------------------|-------|
| Type                 | _____ |
| Housing style square | _____ |
| Housing size         | _____ |
| Housing material     | _____ |
| Housing type neutral | _____ |
| Detection principle  | _____ |
| Sensing distance     | _____ |
| Output type          | _____ |
| Output configuration | _____ |
| Connection type      | _____ |
| Sensitive adjustment | _____ |

## Type Selection

| Housing style   | Range<br>S <sub>n</sub> | Connection  | Ordering no.<br>NPN<br>Make & break switching | Ordering no.<br>PNP<br>Make & break switching |
|-----------------|-------------------------|-------------|---|---|
| M18 Square type | 1 m                     | Cable       | PH 18 CND 10 NASA                             | PH 18 CND 10 PASA                             |
| M18 Square type | 1 m                     | Plug        | PH 18 CND 10 NAM1SA                           | PH 18 CND 10 PAM1SA                           |
| M18 Square type | 1 m                     | Pigtail M12 | PH 18 CND 10 NAT1SA                           | PH 18 CND 10 PAT1SA                           |

## Specifications according to EN60947-5-2

|  |  |                                       |  |
|--|--|---------------------------------------|--|
| <b>Rated operating distance (S<sub>n</sub>)</b>    | Up to 1 m, reference target Kodak test card R27, white, 90% reflective, 200 x 200 mm | <b>Voltage drop (U<sub>d</sub>)</b>   | ≤ 2.0 VDC @ 100 mA                             |
| <b>Blind zone</b>                                  | 20 mm  | <b>Protection</b>                     | Short-circuit, reverse polarity and transients |
| <b>Sensitivity control</b>                         | Adjustable by potentiometer 270°   | <b>Light source</b>                   | InGaAlP, LED, 625 nm                           |
| Adjustable distance                                | 50-1000 mm   | <b>Light type</b>                     | Red, modulated                                 |
| <b>Temperature drift</b>                           | ≤ 0.2%/°C  | <b>Sensing angle</b>                  | ± 2°   |
| <b>Hysteresis (H) (differential travel)</b>        | ≤ 20%  | <b>Ambient light</b>                  | 30.000 lux<br>Incandescent lamp                |
| <b>Rated operational volt. (U<sub>B</sub>)</b>     | 10 to 30 VDC (ripple included)   | <b>Light spot Diameter</b>            | Ø 52 mm @ 0.5 m                                |
| <b>Ripple (U<sub>ripple</sub>)</b>                 | ≤ 10%  | <b>Operating frequency</b>            | 500 Hz   |
| <b>Output current</b>                              |  | <b>Response time</b>                  |  |
| Continuous (I <sub>a</sub> )                       | ≤ 100 mA   | OFF-ON (t <sub>ON</sub> )             | ≤ 1.0 ms                                       |
| Short-time (I)                                     | ≤ 100 mA<br>(max. load capacity 100 nF)  | ON-OFF (t <sub>OFF</sub> )            | ≤ 1.0 ms                                       |
| <b>No load supply current (I<sub>o</sub>)</b>      | ≤ 20 mA @ 24 VDC   | <b>Power ON delay (t<sub>v</sub>)</b> | ≤ 300 ms                                       |
| <b>Minimum operational current (I<sub>m</sub>)</b> | 0.5 mA   | <b>Output function</b>                |  |
| <b>OFF-state current (I<sub>r</sub>)</b>           | ≤ 100 µA   | Type                                  | NPN or PNP                                     |
|  |  | Switching function                    | NO and NC                                      |
|  |  | <b>Indication</b>                     |  |
|  |  | Output ON                             | LED, yellow                                    |
|  |  | Signal stability and power ON         | LED, green                                     |



## Specifications (cont.)

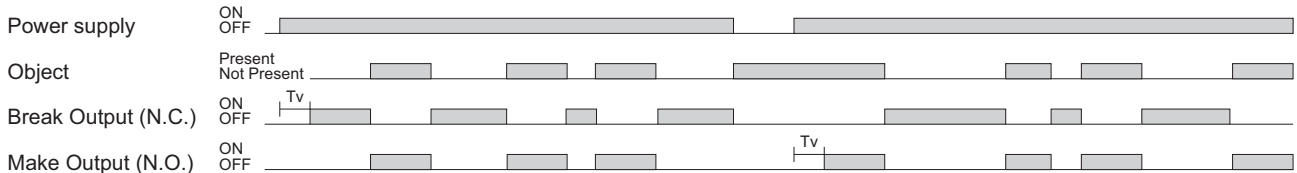
|                                 |  |                         |  |
|---------------------------------|--|-------------------------|--|
| <b>Environment</b>              |  | <b>Housing material</b> |  |
| Installation category           | III (IEC 60664/60664A; 60947-1)                                      | Body                    | ABS, grey  |
| Pollution degree                | 3 (IEC 60664/60664A; 60947-1)  | Front material          | PMMA, red  |
| Degree of protection            | IP 67, IP 69K*   | <b>Connection</b>       |  |
| <b>Ambient temperature</b>      |  | Cable                   | PVC, grey, 2 m<br>4 x 0.25 mm <sup>2</sup> , Ø = 4.5 mm<br>M12, 4-pin<br>(CONM14NF-series)   |
| Operating                       | -25° to +60°C (-13° to +140°F)                                       | Plug                    |  |
| Storage                         | -40° to +70°C (-40° to +158°F)                                       | Pigtail                 | PVC, grey, 30 cm<br>4 x 0.25 mm <sup>2</sup> , Ø = 4.5 mm<br>M12, 4-pin<br>(CONM14NF-series) |
| <b>Vibration</b>                | 10 to 55 Hz, 0.5 mm/7.5 g<br>(IEC 60068-2-6)                         | <b>Weight</b>           | With cable: 75 g<br>With plug: 10 g<br>With pigtail: 35 g                                    |
| <b>Shock</b>                    | 30 g / 11ms, 3 pos, 3 neg<br>per axis<br>(IEC 60068-2-6, 60068-2-32) | <b>CE-marking</b>       | Yes  |
| <b>Rated insulation voltage</b> | 500 VAC (rms)<br>IEC protection class III                            | <b>Approvals</b>        | cULus (UL508)<br>supply class 2  |

\* The IP69K test according to DIN 40050-9 for high-pressure, high-temperature wash-down applications. The sensor must not only be dust tight (IP6X), but also able to withstand high-pressure and steam cleaning. The sensor is exposed to high pressure water from a spray nozzle that is fed with 80°C water at 8'000–10'000 KPa (80–100bar) and a flow rate of 14–6L/min. The nozzle is held 100–150 mm from the sensor at angles of 0°, 30°, 60° and 90° for 30s each. The test device sits on a turntable that rotates with a speed of 5 times per minute. The sensor must not suffer any damaging effects from the high pressure water in appearance and function.

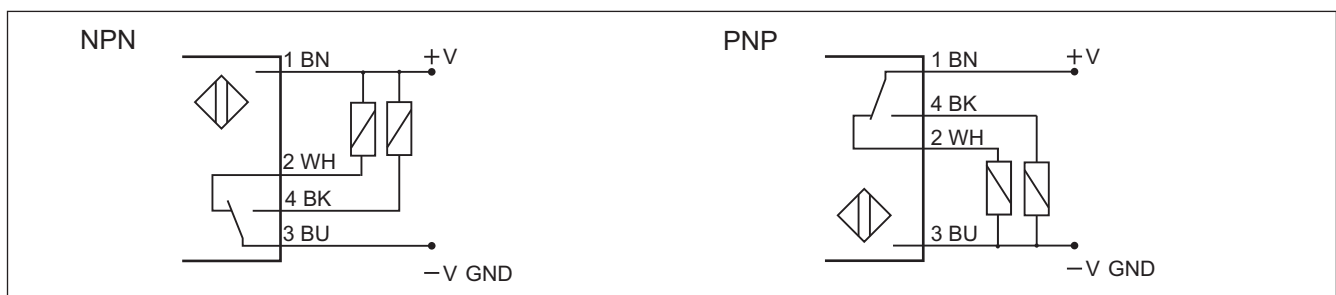


## Operation Diagram

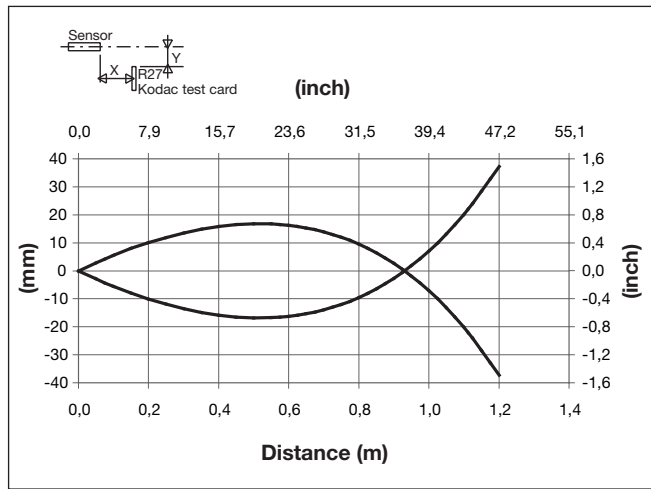
tv = Power ON delay



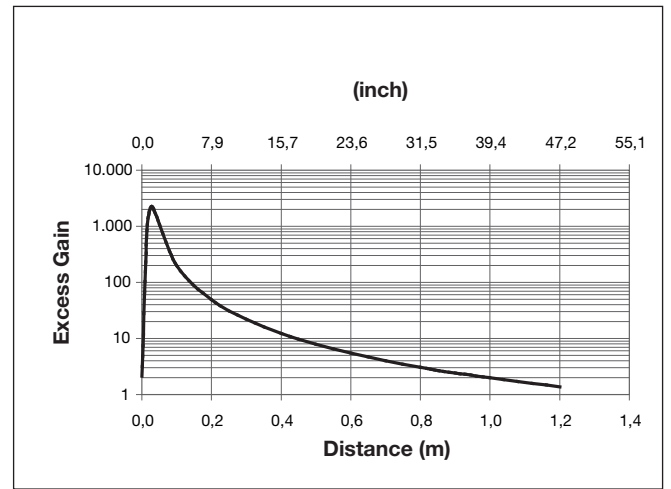
## Wiring Diagrams



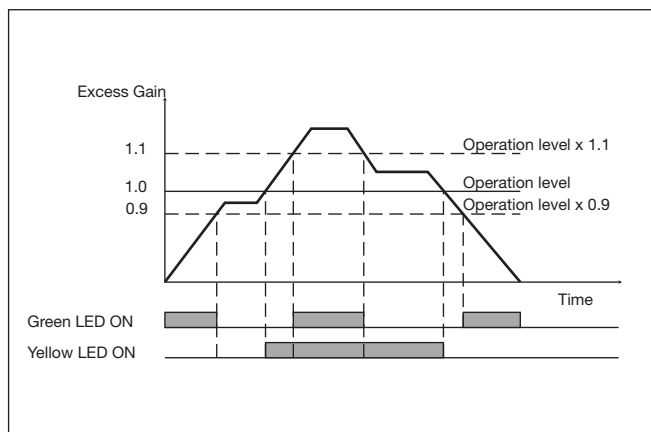
### Detection Diagram



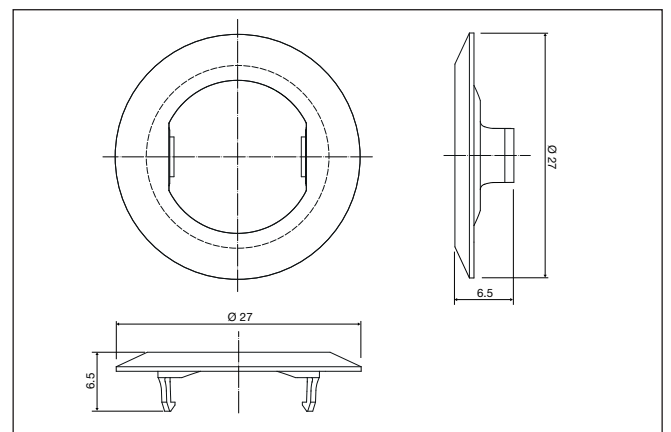
### Excess Gain



### Signal Stability Indication



### APH18-MB1



### Mounting Systems



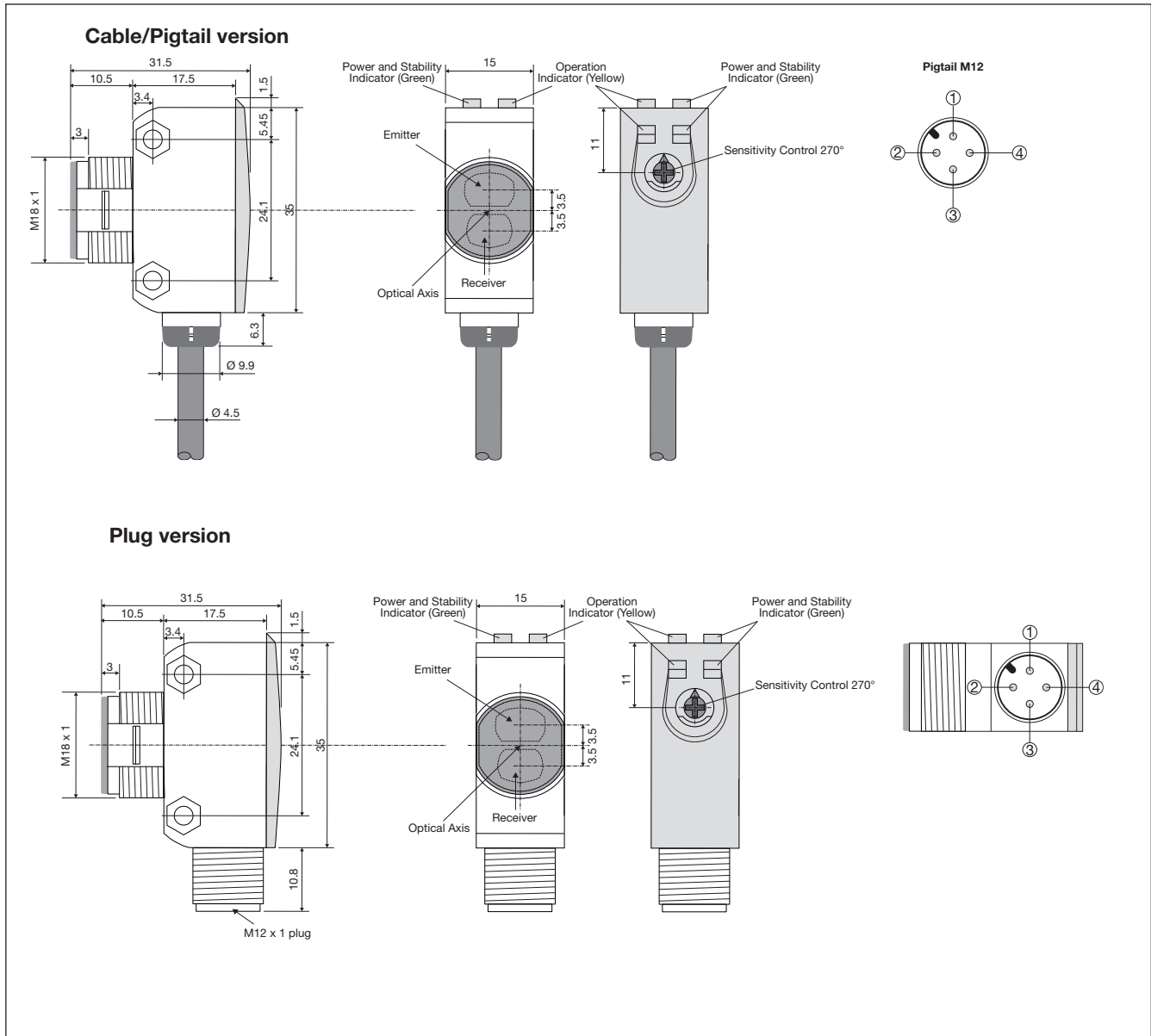
PH18 mounting with a combination of 1 x APH18-MB1 and 1 x M18 locknut. Maximum torque 0.9 NM

Min. 1.0 mm  
Max. 4.5 mm

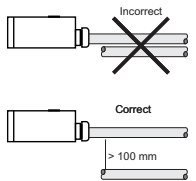
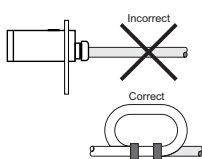
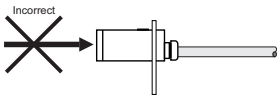
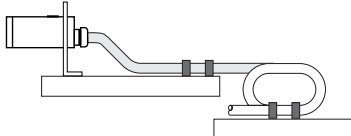
M18 Locknut

APH18-MB1

## Dimensions



## Installation Hints

|  |   |  |  |
|--|---|--|--|
| <p><i>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</i></p>  <p>Incorrect</p> <p>Correct</p> <p>&gt; 100 mm</p> | <p><i>Relief of the cable strain</i></p>  <p>Incorrect</p> <p>Correct</p> <p><i>The cable should not be pulled</i></p> | <p><i>Protection of the sensing face</i></p>  <p>Incorrect</p> <p>Correct</p> <p><i>A proximity switch should not serve as mechanical stop</i></p> | <p><i>Sensor mounted on a mobile carrier</i></p>  <p><i>Any repetitive flexing of the cable should be avoided</i></p> |
|--|---|--|--|

## **Delivery Contents**

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- Photoelectric switch: PH 18 CND...
- Installation instruction on plastic bag
- Screwdriver
- Mounting bracket APH18-MB1
- 1 M18 locknuts
- **Packaging:** Plastic bag

## **Accessories**

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- Connector type CONG1A.. / CONM14NF.. series