

# Photoelectrics Retro-reflective Type PH18CNR..., DC

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- Miniature sensor range
- Range: 6.5 m
- Sensitivity adjustment by potentiometer
- Modulated, infrared light 850 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 PH18CNR... is part of a family of inexpensive general purpose retro-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

PH18CNR65PAM1SA

|                      |                 |
|----------------------|-----------------|
| Type                 | PH18CNR65PAM1SA |
| Housing style square | PH18CNR65PAM1SA |
| Housing size         | PH18CNR65PAM1SA |
| Housing material     | PH18CNR65PAM1SA |
| Housing type neutral | PH18CNR65PAM1SA |
| Detection principle  | PH18CNR65PAM1SA |
| Sensing distance     | PH18CNR65PAM1SA |
| Output type          | PH18CNR65PAM1SA |
| Output configuration | PH18CNR65PAM1SA |
| Connection type      | PH18CNR65PAM1SA |
| Sensitive adjustment | PH18CNR65PAM1SA |

## 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 | 6.5 m                   | Cable       | PH 18 CNR 65 NASA                             | PH 18 CNR 65 PASA                             |
| M18 Square type | 6.5 m                   | Plug        | PH 18 CNR 65 NAM1SA                           | PH 18 CNR 65 PAM1SA                           |
| M18 Square type | 6.5 m                   | Pigtail M12 | PH 18 CNR 65 NAT1SA                           | PH 18 CNR 65 PAT1SA                           |

## Specifications according to EN60947-5-2

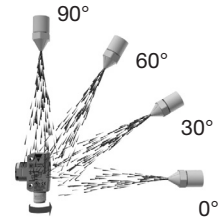
|  |  |                                       |   |
|--|--|---------------------------------------|---|
| <b>Rated operating distance (S<sub>n</sub>)</b>    | Up to 6.5 m, reference target ER4 reflector ø 80 mm              | <b>Voltage drop (U<sub>d</sub>)</b>   | ≤ 2.0 VDC @ 100 mA  |
| <b>Blind zone</b>                                  | 50 mm @ S <sub>n</sub> max.                                      | <b>Protection</b>                     | Short-circuit, reverse polarity and transients                            |
| <b>Sensitivity control</b>                         | Adjustable by potentiometer                                      | <b>Light source</b>                   | LED, 850 nm   |
| Electrical adjustment                              | 210°   | <b>Light type</b>                     | Infrared, modulated   |
| Mechanical adjustment                              | 240°   | <b>Sensing angle</b>                  | ± 2°  |
| Adjustable distance to target                      | 50-650 cm  | <b>Ambient light</b>                  | 30.000 lux<br>Incandescent lamp   |
| <b>Temperature drift</b>                           | ≤ 0.2%/°C  | <b>Light spot Diameter</b>            | Ø 164 mm @ 3.25 m   |
| <b>Hysteresis (H)</b><br>(differential travel)     | ≤ 20%  | <b>Operating frequency</b>            | 500 Hz  |
| <b>Rated operational volt. (U<sub>B</sub>)</b>     | 10 to 30 VDC<br>(ripple included)                                | <b>Response time</b>                  | OFF-ON (t <sub>ON</sub> ) ≤ 1.0 ms<br>ON-OFF (t <sub>OFF</sub> ) ≤ 1.0 ms |
| <b>Ripple (U<sub>rpp</sub>)</b>                    | ≤ 10%  | <b>Power ON delay (t<sub>v</sub>)</b> | ≤ 100 ms  |
| <b>Output current</b>                              | Continuous (I <sub>a</sub> ) ≤ 100 mA<br>Short-time (I) ≤ 100 mA | <b>Output function</b>                | Type: NPN or PNP<br>Switching function: NO and NC                         |
| (max. load capacity 100 nF)                        |  | <b>Indication</b>                     | Output ON: LED, yellow<br>Signal stability and power ON: LED, green       |
| <b>No load supply current (I<sub>o</sub>)</b>      | ≤ 25 mA @ 24 VDC   |                                       |   |
| <b>Minimum operational current (I<sub>m</sub>)</b> | 0.5 mA   |                                       |   |
| <b>OFF-state current (I<sub>r</sub>)</b>           | ≤ 100 µA   |                                       |   |



## Specifications (cont.)

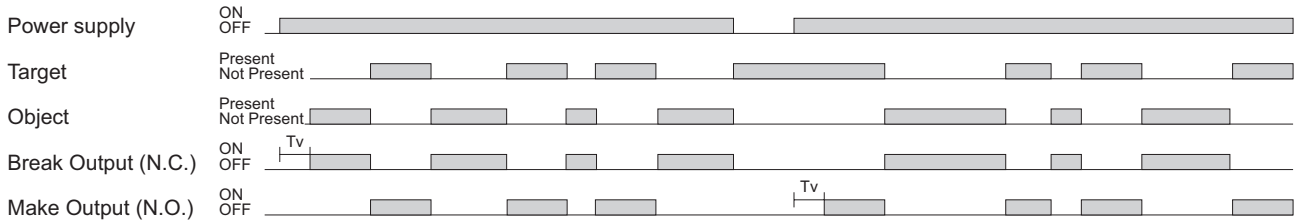
|                                 |  |                   |  |
|---------------------------------|--|-------------------|--|
| <b>Environment</b>              |  | Cable gland       | POM, Black   |
| Installation category           | III (IEC 60664/60664A; 60947-1)                                      | Trimmer shaft     | POM, Dark Grey   |
| Pollution degree                | 3 (IEC 60664/60664A; 60947-1)  | Locknuts          | PP, black  |
| Degree of protection            | IP 67, IP 69K*   | Mounting bracket  | PPA, black   |
| <b>Ambient temperature</b>      |  | <b>Connection</b> |  |
| Operating                       | -25° to +60°C (-13° to +140°F)                                       | Cable             | PVC, grey, 2 m<br>4 x 0.25 mm <sup>2</sup> , Ø = 4.5 mm<br>M12, 4-pin<br>(CONB14NF-series)   |
| Storage                         | -40° to +70°C (-40° to +158°F)                                       | Plug              | PUR, grey, 30 cm<br>4 x 0.25 mm <sup>2</sup> , Ø = 4.5 mm<br>M12, 4-pin<br>(CONB14NF-series) |
| <b>Vibration</b>                | 10 to 150 Hz, 1.0 mm/15 g<br>(IEC 60068-2-6)                         | Pigtail           | With cable: 85 g<br>With pigtail: 40 g<br>With plug: 25 g                                    |
| <b>Shock</b>                    | 30 g / 11ms, 3 pos, 3 neg<br>per axis<br>(IEC 60068-2-6, 60068-2-32) | <b>Weight</b>     | Yes  |
| <b>Rated insulation voltage</b> | 500 VAC (rms)<br>IEC protection class III                            | <b>CE-marking</b> | Yes  |
| <b>Housing material</b>         |  | <b>Approvals</b>  | cULus (UL508)<br>supply class 2  |
| Body                            | ABS, grey  |                   |  |
| Backpart                        | PC-Transparent   |                   |  |
| Front material                  | PMMA, red  |                   |  |

\* 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.

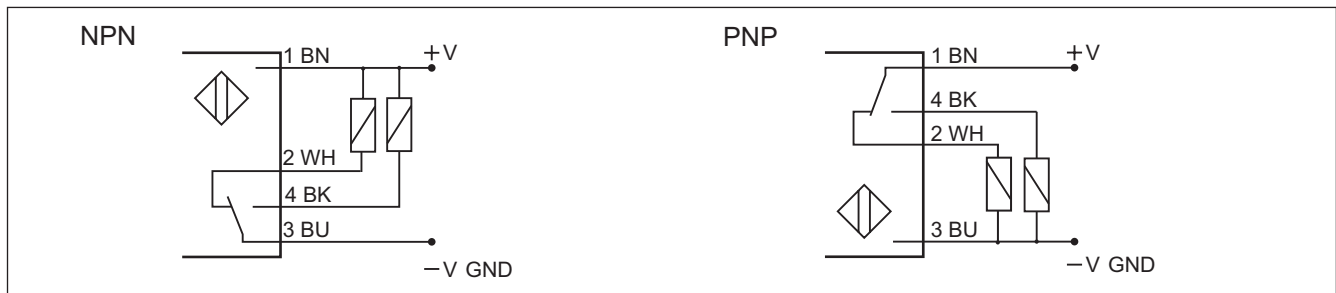


## Operation Diagram

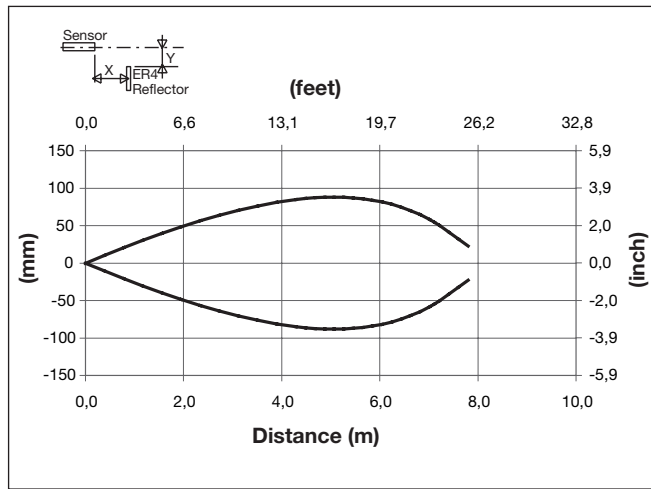
tv = Power ON delay



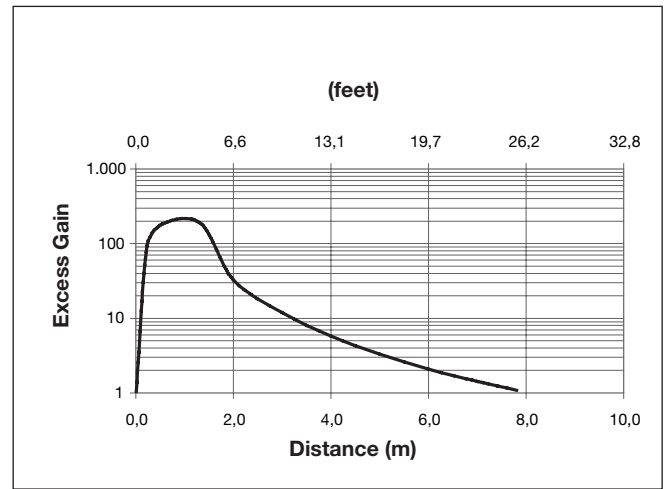
## Wiring Diagrams



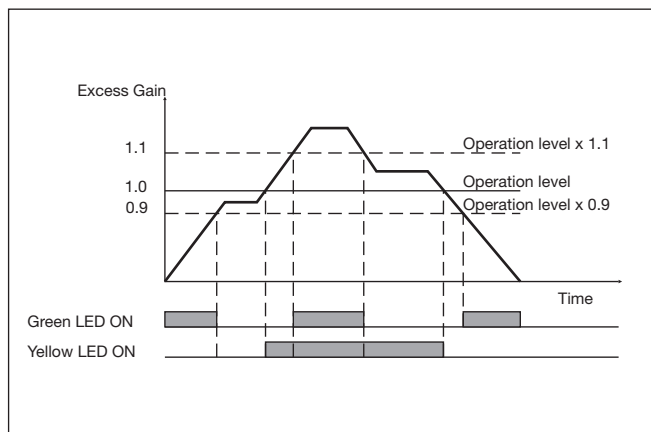
### Detection Diagram



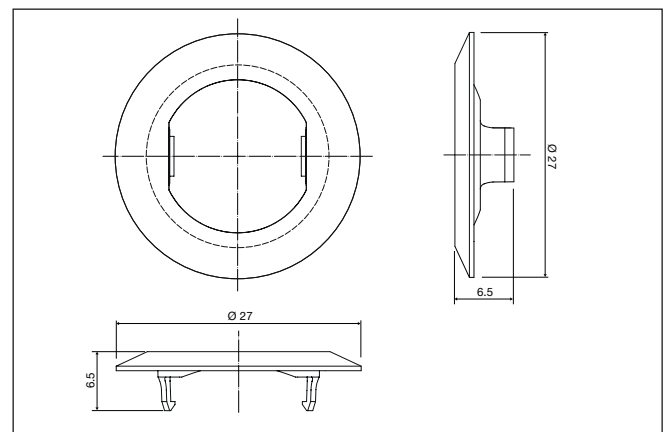
### Excess Gain



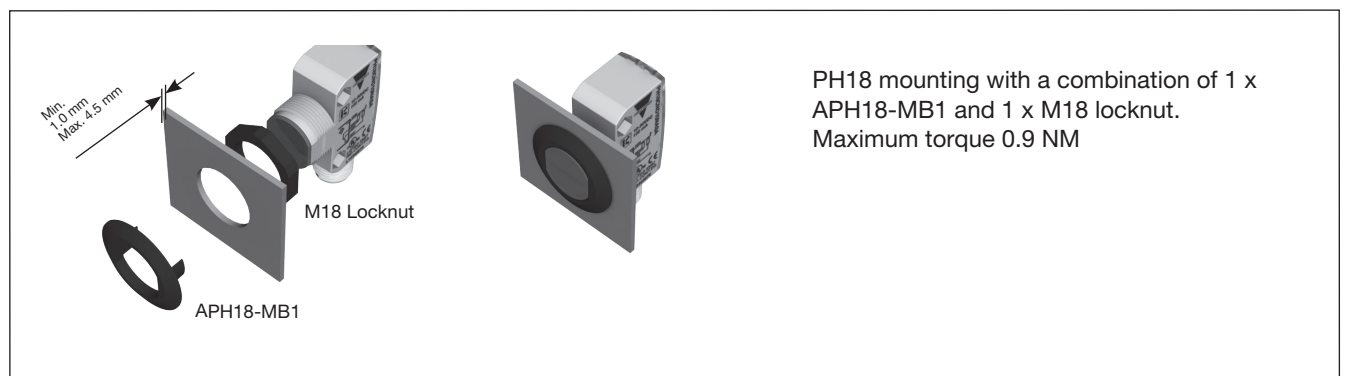
### Signal Stability Indication



### APH18-MB1

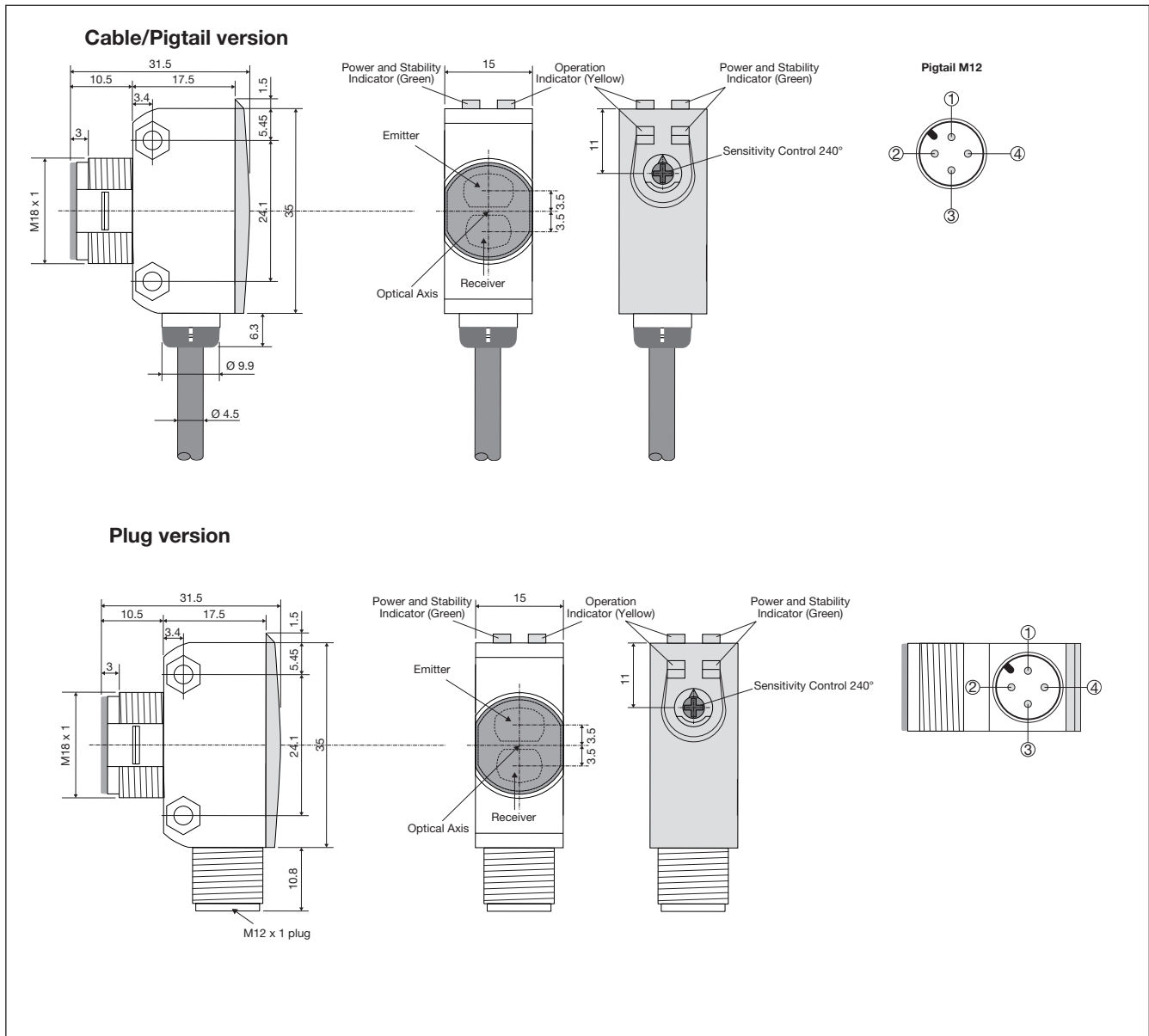


### Mounting Systems



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

## 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><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> |
|--|---|--|--|