

# Photoelectrics Retro-reflective, Polarized Type PA18C.P..., DC

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- Miniature sensor range
- Range: 5 m (axial), 4 m (radial)
- 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 and plug versions
- Excellent EMC performance



## Product Description

The PA18C.P is part of a family of inexpensive general purpose retro-reflective sensors in industrial standard 18 mm cylindrical 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

PA18CAP50PAM1SA

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

## Type Selection

| Housing style   | Range<br>$S_n$ | Connection | Ordering no.<br>NPN<br>Make & break switching | Ordering no.<br>PNP<br>Make & break switching |
|-----------------|----------------|------------|---|---|
| M18 Axial type  | 5.0 m          | Cable      | PA 18 CAP 50 NASA                             | PA 18 CAP 50 PASA                             |
| M18 Axial type  | 5.0 m          | Plug       | PA 18 CAP 50 NAM1SA                           | PA 18 CAP 50 PAM1SA                           |
| M18 Radial type | 4.0 m          | Cable      | PA 18 CRP 40 NASA                             | PA 18 CRP 40 PASA                             |
| M18 Radial type | 4.0 m          | Plug       | PA 18 CRP 40 NAM1SA                           | PA 18 CRP 40 PAM1SA                           |

## Specifications according to EN60947-5-2

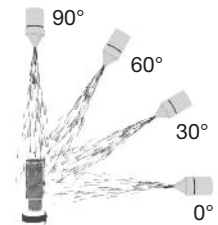
|  |   |   |   |
|--|---|---|---|
| <b>Rated operating distance (<math>S_n</math>)</b><br>Axial type (A)<br>Radial type (R)  | Up to 5.0 m,<br>Up to 4.0 m<br>Reference target: ER4<br>reflector $\varnothing$ 80 mm | <b>No load supply current (<math>I_o</math>)</b>                    | $\leq 25$ mA @ 24 VDC                             |
| <b>Blind zone</b>  | 50 mm @ $S_n$ max.  | <b>Minimum operational current (<math>I_m</math>)</b>               | 0.5 mA  |
| <b>Sensitivity control</b><br>Electrical adjustment<br>Mechanical adjustment<br>Adjustable distance to target<br>Axial types<br>Radial types | Adjustable by potentiometer<br>210°<br>240°<br>50-500 cm<br>50-400 cm                 | <b>OFF-state current (<math>I_r</math>)</b>                         | $\leq 100$ $\mu$ A                                |
| <b>Temperature drift</b>   | $\leq 0.2\%/^{\circ}$ C   | <b>Voltage drop (<math>U_d</math>)</b>                              | $\leq 2.0$ VDC @ 100 mA                           |
| <b>Hysteresis (H)</b><br>(differential travel)   | $\leq 20\%$   | <b>Protection</b>   | Short-circuit, reverse<br>polarity and transients |
| <b>Rated operational volt. (<math>U_B</math>)</b>  | 10 to 30 VDC<br>(ripple included)   | <b>Light source</b>   | InGaAlP, LED, 625 nm                              |
| <b>Ripple (<math>U_{rpp}</math>)</b>   | $\leq 10\%$   | <b>Light type</b>   | Red, modulated                                    |
| <b>Output current</b><br>Continuous ( $I_a$ )<br>Short-time (I)  | $\leq 100$ mA<br>$\leq 100$ mA<br>(max. load capacity 100 nF)                         | <b>Sensing angle</b>  | $\pm 2^{\circ}$                                   |
|  |   | <b>Ambient light</b>  | 30.000 lux<br>Incandescent lamp                   |
|  |   | <b>Light spot Diameter</b>  | $\varnothing$ 150 mm @ 2.5 m                      |
|  |   | <b>Operating frequency</b>  | 500 Hz  |
|  |   | <b>Response time</b><br>OFF-ON ( $t_{ON}$ )<br>ON-OFF ( $t_{OFF}$ ) | $\leq 1.0$ ms<br>$\leq 1.0$ ms                    |
|  |   | <b>Power ON delay (<math>t_v</math>)</b>                            | $\leq 100$ ms                                     |
|  |   | <b>Output function</b><br>Type<br>Switching function                | NPN or PNP<br>NO and NC                           |



## Specifications (cont.)

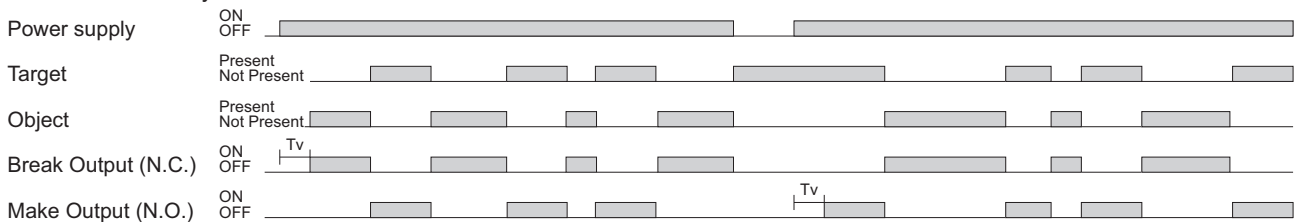
|   |  |   |  |
|---|--|---|--|
| <b>Indication</b><br>Output ON<br>Signal stability and power ON                                 | LED, yellow<br>LED, green  | <b>Housing material</b><br>Body<br>Front material<br>Cable gland<br>Trimmer shaft<br>Locknuts<br>Mounting bracket | ABS, grey<br>PMMA, red<br>POM, Black<br>POM, Dark Grey<br>PBTB, black<br>PPA, black        |
| <b>Environment</b><br>Installation category<br><br>Pollution degree<br><br>Degree of protection | III (IEC 60664/60664A;<br>60947-1)<br><br>3 (IEC 60664/60664A;<br>60947-1)<br><br>IP 67, IP 69K* | <b>Connection</b><br>Cable<br><br>Plug  | PVC, grey, 2 m<br>4 x 0.25 mm <sup>2</sup> , Ø = 4.5 mm<br>M12, 4-pin<br>(CONM14NF-series) |
| <b>Ambient temperature</b><br>Operating<br>Storage  | -25° to +60°C (-13° to +140°F)<br>-40° to +70°C (-40° to +158°F)                                 | <b>Weight</b>   | With cable: 85 g<br>With plug: 25 g  |
| <b>Vibration</b>  | 10 to 150 Hz, 1 mm/15 G<br>(IEC 60068-2-6)   | <b>CE-marking</b>   | Yes  |
| <b>Shock</b>  | 30 g / 11ms, 3 pos, 3 neg<br>per axis<br>(IEC 60068-2-6, 60068-2-32)                             | <b>Approvals</b>  | cULus (UL508)<br>supply class 2  |
| <b>Rated insulation voltage</b>   | 500 VAC (rms)<br>IEC protection class III  |   |  |

\* 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.

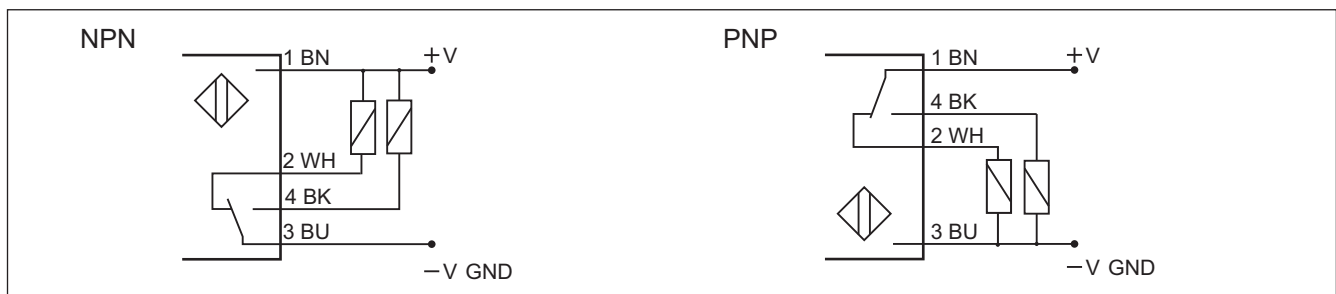


## Operation Diagram

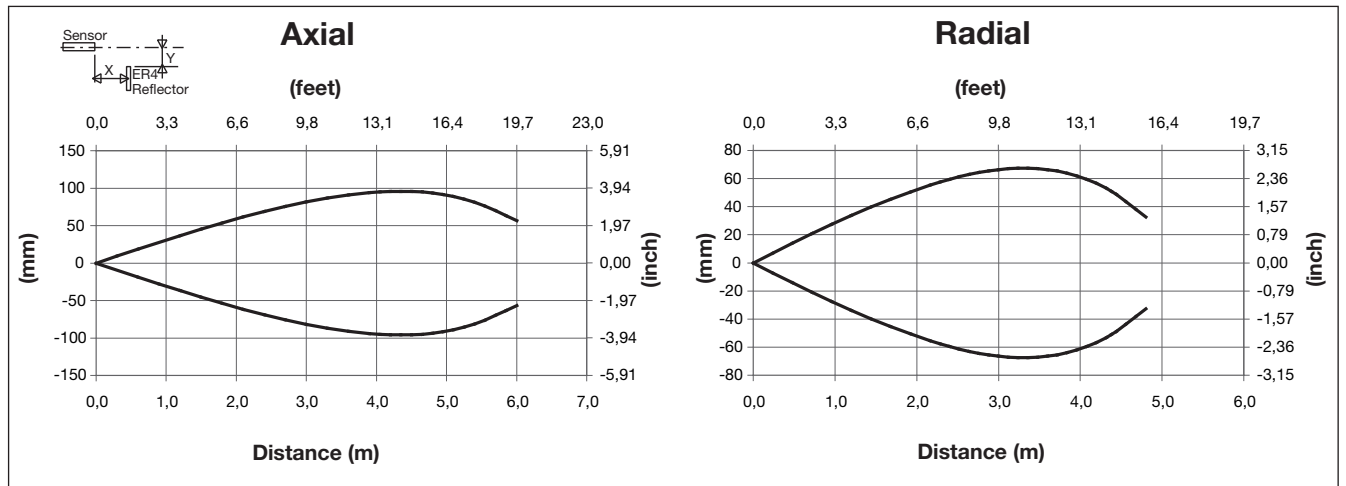
tv = Power ON delay



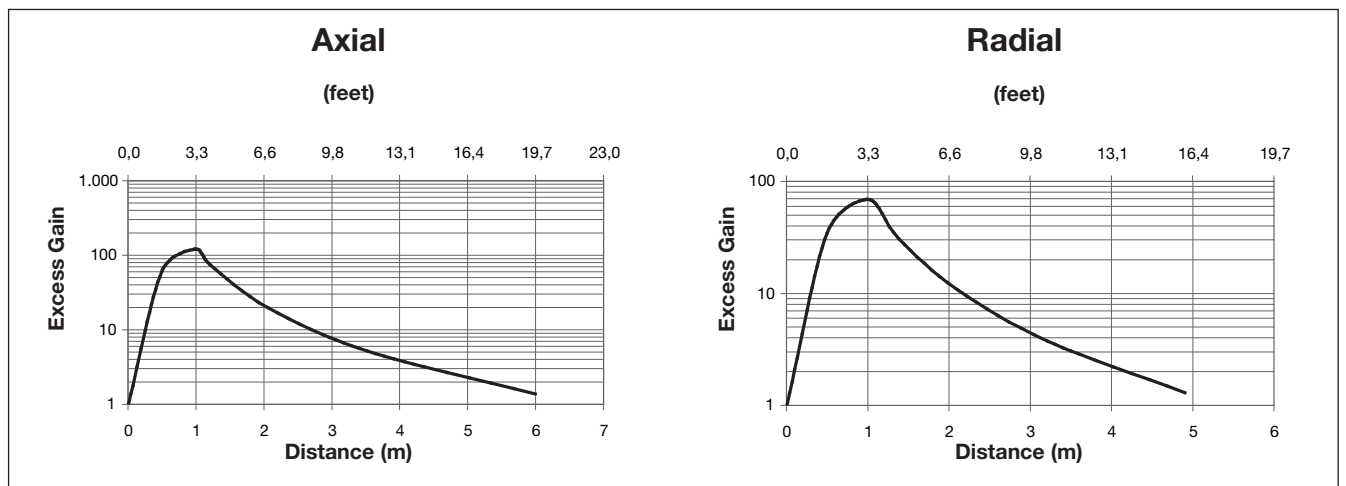
## Wiring Diagrams



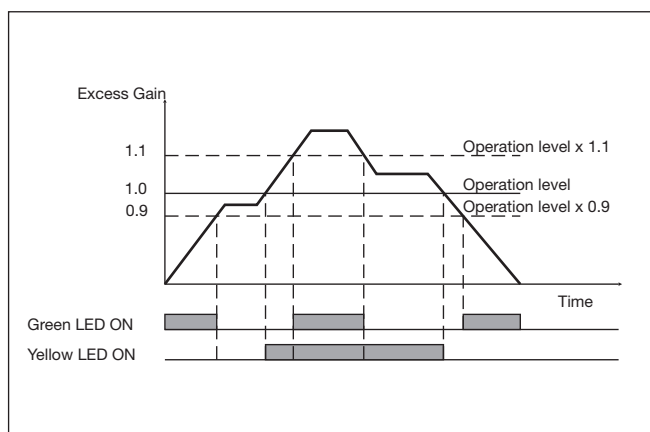
## Detection Diagram



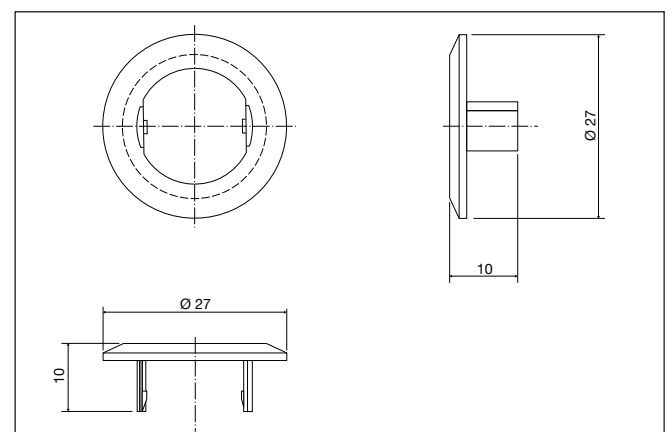
## Excess Gain



## Signal Stability Indication

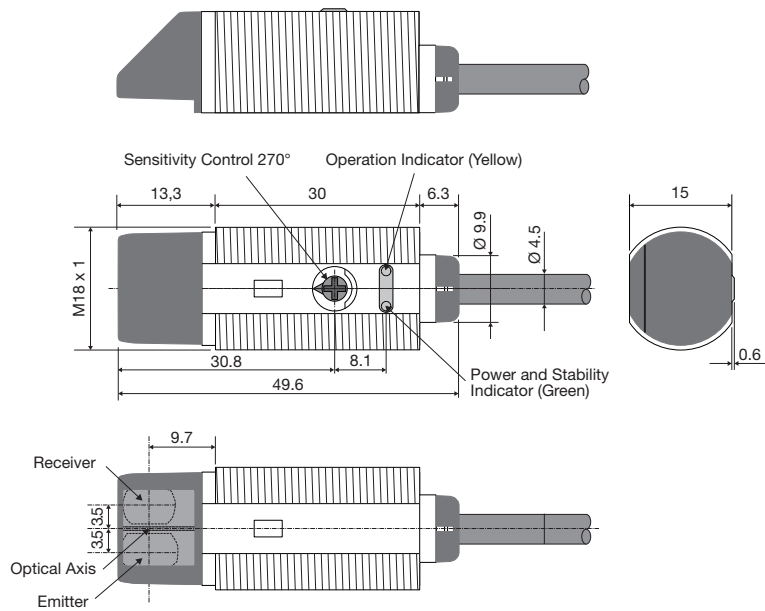


## APA 18-MB1

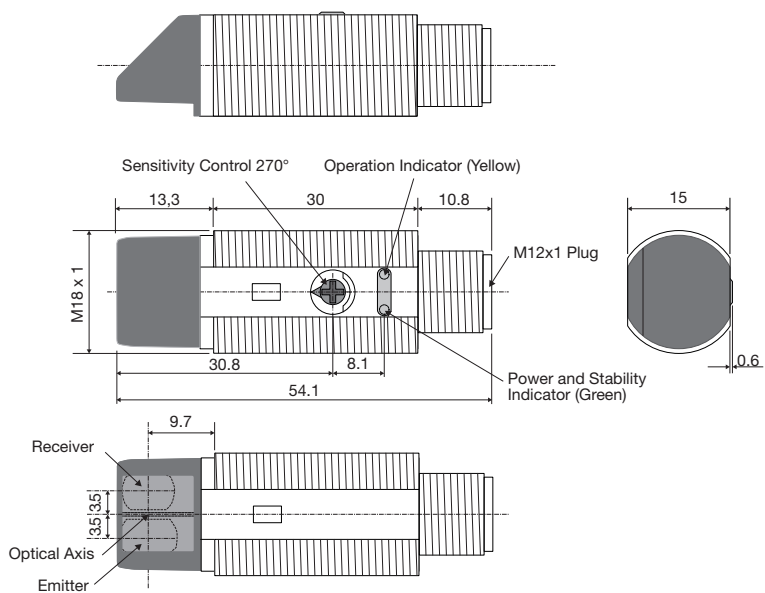


## Dimensions Radial version

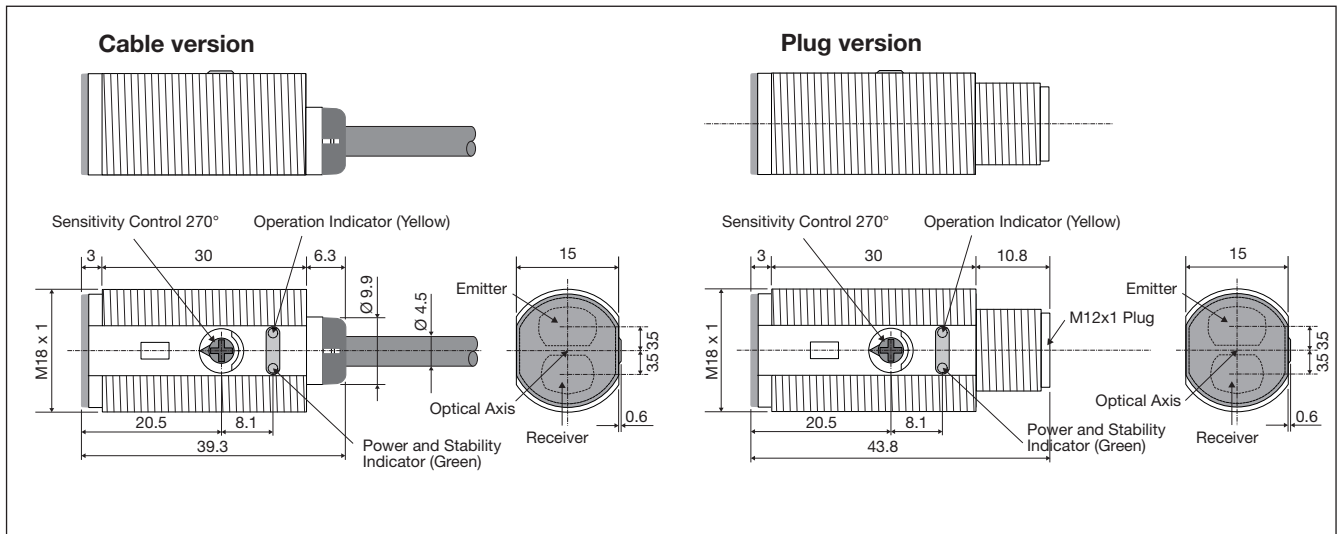
### Cable version



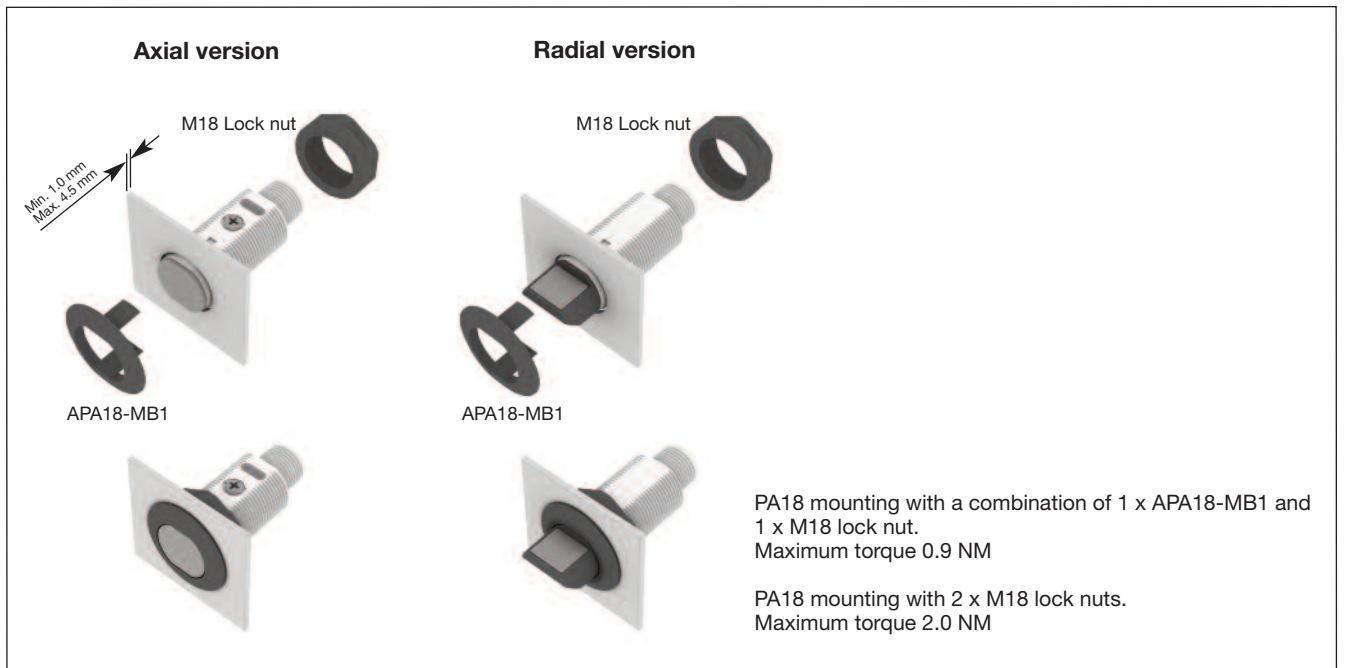
### Plug version



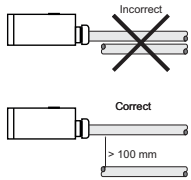
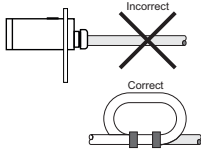
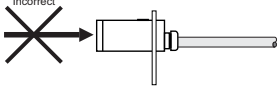
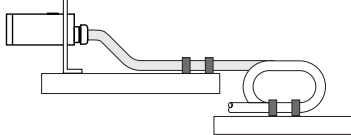
## Dimensions Axial version



## Mounting Systems



## Installation Hints

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

## Delivery Contents

- Photoelectric switch: PA 18 C.P..
- Installation instruction on plastic bag
- Screwdriver
- Mounting bracket APA18-MB1
- 2 M18 lock nuts
- **Packaging:** Plastic bag

## Accessories

- Connector type CONG1A.. / CONM14NF.. series
- Reflector type ER.. - to be purchased separately