

# Photoelectrics

## Diffuse-reflective, Background Suppression

### Type PA18CAB20...

CARLO GAVAZZI



- Miniature sensor range
- Range: 200 mm
- Sensitivity adjustment by potentiometer
- Modulated, red light 625 nm
- Supply voltage: 10 to 30 VDC
- Output: 100 mA, NPN or PNP preset
- Make and break switching function
- LED indication for output and power ON
- Protection: reverse polarity, short circuit and transients
- Cable and plug versions
- Excellent EMC performance
- Excellent colour matching



### Product Description

The PA18CAB20... is part of a family of inexpensive general purpose diffuse reflective sensors with background suppression in industrial standard 18 mm cylindrical ABS housing.

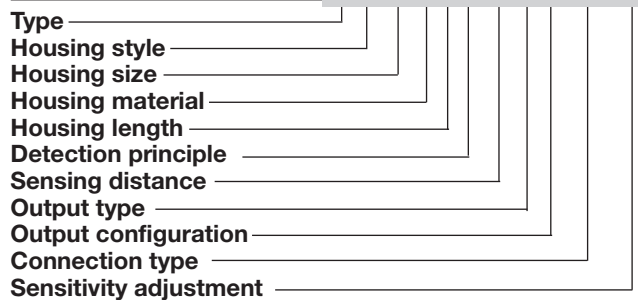
The sensors are useful in applications where high-accuracy detection as well as small size is required.

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 PA18CAB20NAM1SA



### Type Selection

| Housing style  | Range<br>$S_n$ | Connection | Ordering no.<br>NPN<br>Make and break switching | Ordering no.<br>PNP<br>Make and break switching |
|----------------|----------------|------------|---|---|
| M18 Axial type | 200 mm         | Cable      | PA 18 CAB 20 NASA                               | PA 18 CAB 20 PASA                               |
| M18 Axial type | 200 mm         | Plug       | PA 18 CAB 20 NAM1SA                             | PA 18 CAB 20 PAM1SA                             |

### Specifications

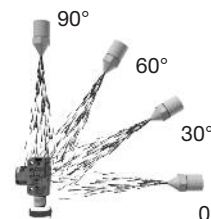
|   |  |   |  |
|---|--|---|--|
| <b>Rated operating distance (<math>S_n</math>)</b>  | Up to 200 mm, reference target: Kodak test card R27, white, 90% reflective, 100 x 100 mm | <b>No load supply current (<math>I_o</math>)</b>                    | $\leq 20$ mA @ $U_B$ max<br>$\leq 40$ mA @ $U_B$ min |
| <b>Maximum detecting distance</b><br>White object 90% refl.<br>Grey object 18% refl.<br>Black object 6% refl. | $\leq 200$ mm<br>$\leq 200$ mm<br>$\leq 150$ mm  | <b>Minimum operational current (<math>I_m</math>)</b>               | $\leq 0.5$ mA  |
| <b>Blind zone</b>   | 10 mm  | <b>OFF-state current (<math>I_r</math>)</b>                         | $\leq 100$ $\mu$ A                                   |
| <b>Sensitivity control</b><br>Electrical adjustment<br>Mechanical adjustment                                  | Adjustable by potentiometer<br>210°<br>240°  | <b>Voltage drop (<math>U_d</math>)</b>                              | $\leq 2$ VDC @ $I_e$ max                             |
| <b>Temperature drift</b>  | $\leq 0.2\%$ /°C   | <b>Protection</b>   | Short-circuit, reverse polarity and transients       |
| <b>Hysteresis (H)</b>   | $\leq 10\%$  | <b>Light source</b>   | InGaAlP, LED, 625 nm                                 |
| <b>Rated operational volt. (<math>U_B</math>)</b>   | 10 to 30 VDC (ripple included)   | <b>Light type</b>   | Red, modulated                                       |
| <b>Ripple (<math>U_{rpp}</math>)</b>  | $\leq 10\%$  | <b>Emitter angle</b>  | $\pm 3.0^\circ$ @ half sensing distance              |
| <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>Ambient light</b>  | $\leq 30,000$ lux, incandescent lamp                 |
|   |  | <b>Operating frequency (f)</b>                                      | $\leq 500$ Hz  |
|   |  | <b>Response time</b><br>OFF-ON ( $t_{ON}$ )<br>ON-OFF ( $t_{OFF}$ ) | $\leq 1$ ms<br>$\leq 1$ ms                           |
|   |  | <b>Power ON delay (<math>t_v</math>)</b>                            | $\leq 100$ ms  |
|   |  | <b>Output function</b><br>Open collector                            | NPN or PNP   |
|   |  | <b>Output switching function</b>                                    | N.O. and N.C.  |



## Specifications (cont.)

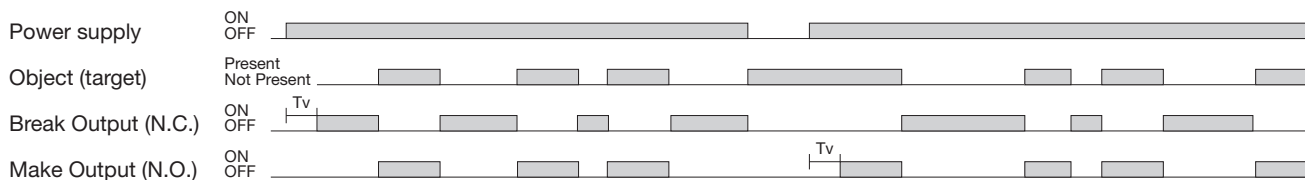
|   |  |   |  |
|---|--|---|--|
| <b>Indication</b><br>Output ON<br>Power ON  | LED, yellow<br>LED, green  | <b>Housing material</b><br>Body<br>Front material<br>Cable gland<br>Trimmer shaft<br>Locknuts<br>Mounting bracket | ABS, grey<br>PMMA, red<br>POM, Black<br>POM, Dark Grey<br>PBTP, black<br>PPA, 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* (IEC 60529;<br>60947-1) | <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><br>Cable version<br>Plug version  | ≤ 85 g<br>≤ 25 g   |
| <b>Vibration</b>  | 10 to 150 Hz, 1.0 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.

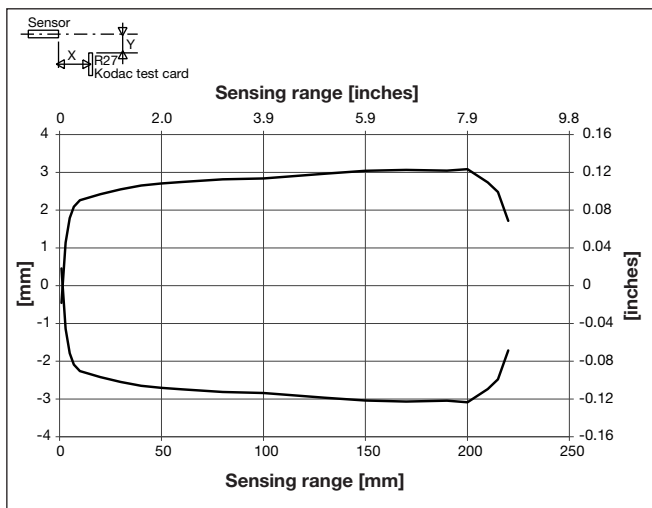


## Operation Diagram

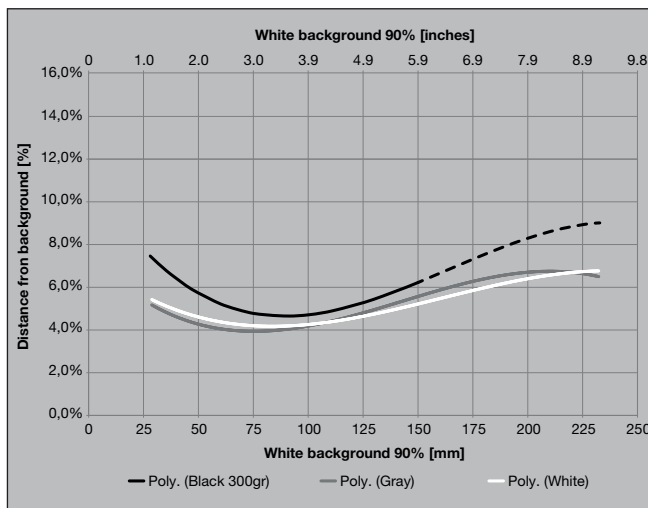
Tv = Power ON delay



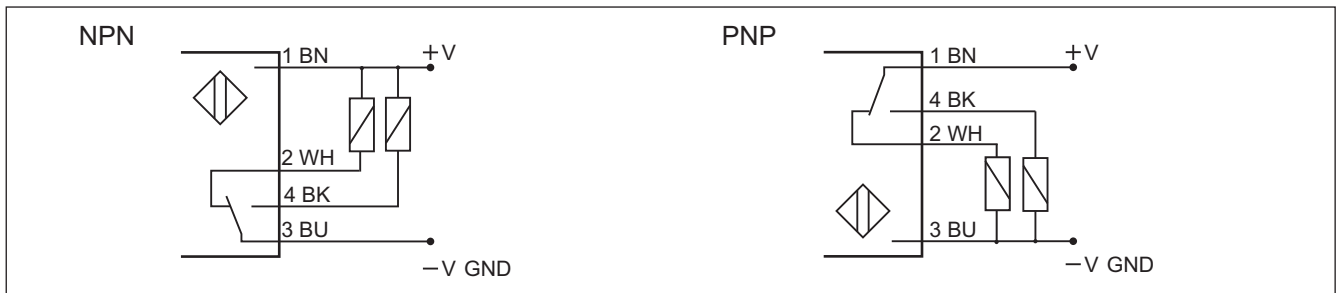
## Detection Diagram



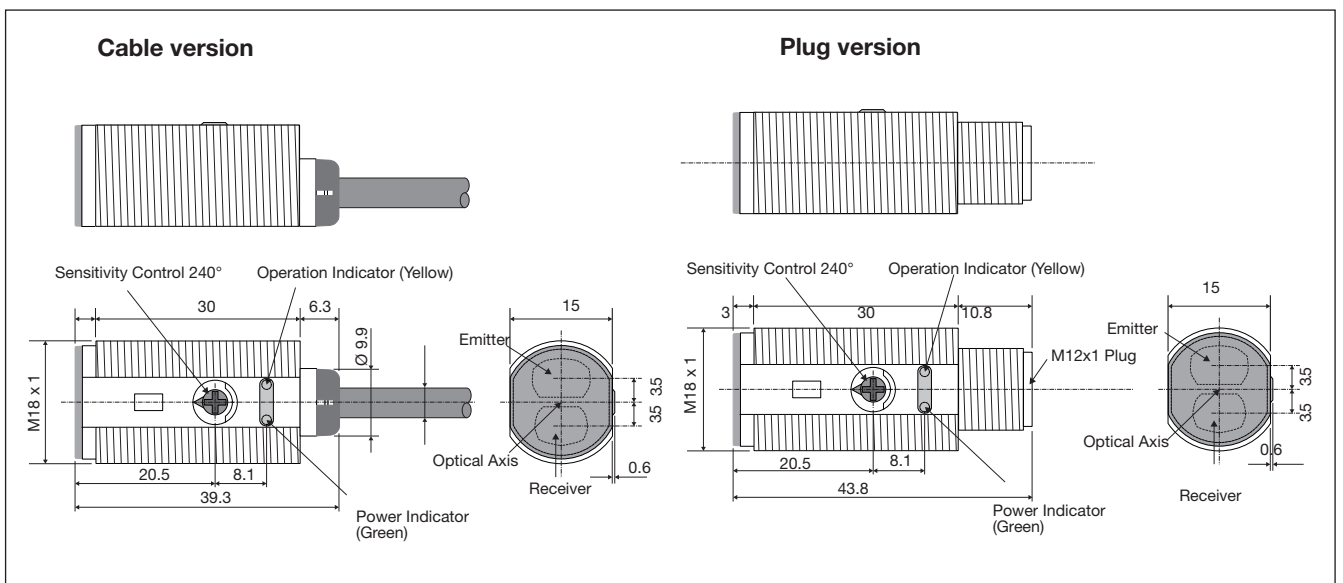
## Sensing Conditions



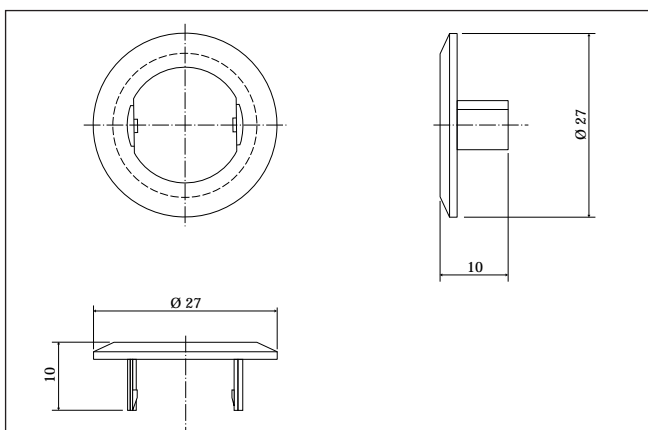
## Wiring Diagrams



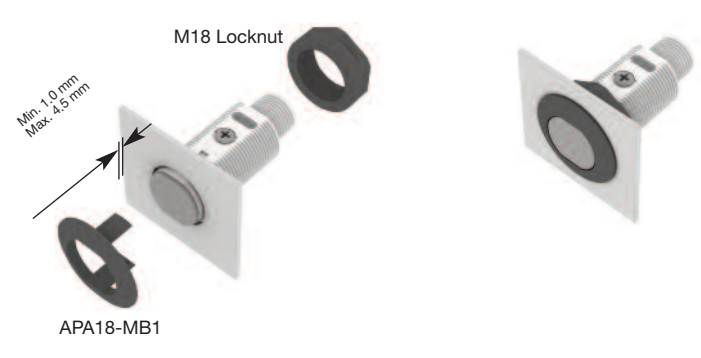
## Dimensions



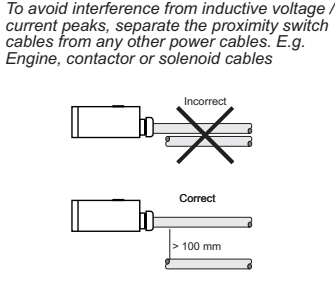
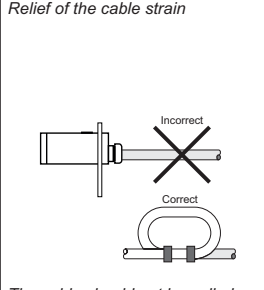
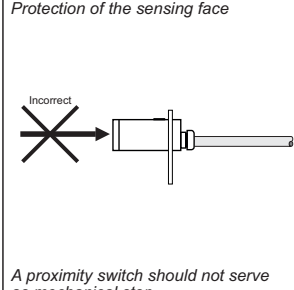
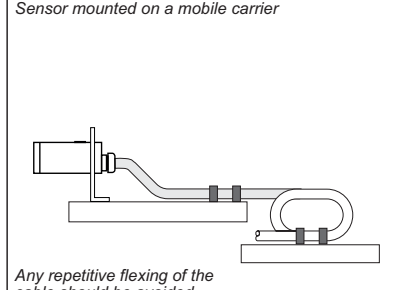
## APA18-MB1



## Mounting Systems

|   |  |
|---|--|
|  <p>Min. 1.0 mm<br/>Max. 4.5 mm</p> <p>M18 Locknut</p> <p>APA18-MB1</p> | <p>PA18 mounting with a combination of 1 x APA18-MB1 and 1 x M18 locknut.<br/>Maximum torque 0.9 NM</p> <p>PA18 mounting with a combination of 2 x M18 locknuts.<br/>Maximum torque 2.0 NM</p> |
|---|--|

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

## Delivery Contents

- Photoelectric switch: PA18CAB20 ...
- Installation instruction on plastic bag
- Screwdriver
- Mounting bracket APA18-MB1
- 2 M18 locknuts
- **Packaging:** Plastic bag

## Accessories

- Connector type CONG1A.. / CONM14NF.. series