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# Photoelectrics Diffuse-reflective Type PA18CAD04...WS, DC

CARLO GAVAZZI



- Miniature sensor range
- Range: 0.4 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 and plug versions
- Excellent EMC performance
- Wide detection angle - short blind zone



## Product Description

The PA18CAD04...WS is part of a family of inexpensive general purpose diffuse 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.

The sensor is characterized by a wide detection angle as well as a short blind zone.

## Ordering Key PA18CAD04PAM1WS

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

## Type Selection


Housing style	Range S <sub>n</sub>	Connection	Ordering no. NPN Make & break switching	Ordering no. PNP Make & break switching
M18	0.4 m	Cable	PA 18 CAD 04 NAWS	PA 18 CAD 04 PAWS
M18	0.4 m	Plug	PA 18 CAD 04 NAM1WS	PA 18 CAD 04 PAM1WS

## Specifications according to EN60947-5-2

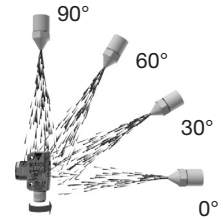
<b>Rated operating distance (S<sub>n</sub>)</b>	Up to 0.4 m, reference target Kodak test card R27, white, 90% reflective, 100 x 100 mm	<b>Protection</b>	Short-circuit, reverse polarity and transients
<b>Blind zone</b>	0 mm @ S <sub>n</sub> max.	<b>Light source</b>	InGaAlP, LED, 625 nm
<b>Sensitivity control</b>	Adjustable by potentiometer	<b>Light type</b>	Red, modulated
Electrical adjustment	210°	<b>Emitter angle</b>	±16° @ half sensing distance
Mechanical adjustment	240°	<b>Light spot</b>	120 x 160 mm @ 200 mm
Adjustable distance	30-400 mm	<b>Ambient light</b>	30.000 lux incandescent lamp
<b>Temperature drift</b>	≤ 0.2%/°C	<b>Operating frequency</b>	500 Hz
<b>Hysteresis (H)</b> (differential travel)	≤ 20%	<b>Response time</b>	OFF-ON (t <sub>ON</sub> ) ON-OFF (t <sub>OFF</sub> )
<b>Rated operational volt. (U<sub>B</sub>)</b>	10 to 30 VDC (ripple included)		≤ 1.0 ms ≤ 1.0 ms
<b>Ripple (U<sub>rip</sub>)</b>	≤ 10%	<b>Power ON delay (t<sub>v</sub>)</b>	≤ 100 ms
<b>Output current</b>		<b>Output function</b>	
Continuous (I <sub>a</sub> )	≤ 100 mA	Type	NPN or PNP
Short-time (I)	≤ 100 mA (max. load capacity 100 nF)	Switching function	NO and NC
<b>No load supply current (I<sub>o</sub>)</b>	≤ 15 mA @ 24 VDC	<b>Indication</b>	
<b>Minimum operational current (I<sub>m</sub>)</b>	0.5 mA	Output ON	LED, yellow
<b>OFF-state current (I<sub>r</sub>)</b>	≤ 100 μA	Signal stability and power ON	LED, green (see curve for condition of stability)
<b>Voltage drop (U<sub>d</sub>)</b>	≤ 2.0 VDC @ 100 mA		



## Specifications (cont.)

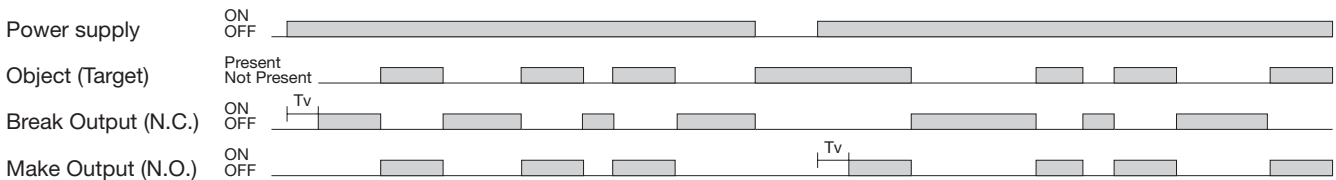
<b>Environment</b>		<b>Housing material</b>	
Installation category	III (IEC 60664/60664A; 60947-1)	Body	ABS, grey
Degree of pollution	3 (IEC 60664/60664A; 60947-1)	Front material	PMMA, red
Degree of protection	IP 67, IP 69K*	Cable gland	POM, Black
<b>Ambient temperature</b>		Trimmer shaft	POM, Dark Grey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

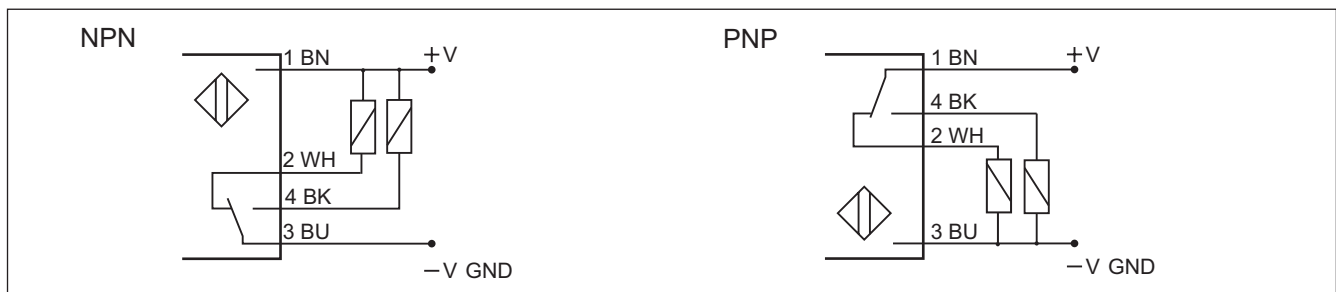


## Operation Diagram

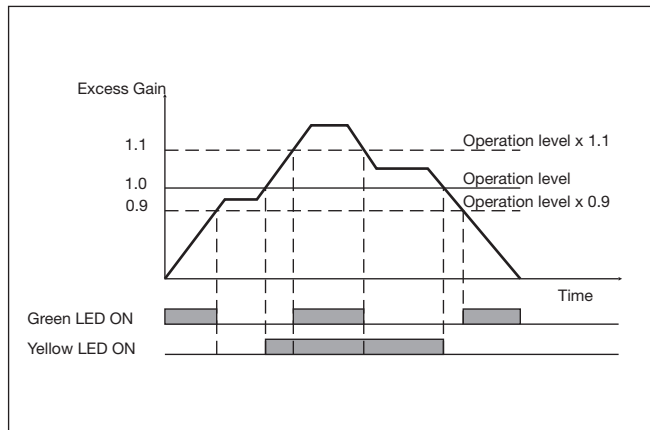
tv = Power ON delay



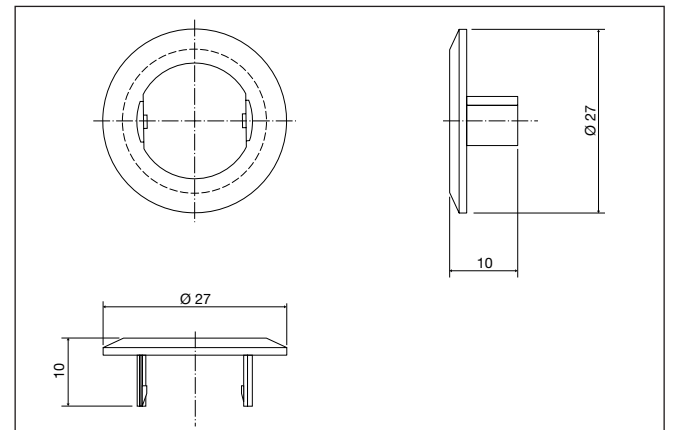
## Wiring Diagrams



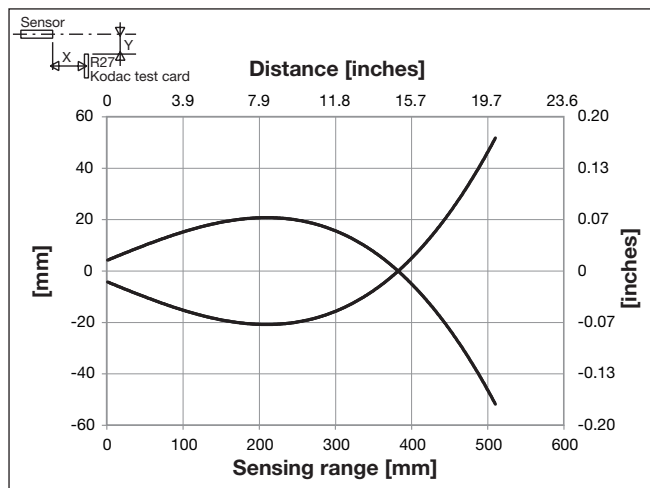
### Signal Stability Indication



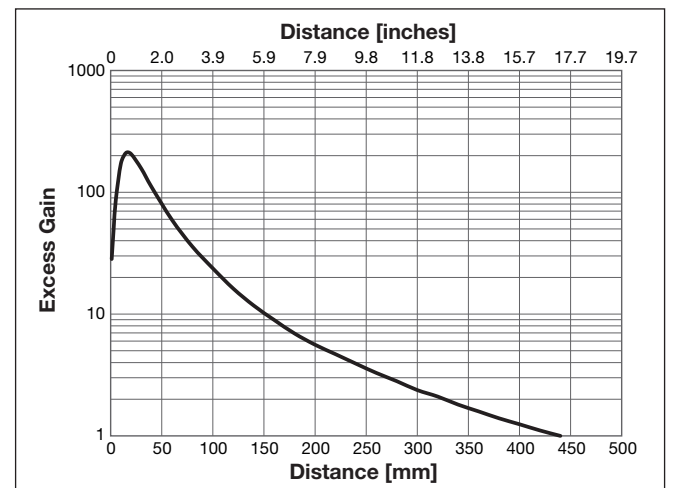
### APA18-MB1



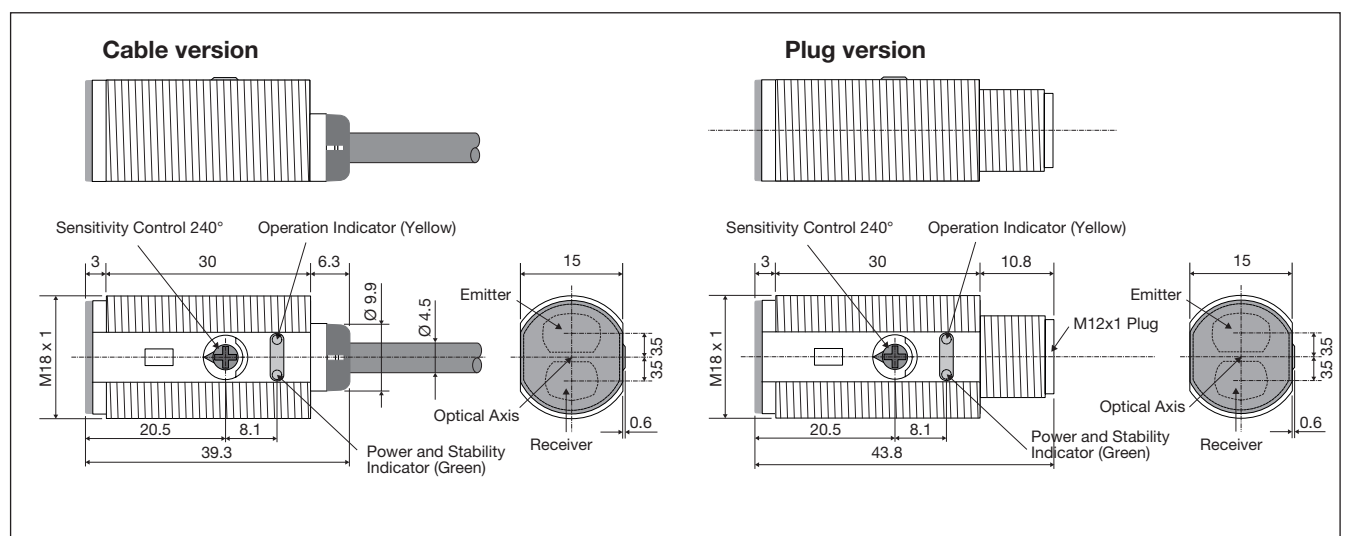
### Detection Diagram



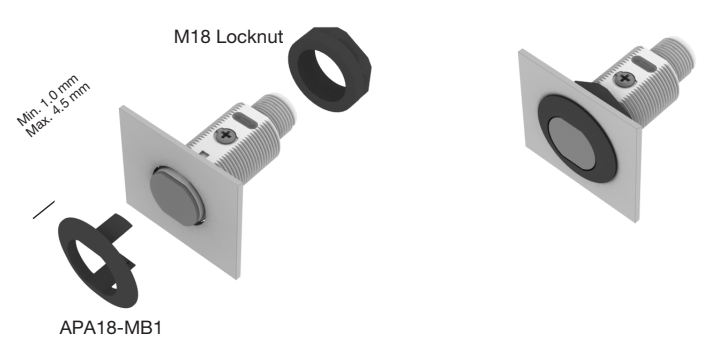
### Excess Gain



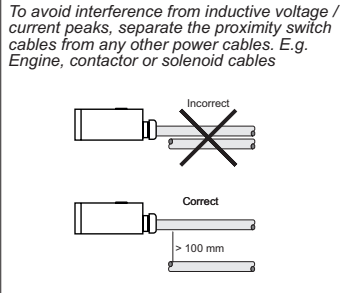
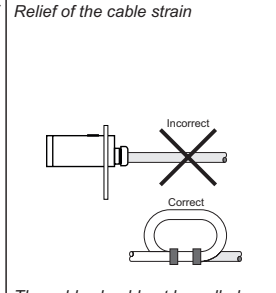
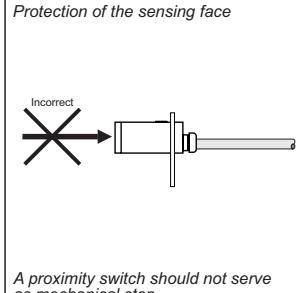
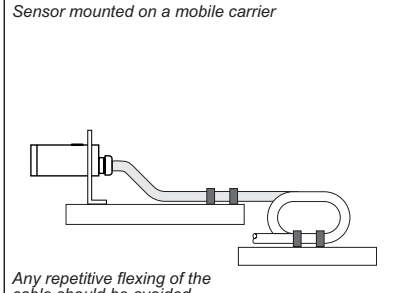
### Dimensions



## Mounting Systems

 <p>Min. 1.0 mm 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. Maximum torque 0.9 NM</p> <p>PA18 mounting with a combination of 2 x M18 locknuts. Maximum torque 2.0 NM</p>
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## 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>
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## Delivery Contents

- Photoelectric switch: PA 18 CAD04...WS
- Installation instruction on plastic bag
- Screwdriver
- Mounting bracket APA18-MB1
- 2 M18 locknuts
- **Packaging:** Plastic bag

## Accessories

- Connector type CONG1A.. / CONB14NF.. series