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



- 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_n	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

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

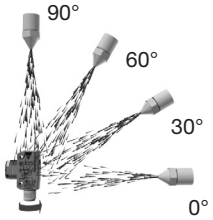
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Specifications (cont.)

Environment	
Installation category	III (IEC 60664/60664A; 60947-1)
Degree of pollution	3 (IEC 60664/60664A; 60947-1)
Degree of protection	IP 67, IP 69K*
Ambient temperature	
Operating	-25° to +60°C (-13° to +140°F)
Storage	-40° to +70°C (-40° to +158°F)
Vibration	10 to 150 Hz, 1 mm/15 G (IEC 60068-2-6)
Shock	30 g / 11ms, 3 pos, 3 neg per axis (IEC 60068-2-6, 60068-2-32)
Rated insulation voltage	500 VAC (rms) IEC protection class III

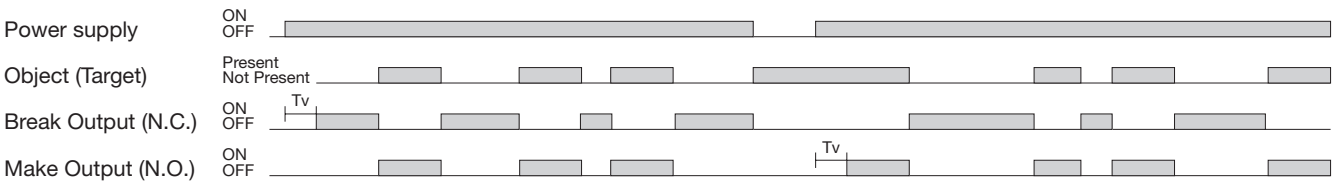
Housing material	
Body	ABS, grey
Front material	PMMA, red
Cable gland	POM, Black
Trimmer shaft	POM, Dark Grey
Locknuts	PBTP, black
Mounting bracket	PPA, black
Connection	
Cable	PVC, grey, 2 m 4 x 0.25 mm², Ø = 4.5 mm
Plug	M12, 4-pin (CON.14NF..W series)
Weight	With cable: 85 g With plug: 25 g
CE-marking	Yes
Approvals	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.

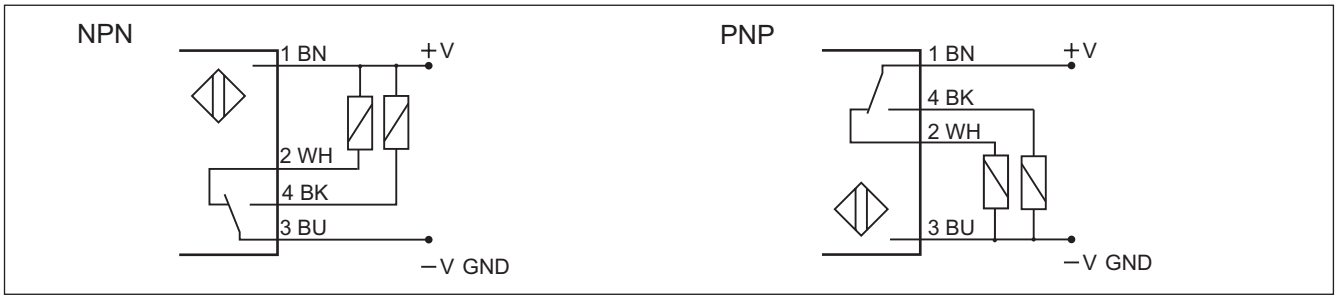


Operation Diagram

tv = Power ON delay

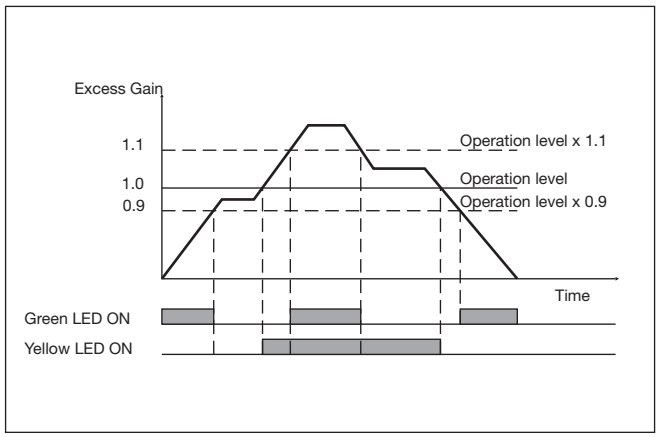


Wiring Diagrams

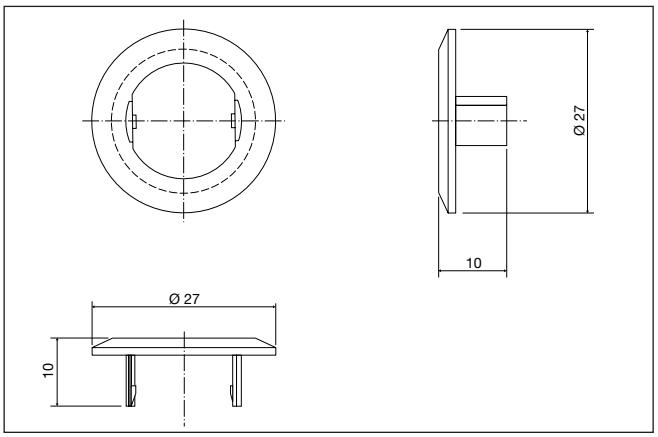


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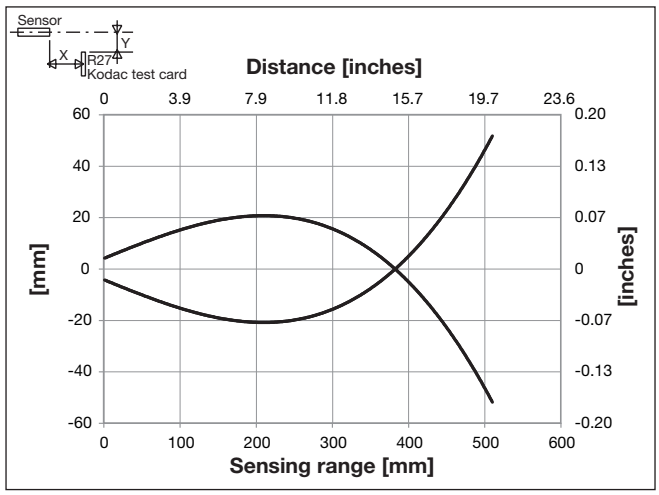
Signal Stability Indication



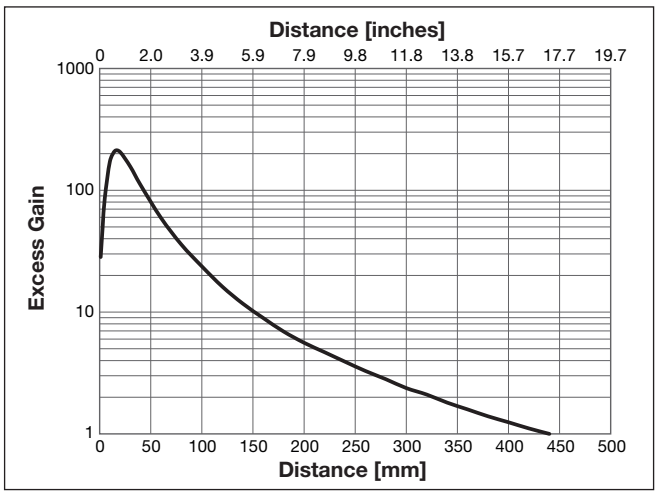
APA18-MB1



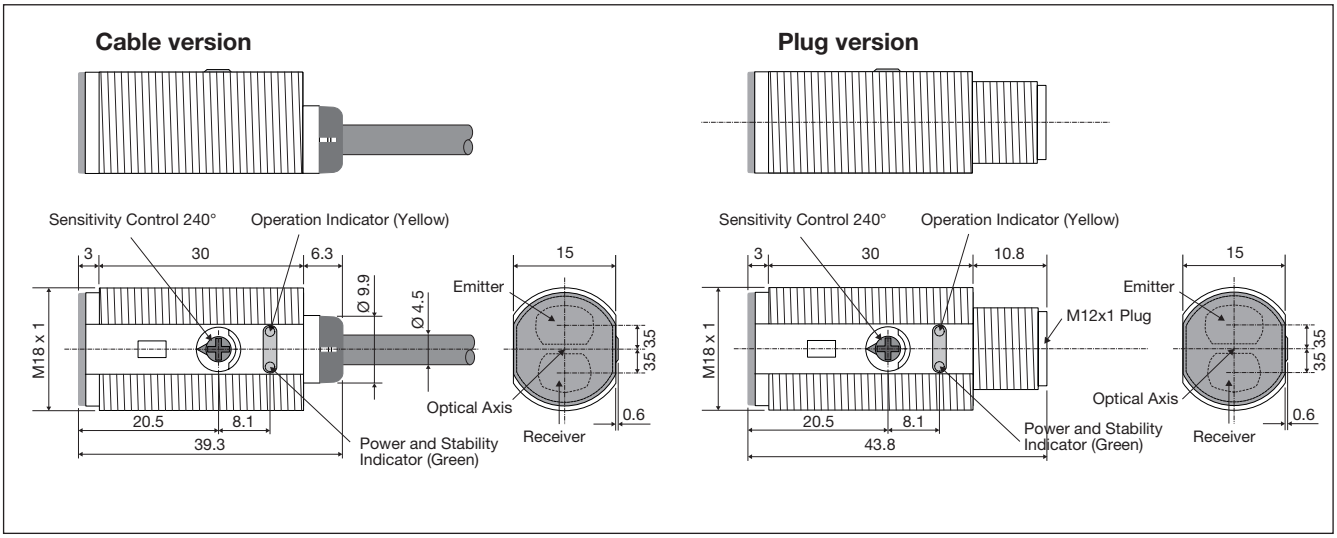
Detection Diagram



Excess Gain

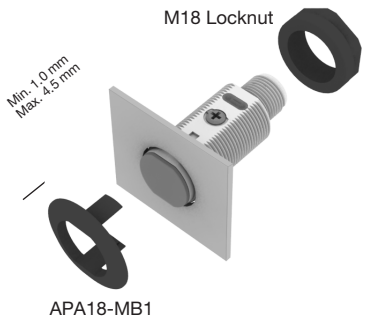


Dimensions



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Mounting Systems



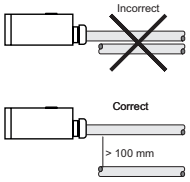


PA18 mounting with a combination of 1 x APA18-MB1 and 1 x M18 locknut.
Maximum torque 0.9 NM

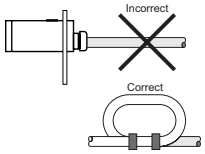
PA18 mounting with a combination of 2 x M18 locknuts.
Maximum torque 2.0 NM

Installation Hints

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

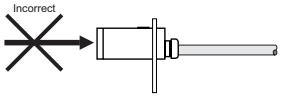


Relief of the cable strain



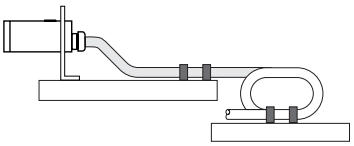
The cable should not be pulled

Protection of the sensing face



A proximity switch should not serve as mechanical stop

Sensor mounted on a mobile carrier



Any repetitive flexing of the cable should be avoided

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 CON.14NF..W series

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