PA/PH18 Series

Compact Photoelectric Sensors

This powerful PA/PH18 sensor series, with its cost effective, compact design and robust ABS housing, offers a space saving and easy-to-clean solution for a variety of applications in e.g. material handling, textile and food & beverage industries. Due to their longer sensing distance, their high-speed detection and their improved LED diagnostics, the PA/PH18 sensors provide an excellent price to performance ratio. Being resistant to high temperatures, high-pressure cleaning, strong cleaning agents and disinfectants, these sensors are especially well suited for reliable detection in harsh environments.

The PA/PH18 series is available in a variety of versions:
- The PA18 comes in an axial or a radial version and the PH18 in a square version.
- Both PA18 and PH18 are available as diffuse reflective with narrow or wide viewing angle, diffuse reflective with background supression, retro-reflective, polarized retro-reflective and through-beam sensors.

High Technology
A built-in microprocessor guarantees advanced filtering and detection ensuring flexible customized solutions.

Easy Adjustment
A very precise and linear sensitivity adjustment and use of a manual potentiometer provide accurate and easy setting from close distances to full range.

Easy Mounting
The PA/PH18 series comes with a new mounting accessory that facilitates fast and easy mounting.

Easy to Clean
Due to the smart and simple mounting accessory and the robust design of the sensors, cleaning has become more efficient and easier.

High Immunity
The PA/PH18 sensors possess a remarkably high immunity to light and electromagnetic disturbances. System maintenance is hereby reduced and the application uptime is increased.

Harsh Environments
The PA/PH18 sensors have been developed to operate in the harshest conditions. They conform to the standards of ECOLAB, IP67 and IP69K.

Approvals
- CE (EN60947-5-2)
- cULus (UL508) supply class 2
- Food & Beverage: ECOLAB certified

CARLO GAVAZZI Automation Components. Specifications are subject to change without notice. Illustrations are for example only.
Mounting
Installation of the PA/PH18 sensor is swiftly and easily carried out by means of a new mounting bracket, APA/APH18-MB1.
In addition, this simple accessory results in a smooth and neat finish and a space saving, easy-to-clean application.

IP69K and ECOLAB
Built to withstand cleaning with water at 80°C (176°F), high pressure washing up to 100 bar (1,450 psi) and to resist alkaline and acidic cleaning agents, the PA/PH18 sensor series is an excellent solution for applications where harsh cleaning methods are required.

Your Benefits

**PA18 Axial**
PA18: M18 x 40 mm (Axial cable)
PA18: M18 x 44 mm (Axial plug)

**PA18 Radial**
PA18: M18 x 50 mm (Radial cable)
PA18: M18 x 54 mm (Radial plug)

**PH18 Square**
PH18: 31,5 x 42,8 (Square cable)
PH18: 31,5 x 47,3 (Square plug)
PH18: 31,5 x 42,8 (Square pig-tail)

**Manual Potentiometer**
The potentiometer can be left on maximum for plug & play setup, or the sensitivity level can be optimized as circumstances may require. For retro-reflective and through-beam versions this allows detection of semitransparent objects.

**Clear Robust Laser Printing**
Laser engraving has replaced the sensor label ensuring that the information stays intact after any cleaning process.

**LED Indication**
The sensor functions are easily diagnosed by the dual LED indication in three combinations.

CARLO GAVAZZI Automation Components. Specifications are subject to change without notice. Illustrations are for example only.
Technologically Advanced

The PA/PH18 photoelectric sensor is technologically advanced yet small, economical and easy to use without compromising quality and durability.

NO and NC in One Sensor
The PA/PH18 sensors offer the freedom to choose between a normally open and normally closed output. This drastically reduces demands on storage capacity and stock control.

Efficient Lens Design
The optimized aspherical lens design results in a wide sensing angle and a much longer sensing range.

Advanced Microprocessor
The built-in microprocessor uses advanced filtering and detection principles which efficiently eliminate false detection caused by common light sources, flash beacon lamps or electromagnetic interference. Furthermore, this microprocessor achieves significantly faster detection.

New background suppression principle
The new PA/PH18 background suppression sensor (BGS) is based on a brand-new sensing principle. This considerably increases the sensing distance (200 mm for white and grey objects, 150 mm for black objects) and improves the detection accuracy of different colours, suppressing the background even more efficiently.

This revolutionary sensing technology uses an Active Pixel Sensor (APS) CMOS array of 64 x 1 sensors, where each pixel represents a specific position. It takes advantage of the fact that the reflected light hits the APS array at exactly the same position. This way, the object’s mass centre can be found regardless of the energy of the received light. Using this technology, grey, black and white objects are detected at almost exactly the same distance.

Furthermore, unlike traditional CCD arrays, the CMOS array benefits from being immune to the blooming effect - not letting the light bleed onto other pixels and disturbing the detection.
## PA18 and PH18 - specifications

<table>
<thead>
<tr>
<th>Diffuse reflective</th>
<th>Retro-reflective</th>
<th>Through-beam</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PA18 and PH18</strong></td>
<td><strong>Background suppression</strong></td>
<td><strong>Standard</strong></td>
</tr>
<tr>
<td><strong>Cable</strong> 2 m</td>
<td><strong>NPN</strong></td>
<td><strong>Axial</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Radial</strong></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>Square</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>Plug M12</strong></td>
<td><strong>Axial</strong></td>
<td>PA1BCAB20NAM1SA</td>
</tr>
<tr>
<td></td>
<td><strong>Radial</strong></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>Square</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>Pigtail M12</strong></td>
<td><strong>Axial</strong></td>
<td>PA1BCAB20NAM1SA</td>
</tr>
<tr>
<td></td>
<td><strong>Radial</strong></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>Square</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>Rated operating distance (S&lt;sub&gt;n&lt;/sub&gt;)</strong></td>
<td><strong>Axial 0.2 m</strong></td>
<td><strong>Radial 0.8 m</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Square 0.2 m</strong></td>
<td><strong>Square 1.0 m</strong></td>
</tr>
<tr>
<td><strong>Blind Zone</strong></td>
<td><strong>PA: 10 mm</strong></td>
<td><strong>PH: 8 mm</strong></td>
</tr>
<tr>
<td><strong>Hysteresis (H)</strong></td>
<td>10%</td>
<td>-</td>
</tr>
<tr>
<td><strong>Rated operational voltage</strong></td>
<td>10 to 30 V DC, Ripple included</td>
<td>-</td>
</tr>
<tr>
<td><strong>No load supply current (I&lt;sub&gt;o&lt;/sub&gt;)</strong></td>
<td>≤ 20 mA @ U&lt;sub&gt;max&lt;/sub&gt;</td>
<td>≤ 15 mA @ 24 V DC</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td>NPN or PNP</td>
<td>-</td>
</tr>
<tr>
<td><strong>Output function</strong></td>
<td>N.O. and N.C.</td>
<td>-</td>
</tr>
<tr>
<td><strong>Minimum operational current</strong></td>
<td>≤ 100 mA</td>
<td>-</td>
</tr>
<tr>
<td><strong>Off-State current (I&lt;sub&gt;o&lt;/sub&gt;)</strong></td>
<td>100 µA</td>
<td>-</td>
</tr>
<tr>
<td><strong>Voltage drop (U&lt;sub&gt;o&lt;/sub&gt;)</strong></td>
<td>≤ 2.0 V @ 10 mA</td>
<td>-</td>
</tr>
<tr>
<td><strong>Sensor protection</strong></td>
<td>Shortcircuit (A), reverse polarity (B) and transients (C)</td>
<td>B + C</td>
</tr>
<tr>
<td><strong>Response time</strong></td>
<td>≤ 1.0 ms</td>
<td>-</td>
</tr>
<tr>
<td><strong>Power on delay (t&lt;sub&gt;on&lt;/sub&gt;)</strong></td>
<td>≤ 100 ms</td>
<td>-</td>
</tr>
<tr>
<td><strong>Led indications</strong></td>
<td>Output ON (Yellow LED), Signal stability and Power ON (Green LED)</td>
<td>Power ON</td>
</tr>
<tr>
<td><strong>Sensitivity control</strong></td>
<td>Adjustable by potentiometer</td>
<td>-</td>
</tr>
<tr>
<td><strong>Degree of protection</strong></td>
<td>IP67 and IP69K</td>
<td>-</td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>Operating: -25 to +60°C (-13 to +140°F), Storage: -40 to +70°C (-40 to +158°F)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Ambient light</strong></td>
<td>≤ 30,000 Lux, incandescent lamp</td>
<td>-</td>
</tr>
<tr>
<td><strong>CE marking</strong></td>
<td>According to EN 60947-5-2</td>
<td>-</td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td>cULus (UL508) Supply class 2</td>
<td>-</td>
</tr>
<tr>
<td><strong>Installation category</strong></td>
<td>III [IEC60664/60664A; 60947-1]</td>
<td>-</td>
</tr>
<tr>
<td><strong>Pollution degree</strong></td>
<td>3[IEC60664/60664A; 60947-1]</td>
<td>-</td>
</tr>
<tr>
<td><strong>Vibration</strong></td>
<td>10 to 150 Hz, 1 mm/15G pr. axis (IEC 60068-2-6)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Shock</strong></td>
<td>30g / 11 m/s, 3 positive and 3 negative pr. axis (IEC 60068-2-6)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Emitting light source</strong></td>
<td>Red LED</td>
<td>Infrared LED</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>Body: ABS grey, Front material: PMMA red</td>
<td>-</td>
</tr>
<tr>
<td><strong>Cable</strong></td>
<td>PVC, grey, 2 m, (4) x 0.25mm², Ø=4.5 mm</td>
<td>-</td>
</tr>
<tr>
<td><strong>Connector</strong></td>
<td>4-pin M12</td>
<td>-</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>PA18: M18 x 43.3 mm, PH18:10.8 x 20 x 30 mm</td>
<td>-</td>
</tr>
<tr>
<td><strong>Weight incl. packaging</strong></td>
<td>PA18: Cable 85 g, Plug 25 g; PH18: Cable 85 g, Plug 25 g, Pigtail 40 g</td>
<td>-</td>
</tr>
</tbody>
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