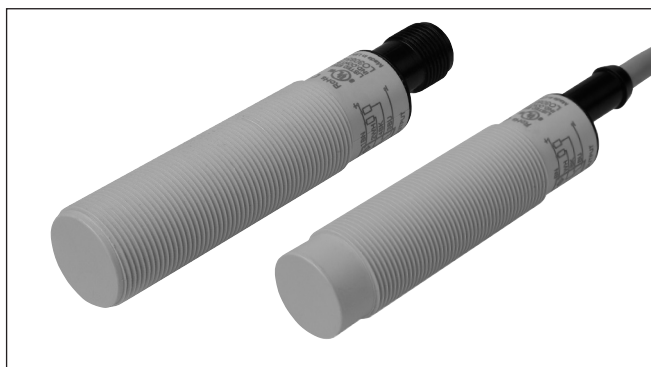


# Proximity Sensors Capacitive Thermoplastic Polyester Housing Types CA18CAN/CAF.....

CARLO GAVAZZI



- **4<sup>TH</sup> Generation TRIPLESIELD™**
- Adjustable sensing distance: 2 - 10 mm Flush or 3-15 mm Non-flush
- Protection: short-circuit, transients and reverse polarity
- Dust and humidity compensation
- Dust or Temperature alarm output
- Rated operational voltage: 10-40 VDC
- Output: DC 200 mA, NPN or PNP
- Standard Output: NO and NC
- LED indications for Power-supply, Target and Stability
- IP67, IP68, IP69K, Nema 1, 2, 4, 4X, 5, 6, 6P, 12
- Cable and M12 connector versions available



## Product Description

The CA18CA.. capacitive proximity switches feature an improved 4<sup>TH</sup> Generation TRIPLESIELD™ technology. Furthermore, these sensors feature increased immunity to electromagnetic interference (EMI), especially to frequency drives. Not only does 4<sup>TH</sup> Generation TRIPLESIELD™ feature an increased EMI, but it also increases the immunity to humidity and dust. The implementation of stability indication eases the setup procedure as both Stable ON and Stable OFF positions are

indicated by the Green and yellow LEDs.

The sensing distance is increased by 25 % allowing room for additional stable detection.

The Dust Alarm function gives an early warning that the sensing surroundings have to be cleaned.

The Temperature alarm function raises an alarm if the sensing surface goes beyond 60 degree celcius.

The sensor housing is featuring IP69K as well as approval by ECOLAB for cleaning- and disinfection agents.

## Ordering Key

**CA18CAN12NAM1**

Capacitive proximity switch  
Housing diameter (mm)  
Housing material  
Housing length  
Detection principle  
Rated operating dist. (mm)  
Output type  
Output configuration  
Connection type

## Type Selection

| Housing diameter | Sensor type | Output type | Output function | Connection | Rated operating distance (S <sub>n</sub> ) | Ordering no. Standard | Ordering no. Dust alarm | Ordering no. Temperature alarm |
|------------------|-------------|-------------|-----------------|------------|--------------------------------------------|-----------------------|-------------------------|--------------------------------|
| M 18             | Flush       | NPN         | NO+NC           | Cable      | 2 - 8 mm                                   | CA18CAF08NA           |                         |                                |
| M 18             | Flush       | NPN         | NO+NC           | M12 Plug   | 2 - 8 mm                                   | CA18CAF08NAM1         |                         |                                |
| M 18             | Flush       | PNP         | NO+NC           | Cable      | 2 - 8 mm                                   | CA18CAF08PA           |                         |                                |
| M 18             | Flush       | PNP         | NO+NC           | M12 Plug   | 2 - 8 mm                                   | CA18CAF08PAM1         |                         |                                |
| M 18             | Flush       | PNP         | NO              | Cable      | 2 - 8 mm                                   |                       | CA18CAF08PODU           | CA18CAF08POTA                  |
| M 18             | Flush       | PNP         | NC              | Cable      | 2 - 8 mm                                   |                       | CA18CAF08PCDU           | CA18CAF08PCTA                  |
| M 18             | Non-Flush   | NPN         | NO+NC           | Cable      | 3 - 12 mm                                  | CA18CAN12NA           |                         |                                |
| M 18             | Non-Flush   | NPN         | NO+NC           | M12 Plug   | 3 - 12 mm                                  | CA18CAN12NAM1         |                         |                                |
| M 18             | Non-Flush   | PNP         | NO+NC           | Cable      | 3 - 12 mm                                  | CA18CAN12PA           |                         |                                |
| M 18             | Non-Flush   | PNP         | NO+NC           | M12 Plug   | 3 - 12 mm                                  | CA18CAN12PAM1         |                         |                                |
| M 18             | Non-Flush   | PNP         | NO              | Cable      | 3 - 12 mm                                  |                       | CA18CAN12PODU           | CA18CAN12POTA                  |
| M 18             | Non-Flush   | PNP         | NC              | Cable      | 3 - 12 mm                                  |                       | CA18CAN12PCDU           | CA18CAN12PCTA                  |

## Specifications EN 60947-5-2

### Rated operating distance (S<sub>n</sub>)

Non-flush mounted sensor

3 - 12 mm (factory setting 12 mm),  
(ref. target 36x36 mm ST37, 1 mm thick, grounded)

Flush mounted sensor

2 - 8 mm (factory setting 8 mm - non-flush mounted)  
(ref. target 24x24 mm ST37, 1 mm thick, grounded)

### Sensitivity control

Electrical adjustment  
Mechanical adjustment  
Adjustable distance  
Flush types  
Non-flush types

Adjustable by potentiometer

11 turns  
16 turns

2 to 10 mm  
3 to 15 mm

### Effective operating dist. (S<sub>r</sub>)

$0.9 \times S_n \leq S_r \leq 1.1 \times S_n$

## Specifications (cont.) EN 60947-5-2

|                                                       |                                                                                                                              |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Usable operating dist. (<math>S_u</math>)*</b>     | $0.85 \times S_r \leq S_u \leq 1.15 \times S_r$                                                                              |
| <b>Repeat accuracy (R)</b>                            | $\leq 5\%$                                                                                                                   |
| <b>Hysteresis (H)</b>                                 | 3 - 20%                                                                                                                      |
| <b>Rated operational volt. (<math>U_B</math>)</b>     | 10 to 40 VDC (ripple incl.)                                                                                                  |
| <b>Ripple</b>                                         | $\leq 10\%$                                                                                                                  |
| <b>Output function</b>                                | NPN or PNP                                                                                                                   |
| <b>Output switching function</b>                      | N.O. and N.C.                                                                                                                |
| <b>Rated operational current (<math>I_a</math>)</b>   | $\leq 200$ mA (continuous)                                                                                                   |
| <b>Capacitive load</b>                                | 100 nF                                                                                                                       |
| <b>No-load supply current (<math>I_o</math>)</b>      | $\leq 12$ mA                                                                                                                 |
| <b>Voltage drop (<math>U_d</math>)</b>                | $\leq 2.0$ VDC @ 200 mA DC                                                                                                   |
| <b>Minimum operational current (<math>I_m</math>)</b> | $\geq 0.5$ mA                                                                                                                |
| <b>OFF state current (<math>I_i</math>)</b>           | $\leq 100$ $\mu$ A                                                                                                           |
| <b>Protection</b>                                     | Short-circuit, reverse polarity, transients                                                                                  |
| <b>Frequency of operating cycles (f)</b>              | 50 Hz                                                                                                                        |
| <b>Response time OFF-ON (<math>t_{on}</math>)</b>     | $\leq 10$ ms                                                                                                                 |
| <b>Response time ON-OFF (<math>t_{off}</math>)</b>    | $\leq 10$ ms                                                                                                                 |
| <b>Power ON delay (<math>t_v</math>)</b>              | $\leq 200$ ms                                                                                                                |
| <b>Indication</b>                                     |                                                                                                                              |
| Target detected                                       | LED, yellow                                                                                                                  |
| Power and detection stability                         | LED, green                                                                                                                   |
| <b>Environment</b>                                    |                                                                                                                              |
| Installation category                                 | III (IEC 60664, 60664A; 60947-1)                                                                                             |
| Degree of pollution                                   | 3 (IEC 60664, 60664A; 60947-1)                                                                                               |
| Degree of protection                                  | IP 67, IP 68/60 min., IP69K** (IEC 60529; 60943-1)                                                                           |
| NEMA type                                             | 1, 2, 4, 4X, 5, 6, 6P, 12                                                                                                    |
| Operating temperature                                 | -30 to +85°C (-22 to +185°F)                                                                                                 |
| Max. temperature on sensing face                      | 120°C (248°F)                                                                                                                |
| Storage temperature                                   | -40 to +85°C (-40 to +185°F)                                                                                                 |
| <b>Rated insulation voltage</b>                       | 1 kVAC (rms)<br>IEC protection class III  |
| <b>Tightening torque</b>                              | $\leq 2.6$ Nm                                                                                                                |
| <b>Connection</b>                                     |                                                                                                                              |
| Cable                                                 | PVC,<br>$\varnothing 5.2 \times 2$ m, 4 x 0.34 mm <sup>2</sup><br>Oil proof, grey                                            |
| Plug (M1)                                             | M12 x 1 - 4 pin                                                                                                              |

**Temperature alarm output**  
Response time examples  
 $T_A = 25^\circ\text{C}$

$60^\circ\text{C} \pm 5^\circ\text{C}$

14 sec @  $T_{EXC} = 800^\circ\text{C}$   
315 sec @  $T_{EXC} = 80^\circ\text{C}$

### TRIPLESHIELD™

#### Exceeding the norms for capacitive sensors

Electrostatic discharge

(EN61000-4-2)

Contact discharge

Air discharge

$> 40$  kV

$> 40$  kV

Electrical fast transients/burst  
(EN 61000-4-4)

$\pm 4$  kV

Surge

(EN 61000-4-5)

Power-supply

Sensor output

$> 2$  kV (with 500  $\Omega$ )

$> 2$  kV (with 500  $\Omega$ )

Wire conducted disturbances  
(EN 61000-4-6)

$> 20$  Vrms

Power-frequency magnetic  
fields (EN 61000-4-8)

Continuous

Short-time

$> 60$  A/m, 75.9  $\mu$  tesla

$> 600$  A/m, 759  $\mu$  tesla

Radiated RF electromagnetic  
fields (EN 61000-4-3)

$> 20$  V/m

Shock (IEC 60068-2-27)

30 G / 11ms, 3 pos, 3 neg  
per axis

Rough handling shocks  
(IEC 60068-2-31)

2 times from 1m  
100 times from 0,5m

Vibration (IEC 60068-2-6)

10 to 150 Hz, 1 mm / 15 G

#### Housing material

Body

Cable gland

Fingernuts

Trimmershaft

PBT, grey,  
30% glass reinforced  
PA12, black  
PA12, black  
Nylon

#### Weight

Cable version

Plug version

150 g

75 g

#### Approvals

cULus (UL508), ECOLAB

#### CE-marking

Yes

#### MTTF<sub>d</sub>

825 years @ 40°C (+104°F)

\* For Flush type sensor flushmounted in conductive material, the usable operating distance ( $S_u$ ) is  $0.80 \times S_r \leq S_u \leq 1.2 \times S_r$  for temperatures exceeding 0 - 60 °C (32 - 140°F).

\*\* 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.

