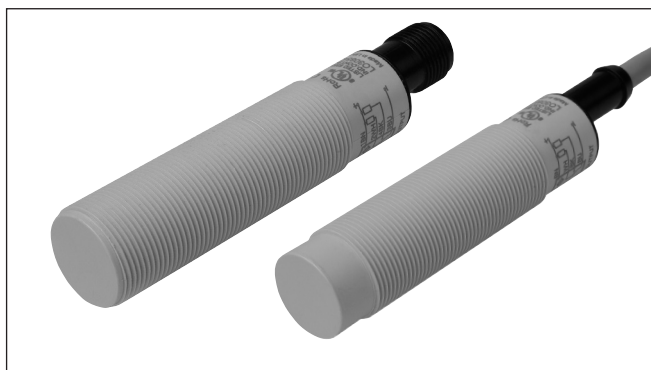


Proximity Sensors Capacitive Thermoplastic Polyester Housing Types CA18CAN/CAF.....

CARLO GAVAZZI



- **4TH 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 4TH Generation TRIPLESIELD™ technology. Furthermore, these sensors feature increased immunity to electromagnetic interference (EMI), especially to frequency drives. Not only does 4TH 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 _n)	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_n)

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_r)

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

Specifications (cont.) EN 60947-5-2

Usable operating dist. (S_u)*	$0.85 \times S_r \leq S_u \leq 1.15 \times S_r$
Repeat accuracy (R)	$\leq 5\%$
Hysteresis (H)	3 - 20%
Rated operational volt. (U_B)	10 to 40 VDC (ripple incl.)
Ripple	$\leq 10\%$
Output function	NPN or PNP
Output switching function	N.O. and N.C.
Rated operational current (I_a)	≤ 200 mA (continuous)
Capacitive load	100 nF
No-load supply current (I_o)	≤ 12 mA
Voltage drop (U_d)	≤ 2.0 VDC @ 200 mA DC
Minimum operational current (I_m)	≥ 0.5 mA
OFF state current (I_i)	≤ 100 μ A
Protection	Short-circuit, reverse polarity, transients
Frequency of operating cycles (f)	50 Hz
Response time OFF-ON (t_{on})	≤ 10 ms
Response time ON-OFF (t_{off})	≤ 10 ms
Power ON delay (t_v)	≤ 200 ms
Indication	
Target detected	LED, yellow
Power and detection stability	LED, green
Environment	
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)
Rated insulation voltage	1 kVAC (rms) IEC protection class III 
Tightening torque	≤ 2.6 Nm
Connection	
Cable	PVC, $\varnothing 5.2 \times 2$ m, 4 x 0.34 mm ² 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)

± 4 kV

Surge

(EN 61000-4-5)

Power-supply

Sensor output

> 2 kV (with 500 Ω)

> 2 kV (with 500 Ω)

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 μ tesla

> 600 A/m, 759 μ 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

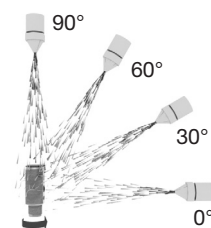
Yes

MTTF_d

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.



Adjustment Guide

The environments in which capacitive sensors are installed can often be unstable as regards to temperature, humidity, object distance and industrial (noise) interference. Because of this, Carlo Gavazzi offers

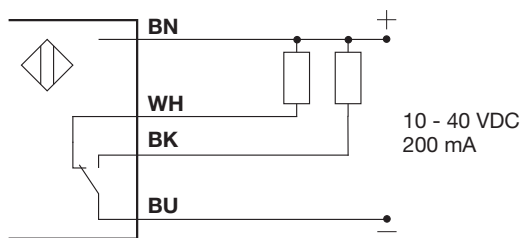
as standard features in all *TRIPLESHIELD™* capacitive sensors a user-friendly sensitivity adjustment instead of a fixed sensing range. Likewise, these sensors provide an extended sensing range to accommodate

mechanically demanding areas and temperature stability to ensure high immunity to electromagnetic interference (EMI) and a minimum need for adjusting sensitivity if the temperature varies.

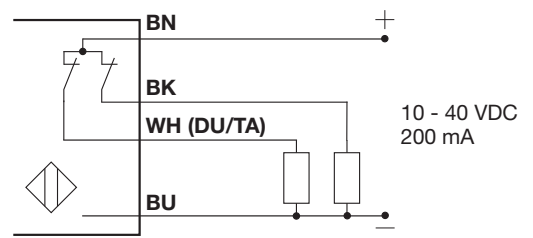
Note: Sensors are factory set (default) to nominal sensing range S_n .

Wiring Diagram

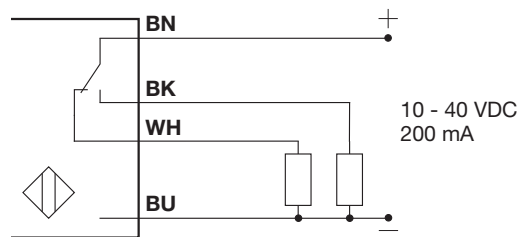
NPN



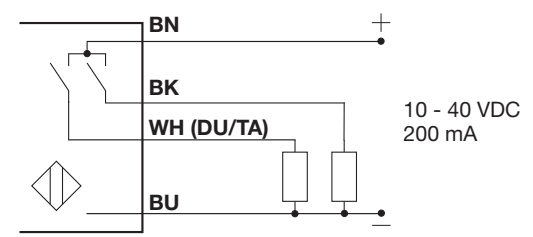
PNP Dust- or Temperature alarm on NC



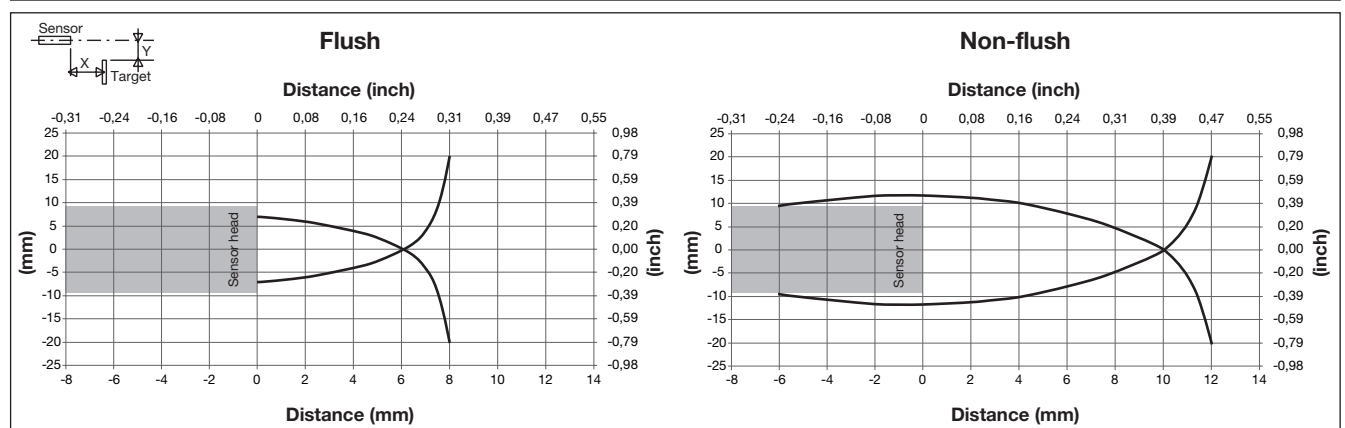
PNP



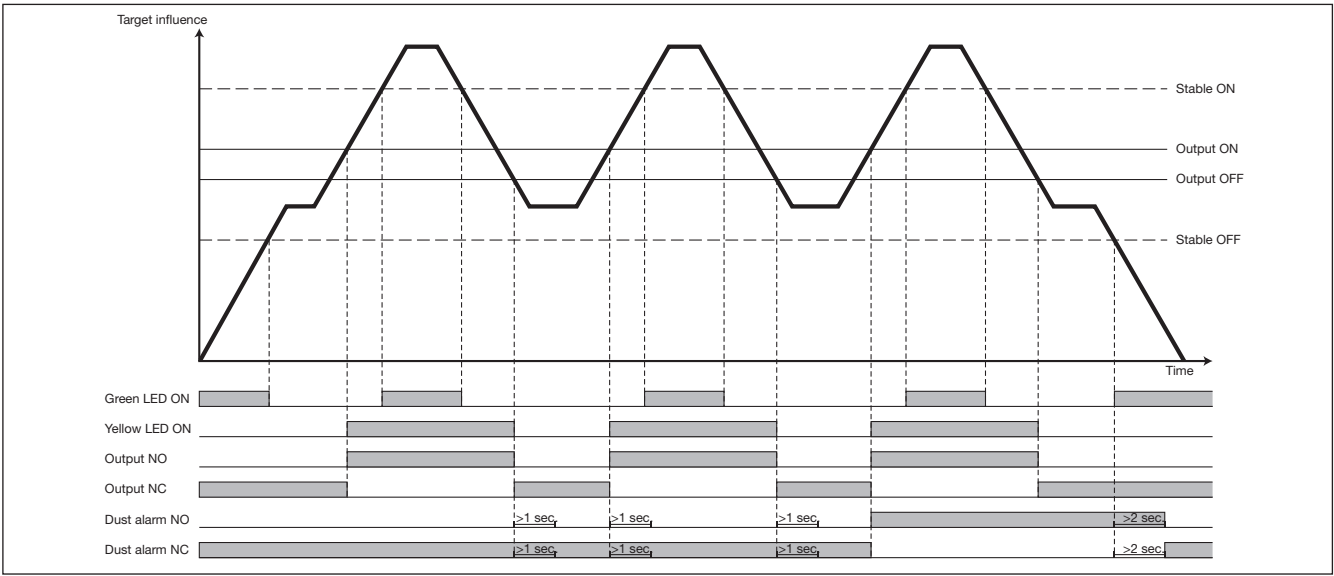
PNP Dust- or Temperature alarm on NO



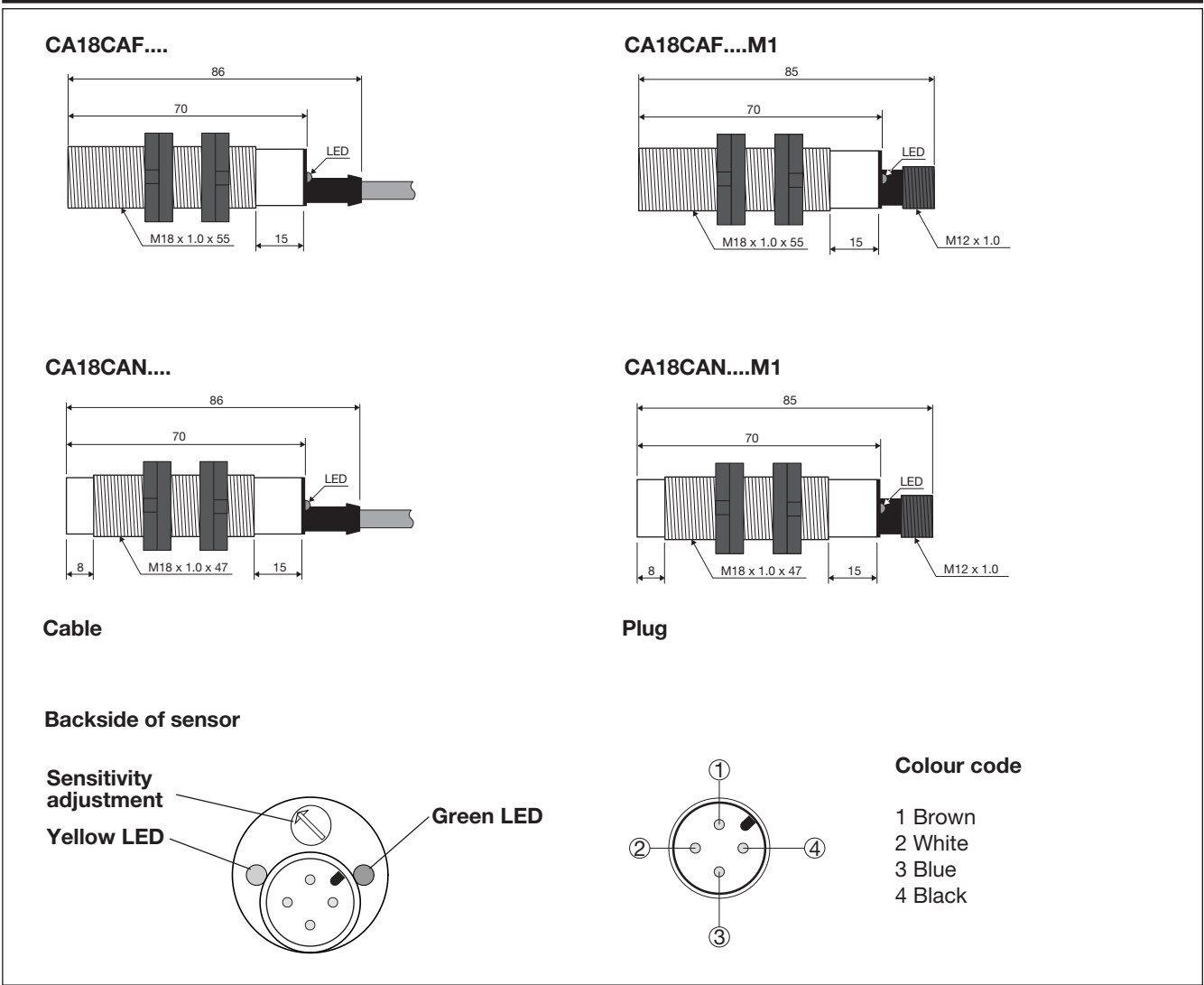
Detection Diagram



Detection Stability Indication



Dimensions



Installation Hints

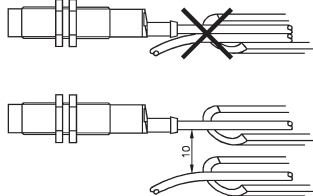
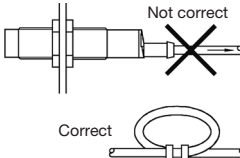
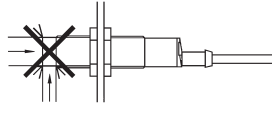
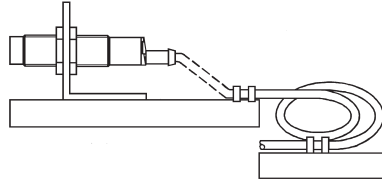
Capacitive sensors have a unique ability to detect almost any material in liquid or solid form. Capacitive sensors are able to detect metallic as well as non-metallic objects. However, their traditional use is for non-metallic materials such as:

- **Plastics Industry**
Resins, regrinds or moulded products.
- **Chemical Industry**
Cleansers, fertilizers, liquid soaps, corrosives and petrochemicals.
- **Wood Industry**
Saw dust, paper products, door and window frames.
- **Ceramics & Glass Industry**
Raw materials, clay or finished products, bottles.

- **Packaging Industry**
Package inspection for level or contents, dry goods, fruits and vegetables, dairy products.

Materials are detected due to their dielectric constant. The bigger the size of an object, the higher the density of material, the better or easier it is to detect the object.

The nominal sensing distance for a capacitive sensor is referred to a grounded metal plate (ST37). For additional information regarding dielectric ratings of materials please refer to Technical Information.

<i>To avoid interference from inductive voltage/current peaks, separate the prox. switch power cables from any other power cables, e.g. motor, contactor or solenoid cables</i> 	<i>Relief of cable strain</i>  The cable should not be pulled	<i>Protection of the sensing face</i>  A proximity switch should not serve as mechanical stop	<i>Switch mounted on mobile carrier</i>  Any repetitive flexing of the cable should be avoided
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Delivery Contents

- Capacitive switch: CA18CAN/CAF.....
- User manual
- 2 x M18 finger nuts
- Screwdriver
- **Packaging:** Cardboard box

Accessories

- Connector type CONM14NF.. -series.
- Mounting Brackets AMB18-S.. (straight), AMB18-A.. (angled)