

Proximity Sensors Capacitive Thermoplastic Polyester Housing Types CA30CAN/CAF.....

CARLO GAVAZZI



- 4TH Generation TRIPLESIELD™
- Adjustable sensing distance: 2 - 20 mm flush or 4-30 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, output and stability
- IP67, IP68, IP69K, Nema 1, 2, 4, 4X, 5, 6, 6P, 12
- Cable and M12 connector versions available



Product Description

The CA30CA.. 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 20 - 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 Celsius. The sensor housing is featuring IP69K as well as approval by ECOLAB for cleaning and disinfection agents.

Ordering Key

CA30CAN25NAM1

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 30	Flush	NPN	NO+NC	Cable	0 - 16 mm	CA30CAF16NA		
M 30	Flush	NPN	NO+NC	M12 Plug	0 - 16 mm	CA30CAF16NAM1		
M 30	Flush	PNP	NO+NC	Cable	0 - 16 mm	CA30CAF16PA		
M 30	Flush	PNP	NO+NC	M12 Plug	0 - 16 mm	CA30CAF16PAM1		
M 30	Flush	PNP	NO	Cable	0 - 16 mm		CA30CAF16PODU	CA30CAF16POTA
M 30	Flush	PNP	NC	Cable	0 - 16 mm		CA30CAF16PCDU	CA30CAF16PCTA
M 30	Flush	PNP	NC	M12 Plug	0 - 16 mm		CA30CAF16PCM1DU	
M 30	Non-Flush	NPN	NO+NC	Cable	0 - 25 mm	CA30CAN25NA		
M 30	Non-Flush	NPN	NO+NC	M12 Plug	0 - 25 mm	CA30CAN25NAM1		
M 30	Non-Flush	PNP	NO+NC	Cable	0 - 25 mm	CA30CAN25PA		
M 30	Non-Flush	PNP	NO+NC	M12 Plug	0 - 25 mm	CA30CAN25PAM1		
M 30	Non-Flush	PNP	NO	Cable	0 - 25 mm		CA30CAN25PODU	CA30CAN25POTA
M 30	Non-Flush	PNP	NC	Cable	0 - 25 mm		CA30CAN25PCDU	CA30CAN25PCTA

Specifications EN 60947-5-2

Rated operating distance (S_n)
Non-flush mounted sensor

0 - 25 mm (factory setting 25 mm),
(ref. target 75x75 mm ST37, 1 mm thick, grounded)

Flush mounted sensor

0 - 16 mm (factory setting 16 mm - non-flush mounted)
(ref. target 48x48 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 20 mm
4 to 30 mm

Effective operating dist. (S_r)

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

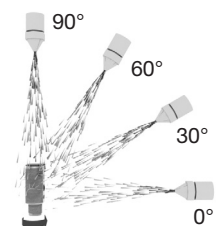
Usable operating dist. (S_u)

$0.85 \times S_r \leq S_u \leq 1.15 \times S_r$

Specifications (cont.) EN 60947-5-2

Repeat accuracy (R)	≤ 5%	Temperature alarm output	60°C ± 5°C
Hysteresis (H)	3 - 20%	Response time examples T _A = 25°C	16 sec @ T _{EXC} = 800°C 390 sec @ T _{EXC} = 80°C
Rated operational volt. (U_B)	10 to 40 VDC (ripple incl.)	TRIPLESHIELD™	
Ripple	≤ 10%	Exceeding the norms for capacitive sensors	
Output function	NPN or PNP	Electrostatic discharge (EN61000-4-2)	
Output switching function	N.O. and N.C.	Contact discharge	> 40 kV
Rated operational current (I_a)	≤ 200 mA (continuous)	Air discharge	> 40 kV
Capacitive load	100 nF	Electrical fast transients/burst (EN 61000-4-4)	±4kV
No-load supply current (I_o)	≤ 12 mA	Surge (EN 61000-4-5)	
Voltage drop (U_d)	≤ 2.0 VDC @ 200 mA DC	Power-supply	> 2kV (with 500 Ω)
Minimum operational current (I_m)	≥ 0.5 mA	Sensor output	> 2kV (with 500 Ω)
OFF state current (I_i)	≤ 100 μA	Wire conducted disturbances (EN 61000-4-6)	> 20 Vrms
Protection	Short-circuit, reverse polarity, transients	Power-frequency magnetic fields (EN 61000-4-8)	
Frequency of operating cycles (f)	50 Hz	Continuous	> 60 A/m, 75.9 μ tesla
Response time OFF-ON (t_{on})	≤ 10 ms	Short-time	> 600 A/m, 759 μ tesla
Response time ON-OFF (t_{off})	≤ 10 ms	Radiated RF electromagnetic fields (EN 61000-4-3)	> 20 V/m
Power ON delay (t_v)	≤ 200 ms	Shock (IEC 60068-2-32)	30 G / 11ms, 3 pos, 3 neg per axis
Indication		Rough handling shocks (IEC 60068-2-31)	twice from 1 m 100 times from 0.5 m
Target detected	LED, yellow	Vibration (IEC 60068-2-6)	10 to 150 Hz, 1 mm / 15 G
Power and detection stability	LED, green	Housing material	
Environment		Body	PBT, grey, 30% glass reinforced
Installation category	III (IEC 60664, 60664A; 60947-1)	Cable gland	PA12, black
Degree of pollution	3 (IEC 60664, 60664A; 60947-1)	Fingernuts	PA12, black
Degree of protection	IP 67, IP 68/60 min., IP69K* (IEC 60529; 60943-1)	Trimmershaft	Nylon
NEMA type	1, 2, 4, 4X, 5, 6, 6P, 12	Weight	
Operating temperature	-30 to +85°C (-22 to +185°F)	Cable version	190 g
Max. temperature on sensing face	120°C (248°F)	Plug version	106 g
Storage temperature	-40 to +85°C (-40 to +185°F)	Approvals	cULus (UL508), ECOLAB
Rated insulation voltage	1 kVAC (rms) IEC protection class III 	CE-marking	Yes
Tightening torque	≤ 7.5 Nm	MTTF_d	829 years @ 40°C (+104°F)
Connection			
Cable	PVC, Ø5.2 x 2 m, 4 x 0.34 mm ²		
Plug (M1)	Oil proof, grey M12 x 1 - 4 pin		

* 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 temperature, humidity, object distance and industrial (noise) interference. This is why Carlo Gavazzi offers, as a stand-

ard feature in all TRIPLES-IELD™ capacitive sensors, a user-friendly sensitivity adjustment instead of a fixed sensing range. Likewise, these sensors provide an extended sensing range to accommodate mechanically

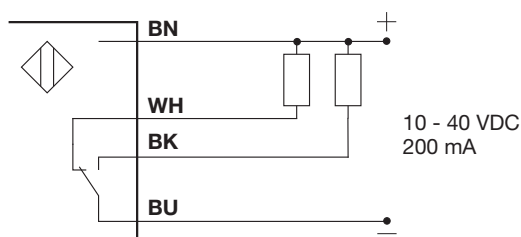
demanding areas and temperature stability to ensure high immunity to electromagnetic interference (EMI) and a minimum need for adjusting sensitivity if the temperature varies.

Note:

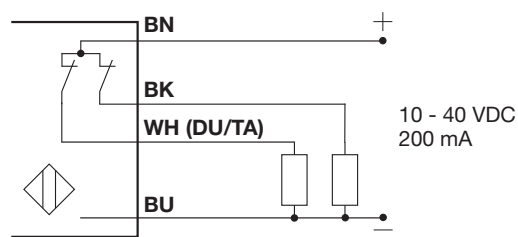
The sensors are factory set (default) to nominal sensing range S_n .

Wiring Diagram

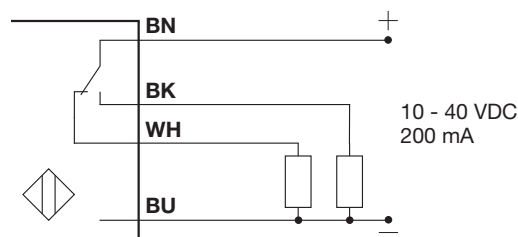
NPN



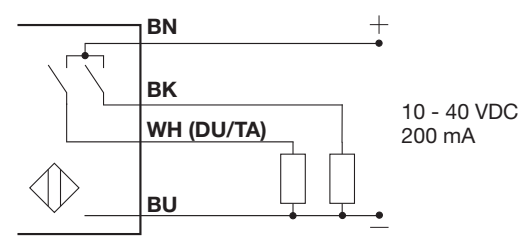
PNP Dust- or Temperature alarm on NC



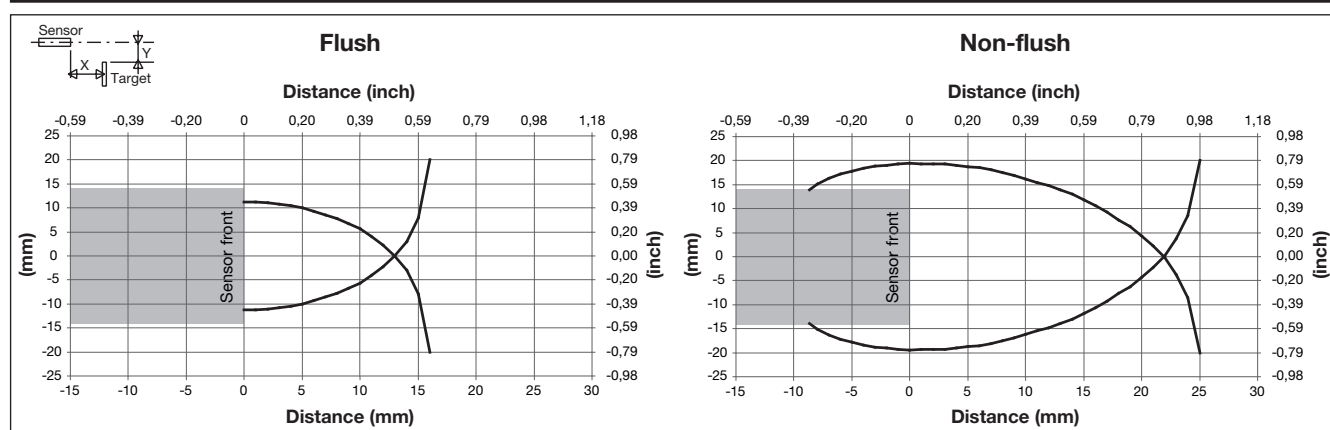
PNP



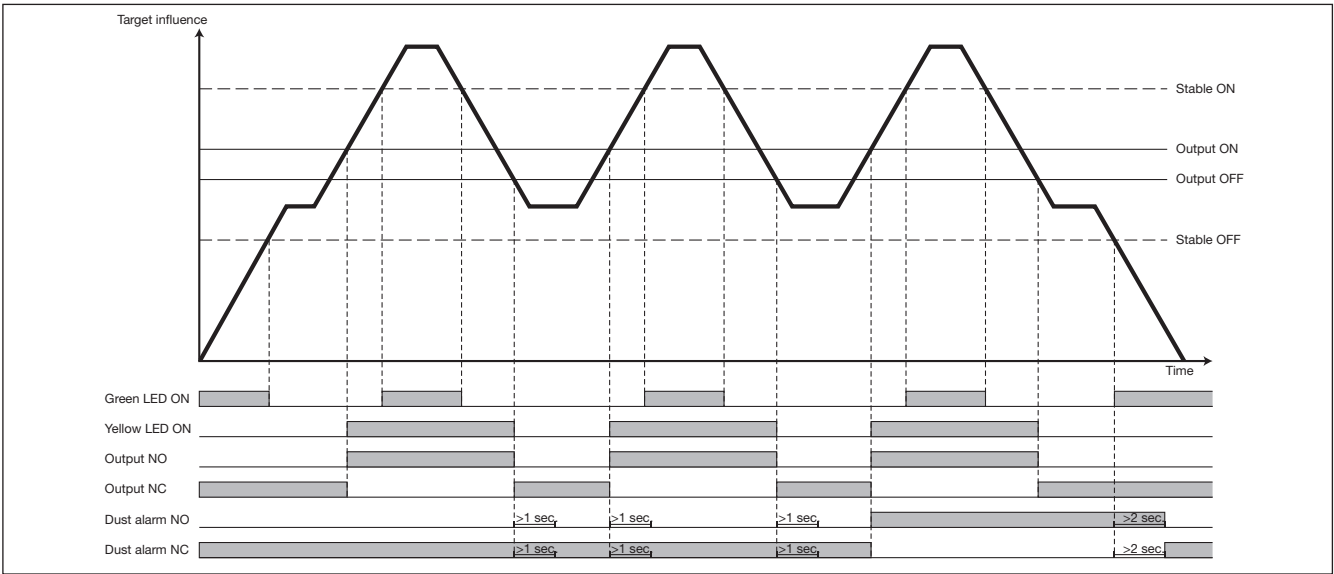
PNP Dust- or Temperature alarm on NO



Detection Diagram



Detection Stability Indication



Dimensions

CA30CAF....

CA30CAF....M1

CA30CAN....

CA30CAN....M1

Cable

Back of sensor

Plug

Colour code

- 1 Brown
- 2 White
- 3 Blue
- 4 Black

Installation Hints

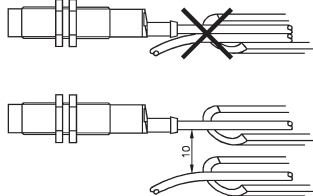
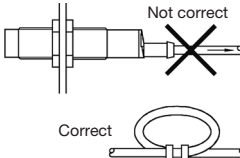
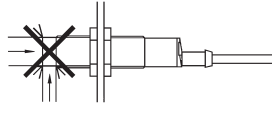
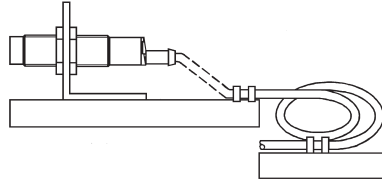
Capacitive sensors have a unique ability to detect almost any material in liquid or solid form. Capacitive sensors are able to detect metallic as well as non-metallic objects. However, their traditional use is for non-metallic materials such as:

- **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.

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 	Relief of cable strain  The cable should not be pulled	Protection of the sensing face  A proximity switch should not serve as mechanical stop	Switch mounted on mobile carrier  Any repetitive flexing of the cable should be avoided
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Delivery Contents

- Capacitive switch: CA30CAN/CAF.....
- User manual
- 2 x M30 finger nuts
- Screwdriver
- **Packaging:** Cardboard box

Accessories

- Connector type CONB14NF-... -series.
- Mounting Brackets AMB30-S.. (straight), AMB30-A.. (angled)