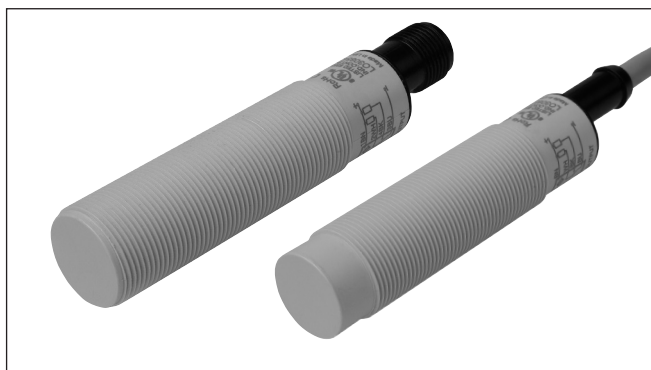


# Proximity Sensors Capacitive Thermoplastic Polyester Housing Types CA18CAN/CAF.....

CARLO GAVAZZI



- 4<sup>TH</sup> Generation **TRIPLESHIELD™**
- 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 **TRIPLESHIELD™** technology. Furthermore, these sensors feature increased immunity to electromagnetic interference (EMI), especially to frequency drives. Not only does 4<sup>TH</sup> Generation **TRIPLESHIELD™** 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.

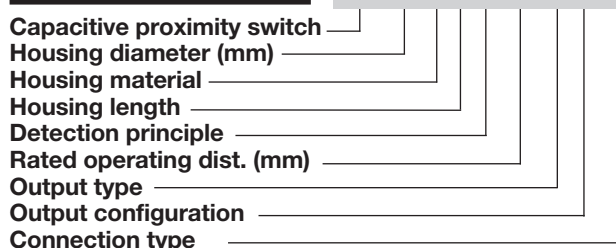
The Dust Alarm function gives an early warning that the sensing surroundings have to be cleaned.

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**



## 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	0 - 8 mm	<b>CA18CAF08NA</b>		
M 18	Flush	NPN	NO+NC	M12 Plug	0 - 8 mm	<b>CA18CAF08NAM1</b>		
M 18	Flush	PNP	NO+NC	Cable	0 - 8 mm	<b>CA18CAF08PA</b>		
M 18	Flush	PNP	NO+NC	M12 Plug	0 - 8 mm	<b>CA18CAF08PAM1</b>		
M 18	Flush	PNP	NO	Cable	0 - 8 mm		CA18CAF08PODU <sup>1)</sup>	CA18CAF08POTA <sup>1)</sup>
M 18	Flush	PNP	NC	Cable	0 - 8 mm		CA18CAF08PCDU <sup>1)</sup>	CA18CAF08PCTA <sup>1)</sup>
M 18	Non-Flush	NPN	NO+NC	Cable	0 - 12 mm	<b>CA18CAN12NA</b>		
M 18	Non-Flush	NPN	NO+NC	M12 Plug	0 - 12 mm	<b>CA18CAN12NAM1</b>		
M 18	Non-Flush	PNP	NO+NC	Cable	0 - 12 mm	<b>CA18CAN12PA</b>		
M 18	Non-Flush	PNP	NO+NC	M12 Plug	0 - 12 mm	<b>CA18CAN12PAM1</b>		
M 18	Non-Flush	PNP	NO	Cable	0 - 12 mm		CA18CAN12PODU <sup>2)</sup>	CA18CAN12POTA <sup>2)</sup>
M 18	Non-Flush	PNP	NC	Cable	0 - 12 mm		CA18CAN12PCDU <sup>2)</sup>	CA18CAN12PCTA <sup>2)</sup>

<sup>1)</sup> Replaced by CA18CAF08BPA2IO

<sup>2)</sup> Replaced by CA18CAN12BPA2IO

## Specifications EN 60947-5-2


**Rated operating distance (S<sub>n</sub>)**  
Non-flush mounted sensor

0 - 12 mm (factory setting 12 mm),  
(ref. target 36x36 mm ST37,  
1 mm thick, grounded)

Flush mounted sensor

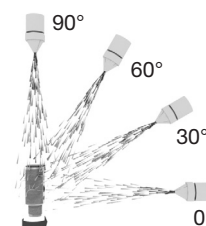
0 - 8 mm (factory setting  
8 mm - non-flush mounted)  
(ref. target 24x24 mm ST37,  
1 mm thick, grounded)

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

<b>Sensitivity control</b>	Adjustable by potentiometer	<b>Connection</b>	
Electrical adjustment	11 turns	Cable	PVC, Ø5.2 x 2 m, 4 x 0.34 mm <sup>2</sup>
Mechanical adjustment	16 turns		Oil proof, grey
Adjustable distance		Plug (M1)	M12 x 1 - 4 pin
Flush types	2 to 10 mm	<b>Temperature alarm output</b>	60°C ± 5°C
Non-flush types	3 to 15 mm	Response time examples	
<b>Effective operating dist. (S<sub>r</sub>)</b>	0.9 x S <sub>n</sub> ≤ S <sub>r</sub> ≤ 1.1 x S <sub>n</sub>	T <sub>A</sub> = 25°C	14 sec @ T <sub>EXC</sub> = 800°C
<b>Usable operating dist. (S<sub>u</sub>)*</b>	0.85 x S <sub>r</sub> ≤ S <sub>u</sub> ≤ 1.15 x S <sub>r</sub>		315 sec @ T <sub>EXC</sub> = 80°C
<b>Repeat accuracy (R)</b>	≤ 5%	<b>TRIPLESHIELD™</b>	
<b>Hysteresis (H)</b>	3 - 20%	<b>Exceeding the norms for capacitive sensors</b>	
<b>Rated operational volt. (U<sub>B</sub>)</b>	10 to 40 VDC (ripple incl.)	Electrostatic discharge (EN61000-4-2)	
<b>Ripple</b>	≤ 10%	Contact discharge	> 40 kV
<b>Output function</b>	NPN or PNP	Air discharge	> 40 kV
<b>Output switching function</b>	N.O. and N.C.	Electrical fast transients/burst (EN 61000-4-4)	±4kV
<b>Rated operational current (I<sub>a</sub>)</b>	≤ 200 mA (continuous)	Surge (EN 61000-4-5)	
<b>Capacitive load</b>	100 nF	Power-supply	> 2kV (with 500 Ω)
<b>No-load supply current (I<sub>o</sub>)</b>	≤ 12 mA	Sensor output	> 2kV (with 500 Ω)
<b>Voltage drop (U<sub>d</sub>)</b>	≤ 2.0 VDC @ 200 mA DC	Wire conducted disturbances (EN 61000-4-6)	> 20 Vrms
<b>Minimum operational current (I<sub>m</sub>)</b>	≥ 0.5 mA	Power-frequency magnetic fields (EN 61000-4-8)	
<b>OFF state current (I<sub>r</sub>)</b>	≤ 100 µA	Continuous	> 60 A/m, 75.9 µ tesla
<b>Protection</b>	Short-circuit, reverse polarity, transients	Short-time	> 600 A/m, 759 µ tesla
<b>Frequency of operating cycles (f)</b>	50 Hz	Radiated RF electromagnetic fields (EN 61000-4-3)	> 20 V/m
<b>Response time OFF-ON (t<sub>on</sub>)</b>	≤ 10 ms	Shock (IEC 60068-2-27)	30 G / 11ms, 3 pos, 3 neg per axis
<b>Response time ON-OFF (t<sub>off</sub>)</b>	≤ 10 ms	Rough handling shocks (IEC 60068-2-31)	2 times from 1m 100 times from 0,5m
<b>Power ON delay (t<sub>v</sub>)</b>	≤ 200 ms	Vibration (IEC 60068-2-6)	10 to 150 Hz, 1 mm / 15 G
<b>Indication</b>		<b>Housing material</b>	
Target detected	LED, yellow	Body	PBT, grey, 30% glass reinforced
Power and detection stability	LED, green	Cable gland	PA12, black
<b>Environment</b>		Fingernuts	PA12, black
Installation category	III (IEC 60664, 60664A; 60947-1)	Trimmershaft	Nylon
Degree of pollution	3 (IEC 60664, 60664A; 60947-1)	<b>Weight</b>	
Degree of protection	IP 67, IP 68/60 min., IP69K** (IEC 60529; 60943-1)	Cable version	150 g
NEMA type	1, 2, 4, 4X, 5, 6, 6P, 12	Plug version	75 g
Operating temperature	-30 to +85°C (-22 to +185°F)	<b>Approvals</b>	cULus (UL508), ECOLAB
Max. temperature on sensing face	120°C (248°F)	<b>CE-marking</b>	Yes
Storage temperature	-40 to +85°C (-40 to +185°F)	<b>MTTF<sub>d</sub></b>	825 years @ 40°C (+104°F)
<b>Rated insulation voltage</b>	1 kVAC (rms) IEC protection class III 		
<b>Tightening torque</b>	≤ 2.6 Nm		

\* For Flush type sensor flush mounted in conductive material, the usable operating distance (S<sub>u</sub>) is 0.80 x S<sub>r</sub> ≤ S<sub>u</sub> ≤ 1.2 x S<sub>r</sub> 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

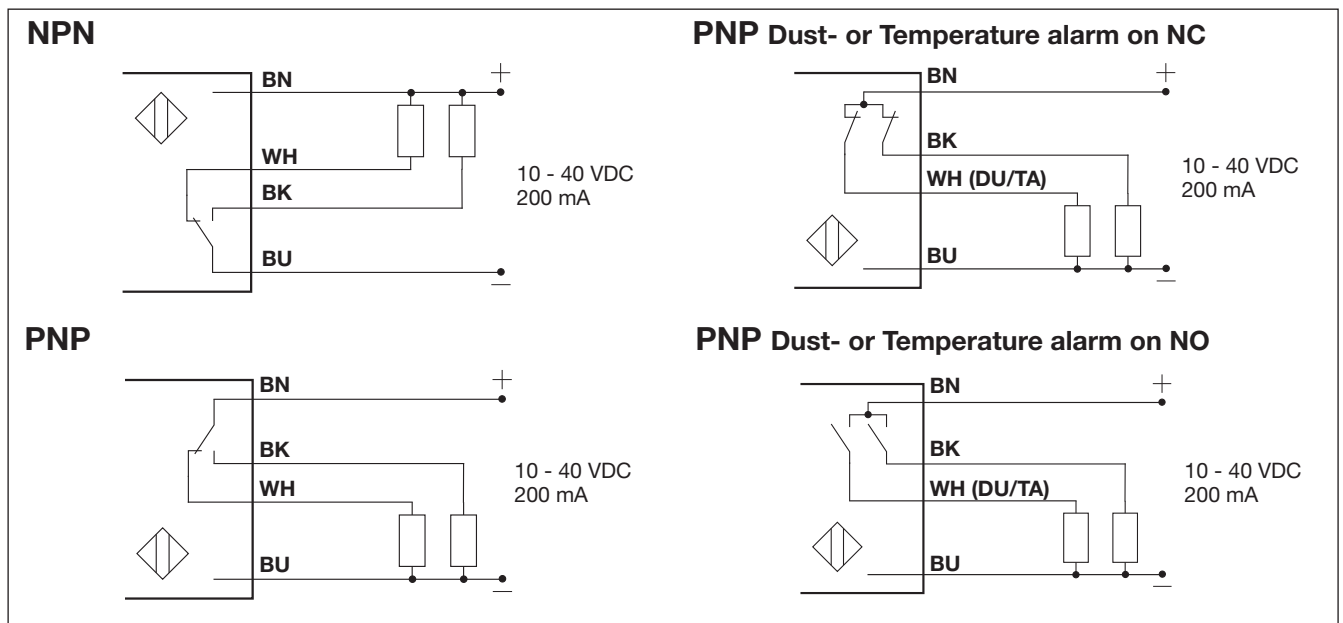
The environments in which capacitive sensors are installed can often be unstable as regards temperature, humidity, object distance and industrial (noise) interference. That is why Carlo Gavazzi offers as standard features in

all TRIPLESIELD™ 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 tem-

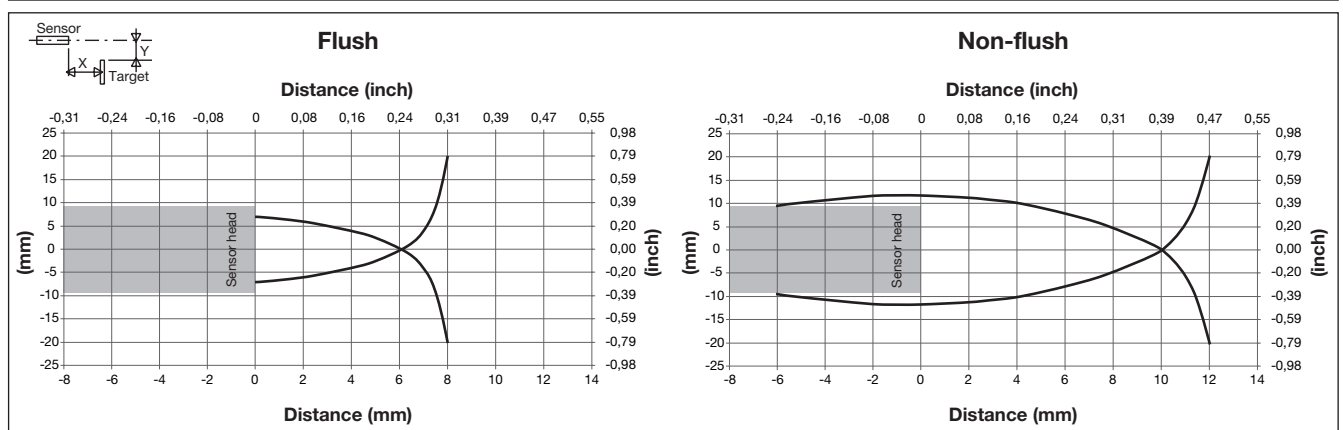
perature stability to ensure high immunity to electromagnetic interference (EMI) and a minimum need for adjusting sensitivity, if the temperature varies.

**Note:**  
The sensors are factory set (default) to nominal sensing range Sn.Sn.

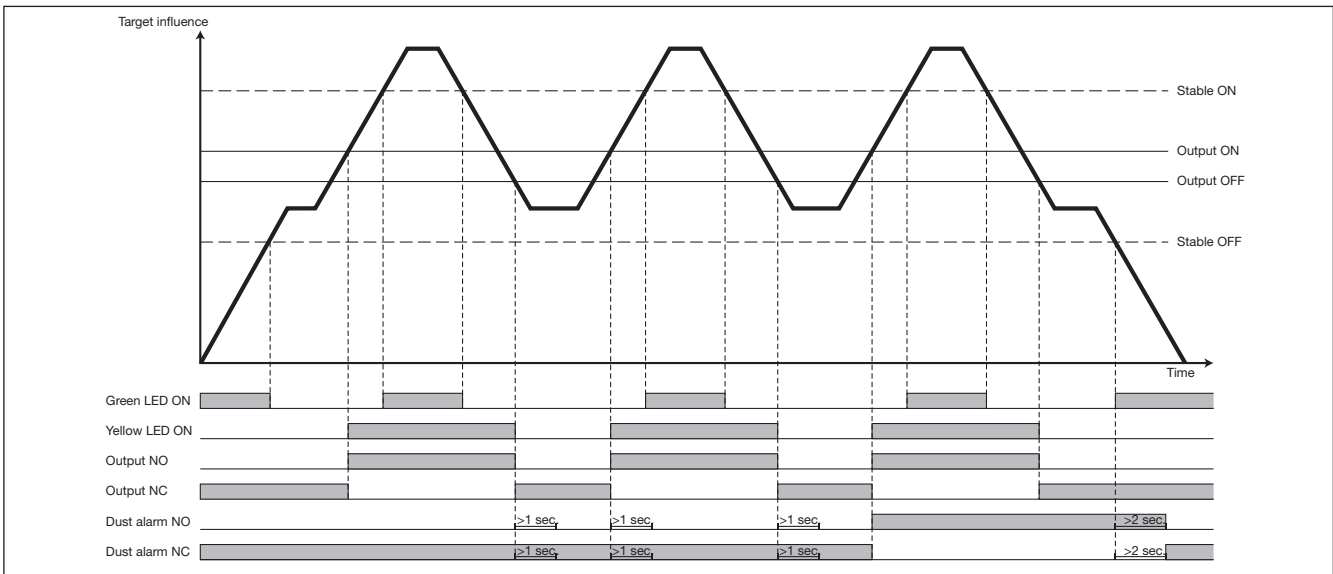
## Wiring Diagram



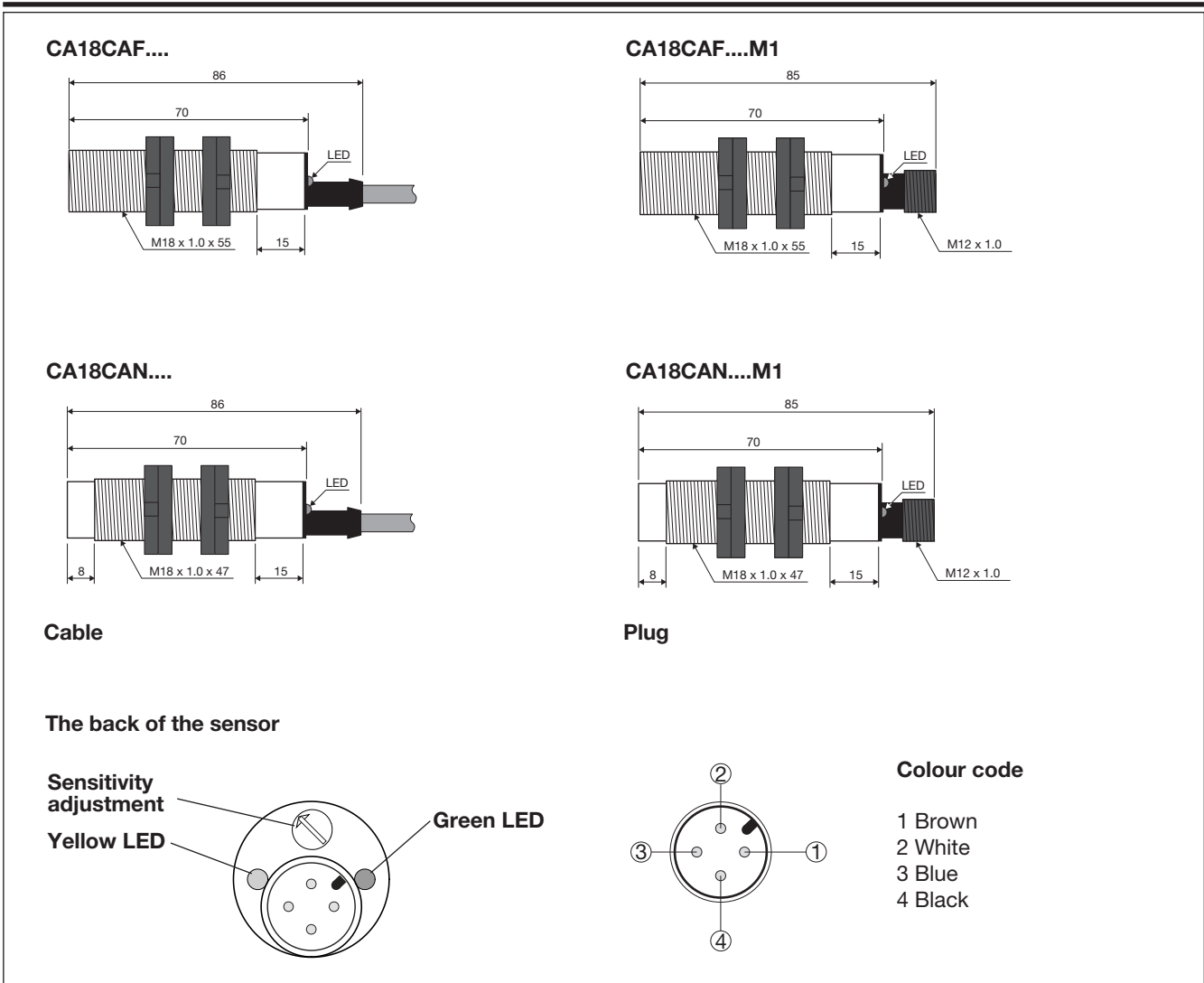
## Detection Diagram



## Detection Stability Indication



## Dimensions



## Installation Hints

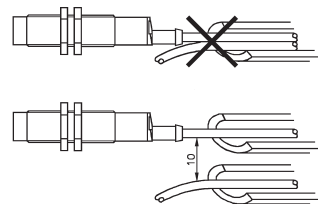
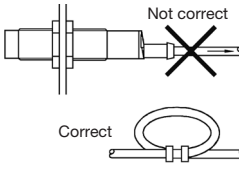
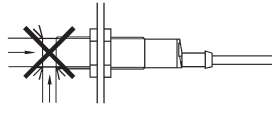
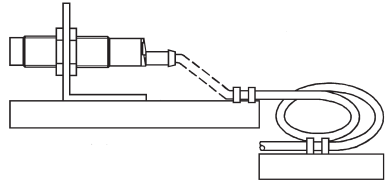
Capacitive sensors have a unique ability to detect almost any material in liquid or solid form. Capacitive sensors are able to detect metallic as well as non-metallic objects. However, their traditional use is for non-metallic materials such as:

- **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.

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

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

## Accessories

- Connector type CONB14NF-... -series.
- Mounting Brackets AMB18-S.. (straight), AMB18-A.. (angled)

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