Proximity Sensors Capacitive Thermoplastic Polyester Housing Types CA, M12, DC, Teach-in

TRIPLESHIELD™

- Featuring *TRIPLESHIELD™* Sensor Protection
- Sensing distance: 0.5 - 8 mm
- Teach-in of sensing distance via push-button or COM-input
- Automatic detection of NPN or PNP load
- Selectable make or break switching by means of Teach-in function
- Protection: Short-circuit, transients and reverse polarity
- Humidity compensation
- Alarm output
- 5 years of warranty

Product Description

Capacitive proximity switches with a sensing distance of either 6 mm flush mounted in metal or 8 mm non-flush mounted.
The switching points can be altered by means of the Teach-in function. 3-wire DC output with selectable make (NO) or break (NC) switching and NPN Alarm. Grey polyester housing with 2 m PVC cable or M12 plug.

Ordering Key

CA12CLC08BPM1

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	Rated operating distance (S_n)	Ordering no. Cable	Ordering no. Plug
M12	8 mm	CA12CLC08BP	CA12CLC08BPM1

Specifications

Sensing range (S_d)	0.5 - 8 mm factory set at 8 mm
Sensitivity	Adjustable (Teach-in)
Effective operating dist. (S_r)	$0.9 \times S_n \leq S_r \leq 1.1 \times S_n$
Usable operating dist. (S_u)	$0.8 \times S_r \leq S_u \leq 1.2 \times S_r$
Repeat accuracy (R)	$\leq 5\%$
Hysteresis (H)	Depending on Teach-in
Rated operational volt. (U_B)	10 to 40 VDC (ripple incl.)
Ripple	$\leq 10\%$
Rated operational current (I_e)	≤ 250 mA (continuous)
No-load supply current (I_o)	≤ 12 mA
Voltage drop (U_d)	≤ 2.5 VDC @ max. load
Protection	Short-circuit, reverse polarity, transients
***TRIPLESHIELD™* protection**	
Electrostatic discharge	30 kV
Burst	3 kV
Airborne HF	> 15 V/m
Wire-conducted noise	> 10 V_{rms}
Frequency of operating cycles (f)	15 Hz

Indication	
For output ON	LED, yellow
For safe/unsafe	LED, green
Environment	
Degree of protection	IP 68
Operating temperature	-20 to +85°C (-4 to +185°F)
Max. temperature on sensing face	120°C (248°F)
Storage temperature	-40 to +85°C (-40 to +176°F)
Housing material	
Body	Grey, thermoplastic polyester
Cable end	Polyester, softened
Nuts	Black, PA12 Grilamid
Connection	
Cable	Grey, 2 m, 4 x 0.25 mm² Oil proof, PVC
Plug (M1)	M12 x 1
Cable for plug (M1)	CON.1A-series
Weight	
Cable version	110 g
Plug version	30 g
Approvals	UL, CSA
CE-marking	Yes

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Adjustment Guide

The environments in which capacitive sensors are installed can often be unstable regarding 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 having a fixed sensing range, extended sensing range to accommodate mechanically demanding areas, temperature stability to ensure minimum

need for adjusting sensitivity if temperature varies and high immunity to electromagnetic interference (EMI).

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

Installation Hints

Capacitive sensors have the unique ability to detect almost all materials, either in liquid or solid form. Capacitive sensors can 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**
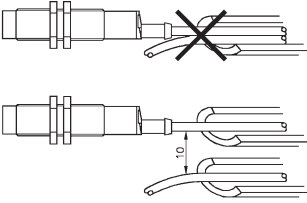 Cleansers, fertilisers, liquid soaps, corrosives and petrochemicals.
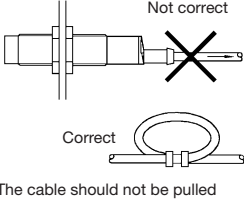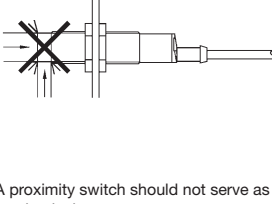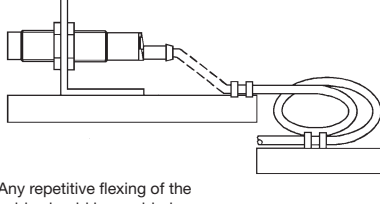
- **Wood Industry**
  Saw dust, paper products, door and window frames.

- **Ceramic & Glass Industry**
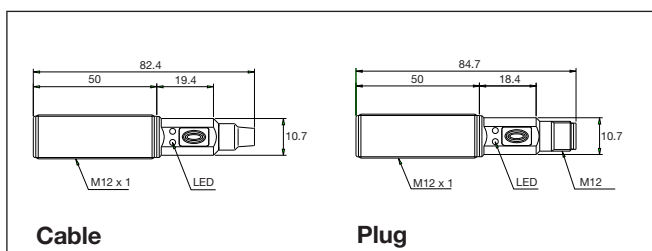 Raw material, clay or finished products, bottles.

- **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. Nominal sensing distance for a capaci-

tive sensor is referenced 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*	*Protection of the sensing face*	*Switch mounted on mobile carrier*
	Not correct / Correct — The cable should not be pulled	A proximity switch should not serve as mechanical stop	Any repetitive flexing of the cable should be avoided

Dimensions

Cable

82.4 / 50 / 19.4 / 10.7 / M12 x 1 / LED

Plug

84.7 / 50 / 18.4 / 10.7 / M12 x 1 / LED / M12

Accessories

- Plugs CON.1A.. series.

For further information please refer to "Accessories.

Delivery Contents

- Capacitive switch: CA..CLC..BP..
- **Packaging:** Cardboard box
- Installation & Adjustment Guide (MAN CAP ENG/GER)

Subject to reasonable modifications due to technical advances.   Printed in Germany

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Teach-in Guide

Adjustment - Background
No target present

Press push-button >3 seconds until LED´s are flashing one time per second. The background will be calibrated when the push-button is released during the following 3 seconds
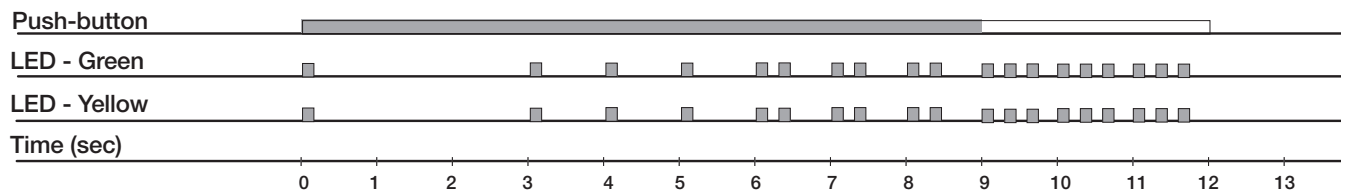
Push-button													
LED - Green													
LED - Yellow													
Time (sec)	0	1	2	3	4	5	6	7	8	9	10	11	12	13
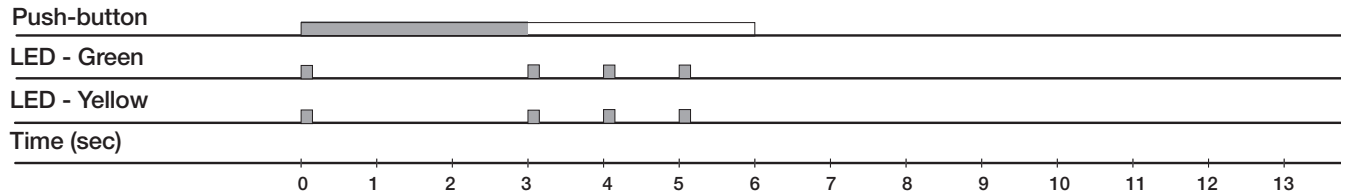
Adjustment - Object
Target present

Press push-button >6 seconds until LED´s are flashing two times per second. The object will be calibrated when the push-button is released during the following 3 seconds

Push-button													
LED - Green													
LED - Yellow													
Time (sec)	0	1	2	3	4	5	6	7	8	9	10	11	12	13
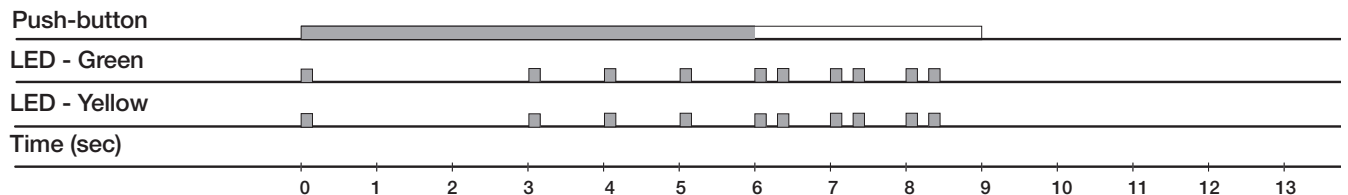
Adjustment - NO - NC

Press push-button >9 sec. until LED´s are flashing three times per second. The status of NO-NC will toggle when the push-button is released during the following 3 seconds

Push-button													
LED - Green													
LED - Yellow													
Time (sec)	0	1	2	3	4	5	6	7	8	9	10	11	12	13

Releasing the push-button after 12 sec. returns the sensor to factory settings.

Wiring Diagram

BN+ (1)

BK (4)

$I_{LOAD} < 250mA$

$I_{ALARM} < 20mA$

WH (2)

Teach-in

BU- (3)

The PNP- or NPN-load will automatically be detected.

By means of the Teach-in wire, the functions described in the Teach-in Guide can be set-up.

It is possible to Teach-in more sensors at the same time by connecting the WH-wires in parallel to the common "-" supply.

(#): Plug connections

Important: If alarm output (WH-wire) is unused, it has to be terminated to +supply

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SENSOTRONIK   3