

Capacitive Proximity Sensor

4th Generation of *TRIPLESHIELD*TM

CA30CBxxBPxIO



- LED bar graph for output, signal stability, power ON and easy adjustment
- Available in M30 in a robust PBT housing, flush or non-flush and IO-Link
- Sensing range: 2...20 mm flush or 4...30 mm non-flush
- Sensitivity adjustment either by trimmer, external teach or by IO-link parameter
- Supply voltage: 10 to 40 VDC
- Output: PNP / NPN / Push-Pull / External input
- Make and break switching function
- LED indication for output, stability and power ON
- Protection: reverse polarity, short circuit and transients
- Cable and plug versions
- Excellent EMC performance (*TRIPLESHIELD*TM)



Description

The new generation of CA30CB...IO sensors are a complete family of high performance capacitive sensors for detection of most solid or liquid targets in industrial applications such as Plastic & Rubber, Agriculture, Food & Beverage and Materials handling.

The sensor housing has the IP69K rating as well as approval by ECOLAB for cleaning and disinfection agents.

The sensor has a LED bar graph that visualizes the signal

stability and makes adjustment easy.

The 4th Generation of *TRIPLESHIELD*TM technology provides increased immunity to electromagnetic interference (EMI), especially to frequency drives, and improved immunity to humidity and dust.

On-board IO-Link communication opens up a variety of functions, such as easy communication and customization of advanced parameter settings.

Part selection key

C	-	Capacitive sensor
A	-	Cylindrical housing with threaded barrel
30	-	Housing diameter (mm)
C	-	Plastic housing - PBT
B	-	Bar graph LEDs
X	F	Flush installation
	N	Non-flush installation
X	16	Rated operating distance: 16 mm (Flush)
	25	Rated operating distance: 25 mm (Non-flush)
B	-	Selectable: NPN, PNP, Push-Pull, External Input (only pin 2) or External teach input (only pin 2)
P	-	Selectable: N.O. or N.C., each output
X	A2	Cable, 2 m
	M1	Plug, M12, 4 pins
IO	-	IO-Link

Part selection

Connection	Rated operating distance	Mounting	Part number
Cable	16 mm	Flush	CA30CBF16BPA2IO
	25 mm	Non-flush	CA30CBN25BPA2IO
Connector	16 mm	Flush	CA30CBF16BPM1IO
	25 mm	Non-flush	CA30CBN25BPM1IO

Features

Main operational data

Functional principle	Capacitive sensor
Functional principle details	• Flush • Non-flush • 2 outputs • Teach settings
Switching modes	Sensor switching channel 1 & 2: • Deactivated • Single point mode * • Windows mode • 2 point mode
Sensing	
Rated operating distance (S_n)	16 mm* Flush 25 mm* Non-flush
Sensing range	Flush 2...20 mm via Trimmer * , teach by wire or IO-Link Setpoint 1: 1000 * and Setpoint 2: 10000 * (higher number = better signal) Non-flush 4...30 mm via Trimmer * , teach by wire or IO-Link Setpoint 1: 1000 * and Setpoint 2: 10000 * (higher number = better signal)
Effective operating distance (S_r)	$0.9 \times S_n \leq S_r \leq 1.1 \times S_n$
Usable operating dist. (S_u)	$0.85 \times S_r \leq S_u \leq 1.15 \times S_r$
Reference target	48 x 48 mm ST37, 1 mm thick, grounded (Flush) 75 x 75 mm ST37, 1 mm thick, grounded (Non-flush)
Hysteresis	Adjustable via IO link (1...100%) • 5% (Flush) * • 10% (Non-flush) *
Operating frequency	50 Hz
Response times	t_{ON} (OFF-ON): ≤ 10 ms * , t_{OFF} (ON-OFF): ≤ 10 ms *
Repeat accuracy (R)	≤ 5%

* **Factory settings** - see options in "Smart functions - IO-Link selectable"

Electrical data

Power supply	
Operating voltage range (U_B)	10 - 40 VDC (Ripple included)
Ripple (U_{rip})	$\leq 10\%$
No load supply current (I_o)	≤ 20 mA
Rated insulation voltage (U_i)	50 VDC
Power-ON delay	300 ms
Outputs	
Sensor output 1 (SO1)	NPN, PNP *, Push-Pull; N.O. *, N.C.
Sensor output 2 (SO2)	NPN, PNP *, Push-Pull, External input, External teach; N.O., N.C. *
Rated operational current (I_o)	≤ 200 mA (continuous) pr output
OFF-state current (I_r)	≤ 100 μ A
Minimum operational current (I_m)	$> 0,5$ mA
Voltage drop (U_d)	$\leq 1,0$ VDC @ 200 mA DC
Capacitive load	≤ 100 nF
Utilization category	DC-12: Control of resistive loads and solid state loads with optical isolation
	DC-13: Control of electromagnets

* **Factory settings** - see options in "Smart functions - IO-Link selectable"

Environmental data

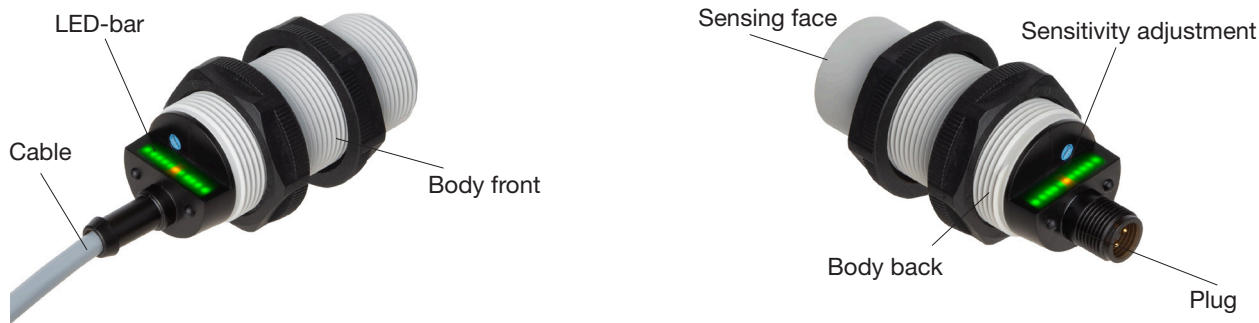
Ambient temperatures	
Operating	-30°C... +85°C (-22°F... +185°F)*
Storage	-40°C ... +85°C (-40°F ... +185°F)*
Max. temp. on sensing face	120°C (+248°F)
Ambient humidity range	
Operating	35% - 95%**
Storage	35% - 95%**
Mechanical influences	
Vibration	10 - 150 Hz, 1.0 mm/15 g (EN IEC 60068-2-6)
Shock	30 g _n / 11 ms, 3 pos, 3 neg per axis (EN IEC 60068-2-27)
Drop test	2 x 1 m and 100 x 0.5 m (EN IEC 60068-2-31)
Categorization	
Pollution degree	3 (EN IEC 60664, 60664A; EN IEC 60947-1)
Overvoltage category	III (EN IEC 60664; EN IEC 60947-1)
Degree of protection	IP67, IP68/60 min., IP69K (EN IEC 60529; EN IEC 60947-1)
NEMA enclosure type	1, 2, 4, 4X, 5, 6, 6P, 12 (NEMA 250)
EMC	
Protections	Short circuits, reverse polarity and transients
Rated insulation voltage (U _i)	50 VDC
Dielectric insulation voltage	≥ 1 kVAC rms, 50/60 Hz for 1 min
Rated impulse withstand voltage	> 2 kV (with 500 Ω)
EMC immunity standard	EN IEC 60947-5-2 / EN IEC 61000-6-2
EMC immunity test	
Electrostatic discharge immunity	>± 40 kV @ air discharge or >± 40 kV @ contact discharge (IEC 61000-4-2, EN IEC 60947-1)
Electromagnetic field immunity	20 V/m (IEC 61000-4-3, EN IEC 60947-1)
Fast transient immunity	± 4 kV / 5 kHz (IEC 61000-4-4, EN IEC 60947-1)
Wire conducted noise immunity	20 Vrms (IEC 61000-4-6, EN IEC 60947-1)
Magnetic field immunity	Continuous: > 60 A/m, 75.9 μ tesla, Short-time > 600 A/m, 759 μ tesla (IEC 61000-4-8, EN IEC 60947-1)

* Do not bend the cable in temperatures below -10°C

** With no icing or condensation

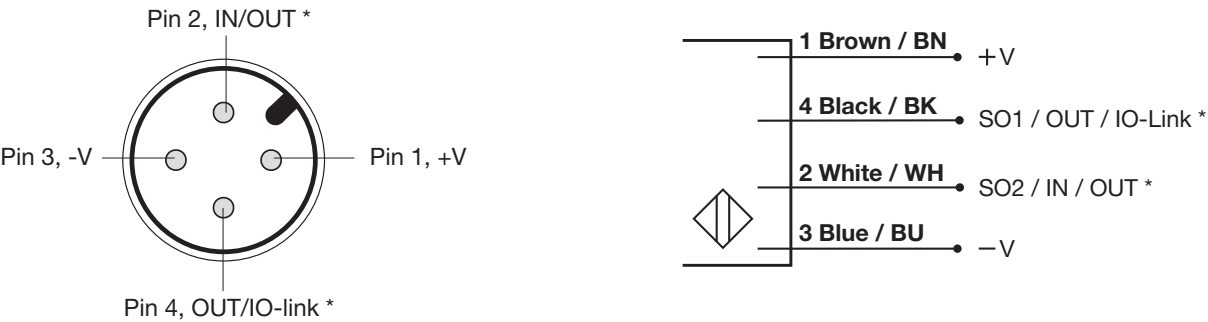
Structure

Housing



Housing	
Housing	Cylindrical with threaded barrel
Body	PBT grey, 30% glass-reinforced
Trimmer shaft	Nylon, blue
Back part	PA12, transparent, black
Finger nuts	PBTP, glass-reinforced
Dimensions	
Thread length	45.5 mm (Non-flush) 59.5 mm (Flush)
Total length	88.7 mm cable version 81.7 mm plug version
Weight	
	≤ 187 g, cable version ≤ 109 g, plug version
Connection	
Cable	2 m, 4 wire, 4 x 0.34 mm², Ø5.2 mm Oil proof PVC, grey
Plug	M12 x 1, 4 pin male connector
Tightening torque	
	≤ 7.5 Nm

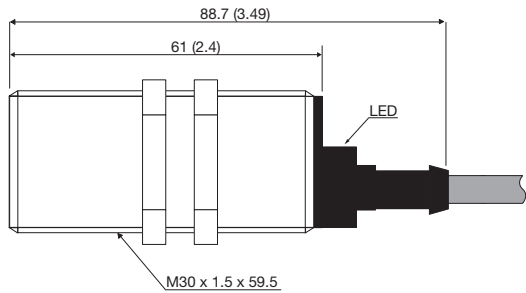
Connection and wiring



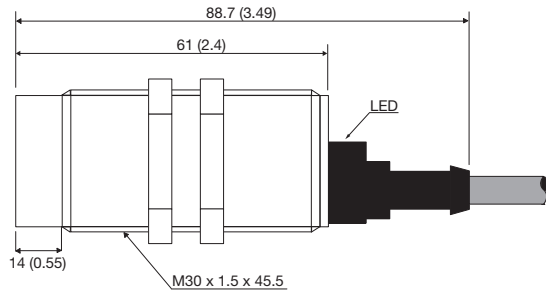
* The outputs can be configured via IO-Link

Dimensions in mm (inches)

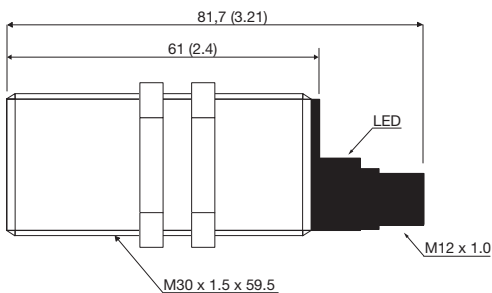
Cable version flush



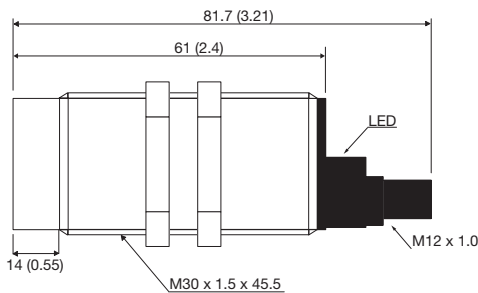
Cable version non-flush



Plug version flush



Plug version non-flush



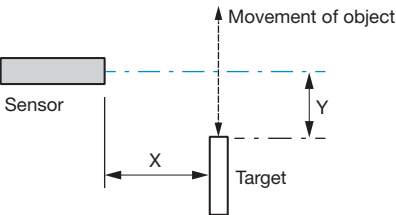
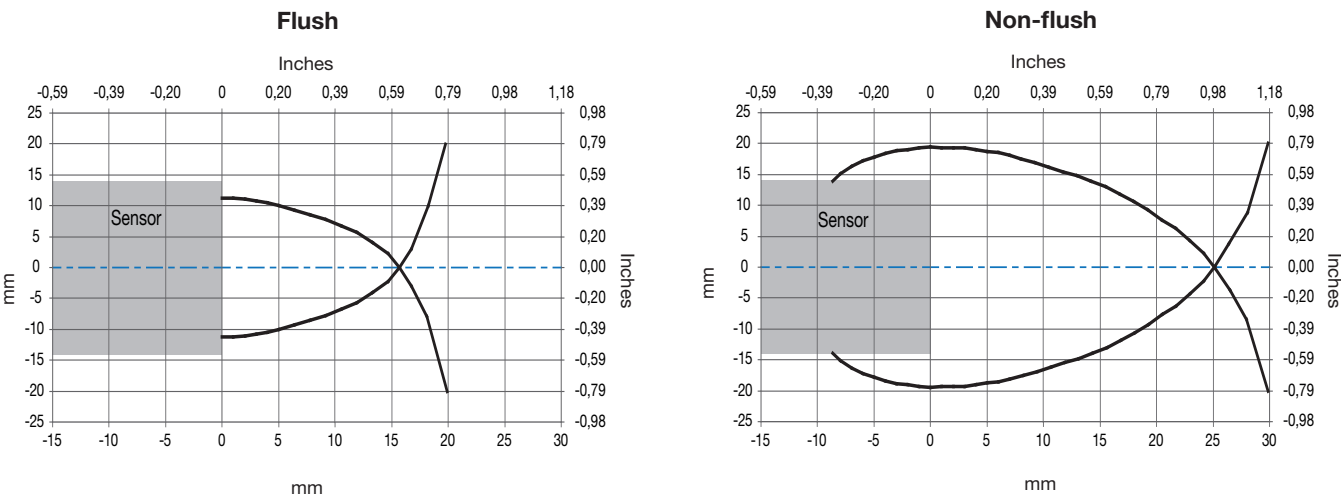
LED indication

LED bar graph	Yellow LED	Switching state of the sensor ON/OFF
	Green LEDs	Signal stability
	Flashing far right green LED	IO-Link connection
	The entire LED bar flashes	Find my sensor
LED settings	- LED indication inactive, - LED indication active, single LED LED indication active, centered LEDs * - LED indication active, all LEDs - Find-my-sensor	

* Factory settings - see options in “Smart functions - IO-Link selectable”

Sensing

Detection diagram



Compatibility and conformity

Approvals and markings

General reference	Sensor designed according to EN IEC 60947-5-2 and EN IEC 60947-1
MTTF _d	96.5 years @ 40°C (+104°F) (EN ISO 13849-1, SN 29500)
CE-marking	
Approvals	 (UL508) Report Reference E353577
ECOLAB	
CFP quantification	Cable: 44,96 Kg CO ₂ e Plug: 44,41 Kg CO ₂ e

IO-Link

IO-Link information	
Revision	1.1
Transmission rate	COM2 (38.4 kbaud)
SDCI-Norm	EN IEC 61131-9
Profile	Smart sensor profile 2nd edition, common profile
Min. cycle time	5 ms
SIO mode	Yes
Min. master port class	A (4-pin)
Process data lenght	32 bit

IO-Link functions

Smart functions - IO-Link selectable

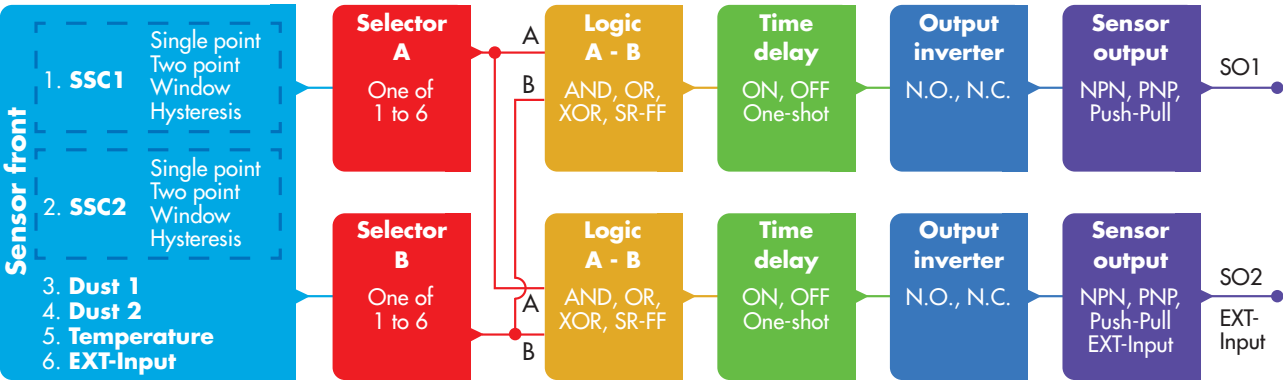
Input selector	Channel A + B: Deactivated 1. SSC1 * (Channel A & B) (SSC = Switching Signal Channel) 2. SSC2 3. Dust alarm 1 4. Dust alarm 2 5. Temperature alarm 6. External input
Logic functions	Channel A + B for SO1 & SO2 (SO = Sensor Output) Direct * - AND - OR - X-OR - SetReset-FlipFlop
Timer mode	For SO1 & SO2 Disabled * - ON delay - OFF delay - ON delay and OFF delay - One-shot leading edge - One-shot trailing edge
Output Inverter	N.O. * (SO1) N.C. * (SO2)
Sensor output / Input	- Disabled output PNP * - NPN - Push-pull - External Input, active high - External Input, active low - Teach-in
Alarms	
Safe limits	0 - 100% of actual SP. SSC1 and SSC2 8% (Flush) * 12% (Non-flush) *
Dust alarm	Safe limits are used for dust alarm level
Temperature alarm	High threshold -50 - +125 °C 85°C * Low threshold -50 - +125 °C -30°C *
Diagnostic parameters	- Sensor diagnostics - Temperature diagnostics - Operating diagnostics: Operating hours, Number of power cycles, Quality of teach, Quality of run, Excess gain - Error count - Device status
Events	Maintenance, temperature and short circuit events

* Factory settings

Smart functions - IO-Link selectable (cont.)

LED settings	- LED indication inactive, - LED indication active, single LED bar graph LED indication active, centered LED bar graph* - LED indication active, all LED bar graph - Find-my-sensor
Observations	Readable via IO-link: - Analog values - Short circuit - Switching outputs - Switching channels - Temperature alarm - Dust alarms

* Factory settings



Delivery contents and accessories

Delivery contents

- Capacitive sensor: CA30CAxxBPxxIO
- 2 x M30 finger nuts
- Packaging: Carton box
- Screwdriver

Accessories

- Connector type CONx14NF-... -series.
- Mounting Brackets AMB30-S.. (straight), AMB30-A.. (angled)

Further information

User manual	http://cga.pub/?f19ed4	
Mounting brackets	http://cga.pub/?68adbc	
Connectors	http://cga.pub/?ed457b	
Carlo Gavazzi website	www.gavazziautomation.com	

Please refer to the user manual for in-depth explanations.