

# CD34CNFLFxxx



## Capacitive sensor, Foreground Suppression



### Description

The CD34.. capacitive sensor is designed for detecting water-based (conductive) liquids through a non-metallic container wall, and it automatically adapts to various thicknesses of plastic or glass walls.

The universal mounting brackets allow the sensor to be fixed on various tubes or containers.

Strong, compact housing with IP69K ratings and ECOLAB approval for wash-down applications.

The sensor will function out of the box in most applications, and teach-in capabilities are available for adapting the sensor to more challenging applications.

### Main features

- Compact housing
- Supply voltage: 10 to 30 VDC
- Output: 100 mA, NPN or PNP preset
- Make or break switching function
- LED indication for output and power ON
- Protection: reverse polarity, short circuit and transients
- Cable and pigtail M8 plug versions
- Excellent EMC performance
- IP65, IP66, IP67, IP68 and IP69K for hose-down applications
- cULus
- Ecolab

### Main functions

- Detection of water-based fluids inside a container or tube without direct contact with the fluids.
- The sensor detects the liquids reliably while compensating for residue film, moisture or foam build-up from liquids such as water, milk, body fluids (blood), acid- or alkaline solutions with conductivity as high as 50 mS/cm inside or outside the container wall.
- Flexible and fast universal mounting bracket.
- The sensing principle detects only the level of the liquids while ignoring foam, film or build-up that would cause standard capacitive sensors to detect faultily.

## References

### Product selection key

CD34CNFLF ☐ ☐ ☐Enter the code option instead of ☐

| Code                     | Option | Description            |
|--------------------------|--------|------------------------|
| C                        | -      | Capacitive sensor      |
| D                        | -      | Rectangular housing    |
| 34                       | -      | Length of housing      |
| C                        | -      | Plastic housing        |
| N                        | -      | Neutral                |
| F                        | -      | Flush mounting         |
| L                        | -      | Liquid level           |
| F                        | -      | Foreground suppression |
| <input type="checkbox"/> | N      | NPN                    |
|                          | P      | PNP                    |
| <input type="checkbox"/> | O      | N.O.                   |
|                          | C      | N.C.                   |
| <input type="checkbox"/> | P2     | 2 m PVC Cable          |
|                          | T5     | Pigtail PVC            |

### Type selection

| Conne-<br>ction  | Output    | Code          |
|------------------|-----------|---------------|
| Cable            | NPN, N.O. | CD34CNFLFNOP2 |
|                  | NPN, N.C. | CD34CNFLFNCP2 |
|                  | PNP, N.O. | CD34CNFLFPOP2 |
|                  | PNP, N.C. | CD34CNFLFPCP2 |
| Pigtail          | NPN, N.O. | CD34CNFLFNOT5 |
|                  | NPN, N.C. | CD34CNFLFNCT5 |
|                  | PNP, N.O. | CD34CNFLFPOT5 |
|                  | PNP, N.C. | CD34CNFLFPCT5 |
| Mounting bracket |           | ACD34-MB01    |



Structure

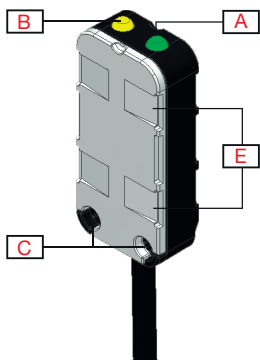


Fig. 1 Cable

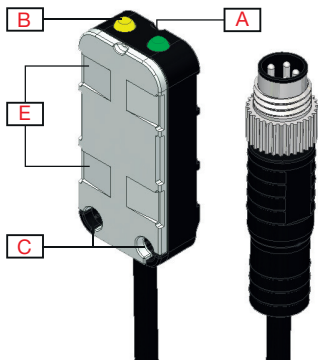


Fig. 2 Pigtail

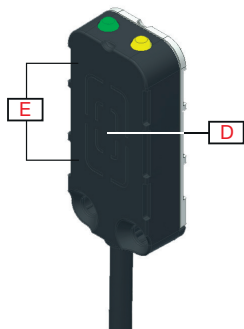


Fig. 3 Sensing surface

| Element | Component                                      | Function                         |
|---------|------------------------------------------------|----------------------------------|
| A       | LED                                            | Green LED: Power ON              |
| B       | LED                                            | Yellow LED: Output               |
| C       | 2 M3                                           | Fixing holes for sensor mounting |
| D       | Sensing surface                                |                                  |
| E       | Recessed area for cable strips, max. 5 mm wide |                                  |

Sensing

Accuracy

|                   |                                   |                                                                                                                                                                    |
|-------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature drift | Factory settings                  | ≤ 20% (-25°C... +80°C)                                                                                                                                             |
|                   | Manual teach                      | ≤ 20% (-25°C... +60°C)                                                                                                                                             |
| Detection         | Pipes diameter                    | Min. Ø 8 mm                                                                                                                                                        |
|                   | Out of the box: wall thickness    | Plastic 0.5 - 6 mm (non-conductive plastic wall)<br>Glass 0.5 - 4 mm (non-conductive glass wall)                                                                   |
|                   | With manual setup: wall thickness | Up to 10 mm plastic wall (best case)<br>Up to 10 mm glass wall (best case)                                                                                         |
|                   | Detection liquids                 | Water-based liquids such as water, milk, syrup, honey, milkshakes, lubricates, acids, alkaline fluids, body fluids and other high-conductive liquids (up to 50 mS) |

## Features

### Power Supply

|                                     |                                 |
|-------------------------------------|---------------------------------|
| Rated operational voltage ( $U_B$ ) | 10 ... 30 VDC (ripple included) |
| Ripple ( $U_{rpp}$ )                | $\leq 10\%$                     |
| No load supply current ( $I_o$ )    | $\leq 13$ mA                    |
| Power-ON delay ( $t_v$ )            | < 300 ms                        |

### Outputs

|                                         |                                                |                                                                         |
|-----------------------------------------|------------------------------------------------|-------------------------------------------------------------------------|
| Output functions                        | NPN or PNP by sensor type                      |                                                                         |
| Output switching function               | N.O. and N.C by sensor type                    |                                                                         |
| Rated operational current ( $I_o$ )     | $\leq 100$ mA                                  |                                                                         |
| OFF-state current ( $I_r$ ) PNP and NPN | 50 $\mu$ A                                     |                                                                         |
| Voltage drop ( $U_d$ )                  | < 1.5 V                                        |                                                                         |
| Protection                              | Short circuit, reverse polarity and transients |                                                                         |
| Utilization category                    | DC-1                                           | Control of resistive loads and solid-state loads with optical isolation |
|                                         | DC-13                                          | Control of electromagnets                                               |
| Load capacitance max at ( $U_o$ )       | 330 nF                                         |                                                                         |

### Operation diagram

$T_v$  = Power-ON delay

|                     |         |  |
|---------------------|---------|--|
| power supply        | ON      |  |
| Target              | Present |  |
| Break output (N.C.) | ON      |  |
| Make output (N.O.)  | ON      |  |

### Response times

|                         |              |                      |
|-------------------------|--------------|----------------------|
| Operating frequency (f) | $\leq 10$ Hz |                      |
| Response times          | $\leq 50$ ms | OFF-ON ( $t_{ON}$ )  |
|                         | $\leq 50$ ms | ON-OFF ( $t_{OFF}$ ) |

## Indication

### Normal mode

| Green LED | Yellow LED | Power | Output |
|-----------|------------|-------|--------|
| OFF       | OFF        | OFF   | OFF    |
| ON        | OFF        | ON    | OFF    |
| ON        | ON         | ON    | ON     |

### Output short circuit

| Green LED | Yellow LED  | Output                            |
|-----------|-------------|-----------------------------------|
| OFF       | Flashes 4Hz | Yellow LED flashes minimum 1 sec. |

### Teach by wire

#### Out of the box (Factory settings):

Typically, the sensor can be used without any additional calibration; it is designed to work with plastic tank walls of approximately 0,5 to 6 mm in thickness and glass walls of approximately 0,5 to 4 mm in thickness. It is important that the glass or plastic is nonconductive.

#### Calibration:

If the factory settings are insufficient, the sensor is teachable to either Full or Empty.

#### Calibration Full:

The sensor switch point is set below the actual detection value to ensure that slight changes in the application will not affect the sensing performance.

In most applications, the full calibration on a full tank or tube will be sufficient.

In critical applications with large variations in media type and temperature, it can be an advantage to teach the Full level with approximately 50 % of the active sensing surface covered.

#### Full calibration procedure:

- Connect teach wire to V+ for 2 - 7 seconds
- The green LED flashes 1 imp. per sec. and the yellow LED is OFF
- After successful calibration, the yellow LED flashes 3 times (with 1 Hz)

#### Calibration Empty:

The sensor switch point is set above the actual detection value to ensure that slight changes in the application will not affect the sensing performance.

In most applications, the Empty calibration on an empty tank or tube will be sufficient.

In critical applications with a high amount of residue film, moisture or foam build-up, an Empty calibration can be performed with the build-up present.

#### Empty calibration procedure:

- Connect teach wire to V+ for 7 - 12 seconds
- The green LED flashes 1 imp. per sec. and the yellow LED is ON
- After successful calibration, the yellow LED flashes 3 times (with 1 Hz)

#### Cancel calibration procedure:

- Keep the teach wire connected to V+ for more than 14 seconds to abort teach procedure. The switch points will remain unchanged.
- The green LED is off and the yellow LED flashes (4 Hz)



| Green LED   | Yellow LED           | Output                                                  |
|-------------|----------------------|---------------------------------------------------------|
| Flashes 1Hz | OFF                  | Full calibration (2-7 sec)                              |
| Flashes 1Hz | ON                   | Empty calibration (7-12 sec)                            |
| NA          | Flashes 3 times 1Hz  | Successful "full calibration"                           |
| NA          | Flashes 3 times 1Hz  | Successful "empty calibration"                          |
| NA          | Flashes 10 times 4Hz | Unsuccessful calibration (cancelled or error) (>12 sec) |

## Environmental

|                                            |                                        |                                |
|--------------------------------------------|----------------------------------------|--------------------------------|
| Ambient temperature                        | -25° ... +80°C (-13° ... +176°F)       | Operating                      |
|                                            | -40° ... +85°C (-40° ... +185°F)       | Storage                        |
| Ambient humidity range                     | 35% ... 100%                           | Operating                      |
|                                            | 35% ... 100%                           | Storage                        |
| Vibration                                  | 10 ... 150 Hz, 1.0 mm/15 g             | EN 60068-2-6                   |
| Shock                                      | 30 gn / 11ms, 6 pos, 6 neg per axis    | EN60068-2-27                   |
| Drop test                                  | 2 x 1 m and 100 x 0.5 m                | EN 60068-2-31                  |
| Rated insulation voltage (U <sub>i</sub> ) | 75 VDC                                 |                                |
| Dielectric insulation voltage              | ≥ 1250 VAC rms                         | 50/60 Hz for 1 min.            |
| Rated impulse withstand voltage            | 1 kV                                   | 1.2/50 μs                      |
| Pollution degree                           | 3                                      | ICE60664, ICE60664A, EN60947-1 |
| Overvoltage category                       | III                                    | IEC60664; EN60947-1            |
| Degree of protection                       | IP65, IP66, IP67, IP68 @ 1.3m and 24 h | IEC60539; EN60947-1            |
|                                            | IP69K                                  | DIN 40050-9                    |
| NEMA Enclosure Types                       | 1, 2, 4, 4x, 5, 12                     | NEMA 250                       |

## EMC

|                                              |                                                         |                          |
|----------------------------------------------|---------------------------------------------------------|--------------------------|
| Electrostatic discharge immunity test        | ± 8 kV @ air discharge or<br>± 4 kV @ contact discharge | IEC 61000-4-2, EN60947-1 |
| Electromagnetic field immunity               | 3 V/m                                                   | IEC 61000-4-3, EN60947-1 |
| Fast transient immunity                      | 2 kV                                                    | IEC 61000-4-4, EN60947-1 |
| Wire-conducted noise                         | 3 V                                                     | IEC 61000-4-6, EN60947-1 |
| Power frequency magnetic field immunity test | 30 A/m                                                  | IEC 61000-4-8, EN60947-1 |

## Mechanics/electronics

### Connection

|                |                                                        |
|----------------|--------------------------------------------------------|
| <b>Cable</b>   | 2 m, 4-wire 4 x 0.14 mm <sup>2</sup> , Ø = 3.4 mm, PVC |
| <b>Pigtail</b> | 0.3 m, M8, 4-pin, male                                 |

### Wiring

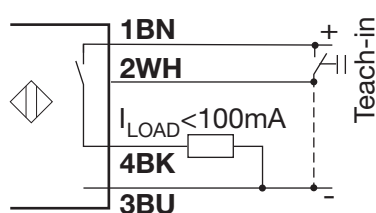


Fig. 4 PNP NO

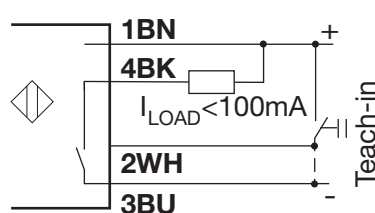


Fig. 5 NPN NO

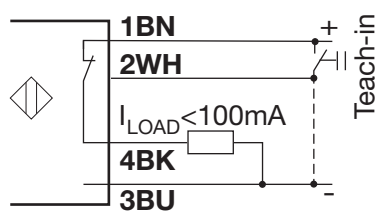


Fig. 6 PNP NC

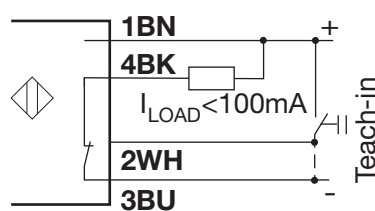


Fig. 7 NPN NC

NOTE: White wire connected to GND (3BU) wire when not in use

| Colour code |       |           |       |
|-------------|-------|-----------|-------|
| <b>BN</b>   | Brown | <b>WH</b> | White |
| <b>BK</b>   | Black | <b>BU</b> | Blue  |

### Housing

|                                            |                                                                  |                 |
|--------------------------------------------|------------------------------------------------------------------|-----------------|
| <b>Body</b>                                | PC/PBT                                                           |                 |
| <b>Mounting bracket</b>                    | PC/PBT                                                           |                 |
| <b>Light guides</b>                        | Polyamid TR55, Transparent                                       |                 |
| <b>Pigtail</b>                             | Black TPU (Thermoplastic polyurethane), Stainless steel AISI 304 |                 |
| <b>Dimensions</b>                          | 8 x 16 x 34 mm                                                   |                 |
| <b>Weight</b>                              | ≤ 60 g                                                           | Cable version   |
|                                            | ≤ 30 g                                                           | Pigtail version |
| <b>Tightening torque, Sensor</b>           | 0.2 Nm                                                           |                 |
| <b>Tightening torque, Mounting bracket</b> | 0.2 Nm                                                           |                 |
| <b>Screw size</b>                          | M3 (with lowered head)                                           |                 |

Dimensions (mm)

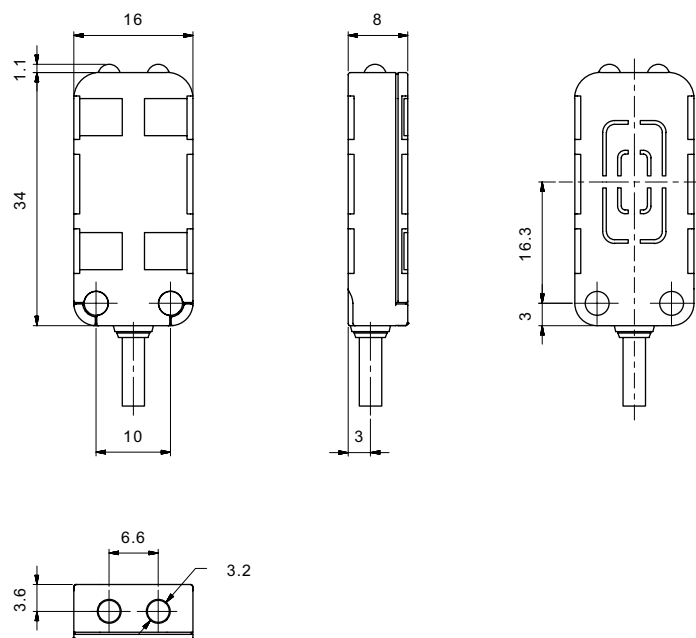


Fig. 8 CD34

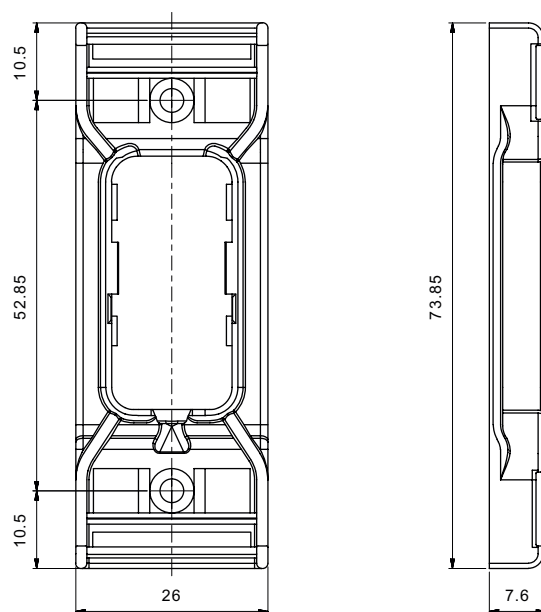


Fig. 9 Mounting bracket (ACD34-MB01)

## Compatibility and conformity

### Approvals and markings

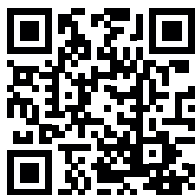
|                   |                                                                                                   |                                                                          |
|-------------------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| General reference | Sensor designed according to EN60947-5-2 and EN60947-1                                            |                                                                          |
| MTTF <sub>d</sub> | 246 years @ 40°C (+104°F)                                                                         | EN ISO 13849-1, SN 29500                                                 |
| CE-marking        |                  |                                                                          |
| Approvals         |  (UL508 + C22.2) |                                                                          |
| Other Approvals   |                  | Topax 56, Topaz AC1, Topaz MD3, Topaz CL1, Topactiv OKTO, P3-hypochloran |

## Delivery contents and accessories

### Delivery contents

- Capacitive sensor: CD34CNFLF...
- Mounting bracket: ACD34-MB01
- 2 x Foam pads 3 mm (for pipe mounting)
- 2 x Adhesive pads 1 mm (for screwless surface mounting)
- Quick installation guide

### Accessories



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