# CAPACITIVE PROXIMITY SWITCHES DC

## GENERAL DESCRIPTION

### Principle Function

The proximity-action capacitive sensor converts a variable of interest in technical production terms (e. g. distance or level) into a signal which can be processed further: The function is based on the alteration in the electrical field around it's active zone. The sensor in it's basic configuration consists of an RC oscillator as pickup, a demodulator and an output stage.

The approach of metals or non-metals into the active zone of the capacitive sensor causes a change in capacitance, which in turn causes the RC oscillator to begin to vibrate.

This causes the trigger stage downstream of the oscillator to flip, and the switching amplifier to change it's output is either an N. O., N. C. or changeover contact, depending on the type of unit involved.

The function of the capacitive sensor can be explained in terms of variation in all parameters of the equation for capacitance:

$$C = \varepsilon_0 \times \varepsilon_r \times F \times (1/S)$$

$\varepsilon_r$: as the relative dielectric coefficient (property of the medium being scanned)
$\varepsilon_0$: as absolute dielectric coefficient = sonst.
F: as surface
S: as distance

From the formula above it follows that objects which have a sufficiently large relative dielectric coefficient ($\varepsilon_r$) and surface will be detected by the capacitive sensor.

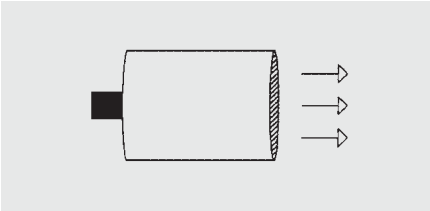
Our capacitive sensors contain an RC oscillator as the pick-up component, backed up by the evaluation electronics (switching amplifier and output stage).

We manufacture capacitive sensors in 2 different versions:

### Application:

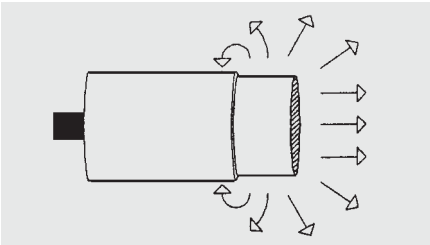
The capacitive proximity switches are suitable as non-contact sensors for controlling and monitoring machine processes and as primary detectors for counting jobs, where metals and non-metals are available; for level messages in tanks and through tank walls, in cases where liquid, pulverized or granular substances have to be detected.

We distinguish between two areas of application for capacitive sensors:



### 1. Flush Mount

Sensors with a straight-line electrical field. These units scan solids (e. g. wafers, components, PCB's, hybrids, cartons, paper piles, bottles, plastic blocks and plastic plates) at a distance, or liquids through a separating wall (glass or plastic up to max. 4 mm thick).

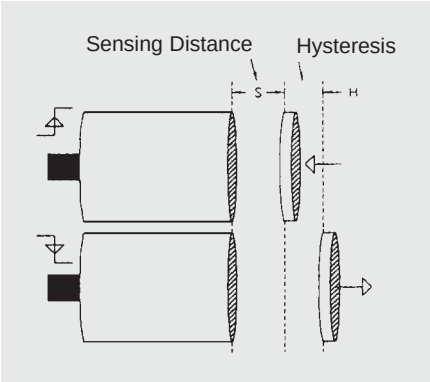


### 2. Non-flush Mount

Sensors with a spherical electrical field. These units are designed to touch the product, bulk goods or liquids involved (e. g. granulate, sugar, flour, corn, sand, or oil and water) with their active surface.

### Sensing Distance S

This is the distance between the active sensor surface and the product being scanned at the moment of output-signal change as the object is approached. It depends on shape, size and nature of the object concerned.




### Hysteresis

Hysteresis is the distance differential between the switch-on point (as the object approaches) and the switch-off point (as the object recedes again).

### Repeatability

The repeat accuracy parameter describes the maximum deciation from the sensing distance when the object in question is approached several times.

### Effective Sensing Distance (Sn)

The effective sensing distance is a sensor's measured sensing distance directed at an earthed metalplate in conformity with IEC 60947-5-2.

It is a 1mm-thick square metal plate, consisting of carbon steel Type FE 360 (definition to ISO 630:1980)

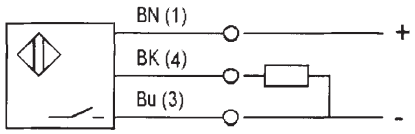
The surface must be smoothed. The size must be dimensioned so as to ensure that the edge length (m) of the square metal plate is equal to the diameter of the circle drawn on the active surface or equal to three times the rated operating distance Sr, depending on which is greater.

If the plate is made from a different material, or has smaller dimensions, is not grounded, or exhibits a different shape or surface quality, the sensing distances will be smaller.

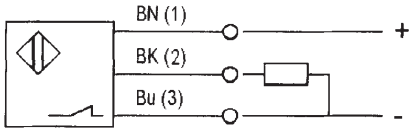
# CONNECTIONS

## Inductive proximity switches DC

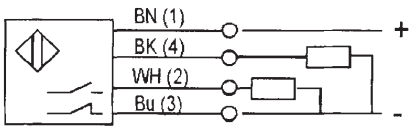
**PNP-NO**



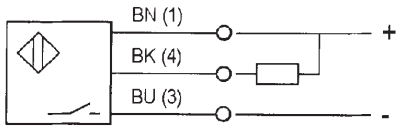

**PNP-NC**



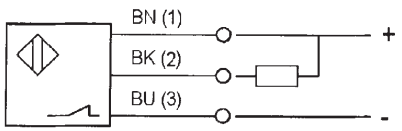

**PNP-NO + NC**



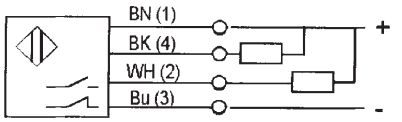

**NPN-NO**




**NPN-NC**

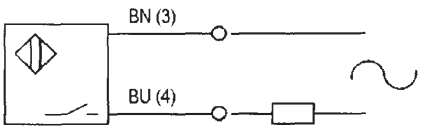



**NPN-NO + NC**

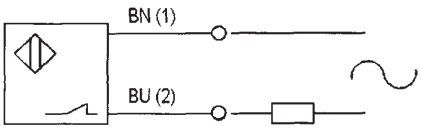



## Inductive proximity switches

**AC-NO**

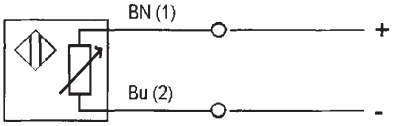



**AC-NC**




## Inductive proximity switches Namur

**NA**




- All types CE marked
- Plastic construction on request