CAPACITIVE
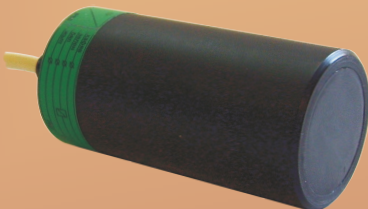
PROXIMITY SENSORS

FOR DIRECT CURRENT

"DC"

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Operating principle and purpose

The presented capacitive sensors are used to commutate direct current electrical circuits. Their action is based on a capacitive principle. When changing the dialectical permeability in front to their active part, their output switches over - the electric circuit opens up or shuts up. They react to metal or non-metal objects. The sensors have a potentiometer to adjust their sensitivity. When there is object in front of their active part, the output indicator is on. They are used as level controllers of bulk materials. They are widely used to automate production processes in the food processing industry, paper industry, textile industry etc.

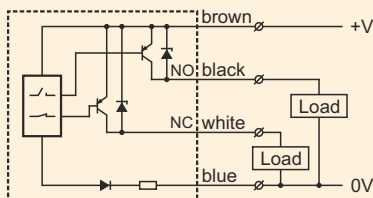## Rules for mounting sensors

a) installation in metal plate
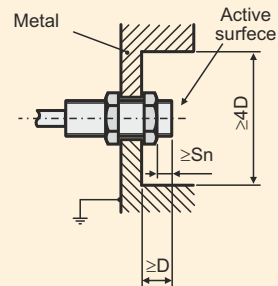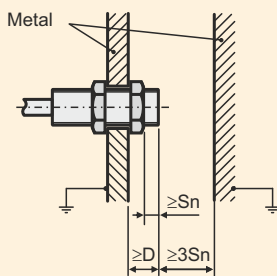
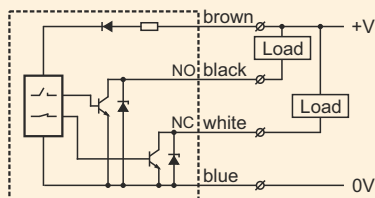### b) installation of two or more sensors
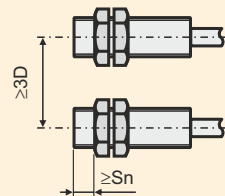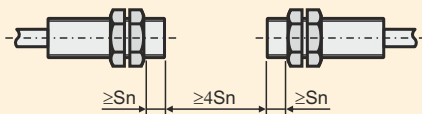
Sn - nominal switching distance

D - diameter of sensor
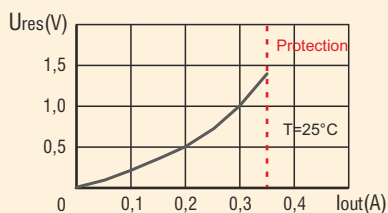
Connection circuits of sensors

Scheme 10 (PNP / NO+NC)

Scheme 20 (NPN / NO+NC)

Output characteristic /residual voltage/

Features of connecting a capacitive load to sensors with impulse protection against current overload
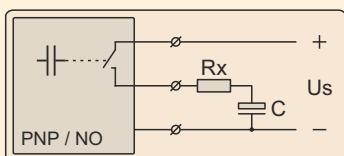
Connection of capacitive load
to PNP type sensor
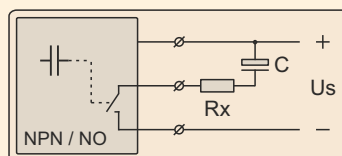
Connection of capacitive load
to NPN type sensor

When working with sensors that have pulse protection against overloading and short-circuit in their outputs, it is necessary to add a resistor Rx, that limits the current when charging the load capacitor C for first time (Resistor Rx add if capacitor C more 100nF).

$$Rx = Us / 0,5 \quad (Rx = 20\Omega \ldots 60\Omega)$$

fig.1

Operating principle

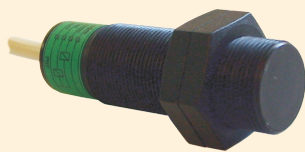The presented M18 capacitive proximity sensor serves to switch 3- and 4-wire direct current circuits. Its output switches as metal or non-metallic objects approach to its active part. The sensor has a potentiometer for adjusting the distance of action Sn.

Technical parameters

Operating distance, Sn	8,0 mm
Hysteresis, h	10...20%
Supply voltage, Us	11…30 Vdc (Ripple ±10 %)
Output voltage (max), $Uout$	35 Vdc (open collector)
Residual voltage, $Ures$	0,8 V (I = 250 mA)
Load current (max), $Iout$	250 mA
Protection of output (scanning), $Iprot$	350 mA (25ºC)
Current consumption, Is	9 mA
Switching frequency (max), fo	10 Hz (Sn=4,0 mm)
Sensitivity adjustment	0...Sn
Operating temperature range, $Tamb$	-10º…+50º C
Degree of protection	IP54
Output light indicator	LED
Connection cable	4x0.25 mm^2, L=2 m, PVC
Overall dimensions	M18x1, L=59 mm
Housing - plastic	PVC

Features:
Protection from reverse inclusion of the supply voltage.
Protection of the outputs from overcurrent and short circuit.

Type parameters

Type	Output function	Scheme of connection
CP1-18.10.K	PNP / NO+NC	10
CP1-18.20.K	NPN / NO+NC	20

Schemes of connection

Scheme 10

Scheme 20

fig.1

Operating principle

The presented M30 capacitive proximity sensor serves to switch 3- and 4-wire direct current circuits. Its output switches as metal or non-metallic objects approach to its active part. The sensor has a potentiometer for adjusting the distance of action Sn.
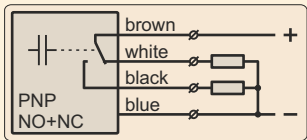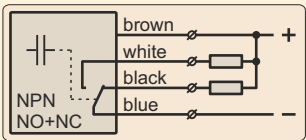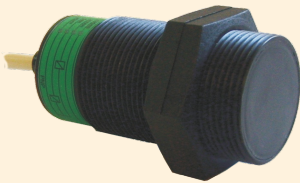
## Technical parameters

Operating distance, Sn	15,0 mm
Hysteresis, h	10...20%
Supply voltage, Us	11…30 Vdc (Ripple ±10 %)
Output voltage (max), $Uout$	35 Vdc (open collector)
Residual voltage, $Ures$	0,8 V (I = 250 mA)
Load current (max), $Iout$	250 mA
Protection of output (scanning), $Iprot$	350 mA (25ºC)
Current consumption, Is	9 mA
Switching frequency (max), fo	10 Hz (Sn=8,0 mm)
Sensitivity adjustment	0...Sn
Operating temperature range, $Tamb$	-10º…+50º C
Degree of protection	IP54
Output light indicator	LED
Connection cable	4x0.25 mm^2, L=2 m, PVC
Overall dimensions	M30x1.5, L=61 mm
Housing - plastic	PVC

Features:
Protection from reverse inclusion of the supply voltage.
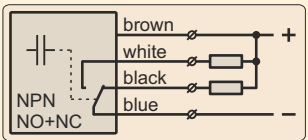Protection of the outputs from overcurrent and short circuit.

Type parameters

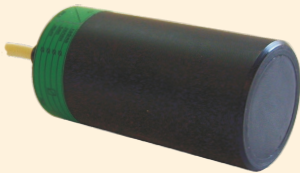| Type	Output function	Scheme of connection
CP1-30.10.K	PNP / NO+NC	10
CP1-30.20.K	NPN / NO+NC	20

Schemes of connection
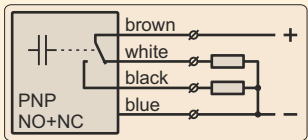
Scheme 10

Scheme 20

fig.1

Operating principle

The presented ø34 capacitive proximity sensor serves to switch 3- and 4-wire direct current circuits. Its output switches as metal or non-metallic objects approach to its active part. The sensor has a potentiometer for adjusting the distance of action Sn.

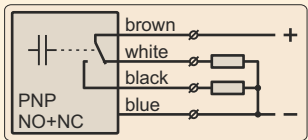## Technical parameters

Operating distance, Sn	15,0 mm
Hysteresis, h	10...20%
Supply voltage, Us	11…30 Vdc (Ripple ±10 %)
Output voltage (max), $Uout$	35 Vdc (open collector)
Residual voltage, $Ures$	0,8 V (I = 250 mA)
Load current (max), $Iout$	250 mA
Protection of output (scanning), $Iprot$	350 mA (25ºC)
Current consumption, Is	9 mA
Switching frequency (max), fo	10 Hz (Sn=8,0 mm)
Sensitivity adjustment	0...Sn
Operating temperature range, $Tamb$	-10º…+50º C
Degree of protection	IP54
Output light indicator	LED
Connection cable	4x0.25 mm^2, L=2 m, PVC
Overall dimensions	Ø34, L=70 mm
Housing - plastic	PVC

Features:
Protection from reverse inclusion of the supply voltage.
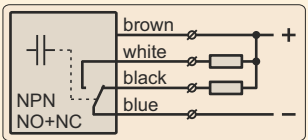Protection of the outputs from overcurrent and short circuit.

Type parameters

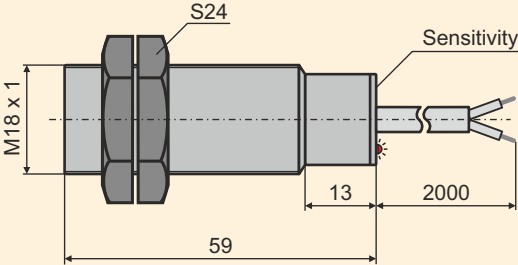| Type	Output function	Scheme of connection
CP2-34.10.K	PNP / NO+NC	10
CP2-34.20.K	NPN / NO+NC	20

Schemes of connection

Scheme 10

Scheme 20

M18

S24

Sensitivity

M18 x 1

13

2000

59

M30

S36

Sensitivity

M30 x 1,5

13

2000

61

Ø34

Sensitivity

Ø34

70

2000