

# EVERY THING ULTRA SONIC

Extract from our online catalogue:

nano ultrasonic sensors

Current to: 2024-02-26



nano – what's in a name? At just 55 mm long, including plug, the nano is the shortest M12 ultrasonic sensor on the market.

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## HIGHLIGHTS

- › Ultrasonic sensor in the M12 threaded sleeve
- › IO-Link interface › for support of the new industry standard
- › The total length including plug is only 55 mm
- › Improved temperature compensation › adjustment to working conditions within 45 seconds
- › UL Listed to Canadian and US safety standards

## BASICS

- › 1 Push-Pull switching output › pnp or npn basis
- › Analogue output 4–20 mA or 0–10 V
- › 2 detection ranges with a measurement range of 20 mm to 350 mm
- › microsonic Teach-in on pin 2
- › 0.069 mm resolution
- › Operating voltage 10–30 V › for use with various voltage networks

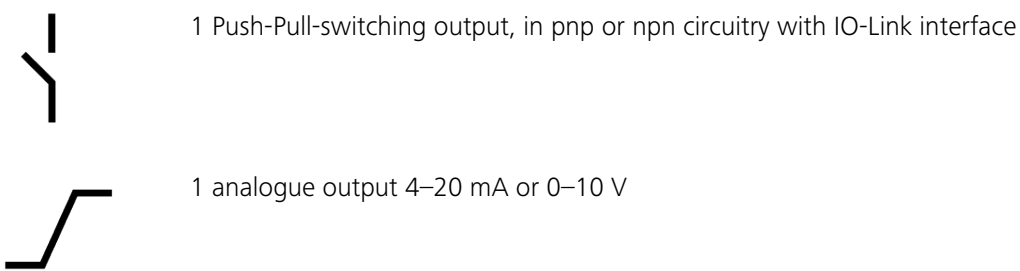
# Description

## With a housing length of only 55 mm

nano sensors with switching outputs are the smallest ultrasonic sensors inside the M12 threaded sleeve on the market. Analogue sensors are 60 mm long. nano has a 4-pole M12 circular plug and are taught via pin 2.

## For the nano sensor family

there are 2 output stages and 2 measuring ranges available:



## The temperature compensation

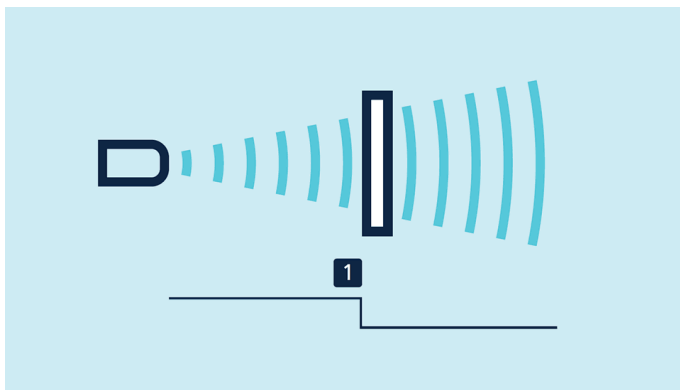
of the sensors profits from a significant improvement. The sensors reach their operating point only 45 seconds after activation of the operating voltage. We now compensate for the influence of self-heating and installation conditions. This brings improved precision shortly after activation of the supply voltage and in running operation.

## The nano sensors with switched output have three operating modes:

- › Single switching point
- › Two-way reflective barrier
- › Window mode

## Teach-in of a single switching point

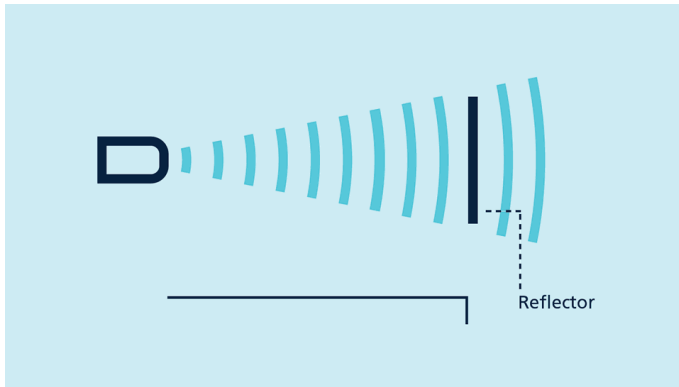
- › Place object (1) to be detected at the desired distance
- › Apply  $+U_B$  to pin 2 for about 3 seconds
- › Then apply  $+U_B$  to pin 2 again for about 1 second



### Teach-in of a two-way reflective barrier

with a fixed mounted reflector.

- › Apply  $+U_B$  to pin 2 for about 3 seconds
- › Then apply  $+U_B$  to pin 2 again for about 10 second



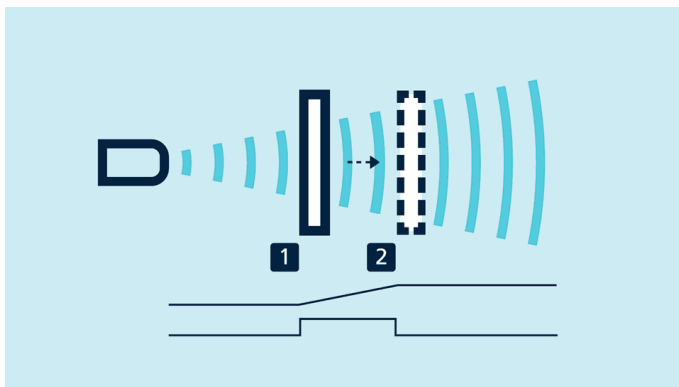
Teach-in of a two-way reflective barrier

### To set a window with two switching points

- › Place object to the sensor-close window limit (1)
- › Apply  $+U_B$  to pin 2 for about 3 seconds until both LEDs flash
- › Then move the object to the sensor-distant window limit (2)
- › Then apply  $+U_B$  to pin 2 again for about 1 second until LED2 extinguishes

### For setting an analogue output

- › initially position the object to be detected on the sensor-close window limit (1)
- › Apply  $+U_B$  to pin 2 for about 3 seconds until both LEDs flash
- › Move the object to the sensor-distant window limit (2)
- › Then apply  $+U_B$  to pin 2 again for about 1 second



Teach-in of an analogue characteristic or of a window with two switching points

### NCC/NOC

and rising/falling analogue characteristic can also be set via pin 2.

### One green and one yellow LED

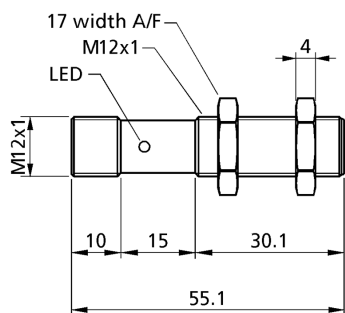
indicate the state of the output and support microsonic Teach-in.

### IO-Link integrated

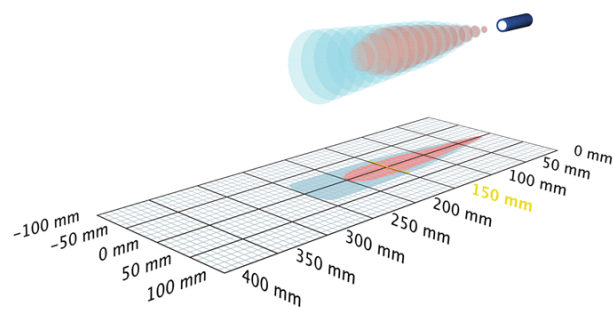
in version 1.1 for sensors with Push-Pull output. The **nano-15/CF** and **nano-24/CF** support the Smart Sensor Profile, which creates more transparency between IO-Link devices.

# nano-15/CF

## scale drawing



## detection zone



1 x Push-Pull



measuring range	20 - 250 mm
design	cylindrical M12
operating mode	IO-Link proximity switch/reflective mode reflective barrier window mode
particularities	narrow sound field IO-Link version 1.1 Smart Sensor Profile UL Listed

## ultrasonic-specific

means of measurement	echo propagation time measurement
transducer frequency	380 kHz
blind zone	20 mm
operating range	150 mm
maximum range	250 mm
resolution	0.10 mm
reproducibility	± 0.15 %
accuracy	± 1 % (temperature drift internally compensated)

## electrical data

operating voltage $U_b$	10 - 30 V d.c., reverse polarity protection
voltage ripple	± 10 %
no-load current consumption	≤ 30 mA
type of connection	4-pin M12 initiator plug

# nano-15/CF

## outputs

output 1	switching output Push-Pull, $U_B-3\text{ V}$ , $-U_B+3\text{ V}$ , $I_{\max} = 100\text{ mA}$ NOC/NCC adjustable, short-circuit-proof
switching hysteresis	2.0 mm
switching frequency	25 Hz
response time	32 ms
delay prior to availability	< 300 ms

## inputs

input 1	com input synchronisation input teach-in input
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## IO-Link

product name	nano-15/CF
product ID	34020
SIO mode support	yes
COM mode	COM2 (38,4 kBaud)
min. cycle time	8 ms
format of process data	4 Byte
content of process data	Bit 0: initial state Pin 4; Bit 8-15: scale (Int. 8); Bit 16-31: measured value (Int. 16)
ISDU paramter	Identification, measuring configuration, switched output, filter, temperature compensation, operation
system commands	SP1 Teach-in, SP2 Teach-in, factory settings
Smart Sensor Profile	yes
IODD version	IODD version 1.1

## housing

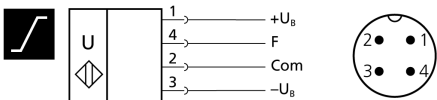
material	brass sleeve, nickel-plated, plastic parts, PBT
ultrasonic transducer	polyurethane foam, epoxy resin with glass contents
class of protection to EN 60529	IP 67
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	15 g

# nano-15/CF

## technical features/characteristics

temperature compensation	yes
scope for settings	Teach-in via com input on pin 2 LCA-2 with LinkControl IO-Link
Synchronisation	yes
multiplex	yes
indicators	LED grün, LED gelb
particularities	narrow sound field IO-Link version 1.1 Smart Sensor Profile UL Listed

## pin assignment



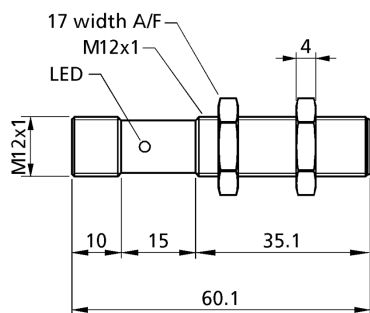
order no. **nano-15/CF**

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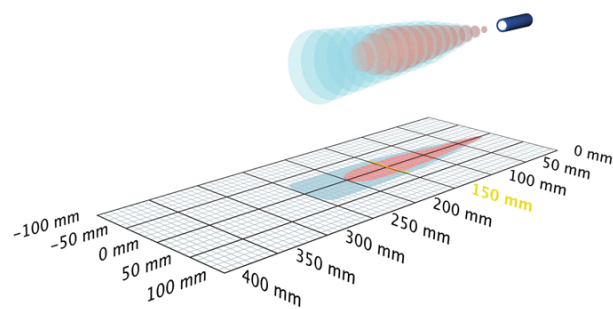


# nano-15/CI

## scale drawing



## detection zone



1 x analogue 4-20 mA



250 mm

measuring range	20 - 250 mm
design	cylindrical M12
operating mode	analogue distance measurements
particularities	narrow sound field UL Listed

## ultrasonic-specific

means of measurement	echo propagation time measurement
transducer frequency	380 kHz
blind zone	20 mm
operating range	150 mm
maximum range	250 mm
reproducibility	± 0.15 %
accuracy	± 1 % (temperature drift internally compensated)

## electrical data

operating voltage $U_B$	10 - 30 V d.c., reverse polarity protection
voltage ripple	± 10 %
no-load current consumption	≤ 30 mA
type of connection	4-pin M12 initiator plug

# nano-15/CI

## outputs

output 1	analogue output current: 4-20 mA switchable rising/falling
response time	24 ms
delay prior to availability	< 300 ms

## inputs

input 1	Teach-in input
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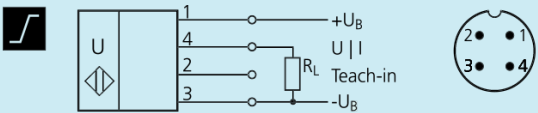
## housing

material	brass sleeve, nickel-plated, plastic parts, PBT
ultrasonic transducer	polyurethane foam, epoxy resin with glass contents
class of protection to EN 60529	IP 67
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	15 g

## technical features/characteristics

scope for settings	Teach-in Teach-in via com input on pin 2
indicators	1 x LED green: working, 1 x LED yellow: object in the window
particularities	narrow sound field UL Listed

## pin assignment

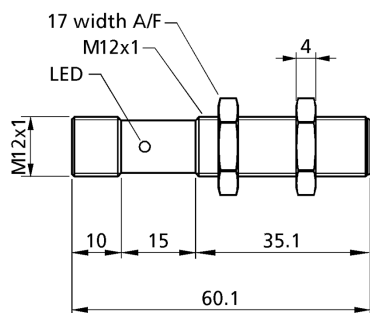


order no. **nano-15/CI**

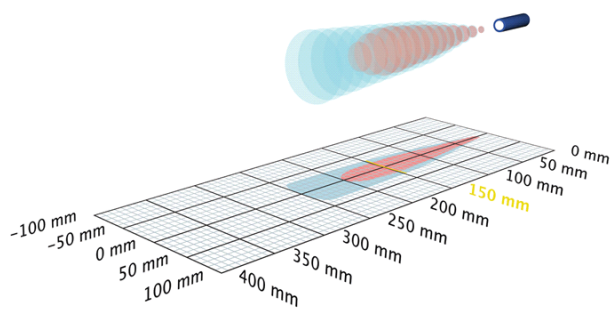
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# nano-15/CU

## scale drawing



## detection zone



1 x analogue 0-10 V



250 mm

measuring range	20 - 250 mm
design	cylindrical M12
operating mode	analogue distance measurements
particularities	narrow sound field UL Listed

## ultrasonic-specific

means of measurement	echo propagation time measurement
transducer frequency	380 kHz
blind zone	20 mm
operating range	150 mm
maximum range	250 mm
reproducibility	± 0.15 %
accuracy	± 1 % (temperature drift internally compensated)

## electrical data

operating voltage $U_B$	15 V bis 30 V DC, verpolfest
voltage ripple	± 10 %
no-load current consumption	≤ 30 mA
type of connection	4-pin M12 initiator plug

# nano-15/CU

## outputs

output 1	analogue output voltage: 0-10 V (at $U_B \geq 15$ V), short-circuit-proof switchable rising/falling
response time	24 ms
delay prior to availability	< 300 ms

## inputs

input 1	Teach-in input
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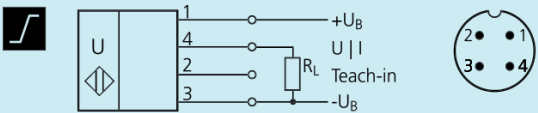
## housing

material	brass sleeve, nickel-plated, plastic parts, PBT
ultrasonic transducer	polyurethane foam, epoxy resin with glass contents
class of protection to EN 60529	IP 67
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	15 g

## technical features/characteristics

scope for settings	Teach-in Teach-in via com input on pin 2
indicators	1 x LED green: working, 1 x LED yellow: object in the window
particularities	narrow sound field UL Listed

## pin assignment

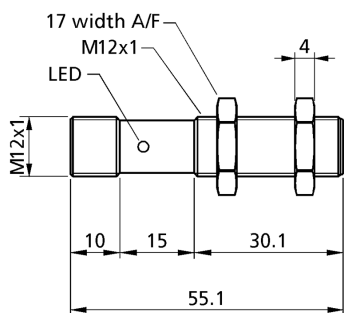


order no. **nano-15/CU**

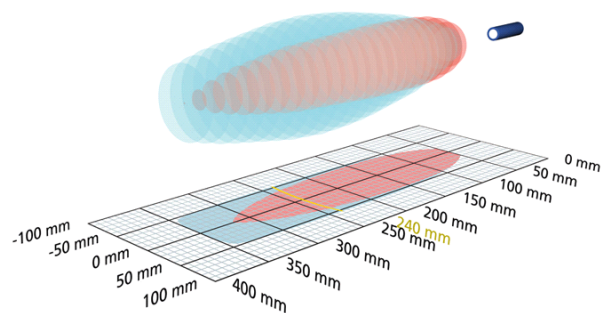
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# nano-24/CF

## scale drawing



## detection zone



1 x Push-Pull



350 mm

measuring range	40 - 350 mm
design	cylindrical M12
operating mode	IO-Link proximity switch/reflective mode reflective barrier window mode
particularities	narrow sound field IO-Link version 1.1 Smart Sensor Profile UL Listed

## ultrasonic-specific

means of measurement	echo propagation time measurement
transducer frequency	500 kHz
blind zone	40 mm
operating range	240 mm
maximum range	350 mm
resolution	0.10 mm
reproducibility	± 0.15 %
accuracy	± 1 % (temperature drift internally compensated)

## electrical data

operating voltage $U_b$	10 - 30 V d.c., reverse polarity protection
voltage ripple	± 10 %
no-load current consumption	≤ 40 mA
type of connection	4-pin M12 initiator plug

# nano-24/CF

## outputs

output 1	switching output Push-Pull, $U_B-3\text{ V}$ , $-U_B+3\text{ V}$ , $I_{\max} = 100\text{ mA}$ NOC/NCC adjustable, short-circuit-proof
switching hysteresis	3 mm
switching frequency	20 Hz
response time	40 ms
delay prior to availability	< 300 ms

## inputs

input 1	com input synchronisation input teach-in input
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## IO-Link

product name	nano-24/CF
product ID	34021
SIO mode support	yes
COM mode	COM2 (38,4 kBaud)
min. cycle time	10 ms
format of process data	4 Byte
content of process data	Bit 0: initial state Pin 4; Bit 8-15: scale (Int. 8); Bit 16-31: measured value (Int. 16)
ISDU paramter	Identification, measuring configuration, switched output, filter, temperature compensation, operation
system commands	SP1 Teach-in, SP2 Teach-in, factory settings
Smart Sensor Profile	yes
IODD version	IODD version 1.1

## housing

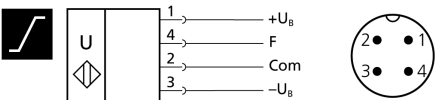
material	brass sleeve, nickel-plated, plastic parts, PBT
ultrasonic transducer	polyurethane foam, epoxy resin with glass contents
class of protection to EN 60529	IP 67
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	15 g

# nano-24/CF

## technical features/characteristics

temperature compensation	yes
scope for settings	Teach-in via com input on pin 2 LCA-2 with LinkControl IO-Link
Synchronisation	yes
multiplex	yes
indicators	LED grün, LED gelb
particularities	narrow sound field IO-Link version 1.1 Smart Sensor Profile UL Listed

## pin assignment

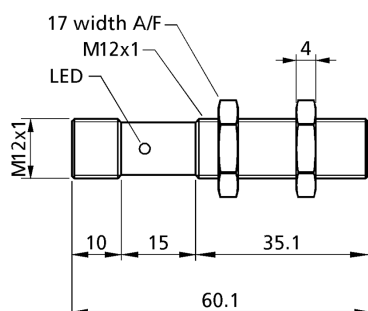


order no. **nano-24/CF**

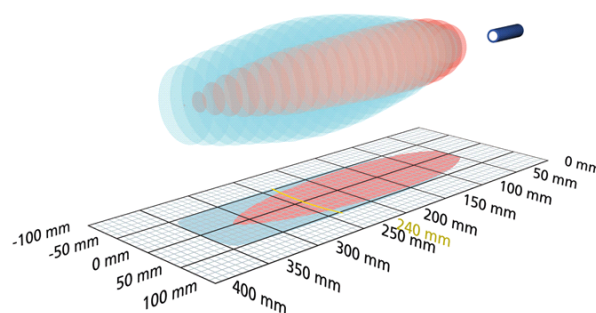
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nano-24/Cl

scale drawing



## detection zone



1 x analogue 4-20 mA



350 mm

measuring range	40 - 350 mm
design	cylindrical M12
operating mode	analogue distance measurements
particularities	narrow sound field UL Listed

## ultrasonic-specific

means of measurement	echo propagation time measurement
transducer frequency	500 kHz
blind zone	40 mm
operating range	240 mm
maximum range	350 mm
reproducibility	± 0.15 %
accuracy	± 1 % (temperature drift internally compensated)

electrical data

operating voltage U <sub>B</sub>	10 - 30 V d.c., reverse polarity protection
voltage ripple	± 10 %
no-load current consumption	≤ 40 mA
type of connection	4-pin M12 initiator plug



# nano-24/CI

## outputs

output 1	analogue output current: 4-20 mA switchable rising/falling
response time	30 ms
delay prior to availability	< 300 ms

## inputs

input 1	Teach-in input
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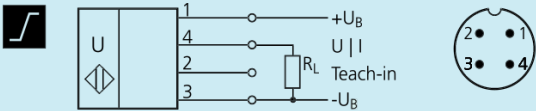
## housing

material	brass sleeve, nickel-plated, plastic parts, PBT
ultrasonic transducer	polyurethane foam, epoxy resin with glass contents
class of protection to EN 60529	IP 67
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	15 g

## technical features/characteristics

scope for settings	Teach-in Teach-in via com input on pin 2
indicators	1 x LED green: working, 1 x LED yellow: object in the window
particularities	narrow sound field UL Listed

## pin assignment

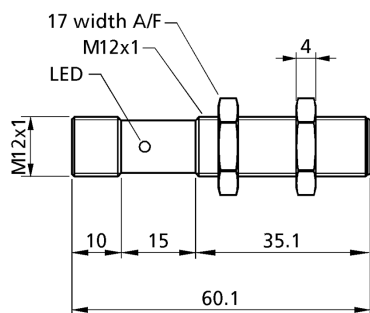


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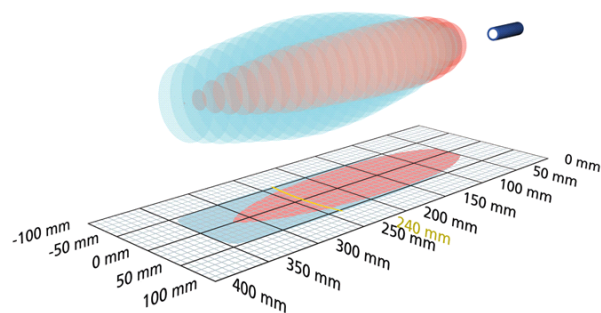
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# nano-24/CU

## scale drawing



## detection zone



1 x analogue 0-10 V



350 mm

measuring range	40 - 350 mm
design	cylindrical M12
operating mode	analogue distance measurements
particularities	narrow sound field UL Listed

## ultrasonic-specific

means of measurement	echo propagation time measurement
transducer frequency	500 kHz
blind zone	40 mm
operating range	240 mm
maximum range	350 mm
reproducibility	± 0.15 %
accuracy	± 1 % (temperature drift internally compensated)

## electrical data

operating voltage U <sub>B</sub>	15 V bis 30 V DC, verpolfest
voltage ripple	± 10 %
no-load current consumption	≤ 40 mA
type of connection	4-pin M12 initiator plug

# nano-24/CU

## outputs

output 1	analogue output voltage: 0-10 V (at $U_B \geq 15$ V), short-circuit-proof switchable rising/falling
response time	30 ms
delay prior to availability	< 300 ms

## inputs

input 1	Teach-in input
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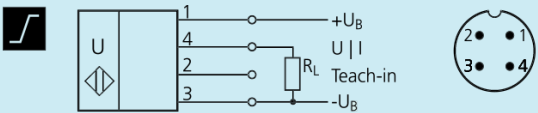
## housing

material	brass sleeve, nickel-plated, plastic parts, PBT
ultrasonic transducer	polyurethane foam, epoxy resin with glass contents
class of protection to EN 60529	IP 67
operating temperature	-25°C to +70°C
storage temperature	-40°C to +85°C
weight	15 g

## technical features/characteristics

scope for settings	Teach-in Teach-in via com input on pin 2
indicators	1 x LED green: working, 1 x LED yellow: object in the window
particularities	narrow sound field UL Listed

## pin assignment



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