



pico⁺

“The little guy” that can do it all: 4 ranges, 3 output signals, 2 housing variants and an IO-Link interface.

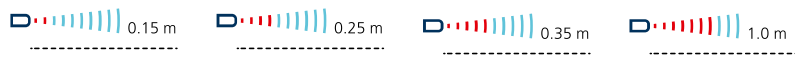
HIGHLIGHTS

- › Variant with 90° angled head
- › IO-Link interface › for support of the new industry standard
- › Automatic synchronisation and multiplex operation › for simultaneous operation of up to ten sensors in close quarters
- › UL Listed to Canadian and US safety standards
- › Improved temperature compensation › adjustment to working conditions within 120 seconds

BASICS

- › 1 Push-Pull switching output, pnp or npn basis
- › Analogue output 4–20 mA or 0–10 V
- › 4 detection ranges with a measurement range of 20 mm to 1.3 m
- › microsonic Teach-in on pin 5
- › 0.069 mm to 0.1 mm resolution
- › 10–30 V operating voltage
- › LinkControl › for configuration of sensors from a PC





The pico+ ultrasonic sensors

are a cylindrical series with M18 threaded sleeves and a housing length of only 41 mm. In addition to the variants with an axial beam direction, there is also a housing variant with a 90° angled head and radial beam direction.

With four detection ranges from 20 mm to 1.3 m and three different output stages, this sensor family covers a wide range of applications.



Sensors with the Push-Pull output stage support SIO and IO-Link modes. Sensors with analogue output are optionally available with 4–20 mA current output or 0–10 V voltage output.

In SIO mode, sensors are configured using the microsonic Teach-in procedure on pin 5.

The sensors are listed to applicable UL Standards and requirements by UL for Canada and the US.

For the pico+ sensor family

there are two output stages and four detection ranges available:

-  1 Push-Pull switching output with pnp and npn switching technology
-  1 analogue output 4–20 mA or 0–10 V

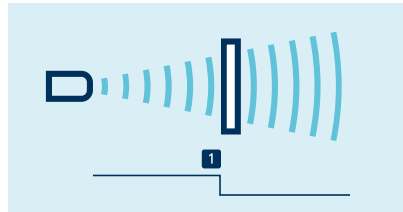
Sensors with switching output have three operating modes:

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

Teach-in of a single switching point

- › Place object to be detected at the desired distance **1**.

- › Apply $+U_B$ to pin 5 for about 3 seconds.
- › Then apply $+U_B$ to pin 5 again for about 1 second.

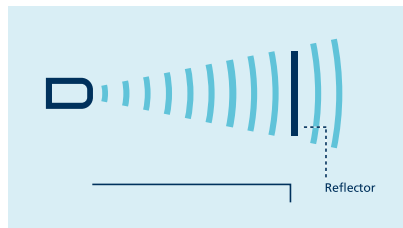


Teach-in of a switching point

Teach-in of a two-way reflective barrier

with a fixed reflector

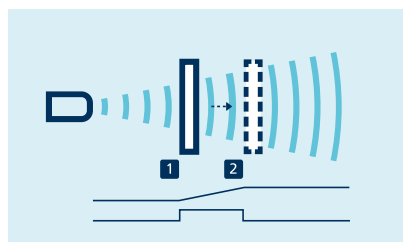
- › Apply $+U_B$ to pin 5 for about 3 seconds until both LEDs flash.
- › Then apply $+U_B$ to pin 5 again for about 10 seconds.



Teach-in of a two-way reflective barrier

For setting the analogue output

- › Initially place the object to be detected at the sensor-close window limit **1**.
- › Apply $+U_B$ to pin 5 for about 3 seconds.
- › Then move the object to the sensor-distant window limit **2**.
- › Then apply $+U_B$ to pin 5 again for about 1 second.



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

NCC/NOC

and rising/falling analogue characteristic curve can also be set via pin 5.

One green and one yellow LED

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

LinkControl

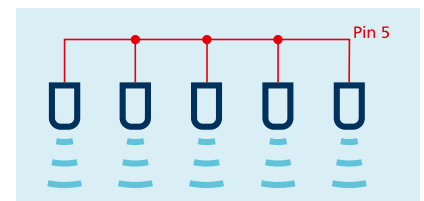
optionally permits the extensive parameterisation of sensors. The LCA-2 LinkControl adapter is available as an accessory and can be used to connect pico+ sensors to the PC.



Sensor connected to the PC via LCA-2 for programming

Easy to synchronise

A number of pico+ sensors can be run closely packed in applications synchronised to stop them from influencing one another. To this end, the sync mode has to be activated and all the sensors are to be electrically connected on to another with pin 5.



Synchronisation via pin 5

IO-Link integrated

in version 1.1 for sensors with switching output.

pico⁺15

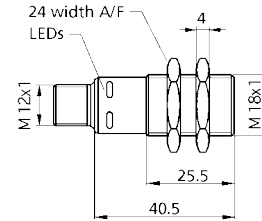
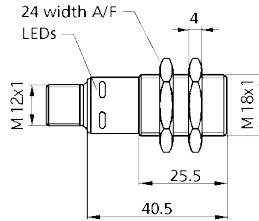
pico⁺25



measuring range

20–250 mm

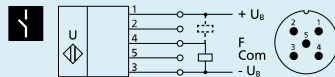
30–350 mm



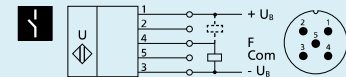
| | | |
|---|--|--|
| blind zone | 20 mm | 30 mm |
| operating range | 150 mm | 250 mm |
| maximum range | 250 mm | 350 mm |
| angle of beam spread | please see i | please see i |
| transducer frequency | 380 kHz | 320 kHz |
| resolution/sampling rate | 0.1 mm | 0.1 mm |
| reproducibility | ± 0.15 % | ± 0.15 % |
| accuracy | ± 1 % (temperature drift internally compensated) | ± 1 % (temperature drift internally compensated) |
| operating voltage U_B | 10 V to 30 V DC, reverse polarity protection | 10 V to 30 V DC, reverse polarity protection |
| no-load current consumption | ≤ 40 mA | ≤ 40 mA |
| housing | brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content | brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content |
| class of protection according to EN 60529 | IP 67 | IP 67 |
| type of connection | 5-pin M12 initiator plug | 5-pin M12 initiator plug |
| controls | com input (pin 5) | com input (pin 5) |
| scope for settings | <ul style="list-style-type: none"> Teach-in via com input on pin 5 LCA-2 with LinkControl IO-Link | <ul style="list-style-type: none"> Teach-in via com input on pin 5 LCA-2 with LinkControl IO-Link |
| indicators | LED green: working, LED yellow: switch status | LED green: working, LED yellow: switch status |
| IO-Link | V 1.1 | V 1.1 |
| IO-Link SIO mode support | yes | yes |
| IO-Link min. cycle time | 8.4 ms | 8.4 ms |
| Smart Sensor Profile | - | - |
| operating temperature | -25°C to +70°C | -25°C to +70°C |
| storage temperature | -40°C to +85°C | -40°C to +85°C |
| weight | 30 g | 30 g |
| switching hysteresis ¹⁾ | 2 mm | 3 mm |
| switching frequency ¹⁾ | 25 Hz | 25 Hz |
| response time ¹⁾ | 32 ms | 32 ms |
| delay prior to availability | < 300 ms | < 300 ms |
| order number | pico+15/F | pico+25/F |
| switching output | Push-Pull, $U_B=3$ V, $-U_B=3$ V, $I_{max} = 100$ mA | Push-Pull, $U_B=3$ V, $-U_B=3$ V, $I_{max} = 100$ mA |



Enclosure Type 1
For use only in industrial machinery NFPA 79 applications.



1 Push-Pull switching output



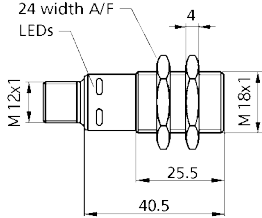
1 Push-Pull switching output

¹⁾ Can be programmed with LinkControl and IO-Link.

pico⁺35



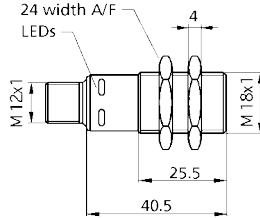
65–600 mm



pico⁺100



120–1,300 mm



| |
|--|
| 65 mm |
| 350 mm |
| 600 mm |
| please see ⓘ |
| 400 kHz |
| 0.1 mm |
| ± 0.15 % |
| ± 1 % (temperature drift internally compensated) |
| 10 V to 30 V DC, reverse polarity protection |
| ≤ 40 mA |
| brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content |
| IP 67 |
| 5-pin M12 initiator plug |
| com input (pin 5) |
| <ul style="list-style-type: none"> • Teach-in via com input on pin 5 • LCA-2 with LinkControl • IO-Link |
| LED green: working, LED yellow: switch status |
| V 1.1 |
| yes |
| 16 ms |
| - |
| -25°C to +70°C |
| -40°C to +85°C |
| 30 g |
| 5 mm |
| 12 Hz |
| 64 ms |
| < 300 ms |

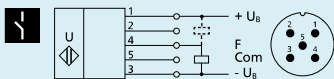
pico+35/F

Push-Pull, $U_B = -3\text{ V}$, $-U_B + 3\text{ V}$, $I_{\text{max}} = 100\text{ mA}$

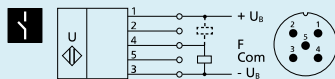
| |
|--|
| 120 mm |
| 1,000 mm |
| 1,300 mm |
| please see ⓘ |
| 200 kHz |
| 0.1 mm |
| ± 0.15 % |
| ± 1 % (temperature drift internally compensated) |
| 10 V to 30 V DC, reverse polarity protection |
| ≤ 40 mA |
| brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content |
| IP 67 |
| 5-pin M12 initiator plug |
| com input (pin 5) |
| <ul style="list-style-type: none"> • Teach-in via com input on pin 5 • LCA-2 with LinkControl • IO-Link |
| LED green: working, LED yellow: switch status |
| V 1.1 |
| yes |
| 20.4 ms |
| - |
| -25°C to +70°C |
| -40°C to +85°C |
| 30 g |
| 20 mm |
| 10 Hz |
| 80 ms |
| < 300 ms |

pico+100/F

Push-Pull, $U_B = -3\text{ V}$, $-U_B + 3\text{ V}$, $I_{\text{max}} = 100\text{ mA}$



1 Push-Pull switching output



1 Push-Pull switching output

pico⁺15

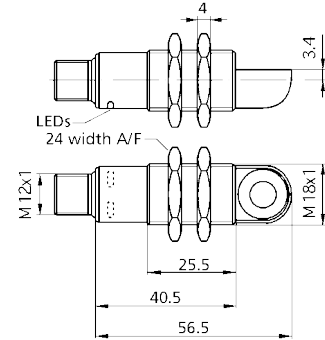
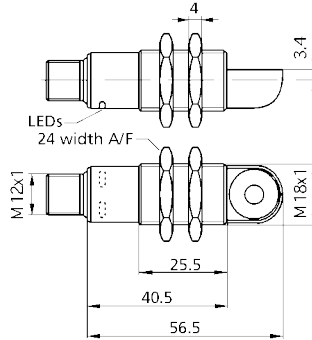
pico⁺25



measuring range

20–250 mm

30–350 mm



| | | |
|---|--|--|
| blind zone | 20 mm | 30 mm |
| operating range | 150 mm | 250 mm |
| maximum range | 250 mm | 350 mm |
| angle of beam spread | please see i | please see i |
| transducer frequency | 380 kHz | 320 kHz |
| resolution/sampling rate | 0.1 mm | 0.1 mm |
| reproducibility | ± 0.15 % | ± 0.15 % |
| accuracy | ± 1 % (temperature drift internally compensated) | ± 1 % (temperature drift internally compensated) |
| operating voltage U_B | 10 V to 30 V DC, reverse polarity protection | 10 V to 30 V DC, reverse polarity protection |
| no-load current consumption | ≤ 40 mA | ≤ 40 mA |
| housing | brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content | brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content |
| class of protection according to EN 60529 | IP 67 | IP 67 |
| type of connection | 5-pin M12 initiator plug | 5-pin M12 initiator plug |
| controls | com input (pin 5) | com input (pin 5) |
| scope for settings | <ul style="list-style-type: none"> Teach-in via com input on pin 5 LCA-2 with LinkControl IO-Link | <ul style="list-style-type: none"> Teach-in via com input on pin 5 LCA-2 with LinkControl IO-Link |
| indicators | LED green: working, LED yellow: switch status | LED green: working, LED yellow: switch status |
| IO-Link | V 1.1 | V 1.1 |
| IO-Link SIO mode support | yes | yes |
| IO-Link min. cycle time | 8.4 ms | 8.4 ms |
| Smart Sensor Profile | - | - |
| operating temperature | -25°C to +70°C | -25°C to +70°C |
| storage temperature | -40°C to +85°C | -40°C to +85°C |
| weight | 35 g | 35 g |
| switching hysteresis ¹⁾ | 2 mm | 3 mm |
| switching frequency ¹⁾ | 25 Hz | 25 Hz |
| response time ¹⁾ | 32 ms | 32 ms |
| delay prior to availability | < 300 ms | < 300 ms |

order number

pico+15/WK/F

pico+25/WK/F

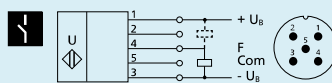
switching output

Push-Pull, $U_B=3\text{ V}$, $-U_B=3\text{ V}$, $I_{\max}=100\text{ mA}$

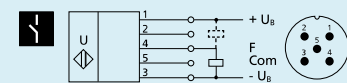
Push-Pull, $U_B=3\text{ V}$, $-U_B=3\text{ V}$, $I_{\max}=100\text{ mA}$



Enclosure Type 1
For use only in industrial
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1 Push-Pull switching output



1 Push-Pull switching output

¹⁾ Can be programmed with LinkControl and IO-Link.

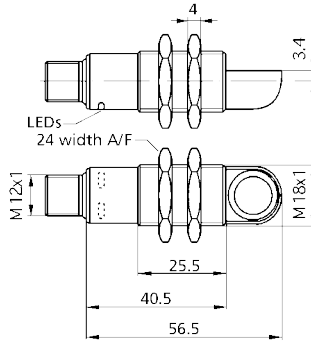
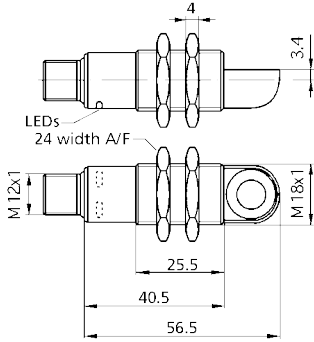
pico⁺35

pico⁺100



65–600 mm

120–1,300 mm



| |
|---|
| 65 mm |
| 350 mm |
| 600 mm |
| please see ⓘ |
| 400 kHz |
| 0.1 mm |
| ± 0.15 % |
| ± 1 % (temperature drift internally compensated) |
| 10 V to 30 V DC, reverse polarity protection |
| ≤ 40 mA |
| brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content |
| IP 67 |
| 5-pin M12 initiator plug |
| com input (pin 5) |
| • Teach-in via com input on pin 5 |
| • LCA-2 with LinkControl |
| • IO-Link |
| LED green: working, LED yellow: switch status |
| V 1.1 |
| yes |
| 16 ms |
| - |
| -25°C to +70°C |
| -40°C to +85°C |
| 35 g |
| 5 mm |
| 12 Hz |
| 64 ms |
| < 300 ms |

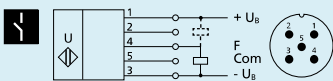
| |
|---|
| 120 mm |
| 1,000 mm |
| 1,300 mm |
| please see ⓘ |
| 200 kHz |
| 0.1 mm |
| ± 0.15 % |
| ± 1 % (temperature drift internally compensated) |
| 10 V to 30 V DC, reverse polarity protection |
| ≤ 40 mA |
| brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content |
| IP 67 |
| 5-pin M12 initiator plug |
| com input (pin 5) |
| • Teach-in via com input on pin 5 |
| • LCA-2 with LinkControl |
| • IO-Link |
| LED green: working, LED yellow: switch status |
| V 1.1 |
| yes |
| 20.4 ms |
| - |
| -25°C to +70°C |
| -40°C to +85°C |
| 35 g |
| 20 mm |
| 10 Hz |
| 80 ms |
| < 300 ms |

pico+35/WK/F

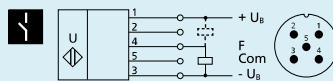
Push-Pull, U_B -3 V, $-U_B$ +3 V, I_{max} = 100 mA

pico+100/WK/F

Push-Pull, U_B -3 V, $-U_B$ +3 V, I_{max} = 100 mA



1 Push-Pull switching output



1 Push-Pull switching output

pico⁺15

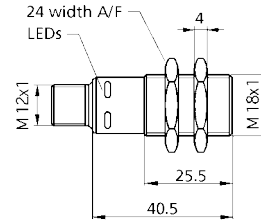
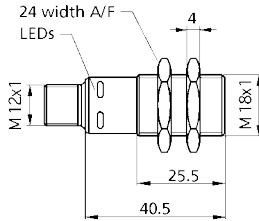
pico⁺25



measuring range

20–250 mm

30–350 mm



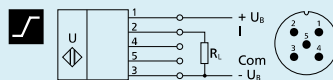
| | | |
|---|---|---|
| blind zone | 20 mm | 30 mm |
| operating range | 150 mm | 250 mm |
| maximum range | 250 mm | 350 mm |
| angle of beam spread | please see | please see |
| transducer frequency | 380 kHz | 320 kHz |
| resolution/sampling rate | 0.069 mm | 0.069 mm to 0.1 mm, depending on the analogue window |
| reproducibility | ± 0.15 % | ± 0.15 % |
| accuracy | ± 1 % (temperature drift internally compensated) | ± 1 % (temperature drift internally compensated) |
| operating voltage U_B | 10 V to 30 V DC, reverse polarity protection | 10 V to 30 V DC, reverse polarity protection |
| no-load current consumption | ≤ 40 mA | ≤ 40 mA |
| housing | brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content | brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content |
| class of protection according to EN 60529 | IP 67 | IP 67 |
| type of connection | 5-pin M12 initiator plug | 5-pin M12 initiator plug |
| controls | com input (pin 5) | com input (pin 5) |
| scope for settings | <ul style="list-style-type: none"> Teach-in via com input on pin 5 LCA-2 with LinkControl | <ul style="list-style-type: none"> Teach-in via com input on pin 5 LCA-2 with LinkControl |
| indicators | LED green: working, LED yellow: object in the window | LED green: working, LED yellow: object in the window |
| operating temperature | -25°C to +70°C | -25°C to +70°C |
| storage temperature | -40°C to +85°C | -40°C to +85°C |
| weight | 30 g | 30 g |
| response time | 32 ms | 32 ms |
| delay prior to availability | < 300 ms | < 300 ms |

order number

analogue output

pico+15/I

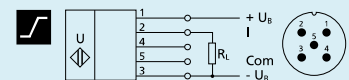
current output 4–20 mA
switchable rising/falling



analogue output 4–20 mA

pico+25/I

current output 4–20 mA
switchable rising/falling



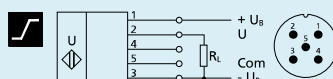
analogue output 4–20 mA

order number

analogue output

pico+15/U

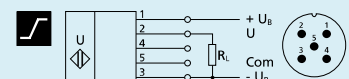
voltage output 0–10 V (at $U_B \geq 15$ V)
short-circuit-proof, switchable rising/falling



analogue output 0–10 V

pico+25/U

voltage output 0–10 V (at $U_B \geq 15$ V)
short-circuit-proof, switchable rising/falling

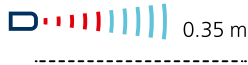


analogue output 0–10 V

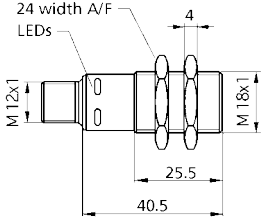


Enclosure Type 1
For use only in industrial
machinery NFPA 79 applications.

pico⁺35



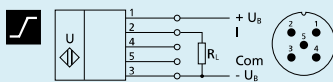
65–600 mm



- 65 mm
- 350 mm
- 600 mm
- please see ⓘ
- 400 kHz
- 0.069 mm to 0.17 mm, depending on the analogue window
- ± 0.15 %
- ± 1 % (temperature drift internally compensated)
- 10 V to 30 V DC, reverse polarity protection
- ≤ 40 mA
- brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content
- IP 67
- 5-pin M12 initiator plug
- com input (pin 5)
 - Teach-in via com input on pin 5
 - LCA-2 with LinkControl
- LED green: working, LED yellow: object in the window
- 25°C to +70°C
- 40°C to +85°C
- 30 g
- 64 ms
- < 300 ms

pico+35/I

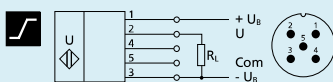
current output 4–20 mA
switchable rising/falling



analogue output 4–20 mA

pico+35/U

voltage output 0–10 V (at $U_B \geq 15$ V)
short-circuit-proof, switchable rising/falling

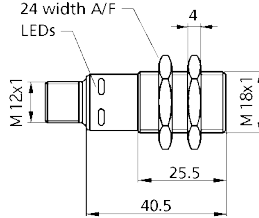


analogue output 0–10 V

pico⁺100



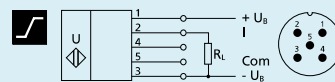
120–1,300 mm



- 120 mm
- 1,000 mm
- 1,300 mm
- please see ⓘ
- 200 kHz
- 0.069 mm to 0.38 mm, depending on the analogue window
- ± 0.15 %
- ± 1 % (temperature drift internally compensated)
- 10 V to 30 V DC, reverse polarity protection
- ≤ 40 mA
- brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content
- IP 67
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- LED green: working, LED yellow: object in the window
- 25°C to +70°C
- 40°C to +85°C
- 30 g
- 80 ms
- < 300 ms

pico+100/I

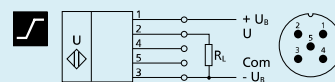
current output 4–20 mA
switchable rising/falling



analogue output 4–20 mA

pico+100/U

voltage output 0–10 V (at $U_B \geq 15$ V)
short-circuit-proof, switchable rising/falling



analogue output 0–10 V

pico⁺15

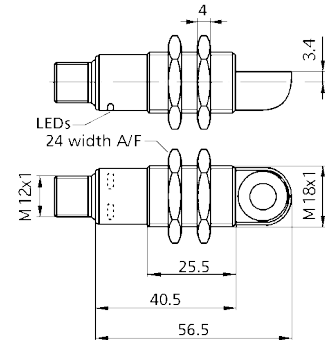
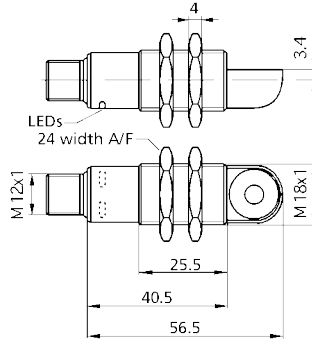
pico⁺25



measuring range

20–250 mm

30–350 mm



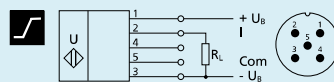
| | | |
|---|---|---|
| blind zone | 20 mm | 30 mm |
| operating range | 150 mm | 250 mm |
| maximum range | 250 mm | 350 mm |
| angle of beam spread | please see i | please see i |
| transducer frequency | 380 kHz | 320 kHz |
| resolution/sampling rate | 0.069 mm | 0.069 mm to 0.1 mm, depending on the analogue window |
| reproducibility | ± 0.15 % | ± 0.15 % |
| accuracy | ± 1 % (temperature drift internally compensated) | ± 1 % (temperature drift internally compensated) |
| operating voltage U_B | 10 V to 30 V DC, reverse polarity protection | 10 V to 30 V DC, reverse polarity protection |
| no-load current consumption | ≤ 40 mA | ≤ 40 mA |
| housing | brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content | brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content |
| class of protection according to EN 60529 | IP 67 | IP 67 |
| type of connection | 5-pin M12 initiator plug | 5-pin M12 initiator plug |
| controls | com input (pin 5) | com input (pin 5) |
| scope for settings | <ul style="list-style-type: none"> Teach-in via com input on pin 5 LCA-2 with LinkControl | <ul style="list-style-type: none"> Teach-in via com input on pin 5 LCA-2 with LinkControl |
| indicators | LED green: working, LED yellow: object in the window | LED green: working, LED yellow: object in the window |
| operating temperature | -25°C to +70°C | -25°C to +70°C |
| storage temperature | -40°C to +85°C | -40°C to +85°C |
| weight | 35 g | 35 g |
| response time | 32 ms | 32 ms |
| delay prior to availability | < 300 ms | < 300 ms |

order number

analogue output

pico+15/WK/I

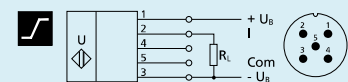
current output 4–20 mA
switchable rising/falling



analogue output 4–20 mA

pico+25/WK/I

current output 4–20 mA
switchable rising/falling



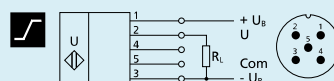
analogue output 4–20 mA

order number

analogue output

pico+15/WK/U

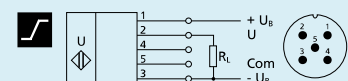
voltage output 0–10 V (at $U_B \geq 15$ V)
short-circuit-proof, switchable rising/falling



analogue output 0–10 V

pico+25/WK/U

voltage output 0–10 V (at $U_B \geq 15$ V)
short-circuit-proof, switchable rising/falling



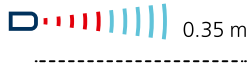
analogue output 0–10 V



Enclosure Type 1
For use only in industrial
machinery NFPA 79 applications.

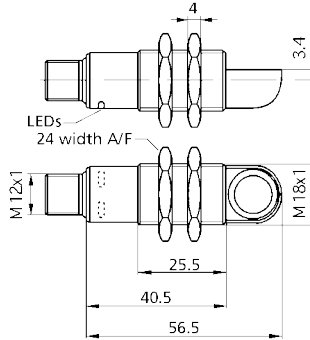
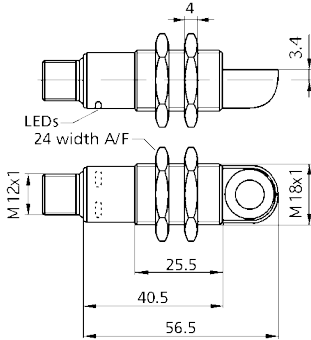
pico⁺35

pico⁺100



65–600 mm

120–1,300 mm



65 mm

350 mm

600 mm

please see ⓘ

400 kHz

0.069 mm to 0.17 mm, depending on the analogue window

± 0.15 %

± 1 % (temperature drift internally compensated)

10 V to 30 V DC, reverse polarity protection

≤ 40 mA

brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content

IP 67

5-pin M12 initiator plug

com input (pin 5)

- Teach-in via com input on pin 5

- LCA-2 with LinkControl

LED green: working, LED yellow: object in the window

-25°C to +70°C

-40°C to +85°C

35 g

64 ms

< 300 ms

120 mm

1,000 mm

1,300 mm

please see ⓘ

200 kHz

0.069 mm to 0.38 mm, depending on the analogue window

± 0.15 %

± 1 % (temperature drift internally compensated)

10 V to 30 V DC, reverse polarity protection

≤ 40 mA

brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content

IP 67

5-pin M12 initiator plug

com input (pin 5)

- Teach-in via com input on pin 5

- LCA-2 with LinkControl

LED green: working, LED yellow: object in the window

-25°C to +70°C

-40°C to +85°C

35 g

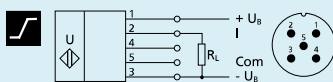
80 ms

< 300 ms

pico+35/WK/I

current output 4–20 mA

switchable rising/falling

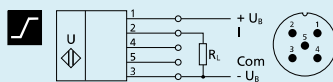


analogue output 4–20 mA

pico+100/WK/I

current output 4–20 mA

switchable rising/falling

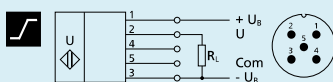


analogue output 4–20 mA

pico+35/WK/U

voltage output 0–10 V (at $U_B \geq 15$ V)

short-circuit-proof, switchable rising/falling

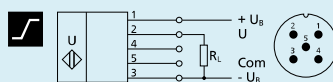


analogue output 0–10 V

pico+100/WK/U

voltage output 0–10 V (at $U_B \geq 15$ V)

short-circuit-proof, switchable rising/falling



analogue output 0–10 V