



Operating Manual

Ultrasonic proximity switch with one switching output and IO-Link

- pico+15/F/A pico+15/WK/F/A
- pico+25/F/A pico+25/WK/F/A
- pico+35/F/A pico+35/WK/F/A
- pico+100/F/A pico+100/WK/F/A

Product description
The pico+ sensor offers a non-contact measurement of the distance to an object which must be positioned within the sensor's detection zone. The switching output is set conditional upon the adjusted detect distance. Via the Teach-in procedure, the detect distance and operating mode can be adjusted. Two LEDs indicate the state of the switching output.

IO-Link
The pico+ sensors are IO-Link-capable in accordance with IO-Link specification V1.1 and support Smart Sensor Profile like Digital Measuring Sensor.

Safety instructions

- Read the operating manual prior to start-up.
- Connection, installation and adjustments may only be carried out by qualified staff.
- No safety component in accordance with the EU Machine Directive, use in the area of personal and machine protection not permitted.

Use for intended purpose only
pico+ ultrasonic sensors are used for non-contact detection of objects.

Installation

- ➔ Mount the sensor at the place of fitting.
- ➔ Connect a connection cable to the M12 device plug, see Fig. 1.

microsonic notation	IO-Link notation	IO-Link Smart Sensor Profile	colour
1	+U _B	L+	brown
2	-	NC	white
3	-U _B	L-	blue
4	F	C/Q	black
5	Com	NC	grey

Fig. 1: Pin assignment with view onto sensor plug, IO-Link notation and colour coding of the microsonic connection cables.

Start-up

- ➔ Connect the power supply.
- ➔ Carry out sensor adjustment in accordance with Diagram 1.

Factory setting

- Switching point operation
- Switching output on NOC
- Detect distance at operating range
- Multi-function input »Com« set to »Teach-in« and »synchronisation«
- Filter at F01
- Filter strength at P00

Operating modes
Three operating modes are available for the switching output:

- **Operation with one switching point**
The switching output is set when the object falls below the set switching point.
- **Window mode**
The switching output is set when the object is outside the set window.

■ **Two-way reflective barrier**
The switching output is set when the object is between sensor and fixed reflector.

Synchronisation
If the assembly distance of multiple sensors falls below the values shown in Fig. 2, the internal synchronisation should be used. For this purpose set the switching outputs of all sensors in accordance with Diagram 1. Then switch-on the multi-function output »Com« to »Teach-in« and »synchronisation« (see »Further settings«, Diagram 1). Finally interconnect each pin 5 of the sensors to be synchronised.

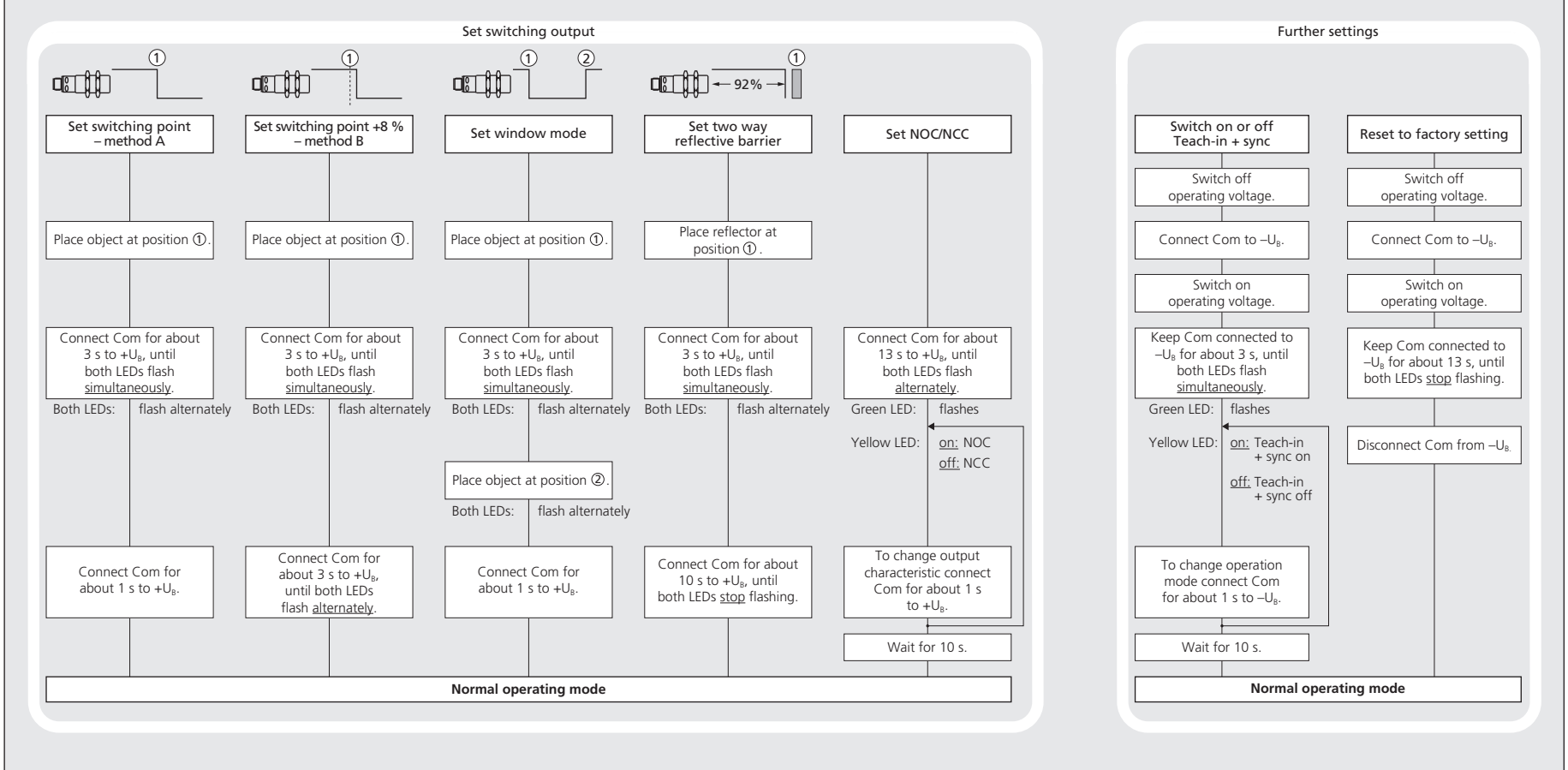
pico+15...	≥0.25 m	≥1.30 m
pico+25...	≥0.35 m	≥2.50 m
pico+35...	≥0.40 m	≥2.50 m
pico+100...	≥0.70 m	≥4.00 m

Fig. 2: Assembly distances.

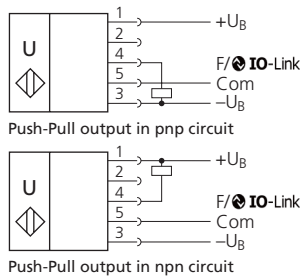
Maintenance
microsonic sensors are maintenance-free. In case of excess caked-on dirt we recommend cleaning the white sensor surface.

- Notes**
- The sensors of the pico+ family have a blind zone, within which a distance measurement is not possible.
 - The pico+ sensors are equipped with an internal temperature compensation. Due to the sensors self heating, the temperature compensation reaches its optimum working-point after approx. 120 seconds of operation.
 - In the normal operating mode, an illuminated yellow LED signals that the switching output is switched through.
 - In the »Two-way reflective barrier« operating mode, the object has to be within the range of 0 to 92 % of the set distance.

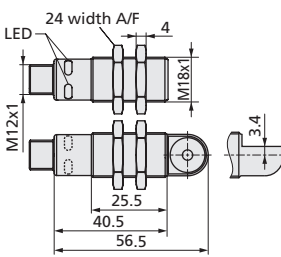
Diagram 1: Set sensor parameters via Teach-in procedure



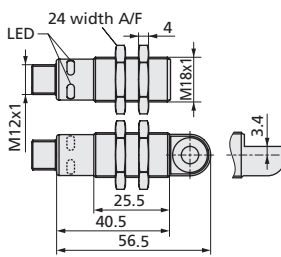
Technical data



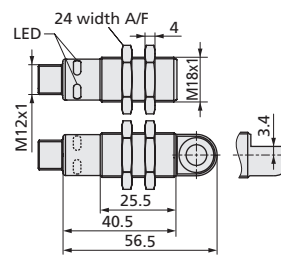
pico+15... D



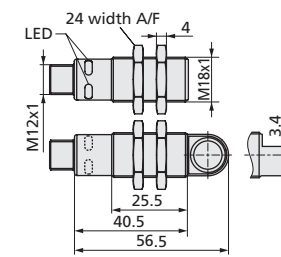
pico+25... D



pico+35... D



pico+100... D



blind zone
operating range
maximum range
angle of beam spread
transducer frequency
resolution
reproducibility

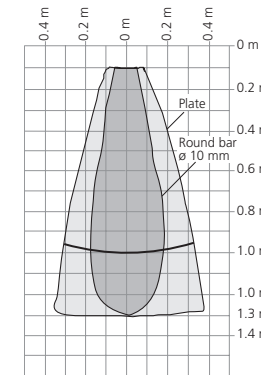
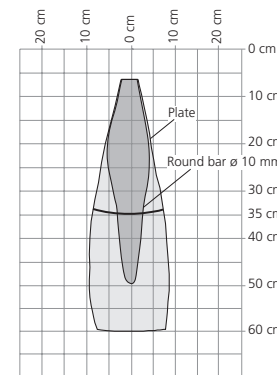
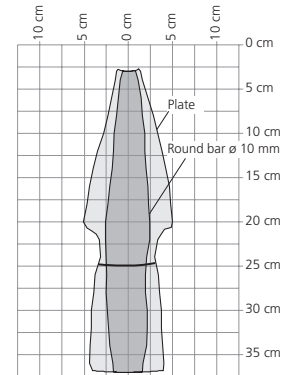
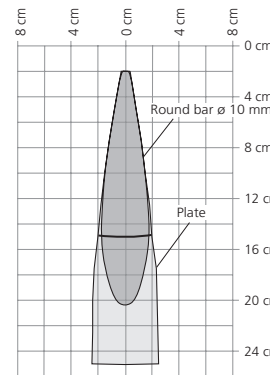
20 mm
150 mm
250 mm
see detection zone
380 kHz
0.1 mm
±0.15 %

30 mm
250 mm
350 mm
see detection zone
320 kHz
0.1 mm
±0.15 %

65 mm
350 mm
600 mm
see detection zone
400 kHz
0.1 mm
±0.15 %

120 mm
1,000 mm
1,300 mm
see detection zone
200 kHz
0.1 mm
±0.15 %

detection zones
for different objects:
The dark grey areas represent the zone where it is easy to recognise the normal reflector (round bar). This indicates the typical operating range of the sensors. The light grey areas represent the zone where a very large reflector – for instance a plate – can still be recognised. The requirement here is for an optimum alignment to the sensor. It is not possible to evaluate ultrasonic reflections outside this area.



accuracy
operating voltage
voltage ripple
no-load current consumption

±1 % (temperature drift internally compensated)
10 bis 30 V DC, reverse polarity protection (Class 2)
±10 %
<40 mA

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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

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

max. tightening torque of nuts
class of protection per EN 60529

15 Nm
IP 67

15 Nm
IP 67

15 Nm
IP 67

15 Nm
IP 67

type of connection
controls

5-pin M12 circular plug
Teach-in via pin 5 (Com)

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5-pin M12 circular plug
Teach-in via pin 5 (Com)

indicators
programmable

LED green, LED yellow
Teach-in, LinkControl, IO-Link

LED green, LED yellow
Teach-in, LinkControl, IO-Link

LED green, LED yellow
Teach-in, LinkControl, IO-Link

LED green, LED yellow
Teach-in, LinkControl, IO-Link

synchronisation
operating temperature

internal synchronisation up to 10 sensors
-25 to +70 °C

internal synchronisation up to 10 sensors
-25 to +70 °C

internal synchronisation up to 10 sensors
-25 to +70 °C

internal synchronisation up to 10 sensors
-25 to +70 °C

storage temperature
switching output

-40 to +85 °C
Push-Pull, $U_B=3\text{ V}$, $-U_B=+3\text{ V}$, $I_{max}=100\text{ mA}$
switchable NOC/NCC, short-circuit-proof

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switching hysteresis¹⁾
switching frequency²⁾

2 mm
25 Hz

3 mm
25 Hz

5 mm
12 Hz

20 mm
10 Hz

response time²⁾
time delay before availability

32 ms
<300 ms

32 ms
<300 ms

64 ms
<300 ms

80 ms
<300 ms

norm conformity

EN 60947-5-2

EN 60947-5-2

EN 60947-5-2

EN 60947-5-2

order no. directly radiating
weight

pico+15/F/A
30 g

pico+25/F/A
30 g

pico+35/F/A
30 g

pico+100/F/A
30 g

order no. angular head
weight

pico+15/WK/F/A
35 g

pico+25/WK/F/A
35 g

pico+35/WK/F/A
35 g

pico+100/WK/F/A
35 g

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

²⁾ With LinkControl and IO-Link, the selected filter setting influences the switching frequency and response time.

■ In the »Set switching point – method A« Teach-in procedure the actual distance to the object is taught to the sensor as the detect point. If the object moves towards the sensor (e.g. with level control) then the taught distance is the level at which the sensor has to switch the output.

■ If the object to be scanned moves into the detection area from the side, the »Set switching point +8 % – method B« Teach-in procedure should be used. In this way the switching distance is set 8 % further than the actual measured distance to the object. This ensures a reliable switching distance even if the height of the objects varies slightly.

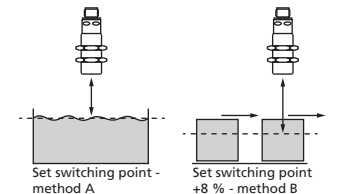


Fig. 3: Setting the switching point for different directions of movement of the object

■ The sensor can be reset to its factory setting (see »Further settings«).

■ Using the LinkControl adapter (optional accessory) and the LinkControl software for Windows®, all Teach-in and additional sensor parameter settings can be optionally adjusted.

■ The pico+ sensors have a push-pull switching output.

■ The latest IODD file and informations about start-up and configuration of pico+ sensors with IO-Link, you will find online at www.microsonic.de/en/pico+.



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

The proximity switches shall be used with a Listed (CYJ/7) cable/connector assembly rated minimum 32 Vdc, minimum 290 mA, in the final installation.

