



**Ultrasonic proximity switch with one switched output**

**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 switched 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 operation and the state of the switched output.

The pico+sensors are IO-Link-capable in accordance with IO-Link specification V1.0.

**Safety instructions**

- Read the operating instructions 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 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.

					colour
1	2	3	4	5	
+U <sub>B</sub>	-	-U <sub>B</sub>	F	Com	brown
					blue
					black
					white
					grey

Fig. 1: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cables

**Start-up**

- Connect the power supply.
- Carry out sensor adjustment in accordance with the diagram.

**Factory setting**

- Detect point operation
- Switched output on NOC
- Detect distance at operating range
- Multi-function input »Com« set to »Teach-in«

**Operating modes**

Three operating modes are available for the switched output:

- Operation with one detect point  
The switched output is set when the object falls below the set detect point.
- Window mode  
The switched output is set when the object is within the set window.
- Two-way reflective barrier  
The switched output is set when the object is between sensor and fixed reflector.

**Synchronization**

If under multiple sensor operation the assembly distance falls below the values shown in Fig. 2, the internal synchronization should be used. For this purpose set the switched outputs of all sensors in accordance with the diagram »Sensor adjustment with the Teach-in procedure«. Then change the multi-function output »Com« to »synchronization« (see »Further settings«). Finally interconnect each pin 5 of the sensors to be synchronized.

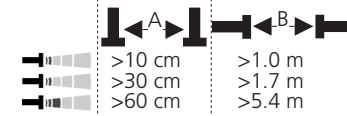


Fig.2: Assembly distances

**Maintenance**

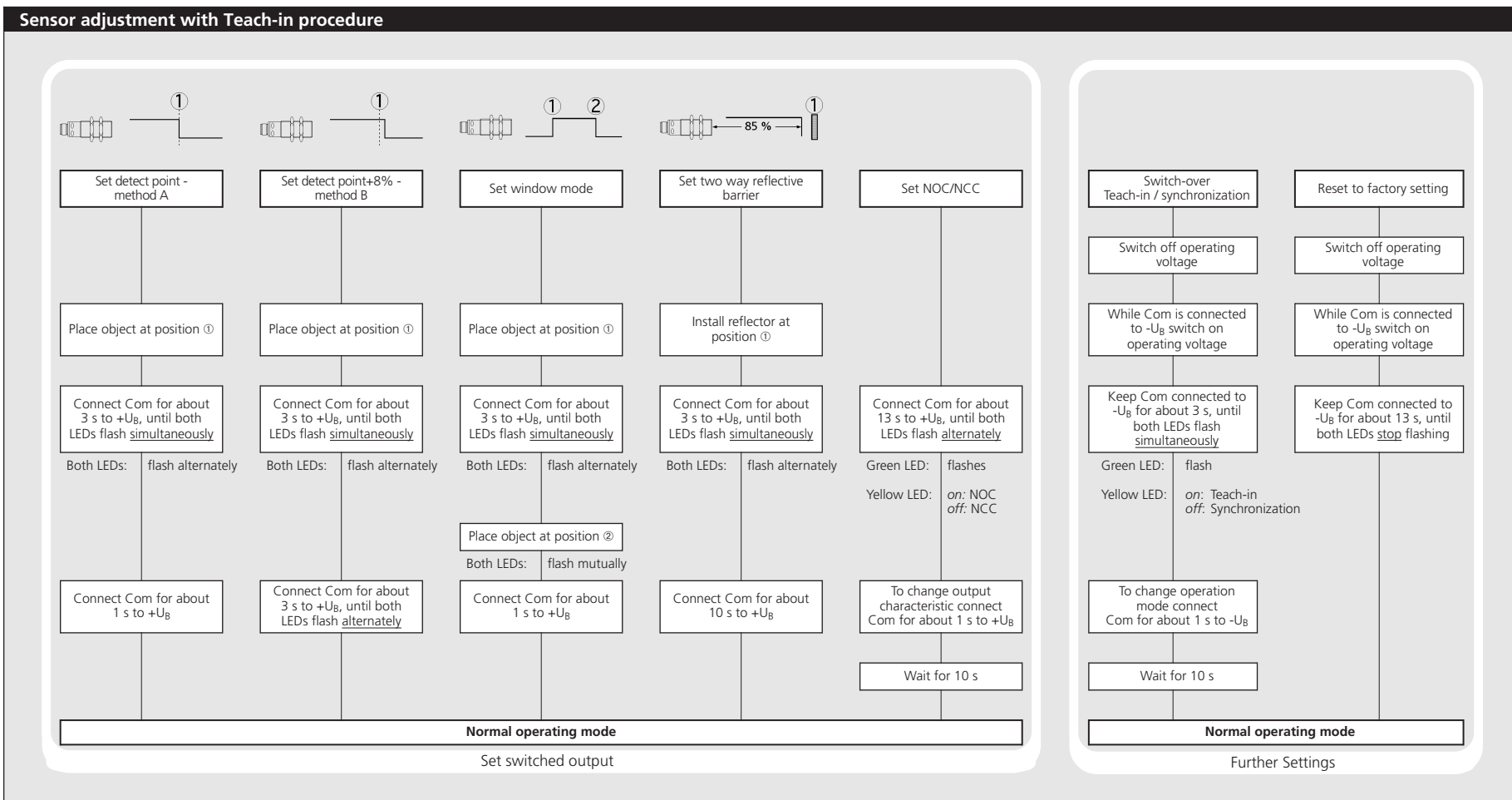
microsonic sensors are maintenance-free. In case of excess caked-on dirt we recommend cleaning the white sensor surface

**Notes**

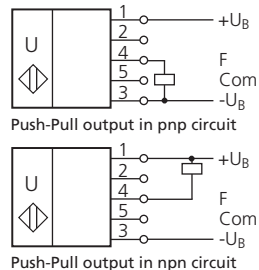
- The sensors of the pico+family have a blind zone, within which a distance measurement is not possible.
- The pico+sensors are equipped with an internal temperature compensation. Due to the sensor's self heating, the temperature compensation reaches its optimum working-point after approx. 20 minutes of operation.
- In the normal operating mode, an illuminated yellow LED signals that the switched output is switched through.
- The pico+sensors have a push-pull switched output.
- In the »Two-way reflective barrier« operating mode, the object has to be within the range of 0-85 % of the set distance.
- In the »Set detect 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

**Operating Instructions**

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



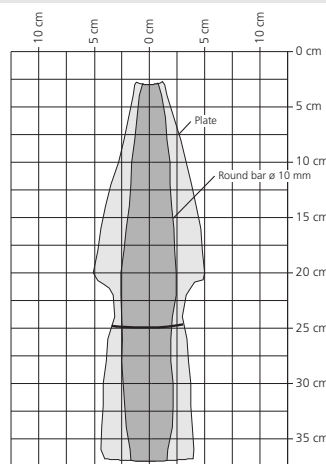
**Technical data**



**Blind zone** 30 mm  
**Operating range** 250 mm  
**Maximum range** 350 mm  
**Angle of beam spread** See detection zone  
**Transducer frequency** 320 kHz  
**Resolution, sampling rate** 0.20 mm  
**Reproducibility** ± 0.15 %

**Detection zones for different objects:**

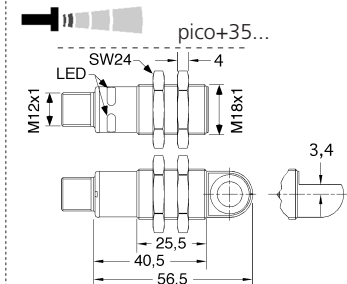
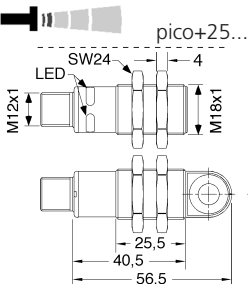
The dark grey areas represent the zone where it is easy to recognize the normal reflector (tube). This indicates the typical operating range of the sensors. The light grey areas represent the zone where a very large reflector - for instance a plate - can still be recognized. The requirement here is for an optimum alignment to the sensor. It is not possible to evaluate ultrasonic reflections outside this area.



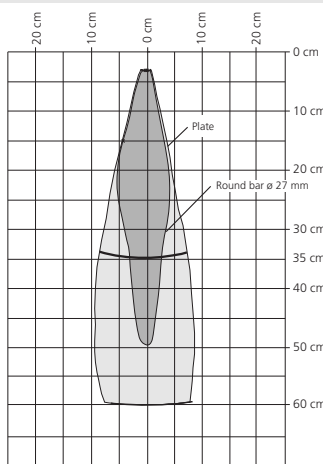
**Accuracy** < 2 % (Temperature drift internally compensated)  
**Operating voltage  $U_B$**  10 - 30 V DC, reverse polarity protection  
**Voltage ripple** ±10 %  
**No-load current consumption** < 40 mA  
**Housing** PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
**Max. tightening torque of nuts** 1 Nm  
**Class of protection per EN 60 529** IP 67  
**Type of connection** 5-pin M12 circular plug  
**Controls** Teach-in via pin 5 (Com)  
**Indicators** LED green (operation)  
 LED yellow (state of output)  
**Programmable** Teach-in, LinkControl  
**Synchronisation** Internal synchronisation up to 10 sensors  
**Operating temperature** -25°C to +70°C  
**Storage temperature** -40°C to +85°C  
**Switched output** Push-Pull,  $I_{max} = 100$  mA  
 switchable NOC/NCC, short-circuit-proof  
**Switching hysteresis** 1) 3 mm  
**Switching frequency** 1) 25 Hz  
**Response time** 1) 32 ms  
**Time delay before availability** 1) < 300 ms  
**Norm conformity** EN 60947-5-2

**Order no. directly radiating** pico+25/F  
**Weight** 15 g

**Order no. angular head** pico+25/WK/F  
**Weight** 20 g



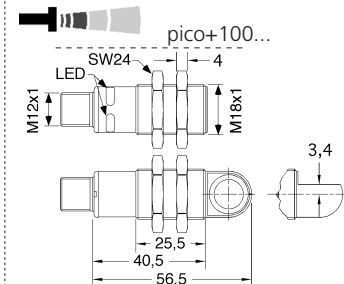
**Blind zone** 65 mm  
**Operating range** 350 mm  
**Maximum range** 600 mm  
**Angle of beam spread** See detection zone  
**Transducer frequency** 400 kHz  
**Resolution, sampling rate** 0.20 mm  
**Reproducibility** ± 0.15 %



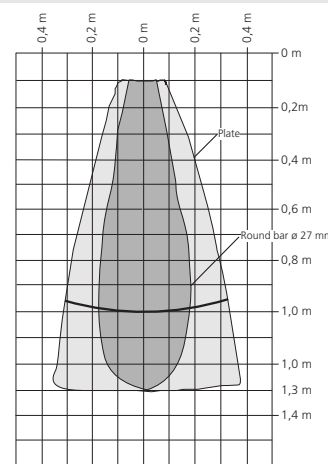
**Accuracy** < 2 % (Temperature drift internally compensated)  
**Operating voltage  $U_B$**  10 - 30 V DC, reverse polarity protection  
**Voltage ripple** ±10 %  
**No-load current consumption** < 40 mA  
**Housing** PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
**Max. tightening torque of nuts** 1 Nm  
**Class of protection per EN 60 529** IP 67  
**Type of connection** 5-pin M12 circular plug  
**Controls** Teach-in via pin 5 (Com)  
**Indicators** LED green (operation)  
 LED yellow (state of output)  
**Programmable** Teach-in, LinkControl  
**Synchronisation** Internal synchronisation up to 10 sensors  
**Operating temperature** -25°C to +70°C  
**Storage temperature** -40°C to +85°C  
**Switched output** Push-Pull,  $I_{max} = 100$  mA  
 switchable NOC/NCC, short-circuit-proof  
**Switching hysteresis** 1) 5 mm  
**Switching frequency** 1) 12 Hz  
**Response time** 1) 70 ms  
**Time delay before availability** 1) < 300 ms  
**Norm conformity** EN 60947-5-2

**Order no. directly radiating** pico+35/F  
**Weight** 15 g

**Order no. angular head** pico+35/WK/F  
**Weight** 20 g



**Blind zone** 120 mm  
**Operating range** 1,000 mm  
**Maximum range** 1,300 mm  
**Angle of beam spread** See detection zone  
**Transducer frequency** 200 kHz  
**Resolution, sampling rate** 0.20 mm  
**Reproducibility** ± 0.15 %



**Accuracy** < 2 % (Temperature drift internally compensated)  
**Operating voltage  $U_B$**  10 - 30 V DC, reverse polarity protection  
**Voltage ripple** ±10 %  
**No-load current consumption** < 40 mA  
**Housing** PBT; ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
**Max. tightening torque of nuts** 1 Nm  
**Class of protection per EN 60 529** IP 67  
**Type of connection** 5-pin M12 circular plug  
**Controls** Teach-in via pin 5 (Com)  
**Indicators** LED green (operation)  
 LED yellow (state of output)  
**Programmable** Teach-in, LinkControl  
**Synchronisation** Internal synchronisation up to 10 sensors  
**Operating temperature** -25°C to +70°C  
**Storage temperature** -40°C to +85°C  
**Switched output** Push-Pull,  $I_{max} = 100$  mA  
 switchable NOC/NCC, short-circuit-proof  
**Switching hysteresis** 1) 20 mm  
**Switching frequency** 1) 10 Hz  
**Response time** 1) 100 ms  
**Time delay before availability** 1) < 300 ms  
**Norm conformity** EN 60947-5-2

**Order no. directly radiating** pico+100/F  
**Weight** 15 g

**Order no. angular head** pico+100/WK/F  
**Weight** 20 g

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 detect 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.

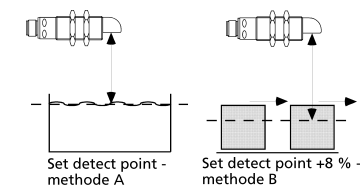


Fig. 4: Setting the detect point for different directions of movement of the object

- If synchronization is activated the Teach-in is disabled (see »Further settings«).
- 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 undertaken.
- The IO-Link conformity of the pico+sensors is not certified as of the moment of printing this operating instruction. For current information about IO-Link please contact the microsonic sales department.



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