microsonic pico+15-TF-I Ultrasonic Sensor with One Analogue Output User Manual

Contents

microsonic pico+15-TF-I Ultrasonic Sensor with One Analogue Output

Product Information

Ultrasonic Sensor with One Analogue Output

The Ultrasonic Sensor with One Analogue Output is available in four different models: pico+15/TF/I, pico+25/TF/I, pico+35/TF/I, and pico+100/TF/I. Additionally, there are four other models with different specifications: pico+15/TF/U, pico+25/TF/U, pico+35/TF/U, and pico+100/TF/U. The sensor is used for non-contact detection of objects and has a blind zone of 20mm with an operating range of 150mm to 250mm depending on the model. The transducer frequency is 380kHz and the resolution is 0.069mm. The pin assignment for the sensor plug is shown in Figure 1.

Technical Data

Model	Blind Zone	Operating Range	Maximum Range	Transducer Frequency	Resolution
pico+15	20mm	150mm	250mm	380kHz	0.069mm
pico+25	20mm	350mm	250mm	see detection zone	0.069 to 0.10mm
pico+35	20mm	see detection zone	see detection zone	320kHz	0.069 to 0.10mm
pico+100	20mm	0.4m	0m to 4m (first 5mm not recommended for mounting)	320kHz	0.069 to 0.10mm

Product Usage Instructions

1. Read the operating manual prior to start-up.
2. Connection, installation, and adjustments may only be carried out by qualified staff.
3. No safety component in accordance with the EU Machine Directive, use in the area of personal and machine

protection not permitted.

4. Use for intended purpose only.
5. For the pico+100/TF, do not use it for mounting the first 5mm of the M22 thread on the side of the transducer.
6. Set sensor parameters via the Teach-in procedure using Diagram 1:
    - Set analog output by placing the object at position 1 and connecting Com for about 3s to +UB until both LEDs flash simultaneously.
    - Set window limits by placing the object at position 2 and connecting Com for about 1s to +UB, then connecting Com for about 13s to +UB until both LEDs flash alternately.
    - Set rising/falling output characteristic curve by connecting Com for about 1s to +UB.
7. To change output characteristics, connect Com for about 1s to +UB.
8. Reset to factory setting by switching off the power supply, then switching on the power supply until both LEDs flash simultaneously. Green LED indicates Teach-in and Yellow LED indicates Sync.
9. The sensors of the Pico+ family have a blind zone. Within this zone, a distance measurement is not possible.
10. Every time the power supply is switched on, the sensor detects its actual operating temperature and transmits it to the internal temperature compensation. The adjusted value is taken over after 120 seconds.
11. In the normal operating mode, an illuminated yellow LED signals that the object is within the adjusted window limits.

Operating Manual

Ultrasonic sensor with one analog output

- pico+15/TF/I
- pico+15/TF/U
- pico+25/TF/I
- pico+25/TF/U
- pico+35/TF/I
- pico+35/TF/U
- pico+100/TF/I
- pico+100/TF/U

Product Description

The pico+ sensor offers a non-contact measurement of the distance to an object that has to be present within the sensor’s detection zone. Depending on the settings window limits, a distance-proportional analog signal is output. The ultrasonic transducer surface of the pico+ sensors is laminated with a PTFE film. The transducer itself is sealed against the housing by a joint ring. This composition permits measurement in up to 0,5 bar overpressure. The window limits of the analog output and its characteristic can be adjusted via the Teach-in procedure. Two LEDs indicate the operation and the state of the analog output.

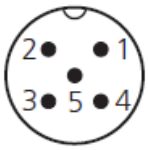
Safety instructions

- 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 the fitting. For the pico+100/TF, we recommend not to use for mounting the first 5 mm of the M22 thread on the side of the transducer.
- Connect a connection cable to the M12 device plug, see Fig. 1.

		**color**
1	$+U_B$	brown
3	$–U_B$	blue
4	–	black
2	I/U	white
5	Com	grey

Pin assignment with view onto sensor plug and color coding of the microscopic connection cables

Start-up

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

Factory setting

- The rising analog characteristic curve between the blind zone and the operating range.
- Multifunctional input »Com« set to »Teach-in«.

Synchronization
If the assembly distance falls below the values shown in Fig. 2, internal synchronization should be used. For this purpose set the switched outputs of all sensors in accordance to Diagram 1 at first. Then set the multifunctional output »Com« to »synchronization« (see »Further settings«, Diagram 1). Finally, connect pin 5 of the sensors plug of all sensors.
Maintenance
microscopic sensors are maintenance-free. In case of excess caked-on dirt, we recommend cleaning the white sensor surface.

		
pico+15…	[3]0.25 m	[3]1.30 m
pico+25…	[3]0.35 m	[3]2.50 m
pico+35…	[3]0.40 m	[3]2.50 m
pico+100…	[3]0.70 m	[3]4.00 m

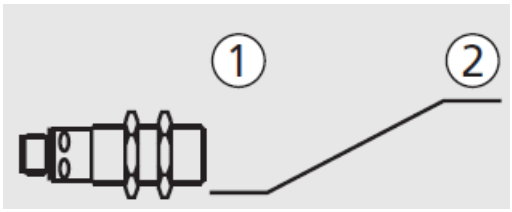
Assembly distances.

Notes

- The sensors of the Pico+ family have a blind zone. Within this zone, a distance measurement is not possible.
- Every time the power supply is switched on, the sensor detects its actual operating temperature and transmits it to the internal temperature compensation. The adjusted value is taken over after 120 seconds.
- In the normal operating mode, an illuminated yellow LED signals the object is within the adjusted window limits.
- If synchronization is activated the Teach-in is disabled (see »Further settings«, Diagram 1).
- The sensor can be reset to its factory setting (see »Further settings«, Diagram 1).
- Optionally all Teach-in and additional sensor parameter settings can be made using the LinkControl adapter (optional accessory) and the LinkControl software for Windows©.

Set sensor parameters via the Teach-in procedure

Set analog output

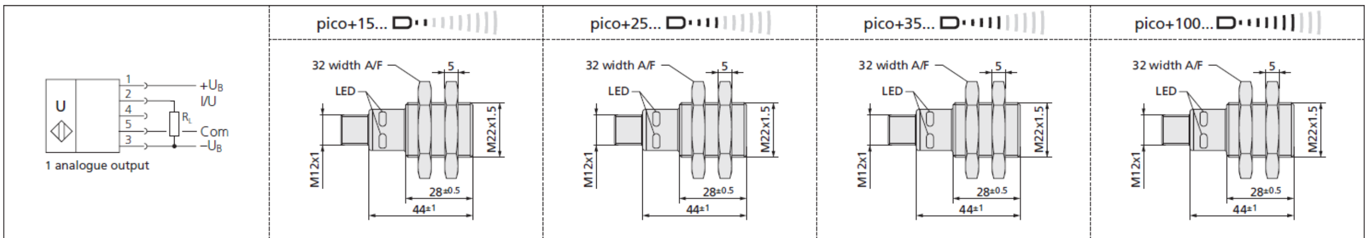


<table>
<tr><td colspan="2">Set window limits</td><td></td><td colspan="2">Set rising/falling output characteristic curve</td></tr>
<tr><td></td><td></td><td></td><td></td><td rowspan="3"></td></tr>
<tr><td colspan="2">Place the object at position 1 .</td><td colspan="2"></td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td colspan="2">Connect Com for about 3 s to +UB, until bot h LEDs flash <u>simultaneously</u>.</td><td></td><td colspan="2">Connect Com for about 13 s to +UB, until bo th LEDs flash <u>alternately</u>.</td></tr>
<tr><td>Both LEDs:</td><td>flash alternately</td><td></td><td>Green LED:
Yellow LED:</td><td rowspan="3">flashes
<u>on</u>: rising
<u>off</u>: falling characteristic curve</td></tr>
<tr><td colspan="2">Place the object at position 2 .</td><td colspan="2"></td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td colspan="2">Connect Com for about 1 s to +UB.</td><td></td><td colspan="2">To change output characteristic connect Co m for about 1 s to +UB.</td></tr>
<tr><td rowspan="3"></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2"></td><td colspan="2">Wait for about 10 s.</td></tr>
<tr><td colspan="2"></td><td></td></tr>
<tr><td colspan="5">Normal operating mode</td></tr>
</table>

Further settings

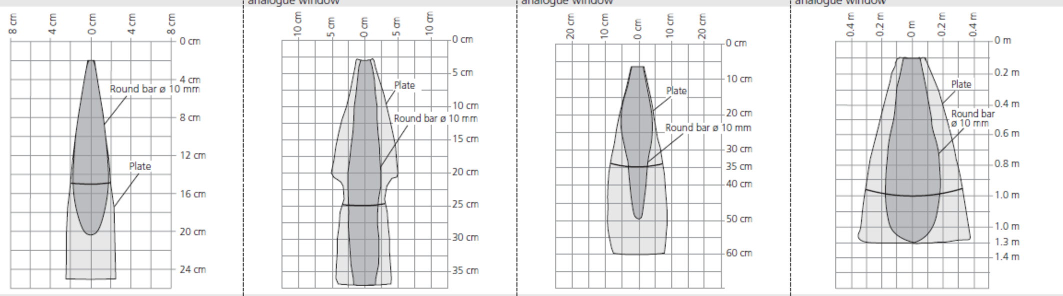
Switch Teach-in + sync			Reset to factory setting	
Switch off the power supply.			Switch off the power supply.	
Connect Com to –UB.			Connect Com to –UB.	
Switch on the power supply.			Switch on the power supply.	
Keep Com connected to –UB for about 3 s, until both LEDs flash <u>sim ultaneously</u>.			Keep Com connected to –UB for about 13 s, until both LEDs <u>stop</u> flas hing.	
Green LED: Yellow L ED:	flashes			
	<u>on</u>: Teach-in		Disconnect Com from –UB.	
	<u>off</u>: Sync			
To change operating mode connect Com for about 1 s to –UB.				
Wait for about 10 s.				
Normal operating mode				

Technical data



	pico+15...	pico+25...	pico+35...	pico+100...
Blind zone	20 mm	30 mm	70 mm	120 mm
Operating range	150 mm	250 mm	350 mm	1,000 mm
Maximum range	250 mm	350 mm	600 mm	1,300 mm
Angle of beam spread	see detection zone	see detection zone	see detection zone	see detection zone
Transducer frequency	380 kHz	320 kHz	400 kHz	200 kHz
resolution	0.069 mm	0.069 to 0.10 mm, depending on the analogue window	0.069 to 0.17 mm, depending on the analogue window	0.069 to 0.38 mm, depending on the analogue window

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 re-gognised. The requirement here is for an optimum alignment to the sensor. It is not possible to evaluate te ultrasonic reflections outside this area.



reproducibility	±0.15 %	±0.15 %	±0.15 %	±0.15 %
accuracy	±1 % (Temperature drift internal compensated)	±1 % (Temperature drift internal compensated)	±1 % (Temperature drift internal compensated)	±1 % (Temperature drift internal compensated)
no-load current consumption	<40 mA	<40 mA	<40 mA	<40 mA
operating voltage ripple	±10 %	±10 %	±10 %	±10 %
housing	plastic parts: PVDF, PBT; ultrasonic transducer: PTFE, FFKM	plastic parts: PVDF, PBT; ultrasonic transducer: PTFE, FFKM	plastic parts: PVDF, PBT; ultrasonic transducer: PTFE, FFKM	plastic parts: PVDF, PBT; ultrasonic transducer: PTFE, FFKM
ambient pressure	up to 0.5 bar over pressure	up to 0.5 bar over pressure	up to 0.5 bar over pressure	up to 0.5 bar over pressure
Weight	30 g	30 g	30 g	30 g
max. tightening torque of nuts	1 Nm	1 Nm	1 Nm	1 Nm
class of protection to EN 60529	IP 67	IP 67	IP 67	IP 67
norm conformity	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
type of connection	5-pin M12 initiator plug	5-pin M12 initiator plug	5-pin M12 initiator plug	5-pin M12 initiator plug
controls	Teach-in via pin 5 (Com)	Teach-in via pin 5 (Com)	Teach-in via pin 5 (Com)	Teach-in via pin 5 (Com)
indicators	LED green, LED yellow	LED green, LED yellow	LED green, LED yellow	LED green, LED yellow
programmable	Teach-in, LinkControl	Teach-in, LinkControl	Teach-in, LinkControl	Teach-in, LinkControl
synchronisation	internal synchronisation up to 10 sensors	internal synchronisation up to 10 sensors	internal synchronisation up to 10 sensors	internal synchronisation up to 10 sensors
operating temperature	–25 to +70 °C	–25 to +70 °C	–25 to +70 °C	–25 to +70 °C
storage temperature	–40 to +85 °C	–40 to +85 °C	–40 to +85 °C	–40 to +85 °C
response time [1]	32 ms	32 ms	64 ms	80 ms
time delay before availability [1]	<300 ms	<300 ms	<300 ms	<300 ms
analogue output 4 to 20 mA	$R_L \leq 500\ \Omega$, rising/falling characteristic	$R_L \leq 500\ \Omega$, rising/falling characteristic	$R_L \leq 500\ \Omega$, rising/falling characteristic	$R_L \leq 500\ \Omega$, rising/falling characteristic
operating voltage U_B	10 to 30 V DC for $R_L \leq 100\ \Omega$ 20 to 30 V DC for $R_L > 100\ \Omega$ terminal reverse polarity protected	10 to 30 V DC for $R_L \leq 100\ \Omega$ 20 to 30 V DC for $R_L > 100\ \Omega$ terminal reverse polarity protected	10 to 30 V DC for $R_L \leq 100\ \Omega$ 20 to 30 V DC for $R_L > 100\ \Omega$ terminal reverse polarity protected	10 to 30 V DC for $R_L \leq 100\ \Omega$ 20 to 30 V DC for $R_L > 100\ \Omega$ terminal reverse polarity protected
order no.	**pico+15/TF/I**	**pico+25/TF/I**	**pico+35/TF/I**	**pico+100/TF/I**
analogue output 0 bis 10 V	$R_L \geq 100\ k\Omega$, short circuit proof, rising/falling characteristic	$R_L \geq 100\ k\Omega$, short circuit proof, rising/falling characteristic	$R_L \geq 100\ k\Omega$, short circuit proof, rising/falling characteristic	$R_L \geq 100\ k\Omega$, short circuit proof, rising/falling characteristic
operating voltage U_B	15 to 30 V DC, terminal reverse polarity protected	15 to 30 V DC, terminal reverse polarity protected	15 to 30 V DC, terminal reverse polarity protected	15 to 30 V DC, terminal reverse polarity protected
order no.	**pico+15/TF/U**	**pico+25/TF/U**	**pico+35/TF/U**	**pico+100/TF/U**

[1] Can be programmed via LinkControl.

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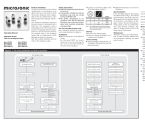
Documents / Resources

	microsonic pico+15-TF-I Ultrasonic Sensor with One Analogue Output [pdf] User Manual pico 15-TF-I Ultrasonic Sensor with One Analogue Output, pico 15-TF-I, Ultrasonic Sensor with One Analogue Output, One Analogue Output, Analogue Output