pico+TF

The pico+TF sensors are ideal for the non-contact fill level measurement of chemically aggressive liquids or granules.

HIGHLIGHTS

- PTFE membrane › for protection against aggressive media
- M22 sleeve in PVDF
- IO-Link interface › for support of new industry standard
- Automatic synchronisation and multiplex operation › for simultaneous operation of up to ten sensors in close quarters
- 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 25 mm to 1,300 mm
- microsonic Teach-in on pin 5
- 0.069 mm resolution
- 10–30 V operating voltage
- LinkControl › for configuration of sensors from a PC

IO-Link integrated

Also see the chapter "Function and advantages"

The pico+TF ultrasonic sensors

The compact dimensions of the pico+TF sensors makes them ideal for fill-level measurement in housings of restricted dimensions. The ultrasonic transformer is protected against aggressive media by a PTFE film. The exterior PVDF coating with its M22 x 1.5 external thread seals the ultrasonic transformer from the sensor housing. The M22 sensors detect in a contactless fashion and are reliable within a measuring range of 25 mm to 1,300 mm. The ultrasonic sensor is the best choice for non-contact fill level measurement with chemically aggressive liquids or granules. A typical application for these sensor line is the fill level monitoring of aggressive paints and inks such as those used in the digital printing sector. These inks often contain ketone. In addition to the high chemical resistance of the sensor, its size makes it especially suited to use in restricted spaces. Regular filling and emptying of the tank can produce wave motions in the tank system, which can be compensated using the internal filter setting.

For the pico+TF 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

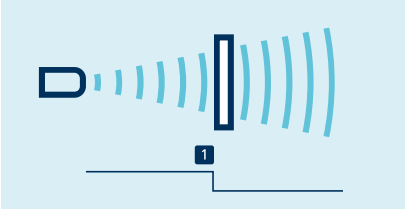
Sensors with switching output have three operating modes:

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

The pico+TF ultrasonic sensor continuously detects the fill level of liquids and granules

Teach-in of a single switching point

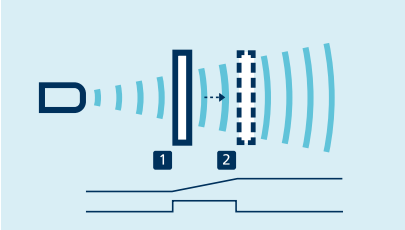
- Place object to be detected at the desired distance 1.
- Apply $+U_B$ to pin 5 for about 3 seconds.
- Then apply $+U_B$ to pin 5 again for about 1 second.



Teach-in of a switching point

For configuration of a window

- Place object at the near edge of the window 1.
- Apply $+U_B$ to pin 5 for about 3 seconds.
- Then move the object to the far edge of the window 2.
- Then apply $+U_B$ to pin 5 again for about 1 seconds.



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

NCC/NOC

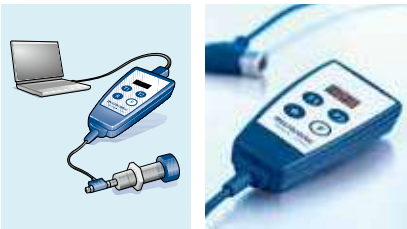
and rising/falling analogue characteristic curve can also be set via pin 5.

One green and one yellow LED

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

LinkControl

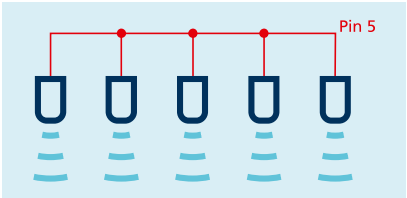
optionally permits the extensive parameterisation of pico+TF level sensors. The LCA-2 LinkControl adapter, which is available as an accessory, can be used to connect pico+TF sensors to the PC.



Sensor connected to the PC via LCA-2 for programming

Easy to synchronise

A number of pico+TF level 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 one to another with pin 5.

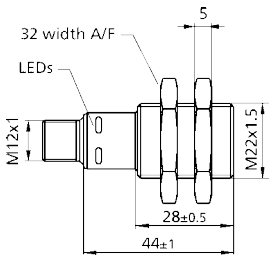


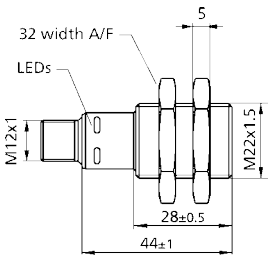
Synchronisation via pin 5

IO-Link integrated

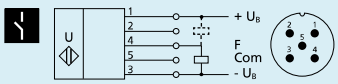
in version 1.1 for sensors with switching output.

	pico+15/TF	pico+25/TF
	0.15 m	0.25 m
measuring range	**20 – 250 mm**	**30 – 350 mm**

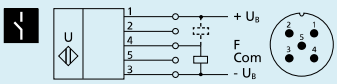




blind zone	20 mm	30 mm
operating range	150 mm	250 mm
maximum range	250 mm	350 mm
angle of beam spread	please see ⓘ	please see ⓘ
transducer frequency	380 kHz	320 kHz
resolution/sampling rate	0.1 mm	0.1 mm
reproducibility	± 0.15 %	± 0.15 %
accuracy	± 1 % (temperature drift internally compensated)	± 1 % (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	PVDF, PBT;	PVDF, PBT;
	ultrasonic transducer: coated with PTFE film,	ultrasonic transducer: coated with PTFE film,
	FFKM O-ring	FFKM O-ring
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	• Teach-in via com input on pin 5	• Teach-in via com input on pin 5
	• LCA-2 with LinkControl	• LCA-2 with LinkControl
	• IO-Link	• 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/TF/F**	**pico+25/TF/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



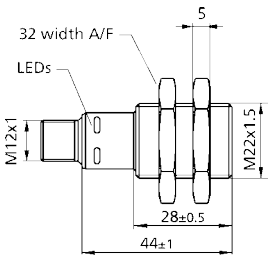
1 Push-Pull switching output

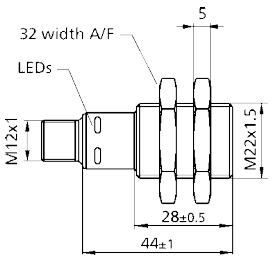


1 Push-Pull switching output

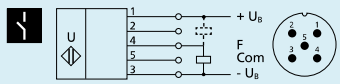
[1)] Can be programmed with LinkControl and IO-Link.

pico+35/TF	pico+100/TF	
0.35 m	1.0 m	
70 – 600 mm	**120 – 1,300 mm**	

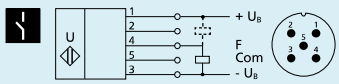




70 mm	120 mm	
350 mm	1,000 mm	
600 mm	1,300 mm	
please see ⓘ	please see ⓘ	
400 kHz	200 kHz	
0.1 mm	0.1 mm	
± 0.15 %	± 0.15 %	
± 1 % (temperature drift internally compensated)	± 1 % (temperature drift internally compensated)	
10 V to 30 V DC, reverse polarity protection	10 V to 30 V DC, reverse polarity protection	
≤ 40 mA	≤ 40 mA	
PVDF, PBT;	PVDF, PBT;	
ultrasonic transducer: coated with PTFE film,	ultrasonic transducer: coated with PTFE film,	
FFKM O-ring	FFKM O-ring	
IP 67	IP 67	
5-pin M12 initiator plug	5-pin M12 initiator plug	
com input (pin 5)	com input (pin 5)	
• Teach-in via com input on pin 5	• Teach-in via com input on pin 5	
• LCA-2 with LinkControl	• LCA-2 with LinkControl	
• IO-Link	• IO-Link	
LED green: working, LED yellow: switch status	LED green: working, LED yellow: switch status	
V 1.1	V 1.1	
yes	yes	
16 ms	20.4 ms	
-	-	
-25°C to +70°C	-25°C to +70°C	
-40°C to +85°C	-40°C to +85°C	
30 g	30 g	
5 mm	20 mm	
12 Hz	10 Hz	
64 ms	80 ms	
< 300 ms	< 300 ms	
pico+35/TF/F	**pico+100/TF/F**	
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	

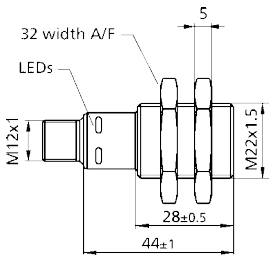


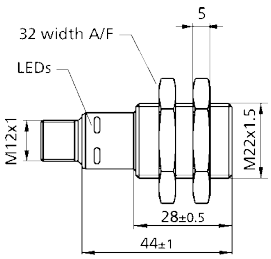
1 Push-Pull switching output



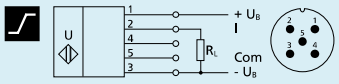
1 Push-Pull switching output

	pico+15/TF	pico+25/TF
	0.15 m	0.25 m
measuring range	**20–250 mm**	**30–350 mm**

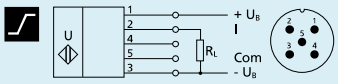




blind zone	20 mm	30 mm
operating range	150 mm	250 mm
maximum range	250 mm	350 mm
angle of beam spread	please see ⓘ	please see ⓘ
transducer frequency	380 kHz	320 kHz
resolution/sampling rate	0.069 mm	0.069 mm to 0.1 mm, depending on the analogue window
reproducibility	± 0.15 %	± 0.15 %
accuracy	± 1 % (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	PVDF, PBT; ultrasonic transducer: coated with PTFE film, FFKM O-ring, epoxy resin with glass content	brass sleeve, nickel-plated, plastic parts: PBT; ultrasonic transducer: coated with PTFE film, FFKM O-ring, 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	• Teach-in via com input on pin 5 • LCA-2 with LinkControl	• 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	**pico+15/TF/I**	**pico+25/TF/I**
analogue output	current output 4–20 mA switchable rising/falling	current output 4–20 mA switchable rising/falling

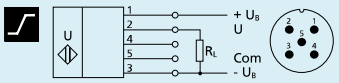


analogue output 4–20 mA

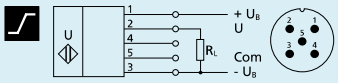


analogue output 4–20 mA

order number	**pico+15/TF/U**	**pico+25/TF/U**
analogue output	voltage output 0–10 V (at $U_B \geq 15$ V) short-circuit-proof, switchable rising/falling	voltage output 0–10 V (at $U_B \geq 15$ V) short-circuit-proof, switchable rising/falling

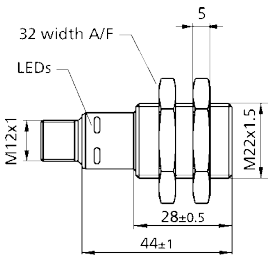


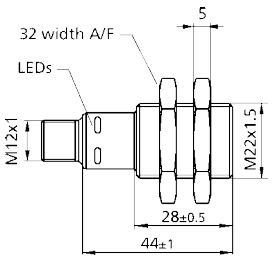
analogue output 0–10 V



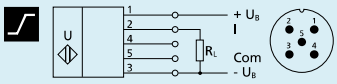
analogue output 0–10 V

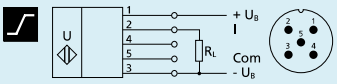
pico+35/TF	pico+100/TF	
0.35 m	1.0 m	
70–600 mm	**120–1,300 mm**	





70 mm	120 mm	
350 mm	1,000 mm	
600 mm	1,300 mm	
please see ⓘ	please see ⓘ	
400 kHz	200 kHz	
0.069 mm to 0.17 mm, depending on	0.069 mm to 0.38 mm, depending on	
the analogue window	the analogue window	
± 0.15 %	± 0.15 %	
± 1 % (temperature drift internally compensated)	± 1 % (temperature drift internally compensated)	
10 V to 30 V DC, reverse polarity protection	10 V to 30 V DC, reverse polarity protection	
≤ 40 mA	≤ 40 mA	
brass sleeve, nickel-plated, plastic parts: PBT;	brass sleeve, nickel-plated, plastic parts: PBT;	
ultrasonic transducer: coated with PTFE film, FFKM	ultrasonic transducer: coated with PTFE film, FFKM	
O-ring, epoxy resin with glass content	O-ring, epoxy resin with glass content	
IP 67	IP 67	
5-pin M12 initiator plug	5-pin M12 initiator plug	
com input (pin 5)	com input (pin 5)	
• Teach-in via com input on pin 5	• Teach-in via com input on pin 5	
• LCA-2 with LinkControl	• LCA-2 with LinkControl	
LED green: working, LED yellow: object in the window	LED green: working, LED yellow: object in the window	
-25°C to +70°C	-25°C to +70°C	
-40°C to +85°C	-40°C to +85°C	
30 g	30 g	
64 ms	80 ms	
< 300 ms	< 300 ms	
pico+35/TF/I	**pico+100/TF/I**	
current output 4–20 mA	current output 4–20 mA	
switchable rising/falling	switchable rising/falling	

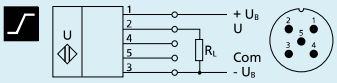


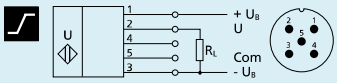


analogue output 4–20 mA

analogue output 4–20 mA

pico+35/TF/U	**pico+100/TF/U**	
voltage output 0–10 V (at $U_B \geq 15$ V)	voltage output 0–10 V (at $U_B \geq 15$ V)	
short-circuit-proof, switchable rising/falling	short-circuit-proof, switchable rising/falling	





analogue output 0–10 V

analogue output 0–10 V