

Ultrasonic level sensor TS-UNS

Ultrasonic level sensor for continuous level measurement
Measuring range from 0,1 ... 1 m up to 0,5 ... 20 m



Description

- PVDF Housing, IP 65
- Measuring range from 0,1 ... 1 m up to 0,5 ... 20 m
- 4 ... 20 mA or 0 ... 10 V DC analog output, RS-485 line with Modbus RTU, PNP switching transistor with open collector or two-state current switch (4 mA / 20 mA)
- Optional available in design
- Ambient temperature range -30 ... +60 or +70 °C
- Sensor configuration via two setting buttons, by magnetic pen or preconfigured
- Status indication via two LEDs directly on the sensor

The Ultrasonic level sensor **TS-UNS** is designed for the continuous measurement of liquids or solid materials, such as liquids in tanks or bulk material in open or closed storage facilities. The measurement method is unaffected by the product properties, works contact-free and is almost maintenance-free.

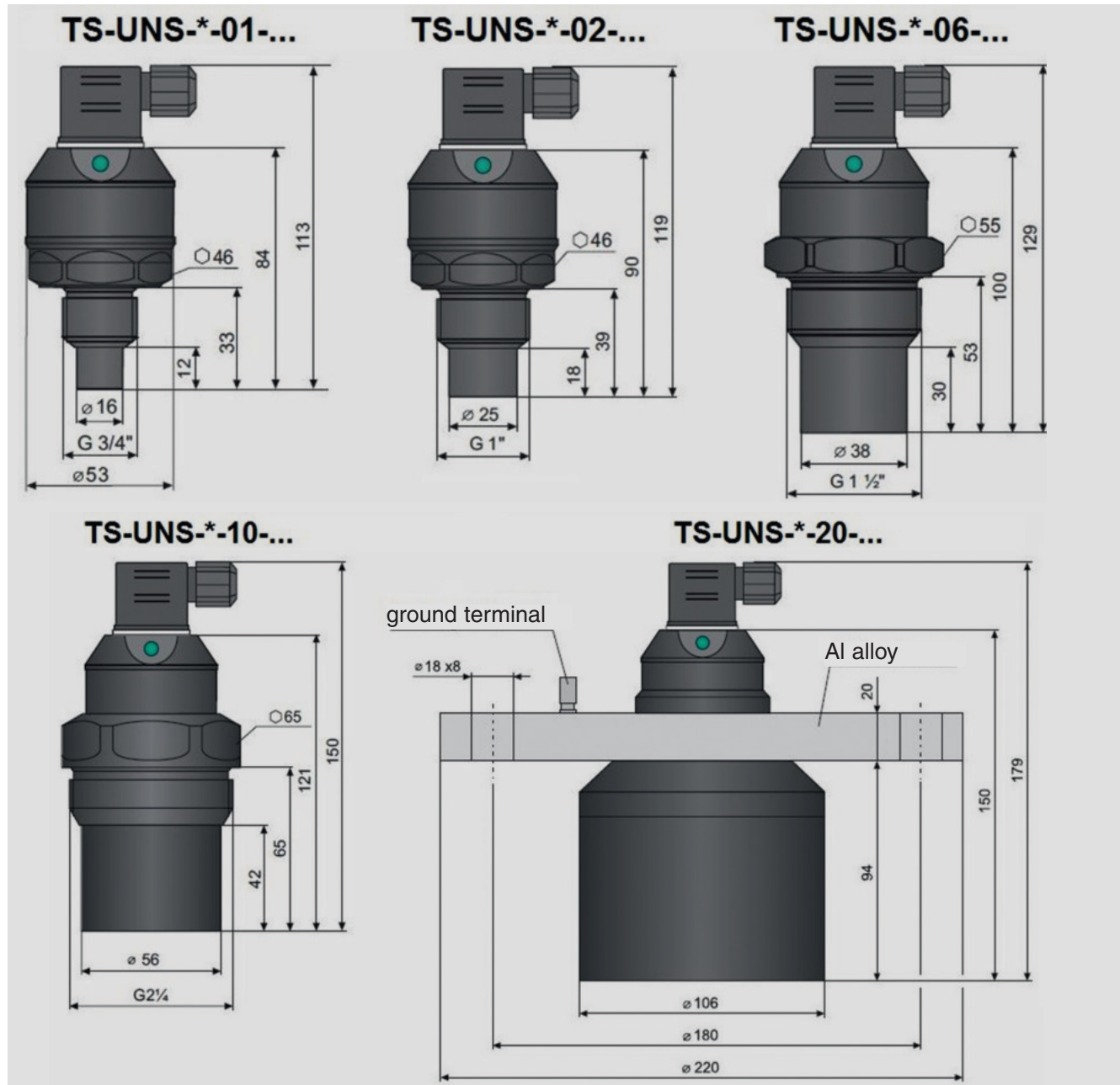
The **TS-UNS** sensor transmits ultrasonic pulses which will be reflected by the surface of the filling material. The reflections are received by the electro-acoustic transducer of the sensor. The signal run time is proportional to the filling level. Therefore the **TS-UNS** sensor can calculate the filling level by using the transit time method.

Technical data	TS-UNS*-01-...	TS-UNS*-02-...	TS-UNS*-06-...	TS-UNS*-10-...	TS-UNS*-20-...
Measuring range (min. and max.)	0,1 ... 1 m	0,2 ... 2 m	0,2 ... 6 m	0,4 ... 10 m	0,5 ... 20 m
Output signal	PNP switching transistor with open collector or two-state current switch (4 mA / 20 mA) Choice of: analog output 4 ... 20 mA or 0 ... 10 V DC, RS-485 line with Modbus RTU,				
Process connection	G 3/4" thread	G 1" thread	G 1 1/2" thread	G 2 1/4" thread	Al-alloy flange
Electrical connection	Choice of: MVS/A connector, M12x1 connector, cable gland (with protective hose)				
Sensor configuration	Choice of: 2 setting buttons +2 LEDs, via magnetic pen (MP8) +2 LEDs, preconfigured				
Current consumption	Depending on the selected output signal, max. 22 mA				
Resolution	< 1 mm	< 1 mm	< 1 mm	< 1 mm	< 1 mm
Operating voltage U_B	standard design				
	18 ... 36 V DC	18 ... 36 V DC	18 ... 36 V DC	18 ... 36 V DC	18 ... 36 V DC
	EX-design (4 ... 20 mA only)				
	18 ... 30 V DC	18 ... 30 V DC	18 ... 30 V DC	18 ... 30 V DC	18 ... 30 V DC
Limit operating parameters for EX-design	$U_i = 30$ V DC; $I_i = 132$ mA; $P_i = 0,99$ W; $C_i = 370$ nF; $L_i = 0,9$ mH				
Max. operating overpressure	1 bar	1 bar	1 bar	1 bar	1 bar
Total measurement error	0,3 % (0,1-0,2 m) FS 0,2 % (0,2-1 m) FS	0,15 % FS	0,15 % FS	0,2 % FS	0,2 % FS
Ambient temperature range	-30 ... +70 °C	-30 ... +70 °C	-30 ... +70 °C	-30 ... +60 °C	-30 ... +60 °C
Temperature error	Max. 0,04 % / K	Max. 0,04 % / K	Max. 0,04 % / K	Max. 0,04 % / K	Max. 0,04 % / K
Housing material	PVDF	PVDF	PVDF	PVDF	PVDF
Protection class	IP65	IP65	IP65	IP65	IP65
Beamwidth (-3 dB)	10°	10°	14°	10°	12°
Measuring period	0,5 s	0,5 s	1,2 s	1,2 s	5,0 s
Averaging	4 measurements (other number of measurements for averaging upon request)				
Weight	~ 200 g	~ 200 g	~ 250 g	~ 650 g	~ 2800 g

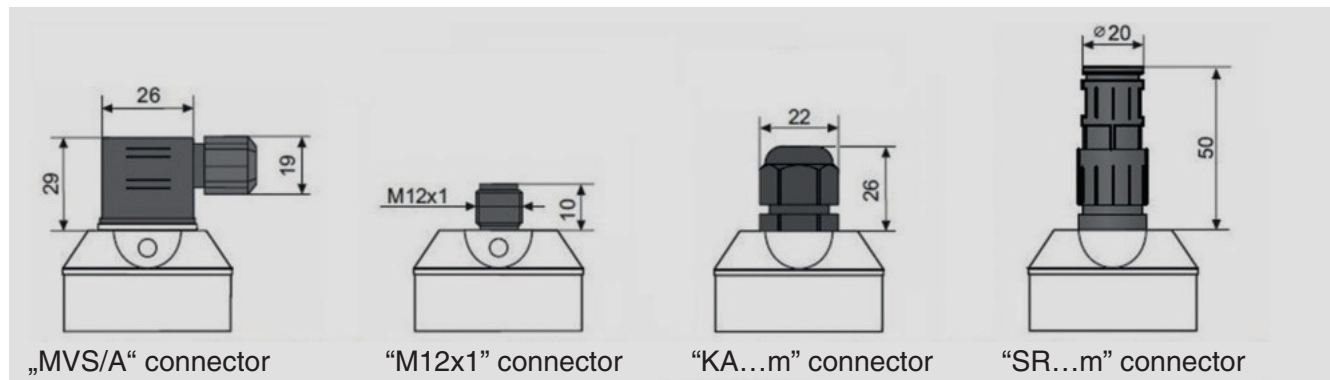
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Dimensional drawing

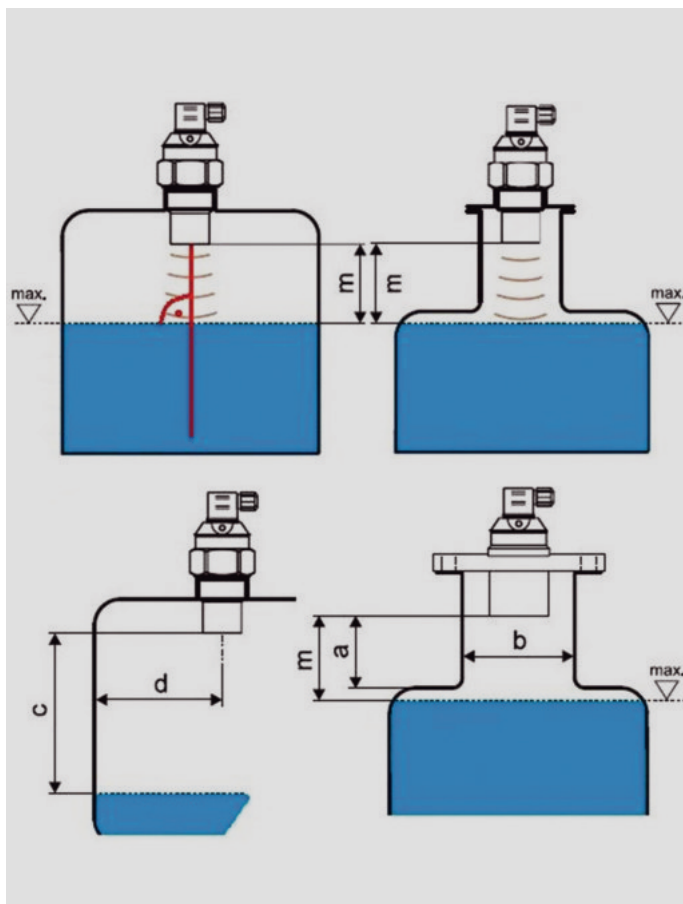


Connector variants



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Mounting recommendation

The front of the TS-UNS ultrasonic level meter must run parallel to the measured level.

Objects inside the tank (e. g. mixers, ladders, etc.) or foam formation may have negative effects on the measurement results.

m = blind zone of ultrasonic sensors (min. necessary measuring distance)

a = neck height

b = neck width

c = total measuring range of sensor (see table below)

d = min. necessary distance from tank wall

Sensortype	a / b	c	d	m
TS-UNS*-01-...	a < 3b b > 100 mm	1.000 mm	d > 1/12 c (min. 200 mm)	100 mm
TS-UNS*-02-...	a < 3b b > 100 mm	2.000 mm	d > 1/12 c (min. 200 mm)	200 mm
TS-UNS*-06-...	a < 3b b > 100 mm	6.000 mm	d > 1/8 c (min. 200 mm)	200 mm
TS-UNS*-10-...	a < 1,5 b b > 100 mm	10.000 mm	d > 1/12 c (min. 200 mm)	400 mm
TS-UNS*-20-...	a < 1,5 b b > 150 mm	20.000 mm	d > 1/10 c (min. 200 mm)	500 mm

Type designation codes

Type TS-UNS - **1** **2** **3** **4** **5** **6**
Type TS-UNS - **Ex** - **02** - **I** - **T** - **G** - **M12x1**

1. Design

Ex = Ex-design for explosive areas (4 ... 20 mA analog output only)
N = standard design for non explosive areas

(TS-UNS-Ex-...)
(TS-UNS-N-...)

2. Measuring range

01 = 0,1 ... 1 m
02 = 0,2 ... 2 m
06 = 0,2 ... 6 m
10 = 0,4 ... 10 m
20 = 0,5 ... 20 m

(TS-UNS*-01-...)
(TS-UNS*-02-...)
(TS-UNS*-06-...)
(TS-UNS*-10-...)
(TS-UNS*-20-...)

3. Output signal:

I = 4 ... 20 mA analog output
U = 0 ... 10 V analog output
M = RS-485 line with Modbus RTU
P = PNP switching transistor with open collector
S = two-state current switch (4 mA / 20 mA)

(TS-UNS*-**-I...)
(TS-UNS*-**-U...)
(TS-UNS*-**-M...)
(TS-UNS*-**-P...)
(TS-UNS*-**-S...)

4. Sensor configuration

T = 2 setting buttons and 2 LED status indicators
M = via magnetic pen (MP8) and 2 LED status indicators
K = preconfigured, minimum and maximum level or switching points need to be defined in advance and cannot be changed

(TS-UNS*-**-*T...)
(TS-UNS*-**-*M...)
(TS-UNS*-**-*K...)

5. Process connection

G = thread
F = flange

(TS-UNS*-**-*G...)
(TS-UNS*-**-*F...)

6. Electrical connection

MVS/A = MVS/A connector acc. to DIN EN 175301-803
M12x1 = M12x1 (S 763-4) connector
KA...m = cable gland + length of cable in m
SR...m = cable gland for protective hose + length of cable in m

(TS-UNS*-**-*MVS/A)
(TS-UNS*-**-*M12x1)
(TS-UNS*-**-*KA...m)
(TS-UNS*-**-*SR...m)