MicroTREK

MICROWAVE LEVEL TRANSMITTERS

2-wire

- **Most advanced method to measure the level of liquids and solids**
- **Measurement is independent of dielectric, temperature, pressure and density variations**
- **Turbulent product surface, dust, vapour and foam have no effect on results**
- **Length easy to modify without calibration**
- **Tight accuracy, repeatability and resolution**
- **Suitable to all tank forms**
- **Measuring range up to 24 m**
- **Medium temperature –50 °C … +600 °C**
- **Pressure up to 40 bar**
- **Different probe types and materials**
- **Optional digital indicator**

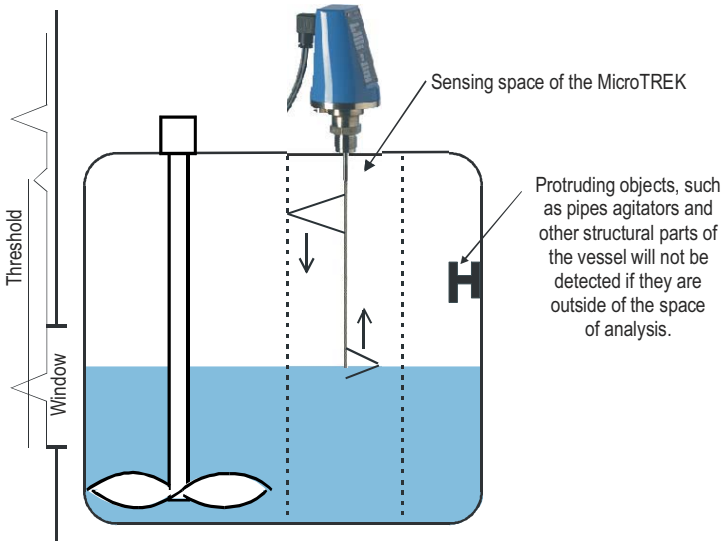
ABOUT THE MICROTREK

MicroTREK level gauge operates on the well known TDR (Time Domain Reflectometry) principle which is commonly used as a discontinuity test of cables.

Micropulses are sent along a probe guide at the velocity of light. As soon as the pulse reaches the product surface, it reflects back to the electronics. Since the velocity of light is a uniform fixed constant in air or gases, the MicroTREK does not require any calibration, commissioning or maintenance.

Distance is directly proportional to the flight time of the pulse divided by 2.

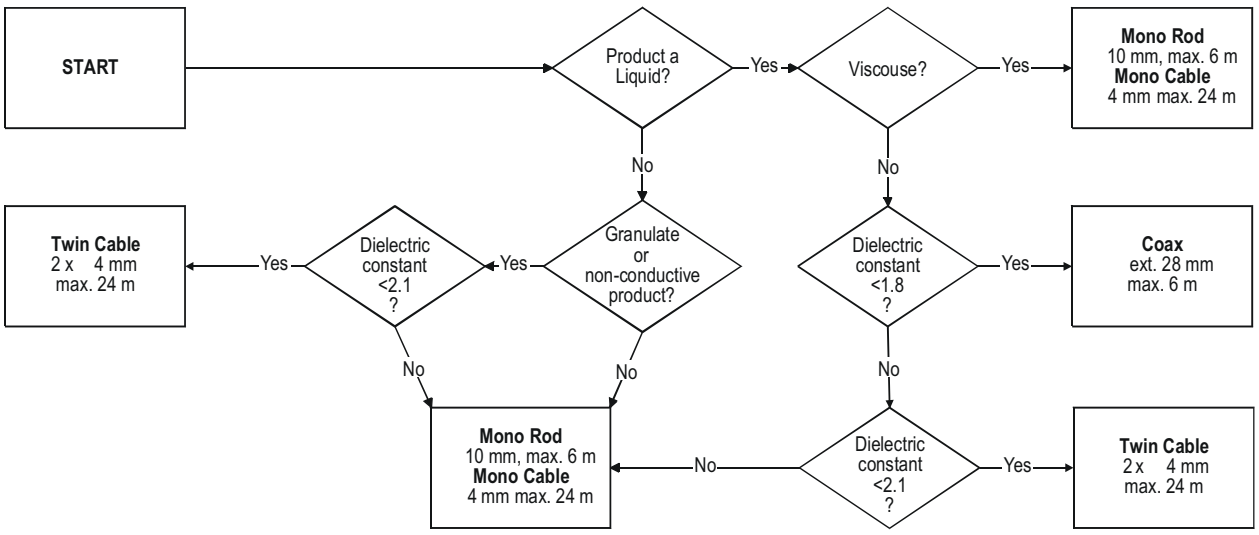
The TDR technology is unaffected by the properties of the medium as well as those of the space above it.



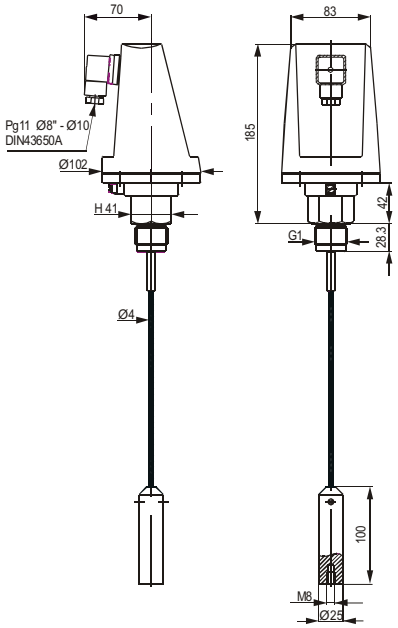
TECHNICAL DATA (2-WIRE TDR INSTRUMENT)

TYPE		MONO-ROD	MONO-CABLE	TWIN CABLE	COAXIAL
Range m/ feet		≤ 6 / 19.7	≤ 24 / 18.7	≤ 24 / 18.7	≤ 6 / 19.7
Dead zone (ε_r = 80)	Top m/feet (A1)	0.40 / 1.3	0.40 / 0.98	0.25 / 0.49	0 / 0
	Bottom m/feet (A2+D)	0.20 / 3.9	0.20 / 3.9 + length of the fastening gravity weight	0.10 / 3.9 + length of the fastening gravity weight	0.10/ 3.9
Reference conditions for accuracy		Highly reflecting product (e.g. water), calm surface, mounted at least 0.3 m/ 1.18 feet away from the vessel wall, +20 °C (+68 °F), 1013 mbar abs. (14.5 psig), 65% rel. humidity			
Error of measurement	4… 20 mA	± 0.01% related to the measured value			
	for liquids	± 15 mm (0.05 ft) for L ≤ 15 m (50 ft) sensor length or ± 0.1% of measured value (or 0.05% on special request) for L > 15 m (50 ft) sensor length			
	for solids	± 20 mm (0,07 ft) or ± 5mm (0,02 ft) on special request			
Temperature drift (HART, Current)		0.01% /K, 0.5 µA / K			
Repeatability / Hysteresis		± 2 mm / None			
Output		Analogue: 4 … 20 mA and digital communication: HART (Fault indication: 22 mA)			
Power supply		18 … 35 V DC (< 28 V DC with the Ex version)			
Temperatures	Process	–50 °C …+ 600 °C			
	Flange	–30 °C …+ 90 °C up to 200 °C on special request (up to 150 °C for Ex)			
	Ambient	–30 °C …+ 55 °C			
Pressure		maximum 16 bar (1.6 MPa), 40 bar (4.0 MPa) on special request			
Dielectric constant		$\varepsilon_r \geq$ 2.3		$\varepsilon_r \geq$ 1.8	$\varepsilon_r \geq$ 1.5
Electrical connections	Wire cross section:	maximum 1.5 mm²			
	Conduit:	Pg11 (cable gland for cable with 8 … 10 mm) or M 16 x 1.5 junction box (cable gland for cable with 3.5 … 8 mm)			
Probe and coating material		∅ 10 mm AISI 316L, Hastelloy, PVC, PVDF	∅ 4 mm, ∅ 8 mm AISI 316, 316L, Hastelloy, FEP	∅ 4 mm AISI 316, 316L, Hastelloy, FEP	∅ 28 mm AISI 316L, Hastelloy
Max. tensile load		1 t	1 t (for ∅ 4 mm) 3,5 t (for ∅ 8 mm)	1 t	-
Minimal process connection		DN50 PN25/40 2" ANSI 150 lbs 1" G, 1" NPT	DN50 PN25/40 2" ANSI 150 lbs 1" G, 1" NPT for ∅ 4 mm 1"½ G, 1½" NPT for ∅ 8 mm	DN50 PN25/40 2" ANSI 150 lbs 2" G, 2" NPT	DN50 PN25/40 2" ANSI 150 lbs 1" G, 1" NPT
Housing material / mass		Aluminium, paint coated / 2 kg without probe			
Gaskets / displacer		Viton, optional Kalrez 4079 / FEP, others on special order			
Ex approvals		ATEX 1G EEx ia IIC T6…T3, ATEX 1G EEx ia IIB T6…T3, ATEX 1/2D T100°C EEx ia, FM Class I, II, III DIV 1, Gr. A,B,C,D,F,G, FM Class I A Ex ia IIC T3-T6, Zone 0, JIS			
Ingress protection		IP 65 (NEMA 4)			

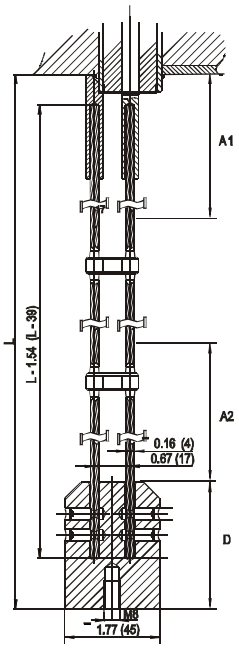
APPLICATION



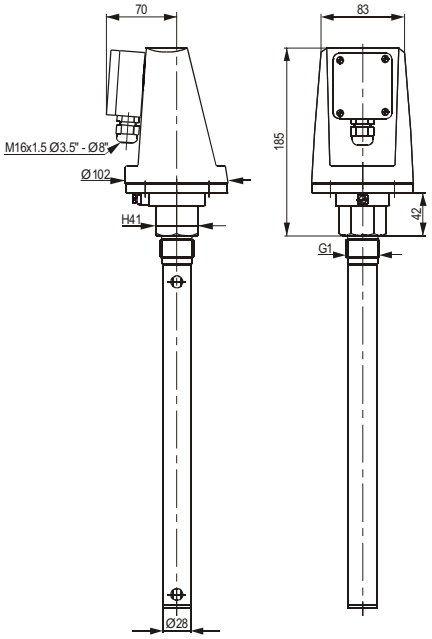
DIMENSIONS



MONO CABLE AND DIN-CONNECTOR



TWIN CABLE PROBE



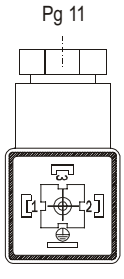
COAXIAL PROBE AND M16-JUNCTION BOX

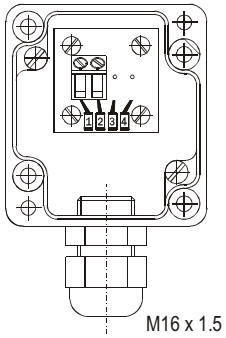
SELECTION

	COAXIAL	TWIN CABLES	MONO CABLE MONO ROD
MAIN APPLICATIONS	♦ Tank height ≤ 6 m (20 ft) ♦ Solvents, liquefied gases ♦ LPG, LNG	♦ Tank farms ♦ Plastic granule silos ♦ LPG, LNG, NH_3, solvents, oil ♦ Water storage tanks	♦ Cement, limestone, fly ash, alumina, carbon black ♦ All high-viscosity liquids ♦ Mineral powders ♦ Plastic granule silos
	FOR CLEAN LIQUIDS	**FOR HIGH SILOS OR TANKS WITH LIQUIDS OR GRANULES**	**FOR CLEAN AND CONTAMINATED LIQUIDS OR FINE POWDERS**
RECOMMENDED IN THE FOLLOWING CASES:	♦ Agitated or flowing liquids – the probe acts as a stilling well ♦ Liquid or vapour spray near the probe ♦ Can be heated ♦ Contact possible with metallic object or tank wall ♦ Very low ε_r liquids	♦ Up to 24 m (80 ft) ♦ For tanks with little head clearance ♦ For small nozzles ♦ For low ε_r ♦ Close to wall mounting possible	♦ For all viscous liquids ♦ For stilling wells (calibration required) ♦ Crystallizing products with FEP coating ♦ Highly conductive foams ♦ High temperature applications without spacers
AVOID:	♦ Crystallizing liquids ♦ Liquids with solid particles ♦ Adhesive products ♦ Powders ♦ Viscous fluids (e.g. crude oil) ♦ Product temperature > 150 °C (max. limit with PTFE spacers)	♦ Agitated liquids without probe anchoring ♦ Product temperature > 150 °C (max. limit with optional FEP spacers) ♦ Conductive build up bridge on spacers	♦ Small nozzle diameters ♦ High nozzle heights

WIRING

There are two types of connections:
Pluggable DIN connector with 1 pc. Pg11 size cable gland and terminal box with 1 pc. M16 x 1.5 mm^2 size cable gland respectively. Cables are to be connected to points 1 and 2 without mattering of polarity.





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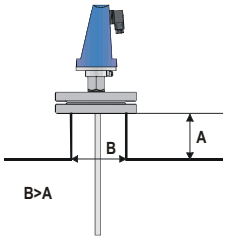
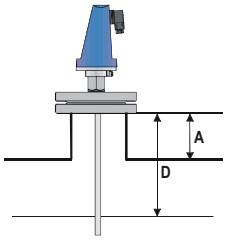
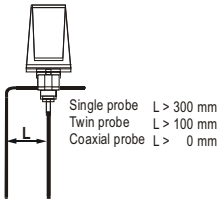


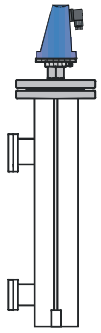
NOZZLE HEIGHT VERSUS DIAMETER



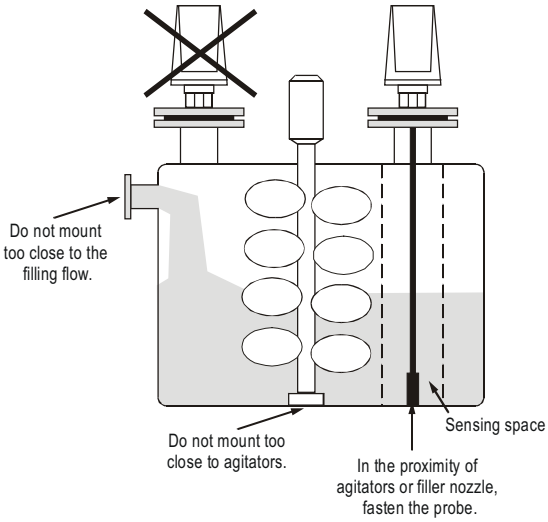
DEAD-ZONE = PROBE-SPECIFIC DEAD ZONE + A



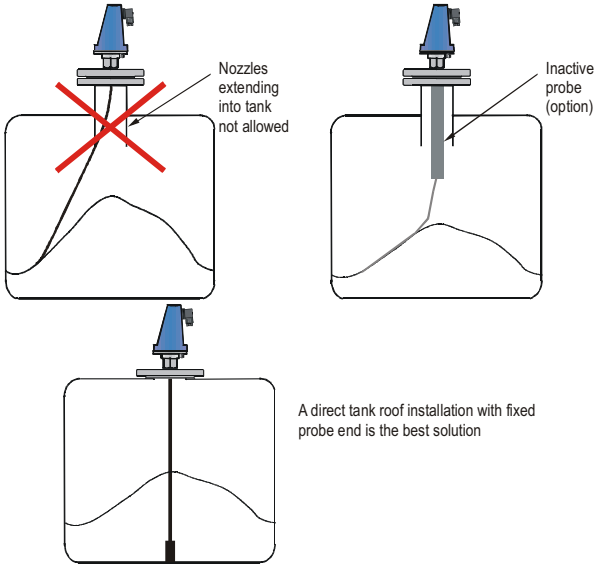
MINIMUM DISTANCE TO THE TANK-WALL



MOUNTING IN STILL WALL



APPLICATION IN AGITATED TANKS



APPLICATION ON FREE FLOWING SOLIDS

ORDER CODES (NOT ALL COMBINATIONS ARE POSSIBLE)

MicroTREK A ☐ ☐ - ☐ ☐ ☐ - ☐

TYPE	CODE
Transmitter, 2-wire	B
Transmitter, +display 2-wire	C
Transmitter, High temp. 2-wire	D
Transmitter, +display High temp. 2-wire	E

PROBE		CODE
Material: 316	Rod	R
	∅ 4 mm cable	K
	∅ 8 mm cable	L
	Twin cable	M
	Coax	N
Hastelloy	Rod	A
	Cable	C
	Coax	D
Plastic	Rod/PVC	X
	Rod/PVDF	Y
	Cable FEP	Z

PROCESS CONNECTION	CODE
1" BSP	O
1" NPT	N
DN 50 PN 40	1
DN 80 PN 16	2
DN 100 PN 16	3
DN 150 PN 16	5
2" ANSI	A
3" ANSI	B
4" ANSI	C
6" ANSI	D
DN 40 Triclamp	E
DN 40 Pipe c.	F
DN 38 SMS	G

LENGTH			
CODE	ROD / COAX		CODE
0	0 m	0.0 m	0
1	1 m	0.1 m	1
2	2 m	0.2 m	2
3	3 m	0.3 m	3
4	4 m	0.4 m	4
5	5 m	0.5 m	5
6	6 m	0.6 m	6
		0.7 m	7
		0.8 m	8
		0.9 m	9

CABLE			
0	0 m	0 m	0
1	10 m	1 m	1
2	20 m	2 m	2
		3 m	3
		4 m	4
		5 m	5
		6 m	6
		7 m	7
		8 m	8
		9 m	9

SOFTWARE / ACCURACY 2-WIRE	CODE
For liquid / ± 15 mm	1
For solids / ± 15 mm	2
For liquid / ± 5 mm	3
For solids / ± 5 mm	4
For liquid / Ex ± 15 mm	5
For solids / Ex ± 15 mm	6
For liquid / Ex ± 5 mm	7
For solids / Ex ± 5 mm	8

Options:
Probe sealing gaskets of KALREZ (instead of standard VITON)
Weights:
∅ 25 x 100 mm of 1.4571 or Hastelloy (HC276, HC22) for ∅ 4 mm mono cable
∅ 45 x 60 mm of 1.4571 for ∅ 4 mm twin cable
∅ 12 x 1500 mm of 1.4571 for ∅ 8 mm mono cable (for solids)
∅ 40 x 260 mm of 1.4571 for ∅ 8 mm mono cable
Inactive probe (for mono cable only)
Connecting cable gland type Pg11 (∅8…10 mm) or M16x1,5 (∅3,5…8 mm)
Approvals: ATEX 1G IIC, IIB; ATEX 1/2D (pulver), FM, JIS

Technical specification may be changed without notice

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