For liquids and solids

MicroTREK

GUIDED MICROWAVE LEVEL TRANSMITTERS





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R PROFESSION IS YOUR LEVEL

MicroTREK TRANSMITTERS FOR LIQUIDS AND SOLIDS

FEATURES

- Measuring range up to 24 m (80 feet)
- Accuracy: ± 5 mm (0.2 inch)
 Measurement is independent of dielectric constant, temperature, pressure and density variations
- Rod, cable and coaxial probes
- Minimum $\mathbf{\varepsilon}_r \ge 1.4$

2-wire version

- Graphic display
- 4 20mA + HART output
- Medium temperature range: –30 °C...+200 °C (–22 °F...+392 °F)
- Maximum process pressure: 40 bar (580 psig)



The **MicroTREK** guided microwave level transmitter is designed for continuous level measuring of conductive or nonconductive liquids, pulps and solids. **MicroTREK** level gauge operates based on the well known TDR (Time Domain Reflectometry) principle. Micropulses are sent along a probe guide at the speed of light. As soon as the pulse reaches the surface of the medium, it is reflected back to the electronic module. Level distance is directly proportional to the flight time of the pulse. The reflected signal is dependent on the dielectric constant of the material, the feasibility of the measurement is $\mathcal{E}_{I} \geq 1.4$. The TDR technology is unaffected by the properties of the medium as well as that of the space above it.

Measurement is also unaffected by the change in the physical properties of the materials such as temperature, pressure, dielectric constant.

The measurability of the medium and the reflected signal strength depends on the relative dielectric constant of the medium.



Informative _{Er} values						
Butane	1.4	Diesel oil	4			
Cement	1.5-10	Grain	3-5			
LPG	1.6-1.9	Limestone	6.1-9.1			
Kerosene	2.1	Sulphuric acid	20			
Crude oil	2.1	Acetone	21			
Whiting	2.2-2.5	Ethanol	24			
Benzene	2.3	Methanol	33.1			
Asphalt	2.6	Glycol	37			
Clinker	2.7	Nitrobenzene	40			
Resin	3.6	Water	80			

Where no dead zone allowed

APPLICATIONS

Bypass applications

Mono Cable / Mono Rod	Twin cable	Twin rod	Coaxial Pipe
 Cement, limestone, fly ash, alumina, carbon black All high-viscosity liquids Mineral powders Clean and contaminated liquids For all viscous liquids For stilling wells (calibration required) Aggressive mediums with coated probes Slightly conductive foams High temperature applications 	 Tank parks with solvents, oil or fuels Water storage tanks Plastic granules For products with low dielectric constant (ε_r > 1.8) Light granules For narrow tanks Where minimum dead-zone is needed Mounting close to tank wall is possible 	 Plastic granule vessels Coated tanks Clean and contaminated liquids Fine powders For narrow tanks Where minimum dead- zone is needed For mediums with low dielectric constants and slightly moving products 	 Small vessels or tanks with max. 6 m (20 feet) height Solvents, liquefied gases LPG, LNG For Clean liquids with low dielectric constant 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

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TECHNICAL DATA

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Genera	l Data					
Input	Measured values	Distance, level, volume				
data	Measuring range	Depends on the probe type and dielectric constant of the measured medium				
Probe types		Coaxial, twin cable, mono cable, twin rod and mono rod				
Housing		Paint coated aluminium or plastic PBT				
Medium terr	perature	−30 °C+200 °C (−22 °F+392 °F) (Ex), other temp. ranges for non-Ex versions on request Flange temperature: −30 °C+90 °C (−22 °F+194 °F), for H or P high temp. versions up to +200 °C (+392 °F)				
Medium pre	ssure	-116 bar (-14232 psig); maximum allowed pressure on 20 °C (68 °F), with 1.4571 (stainless steel) flange: 40 bar (580 psig)				
Ambient terr	nperature	−30 °C+60 °C (−22 °F+140 °F), with display: −20 °C+60 °C (−4 °F+140 °F)				
Sealing		FPM (Viton $^{\circledast}$), for high temp. versions optional Perfluoroelastomer (Kalrez $^{\circledast}$), EPDM				
Ingress protection		IP 65				
Power supply		18 - 35 V DC, protected against surge transients				
		Analogue: 4 - 20 mA, (3.9 - 20.5 mA) passive output, error indication: 22 mA				
	Output signals	Digital: HART® interface, terminal resistor maximum 250 Ohm				
Output		Display: SAP-300 LCD dot-matrix				
data	۸	For liquids: \pm 5 mm (0.2 inch), if probe length L \geq 10 m (32 feet): \pm 0.05 % of the probe length				
	Accuracy	For solids: \pm 20 mm (0.75 inch), if probe length L \geq 10m (32 feet): \pm 0.2 % of the probe length				
	Resolution	\pm 3 μ A				
Electrical connection		2 x M20x1.5 metal cable gland (Ex version), cable diameter: 713 mm (0.30.5 inch), or M20x1.5 plastic cable gland, cable diameter: 612 mm (0.25 0.45 inch) wire cross section: 0.51.5 mm ² (0.00070.002 square inch) (shielded cable suggested) + 2 x NPT 1/2"				
Electrical pro	otection	Class III.				
Mass (head	unit)	1.5 kg (3.3 lb)				

* under ideal reflecting surface and constant temperature conditions

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Additional data for the Ex approved models					
Ex marking	ⓑ II 1G Ex ia IIC T6T3; coated probe versions: ⓑ II 1G Ex ia IIB T6T3; ⓑ II 1D iaD A20/A21 IP65 T100℃				
Intrinsically safe data	Ci \leq 10 nF, Li \leq 100 μ H, Ui \leq 30 V, li \leq 150 mA, Pi \leq 1 W Ex transmitters should be powered with Ex ia power supply				
Applicable Ex power supply, load	Uo <28 V, Io <140 mA, Po <1 W, Supply range: 18 V28 V, Rt max = (Ut - 12 V) / 0.02 A				
Medium temperature	-30 °C+200 °C (-22 °F+392 °F)				
Ambient temperature	-30 °C+60 °C (-22 °F+140 °F), with display: -20 °C+60 °C (-4 °F+140 °F)				

PROBE SELECTION

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Reliable microwave measurement depends on the correct selection of probes taking into consideration the properties of the medium and other technologic conditions.

	Max.	Max. Dead zone*			min.
Probe type	measuring range	Upper (t) / lower (b) ɛ _r = 80	Upper (t) / lower (b) ɛr = 2.4	connection	٤r
Mono cable Ø 4 mm (0.15 inch)					
Mono cable Ø 8 mm (0.3 inch)	24 m (80 feet)			ן 1/2"	2.1
Mono rod Ø 8 mm (0.3 inch)	3 m (10 feet)	300 / 20 mm (12 / 0.75 inch)	400 / 100 mm (16 / 4 inch)	ן "	
Mono rod Ø 14 mm (0.55 inch)	6 m (20 feet)				
Twin cable Ø 4 mm (0.15 inch)	24 m (80 feet)			ן 1/2"	1.8
Twin rod Ø 8 mm (0.3 inch)	3 m (10 feet)	150 / 20 mm (6 / 0.75 inch) 300 / 100 mm (12 / 4 in	300 / 100 mm (12 / 4 inch)		
Coaxial pipe Ø 28 mm (1.1 inch)	6 m (20 feet)	0 / 10 mm (0 / 0.4 inch)	0 / 100 mm (0 / 4 inch)	ן"; ן 1/2"	1.4
Coated cable Ø 6 mm (0.225 inch)	24 m (80 feet)			1"; DN40 Triclamp; DN40 Milch, DN50	0.4
Coated rod Ø 12 / 16 mm (0.45 / 0.65 inch)	3 m (10 feet)	300 / 20 mm (12 / 0.75 inch)	400 / 100 mm (16 / 4 inch)	DN50	2.4

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* the unmeasurable upper and lower part of the tank, the lower dead zone is extended with the length of the counterweight (cable versions only)

Туре	HOK, HOL HOV, HOW		H□S, H□Z		НОТ, НОО		H□A, H□B H□C, H□H	
Denomin.	Cable	Rod	Rod	Cable	Twin cable	Twin rod	Coaxial	
Max. meas. dist.	24 m (80 feet)	3 m (10 feet)	6 m (20 feet)	24 m (80 feet)	3 m (10 feet)	6 m (20 feet)	
Min. meas. dist. $\epsilon_r{=}80$ / $\epsilon_r{=}2.4$		0.3 m / 0.4 m (1 feet / 1.3 feet)		0.15 m / 0.3 m	(0.5 feet / 1 feet)	0 m (0 feet)	
Minimal medium $\epsilon_{\rm r}$		2	.1		1.4			
Min. dist. to objects		Ø 600 m	nm (2 feet)		Ø 200 mm	(0.65 feet)	Ø 0 mm (0 feet)	
Process	1" BSP; 1" NPT	1" BSP		ן 1/2י	' BSP		1" BSP; 1" NPT	
connection	1 1/2" BSP; 1 1/2" NPT	1" NPT			1 1/2" BSP; 1 1/2" NPT			
Probe material	1.4401	1.4	571	1.4	401	1.4571		
Probe nominal Ø	4 mm (0.15 inch)	8 mm (0.3 inch)	14 mm (0.55 inch)	8 mm (0.3 inch)	4 mm (0.15 inch)	8 mm (0.3 inch)	28 mm (1.1 inch)	
Mass	0.12 kg/m (0.08 lb/ft)	0.4 kg/m (0.25 lb/ft)	1.2 kg/m (0.8 lb/ft)	0.4 kg/m (0.25 lb/ft)	0.24 kg/m (0.16 lb/ft)	0.8 kg/m (0.5 lb/ft)	1.3 kg/m (0.85 lb/ft)	
Separator material*			_		PFA, welded on the cable	PTFE-GF25	PTFE	
Weight dimensions	Ø 25x100 mm (1x4 inch)		_	Ø 40x260 mm (1.5x10 inch)	Ø 40x260 mm Ø 40x80 mm (1.5x10 inch) (1.5x3 inch)		-	
Weight material	1.4571		_	1.4	571		_	
Dimensions (mm)								

TECHNICAL DATA OF THE PROBES

TECHNICAL DATA OF THE COATED PROBES

*there is no separator below 1.5 m (5 feet) length

Туре	H□F, H□G	H□X	H□Y	Н□М	H□Q	HDI	
Denomination		FEP coat	PFA coated rod	PP coated rod			
Max. meas. distance		24 m (8	30 feet)		3 m (10 feet)		
Min. meas. distance $\epsilon_r{=}80$ / $\epsilon_r{=}2.4$			m (1 feet / 1.3 feet)				
${\sf Minimum\ medium\ }\epsilon_r$				2.4			
Min. dist. to objects			Ø 600	mm (2 feet)			
Process connection	1″ BSP; 1″NPT	DN 40 Triclamp	DN 40 Milch		DN 50 PN40		
Max. medium temp.			+150 °C (302 °F)		+60 °C (140 °F)		
Probe material		1.44	401		1.4571		
Probe coating material		FE	P		PFA	PP	
Probe nominal Ø		6 mm (0.2	225 inch)		12 mm (0.45 inch)	16 mm (0.65 inch)	
Fillet and weight coating material		-		PFA	PFA	PP	
Weight material		1.45	571		-		
Mass		0.16 kg/m	(0.1 lb/ft)		0.5 kg/m (0.33 lb/ft)	0.6 kg/m (0.4 lb/ft)	
Dimensions (mm)							

INSTALLATION



SETUP, PROGRAMMING

with SAP-300 display unit



With the help of the **SAP-300** plug-in display a simplified programming can be accomplished which covers most of the applications. The basic parameters of measurement and output can be set using the text-based menu system of the **SAP-300**.

The large LCD dot-matrix display displays the measured values in numerical and bar graph form.

MicroTREK IN SYSTEM WITH MultiCONT HART

HANT/

MultiCONT can handle a max. of 8 MicroTREK transmitters. The digital (HART) information is processed, displayed and if needed it can be transmitted in RS485 communication line to a PC. Remote programming of the transmitters is also possible.



s = minimum distance from the internal disturbing objects. Objects that are parallel to probe do not disturb the measurement.

Mono probe	s > 300 mm (12 inch)	$h \leq d$
Twin probe	s > 100 mm (4 inch)	t = upper dead zone
Coaxial probe	s = 0 mm (0 inch)	b = lower dead zone

WIRING



with PC-Star 2 software



PC-Star 2, which is shipped with the instrument free of charge, is a Windows software. All parameters of the MicroTREK can be set and all values can be queried through PC-Star 2. Other features are: continuous "echo-map" reading, trend monitoring, data logging, data saving.

MicroTREK IN SYSTEM WITH A PC

The instrument can be connected to a PC using UNICOMM HART modem. Max. 15 normal (non Ex) instruments can be connected to a HART line. Measured values can be visualised and/or the instrument can be programmed via these interfaces. Applicable software: PC-Star 2 configuration software or NIVISION process visualization software.







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ORDER CODE (NOT ALL COMBINATIONS AVAILABLE

Two-wire guided microwave level transmitter

MicroTREK	н							
Туре	Code	Probe / Proc. conn.	Code	Code	Ler	ngth	Code	Output / Ex
Transmitter	т	Coaxial / 1" BSP	А	Co	oaxial, Ro	od, Twin ro	od	4 - 20 mA + HART
Transmitter +	В	Coaxial / 1" NPT	В	0	0 m	0 m	0	4 - 20 mA + HART
display		Coaxial / 1 1/2" BSP	С	1	1 m	0.1 m	1	Dust Ex
transmitter	Н	Coaxial / 1 1/2 " NPT	н	2	2 m	0.2 m	2	EEx ia
High temp.		Rod / 1" BSP	R	3	3 m	0.3 m	3	
transmitter + display	Р	Rod / 1" NPT	Р	4	4 m	0.4 m	4	
		Rod / 1 ^{1/2} " BSP	S	5	5 m	0.5 m	5	
		Rod / 1 ^{1/2} " NPT	Z	6	6 m	0.6 m	6	
Housing	Code	Twin rod / 1 1/2 " BSP	D			0.7 m	7	
Aluminium	4	Twin rod / 1 1/2 " NPT	E			0.8 m	8	
Plastic Housing	5 (2)	4 mm cable / 1" BSP	К			0.9 m	9	
		4 mm cable / 1" NPT	L		Cable	version		
		4 mm cable / 1 1/2 " BSP	V	0	0 m	0 m	0	
		4 mm cable / 1 1/2 " NPT	W	1	10 m	1 m	1	
		8 mm cable / 1 1/2 " BSP	Ν	2	20 m	2 m	2	
		8 mm cable / 1 1/2 " NPT	J			3 m	3	
		4 mm twin cable / 1 ^{1/2} " BSP	Т			4 m	4	
		4 mm twin cable / 1 ^{1/2} " NPT	U			5 m	5	
		4 mm FEP coated cable / 1" BSP	F			6 m	6	
		4 mm FEP coated cable /	G			7 m	7	
		4 mm FEP coated cable /	М			9 m	9	
		4 mm FEP coated cable / DN 40 Triclamp	х					
		4 mm FEP coated cable / DN 40 Pipe-coupling	Y				-	B
(1) The order code	e of an Ex	PFA coated rod / DN 50 / PN 25	Q			51	00.	Ø
version should (2) Ex version not	l end in 'Ex' available	PP coated rod / DN 50 / PN 25	I			MURLO		-CO

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Accessories SAP-300 Plug-in display UNICOMM SAT-304 HART - USB modem

UNICOMM SAK-305 HART - USB/RS485 modem

MH02 HART - RS232 modem

61622 PCMCIA / RS232 adapter

66217 PC Card / RS232 adapter

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