

for liquids and solids

MicroTREK

GUIDED MICROWAVE LEVEL TRANSMITTERS



LEVEL TRANSMITTERS

OUR PROFESSION IS YOUR LEVEL

LEVEL

MicroTREK TRANSMITTERS FOR LIQUIDS AND SOLIDS

FEATURES

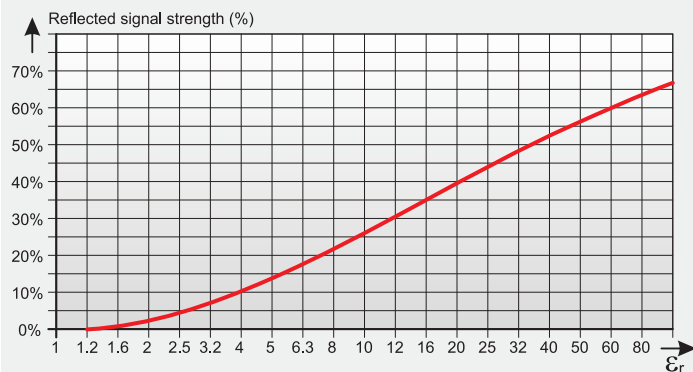
- Measuring range up to 24m
- Accuracy: +/- 5 mm
- Measurement is independent of dielectric constant, temperature, pressure and density variations
- Rod, cable and coaxial probes
- Minimum $\epsilon_r \geq 1,4$
- 2-wire version
- Graphic display
- 4...20mA + HART output
- Medium temperature range: -30...+200°C
- Maximum process pressure: 40 bar



GENERAL DESCRIPTION

The **MicroTREK** guided microwave level transmitter is designed for continuous level measuring of conductive or non-conductive 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 $\epsilon_r \geq 1,4$. 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 ϵ_r 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

APPLICATIONS

Mono Cable / Mono Rod	Twin cable	Twin rod	Coaxial Pipe
<ul style="list-style-type: none"> ■ 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 	<ul style="list-style-type: none"> ■ Tank parks with solvents, oil or fuels ■ Water storage tanks ■ Plastic granules ■ For products with low dielectric constant ($\epsilon_r > 1.8$) ■ Light granules ■ For narrow tanks ■ Where minimum dead-zone is needed ■ mounting close to tank wall is possible 	<ul style="list-style-type: none"> ■ 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 	<ul style="list-style-type: none"> ■ Small vessels or tanks with max. 6 m (19.69 ft) 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 ■ Bypass applications

TECHNICAL DATA

General Data		
Input data	Measured values	Distance, level, volume
	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	Aluminium cast with epoxy paint or plastic	
Medium temperature	-30 °C...+200 °C, (Ex), other temp ranges for non-Ex versions on request Flange temperature: -30 °C...+90 °C, for H or P high temp versions +200 °C	
Medium pressure	- 0.1...1.6 MPa (- 1...16 bar); maximum allowed pressure on 20°C, with 1.4571 (stainless steel) flange 4 Mpa (40 bar)	
Ambient temperature	-30 °C...+60 °C, with display: -20 °C... +60 °C	
Sealing	FPM (Viton®), for high temp versions optional Perfluoroelastomer (Kalrez® 6375), EPDM	
Ingress protection	IP 65	
Power supply	18...35 V DC, protected against surge transients	
Output data	Output signals	Analogue: 4...20 mA, (3.9...20.5 mA) passive output, error indication: 22 mA
		Digital: HART® interface, terminal resistor maximum 250 ohm
		Display: SAP-300 LCD dot-matrix
	Accuracy *	For liquids: ± 5 mm, if probe length L ≥ 10 m: ± 0.05 % of the probe length For solids: ± 20 mm, if probe length L ≥ 10m: ± 0.2 % of the probe length
Resolution	± 3 µA	
Electrical connection	2 x M20x1.5 metal cable gland (Ex version), cable diameter: 7...13 mm, or M20x1.5 plastic cable gland, cable diameter: 6...12 mm wire diameter: 0.5...1.5 mm ² (shielded cable suggested) + 2 x NPT 1/2"	
Electrical protection	Class III.	
Mass (housing)	1.5 kg	

* under ideal reflecting surface and constant temperature conditions

Additional data for the Ex approved models

Approval	⊕ II 1 G Ex ia IIC T6 ... T3 ; II 1 G Ex ia IIB T6 ... T3 ; II 1D iaD A20/A21 IP65 T100°C
Intrinsically safe data	Ci ≤ 15 nF, Li ≤ 200 µH, Ui ≤ 28 V, li ≤ 140 mA, Pi ≤ 1 W Ex transmitters should be powered with EEx ia power supply
Applicable Ex power supply, load	Uo < 28 V, Io < 140 mA, Po < 1 W, Supply range 18 V...28 V, Rt max = (Ut - 12 V) / 0.02 A
Medium temperature	-30 °C ... +200 °C
Ambient temperature	-30 °C ...+60 °C, with display: -20 °C ... +60 °C

PROBE SELECTION

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

Probe type	Max. measuring range (m)	Dead zone*		Process connection	min. ε _r
		Upper (t) / lower (b) (mm) ε _r = 80	Upper (t) / lower (b) (mm) ε _r = 2,4		
Mono cable Ø 4 mm	24	300/20	400/100	1"; 1 1/2"	2,1
Mono cable Ø 8 mm				1 1/2"	
Mono rod Ø 8 mm	3	150/20	300/100	1"	
Mono rod Ø 14 mm				1 1/2"	
Twin cable Ø 4 mm	24	0/10	0/100	1"; 1 1/2"	1,4
Twin rod Ø 8 mm	3				
Coaxial pipe Ø 28 mm	6	300/20	400/100	1"; DN40 Triclamp; DN40 Milch, DN50	2,4
Coated cable Ø 6 mm	24			DN50	
Coated rod Ø 12 / 16 mm	3				

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

TECHNICAL DATA OF THE PROBES

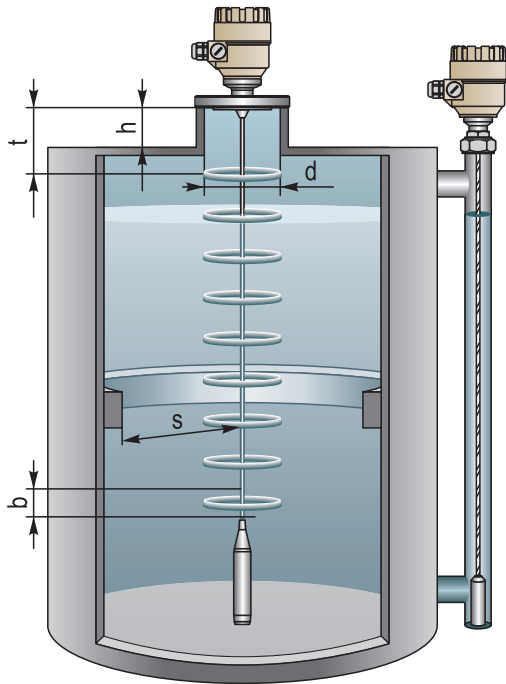
Type	HOK, HOL HOV, HOW	HOR, HOP	HOS, HOZ	HON, HOJ	HOT, HOU	HOD, HOE	HOA, HOB HOC, HOH
Denomin.	Cable	Rod	Rod	Cable	Twin cable	Twin rod	Coaxial
Max. meas. dist.	24 m	3 m	6 m	24 m		3 m	6 m
Min. meas. dist. $\epsilon_r=80 / \epsilon_r=2,4$	0.3 m / 0.4 m			0.15 m / 0,3 m			0 m
Minimal medium ϵ_r	2.1			1.8			1.4
Min. dist. to objects	Ø 600 mm			Ø 200 mm			Ø 0 mm
Process connection	1" BSP; 1"NPT	1" BSP		1 1/2" BSP			1" BSP; 1"NPT
	1 1/2" BSP; 1 1/2" NPT	1"NPT		1 1/2" NPT			1 1/2" BSP; 1 1/2" NPT
Probe material	1.4401	1.4571		1.4401		1.4571	
Probe nominal Ø	4 mm	8 mm	14 mm	8 mm	4 mm	8 mm	28 mm
Mass	0.12 kg/m	0.4 kg/m	1.2 kg/m	0.4 kg/m	0.24 kg/m	0.8 kg/m	1.3 kg/m
Separator material*		-			PFA, welded on the cable	PTFE-GF25	PTFE
Weight dimensions	Ø 25x100 mm	-		Ø 40x260 mm	Ø 40x80 mm	-	
Weight material	1.4571	-		1.4571		-	
Dimensions							

*there is no separator below 1.5m length

TECHNICAL DATA OF THE COATED PROBES

Type	HOF, HOG	HOX	HOY	HOM	HQQ	HOI
Denomination	FEP coated cable			PFA coated rod		PP coated rod
Max. meas. distance	24 m			3 m		
Min. meas. distance $\epsilon_r=80 / \epsilon_r=2,4$	0.3 m / 0.4 m					
Minimum medium ϵ_r	2.4					
Min. dist. to objects	Ø 600 mm					
Process connection	1" BSP; 1"NPT	DN 40 Triclamp	DN 40 Milch	DN 50 PN40		
Max közeghőmérs.	+150 °C					+60 °C
Probe material	1.4401			1.4571		
Probe coating material	FEP			PFA	PFA	PP
Probe nominal Ø	6 mm			12 mm	12 mm	16 mm
Fillet and weight coating material	-			PFA	PFA	PP
Weight material	1.4571			-		
Mass	0.16 kg/m			0.5 kg/m	0.5 kg/m	0.6 kg/m
Dimensions						

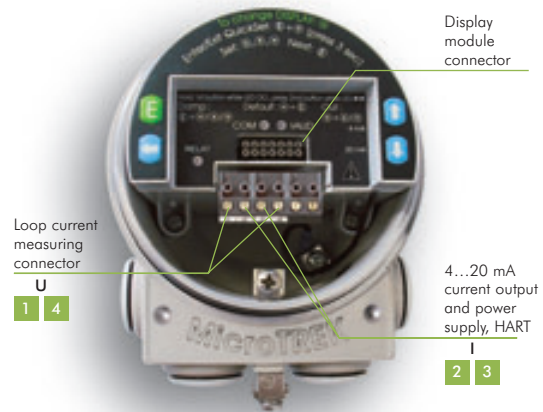
INSTALLATION



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

Mono probe	$s > 300 \text{ mm}$	$h \leq d$
Twin probe	$s > 100 \text{ mm}$	t = upper dead zone
Coaxial probe	$s = 0 \text{ mm}$	b = lower dead zone

WIRING



SETUP, PROGRAMMING

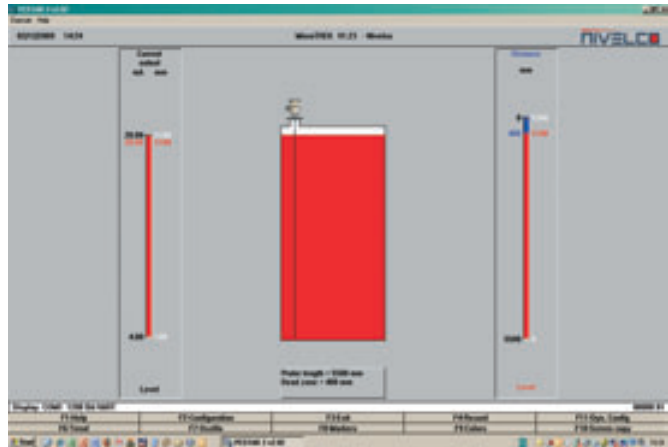
with SAP-300 display unit



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.

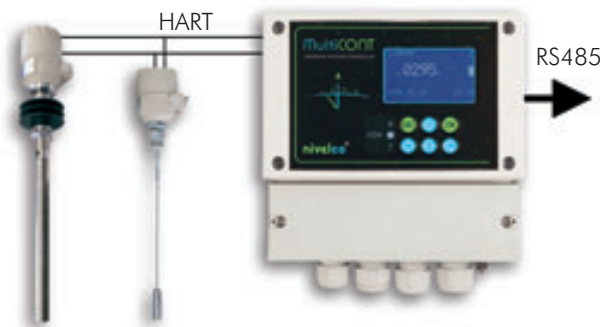
with PC-Star 2 software



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 MULTICONT

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.



MicroTREK IN SYSTEM WITH A PC

The instrument can be connected to a PC using a HART-RS232 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.

ORDER CODE (NOT ALL COMBINATIONS AVAILABLE)

Two-wire guided microwave level transmitter

MicroTREK H ■ ■ ■ - ■ ■ ■ ■ - ■ *

Type	Code	Probe / Proc. conn.	Code	Code	Length	Code	Output / Ex	Code
Transmitter	T	Coaxial / 1" BSP	A	Coaxial, Rod, Twin rod			4 - 20 mA + HART	4
Transmitter + display	B	Coaxial / 1" NPT	B	0	0 m	0 m	4 - 20 mA + HART / Dust Ex	6
High temp. transmitter	H	Coaxial / 1 1/2" BSP	C	1	1 m	0,1 m	4 - 20 mA + HART / EEx ia	8
High temp. transmitter + display	P	Coaxial / 1 1/2" NPT	H	2	2 m	0,2 m		
		Rod / 1" BSP	R	3	3 m	0,3 m		
		Rod / 1" NPT	P	4	4 m	0,4 m		
		Rod / 1 1/2" BSP	S	5	5 m	0,5 m		
		Rod / 1 1/2" NPT	Z	6	6 m	0,6 m		
		Twin rod / 1 1/2" BSP	D			0,7 m		
		Twin rod / 1 1/2" NPT	E			0,8 m		
		4 mm cable / 1" BSP	K			0,9 m		
		4 mm cable / 1" NPT	L	Cable version				
		4 mm cable / 1 1/2" BSP	V	0	0 m	0 m		
		4 mm cable / 1 1/2" NPT	W	1	10 m	1 m		
		8 mm cable / 1 1/2" BSP	N	2	20 m	2 m		
		8 mm cable / 1 1/2" NPT	J			3 m		
		4 mm twin cable / 1 1/2" BSP	T			4 m		
		4 mm twin cable / 1 1/2" NPT	U			5 m		
		4 mm FEP coated cable / 1" BSP	F			6 m		
		4 mm FEP coated cable / 1" NPT	G			7 m		
		4 mm FEP coated cable / DN 50 / PN 25	M			8 m		
		4 mm FEP coated cable / DN 40 Tricomp	X			9 m		
		4 mm FEP coated cable / DN 40 Milch	Y					
		PFA coated rod / DN 50 / PN 25	Q					
		PP coated rod / DN 50 / PN 25	I					

Housing	Code
Aluminium	4
Plastic Housing	5**

* the order code of an Ex version should end in 'Ex'
 ** Ex version not available



Accessories

- SAP-300 Plug-in display
- MH02 HART / RS232 modem
- 61622 PCMCIA / RS232 adapter
- 66217 PC Card / RS232 adapter