

The **GuideScan**



TDR-Sensor with coaxial probe for continuous level measurement and point level detection in liquids, with analog and switching outputs.

MEASUREMENT PRINCIPLE

The **GuideScan** uses TDR (Time Domain Reflectometry) technology – a process for establishing electromagnetic wave transmission time. Low-energy electromagnetic impulses, generated by the sensor's circuitry, are propagated along the inside of the coaxial probe. When these impulses hit the surface of the medium to be measured, part of the impulse energy is reflected back up the probe to the circuitry which then calculates the fluid level from the time difference between the impulses sent and the impulses reflected. The sensor can output the analyzed level as a continuous measurement reading through its analog output, or it can convert the values into freely positionable switching output signals.

TDR-Sensors are also known as Guided Radars or Guided Wave Radars.

APPLICATION AREA

The innovative TDR technology enables an inexpensive and reliable level measurement that is independent of application conditions. **GuideScan** is suitable for continuous level measurement as well as for point level detection in almost every liquid – changes in the chemical and physical properties of the measured liquid do not affect the sensor. **GuideScan** has been designed for very precise and reliable measurement in small tanks and vessels – independent from the installation conditions. Typical applications are found in coolants, oil, cleaning and degreasing agents and other liquid substances used in manufacturing environments.

BENEFITS

- Revolutionary price/performance ratio
- Independent of liquid properties and installation conditions
- Ideally suited for small tanks, due to minimal inactive areas
- Continuous level measurement and point level detection in one device
- Simplest single-button-operation and configuration via teach-in

ELECTRICAL DATA

Output functions	analogue output and/or switching outputs
Analogue output [Q _A]	current output 4...20mA acc. to NAMUR (NE43)
Burden for 4...20mA	<500Ω
Lower signal level	3,8...4,0mA fail LOW: 3,6mA
Upper signal level	20...20,5mA fail HIGH: 21,5mA
Response time	200ms
Switching output PNP [Q ₁ ...Q ₄]	function: normally closed/normally open can be changed for Q ₁ ...Q ₄ individually switching points [S] are freely positionable within the measuring range [M] short-circuit protected
Load current [I _A]	<200mA
Signal voltage HIGH	supply voltage - 21
Signal voltage LOW	0V ≤ 1V
Response time	200ms
Supply voltage	18...30VDC (reverse-polarity protected)
Residual ripple	≤5V _{SS} (may not exceed or fall short of supply voltage tolerances)
Current consumption	<90mA at 24VDC (no burden)
Protection class	Ⓜ
Start-up time	<4s
Connection plug	M12x1, 5-pin or 8-pin

MEASUREMENT PERFORMANCE

	reference condition: dielectric constant [ε _r]=80 (water)
Accuracy	±3mm
Reproducibility	<2mm
Resolution	<1mm
Hysteresis switching output [Q ₁ ...Q ₄]	Fixed ±1,5mm around switching point [S] or variable
Temperatur drift	0,05mm/K
Limits measuring range [M]	26mm...probe length [L] - 10mm [IA] (max. 1.990mm)
Inactive areas [IA]	10mm (plus accuracy tolerances)

APPLICATION CONDITIONS

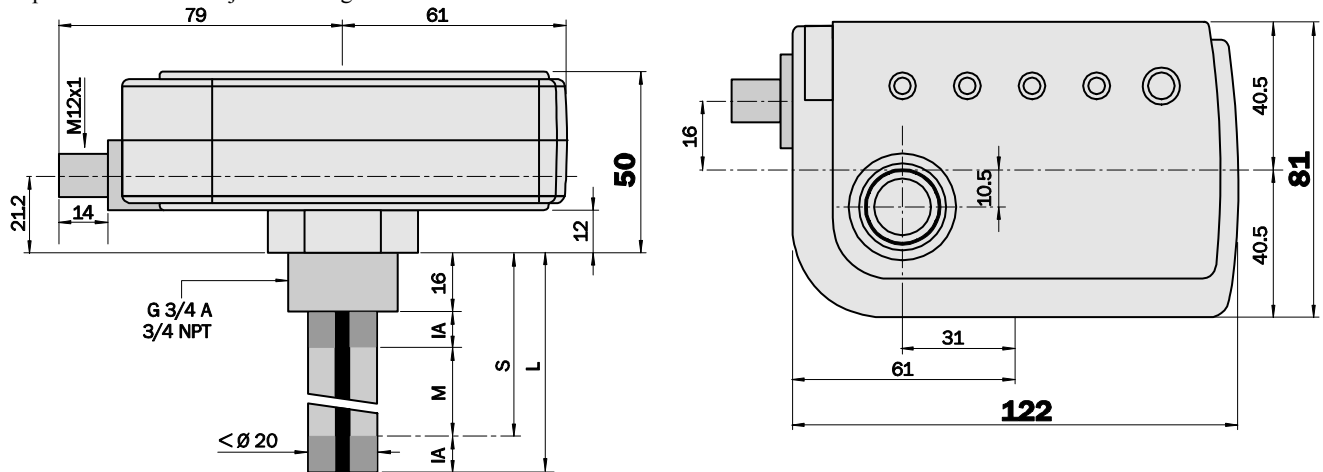
	all specifications relate to the liquid to be measured
Dielectric constant [ε _r]	>1,8 (suitable for all oils, e.g. cutting, grinding and hydraulics oil; coolant; erosion dielectric fluid; cleaning and degreasing agents; all liquid lubricants; water and water-based liquids)
Conductivity	no restrictions
Density	no restrictions
Dynamic viscosity	<2.000mPa s = 2.000cP (not suitable for very viscous or adhesive substances, e.g. grease, honey, chocolate syrup, ketchup, peanut butter)
Application temperature	-25°C...+80°C
Ambient temperature	operation -10°C...+60°C storage -40°C...+80°C
Application pressure	1bar relative (during filling or emptying)
Velocity of level change	<1.000mm/s
Interface (e.g. oil on top of water)	an oil layer of <70mm thickness on top of water is not detected by the sensor; in this case the sensor detects only the water level. From an oil layer thickness >70mm onwards, the sensor detects the total level including the oil layer

* Specifications are subject to change without notice

MECHANICAL DATA	enclosure 360° rotatable
Enclosure rating	IP67
Connection thread	G $\frac{3}{4}$ A; $\frac{3}{4}$ "NPT (CW36)
Probe length [L]	200...2.000mm (10mm increments)
Material enclosure	PBT/PC
Materials probe	1.4404 (316L)
Materials probe end	1.4404 (316L); 1.4310; PTFE

DIMENSIONS IN MM

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INSTALLATION

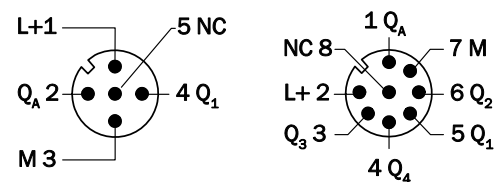
The sensor is mounted into the tank vertically from the top via its connection thread. It can be mounted directly into a weld-in socket or a nozzle. Minimum nozzle diameter or maximum nozzle height do not have to be observed.

The sensor should not have direct contact with other obstacles inside the tank (e.g. filling inlets, other measurement devices), the tank walls or the tank bottom (it might be sufficient to use the provided washer to slightly raise the sensor from the tank bottom). However, minimum distances when mounting the sensor do not have to be observed.

The sensor should not be mounted directly in the flow of the liquid when it is being filled. The sensor should also not be mounted in a very calm area of the tank where sediments can settle over time (e.g. swarf). A constant purging of the probe by liquid is recommended.

CONNECTION PLUG ARRANGEMENT

Pin	Connection plug	Color	Connection plug	Color
	5-pin	connector cable	8-pin	connector cable
1	+18...30VDC [L+]	brown	analog output [Q _A]	white
2	analog output [Q _A]	white	+18...30VDC [L+]	brown
3	ground [M]	blue	Switching output [Q ₃]	green
4	Switching output [Q ₁]	black	switching output [Q ₄]	yellow
5	do not connect [NC]	grey	switching output [Q ₁]	grey
6			switching output [Q ₂]	pink
7			ground [M]	blue
8			do not connect [NC]	Red



The sensor is connected via a standard cordset with an M12x1 female connector (5-pin or 8-pin).



OPERATION

This sensor can be configured entirely via its single button and visual feedback from the LEDs. The following settings can be done directly on the sensor:

- teach-in the switching points [S] for the switching outputs [Q₁...Q₄]
- toggle the switching outputs [Q₁...Q₄] between normally open and normally closed
- set the hysteresis for the switching outputs [Q₁...Q₂]
- define the actual measuring range [M] for the analog output [Q_A]
- reset the sensor to delivery default values