



Tracer 1000™

Guided Radar Level Transmitter Data Sheet



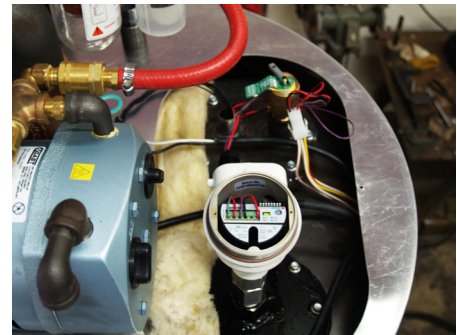
Description

Featuring TDR (Time Domain Reflectometry) technology, the Tracer 1000™ provides continuous level measurement and point level detection in liquids, with analog and switching output. This innovative device has almost no installation restrictions - it can be mounted in small tanks, tall and narrow nozzles and it measures precisely even with difficult tank geometries or close to interfering structures. Factory settings may be configured via HART® Communication protocol. Tracer 1000 is ideal for various types of processing and storage applications and has an exceptional performance in liquids with low reflectivity such as oils and hydrocarbons.

Features & Benefits

- Revolutionary TDR Technology
- Precise continuous level measurement and reliable point level detection combined in one device
- Highly robust measurement due to 4-wire design and innovative signal analysis and disturbance signal suppression
- Fully modular probe design - Simple to install
- Features HART® Communication protocol
- 1.5" Dead Band
- Economically Priced

Tracer 1000™ Shown



Technology

The Tracer 1000 uses TDR Technology: low-energy, high-frequency electromagnetic impulses, generated by the sensor's circuitry, are propagated along the probe which is immersed in the liquid to be measured. When these impulses hit the surface of the liquid, 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.

Specifications

Electrical Specifications	
Output Functions	Continuous level measurement through analog output and point level detection through switching output.
Analog Output (Active)	Current output 4-20mA: The span between the lower range value [4mA] and the upper range value [20mA] is equal to 0-100% of the continuous level measurement reading. It is recommended that the span between those two range values stays within the measuring range [M].
Total Load Resistance	<500Ω: HART resistor approx. 250Ω + load resistance approx. 250Ω if the current output is connected to a device with an inner resistance of approx. 250Ω, then there is no additional, external HART resistor necessary. In that case, the HART modem is connected in parallel to the current output wires.
Lower Range Value	4.0mA (span 0%)
Upper Range Span	20.0mA (span 100%)
Response Time	0.5s (default), 2s 5s (selectable)
Temperature Drift	.0078 in/°F from 65°
Switching Output DC PNP (Active)	Normally Closed (NC - Short circuit protected)
Current Consumption	<70mA at 24 VDC (no burden)
Start-Up Time	<6s
Cable Terminals	Screwless, cage clamp terminal block for stranded and solid wires AWG 22-14 * <i>The usage of cable end sleeves with insulation collar is not recommended</i>
Measurement Specifications	
Accuracy	± 0.12"
Repeatability	< .08"
Resolution	< .04"
Probe Type	316 SS Rod: .24" Coaxial: .68" (Std. Tube: NPS 3/8", 10S) Cable Probe: .16", type 7 x 19
Probe Length [L]	316 SS Rod: 1.5" - 240" Coaxial: 1.5" - 240" Cable Probe: 1.5" - 780" <i>Length must be specified when ordering - The reference point is always the sealing surface of the connection thread (see dimensional drawings)</i>
Top Dead Band	Configurable below 1.5"
Bottom Dead Band	Configurable above 1.5"

Measuring Range [M]	Probe length [L] less both inactive areas at top and bottom [I1 and I2] in this range Tracer 1000™ will have the specified measurement performance. It is recommended that the maximum and minimum liquid levels to be measured in the tank are within the measuring range [M] of the sensor.
Switching Point [S]	Freely positionable within the measuring range [M] Hysteresis can be set by defining separate upper and lower thresholds; if those are set at the same position, the minimum hysteresis of 3mm applies

Application Specifications	
Dielectric Constant [ε_r]	316 SS Rod/Cable Probe: > 1.8 Coaxial: > 1.4
Conductivity	No restrictions
Density	No restrictions
Dynamic Viscosity	316 SS Rod/Cable Probe: < 5.00mPa s = 5.000cP Coaxial: < 500mPa s = 500cP
Application Temperature	F: -40° to 302° C: -40 to 150°
Ambient Temperature	F: -13° to 176° C: -25° to 80°
Application Pressure	-1 bar to 40 bar
Velocity of Level Change	<3.2 fps
Interface (i.e. oil on top of water)	An oil layer of < 7cm thickness on top of water is not detected by the sensor; in this case the sensor will detect only the water level at a slightly lower position than actual. From an oil layer thickness > 7cm onwards, the sensor detects the total level, including the oil layer, according to specifications.

Mechanical Specifications	
Material Exposed to Tank Atmosphere	316 SS Rod: 1.4404 / 316L and PEEK Cable Probe: 1.4401 / 316 and PEEK Coaxial: 1.4401 / 316L, PEEK & O-ring Gasket at connection thread: Klingsil C-4400, 0.2cm thick
Enclosure Material	Aluminum alloy EN AC-AISI9Cu3 (DIN EN 1706), Epoxy Spray (~70µm)
Enclosure Rating	IP68, NEMA6P Device cover has to be properly tightened and IP68 screw plugs and cable glands have to be properly mounted (with sealing) and have to be properly tightened around cable of suitable type and diameter. The cover has a locking screw (Allen key - size 0.15cm) and a safety chain to prevent it from falling to the ground after being unscrewed.

Specifications Continued

Cable Glands/ Screw Plugs	M20 x 1.5 (2) or 1/2" NPT (2) or Cable Gland (2) or 1/2" NPT (1) and Cable Gland (1)
Connection Thread [CT]	3/4" NPT (US) or 3/4" G (Metric)
Weight	Aluminum housing, assembled with electronics and feedthrough: 950g Aluminum housing (empty): 650g
Certification	Atex, Explosion Proof, Zone 1

Specifications are subject to change without notice.



Probe Type Recommendations

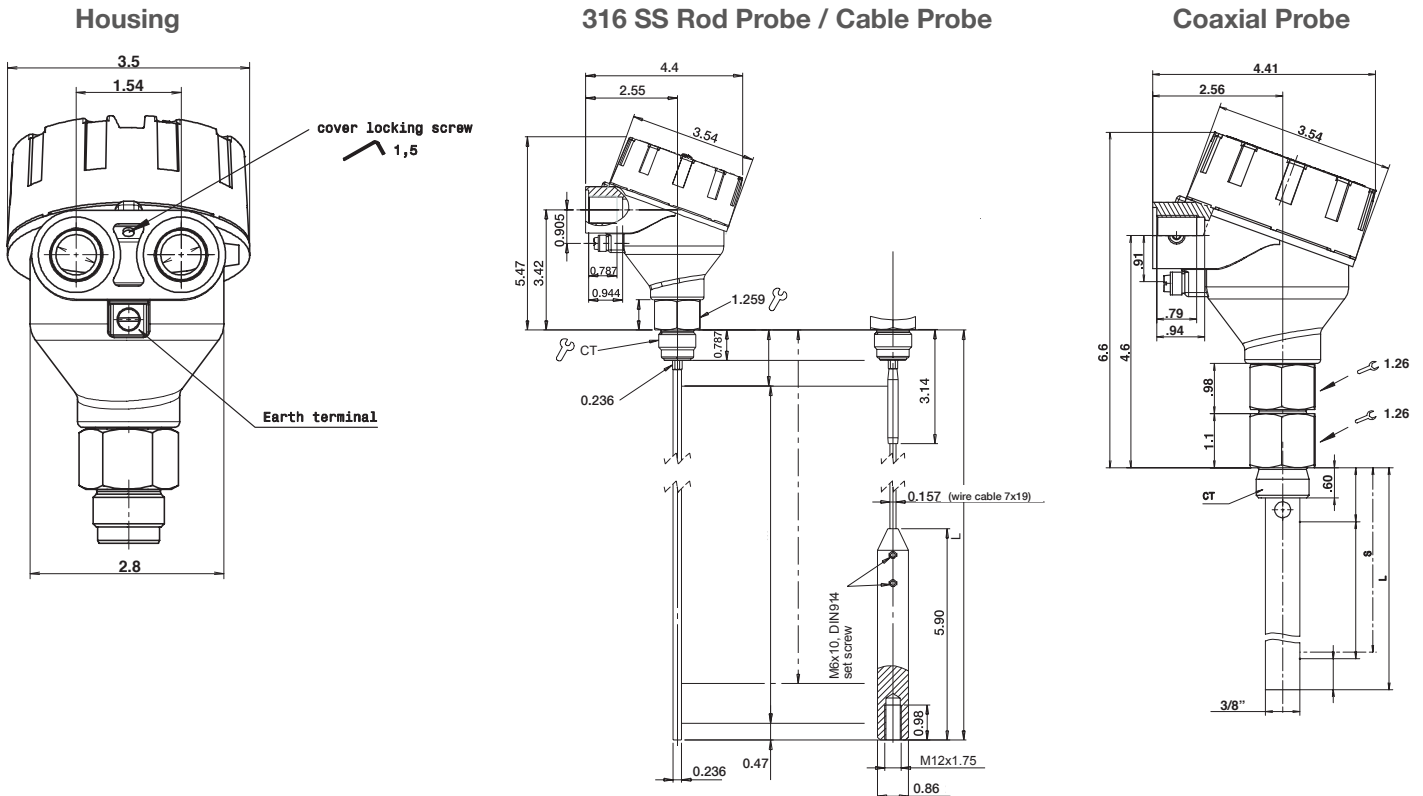
CABLE PROBE			
SINGLE ROD PROBE			
COAXIAL PROBE			
PROBE MOUNTING			
tall and narrow nozzles	+	•	•
difficult tank or nozzle geometries	+	•	•
close to internal tank structures or tank wall	+	•	•
probe might move or touch internal tank structures/tank wall	+	•	•
liquid spray may touch probe above the liquid surface	+	•	•
non-stationary interference targets, e.g. agitator blades	+	•	•
measurement readings at the very top or bottom of the tank	+	•	•
non-metallic tanks	+	•	•
bypass chambers and stilling wells	•	+	-
limited headroom for installation	•	•	+
tall tanks	•	•	+
MEDIA CHARACTERISTICS			
bulk solids	-	-	+
measuring low reflectivity liquids (i.e. low dielectric constant)	+	•	•
viscous, crystallizing, adhesive, coating, or sticky liquids	-	+	+
fibrous liquids, sludge, slurry, pulp	-	+	+
liquids containing solid particles	-	+	+
cleanability of probe is important	-	+	+

+ = recommended

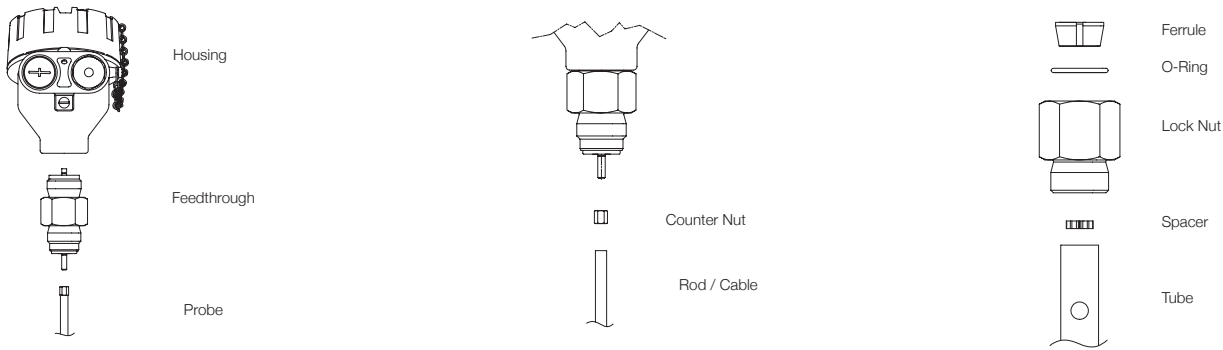
• = possible, maybe with configuration and/or mounting adjustments

- = not recommended

Dimensions (Inches)



Sensor Components



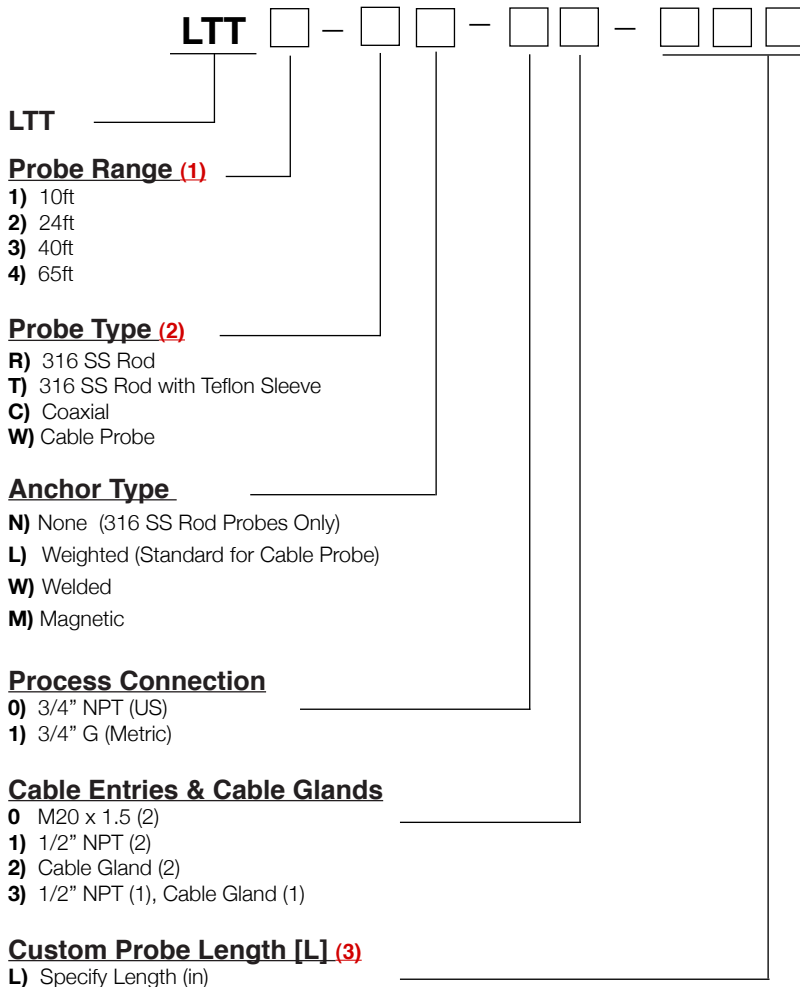
Ordering Information

FLO-CORP MODEL NUMBER BUILDER

For Assistance Call **877.FLO.LINE**

Use the diagram below, working from left to right to construct your FLO-Corp Model Number. Simply match the category number to the corresponding box number.

Example: LTT2-RN-00-036" Tracer 1000 with 24ft Probe Range, 316 SS Rod Probe Type, 3/4" NPT Process Connection, M20 x 1.5 Cable Entries & Cable Glands, 36" Custom Probe Length



*Multiple configuration methods, please contact FLO-Corp to choose appropriate method

LTT

Probe Range (1)

- 1) 10ft
- 2) 24ft
- 3) 40ft
- 4) 65ft

Probe Type (2)

- R) 316 SS Rod
- T) 316 SS Rod with Teflon Sleeve
- C) Coaxial
- W) Cable Probe

Anchor Type

- N) None (316 SS Rod Probes Only)
- L) Weighted (Standard for Cable Probe)
- W) Welded
- M) Magnetic

Process Connection

- 0) 3/4" NPT (US)
- 1) 3/4" G (Metric)

Cable Entries & Cable Glands

- 0 M20 x 1.5 (2)
- 1) 1/2" NPT (2)
- 2) Cable Gland (2)
- 3) 1/2" NPT (1), Cable Gland (1)

Custom Probe Length [L] (3)

- L) Specify Length (in)

Ordering Notes:

- (1) Select the best configuration based on your requirements
- (2) Viton O-Ring is supplied with Coaxial probe type. For additional materials, please contact factory.
- (3) Specify the L-dimension at the end of the model number (ie: LTT1-RN-00-120"). The L-dimension must be specified in inches (in) and fall within the 'Probe Range' selected.

* Additional probe lengths may be available upon request - Please contact factory.