

### Features and Benefits

#### Flexibility for a wide range of applications

- Suitable for a broad range of tank sizes, geometries and internal structures.
- Ideal for dirty service applications.

#### Accurate and reliable level measurement across a range of dynamic process conditions

- Insensitive to changes in dielectric, pressure, conductivity, vacuum, humidity, dust, viscosity, vapor, foam, pH, bulk density, temperature or turbulence.
- Unaffected by filling or emptying conditions such as dust, noise and material movement.
- The TDR-2000 is intrinsically safe and approved for use in hazardous locations.

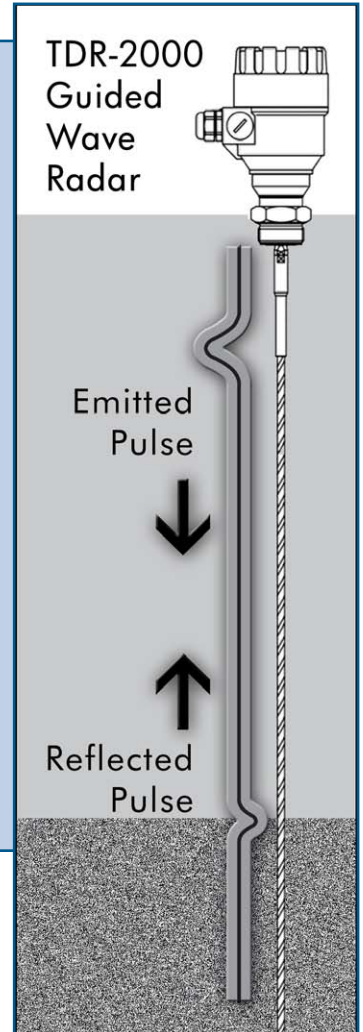
#### Easy Installation

- Simple to install in new tanks or retrofit existing tanks
- Can be installed while tank is in service
- Does not require special configuration to compensate for environmental or structural conditions
- Factory calibrated and configured

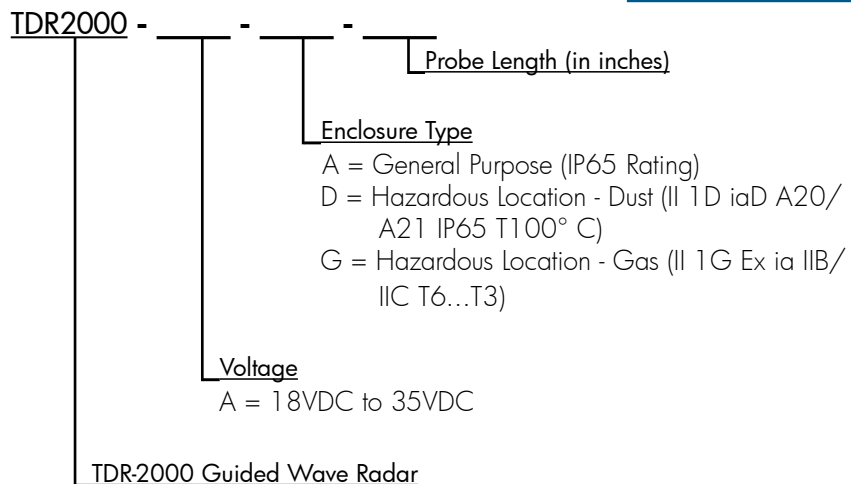
The TDR-2000 provides continuous, non-mechanical level measurement, utilizing guided wave radar technology. The TDR-2000 is particularly suited for measuring the level of solids, granules, and powders as well as a wide range of liquids. For many applications, the TDR-2000 is an economical and superior alternative to capacitance, ultrasonic, and plumb bob technologies.

### Principle of Operation

The TDR-2000 two-wire guided microwave level transmitter uses the TDR (Time Domain Reflectometry) principle. The instrument sends low power nanosecond-wide pulses along an electrically conductive cable with a known propagation speed (the speed of light). As the pulse reaches the surface of the medium (altered dielectric constant  $\epsilon_r$ ), a part of it is reflected back to the electronic module. The efficiency of the reflected signal depends on the dielectric constant ( $\epsilon_r$ ) difference of the mediums. The reflected pulse is detected as an electrical voltage signal and is then processed by the electronics. Level distance is directly proportional to the flight time of the pulse. The measured level data is converted to 4-20mA current and HART® signals and is displayed on the LCD display. The TDR-2000 is unaffected by the other properties of the medium as well as that of the space above it.





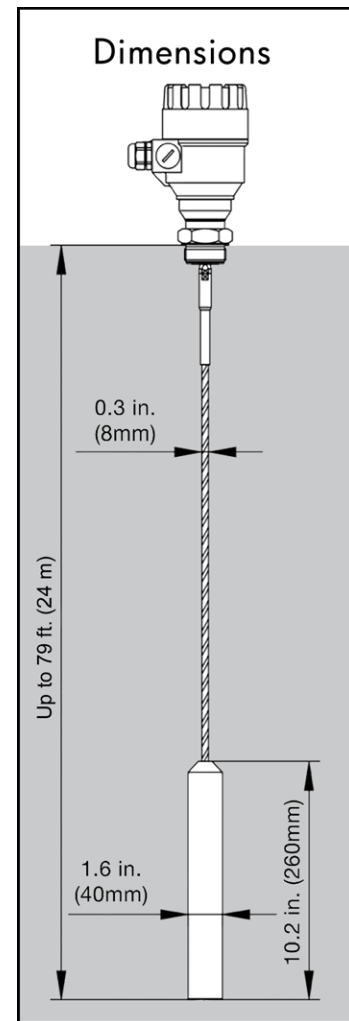
### How To Order



**Note:** The maximum probe length is 79 ft (24.0 m)

## TECHNICAL SPECIFICATIONS

<b>Function:</b>	Level measurement of liquids and solids	
<b>Measuring Range:</b>	Flexible probe:	maximum of 79 ft. (24.0 m)
	Deadband Top:	15.8 in. (40 cm) if $\epsilon_r < 10$ ; 11.8 in. (30 cm) if $\epsilon_r > 10$
	Deadband Bottom:	14.2 in. (36 cm)
	Counter Weight Diameter:	1.575 in. (4 cm); length 10.2 in. (26 cm)
<b>Accuracy:</b>	If cable length < 33 ft. (10 m), then accuracy is $\pm 0.8$ in. (20 mm). If cable length > 33 ft. (10 m), then accuracy is $\pm 0.20\%$ of length.	
<b>Repeatability:</b>	0.04 in. (1.00 mm)	
<b>Dielectric Constant (<math>\epsilon_r</math>):</b>	$\geq 2.1$	
<b>Probe Materials:</b>	Flexible 316 stainless steel cable	
<b>Operating Pressure:</b>	232 psi	
<b>Flange Temperature:</b>	-22° F to 194° F (-30° C to 90° C)	
<b>Electronics Temperature:</b>	-22° F to 131° F (-30° C to 55° C)	
<b>Connection:</b>	1½ in. (38.1 mm) MNPT	
<b>Protection Category:</b>	NEMA 4X, IP66	
<b>Power Supply:</b>	24 VDC (18-35 VDC)	
<b>Output:</b>	4-20mA	
<b>Communication:</b>	HART®	
<b>Approvals:</b>		II 1G Ex ia IIC T6...T3
		II 1G Ex ia IIB T6...T3
		II 1D iaD A20/21 IP65 T100 °C
<b>Weight:</b>	3.3 lb. (1.5 kg) without probe	
<b>Materials of Construction:</b>	<b>Housing:</b>	Aluminum with white epoxy coating
	<b>Cable and weight:</b>	316 stainless steel
	<b>Gasket:</b>	Buna N



## ELECTRICAL CONNECTION

<b>M16 Connector Terminals:</b>	Maximum wire size is 16 AWG (1.5 mm)
<b>Cable Entries:</b>	1 x M16 x 1.5; with standard cable gland: cable clamping area = 0.137 in. - 0.315 in. (3.5 mm - 8 mm)

## ENVIRONMENT

<b>Ambient Temperature:</b>	Without display: -22° F to 131° F (-30° C to 60° C) With display: -4° F to 140° F (-20° C to 60° C)
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