TDR-2000 Guided Wave Radar

Get accurate level data even in difficult process conditions.
Make even better inventory decisions.

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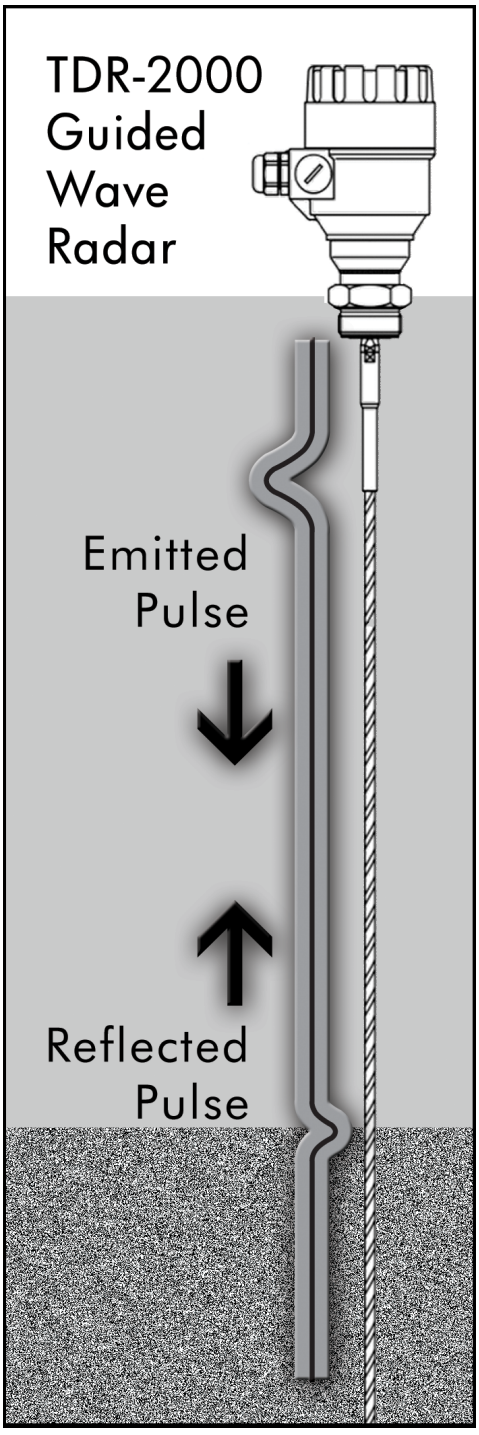
DESIGNED FOR THE MOST DIFFICULT PROCESS CONDITIONS

The TDR-2000 Guided Wave Radar uses a cable to guide a microwave signal. Instead of hoping for a return signal in a dusty, noisy process environment, the TDR-2000 *guides* the signal to the material surface and back again. A consistently reliable measurement is obtained, making this instrument ideal for active silos.

- **TDR-2000 delivers consistently reliable measurements in difficult process conditions:**

  - dust
  - humidity
  - turbulence
  - foam
  - bulk density changes
  - temperature fluctuation
  - vapor
  - pressure/vacuum
  - build-up
  - changes in dielectric constant



EXTREME ACCURACY IN CHANGING CONDITIONS

The cable used by the TDR-2000 Guided Wave Radar unit has a specific impedance value which changes based on the dielectric constant of the surrounding medium. When the TDR-2000 pulse encounters a change in impedance along its cable, a portion of the pulse is reflected back. By measuring the time of flight of the reflected signal, an extremely accurate distance can be calculated.

The measured level data is then converted into 4-20mA and HART® signals and displayed on the LCD display. From the level data, further values can be derived such as volume and mass.

WHY TDR IS MORE RELIABLE THAN THROUGH-AIR TECHNOLOGY

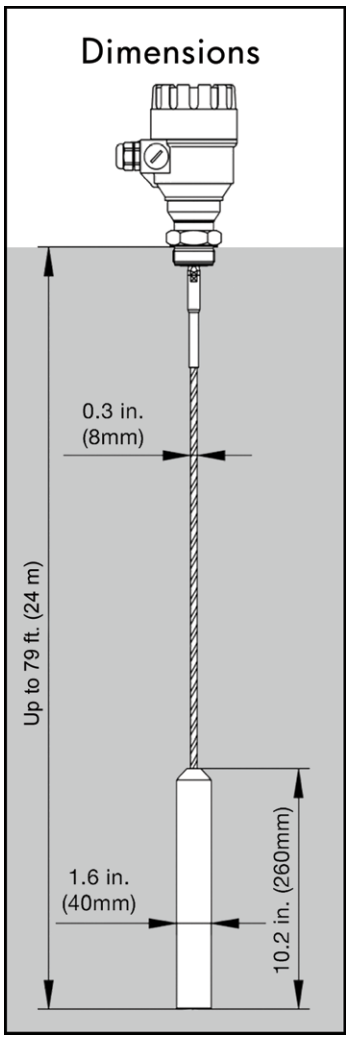
Through-air sonic and through-air radar signals are affected by dust, fill streams, vapors and changes in dielectric constant. The TDR-2000 is, by design, not affected by these changes.

- **Dust** can blind ultrasonic sensors by creating false return signals, thus preventing accurate level measurement especially during the fill cycle.
- **Foam** exhibits a much lower density and a more variable dielectric constant than the liquid below it. Ultrasonic, non-contact radar, capacitance and conductivity level control technologies can give false readings or no readings. Therefore those technologies should not be used in applications involving foam.
- **Vapors** can affect the speed of sound. Ultrasonic sensors are not suitable when vapors are present.
- **Temperature changes** also affect the speed of sound, causing inaccuracies in the distance calculations of sonic and ultrasonic sensors.
- **Material fill streams** obscure the view of many non-contact level-sensing technologies, and the dust and turbulence they create can cause erratic readings.

Easy programming interface allows easy customization in the field.

TECHNICAL DATA

WIRING	Two-wire, loop-powered, maxiumum wire size 16AWG
POWER SUPPLY	24VDC (18VDC to 35VDC)
OUTPUT	4-20mA with HART® protocol, non-isolated
DISPLAY	Integral Display with Keypad
ACCURACY	If cable length < 33 ft. (10 m), then accuracy is ± 0.8 in. (20 mm). If cable length > 33 ft. (10 m), then accuracy is ± 0.20% of length.
DIELECTRIC CONSTANT (εr)	≥ 2.1
OPERATING PRESSURE	232 psi
FLANGE TEMPERATURE	-22° F to 194° F (-30° C to 90° C)
ELECTRONICS TEMPERATURE	-22° F to 131° F (-30° C to 55° C)
MEASURING RANGE	Maximum distance of 79 ft. (24 m)
DEAD BAND	Top: 15.8 in. (0.4 m) if εr < 10; 11.8 in. (0.3m) if εr > 10 Bottom: 14.2 in. (0.36 m)
PROTECTION CATEGORY	NEMA 4X; IP66
PROCESS CONNECTION	1½" (38.1 mm) MNPT
APPROVALS	CE Ex II 1G Ex ia IIC T6… T3 II 1G Ex ia IIB T6… T3 II 1D iaD A20/21 IP65 T100 °C
MATERIALS OF CONSTRUCTION	Housing: Epoxy Coated Aluminum Cable and Weight: 316 Stainless Steel Gasket: Nitrile Rubber (Buna N)



EXPERT INSTALLATION & CONFIGURATION

Our application experts will help you determine the proper configuration for your environment. Then we customize the cable and program each unit for your installation.

genuine BINDICATOR®

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