



DESCRIPTION

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.

HOW IT WORKS

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 rod, cable, or coaxial probe with a known propagation speed (the speed of light). As the pulse reaches the surface of the medium (altered dielectric constant ϵ_r), a part of it is reflected back to the electronic module. The efficiency of the reflected signal depends on the dielectric constant (ϵ_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 4-20 mA current and HART signals and is displayed on the LCD display. From the level data, further derived measuring values can be calculated such as volume and mass. The TDR-2000 is unaffected by the other properties of the medium as well as that of the space above it.

FEATURES AND BENEFITS

Flexibility for a wide range of applications

- Suitable for a broad range of tank sizes, geometries, and internal constructions
- 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

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

Low Maintenance

- Factory calibrated and configured
- Transmitter design minimizes maintenance requirements

HOW TO ORDER

TDR2000 - A - - - - -

- Serial Adapter (Note 2)**
N = No Adapter
Y = RS-422/485
- Enclosure (Note 2)**
N = No Enclosure
E = Plastic Enclosure
- Display Type**
Blank = None (Note 2)
6R0 = 85-265 VAC with no relays
6R2 = 85-265 VAC with two (2) relays
6H0 = 85-265 VAC with no relays, with Sunbright display
6H2 = 85-265 VAC with two (2) relays, with Sunbright display
7R0 = 12-24 VDC with no relays
7R2 = 12-24 VDC with two (2) relays
7H0 = 12-24 VDC with no relays, with Sunbright display
7H2 = 12-24 VDC with two (2) relays, with Sunbright display
- Probe Length, in inches (Note 1)**
- Approvals**
A = General Purpose (IP67)
D = Hazardous Location - Dust (II 1D ia IIIC T85°C...T110°C Da)
G = Hazardous Location - Gas (II 1G Ex ia IIC or IIIB T6...T4)
- Voltage**
A = 18 VDC to 35 VDC

TDR-2000 Guided Wave Radar

NOTES

1. Maximum probe length is 78.8 ft (24.0 m).
2. If no display is required, leave Display Type, Enclosure and Serial Adapter blank

SPECIFICATIONS

FUNCTIONAL

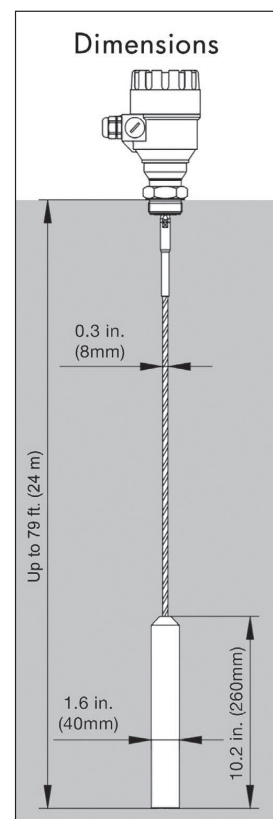
Operating Power	24 VDC (18 to 35 VDC) Ex Version: 24 VDC (18 to 28 VDC)
Ambient Temperature	-4° to 140° F (-20° to 60° C)
Process Temperature	-22° to 212° F (-30° to 100° C)
	Flange: -22° to 194° F (-30° to 90° C)
Operating Pressure	580 psig (40 bar)
Accuracy	Cable length < 33 ft. (10 m); accuracy is $\pm 0.8"$ (20 mm) Cable length > 33 ft. (10 m); accuracy is $\pm 0.20\%$ of length
Dielectric Constant	> 2.1
Output	4-20mA, HART® Communication, terminal resistor 750 Ohm max

PERFORMANCE

Measuring Range	Flexible Probe: Max of 79 ft (24.0 m) Deadband Top: 15.8" (40 cm) if $\epsilon_r < 10$; 11.8" (30 cm) if $\epsilon_r > 10$ Deadband Bottom: 14.2" (36 cm) Counter Weight Diameter: 1.6" (4 cm); length 10.2" (26 cm)
Repeatability	0.04" (1 mm)

PHYSICAL

Process Connection	1½" MNPT
Ingress Protection	1P67 (NEMA 4-4X)
Conduit Connections	(2) M20 x 1.5 and (2) ½" NPT
Electrical Protection	Class III
Probe Materials	Flexible 316 Stainless Steel Cable
Enclosure Materials	Aluminum with white epoxy coating
Gasket Materials	FPM (Viton®), FFKM Perfluoroelastomer (Kalrez® 6375), EPDM
Shipping Weight (Head Unit)	3.3 lb (1.5 kg)



APPROVALS:

ATEX MARKINGS

II 1G Ex ia IIB T6...T4 Ga
II 1G Ex ia IIC T6...T4 Ga
II 1D Ex ia IIIC T85° C...T110° C

T ambient = -20°C...+60° C

PER THE FOLLOWING STANDARDS:

MSZ EN 60079-0:2013
MSZ EN 60079-0:2013/A11:2014
MSZ EN 60079-11:2012



PRD1000 in NEMA 4X Enclosure

POWER SUPPLY AND LOCAL DISPLAY

The PRD1000 is a power supply and local display meter ideal for level, flow rate, temperature, or pressure transmitter applications. Available in 85-265 VAC or 12-24 VDC with up to two relays. It has a dual-line 6-digit display, advanced signal input conditioning, function keys, and Modbus RTU serial communications. The basic model includes an isolated 24 VDC transmitter power supply that can be used to power the input transmitter or other devices. A NEMA 4X enclosure is optional, as well as, an RS-485 serial adapter.



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MEASUREMENT

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