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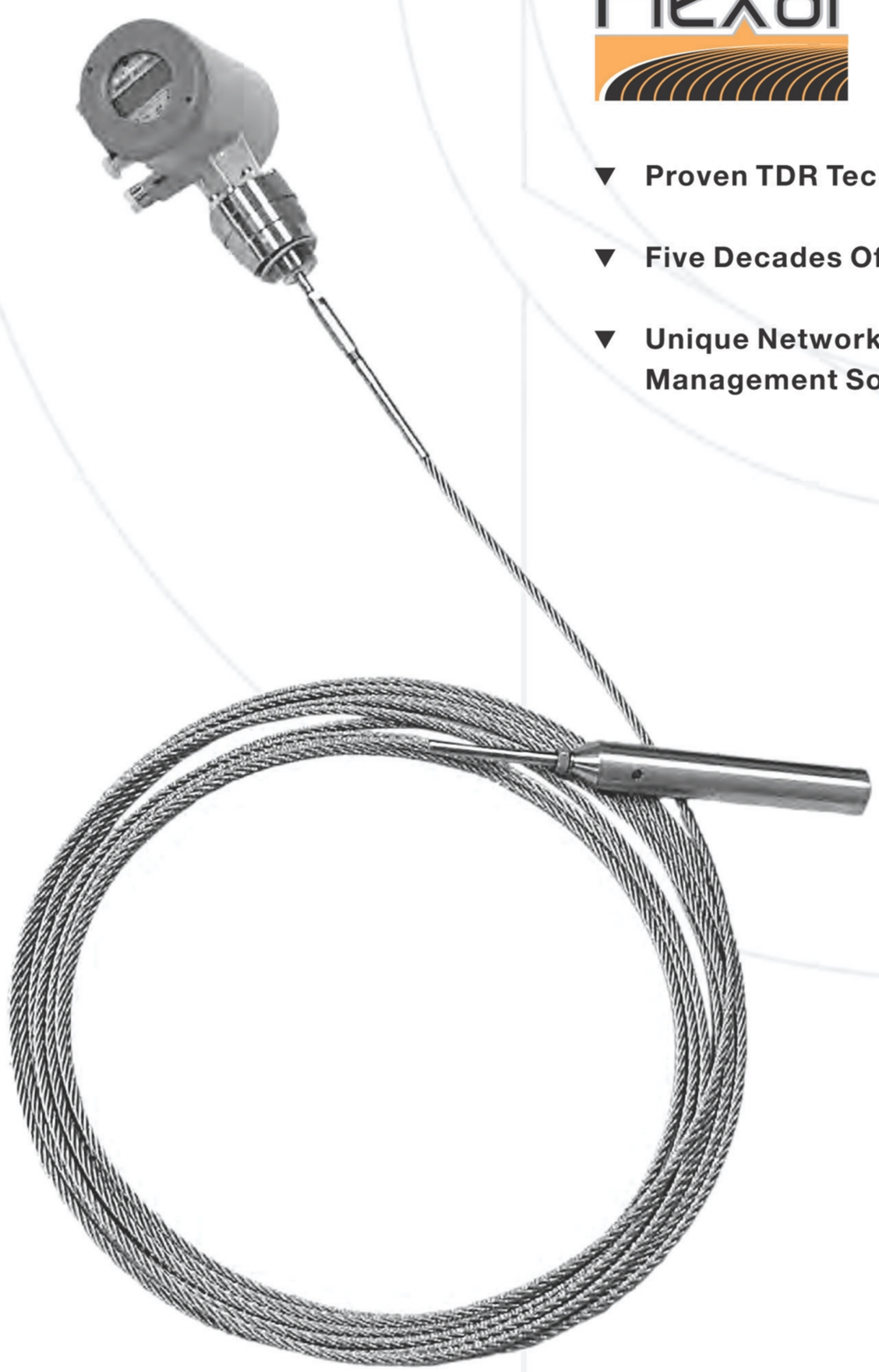
Setting The Standard For Supplier Excellence



Flexar®

Guided Wave Radar Continuous Level Measurement System

- Proven TDR Technology (Time Domain Reflectometry)
- Five Decades Of Application Expertise In Bulk Solids
- Unique Network-Ready PC-Based Inventory Management Software

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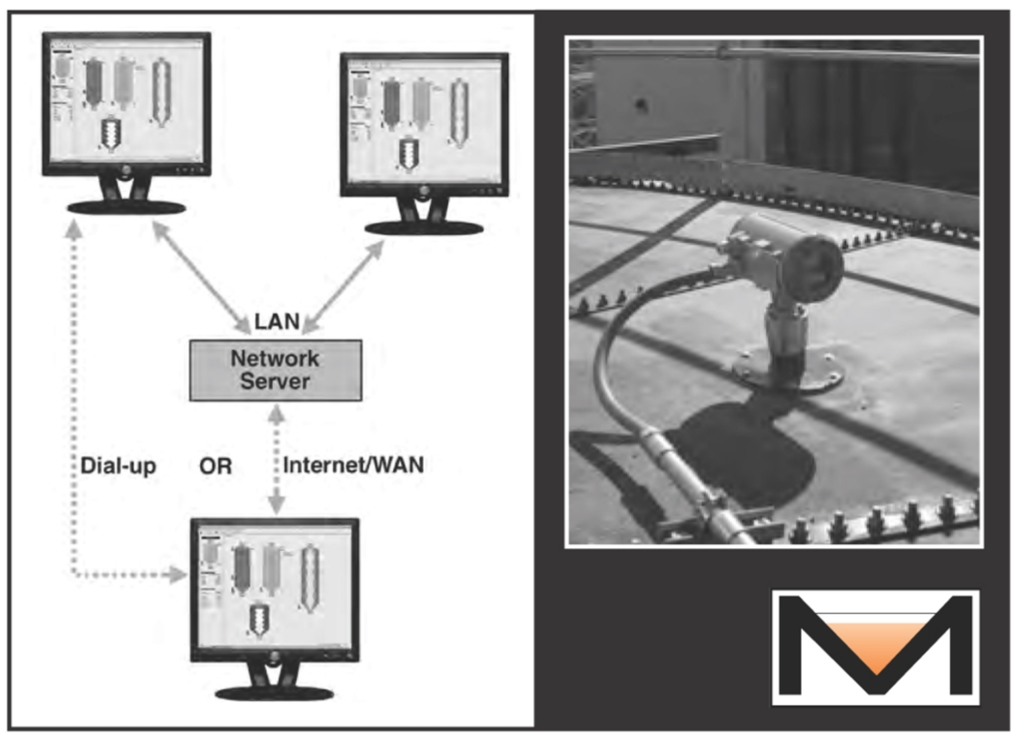
- **Proven Flexar® Technology Installed In Thousands Of Bulk Solids Applications**
- **Reliable TDR (a.k.a Reflex Radar) Technology Used For Decades**
- **"Smart" Transmitter Output For Use With Industry-Leading SiloTrack™ Inventory Management Software**
- **SiloTrack Software Is Network-Ready – Virtually Unlimited Users (Local & Remote)**
- **Measuring Range Up To 100ft (30m) In Solids And 200ft (60m) In Liquids**
- **Unaffected By Airborne Dust, Bulk Density, Temperature, And Other Properties – Ideal For Powders And Pneumatically Filled Solids**
- **Process Temperatures To +392°F (200°C)**
- **No Field Calibration Required - Easy To Install And Setup**
- **Optional Analog Output For Easy Connection To Existing Control Systems Or Indicating Devices**
- **Hazardous Location Approvals Available**



SiloTrack™

Flexar® technology installed on grain bin at Ethanol plant

Flexar® Guided Wave Radar Continuous Level Measurement System

When All The Pieces Fit Just Right!

The Flexar® continuous level measurement system is a smart guided wave radar device used for monitoring the level of powders, granules and other bulk solids. It is also suitable for use with a multiplicity of liquids. It is used in a wide assortment of vessels and industries for measuring levels up to 200ft (60m) in height.

Bringing the Pieces Together: We uniquely combine this proven technology with five decades of expertise and focus in powder and bulk solids applications, along with our **SiloTrack**™ inventory management software interface. Monitor Technologies uniquely provides the best solutions in level measurement and inventory management of powders and bulk solids.

The Flexar sensor requires no field calibration and can be setup easily by customer personnel without the use of any special tools or training. Flexar units are suited for almost any application, can operate with process temperatures up to 392° F (200°C), can be provided with a variety of process connections and can work reliably with materials having a wide range of bulk densities and dielectric constants.

Flexar is available with a choice of two outputs. The standard output is a "smart" interface for use with **SiloTrack**™ Version 3.5 PC-based inventory management software. This network-ready software provides a flexible graphical interface for up to 128 "smart" output sensors. In lieu of this "smart" output, an optional analog output is also available.

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In the TBF mode the pulses travel through air at the speed of light and then pass through the material in the vessel at a slower speed, dependent on the specific dielectric constant. The pulses are reflected at the short circuit back up the probe. Flexar sensors in the TBF mode measure the time between the emission and reception of the pulses from the probe short circuit. Because the return time of a pulse when no material is present (through air) is known, we can determine the difference in time between the time-of-flight when empty and the time-of-flight when filled as being directly proportional to the material level in the vessel.

Flexar® technology measuring the level of a powder mixture for glass production

APPLICATIONS

The Flexar® smart guided wave radar continuous level measuring system can be used in a wide variety of applications, including powders, coarse/fine granular solids, liquids, foodstuffs and even some corrosive substances. Flexar sensor technology is proven in many difficult applications including those where dust levels make it difficult for other technologies to perform reliably, especially at long ranges.

TYPICAL APPLICATIONS INCLUDE, BUT ARE NOT LIMITED TO:

Feeds	Bulk Chemicals
Cement	Plastic Pellets
Coal Dust	Aggregates
Lime	Oils
Powders	Fly Ash
Grains	Flour
Carbon Black	PVC Powder
Silica	

The maximum range for solids applications is typically limited to 100ft (30m)[††] due to load limits possible from heavy materials in long ranges. Liquid applications can extend up to 200ft (60m)[††]. Any application requiring a continuous level measurement update where the process temperature does not exceed 392° F (200°C) and 580psig (40bar) is possible. The 316 stainless steel probes and threaded or flanged process connections make the Flexar continuous level measuring system ideal for almost any bulk solid and liquid application. To ensure a successful and reliable application, consult with the Monitor Technologies factory-based technical support group to see if Flexar is right for your application.

REMOTE INVENTORY MONITORING

If material levels need to be monitored at one or many locations (i.e. your facility, a location down the street, or a plant on the other side of the world) the Flexar system can provide continuous, reliable and accurate measurements. Using **SiloTrack**™ Version 3.5 software, inventory monitoring from remote locations has never been easier.

[††] Maximum measuring range is also limited by the dielectric constant of the material being measured.

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FEATURES

▼ Solid-State Performance, No Moving Parts.
Unlike weight and cable based systems of old, Flexar® guided wave radar sensors are state-of-the-art and use a time-proven electronic method for continuous measurement of a material level. This non-mechanical means of measurement helps ensure low maintenance.

▼ Measure Materials With Dielectric > 1.4 (TBF Mode). Flexar sensors are capable of sensing and measuring the level of most any material. Materials with dielectric constants below 1.8-2.1† require the use of our TBF (tank bottom following) measuring mode.

▼ Unaffected By Dust And Changes In Material Properties. The technology employed in Flexar units has been proven to be unaffected by airborne dust even during pneumatic filling operations. Unlike through-air technologies such as ultrasonic, through-air radar and laser, Flexar can reliably measure in dusty environments without sacrificing performance or reliability.

▼ Range Of Probes.
In order to handle the assortment of applications possible with Flexar, Monitor offers a range of probe styles including single-cable, twin-cable and single-rod. All probes are constructed of 316 stainless steel, have traction load handling capabilities suitable for their respective applications and are easily field replaceable. Consult with Monitor's factory-based technical support personnel to select the right probe style for your application.

▼ Assortment Of Process Connections.
To meet the required bulk solids and liquid applications we have prepared a selection of process connections that will ensure a smooth and simple installation. Flexar sensors can be provided with 1-1/2" NPT, 1-1/2" BSP G, 2" ANSI or DIN DN50PN40 flange connections. Probe type will determine the available process connections.

† Overall measuring range effects the minimum dielectric constant that can be measured.

▼ Dual Compartment Enclosure.
The Flexar smart guided wave radar sensor uses an enclosure with two compartments, each with its own access cover. This allows separation of access for wiring and setup/display. The setup/display compartment is provided with a cover window allowing local viewing of the LCD display. In addition, every unit is provided with either two 1/2" NPT conduit entrances (NPT threaded and ANSI flanged process connections) or M20 cable connectors (BSP threaded and DN flanged process connections).

▼ Local LCD Display And Setup.
Each sensor includes a built-in user interface consisting of a three-line backlit LCD display, three pushbuttons and three magnetic sensors (used to perform setup and interact with the unit without having to remove the display cover).

▼ Universal Power Supply.
Power supply choices include a universal high voltage option 100-240 VAC and a low voltage 24 VAC/VDC option.

▼ Choice of outputs.
The standard output for all Flexar guided wave radar units is a "smart" RS-485 communications interface for use with **SiloTrack**™ Version 3.5 inventory management software. In lieu of this "smart" interface an analog 4-20mA output is available.

Flexar® technology on cement powder silo at concrete batch plant

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SPECIFICATIONS

Power Requirements:	100-240VAC (+10%/- 15%); 9VA; 50/60Hz or 24VAC/VDC (+10%/- 15%); 9VA/W
Altitude:	6562ft (2000m) maximum
Installation Category:	II
Pollution Degree:	4 (reduced to 2 by enclosure) Suitable for indoor/outdoor use
Process Temperature:	
Ordinary Location Units	-20˚F to +300˚F (-30˚C to +150˚C);
Hazardous Location Units	-20˚F to +392˚F (-30˚C to +200˚C)
Ambient Temperature:	-5˚F to +120˚F (-20˚C to +50˚C)
Operating Pressure:	
1-1/2” NPT:	-14.5psig to +580psig (-1bar to +40bar)
G 1-1/2 (1-1/2” BSP):	-14.5psig to +580psig (-1bar to +40bar)
2” ANSI:	-14.5 psig to 150 psig (-1bar to 10bar)
DN50PN40:	-14.5psig to +580psig (-1bar to +40bar)
Measurement Range††:	
Single Cable 0.16” (4mm):	150ft (45m)
Single Cable 0.31” (8mm):	100ft (30m)
Twin Cable 0.16” (4mm):	200ft (60m)
Single Rod .38” (10mm):	10ft (3m)
Accuracy:	
Direct Mode	
Solids	± 0.8” (20mm)
Liquids	< 20ft (6m): ± 0.2” (5mm) ≥ 20ft (6m): ± 0.2” (5mm) + 0.02% of distance measured
TBF Mode (All)	± 0.8” (20mm) when Dielectric is constant
Repeatability:	± 0.04” (1mm)
Resolution:	± 0.012” (0.3mm)
Minimum Dielectric Constant†:	
Direct Mode	Twin Cable ≥ 1.8; Single Cable/Rod ≥ 2.1
TBF Mode	All Probe Styles ≥ 1.4
Process Mounting Connection:	
Single Cable/Rod Only	1-1/2” NPT; G 1-1/2 (1-1/2” BSP)
All probe Styles	2” ANSI 150lb. Flange; DN50PN40 Flange
Conduit/Cable Entry:	
NPT/ANSI Process Connections	(2) 1/2” NPT
BSP/DN Process Connections	(2) M20 x 1.5 cable connectors
Probe Styles:	
Single Cable	
0.16” (4mm)	316SS
0.31” (8mm)	316SS
Single Rod	316SS; 0.38” (10mm) diameter;
Twin Cable	316SS; Two 0.16” (4mm) cables; FEP spacers
Weight:	
Enclosure	18lb (8kg) without probe for ordinary location; 20lb (9kg) without probe for hazardous location;
Single Cable	
0.16” (4mm)	0.08lb/ft (0.12kg/m)
0.31” (8mm)	0.28lb/ft (0.41kg/m)
Single Rod	0.42lb/ft (0.62kg/m)
Twin Cable	double weight of 4mm cables above for twin cable

† Overall measuring range effects the minimum dielectric constant that can be measured.

†† Maximum measuring range is also limited by the dielectric constant of the material being measured.

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Maximum Traction Loading:	
0.31” (8mm) Single Cable	7,700lbs/3.9 tons (3.5 metric tons)
0.16” (4mm) Single Cable	2,250lbs/1.1 tons (1.02 metric tons)
Minimum Separation From Objects:	
Single Cable/Rod	12” (300mm)
Twin Cable	4” (100mm)
Output Signal:	
“Smart”:	RS-485, half-duplex, isolated, proprietary protocol
Analog:	4-20mA; 350ohms maximum load
Wiring Distance (“smart” output):	4,000ft (1,220m)
Local Display:	3-line; Backlit LCD; 3 pushbuttons; 3 magnetic sensors for setup without cover removal
Materials of Construction:	
Enclosure:	Aluminumm, powder coated
Threaded/Flange Connection:	316 Stainless Steel
Process Insulator:	Teflon (PTFE)
O-Ring Seal:	Viton
Probes:	316 Stainless Steel
Remote Electronics:	16.4’ (5m) pre-wired interconnection cable
Dead Zones:	
Single Cable/Rod	
Dielectric = 80 (water)	Top = 15.75” (400mm) Bottom = 0.8” (20mm)
Dielectric = 2.4 (oil)	Top = 19.7” (500mm) Bottom = 3.9” (100mm)
Twin Cable	
Dielectric = 80 (water)	Top = 9.8” (250mm) Bottom = 0.8” (20mm)
Dielectric = 2.4 (oil)	Top = 13.0” (330mm) Bottom = 0.8” (20mm)
Enclosure Rating:	NEMA 4, IP66
Approvals:	
Integral Electronics Only	
Ordinary Location	CE Mark, $CSA_{US/C}$ (pending)
Hazardous Location	$CSA_{US/C}$ Class I, Div 1,2, Groups B, C, D; Class II, Div 1,2, Groups E, F, G; Class III
Remote Electronics	
Ordinary Location	CE Mark