TEKTROL
Technology Solutions

TEK-FLEX 4100A

Explosion-Proof Guided Wave Radar Level Transmitter

LEVEL

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Flow | Level | Temperature | Pressure | Valves | Analyzers | Accessories | TekValSys

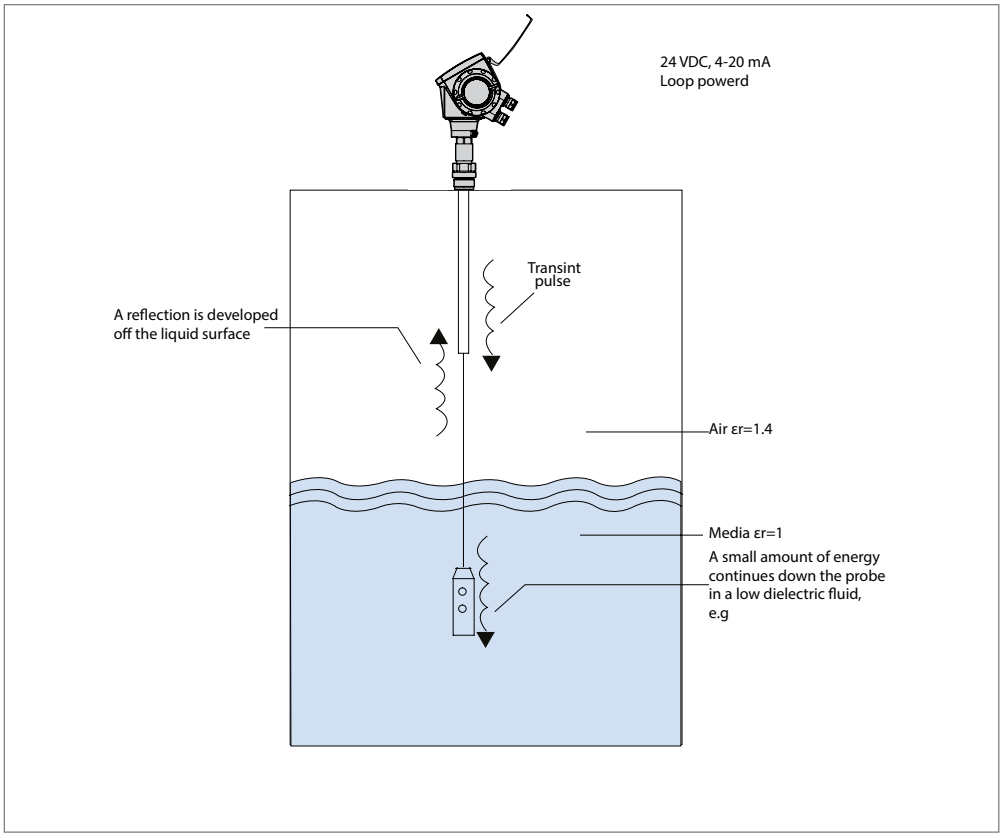
Introduction

Featuring TDR (Time Domain Reflectometry) technology, the Tek-Flex 4100A Explosion-Proof Guided Wave Radar level transmitter provides continuous level measurement in liquids, solids, and slurries. This innovative device has almost no installation restrictions in tanks, silos, and bins up to 65 feet. The Tek-Flex 4100A has a fully isolated 4-20 mA output that can be scaled for tank level or distance. The unit requires 18 to 30 VDC power. The Tek-Flex 4100A ships precisely pre-calibrated for the customers application for quick installation and setup. TDR technology is not affected by pressure, vacuum, temperature, viscosity, foam, or dust. Changes in dielectric constant or coating of the probe do not affect the level measurement due to the dynamic sensing technology programmed into the artificial intelligence of the Tek-Flex 4100A level transmitter.

Working Principle

Tek-Flex 4100A Explosion-Proof Guided Wave Radar's principle is solely based on microwave technology. Probe is immersed in the liquid or bulk media. High frequency electromagnetic pulses transmitted down the probe are reflected at the point of discontinuity between the air and the process medium. Reflections are measured by high–speed circuitry in the transmitter and establish the measurement level. Microwaves accuracy are not affected by temperature variations, dust, pressure, and viscosity except materials that are used in the tank or chambers. The device sends a low energy microwave pulse down the probe. When the pulse and media come in contact, a constant amount of energy is reflected back up the probe to the device. The level is directly proportional to Time Domain Reflectometry. The transmitter measures the time delay between the transmitted and received echo signals and the on-board microprocessor in the transmitter calculates the distance to the liquid using the formula:

Distance = (speed of light * time delay)/2



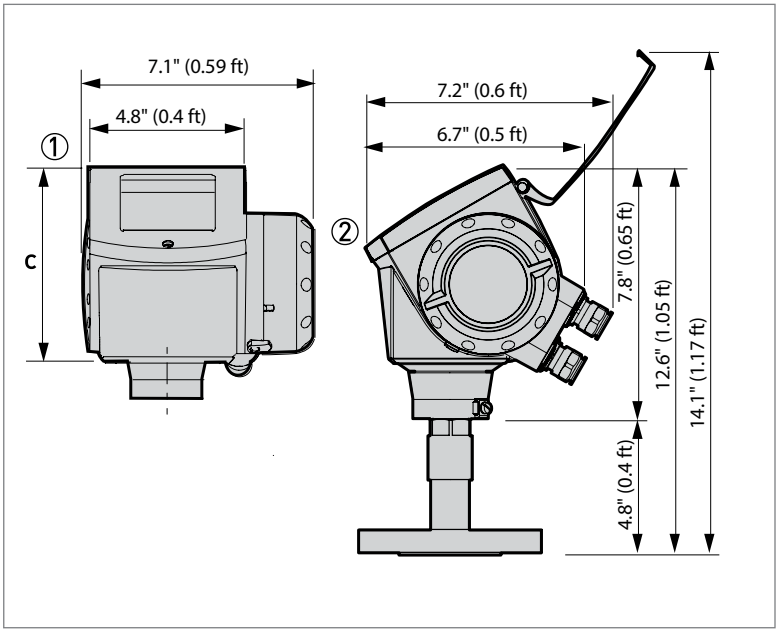
Benefits

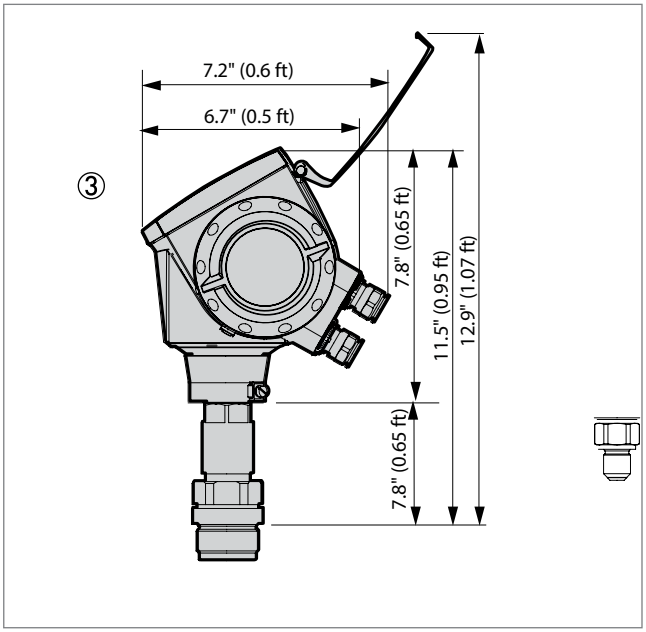
- Revolutionary TDR Technology
- Auto calibration to any dielectric
- Precise continuous level measurement
- Measures liquids, slurries, and solids
- Highly robust measurement due to the 4-wire designand
- Signal analysis, and constant disturbance signal suppression
- Optional NEMA 7 enclosure for Class 1 Div 1 areas
- Measures up to 65 feet
- Pre-calibrated from factory for easy installation
- High temperature applications
- Programmable fail safe mode
- Economically priced

Applications

- Iron and steel Industry
- Oil and gas production Industry
- Power Generation Industry
- Pulp and paper Industry
- Chemical Industry
- Food & Beverage Industry

Dimensional Drawing

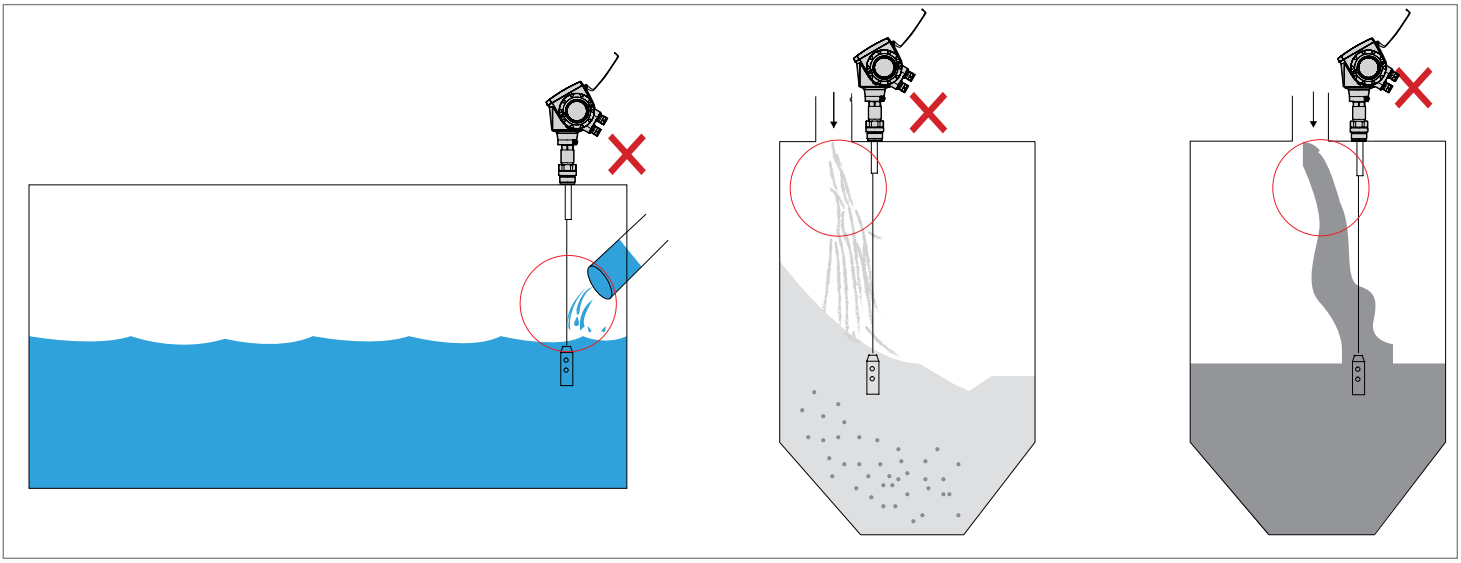




Specifications

Signal Output	4-20 mA
Fail Safe Output	User selectable to 3.8 mA, 4 mA, 20 mA, 20.2 mA
Operating Voltage	12-30 VDC (residual ripple no greater than 100 mV)
Power Consumption	<3W @ 24 VDC
Communications	RS485 Modbus
Measurement Range	65' with minimum dielectric constant of 0.3
Repeatability	±0.02" (0.5 mm)
Max Operating Temperature	Electronics: -40 °F to 158 °F (-40 to 70 °C) Process/Probe: -40 °F to 398 °F standard (-40 °C to 203 °C)
MaxOperating Pressure	-14.50 psi to 580 psi
Accuracy	±0.039" (1mm) or 0.02% of measured distance, whichever is greatest.
Resolution	0.0008"
Signal Wiring	Recommended Signal Output and Communications Output is Twisted Shielded Pairs, 20-18 AWG
Probe Type/Diameter	Rod Probe: 316 Stainless Steel, 0.25" diameter Wire Cable Probe: 316 Stainless Steel, 0.195" diameter Weighted Assembly: 0.75" diameter
Tensile Load	4,270 lbs
Enclosure	NEMA 6: Coated Epoxy Aluminum with IP67 Sealing NEMA 7: Class 1, Group D Class 2, Group E, F and G Class 3, DIV. 1 and 2
Cable Entries	2 ½" NPT Conduit Entries

Installation



- Minimum nozzle diameter should be 2" from the probe at initial installation.
- Probes should not come in contact with the metallic tank walls, obstructions or structures.
- If using cable probes, take into account the possibility of cable sway encroaching clearance requirements of agitators and augers. If this possibility occurs, secure a ring or mounting connection to the cable weight and to the vessel floor.

Tek-Flex 4100A with ¾" NPT mounting in liquids, slurries, or solids applications

Model Chart

4100A		Tek-Trol 4110B Guided Radar (TDR) Level Transmitter for heavy-duty and interface applications			
		Approval			
		0	Without		
		2	ATEX II 1 G Ex ia IIC T6 Ga + II 1 D Ex ia IIIC Da		
		6	FM IS CL I/II/III DIV 1 GPS A-G + CL I zone 0 Ex ia IIC T6		
			FM XP-AIS/DIP/NI CL I/II/III Div 1 GPS A–G + CL I zone 1 / zone 2 Ex d[ia] / Ex nA[ia] IIC T6		
			Material of Process Connection and Probe / Pressure		
			0 316L (1.4404) / 40 barg (580 psig)		
			1 HASTELLOY® C-22® (2.4602) / 40 barg (580 psig)*		
4100A		Order code (complete this code on the pages that follow)			
			Probe type		
			0	Single rod Ø8 mm (0.32¨) max. 4 m (13.12 ft)	
			1	Double rod Ø8 mm (0.32¨) max. 4 m (13.12 ft)	
			2	Coaxial Ø22 mm (0.87¨) max. 6 m (19.69 ft)	
			3	Single cable Ø4 mm (0.16¨) max. 35 m (114.83 ft)	
			4	Single cable Ø8 mm (0.32¨) max. 35 m (114.83 ft)	
			5	Double cable Ø4 mm (0.16¨) max. 8 m (26.25 ft)	
			7	Single cable Ø4 mm (0.16¨) FEP coating 1 mm (0.04¨) max. 35 m (114.83 ft)	
			8	Single rod Ø8 mm (0.32¨) + PVDF sheath max. 4 m (13.12 ft)	
			A	No probe – (single rod Ø8 mm (0.32¨) max. 4 m (13.12 ft)	
			B	No probe – (double rod Ø8 mm (0.32¨) max. 4 m (13.12 ft)	
			C	No probe – (single cable Ø4 mm (0.16¨) max. 35 m (114.83 ft)	
			D	No probe – (single cable Ø8 mm (0.32¨) max. 35 m (114.83 ft)	
			E	No probe – (double cable Ø4 mm (0.16¨) max. 8 m (26.25 ft)	
			H	Single cable Ø4 mm (0.16¨) for BM 26 ADVANCED	
			L	Single cable Ø4 mm (0.16¨) for BM 26 F	
			M	Single rod Ø8 mm (0.32¨) max. 6 m (19.69 ft) – segmented	
			S	Coaxial Ø22 mm (0.87¨) max. 6 m (19.69 ft) – segmented	
				Probe end type	
				0	Without (rod and coaxial probes)
				1	Counterweight Ø12 mm × 100 mm (Ø0.47¨ × 3.94¨) (single cable Ø8 mm (0.32¨)
				2	Counterweight Ø38 mm × 245 mm (Ø1.5¨ × 9.65¨) (single cable Ø8 mm (0.32¨)
				3	Counterweight Ø20 mm × 100 mm (Ø0.79¨ × 3.94¨) (single cable Ø4 mm (0.16¨)
				4	Counterweight Ø38 mm × 60 mm (Ø1.5¨ × 2.36¨) (double cable Ø4 mm (0.16¨)
				A	Turnbuckle
				B	Chuck
				C	Threaded end
				D	Crimped end
				E	Open end
				L	Centering counterweight for BM 26 F + BM 26 ADVANCED

					Feedthrough / Temperature / Sealing					
					0	Standard / -40...+200°C (-40…+392°F) / FKM/FPM				
					1	Standard / -20...+200°C (-4…+392°F) / Kalrez 6375				
					4	Standard / -50…+150°C (-58…+302°F) / EPDM				
4100A					Order code (complete this code on the pages that follow)					
						Process connection ASME				
						2	1 NPT			
						3	1½ NPT			
						7	2¨ 150 lb RF ASME B16.5			
						8	2¨ 300 lb RF ASME B16.5			
4100A							Order code (complete this code on the pages that follow)			
							Output			
							0	1 output: 4…20 mA (HART®)		
							2	2 outputs: 4...20 mA (HART®) + 4…20 mA – INTERFACE		
								Housing / Cable entry / Cable gland		
								1	Aluminium / ½ NPT (nickel-plated brass adapter) / without	
									Housing option	
									0	Without
									2	Stainless steel weather protection
4100A										Order code (complete this code on the pages that follow)
										HMI (display and keys)
										0 Without
										1 With HMI
4100A										Order code

* Not available for single cable Ø8 mm (0.32¨) and double cable Ø4 mm (0.32¨) probes

Customer Service and Support

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Tek-Trol is a fully owned subsidiary of TEKMATION LLC. We offer our customers a comprehensive range of products and solutions for process, power, and oil and gas industries. Tek-Trol provides process measurement and control products for Flow, Level, Temperature and Pressure measurement, Control valves and Analyzer systems. We are present in 15 locations globally and are known for our knowledge, innovative solutions, reliable products, and global presence.

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