



Technology Solutions

TEK-WAVE 4300A

Radar Level Transmitter



LEVEL



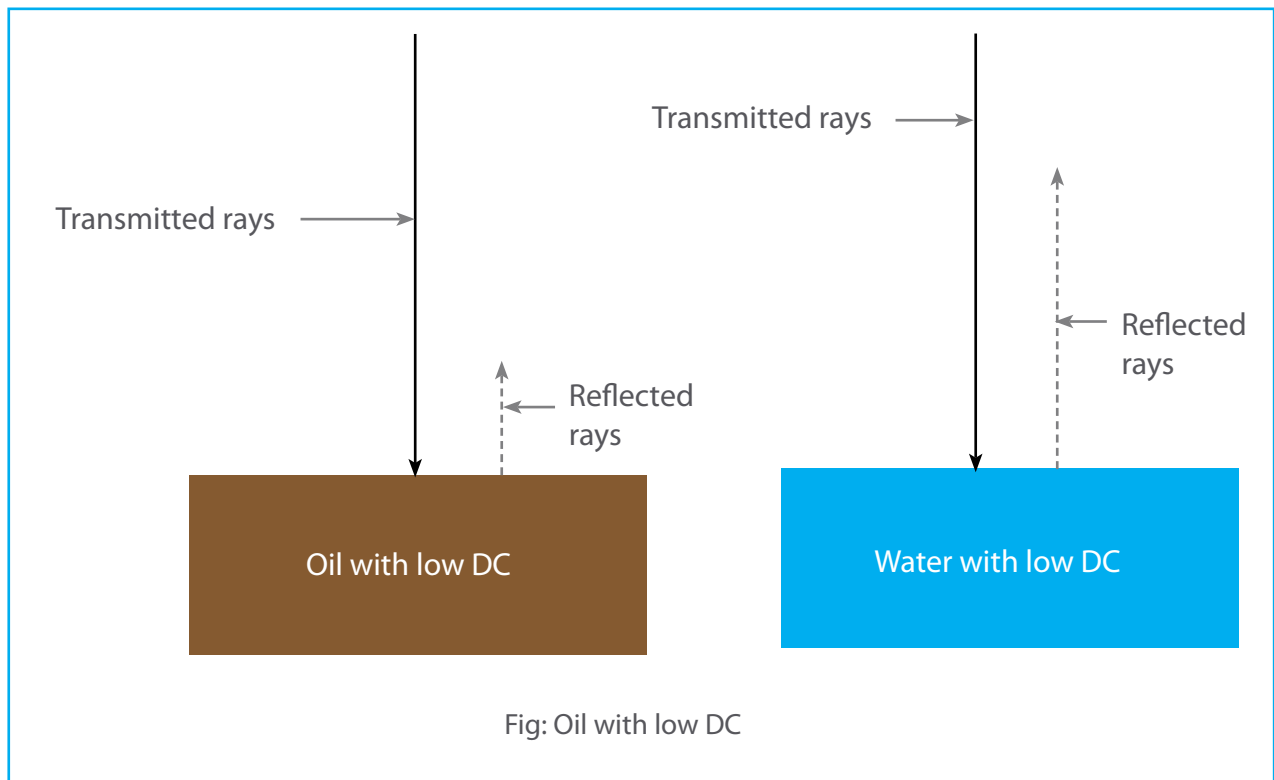
Introduction

The Tek-Wave 4300A Radar Level Transmitter is a device for continuous level measurement that uses radar technology to measure the level of different types of media. The key advantage of this device is its ability to take reliable and accurate measurements even under extreme temperature and pressure conditions. The density, viscosity, or the conductivity of the medium does not affect it. Furthermore, since it does not come in contact with the media. It can also be used to measure levels of corrosive, viscous, and abrasive materials without any damage.

Working Principle

The Tek-Wave 4300A uses the Time of Flight method to measure the level of the medium. The radar transmits a signal containing short-duration radar pulses via the antenna towards the surface of the medium. When the signal reaches the surface, a part of it is reflected back to the antenna. The transmitter calculates the time between the transmissions of the signal to the reception of the reflected signal (also called the echo) by the antenna. This is known as the Time of Flight and is used to calculate the distance to the surface of the medium. The level measurement of any medium depends on the strength of the reflected signal, which in turn is influenced by factors such as the Dielectric Constant (DC) of the medium, the distance from the antenna, and the turbulence on the surface of the medium. Every medium has a Dielectric Constant (DC). The higher the Dielectric Constant (DC) of a medium, the stronger the reflected signal, and the range measure can be longer.

For example, vacuum has a Dielectric Constant (DC) 0 and does not generate any reflection. The approximate Dielectric Constant (DC) of oil and water are 2 and 80 respectively; the signal strength of oil is therefore weaker than that of water. The intensity of the reflected signal also decreases as the distance between the antenna and the medium surface increases.



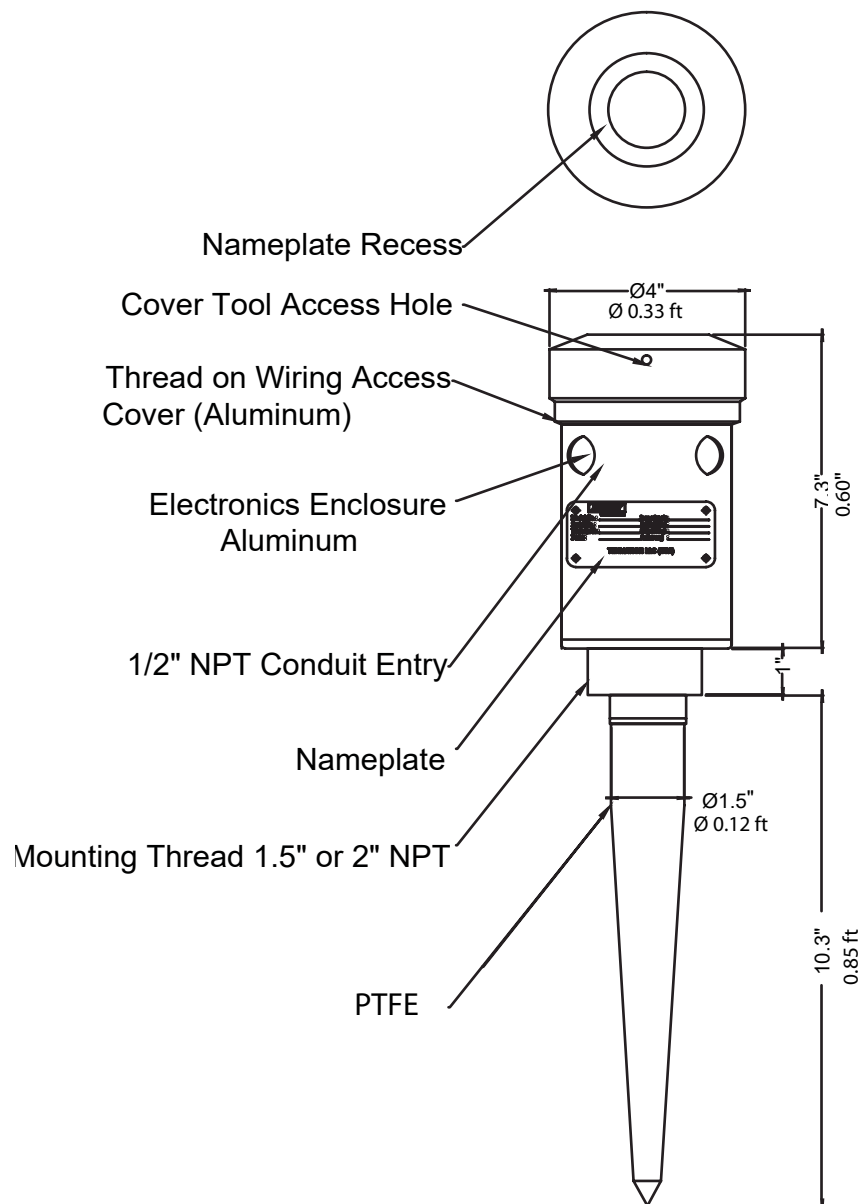
Benefits

- 2-wire operation with HART
- The radar adjusts its power and sensitivity to receive one echo from measured material and eliminates any false echoes
- Simple push-button calibration

Application

- Water/Wastewater Industry
- Chemical Industry

Dimensional Drawings



Specifications

TEMPERATURE SPECIFICATIONS

Temperature	-40 °F to 140 °F (-40 °C to 60 °C)
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OPERATIONAL SPECIFICATIONS

Operation	Pulse Radar
Accuracy	±0.1% of Max. Range in Lab Using 4-20 mA Current Output
Response Time	Standard Unit 2-3 Echoes Per Sec. Std. with Less Damping 6 Echoes/sec. Fast Protocol Unit 10 - 30 Echoes/Sec.
Frequency	6.3 GHz
Transmit Power	50 µW Average
Calibration	Via Communications Port (required)
Diagnostics	Echo Profile via Communications Port
Antenna	PTFE
Power Input	20-35 VDC
Loss of Echo Current	Default 22 mA or 3.5 mA
Output	4 to 20 mA with HART
Agency Approvals	FM for Can. & US Explosion Proof Class I, Div.1, Groups B, C, D: Dust-Ignition Proof Enclosure for Class II/III Div. 1, Groups E, F, G.

PROCESS SPECIFICATIONS

Temperature PP Rod	-40 °F to 176 °F (-40 °C to 80 °C)
De-coupler and PTFE Rod	-40 °F to 350 °F (-40 °C to 177 °C)
Material Dielectric	Er >2
Max. Pressure	72.5 PSI (5 bar) (Without De-coupler)

MECHANICAL SPECIFICATIONS

Conduit Entry	1/2" NPT x 2
Enclosure	Aluminum
Ingress Protection	NEMA 6 (IP68)

TECHNICAL SPECIFICATIONS

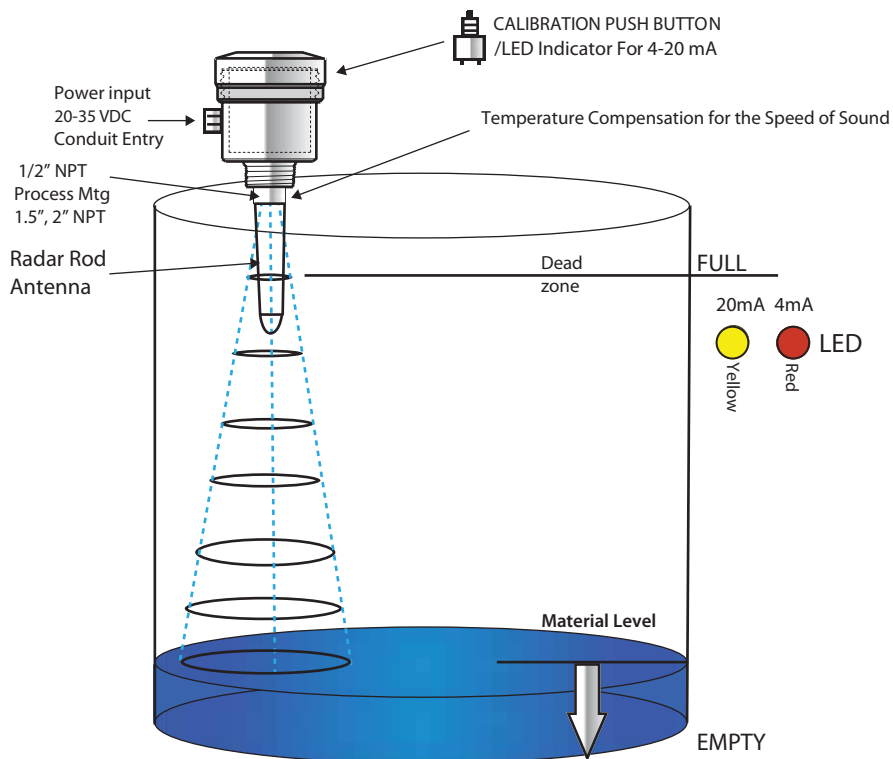
Radars Range Code	Range in Liquids	Resolution	Mounting
017	(204") *17 ft.	0.08"(0.006 ft)	**2", 1 1/2" NPT
033	(396") *33 ft.	0.15" (0.012 ft)	**2", 1 1/2" NPT
050	(600") *50 ft.	0.22" (0.018 ft)	**2", 1 1/2" NPT
100	(1200") *100 ft.	0.44" (0.036 ft)	**2", 1 1/2" NPT

Note: *Minimum range starts at the lower tip of the antenna for high dielectric material (water). For low dielectric material allow a longer minimum range.

**Only 2" and 3" NPT mounting connection is available on high temperature radar.

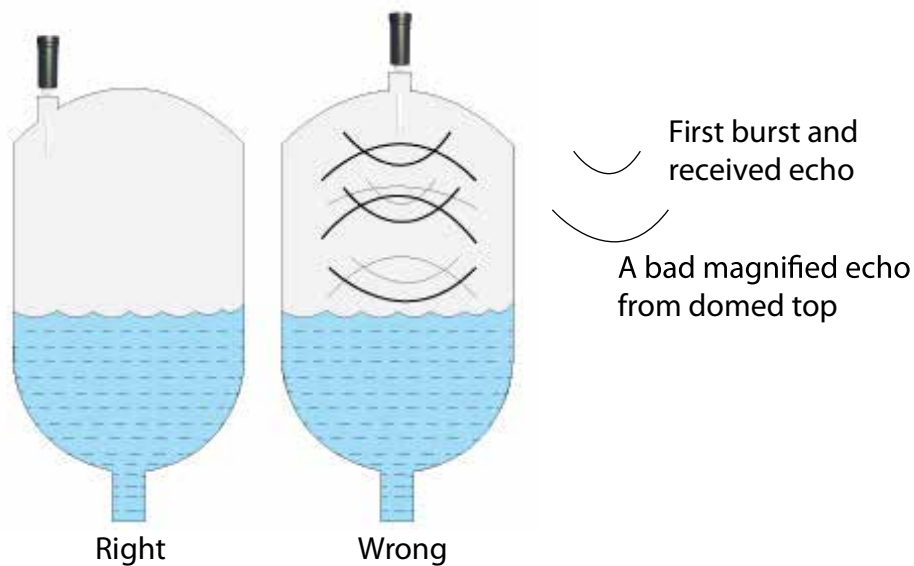
Installation

The radar unit must be installed into a metal fitting with the antenna pointing downward



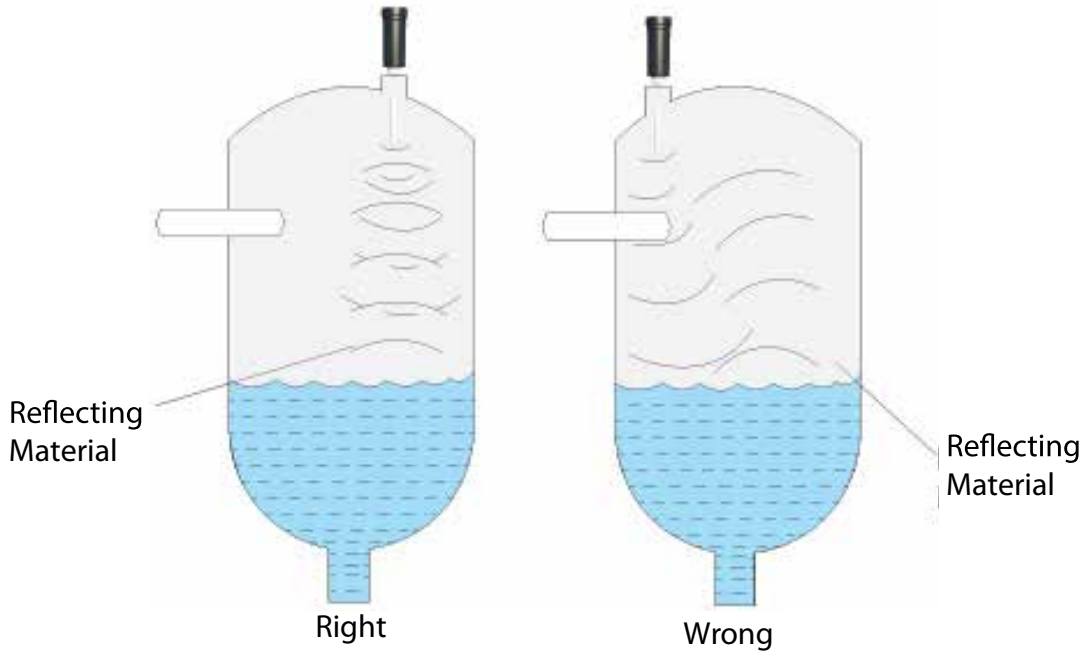
Installation of Tanks with Domed Top

When mounting Tek-Wave 4300A in a tank that has a domed top, the mounting cannot be in the centre. The domed top works like a satellite dish and magnifies the first receiving echo. This echo actually gets stronger than the first received echo. This creates a false echo which the software locks onto. This echo is typically twice the distance of where the material actually is.



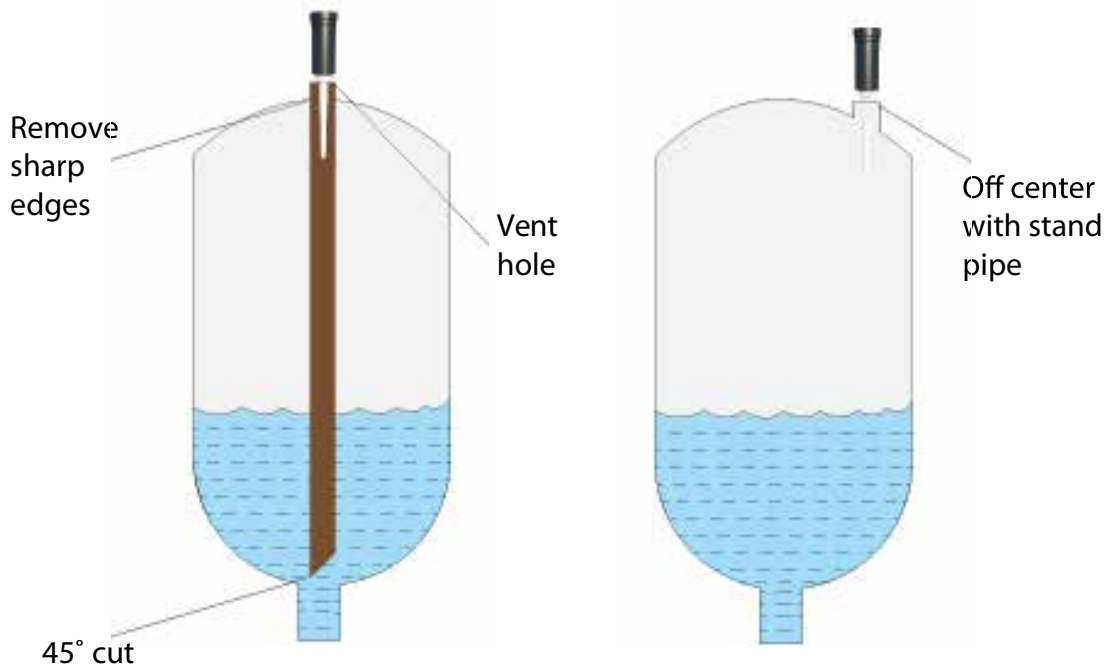
Installation on Tanks with Obstruction

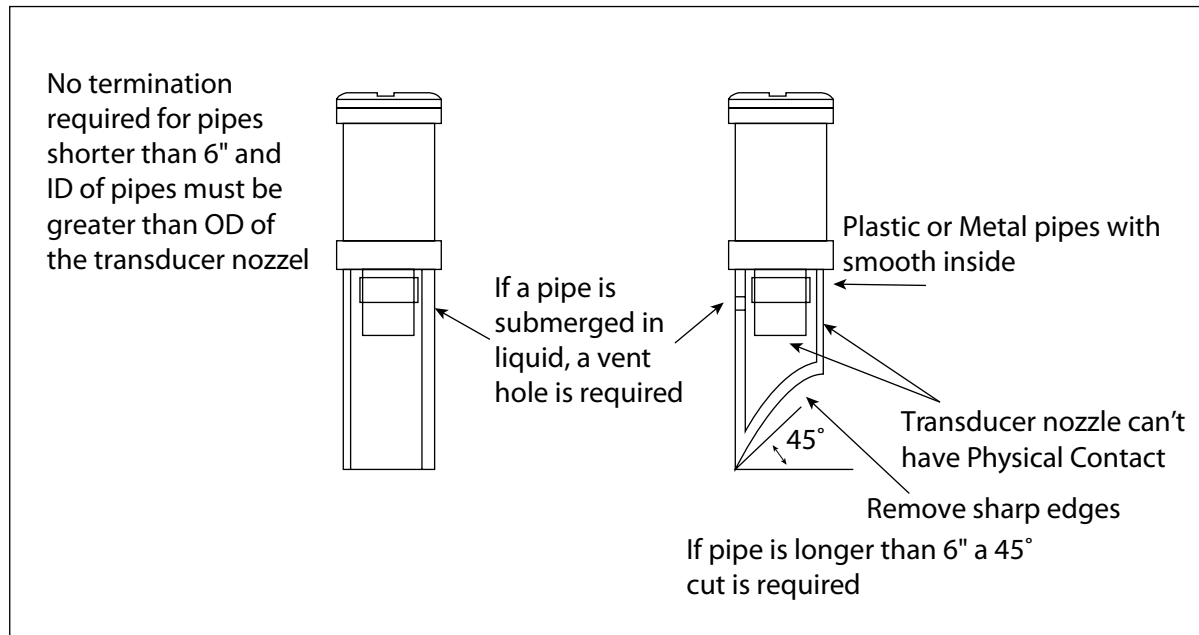
During installation make sure that you do not have any large objects in front of transducer or antenna.



Installation on Stilling Well and Stand Pipe

Radar must be mounted off center or in a stilling well because multiple reflections can occur. The rounded bottom of the tank can gain our radar signal and cause false readings.





Stilling Well must be within 5" of the bottom of the tank with 45° cut.

Popular Models

Model Number	Description
4300A-017R6CH-ALATE	17 ft. Range, 2 wire 4-20 mA w/HART
4300A-033R6CH-ALATE	33 ft. Range, 2 wire 4-20 mA w/HART
4300A-050R6CH-ALATE	50 ft. Range, 2 wire 4-20 mA w/HART
4300A-100R6CH-ALATE	100 ft. Range, 2 wire 4-20 mA w/HART