

ABB MEASUREMENT & ANALYTICS | APPLICATION NOTE

Modernizing reverse float gauge technology

Float tape and board automation



Leveraging laser level transmitters for enhanced tape gauge measurements

Measurement made easy

Bulk tank

Introduction

Float and board level gauges, along with reverse float gauge technology, are widely utilized in various industries such as upstream oil and gas, water and wastewater treatment, food and beverage, power generation, petrochemicals, and mining for precise monitoring of liquid levels in bulk storage tanks.

These gauges provide visual indication by utilizing buoyant floats or weighted targets attached to measuring tapes or cables. As industries strive for modernization and enhanced accuracy, exploring alternative solutions such as laser level transmitters becomes imperative to achieve continuous analog output and seamless integration into control systems.

Additional Information

Additional documentation on Modernizing reverse float gauge technology is available for download free of charge at www.abb.com/level.

Alternatively simply scan this code:



Challenge

02 LLT100 mounted facing upward to target weight on reverse tape gauge

03 Condensation shield to protect laser lens This technology is still widely used due to its costeffective design and ability to measure over very long distances.

However, the technology is limited to only offering a visual indication of the level inside the tank and/or proximity switches which are maintenance intensive and may require costly scaffolding and permitting.

Also, many of the existing installations do not allow for tank modification due to height, accessibility, cost constraints, and regulatory code compliance. This causes more complexity to add modern automation technology for remote monitoring.



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Recognizing these limitations, industries seek alternative solutions that offer improved accuracy, continuous analog output, and easier integration, enabling them to overcome these challenges and unlock the full potential of their tank level monitoring systems.

The ABB solution



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The LLT100 is able to solve issues with this measurement due to its small beam divergence of < 0.3° allowing it to be installed facing upward to track the position of the weight or target with minimal modification. Testing of condensation building up on the lens also had little impact on the performance as water acted as a magnifying glass for the laser to shoot through. Previous technology used yielded poor performance due to inherent issues with microwave technology. The PVC guide tube will not trap the radar signal inside and even the smallest beam angle on the market, 3°, struggled to detect the weight reliably.

Rationalization

04 Four-day signal trend from through air radar technology

05 Four-day signal trend from laser Modernizing these systems by adding continuous position monitoring has proved to be simple and cost effective. However, there are some key points to consider.

Most notably is the distance to be measured and the size of the target. Since lasers have a <0.3° beam angle, some standard spot widths can be calculated at distance.



10 ft 0.8 in 16 ft 1.3 in 33 ft 2.6 in 66 ft 5.3 in 98 ft 7.9 in 164 ft 13.4 in 228 ft 27.3 in	Distance	Spot width	
16 ft 1.3 in 33 ft 2.6 in 66 ft 5.3 in 98 ft 7.9 in 164 ft 13.4 in 228 ft 27.3 in	10 ft	0.8 in	
33 ft 2.6 in 66 ft 5.3 in 98 ft 7.9 in 164 ft 13.4 in 228 ft 27.3 in	16 ft	1.3 in	
66 ft 5.3 in 98 ft 7.9 in 164 ft 13.4 in 228 ft 27.3 in	33 ft	2.6 in	
98 ft 7.9 in 164 ft 13.4 in	66 ft	5.3 in	
164 ft 13.4 in	98 ft	7.9 in	
220 ft 27 2 in	164 ft	13.4 in	
21.2 III	328 ft	27.2 in	

The corresponding spot widths should be considered when determining how large the weight or target needs to be for the laser to reliably detect it. An advantageous aspect of laser level transmitters is that the target material of construction does not impact their functionality. This is because the technology relies on infrared light rather than microwaves, which are dependent on the dielectric constant of the material for detection.

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In conclusion, the adoption of laser level transmitters presents a transformative opportunity for industries seeking to enhance their existing tape gauge level monitoring.



ABB Measurement & Analytics

For your local ABB contact, visit: www.abb.com/contacts

For more product information, visit: www.abb.com/level



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