

Werted 28

A practical guide to werted 28, covering the reader intent, the relationship to werted 28, key evaluation criteria, common risks, and the information the intended project audience should confirm before taking the next step.



levelmeter.org
Main topic: Main Page
<https://www.level-meters.com/>

In the landscape of industrial process automation, the precision of level measurement is a fundamental requirement for operational safety, inventory management, and process efficiency. Among the various technologies available, the werted 28 series has emerged as a significant solution for high-frequency radar level measurement. This article provides a comprehensive engineering reference for the werted 28, detailing its underlying measurement principles, selection criteria, and practical installation guidelines for B2B applications in water treatment, chemical processing, and oil and gas industries.

| Understanding the Principles of Level Measurement

Before selecting a specific instrument like the werted 28, it is essential to understand the physical principles that govern level detection. Industrial level measurement is generally categorized into contact and non-contact methods, each with distinct advantages depending on the medium and environmental conditions.

| Radar Level Measurement (Non-Contact)

The werted 28 typically utilizes high-frequency radar technology, specifically operating in the 26GHz or 80GHz bands. The principle is based on the "Time of Flight" (ToF) of electromagnetic waves. The instrument emits a microwave pulse from its antenna, which travels at the speed of light. When these waves encounter the surface of the medium (liquid or solid), a portion of the energy is reflected back toward the sensor.

The distance (D) from the sensor to the material surface is calculated using the formula:

$$D = (c \times t) / 2$$

Where:

- c is the speed of light.
- t is the measured time delay between emission and reception.

High-frequency radar instruments like the werted 28 are preferred in modern engineering because they are virtually unaffected by changes in process pressure, temperature, or the presence of inert gases in the vapor space. Furthermore, the shorter wavelength of high-frequency radar allows for smaller antenna sizes and narrower beam angles, which are critical when installing sensors in narrow tanks or vessels with internal obstructions.

| Ultrasonic Level Measurement

Ultrasonic sensors operate on a similar ToF principle but use mechanical sound waves instead of electromagnetic pulses. While cost-effective, ultrasonic measurement is sensitive to the medium's temperature (as the speed of sound varies with air density) and can be hindered by heavy foam, dust, or vacuum conditions. For more demanding applications, engineers often transition from ultrasonic to radar solutions found on the Main Page of specialized manufacturers.

| Hydrostatic Level Measurement

Hydrostatic transmitters measure the pressure exerted by a liquid column at the bottom of a tank. The level is calculated based on the density of the liquid and gravity ($P = \rho gh$). This is a contact method that is highly reliable for vented tanks but requires precise knowledge of the liquid's density, which may fluctuate with temperature changes.

| Technical Specifications and Evaluation of Werted 28

The werted 28 is engineered to handle complex industrial environments where accuracy and durability are paramount. Its design often features a 26GHz pulse radar architecture, which provides a balance between penetration capability and signal focus.

| Key Technical Characteristics

1. Measurement Range: Typically up to 30 meters (approx. 98 feet) for liquids and 15 meters for solids, depending on the dielectric constant of the material.

- 2. Accuracy: Standard units offer an accuracy of $\pm 3\text{mm}$ to $\pm 5\text{mm}$, making them suitable for both process control and inventory monitoring.
- 3. Process Temperature: Capable of operating in environments ranging from -40°C to $+250^{\circ}\text{C}$, provided the appropriate cooling or insulation flanges are utilized.
- 4. Signal Output: Standard 4-20mA with HART protocol is common, allowing for easy integration into existing PLC or SCADA systems. Modbus RS485 and Profibus options are also frequently available for digital networking.
- 5. Frequency: The 26GHz frequency allows the werted 28 to maintain a concentrated beam, reducing the risk of false echoes from tank walls or agitators.

| Selection Criteria for Industrial Applications

Choosing the correct configuration for the werted 28 involves evaluating the physical and chemical properties of the application. The following table provides a practical selection guide for common industrial scenarios.

| Table 1: Technology Selection Matrix

Medium Type	Process Condition	Recommended Technology	Why?
Clean Water	Ambient Pressure	Ultrasonic / Radar	Cost-effective and reliable.
Corrosive Acid	High Temperature	Radar (PTFE Antenna)	Non-contact prevents corrosion; PTFE resists vapors.
Crude Oil	Potential Vapor	Radar (26GHz)	Radar waves penetrate vapors unaffected.
Wastewater	Turbulence/Foam	Hydrostatic / Radar	Hydrostatic is unaffected by surface foam.
Solid Grain	Heavy Dust	Radar (80GHz / 26GHz)	High-frequency radar penetrates dust better than ultrasonic.

When evaluating a project, engineers should confirm the Dielectric Constant (ϵ_r) of the medium. Materials with a low ϵ_r (such as liquid gases or hydrocarbons) reflect less radar energy, requiring more sensitive electronics or a stilling well to concentrate the signal.

Installation Guidelines and Best Practices

Proper installation is the most critical factor in ensuring the long-term reliability of the werted 28. Even the most advanced sensor will fail to provide accurate data if positioned incorrectly.

Positioning and Clearance

Avoid the Center: Never install the sensor in the dead center of a circular tank. This can lead to multiple reflections (parabolic effect) that confuse the signal processor.

Wall Distance: Maintain a minimum distance from the tank wall, typically 1/6th of the tank diameter or at least 200mm. This prevents the beam from reflecting off the wall surface.

Obstruction Mapping: Ensure the beam path is clear of ladders, heating coils, or agitators. If obstructions are unavoidable, most Werted 28 units allow for "False Echo Storage," where the software learns to ignore static reflections from internal structures.

| Nozzle Considerations

The nozzle height and diameter play a significant role in signal quality. The antenna should ideally extend slightly beyond the bottom of the nozzle to prevent internal reflections within the mounting pipe. If a long nozzle is required, a larger diameter nozzle should be used to minimize interference.

| Environmental Protection

For outdoor installations, a sunshade or protective cover is recommended to prevent extreme temperature fluctuations from affecting the electronics housing. In applications involving steam or condensation, an instrument with a specialized "drip-off" antenna design or a purging connection should be selected to keep the sensor face clean.

| Limitations and Operational Risks

While the Werted 28 is a robust instrument, it is not a universal solution for every process. Engineers must be aware of the following limitations:

1. **Heavy Foam:** Extremely thick, dense foam (such as that found in some fermentation processes) can absorb radar signals entirely. In these cases, a guided wave radar (GWR) or a hydrostatic transmitter may be more appropriate.
2. **Vacuum Conditions:** While radar works in a vacuum, the sealing of the instrument must be rated for negative pressure to prevent air ingress or damage to the internal diaphragm.

3. Low Dielectric Media: If the ϵ_r is below 1.4, the reflection may be too weak for standard non-contact radar. A stilling well or a bypass chamber can be used to increase the signal strength.

4. Agitation: High-speed agitators can create a vortex or a turbulent surface, causing the signal to scatter. Increasing the damping time in the sensor settings can help stabilize the output.

Frequently Asked Questions (FAQs)

Q1: Can the Werted 28 be used for both liquids and solids?

Yes, the Werted 28 is versatile. However, for solids (like cement or plastic pellets), the signal return is often weaker due to the angle of repose. A 26GHz radar with a larger flange or a parabolic antenna is usually recommended for these applications.

Q2: What is the difference between 2-wire and 4-wire configurations?

A 2-wire system uses the same pair of wires for both power supply and the 4-20mA signal, which simplifies wiring and reduces costs. A 4-wire system has separate power and signal circuits, which is often necessary for high-power applications or when integrated heating elements are required.

Q3: How does the Werted 28 handle condensation on the antenna?

Most modern Werted 28 units utilize a horn antenna with a PTFE cover or a solid-state lens antenna. These materials have low surface tension, causing condensation to form into small droplets that do not significantly interfere with the 26GHz signal. If heavy buildup is expected, a compressed air purging system can be integrated.

Q4: Is calibration required after installation?

While the instruments are factory-calibrated, "field adjustment" is necessary. This involves setting the zero point (empty tank) and the span (full tank) based on the specific geometry of the vessel. This can be done via the local display, a handheld HART communicator, or PC-based software.

| Conclusion

The werted 28 represents a reliable and sophisticated choice for B2B industrial level measurement. By understanding the physics of radar technology and adhering to strict installation standards, engineering teams can achieve high levels of accuracy and process stability. For those looking to compare specific models or request customized OEM/ODM services, reviewing the technical documentation on the Main Page is the recommended next step to ensure the selected instrument aligns with the specific chemical and physical demands of the project.