

28gs

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



[levelmeter.org](https://www.level-meters.com/)

Main topic: Main Page

<https://www.level-meters.com/>

In the field of industrial process control, the 28gs series represents a sophisticated class of high-frequency radar level measurement instruments. Specifically designed to address the complexities of liquid and solid level monitoring, these sensors utilize 26GHz or higher frequency electromagnetic pulses to provide non-contact measurement. For engineers and procurement specialists, understanding the technical nuances of the 28gs series is essential for ensuring operational efficiency in sectors ranging from chemical processing to wastewater treatment.

High-frequency radar technology has largely superseded older low-frequency (6GHz) systems in most modern applications due to its narrower beam angle and smaller antenna size. The 28gs series leverages these physical advantages to deliver high precision, even in narrow tanks or environments with internal obstructions. This article provides a comprehensive technical overview of the measurement principles, selection criteria, and installation requirements for the 28gs radar level meter.

| Measurement Principles of 28gs Radar

The 28gs radar level meter operates on the "Time of Flight" (ToF) principle. The instrument's antenna emits extremely short microwave pulses that travel at the speed of light. When these pulses encounter the surface of the medium being measured, a portion of the energy is reflected back toward the sensor. The antenna acts as both a transmitter and a receiver, capturing the reflected echo.

| The Time-Distance Relationship

The distance from the sensor reference point to the material surface is calculated using the following formula:

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

Where:

D is the distance to the surface.

c is the speed of light (approximately 300,000 km/s).

t is the measured time delay between transmission and reception.

Once the distance (D) is known, the internal electronics subtract this value from the total tank height (H) to determine the level (L) of the material. The 28gs series utilizes advanced digital signal processing (DSP) to filter out "false echoes" caused by tank walls, agitators, or ladders, ensuring that only the signal from the actual product surface is processed.

| Frequency and Beam Angle

The "28" in the series designation typically refers to the high-frequency range (centered around 26GHz). A higher frequency results in a shorter wavelength, which allows the radar to be focused into a much narrower beam. For instance, a 28gs radar with a DN50 (2-inch) antenna might have a beam angle of only 8°, whereas a low-frequency radar would require a much larger antenna to achieve the same focus. This narrow beam is critical for avoiding interference from internal tank structures.

| Technical Specifications and Evaluation Criteria

When evaluating the 28gs for a specific application, several technical parameters must be considered to ensure the instrument performs within its intended accuracy limits. For detailed technical datasheets and specific model variations, engineers can visit the Main Page to review product options and application support.

| 1. Accuracy and Repeatability

The 28gs series typically offers a standard accuracy of $\pm 2\text{mm}$ to $\pm 5\text{mm}$. In high-precision applications, such as custody transfer or chemical dosing, this level of repeatability ensures that inventory management remains tight and process deviations are minimized.

2. Measuring Range

Depending on the antenna configuration and the dielectric constant of the medium, the 28gs can measure distances up to 30 meters (98.4 feet) for liquids and up to 15 meters (49.2 feet) for solids. For solid materials, the range is often shorter because the uneven surface of powders or granules scatters the radar signal, reducing the strength of the return echo.

3. Process Conditions

Temperature: Standard models handle -40°C to 150°C (-40°F to 302°F). Specialized high-temperature versions can extend this to 250°C (482°F) using cooling fins or specialized seal materials.

Pressure: The 28gs is designed to operate from vacuum conditions up to 40 bar (580 psi), depending on the flange and housing material selected.

Practical Selection Table

Choosing the right configuration within the 28gs family depends on the physical state of the medium and the tank geometry. The following table outlines typical selection paths:

Feature	Liquid Application	Solid/Powder Application
Antenna Type	Horn or Shielded Pipe	Large Horn or Parabolic
Beam Angle	8° - 12°	4° - 8°
Measuring Range	Up to 30m (98.4 ft)	Up to 15m (49.2 ft)
Dielectric Constant (ϵ_r)	> 1.6	> 2.0
Common Challenges	Surface turbulence, foam	Dust, angle of repose
Recommended Housing	Aluminum or Stainless Steel	Aluminum with Dust Cover

| Installation Considerations

Proper installation is the most critical factor in the performance of a 28gs radar level meter. Even the most advanced signal processing cannot compensate for a poorly positioned sensor.

| Nozzle Positioning

The radar should be installed at a distance from the tank wall that is at least 1/6th of the tank diameter. Installing the sensor too close to the wall will cause the radar beam to interact with the wall surface, leading to parasitic reflections. Conversely, the sensor should never be installed in the exact center of a cylindrical tank, as this can lead to multiple-path reflections that amplify noise.

| Avoiding Obstructions

The "keep-out zone" of the radar beam must be clear of obstructions such as:

Inlet pipes or filling streams.

Heating coils.

Agitators and stirrers.

Limit switches or ladders.

If an obstruction is unavoidable, the 28gs software allows for "False Echo Mapping," where the instrument learns the location of static objects and ignores their reflections. However, it is always better to avoid these objects during the design phase.

| Nozzle Height and Diameter

The mounting nozzle should be as short as possible. If the nozzle is too long or too narrow, the radar signal will bounce off the internal edges of the nozzle before it even enters the tank. This creates a large "ringing" effect in the near-field, which can obscure the signal if the tank is nearly full. For a 28gs unit, the antenna should ideally extend 10mm (0.4 inches) past the bottom of the nozzle.

| Limitations and Risks

While the 28gs is a versatile tool, it is not a universal solution. Engineers must be aware of specific limitations:

1. Dielectric Constant (ϵ_r): Radar relies on the change in dielectric constant at the air-medium interface. Materials with a very low ϵ_r (such as liquid nitrogen or some dry powders with $\epsilon_r < 1.4$) reflect very little energy. In these cases, a guided wave radar or a larger parabolic antenna may be required.
2. Heavy Foam: Dense, thick foam can absorb the radar signal entirely, preventing an echo from returning. While the 28gs can penetrate light steam and thin foam, heavy chemical foam often requires a different measurement technology, such as a hydrostatic pressure transmitter or a magnetic level gauge.
3. The "Blind Zone": Every radar has a minimum measuring distance (typically 200mm to 400mm from the antenna tip). If the liquid level rises into this zone, the device cannot provide an accurate reading. This must be accounted for when calculating the maximum fill level of the vessel.

| Frequently Asked Questions (FAQs)

Q: Can the 28gs measure level through a plastic tank lid?

A: Yes. Because plastic is non-conductive and has a low dielectric constant, microwaves can pass through it. This allows for "non-invasive" measurement where the sensor is mounted outside a plastic IBC or storage tank.

Q: How does dust affect the 28gs signal?

A: High-frequency radar is generally excellent at penetrating dust. However, if the dust is extremely thick and conductive, it may attenuate the signal. In such cases, an integrated air purge connection is recommended to keep the antenna lens clean.

Q: Is the 28gs suitable for vacuum tanks?

A: Yes. Electromagnetic waves do not require a medium to travel, making radar ideal for vacuum applications where ultrasonic sensors (which require air to transmit sound) would fail.

Q: What maintenance is required for the 28gs?

A: Since there are no moving parts and the measurement is non-contact, maintenance is minimal. Periodic inspection of the antenna for material buildup is recommended, especially in crystallizing or sticky applications.

| Conclusion

The 28gs high-frequency radar level meter provides a robust, accurate, and low-maintenance solution for modern industrial level measurement. By understanding the principles of microwave propagation and adhering to strict installation guidelines regarding nozzle geometry and tank obstructions, process engineers can achieve reliable data even in challenging environments. For those looking to integrate these sensors into their automation systems, it is advisable to consult technical experts to match the specific antenna material and frequency to the chemical properties of the stored medium. For further technical specifications and to explore the full range of industrial level measurement solutions, please refer to the Main Page.