Level Instrumentation for the Refining Industry

Moving to a Higher Level Performance
Delivering Results for You and Your Plant

The Power to Deliver Results
Rosemount level devices power Emerson’s PlantWeb® architecture to deliver higher performance, greater safety, and lower life cycle costs. This is achieved by combining our industry-leading products with predictive field intelligence and best implementation practices.

Best-in-Class Products
- Pioneering new level technologies
- Extensive portfolio
- Industry leadership
- Ongoing investment in leading level and instrument technologies

Resources Make the Difference
- Experienced and knowledgeable people
- Continuous training for level specialists
- Consultative approach based on best measurement practices
- Extensive network of service and support personnel
- Local repairs and on-site service
- Manufacturing locations around the globe
- Deliveries from locations close to the customer
Level Measurement in the Refining Industry

Level Measurement and Control in the Refining Industry

Traditionally, displacers and floats have been used in about 80% of refinery level applications. Accuracy of these types of instruments is affected by varying density and temperature. These variations can cause inaccurate readings and affect control.

The Right Technology to Meet Your Needs

The Rosemount level product offering includes the technologies required for maximum efficiency in a wide range of installation and application conditions, providing robust and reliable measurements. Each product is designed to help you get the most out of virtually any level application: high or low temperatures, aggressive environments, high pressures, hazardous areas, or the simplest level switching requirement.

Benefits of Using Rosemount Level Products

• Improved energy efficiency
• Helps maximize throughput
• Improved product quality
• Increased refinery safety and ability to meet environmental regulations
• Reduced manpower due to easy commissioning and operations
• Reduced maintenance cost
• Higher performance
• Higher reliability
Immune to density changes and with no moving parts, Guided Wave Radar is a reliable and low maintenance alternative to displacers.

Choose between a complete chamber assembly, or reuse your existing chamber. With a range of process connections, wetted materials and high temperature/pressure options plus extensive experience of GWR chamber applications, we can help you select the best fit for your application.

If you have no existing chamber, or your chamber is in need of replacement, contact us for details of the 9901 chamber.

Reduce Start-up Costs

Rosemount® level instruments are easy to install, both in new and existing systems. Just mount the device, power it up and configure in a few simple steps.

Rosemount Radar Master is the ultimate setup software and supports both HART® and FOUNDATION fieldbus™. It provides configuration through a user-friendly interface with application specific configuration, measure-and-learn functionality plus extensive online help. In addition, easy configuration may also be carried out in any host system that supports electronic device descriptors (DD).

Easy Replacement of Old Equipment
Our radar transmitters cover more applications than ever before. Product innovations such as Direct Switch Technology and Dual Port put more power on the surface to ensure a highly accurate and reliable measurement even at extreme process conditions.

The unique fork design for highly responsive vibrating fork switching is another example of Rosemount product innovation.

**Application Flexibility**

The comprehensive offering of temperature and pressure ranges, materials, process connections, sensor types and accessories means high application flexibility. With Rosemount level products, the best match for specific and challenging applications is obtained, enabling you to run your plant at maximum capacity.

Safety, health, and environment are top priorities. Rosemount instrumentation can help prevent unsafe conditions in your plant through process alerts, SIS devices, and best installation practices.
Maximized Throughput and Minimized Process Down-time

Keep your Plant Running at Maximum Efficiency

The quality designed and built into each Rosemount product delivers unparalleled reliability and stability, helping you to optimize your operation and minimize your process down-time.

Robust and Unique Product Design

Leakage prevention and reliable performance under extreme process conditions are vital for the safety and efficiency of your plant. This is also key in our robust, shock-resistant and vibration proof designs.

Heavy-duty Guided Wave Radar probes meet the extreme temperature and pressure challenges by providing multiple layers of protection.

Condensation and dirt resistant radar cone antennas ensure a reliable measurement, even in very dirty applications.

Rosemount Differential Pressure level transmitters are welded with no threads and 100% helium leak-tested. An all welded option is available with no gaskets for full vacuum applications.

Double Layered Safety

Maximizing tank capacity with minimized risk of hazardous spillage and overfill is obtained with Rosemount transmitters and level switches. Top-down radar transmitters offer a precise level measurement independent of fluid properties, level switches add another layer of protection against overfills, and DP transmitters provide robust level indication in a wide variety of conditions.
Reduced Maintenance Costs and Easy Operations

Move from Reactive to Predictive Maintenance

With no moving parts and no recalibration needed for Rosemount level instruments, maintenance is kept to a minimum.

In challenging situations, process and device diagnostics help predict abnormal conditions. Advanced diagnostics in the devices, including self-check of probes and forks and detection and monitoring of process conditions, can be used to schedule maintenance.

PlantWeb alerts communicate process and device health to avoid unscheduled shutdowns, moving you from reactive to predictive maintenance.

Efficient Operations

Gain insight to your processes with advanced echo curve tools, featuring online troubleshooting. This means no downtime for checking the process and the vessel only opens when really necessary.

Modular Design Reduces Costs

Fewer spare parts is an advantage of the modular design of Rosemount level products.

The detachable radar transmitter head and the interchangeable cassettes of the vibrating fork switches allow for easy replacement of electronics without breaching the tank atmosphere.
Proven Level Installations and Customer Benefits

Across Refinery

Separators / Knock-Out Drums

*Best practice: 5300 with single probe*
- Separate phases more effectively – Real time data of separator performance
- Increase control of product quality
- Reliable measurement
- Reduced maintenance

Accumulators / Feed Tanks

*Best practice: Guided Wave Radar with single probe or Direct mount DP with 1199 remote seals*
- Helps ensure adequate supply of process fluid to minimize damage of downstream equipment (ex. pump cavitation)
- Helps prevent spills, environmental impact, and clean-up costs

Blowdown Drums

*Best practice: 5600 Non-contacting radar*
- Safety! Response to upsets
- Maintain adequate headspace for gas vaporization
- Accurate, reliable, and responsive measurement

Compressors

*Best practice: 5300 with single probe or Direct mount DP with 1199 Remote seals*
- Helps ensure supply of process fluid to minimize damage of downstream equipment (ex. pump cavitation)
Proven Level Installations and Customer Benefits

Across Refinery

Switch Applications

*Best practice: 2100 Series vibrating fork level switch\n
**Floats**

**Lo-lo Level Shutdown**
- Pump protection in
  - Buffer tanks
  - Reactors
  - Column bottoms
  - Storage tanks
- Helps prevent pumps from running dry – protects pump bearings and mechanical damage

**Hi-hi Overflow Protection**
- Shutdown supply source - pump shutdown and close valve
- Reactors, tanks, storage vessels, overhead condensers
- Helps prevent spillsovers and subsequent environmental and/or safety incidents

**Protection**
- Process compressor - lube oil system
- Thermo Siphon re-boiler - freshwater bottoms
- Reactor - lo level and hi-hi level
- Absorption columns
- Helps prevent mechanical damage to equipment, reduces maintenance cost, and saves energy
Proven Level Installations and Customer Benefits

Crude Distillation

**Crude Buffer Storage**

*Best practice: Non-contacting radar*

- Good application for wireless transmission
- Reliable, little attention needed
- Safety
- Reduced maintenance costs
- Better overfill protection

**Desalter**

*Best practice: 5302 Guided Wave Radar with single lead probe*

- Reliable interface measurement
- Reduced maintenance costs
- Decreased process downtime

**Distillation Towers**

*Best practice: 5300 with single probe in chamber, for lower draw applications use HTHP probe. Differential pressure for direct mount, configurations are available to match connection and application conditions*

- Safety: Helps ensure towers will not flood
- Helps maximize throughput of distillation efficiency
- Improved effluent quality through more effective separation
Proven Level Installations and Customer Benefits

Catalytic Cracker

Flare Knock-Out

*Best practice: 5300, 5400, 5600*

- Safety
- Controlled release of vapors
- Better overfill prevention
- Response time critical

Hydrotreater

Sulfur Pits

*Best practice: 5600 with cone/parabolic antenna or 5400 with process seal*

Heat tracing or purging option recommended

- Helps avoid spills and safety hazards through increased level control
- Reduced maintenance and installed costs

Ammonia

*Best practice: 5301 with any of the probe types*

- Helps ensure reliable level measurement
Proven Level Installations and Customer Benefits

Alkylation

Alkylation Units – Settler (separation)

*Best practice: 5300 with single probe*

- More accurate interface
- Reliable and responsive measurement
- Less maintenance
- Increased safety

Blending

Blending Tank

*Best practice: 5400 or direct mount DP with 1199 Remote seals*

- Helps eliminate spills
- Accurate supply
- Better level measurement due to immunity to vapors and density
Proven Level Installations and Customer Benefits

Finished Products

Natural Gas Liquids

Best practice: 5300

- Coax probe if clean
- Single probe if in chamber/stilling well

- Reliable control
- Reduced maintenance

Water and Oil Skim Tanks

Best practice: 5302

- Optimal use of storage capacities
- Better overfill protection
- Remote unmanned operations
- Reduced maintenance and operations

Utilities

General Utilities: Power Plant, Waste Water

Best practice: 5300, 5400

3100 for non-hazardous applications

- Optimal use of storage capacities
- Prevent overspills
- Improve throughput
- Automation of remote location
**Rosemount Level Technologies**

**Guided Wave Radar for Level and Interface**
- Highly accurate and reliable direct level measurement
- Best fit for chamber applications, ideal for replacing old equipment
- Designed for maximum reliability, even in harsh environments
- Virtually maintenance free
- 5300 Series – Superior performance and advanced diagnostics
- 3300 Series – Versatile and easy to use with field proven reliability
- 9901 Series – Chambers for process level instrumentation

**Non-contacting Radar and Ultrasonic for Level**
**Radar**
- Highly accurate and reliable direct level measurement
- Designed for meeting in-tank challenges
- Good for dirty liquids, coating and corrosive applications
- Virtually maintenance free
- 5400 Series – 2 wire superior performance
- 5600 Series – 4 wire for special applications

**Ultrasonic**
- 3100 Ultrasonic – Cost effective choice for non-hazardous applications

**Differential Pressure for Level**
- Flexible mounting for liquid tank levels
- Can be isolated by valves
- Ideal for use on tanks with agitation and foam
- 3051 and 2051 Series - Integrated level transmitters with advanced diagnostics
- 1199 Series – Remote seal systems

**Point Level Detection**
- Proven and reliable detection of high and low liquid levels
- Ideal for overfill protection and critical alarm duties
- Globally approved and used throughout the process industries
- 2100 Series vibrating fork switches – Highly responsive switching
- Float level switches – Unique magnet switching system
- 9901 Series – Chambers for process level instrumentation