

**Transform your operations
with real-time insight and
run at your peak potential**

Measurement Instrumentation

Technologies that help you reliably maximize performance, profitability and safety.



TABLE OF CONTENTS



Introduction	3-7
MyEmerson	6-7
Digital Transformation	8-9
Rosemount Wireless Technology	10-11
Plantweb™ Insight	12
Location Awareness	13
Rosemount Wireless Corrosion and Erosion Monitoring Systems	14-15
Rosemount Pressure Measurement	16-17
Rosemount Pressure Transmitters, Manifolds, and Gauges	18-19
Rosemount Advanced Pressure Diagnostics	20-21
Flow Measurement	22
Micro Motion Coriolis Flow Meters	22-25
Micro Motion Density and Viscosity Solutions	26-27
Smart Meter Verification	28-29
Rosemount Ultrasonic Flow Meters	30-31
Rosemount Vortex Flow Meters	32-33
Rosemount Magnetic Flow Meters	34-35
Roxar Multiphase Flow	36
Roxar Downhole Monitoring Solutions	37
Roxar Intelligent Multistage Completion Network	37
Poly-Oil Solutions	37
Rosemount Differential Pressure Flow Measurement Solutions	38-39
Level Measurement	40-41
Rosemount Differential Pressure Level	42-43
Rosemount Guided Wave and Non-Contacting Radar	44-46
Rosemount Vibrating Fork Level Detectors	47
Rosemount Tank Gauging	48-49
Rosemount Temperature Measurement	50-53
Rosemount Flame and Gas Detection	54-57
Rosemount Liquid Analysis	58-61
Rosemount Combustion Analysis	62-63
Rosemount Gas Analysis	64-66
Quantum Cascade Laser Technology	67
Measurement Systems	68-71
Lifecycle Services, Project Management, and Workforce Training	72-73
In Closing	74



Emerson helps you accelerate performance with faster, smarter decisions

Manufacturers face increasing demands for productivity on a scale never seen before, and may require you to reorient your business plans with an eye toward digital transformation and resource optimization that help drive business performance.

For both capital projects and ongoing operations, Emerson's Measurement Instrumentation technologies provide insight and decision support to help you achieve Top Quartile performance - the top 25 percent of your peers. Real performance improvements in the areas that matter.

Innovative technologies to help you transform your operations and exceed performance expectations

Your facilities need safe, reliable process solutions that give insights to keep up with the ever-changing demands of complex operations. Continually striving for greater productivity and increased efficiency while attaining consistent measurements, precise analysis, and high safety standards is critical to your success.

Emerson has one of the industry's broadest portfolios to help you address the challenges of today for a more profitable tomorrow. Put Emerson's Measurement Instrumentation technologies to work in your operations.

"Safety is more important than cost. We can now perform real-time monitoring of the floating roofs from the control room."

– Vice General Manager, Zhanjiang Port Group Co. Ltd.



"The technology of the Rosemount 3051S Electronic Remote Sensor (ERS)™ System is a game changer to replace other solutions that haven't been performing satisfactorily due to high maintenance costs and unreliability."

– Nick Ahlschlager, Area Supervisor Dakota Gasification



"This technology has opened up new possibilities. We plan to continue utilizing Rosemount Wireless technology to improve our oil production, improve our cost position, and make our people more productive."

– Michael Fischback, Facilities Engineer,
PXP (Plains Exploration and Production Company)



"We're investing in the best performance for our process by installing Emerson's Cascade Aerosol Micro Leak Detection System to help us ensure product safety and quality, meet regulatory requirements, and avoid very high capital and maintenance costs."

– Mark Eggen, CEO TSI Supercool™ Specialty Lubricant Manufacturer



Emerson's tireless pursuit of innovation drives our portfolio of superior quality Measurement Instrumentation technologies to provide insights needed to help you operate efficiently, safely, and with peace of mind.



MyEmerson – a collaborative environment to simplify and accelerate work online

MyEmerson accelerates digital transformation by connecting people and technology through streamlined work processes in a collaborative environment.

Quickly engineer solutions, manage software and installed assets, collaborate with experts, and streamline procurement processes to achieve measurement improvement in speed and productivity. An account with MyEmerson is more than a place to order products and parts, it is an interconnected, personalized digital experience.

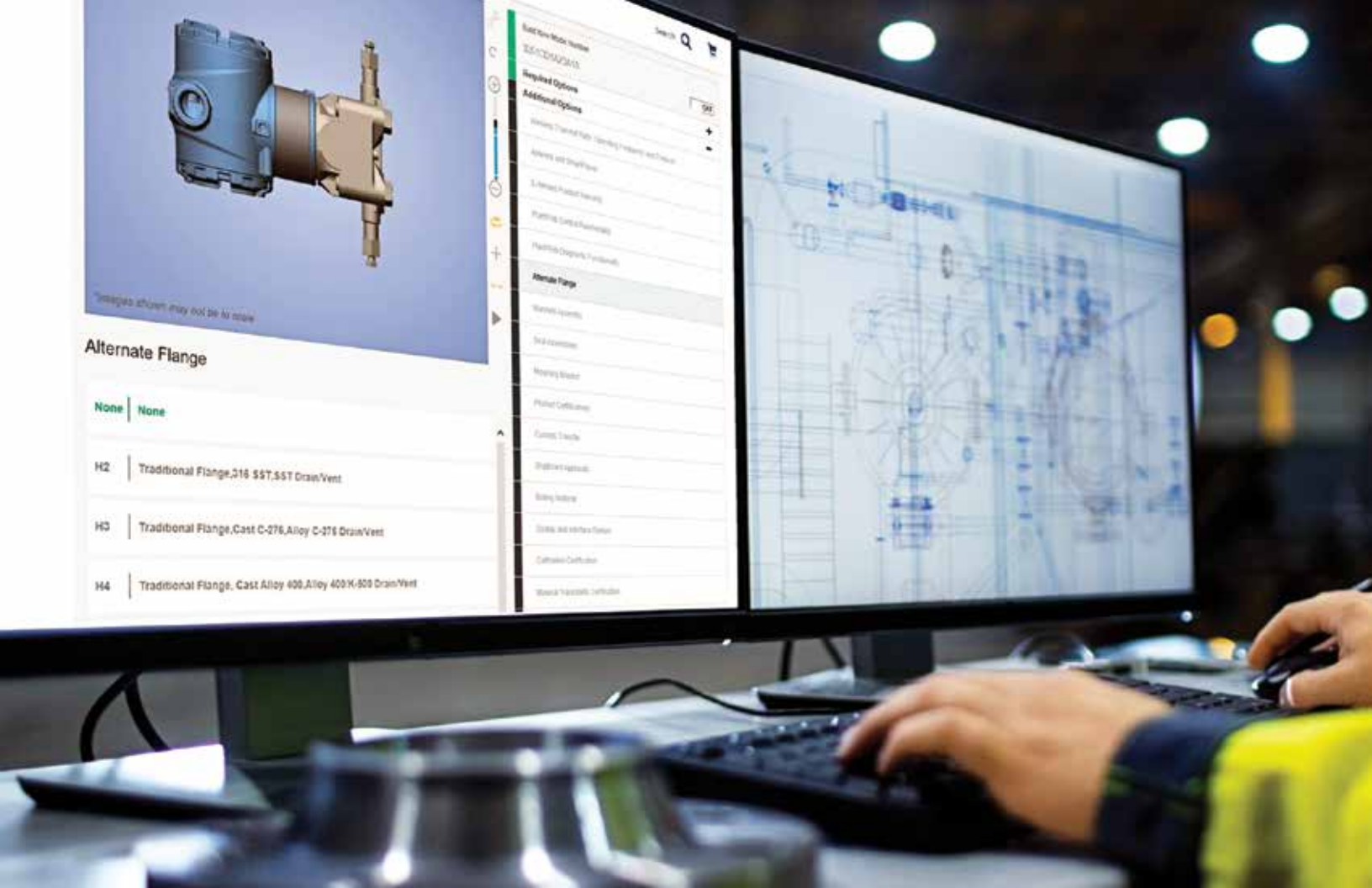
Digitally Connected and Aligned to Your Vision

- Collaborative engineering in an integrated and centralized workspace
- Easily manage project data across multiple sources
- Manage project schedule and governance



Save Time Through Digital Tools

Our digital tools allow you to improve efficiency by choosing the right product for your application,



MyWorkspace

Increase efficiency with engineering tools to size and configure, generate drawings and collaborate.



MyTransactions

Streamline procurement process to more quickly create accurate quotes and orders, manage lead times and view transactional history.



MyAssets

Improve maintenance efficiency with digital record of installed devices, access to technical documents and recommended spare and replacement parts.





Digital Transformation

Emerson has identified building blocks to navigate digital transformation successfully. Using data to justify business investments, coupled with predictable and scalable action plans for implementation and the right technology connectivity to bring the vision to life, digital transformation can be realized. Ensuring success involves preparing people and inspiring the workforce of the future. Emerson partners with our customers on their digital transformation journey, bringing our extensive expertise and full IIoT portfolio.



Data

A portfolio of **innovative sensors** that are easy to install and maintain



Connectivity

A set of **architectural designs** that ensures data in existing systems are seamlessly connected to operational applications



Analytics

A portfolio of **scalable applications** to deliver information and actionable insights



Services

Delivering access and outcomes through **monitoring solutions and new commercial models**

Plantweb Digital Ecosystem

Advance your facility's performance in the areas of production, reliability, safety and energy management with the Plantweb™ Digital Ecosystem.



Wireless Solutions



Secure First Mile



Analytics

Increased measurement points utilizing wireless technology bring improved visibility across facilities and provide the basis for digitization efforts.

Helps ensure operational data and enables interaction with IT and cloud applications by implementing these architectures.

Scalable software applications provide increased visibility and deliver actionable insights, transforming work processes.



Services



Achieve operational outcomes by utilizing Emerson expertise in monitoring, consulting, education, and implementation services.

Emerson Wireless Technology

Traditional challenges, meet Wireless



Digital Transformation Starts Here

Today, businesses are evolving and automating processes at a steadily increasing pace. Evaluating digitization opportunities and finding projects with quick ROI can help improve operations and generate profits. Flexible, scalable, and robust wireless solutions are the foundation for digital transformation in process facilities.

From implementing a plant-wide wireless infrastructure to adding new monitoring points, Emerson can partner with your business to help advance your IIoT strategy and gain increased visibility and insights. With more than a decade of experience and a broad trusted wireless portfolio, Emerson has the technology to help transform your business for tomorrow.

The Foundation for your IIoT Initiatives

- Accelerate your digitization efforts and evolve your facility's processes
- Solve unique application challenges
- Achieve faster ROI

Cost-effective, Easy-to-integrate

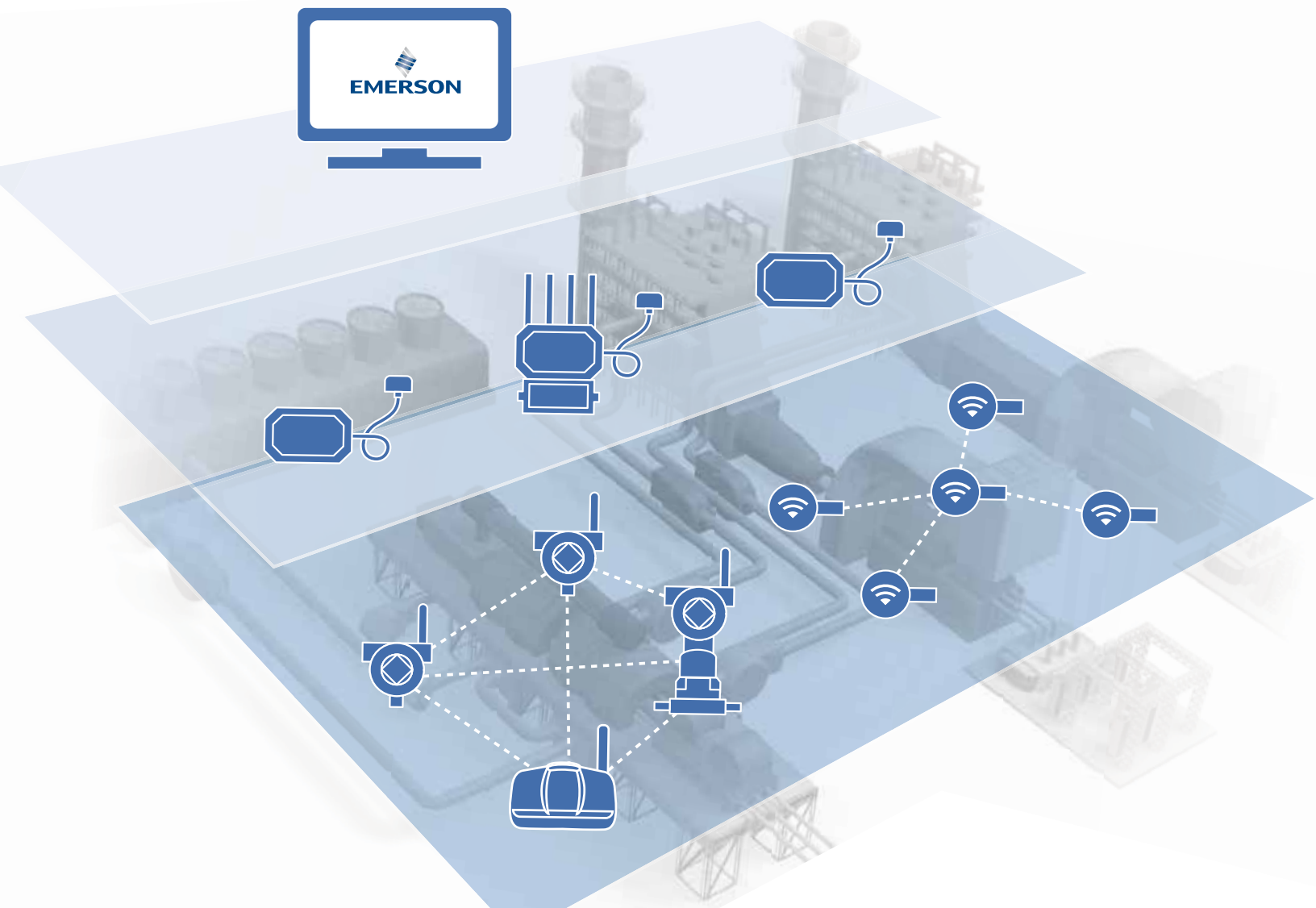
- Up to 60% less cost per device
 - Many non-intrusive device options
 - Less cabling and conduit
 - Self-powered
- Up to 65% less time per device*
 - Less engineering and faster commissioning times
 - Quick deployment, less training
 - Easy integration
 - Low maintenance

Enhanced Levels of Reliability and Security

- Always-on, multi-tiered security
- 99% data reliability**
- Host system and instrumentation work together

* As compared to standard wired devices

** FieldComm Group *WirelessHART*® User Case Studies Brochure 2019



Wireless infrastructure and applications can be scaled to meet your facility's digital transformation roadmap.



"We were particularly impressed by the number and range of existing implementations around the world. Emerson's experience was far in front of the other vendors, and this experience gave us great confidence with our own application."

- Nicolas Delfose, AkzoNobel

Plantweb Insight

Increased visibility to the data most critical to your operation



Pre-built Analytics Give You Actionable Information

Plantweb Insight instantly interprets key asset health and infrastructure data using algorithms developed over decades of Emerson's industry experience. This scalable platform of software applications enables facilities to get actionable information faster and make better, more informed decisions.

Plantweb Insight applications can be easily accessed anytime you have a wireless connection to help improve operational efficiency, safety, and compliance.

Focused on Your Key Applications

Plantweb Insight applications leverage Pervasive Sensing strategies to fit a variety of applications in your facility, including:

- Pressure relief valves
- Heat exchangers
- Pumps
- Steam traps
- Corrosion
- Cooling towers
- And more

- Gain better understanding of facility data with analytics
- Shift strategy from reactive to predictive
- Visualize your data via the intuitive web-based platform
- Easily integrate into your current systems
- Identify abnormal situations before they become critical



Location Awareness

Digitally transform facilities and extend IIoT to safety

Advanced Location Solution

Evolving safety practices in industrial facilities have typically been too challenging and too costly to implement on a broader scale. Leveraging *WirelessHART*® technology, Emerson's Location Awareness provides a robust, yet cost-effective, digital monitoring system.

Safety mustering

- Monitor your muster points and receive alerts of personnel who have not arrived during an emergency or drill

Geofencing

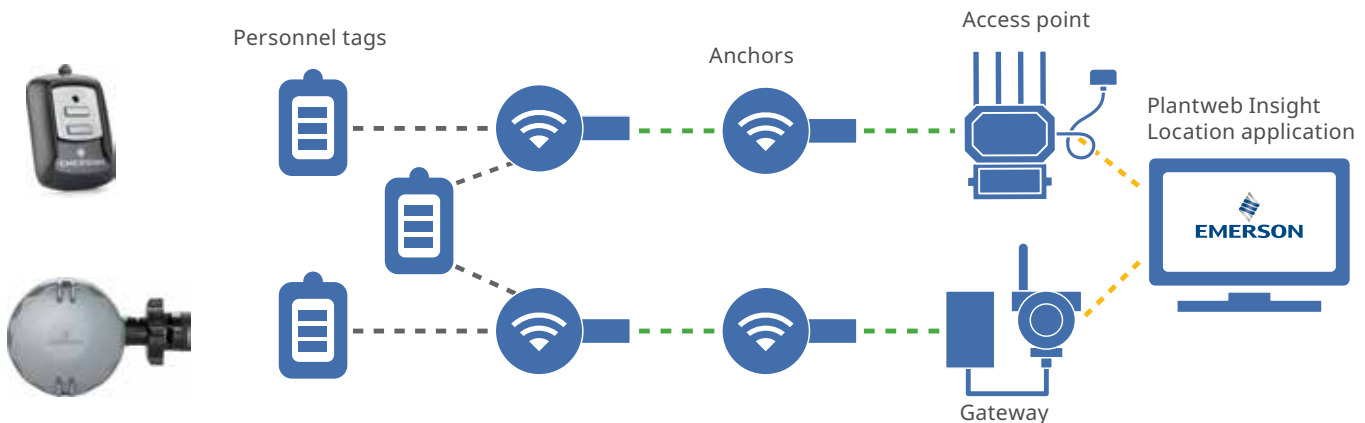
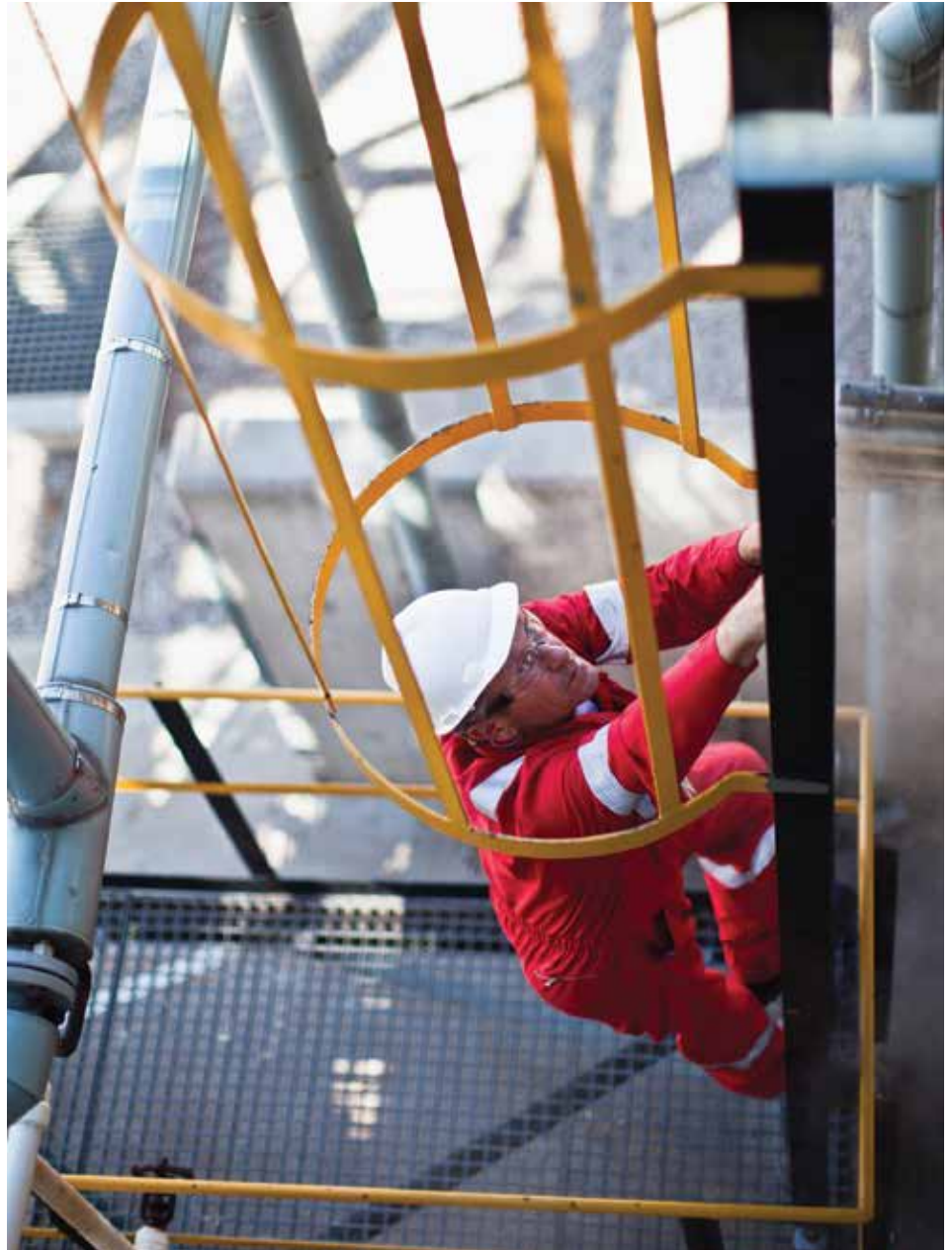
- Designate boundaries to restrict access based on training requirements

Safety alerts

- Personnel who are injured or find themselves in an unsafe situation can initiate an alert for potentially faster response

How it Works

- Wearable tags actively send signals to fixed Location Anchors for relevant-time updates
- Location Anchors utilize *WirelessHART* to communicate to Wireless Gateways
- Data is provided in an intuitive user interface in the Plantweb Insight Location application



Rosemount Wireless Corrosion and Erosion Monitoring Systems

Monitor pipework for maximum output



A Comprehensive Non-intrusive Solution

Emerson's Rosemount Wireless Permasense™ technology provides a non-intrusive, sensor-based solution for ongoing monitoring of pipework metal loss from corrosion or erosion in extreme environments.

- Wireless delivery of wall thickness data is critical to managing equipment integrity while informing your decisions around timing and scope of planned maintenance, optimization of corrosion mitigation strategies, and feedstock selection
- Helps user's assets operate safely and reliably at maximum capability and profitability

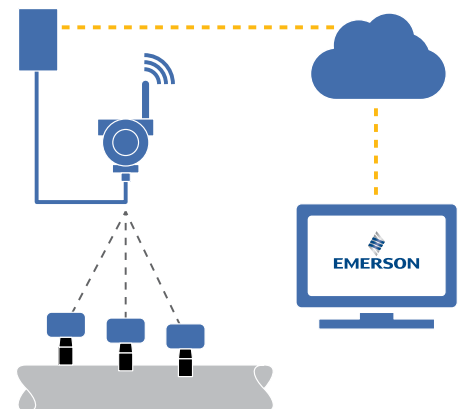
Innovative, Proven Technology for Better-informed Decision Making

Rosemount Wireless Permasense Technology

- Sophisticated data management software and analytics tools
- Non-intrusive ultrasonic sensor technology- continuously measures the impact of changing corrosion or erosion risk on asset integrity
- *WirelessHART* data retrieval

Rosemount Corrosion Erosion Connected Services

- Skilled manpower available to assist with maintenance activities
- Detailed quarterly reports provide information about system performance and corrosion/erosion trends



Refinery Increases Profitability by Using Opportunity Crudes While Minimizing Corrosion Problems



A major European refiner was faced with low commodity prices and the need to improve profitability through buying opportunity crudes.

This exposed the plant to corrosive and erosive contaminants capable of destroying production piping and equipment from the inside out.

For a refinery processing up to 500,000 barrels each day, saving even \$1 or \$2 per barrel of feedstock can improve the profit picture considerably. However, opportunity crudes can also add costs and risks through increased manual inspections, running units too long, or requiring the plant to be cautious and shut down or replace items before they are needed.

To address these challenges the company needed to monitor wall thickness continuously in critical piping areas to minimize wear-and-tear on

piping and vessel wall thickness which could lead to failures and unnecessary shutdowns. They turned to Emerson and installed its Rosemount Wireless Permasense Corrosion and Erosion transmitters with data analysis software leveraging a *WirelessHART* network.

The analysis software provides a current thickness reading in the context of historical data and trends allowing operators to project the rate of metal loss and help determine the expected remaining life of any part of the process piping or equipment with a high degree of confidence. Once sufficient data and trend information had been collected, facility engineers were able to analyze the effects of specific operating conditions in addition to the characteristics of the crude oil to proactively improve operations and profitability.



The results

- **Increased profitability** by using data analytics
- **Prevented shutdowns** by verifying equipment conditions
- **Improved insight to operating conditions** with quantified corrosion aggressiveness of various crudes

“For a refinery processing 300,000 to 500,000 barrels each day, saving even \$1 or \$2 per barrel of feedstock cost can improve the profit picture considerably – but this approach can add costs through increased corrosion of piping and equipment if not monitored properly.”

**Plant Engineer,
European Refinery**



Rosemount Pressure Measurement

Gain the process insight to optimize every point



Innovation for Quality, Performance, and Safety

- **Accelerate project execution and reduce costs** with leak-tested, installation-ready assemblies based on the compact design of the Rosemount Coplanar™ platform.
- **Drive better decision making and improve uptime** through early detection of abnormal situations with Process Intelligence and Plugged Impulse Line diagnostics.
- **Increase productivity and reduce maintenance** by controlling closer to set point with the Ultra for Flow performance class and extending calibration intervals with 15-year stability.
- **Help protect the safety of your people, facility, and the environment** by detecting wiring failures with the Loop Integrity diagnostic and by eliminating operator rounds with the Rosemount Wireless Pressure Gauge.

The Industry Standard for Reliability

For more than 50 years, Emerson's Rosemount pressure instruments have led the way in providing innovative solutions to critical measurement challenges in harsh environments.

The industry's broadest offering of pressure, flow, and level solutions includes:

- Differential, gage, and absolute pressure transmitters
- Differential Pressure (DP) flow meter solutions
- Level transmitters and Rosemount 3051S Electronic Remote Sensor (ERS) Systems
- Remote diaphragm seals
- Instrument manifolds
- Pressure gauges

With more than 20 million devices installed worldwide, Emerson pressure instruments deliver proven performance to help you enhance safety, reduce downtime and operate at higher levels of efficiency.

Achieve industry-leading field reliability and safety with Pressure instrumentation

Pressure Transmitters



Instrument Manifolds



Pressure Gauges



Increase accuracy and reduce maintenance costs with DP Flow solutions

Flow Meters



Primary Elements



Simplify installation and improve performance with DP Level technologies

Level Transmitters and Seal Systems



Electronic Remote Sensor (ERS) Systems



Thermal Range Expander



Rosemount Pressure Transmitters, Manifolds, and Gauges

Accurate and dependable measurements – every time



Field-proven Performance to Maximize Uptime

- Increase confidence in your measurement with the industry's most reliable differential, gage and absolute pressure transmitters
- Meet your most demanding applications, from -76 °F (-60 °C) ambient to 770 °F (410 °C) process temperatures

Meet Quality Targets and Production Goals with the Latest Technology

- Deploy the world's only scalable transmitter platform – Emerson's Rosemount 3051S Series – backed by 15-year stability and a 15-year limited warranty
- Eliminate unnecessary maintenance routines with advanced diagnostic capabilities that predict abnormal situations before they impact your process



"The Rosemount 3051S is the most important piece of equipment that we can turn to at any time — knowing that we can get the accuracy, reliability, and continued performance for any process measurement."

- Yoga Anand, Instrument and Controls Engineer, BP

Improve performance with better installation practices

Coplanar Process Connections



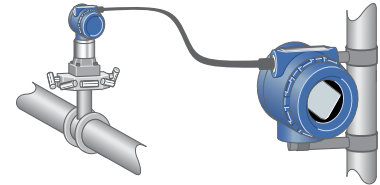
- Patented Coplanar transmitter reduces weight by 30% with a compact design
- Direct-mount capability eliminates hardware and potential leak points while simplifying the installation

Enhanced Manifolds



- Rosemount R305 and R306 manifolds feature a two-piece stem and exclusive Pressure-Lock™ Valve technology
- Offers simplified operation, increased safety, and enhanced reliability

Remote Display and Interface



- Enables at-grade transmitter access and supports more reliable direct mounting
- Provides easy and safe access to process and device information

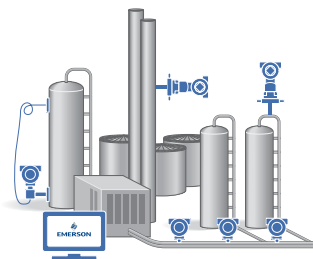
Reliability and safety in even the most demanding environments

SuperModule™ Platform



- An all-welded, hermetic SST design resists process effects such as over-pressure and line pressure
- Robust platform delivers unmatched performance to maintain measurement repeatability

Advanced Diagnostics



- Enhance SIL 2/3 safety and extend proof test intervals with certified diagnostic coverage from your process to the control room
- Proactively detect electrical loop issues and process abnormalities

High Pressure Capabilities



- High static differential pressure (DP) transmitters designed to 15,000 PSI static pressure
- GP/AP transmitters capable of measuring 20,000 PSI deliver superior performance and reliability in your most critical operations

Increase efficiency with insights and actionable data

Wireless Pressure Gauge



- Eliminate common mechanical gauge failures with Emerson's Rosemount pressure sensor technology
- Verify gauge readings from a central location and eliminate operator rounds with the Plantweb Insight Wireless Pressure Gauge application

Wireless Pressure Transmitters



- Wireless transmitters install in almost any location to monitor more points throughout your facility
- Fast and cost effective solution for flow, level and pressure measurement

Rosemount Advanced Pressure Diagnostics

Insight for truly informed process decisions



Stay on Top of the Health of Your Process

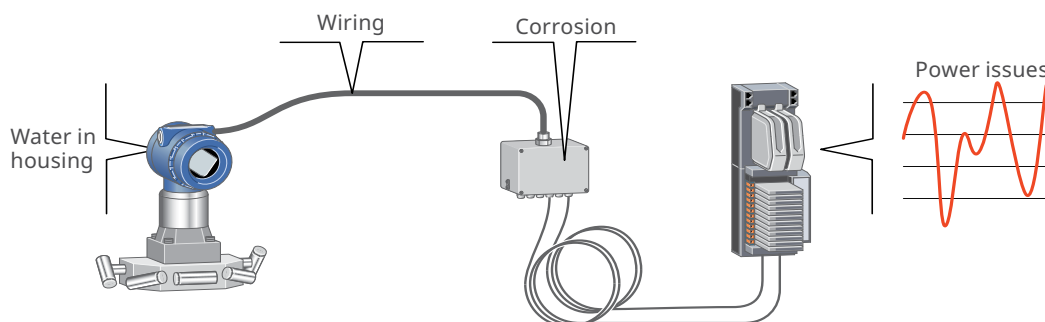
Help predict and prevent issues before they happen with the Rosemount 3051S transmitter with Advanced Diagnostics — the industry's only field device to provide comprehensive diagnostics that go beyond the transmitter itself to cover both the process and the electrical loop.

- Spot problems before they impact production with the Process Intelligence diagnostic
- Detect degraded electrical loop issues that can potentially cause dangerous on-scale failures with Loop Integrity
- Proactively identify process connection issues with the Plugged Impulse Line diagnostic
- Extend proof test intervals using comprehensive diagnostic capabilities that can help improve safety compliance and ensure reliable operation of your Safety Instrumented Systems

Detect Electrical Loop Issues with Loop Integrity Diagnostics

Everyday hazards such as environmental effects, human error, accidental damage, or an aging facility may lead to conditions such as corrosion, water in the housing, and unstable power supplies.

The Loop Integrity Diagnostic helps prevent on-scale failures before they potentially jeopardize your operations or safety by continuously monitoring for problems in the entire electrical loop and proactively detecting issues that can limit the power to your device.



Wireless Instrumentation Improves Cooling Tower Efficiency and Extends Turbine Life in Power Plant



The results

- **Improved throughput** of cooling towers with better thermal efficiency
- **Increased turbine efficiency** and reduced megawatt use by monitoring filters
- **50% reduction** in preventative maintenance on turbines with online leak detection
- **\$18K saved** by extending lifetime of cooling tower fan

A California public utility needed to monitor the performance and efficiency of cooling towers and turbines in their combined cycle plant to detect air pressure leaks faster, and to prevent air filter plugging and overheating.

The company could not monitor temperature inside their turbine compartments, which is needed to determine if there is a leak in forced air that cools the exhaust. As a result, they conducted frequent inspections to identify what caused their switches to close when overheated.

In addition, the utility's current system for measuring air plugs did not give reliable readings, significantly decreasing turbine efficiency and causing the need to frequently clean the filters.

Safety was also a concern when pump valves shut and heated up pipes, which could potentially cause someone to get burned. It also risked damage to the pumps. The ability to monitor the

fire pump temperature would help the company improve safety and decrease pump damage.

The company partnered with Emerson for a comprehensive wireless instrumentation solution, giving them access to real-time data, reducing mechanic manual inspections to diagnose issues and realizing long-term cost savings. Emerson's wireless temperature, pressure, and differential pressure transmitters were installed, enabling the company to improve process efficiency across the plant.

- Temperature transmitters provide online turbine compartment temperatures to detect leakage of hot air, and help protect against pump damage
- Pressure transmitters monitor air pressure on forced draft fans for turbine cooling, detecting leaks faster
- Differential Pressure transmitters monitor inlet air filter efficiency and detect clogs

“Wireless provided a cost effective solution to bring new pressure, temperature, and DP readings online, enabling us to improve cooling tower performance and turbine efficiency.”

Plant Engineer,
Utility in California



Micro Motion Coriolis Flow Meters

Best-in-class technology, best in class performance



Coriolis Overview

Emerson is dedicated to offering Micro Motion Coriolis products that deliver the three things that we believe are key to the success of your process: simplified solutions, measurement confidence and process insights.

Emerson offers a wide range of Coriolis flow meter products for any application — all of which are easy to install, configure and maintain. Not only do our products exhibit unparalleled real-world performance, but they also provide actionable insights that help you optimize your process and set you up for success.

To optimize your process and ensure that it is running smoothly, you need to have the right insights. Our technology and experts provide you with just that.

Emerson technologies offer powerful integrated diagnostics that provide you with process data and actionable information, enabling you to make quick, effective decisions. With our meters, issues such as two-phase flow or corrosion can easily be detected and addressed.

Material Balance and Product Quality in Polypropylene Manufacturing Improved with Micro Motion Flow Meters



The results

- Improved product consistency
- Monitored feed rate and solids content with a single device
- Enhanced process control
- Minimized unusable product

In the manufacturing of polypropylene, solid catalyst is mixed with solvent and injected into a polymerization reactor, where it is combined with propylene feed stock. The solvent is then extracted and recycled. The “dry” polymer is turned into pellets and injected with hot additives to produce the end product.

The primary reaction requires a precise mass balance between the catalyst and the propylene feedstock. If this balance is not maintained continuously as the components are combined, the polymer will be out of specification. Since the balance cannot be adjusted after the reaction occurs, an entire batch might have to be rejected. To achieve the correct continuous mass balance, it's critical that the feed rate of the catalyst slurry and its solids content are consistent and accurate. It is imperative to use a non-intrusive type of flow meter in the application.

Additives represent a very small quantity in proportion to the total process output, but injection rates must be properly controlled in order to maintain specification on the end product. The additives are typically maintained at temperatures between 100 °C and 150 °C and are viscous materials even at those temperatures, so they tend to coat the piping system.

Micro Motion Coriolis flow meters are ideally suited to this application for several reasons. Since they measure mass flow and density directly, critical process information on both the feed rate and solids content of the catalyst slurry can be monitored and controlled using a single device. The Coriolis sensor is non-intrusive and has no moving parts, so it is less affected by erosive properties of the solid catalyst. If erosion is a concern in the tubes, Smart Meter Verification can be scheduled to run routinely to

monitor the health of the tubes and to verify that the flow calibration has not changed. Furthermore, because the measurement is mass-based moderate coating of the sensor walls will not impair precise control of additive feed rates. Micro Motion meters can provide accurate mass flow rate data on the solvent makeup and regeneration, as well as the propylene feedstock. Resulting improvements in process control and evaluation capabilities represent a significant benefit.



Micro Motion Coriolis Sensor Portfolio

ELITE®

ELITE® Coriolis flow meters provide unmatched flow and density measurement performance for gas, liquid and multiphase applications.



F-Series



F-Series Coriolis meters deliver highly accurate mass, volume flow, and density measurement in applications that require a compact, drainable design.

H-Series



Sanitary and Hygienic H-Series meters offer highly accurate mass flow, volume flow, and density measurement in a compact, drainable and cleanable design.

R-Series



Low-footprint, drainable R-Series Coriolis flow meters provide accurate flow and density measurements and are ideally suited for general purpose applications.

TA-Series



TA-Series Coriolis Flow and Density meters have all wetted material constructed from pure tantalum and are ideal for handling corrosive fluids, such as acids and bases.

LF-Series



LF-Series meters are the smallest Coriolis meters available for low flow measurement needs. This meter fits into any tight space, providing a scalable platform for individual flow measurement needs.

T-Series



T-Series meters feature all titanium wetted parts for corrosion resistance and offer superior flow measurement in a straight-tube, full-bore meter design.

Micro Motion Coriolis Transmitter Portfolio

5700



5700 transmitters are full-featured, field-mount devices with wi-fi capability that deliver increased confidence in flow measurement with their advanced capabilities in meter verification, process data handling and entrained gas alerts.

1600



With a compact and light design, the 1600 transmitter delivers ease of integration with a native Ethernet connection and Power over Ethernet. The task of maintaining product satisfaction through ever-changing consumer behaviors falls on Food and Beverage manufacturers – maximizing production while ensuring quality, reliability and traceability, and conserving resources.

1700/2700



1700/2700 field-mount transmitters are powered by MVD™ Technology and designed for compact integral mounting, or easily mounting on a wall or pipe stand.

4200



4200 transmitters offers highly accurate mass flow and density measurement in loop-powered applications – and without the need for additional power wiring.

2400S



2400S transmitters with MVD Technology deliver unsurpassed Coriolis performance in two-phase flow applications.

3500/3700



3000 electronics combine Coriolis transmitter functions and PLC capabilities in one instrument.

1500/2500



1500/2500 DIN rail-mounted transmitters are powered by MVD Technology and designed to easily fit into control room panels.

Filling Mass Transmitter (FMT)



The FMT Coriolis transmitter was specifically designed for filling and dosing applications to deliver outstanding performance in high speed and very small fills.



Micro Motion Density and Viscosity Solutions



Micro Motion Portfolio

The Micro Motion portfolio of density and viscosity products have been designed with measurement speed, accuracy and robustness in mind. As such they are highly flexible and are suitable for use in many different applications and industries including Oil & Gas, Refining, Chemical/ Petrochemical, Power, Food and Beverage, Mining and Minerals and several others.

Universal Features and Functionality

- Single, flexible, common transmitter across platform
- Interconnectivity - Direct input of external measurement variables for enhanced readings through HART I/O
- Application specific pre-configured outputs simplify startup and reduce commissioning costs
- KDV meter health diagnostics identifies corrosion, erosion or coating

Key Advantages

- **Speed of response** – Quick response to process changes for fast loop control
- **Accuracy** – Optimized yields and reduced costs
- **No moving parts** – Low/No maintenance means reduced operating costs
- **Robust design** – Minimum down-time and longer meter life
- **Installation flexibility** – Reduced installation time and costs
- **Integral temperature measurement** – Improved fluid characterization and optimization

Micro Motion Density and Viscosity Portfolio

Compact Density Meter (CDM)



The Compact Density Meter (CDM) is the next generation in fiscal custody transfer and precision process density and concentration measurement.

Fork Density Meter (FDM)



The Fork Density Meter (FDM) is the latest development in direct insertion density and concentration. This meter builds upon the success of the Micro Motion 7826 and 7828 density meters.

Fork Viscosity Meter (FVM)



The Fork Viscosity Meter (FVM) is the latest development in multivariable direct insertion viscosity meters. These unique meters provide unbeatable installation flexibility, robustness and market-leading communications flexibility.

Gas Density Meter (GDM)



The Gas Density Meter (GDM) is the next generation in fast response direct gas density measurement. It's designed for applications such as fiscal custody transfer where reliability and accuracy are critical.

Gas Specific Gravity Meter (SGM)



The Gas Specific Gravity Meter (SGM) is the industry standard for direct measurement of specific gravity, molecular weight, relative density, Calorific Value/BTU and Wobbe Index.

Heavy Fuel Viscosity Meter (HFVM)



The HFVM Viscomaster is a high performance, multivariable viscosity meter designed for the measurement and control of heavy fuel oil (HFO) that supply engines, turbines and burners in Marine and Power applications.



Delivering Insight for Better Measurement and Better Process Management



Overview

Smart Meter Verification enables you to check your flow meter's health without taking your meter out of line. Its diagnostics continuously monitor meter health to empower users to take action and avoid safety and measurement issues as a result of corrosion, erosion, over-pressurization, build-up and other sources of potential instrument damage.

Smart Meter Verification is compatible on a variety of Emerson flow products including Micro Motion Coriolis Flow Meters, Rosemount Magnetic Flow Meters and Rosemount Gas Ultrasonic Flow Meters. Using on-board diagnostics, the flow transmitter continuously monitors key performance indicators, like tube stiffness in Coriolis meters, output parameters in Magnetic meters, and transducer health in Ultrasonic meters. This method provides early detection of instrument damage that will reduce process downtime and increase operational certainty.

Easily monitor meter performance without interrupting your process

Agency Recognition



Traceable calibration verification results on the Smart Meter Verification report are recognized to extend proof-test and recalibration intervals by agencies including the EPA, FDA, API, Exida, GOST-R, and more.

Non-uniform Coating Detection



Enhance maintenance and Clean-In-Place (CIP) programs to avoid proving failures, measurement inaccuracies and quality challenges.

Intuitive Interface



Quickly generate agency-recognized reports and confidence in your Coriolis measurement through ProLink, Ethernet webpages and AMS.

Two versions to address your verification needs

	Basic	Professional	
Sensors		CMF, CMFS, F, H, R, and T	
Transmitters	Direct Connect, 1500, 1700, 2400, 2500, 2700, 4200, 5700 <i>(enhanced core processors only)</i>		5700
Access	Included	Licensed	90-Day trial, licensed
Calibration verification	●	●	●
Electronics verification	●	●	●
Automation	●	●	●
Compliance report		●*	●*
Previous 20 verifications stored		●	●
Non-uniform coating detection			●
Installation verification			●
Multiphase diagnostic			●**
Flow range diagnostic			●**

* Access, Save and Export with ProLink III Basic and Professional, Ethernet webpage, and AMS SMV SNAP-ON

** Access 24-hour visual historian for these diagnostics in ProLink III Professional

Basic

- Calibration and electronics verification **now included with all Enhanced Core Processors**
- Follow actionable NE107 alert recommendations to resolve operational challenges quickly
- Verify measurement is within factory specification under current flowing conditions

Professional

- Optimize instrumentation and process compliance
- Generate reports recognized by regulatory agencies (e.g. EPA, FDA, API, SIS) to extend recalibration, proving and proof-test intervals
- Detect non-uniform coating to protectively clean equipment before it leads to quality, safety or proving challenges
- Improve measurement performance by diagnosing process upsets or an improper installation



Rosemount Ultrasonic Flow Meters

Bridging innovation and intelligence to custody transfer applications



Reduce Measurement Uncertainty

- Troubleshoot with performance-based diagnostics, expert analysis, disturbance alerts and suggestive corrective actions

Maximize Uptime, Minimize Costs

- Advanced meter design has no moving parts and offers bi-directional flow capabilities, increased flow capacity and no incremental pressure drop
- High rangeability of >100:1 ensures fewer meter runs, smaller line sizes and lower capital costs

Highest Accuracy for Custody Transfer

- Eight-path gas meter offers best-in-class resolution of flow and swirl calculation for non-ideal flow distortions

Ultrasonic Flow Meter Overview

Rosemount Ultrasonic Flow Meters are used around the world in a variety of critical measurement applications. Commonly installed in onshore and offshore production facilities, natural gas transmission pipelines, compressor stations, processing facilities and city gates, these products are useful for allocation, check metering, leak detection, storage and custody transfer.

Combining field-proven, smart meter design which rapidly detects abnormal flow profiles and contaminants, and offer a wealth of predictive diagnostics, Rosemount Ultrasonic Flow Meters enable you to be more profitable and confident in your measurements by using its advanced capabilities to maximize productivity, quality and safety.

Rosemount Gas Ultrasonic Flow Meters

SeniorSonic 3414 4-Path



Natural gas custody transfer applications requiring high accuracy and low maintenance.

- Four-path chordal design reduces susceptibility to meter fouling

3415 4+1 and 3416 4+2 Dual Configuration



Exceptional custody transfer accuracy and reliability

- Sensitive vertical reflective paths detect trace amounts of liquid and other debris build-up

Redundant 4+4 3417 4-Path



Maximize uptime with superior custody transfer accuracy.

- Full-redundant with two 4-path chordal, British Gas-design meters
- Wet, rich and/or dirty gas applications

3418 8-Path Gas Ultrasonic Flow Meter



Highest accuracy and reliability custody transfer.

- 0.5 OIML accuracy class requires only five diameters of straight run with no flow conditioner
- Available line sizes: 254 mm to 1066 mm (10 in to 42 in)

JuniorSonic 3411 1-Path and 3412 2-Path Gas Ultrasonic Flow Meters



Ideal for natural gas non-custody transfer applications

- Two-path design for measurement redundancy
- Wet gas tolerant
- Flow calibrated accuracy: $\pm 0.5\%$ of reading relative to lab
- Available line sizes: 100 mm to 914 mm (4 in to 36 in)

Rosemount Liquid Ultrasonic Flow Meters

3812 2-Path Liquid Ultrasonic Flow Meter



Reliable and economical solution for non-custody transfer applications.

- Two direct measurement chords measure the transit times of ultrasonic pulses passing through the liquid in two parallel paths
- Field-replaceable transducers simplify maintenance
- Bi-directional flow capabilities simplify installation

3814 4-Path Liquid Ultrasonic Flow Meter



Ideal for applications requiring high accuracy, flow dynamic intelligence, low maintenance and low pressure drop.

- Well suited for custody transfer and inventory control applications
- 4-path chordal design allows for cross-flow compensation in each measuring plane

3818 8-Path Liquid Ultrasonic Flow Meter for LNG



Specifically designed to reduce measurement uncertainty and long-term performance in LNG applications. The 3818 meters are ideal for meeting strict safety and environmental regulations.

- Built-in diagnostics track LNG quality, process conditions and flow integrity
- Advanced transducer technology for increased reliability



Rosemount Vortex Flow Meters

Unmatched reliability, repeatability and accuracy



Unmatched Reliability

- No impulse lines, ports, or gaskets to improve reliability
- Unique all welded/casted, gasket-free design construction with no ports or crevices that can clog
- Mass balancing of sensor system and Adaptive Digital Signal Processing (ADSP) provide vibration immunity
- Device Diagnostics enable field verification of all meter electronics and sensor without process shutdown

Enhance Overall Safety

- Unique non-wetted sensor requires no bypass piping even in the most difficult process environments
- Eliminate the need to shut down the process during routine maintenance and meter verification
- CriticalProcess valve provides an extra level of safety assurance by allowing users to verify secondary containment integrity

Reduce Installation Complexity

- Flanged, wafer, weld-end connections to connection meet the needs of an application
- Widest selection of materials (SST, Nickel, Carbon Steel, and Duplex) to provide a tailored solution for any process challenge
- Standard and armored cables provide flexibility of remote mounting transmitters

Rosemount 8600 Vortex Flow Meters

8600 Utility Vortex Flow Meter

- Optimized for general purpose flow metering and utility applications including clean fluids and steam flow
- Enhanced reliability and simplified maintenance with superior vibration immunity without any moving parts



Rosemount 8800 Vortex Flow Meters

8800 Flanged Vortex Flow Meter



- Wide range of flange ratings available
- Ideal for all applications from general purpose to the most demanding application
- Up to ANSI Class 1500 pressure ratings for high pressure applications
- Ideal for injection applications

8800 Reducer™ Vortex Flow Meter



- Flanged vortex flow meter with reducing flanges integrated into the design
- Reduces cost by eliminating the need for field assembly of reduced piping
- Both Reducer and standard vortex have a common face-to-face dimension which allows the user to change the meter without impacting the piping layout or drawing

8800 MultiVariable Vortex Flow Meter



- Integral pressure and temperature sensors enable compensation
- Removable temperature sensor makes access and removal easy without draining the process piping
- Mass flow, volumetric flow or temperature are available as configurable outputs

8800 Weld-End Vortex Flow Meter



- Flange gaskets are eliminated by welding the flow meter directly into your process piping
- The only vortex flow meter available with zero potential leak points
- Ideal for applications where reducing potential leak points is important

8800 Dual/Quad Vortex Flow Meter



- Flanged vortex flow meter with redundant electronics and sensors
- Use for SIS and other applications where redundancy is critical
- Transmitters available with independent configurations

8800 Wafer Vortex Flow Meter



- Lightweight, cost-effective solution
- Easy installation with standard alignment rings
- Ideal for utility applications



Rosemount Magnetic Flow Meters

Highly accurate flow measurement solutions for a wide variety of conductive fluid applications



Reliability By Design

- Dual compartment Magnetic transmitter housing and all-welded sensor prevent moisture ingress and maintain safe local configuration

Industry-Leading Performance

- A temperature characterization and verification process for Magnetic transmitters minimizes the effects of ambient temperature changes

Valuable Diagnostics

- Smart Meter Verification for Magnetic flow meters continually monitors meter performance without stopping the process

Magnetic Flow Meter Overview

Magnetic flow meters, also known as electromagnetic flow meters or mag meters, are often selected because they are obstruction less, cost-effective, bidirectional, and provide highly accurate volumetric flow measurement.

Electromagnetic flow meters, or magmeters, are comprised of a transmitter and sensor that together measure flow. The magnetic flow meter's sensor is placed inline and measures an induced voltage generated by the fluid as it flows through a pipe. The transmitter takes the voltage generated by the sensor, converts the voltage into a flow measurement and transmits that flow measurement to a control system.

A range of liner materials, electrode options and line sizes accommodate a wide variety of process applications. For aggressive high noise applications, look to our Slurry Platform for optimum performance.

Rosemount Magnetic Sensor Portfolio

MS Slurry Sensor



A robust solution for difficult to measure applications such as sand, high solid content fluids, long pulp fibers, or installations that generate excessive process noise.

8705 Flanged Sensor



An all-welded design ensures reliability in the harshest environments. A wide range of sizes, liners, and electrode material options are available to meet most process conditions.

8750W Flow Meter



A reliable, robust design makes this utility magnetic flow meter system ideal for water, wastewater, and utility flow applications.

8711 Wafer Sensor



An economical, compact, and light-weight alternative to flanged magnetic flow meters with included alignment spacers for easy installation.

8721 Hygienic Sensor



Specifically designed for food, beverage, and pharmaceutical applications that require reliable, safe, and hygienic operation.

Liner Options



PFA, PTFE, ETFE



Polyurethane



Neoprene



Linatex

8782 Slurry Transmitter



The 8782 Slurry Transmitter is ideal for high noise applications where the highest levels of performance are required.

8732 Transmitter



This integral-mount transmitter with explosion-proof housing supports a variety of communication protocols and is available with Smart Meter Verification.

8712E Transmitter



This remote-mount transmitter has an easy-to-use LOI with dedicated configuration buttons, and is available with Smart Meter Verification.



Roxar Multiphase Flow Meters

Adjust for multiple flow regimes with performance monitoring and adaptive measurement capabilities



The Power of Performance Monitoring for Roxar 2600 Multiphase Flow Meters drives process insight and value directly at the wellhead.

The Roxar 2600 Multiphase Flow Meters (MPFM) accurately characterize flow regimes and provide critical information on a well's production capabilities. Built on a scalable technology platform, the advanced meter's signal processing and field electronics provide sensitive measurements and a comprehensive mapping of flow. Employ this modular meter to improve production optimization, flow assurance and well testing, while meeting all field conditions and cost requirements.

Automate Work Processes

- Collect diagnostic data from the meter and transfer the information to the Microsoft Azure cloud in real time, eliminating manual and timely processes for collecting data in the field.

Gain Actionable Insight

- Actionable insights from the Roxar 2600 Multiphase Flow Meters, enable proactive maintenance and help mitigate costly downtime.

Eliminate Uncertainty

- Reduce costly consequences associated with uncertainty in well data. With continuous remote monitoring, operators have the operational assurance they need to make informed decisions.

Access to Expertise

- Through the cloud environment the Emerson experts will monitor meter performance and provide recommendation of any actions required, reducing the need to build in-house competence.

Roxar Downhole Monitoring Solutions

Improving subsea well integrity with real-time monitoring of Annulus B pressure on subsea wells



Emerson's Roxar™ Downhole Wireless PT Sensor System - Annulus B allows the continuous monitoring of pressure and temperature in the B annulus of a sub-sea well. With this previously inaccessible data, the operator now has a unique opportunity to make informed well management decisions, enabling improved overall risk assessment, better well management and extended production up-time.

Key Benefits

- Real-time pressure and temperature data allowing for a more in-depth risk assessment of critical well barriers
- Simple to integrate, can use the same interface card, cable and wellhead feedthroughs as Roxar reservoir gauges
- High-integrity design with no casing penetration

Applications

- Subsea and TLP wells
- Production and injection wells
- Gas lift wells

Roxar Intelligent Multistage Completion Network™

Wireless interface enables connection to lower completions monitoring and control instrumentation



The Intelligent Multistage Completion Network™, an Emerson-Metrol partnership offering, offers a cost-effective solution to downhole monitoring in multistage completions. A permanent reservoir monitoring system is installed in the upper completion. The new Roxar Matrix Downhole Wireless Interface™ enables connection to Metrol wireless monitoring and control devices in the lower completion.

Key Capabilities and Performance

- High resolution temperature profiles from reservoir sections of the well
- Pressure and temperature data from multiple locations along the sand face
- Wireless control within the lower completion and along the sand face
- Online productivity data enabling selection of correct well management actions
- Permanent gauge installation providing life-of-well data

Applications

- Production and Injection wells with two-stage completions
- Subsea wells

PolyOil Solutions

PolyOil use a range of high impact wear resistant materials which by their unique processing methods make them the toughest available. The natural polymer properties make them low weight, safe and easy to handle and resiliency makes them kinder on all other equipment.



Anti-Jar Clamp - Subsea

- Acts as a safety device to prevent jar from cocking. It is light weight, easier handling than metal, benefits from a hinged design, and simple and fast to fit

Centralizer and Control Line Protector - Downhole

- Help get the casing to the depth of the well in long horizontal profiles by significantly reducing friction and drag, compared to metal clamps

Riser Sealing Mandrel & Cased-Wear Joint - Subsea

- Protect umbilical lines and increase safety on drilling rigs during completion and workover operations

Umbilical Protector Poly-Tector - Subsea

- Designed in-house to suit clients specification, being available in single or dual hinged design. It is simple and fast fitting, buoyant and counts on mid joint or cross coupling system



Rosemount Differential Pressure Flow Measurement Solutions

Accurate flow measurement for long-term performance



Driven by Innovation

- Emerson's diverse portfolio of primary elements, transmitters, and fully assembled flow meters provides a customized solution to address your measurement challenge
- Industry-leading differential pressure (DP) innovations including the Rosemount Annubar™ Primary Element, Conditioning Orifice, Integral Orifice, and MultiVariable™ technologies deliver unparalleled performance even in demanding and critical applications

Fully Configured Solutions for Faster Start-ups

- Save time and money with Emerson's Rosemount flow meters, which arrive fully configured, leak tested, and ready to install
- Reduce process penetrations and pipe straight run requirements as well as enable routine maintenance and installation without shutting down your process



Lower Operating Costs. Maximize Energy Savings.

With its innovative T-shape, the Rosemount Annubar primary element incurs one of the lowest permanent pressure losses of any flow device. This helps to reduce fuel consumption, decrease pumping and compressor costs, and increase plant capacity.

Solve common flow challenges with easy-to-maintain solutions

Minimize Leak Points



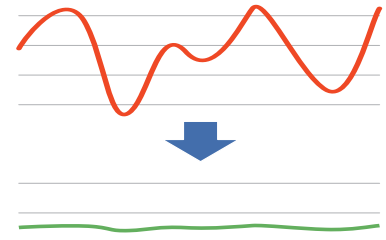
- Eliminate impulse lines and additional process penetrations with the Rosemount 405 Compact Flow Meter that mounts between existing flanges
- Reduce potential leak points by up to 70%

Simple, Drop-in Solution



- Reduce installation time with the all-welded Rosemount 9295 Process Flow Meter, which arrives preassembled and leak-checked
- Available with optional redundant transmitter assemblies, ideal for SIS applications

Large Flow Range Accuracy



- Ultra for Flow is the industry's first percent of reading DP transmitter specification
- Improve accuracy and performance in high turndown applications by controlling closer to set point

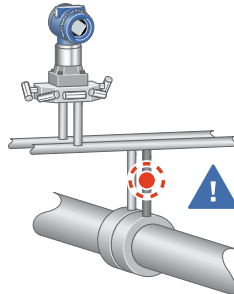
Increase visibility into process conditions and receive information when you need it most

Built-in Flow Calculations



- Simplify mass and energy flow measurement with the Rosemount 3051S MultiVariable transmitter
- Eliminate guess work with two-step configuration and 3:1 measurement output

Advanced Diagnostics



- Help eliminate unnecessary maintenance by proactively detecting and diagnosing process connection issues and plugged impulse lines before they impact production

Insight into Remote Locations



- Emerson offers the only native wireless DP flow meters with *WirelessHART*
- Add more monitoring points across your plant to help reduce maintenance costs and safety risks

Decrease energy costs, simplify installation, and increase flow measurement accuracy

Annubar Technology



- The lower permanent pressure loss achieved by Annubar primary elements results in up to 50% energy savings
- Insertion technology reduces installation cost up to 90% over traditional orifice installations

Conditioning Orifice Technology



- Reduces straight run requirements by 90%, enabling material, labor and procurement cost reductions
- Patented 4-hole design accurately measures flow regardless of upstream swirl and irregular flow profiles



Rosemount Level Measurement

Solve your liquids and bulk solids challenges across all applications



Full Range of Continuous and Point Level Measurements

Emerson's portfolio for liquids and solids measurement covers a wide spectrum from basic point level detection to challenging continuous level, interface, and volume measurement, even in extreme conditions.

Increase Uptime and Make Your Process Safer

- Fast remote proof-testing from the control room
- Automatic monitoring of tank roof position and advanced diagnostics alerting you to any abnormal conditions, which can increase uptime and make your process safer



"The Rosemount 5408 is very easy to work with. Installation was straightforward and the diagnostic wizards are excellent and very user friendly."

**- Andreas Berndtsson, Instrument Technician,
Södra Cell AB.**

Meet all your continuous level measurement requirements

Guided Wave Radar



- Manage applications including solids, saturated steam, small spaces, and long ranges
- Measure and detect level and interface for process optimization
- Easy to install, Ideal for chamber applications and for replacing older technologies

Non-contacting Radar



- Highly accurate & reliable measurement
- Immune to most process conditions such as changing density, conductivity, temperature, pressure, viscosity, and pH
- Applicable to a wide range of applications with a broad selection of process connections, antenna styles, and accessories

Differential Pressure



- Straightforward, easy to install liquid level technology that can be isolated by valves
- Handles demanding applications, extreme temperatures, and corrosive fluids
- Unaffected by surface conditions, foam, and internal obstructions

Overcome difficult application conditions and minimize costs

Solids Level Measurement



- Emerson's Rosemount solids portfolio provides reliable, accurate level measurement for most solids applications, regardless of the solids surface, DC, density, filling rate, dust, or condensation

Vibrating Fork



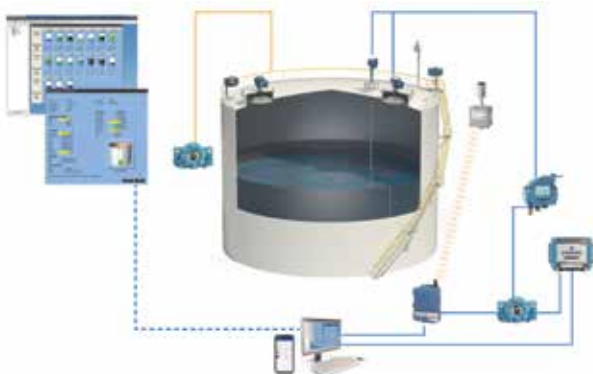
- Reliable high/low level alarms, overflow prevention and pump control
- Help prevent unplanned shutdowns with advanced diagnostics
- Fully integrated remote proof-testing

Magnetic Level Indicators



- Simple redundant measurement with no power required
- Low maintenance alternative to sight glasses with minimal leak points

Meet your productivity goals with efficiency, safety, and accuracy



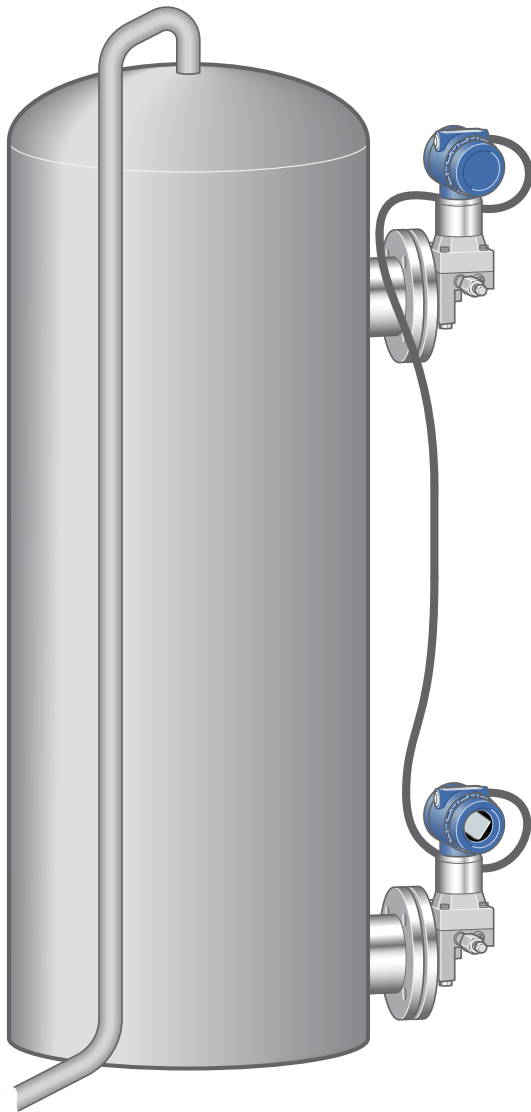
Inventory Tank Gauging



- Get highly accurate measurement data and real-time inventory calculations in bulk liquid storage tanks with Rosemount Tank Gauging Systems

Rosemount Differential Pressure Level

Robust, proven technology for optimized plant operation



Simplify Installation with Reliable Solutions

- Achieve worry-free installations unaffected by vapor space changes, surface conditions or internal tank equipment
- Connect to virtually any process with Emerson's comprehensive offering of seals, fill fluids, and materials

Improve Performance Using Advanced Technology

- For distillation towers and tall vessels, the Rosemount 3051S ERS System eliminates impulse piping and capillary using an innovative digital architecture
- The Rosemount 3051S Thermal Range Expander eliminates the need for heat tracing with a unique design rated up to 770 °F (410 °C) operating temperature range
- Ideal for applications with shorter spans and higher operating pressures, Tuned-System™ Assemblies improve response time and reduce installed costs by up to 20%



"[Using the Rosemount 3051S ERS System] we have reduced our maintenance time on this unit by nearly 40 percent, and have longer production cycles with fewer shutdowns and startups due to maintenance issues.

We have also been able to raise the upper limit of the level measurement, as we have improved the accuracy and reliability of the level measurement. This has made our unit more efficient and has reduced our overall cost to operate the column."

- Herr Andreas Busch-Ahlschläger, I&C Engineer, OXEA

Leverage the industry's leading differential pressure (DP) level portfolio to run at your full potential

Broadest Seal Selection



- Protect transmitters from corrosive, erosive, or extreme temperature processes with Rosemount 1199 Remote Seals
- Wide variety of seals and 20 fill fluid options meet varying process requirements and industry-specific applications

Unparalleled Performance



- Eliminate temperature error associated with capillary systems with the Rosemount 3051S ERS System technology
- Digital technology cuts response time by up to 90%

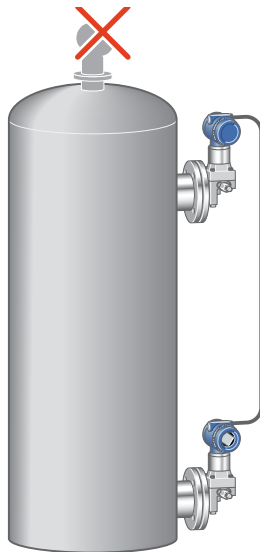
Reliability in Demanding Environments



- Ensure lasting, stable measurement performance in corrosive processes, hard vacuums, and other challenging applications
- Extend instrument life in high temperature applications with the Rosemount 3051S Thermal Range Expander

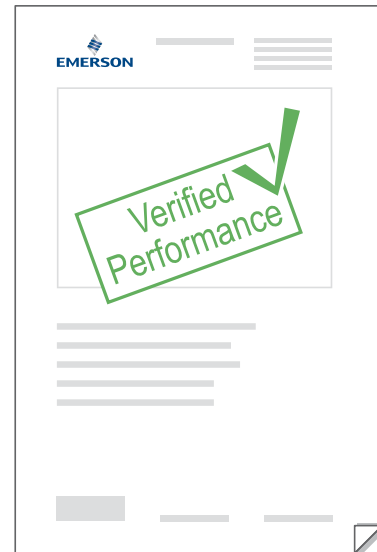
Gain enhanced process insight and confidence in your level measurements

Expand Visibility into Your Tank Beyond Level



- Eliminate the need for separate blanket pressure transmitter
- Drive proactive maintenance practices through sensor diagnostics
- MultiVariable capabilities provide additional process information for optimized control

Verified Performance



- Optimize performance and reduce risk by validating the seal configuration for your unique application
- Backed by a remote seal system performance certification

Rosemount Guided Wave and Non-Contacting Radar

Gain insights into your tank



Reliable Measurements Across all Applications

Whatever your application or process challenge, Emerson has the radar solution for your operation. Rosemount Radar Transmitters help you anticipate problems and take corrective action sooner, preventing downtime, spills, and safety incidents.

Better Performance and Uptime

- Find out what happened during a specific event with built-in historians
- Automate level & interface measurements in previously inaccessible locations with the world's first fully integrated wireless guided wave radar level transmitter
- Achieve increased reliability and sensitivity in a wider range of applications using Frequency Modulated Continuous Wave technology
- Get more reliable measurements with longer measurement ranges and better signal strength, using Direct Switch Technology
- Take out the troubleshooting guesswork with Signal Quality Metrics, which provide a "heads up" on the system before it becomes necessary to take a trip out to the field



Solids Level Measurement

Get accurate and cost effective solids measurement with minimum maintenance and easy installation using Emerson's Rosemount range of solids measurement devices. Designed to suit your application, they offer a complete range of continuous and point level sensors to help ensure you get the right solution for your particular challenge.

Unique features include a solids algorithm that emphasizes the reflection from rough and inclined surfaces to provide more reliable readings.

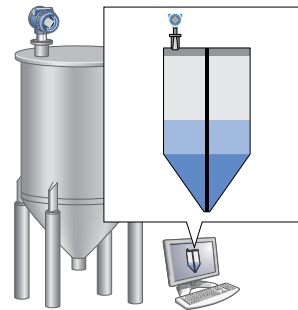
Engineered for ease-of-use

Safe, Efficient Proof-Testing



- Carry out proof-testing efficiently with minimal process interruption, avoiding the need to climb tanks
- Advanced diagnostics alert you to any abnormal conditions, allowing for increased uptime and process safety

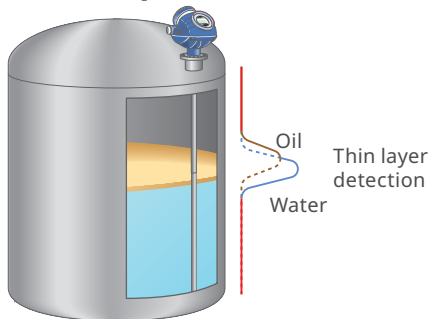
Easy to Operate Radar System



- Reduce installation costs and simplify the complexity of operations with Emerson's easy-to-use devices
- Decrease operator error with on-board pictorial user instructions, built-in historians, and easy configuration

Solve level challenges and improve uptime

Improved Separation Process and Layer Build-up Notification



- Detect unwanted top layers to see if your process has been compromised, and optimize the separation process with thin layer technology
- Ensure reliable and accurate level readings and minimize shutdowns by utilizing preventative build up diagnostics

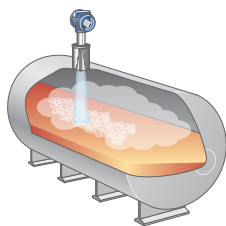
Accuracy and Robustness in Saturated Steam



- Accurate measurements - without deviation - in challenging, saturated steam applications with Dynamic Vapor Compensation
- Help optimize boiler efficiency and decrease fuel costs by automatically compensating for variable process conditions

Increase visibility into process conditions

Technology Designed for Your Application



- Robust and reliable measurement with maximized radar signal strength using FMCW technology
- Simplify installation by eliminating the need for O-rings with unique PTFE seal design
- Process seal antenna provides reliable measurement for applications with heavy condensation and aggressive media

Remote Locations with Wireless Technology



- Automate processes that were not possible before with native *WirelessHART* guided wave radar and vibrating fork detectors
- Enable low cost installation and eliminate unnecessary field trips
- Configure, monitor, and control level from the control room and gain advanced diagnostics with proactive alerts



Gasum Uses a Certified System to Control LNG Terminal Operations

The Gasum Terminal in Lysekil, Sweden, is world leading in small-scale LNG handling. They sought for a solution to their big challenge – operate efficiently and safely using just one tank.

The facility supplies natural gas to an adjacent refinery, so it is critical to avoid unplanned shutdowns that would stop the flow of energy and cost millions of dollars.

An LNG tank is rarely, if ever, opened during its lifetime. Temperature control is crucial to avoid unwanted boil-off and evaporation leading to economical loss, safety and environmental hazards.

To meet these challenges, Gasum selected Emerson’s Rosemount Tank Gauging System based on radar technology. It requires minimum maintenance, and all electronics are accessible from outside the tank. Their tank is equipped with three Rosemount 5900S level gauges, each with an antenna suitable for cryogenic temperatures. This is a common configuration to help safeguard against false alarms, and to achieve redundancy.

They also installed Rosemount 2240S transmitters with sensors for multiple spot temperature measurements, cool-down and leak detection. An instrument for stratification detection was also added to prevent roll-over incidents. To further improve safety, Gasum utilized the comprehensive support within the Rosemount TankMaster Inventory Management System for convenient proof-testing from the control room.

“ We don’t take any risks. A stop in operation is not an option, so we use the 2003 voting principle for safety and maintenance purposes.”

Benny Johansson
Terminal Manager, Gasum

Perstorp Solves Challenging Level Application

Perstorp, a specialty chemical plant in Sweden, needed to increase uptime in their reactors and mixer vessels to eliminate potential batch process losses while operating at maximum capacity.

Perstorp’s batch reactors have shaft agitators positioned at multiple levels, making the surface very turbulent with heavy condensation. Also, this agitation creates a thick layer of dense foam in some of the reactors. Previous level instruments were unreliable under those conditions.

For this challenging application, Perstorp installed the Rosemount 5408 non-contacting radar level transmitter with a condensation resistant process seal antenna.

The transmitter has high sensitivity and advanced signal processing, which can pick up the weaker signals in these extreme conditions, giving Perstorp the data needed to increase process efficiency.



The results

GASUM

- **99.5% availability**
- **Multimillion-dollar savings** by avoiding unplanned shutdowns
- **Improved safety** with remote proof-testing and overfill prevention
- **Increased plant efficiency** with data insights

PERSTORP

- **Reliable measurement** despite challenging conditions
- **Downtime reduced** considerably
- **Lower maintenance costs**



“The Rosemount 5408 was able to handle turbulence, foam, and agitators and provide a reliable, stable level measurement.”

Perstorp Manager

Rosemount Vibrating Fork Level Detectors

Help ensure your process is running safely and efficiently



Ensure Regulatory Compliance

Environmental and safety regulations continually enforce monitoring of all tanks, while simultaneously, operators are constantly pushing to minimize costs. Emerson's Rosemount Liquid Level Switches handle a wide range of applications, from overflow prevention duties to critical high and low level alarms. Unique fully integrated HART functionality makes it quick and simple to help ensure your process complies with major regulatory safety standards.

Eliminate Overfills

- Bring your process to a safe state when needed with the most reliable point level detector in its class
- Verify functionality and reduce human error with simple proof-testing, minimizing process interruptions
- Reliability in harsh environments with robust designs and dual compartment housing

Prevent Unplanned Shutdowns

- Continuously monitor instrument health and be alerted to potential issues with powerful built-in diagnostics
- Proactively plan maintenance with fork corrosion and coating detection capabilities
- Detect unwanted sediment build-up in your vessel with unique sand switch functionality



Simplify Your Operations

- Reduce routine trips to the field with remote configuration, functional testing and troubleshooting capabilities
- Realize potentially significant savings in critical applications with unique fully integrated remote proof-testing that takes only minutes to perform
- Help keep personnel safe by avoiding the need to climb tanks, work in high places, or risk exposure to hazardous process media
- Wired and wireless technology provides flexibility for all types of installation



Rosemount Tank Gauging

Achieve high performance bulk liquid measurement



Use Inventory and Custody Transfer Tank Gauging for your Large Volume Tank Storage Applications

Secure efficient operations, reduce risk and measurement uncertainty with the Rosemount Tank Gauging System. It includes complete inventory management and devices for accurate measurements of tank storage data, such as level, temperature, and pressure for net volume and density calculations. Use Emerson's targeted system solutions for bulk liquid storage in tank terminals, including LNG/cryogenic applications, refineries, and fuel depots.

Use System Features for Comprehensive Inventory Management

- Measure level, temperature, and pressure for accurate volume and mass calculations
- Utilize complete inventory, hybrid, and custody transfer functions

Address Safety Concerns with Unique Features

- Use certified system solution for both automatic tank gauging, process control, and overfill prevention
- Get dual-level data utilizing a single nozzle with 2-in-1 technology
- Increase employee safety by performing remote proof-testing from the control room
- Monitor floating roof position

Achieve Efficient Upgrades with Emulation Technology

- Make cost efficient step-by-step upgrades of existing equipment from any major supplier on the market
- Replace old or malfunctioning field and control room equipment seamlessly
- Use existing cabling and communication protocols for quick and easy installation
- Reduce maintenance costs for more efficient operations

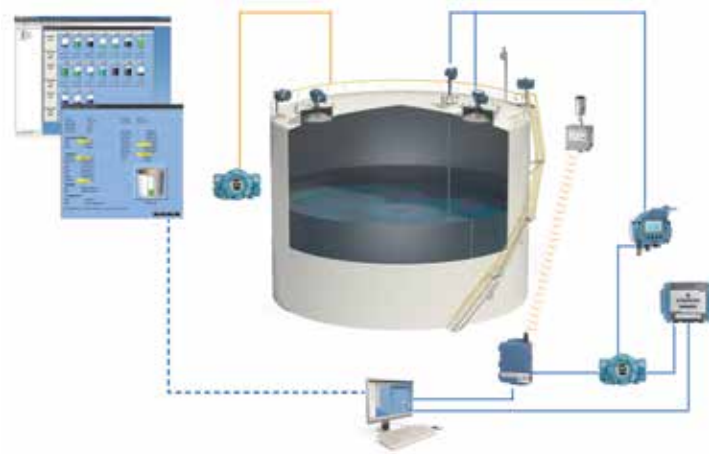
Control your inventory and custody transfer activities

Custody Transfer Certified Radar Level Measurements



- Minimize maintenance with reliable and accurate radar level technology
- Save on costs with 2-in-1 gauge option to achieve redundancy, or SIL 3 certified safety in just one level device
- Reduce complexity with one gauge and customized antennas to fit various tank types and liquids, ranging from liquefied gas and gasoline to crude oil and asphalt

Complete Inventory Management Functionality



- View current tank data to get insight into tank activities, allowing for better and more informed decision-making
- Control inventory with net volume and other calculations based on API and ISO standards
- Receive extensive support for inventory and custody transfer functions, e.g. batch handling, proof-testing and floating roof monitoring
- Perform easy system configuration and service

Reliable and flexible solutions even for the most demanding applications

Open and Scalable System Solutions



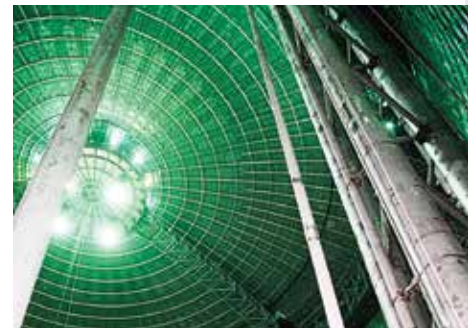
- Get dual data paths by leveraging both wired and wireless communication for maximum reliability
- Minimize cost by updating equipment as needed with support for all major communication protocols
- Perform a quick and safe installation utilizing 2-wire intrinsically safe cabling for power supply and measurement data

Temperature for Bulk Liquid Storage



- Choose between single or multiple spot sensor options allowing for one or more measurements across the tank
- Use temperature transmitter with highly accurate and calibrated multiple spot sensors for critical measurements and very accurate net volume calculations
- Combine with free water level sensor for measurements close to the tank bottom

Cryogenic and Refrigerated Tanks



- Improve reliability with low maintenance radar level instrumentation
- Use cryogenic sensors for multiple spot temperature measurement, cool-down, and leak detection
- Prevent roll-over incidents by detecting tank stratification layers in the tank

Rosemount Temperature Measurement

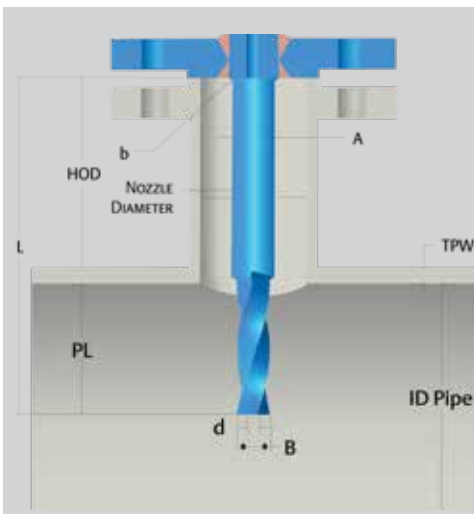
Maintain your ideal process temperature to keep your operations flowing smoothly



Make Better Decisions

Temperature is the most measured variable in process industries and is often the most critical factor. Emerson's Rosemount Temperature portfolio enables you to improve operational performance by increasing efficiency, decreasing energy consumption, and improving product quality. Innovative solutions stand up to extreme conditions and maximize control and throughput.

- Maintain your ideal temperature levels and keep your materials and operations flowing smoothly with reliable and accurate measurements
- Minimize downtime by leveraging Advanced Diagnostics for early detection of abnormal device or process conditions
- Gain process insights allowing you to improve uptime with innovative technologies and intelligent capabilities



Turn 50 Hours of Design Time into 15 Minutes

Emerson's Rosemount Thermowell Design Accelerator automatically iterates thermowell design specifications to pass ASME standards.

- Saves up to 90% of design time vs conventional methods, automatically recalculating tags that fail
- Provides explanation for why process designs fail
- Adheres to ASME PTC 19.3 (TW) standards
- Eliminates redundant calculations

Gain trust with every communication

Temperature Transmitters



- Reliable temperature measurement with Advanced Diagnostics to detect sensor drift or failure while providing redundancy to help you maximize process uptime
- Reduce infrastructure costs by using High Density Transmitter technologies to measure hundreds of temperature points with the Rosemount 848
- Increase accuracy by up to 75% with Callendar-Van Dusen sensor matching capability in the Rosemount 3144P and Rosemount 644

Make the right connections

Temperature Sensors



- Fast response times in your most critical applications to help keep your facility safe
- Achieve high accuracy with transmitter-sensor matching capability
- Reduce energy costs by maintaining optimal temperatures with ranges from -196° to 2192 °F (-321° to 1200 °C)
- Select from a wide variety of RTD and thermocouple sensors for any application and process environment for efficient and safe operations

Benefit from the experts who wrote the book on thermowells

Temperature Thermowells



- Precision manufactured in a wide variety of mounting styles, process connections, and materials to meet all your application requirements
- Provides mechanical stability against process variables during the full lifecycle of sensors
- Standardized thermowell tests and certificates for traceability and safety

Increase reliability with reduced Vortex Induced Vibration

Twisted Square™ Thermowells



- Simplifies calculations by eliminating over 90% of dynamic stress - the number one source of thermowell fatigue failures
- Eases design effort by reducing iterative calculations saving time to install
- Allows for longer thermowells at higher velocities for more accurate temperature measurements



Rosemount X-well™ Technology Optimizes Heat Exchanger Efficiency, Saving Downtime and Maintenance Costs



The results

- **Reduced down time** with performance information at your fingertips
- **\$100K in annual maintenance savings**
- **Improved operation efficiency** by balancing cooling loads

“ This Rosemount X-well 648 transmitter was commissioned in under an hour and seamlessly connected to the existing wireless infrastructure without process shut down or production loss.”

A major chemical manufacturer was lacking data to monitor the incoming and outgoing temperature of cooling water and process streams in heat exchangers, leading to high maintenance costs and increased energy consumption.

Without temperature data, it wasn't possible to monitor heat exchanger conditions and balance flow rates to determine when the exchanger should be cleaned. Consequently they regularly operated with two heat exchangers off-line for cleaning and one in operation.

Emerson worked with the manufacturer and identified 65 temperature points that would

identify flow rates based on the energy balance of the heat exchanger, thus decreasing maintenance costs to clean when it was not necessary. However, installing traditional wired intrusive thermowell temperature points was considered too costly and the risk of creating new leak points in the process was considered too high.

As a result, the company commissioned Emerson's non-intrusive Rosemount 648 with X-well technology, which

“X-well technology saves us an estimated \$100,000 in annual operational costs.”

drastically reduced the cost of installation, eliminated the risk of leak points and provided the data needed to determine the flow rate of cooling water. The new insights into their operation gave them the knowledge needed to adjust valve positions for accurate flow balancing of cooling water through heat exchangers ensuring they are not running at rates that would lead to erosion or Microbial Induced Corrosion (MIC). In addition, using Emerson's Smart Gateway and AMS software the customer was able to easily bring the new temperature data into their Procedural Language (PL) data historian leading to the ability to anticipate potential maintenance.

No cutting. No welding. No thermowells.

X-well Technology Gives You Accurate Process Temperature Measurement Without a Thermowell



This innovative solution measures process temperature using X-well's built-in algorithm and eliminates the need for thermowells, wake frequency calculations, or process shutdowns.

- Cut the cost of each temperature measurement point by up to 29%
- Reduce engineering and design time by up to 65%
- Reduce installation time by up to 70% over conventional temperature instrumentation
- Available with Rosemount 3144P or Rosemount 648 transmitters for easy integration into your wired or wireless system



Available in stainless steel for extra protection in marine and offshore applications or where high corrosion protection is desired.

Rosemount Flame and Gas Detection

Reliably safeguard your most valuable assets



Fulfill your Safety Requirements

- Emerson's comprehensive flame and gas detection technologies provide protection from continuously evolving hazards
- Achieve peace of mind with asset security in diverse environments

Experience Superior Performance

- Reliably and consistently detect certain hazardous gas releases
- Obtain accurate measurements with minimal false alarm disruptions

Benefit from Technical Expertise

- Emerson's experts recommend best practices, including device placement strategies for maximum coverage protection
- Receive technical support from an experienced representative before, during, and after device installation



"The Incus is factory calibrated for life eliminating up to 64 hours of maintenance time per year per unit, an annual cost savings estimated at \$50,000 for 10 units."

- Manufacturing Engineering Manager at a major fertilizer manufacturer in Asia Pacific

Early detection in difficult to reach areas to prevent toxic gas exposure

Wireless Gas Monitors



- Obtain an early warning of gas presence to help prevent your employees from entering potentially hazardous areas
- Hot-swappable smart sensors are lab calibrated prior to installation, resulting in up to 50% periodic maintenance savings
- Save up to 60% on installation equipment costs by eliminating the need for expensive wiring

Real-time detection and diagnostics

Fixed Point Gas Detectors



- Continuous, localized gas detection for a variety of toxic and combustible gases helps provide vital property and personnel protection
- Universal transmitters are compatible with universal electrochemical, infrared, and catalytic bead sensors for use in a wide range of applications
- Minimum power consumption enables cost saving benefits and improved longevity

Rapidly detect radiation emitted from a flame

Flame Detectors



- Identify specific wavelengths associated with types of fires potentially occurring in a facility, resulting in up to 80% decrease in response time
- Effectively recognize and reject false alarms, reducing the need for plant personnel to make unnecessary, costly adjustments
- Wide field of view allows for an up to 31% increase in area coverage to reduce capital expenses

Long range line-of-sight detection of gases

Open Path Gas Detectors



- Provide efficient perimeter monitoring with reduced devices required for commissioning
- Straightforward one person installation, including simple alignment, for quick and easy setup
- Heated optics allow full performance in difficult weather conditions by preventing ice formation, snow build-up, and condensation on the lens

Listen for leaks with acoustic technology

Ultrasonic Gas Leak Detectors



- Critical to aid in safe operation, these devices respond to gas leaks in high pressure processes, such as pipeline monitoring or gas compressor stations
- Achieve optimal asset protection with four independent sensors that provide a redundant, broad area detection coverage
- Maintains effective coverage in inclement weather, wind, leak or gas dilution, making it well-suited for use in ventilated outdoor applications

External measurements for harsh conditions

Gas and Smoke Aspirator Systems



- The sensor and transmitter are located outside the sample area, preventing the effects of high heat or humidity
- Simplified plumbing for ease of installation and maintenance
- Placed in readily accessible locations, allowing for ease of maintenance and replacement

Rosemount Liquid Analysis

Optimize operations with reliable liquid analytical measurement



Your Process Liquid Challenges, Solved

Critical to many applications across your facilities, effective liquid analysis monitors, and controls: drinking water to ensure quality, wastewater to stay compliant, water purification to protect capital assets, sanitation systems to optimize processes, and much more.

- Dependable, accurate liquid analysis makes the difference for yielding profitable and productive processes, and Emerson experts will work with you to help make any necessary improvements and find a solution to any liquid analysis problem
- Emerson's global ability and proven technology offers a comprehensive range of analyzers, transmitters, and sensors for maintaining and controlling even the most demanding applications



"They are truly trying to understand our pains, to be engaged, to understand the impact that a given issue has on us. We are able to minimize maintenance and reduce costs because their sensor can last up to four times longer than others available."

**- Control Engineer,
Chemical Plant**

Enhance process insight with continuous in-line measurement and monitoring

Dual Channel Transmitter



- Advanced transmitter with large, customizable screen provides at-a-glance view of two liquid measurements, diagnostics, and temperature readings
- Intuitive, easy-to-use design helps reduce configuration, installation, and maintenance time

Explosion-Proof Transmitter



- Intrinsically safe, explosion-proof design enables accurate measurement in hazardous areas
- Weatherproof and corrosion-resistant enclosure allows for use in harsh environments

Reduce operating costs and minimize maintenance with high performance pH and ORP sensors

General Purpose pH/ORP Sensor



- Stable, reliable pH measurement you can count on across many applications

Scaling Resistant pH/ORP Sensor



- Built to extend sensor life in dirty, abrasive, coating, and high-solid applications

Poison Resistant pH/ORP Sensor



- Reduce reoccurring sensor costs with long-lasting design built to protect against poisoning ions

High Temperature pH/ORP Sensors



- Lower cost of ownership with rebuildable design that allows continued use in high temperatures

Increase productivity and help maintain product quality with innovations for the Life Sciences industry

Single-Use pH Sensor for Biopharmaceutical Processing



- Pre-installed and gamma irradiated on the bioreactor bag, eliminating installation and sterilization time
- Stored in wet environment for immediate verification and calibration, reducing setup time
- High stability eliminates maintenance or calibration after initial one-point standardization

Hygienic Steam Sterilizable pH Sensor



- Pressurized reference gel prevents process fluid from entering the sensor, eliminating cross contamination and helping to maintain product quality
- Durable design maintains a drift-free pH signal after numerous sterilization cycles, providing long-lasting accurate and reliable measurement





Accurate analysis means big gains for operators who must maintain safe, healthy water supplies. Emerson's sensors and systems provide reliable chlorine and ozone measurements that will help ensure the effectiveness of your water treatment and monitoring applications.

In addition to advanced technology solutions, Emerson's technical support and application expertise will help you meet regulatory compliance and keep your water safe.



Liquid Analytical Measurements for Sanitary Applications

Liquid sensors and analyzers with rich online diagnostics provide insights that help streamline process performance by increasing throughput, minimizing waste, and improving quality for life science, food, and beverage manufacturers.

Conductivity, pH, and dissolved oxygen measurements are commonly used to maintain tight process control for sanitary applications, including steam-in-place and clean-in-place, by providing highly accurate measurements with fast response time.

Helps ensure water quality and regulatory compliance while controlling costs

Total Chlorine Sample Conditioning System



- Complete sample conditioning system measures total chlorine in blow-down water and seawater treatment applications to help ensure effective water treatment

Free Chlorine Measuring System



- Achieve faster, easier installation with integrated pH sensor, chlorine sensor, connecting cable, analyzer, and flow controller
- Continuous pH correction eliminates use of reagents, reducing costs and maintenance

Amperometric Ozone Sensor



- Continuously measure dissolved ozone in water to optimize bottled water and semi-conductor applications
- Simple membrane and electrolyte replacement minimizes maintenance costs

Overcome application challenges and ease installation and maintenance

General Purpose Contacting Conductivity Sensor



- Ready-to-install sensors require no initial calibration and offer versatile mounting options for fast and easy installation
- Rugged corrosion-resistant electrodes maintain stable, accurate measurement

Hygienic Conductivity Sensor



- Optimize water-for-injection and clean-in-place with reliable conductivity measurement and monitoring
- Quick response time helps conserve costly solutions and enhance system performance

Toroidal Conductivity Sensor for Heavy Industrial Environments



- Maintains consistent measurement and control in harsh, highly conductive liquid concentrations, prolonging sensor life and reducing maintenance
- Chemical-resistant options and high-vibration tolerance meet harsh application requirements

Reduce operating costs and increase uptime with sensors designed to last

Dissolved Oxygen Sensor



- Rugged construction provides reliable operation for applications ranging from power to wastewater
- Achieve longer sensor life with simple membrane and electrolyte replacement that minimizes maintenance and equipment costs

Steam Sterilizable Dissolved Oxygen Sensor



- Improve steam-in-place operations for life sciences, chemical, and food processing with fast and stable measurement
- Sensor functionality is maintained over many cleaning cycles, extending life and minimizing costs

Single-Use Dissolved Oxygen Sensor Adapter

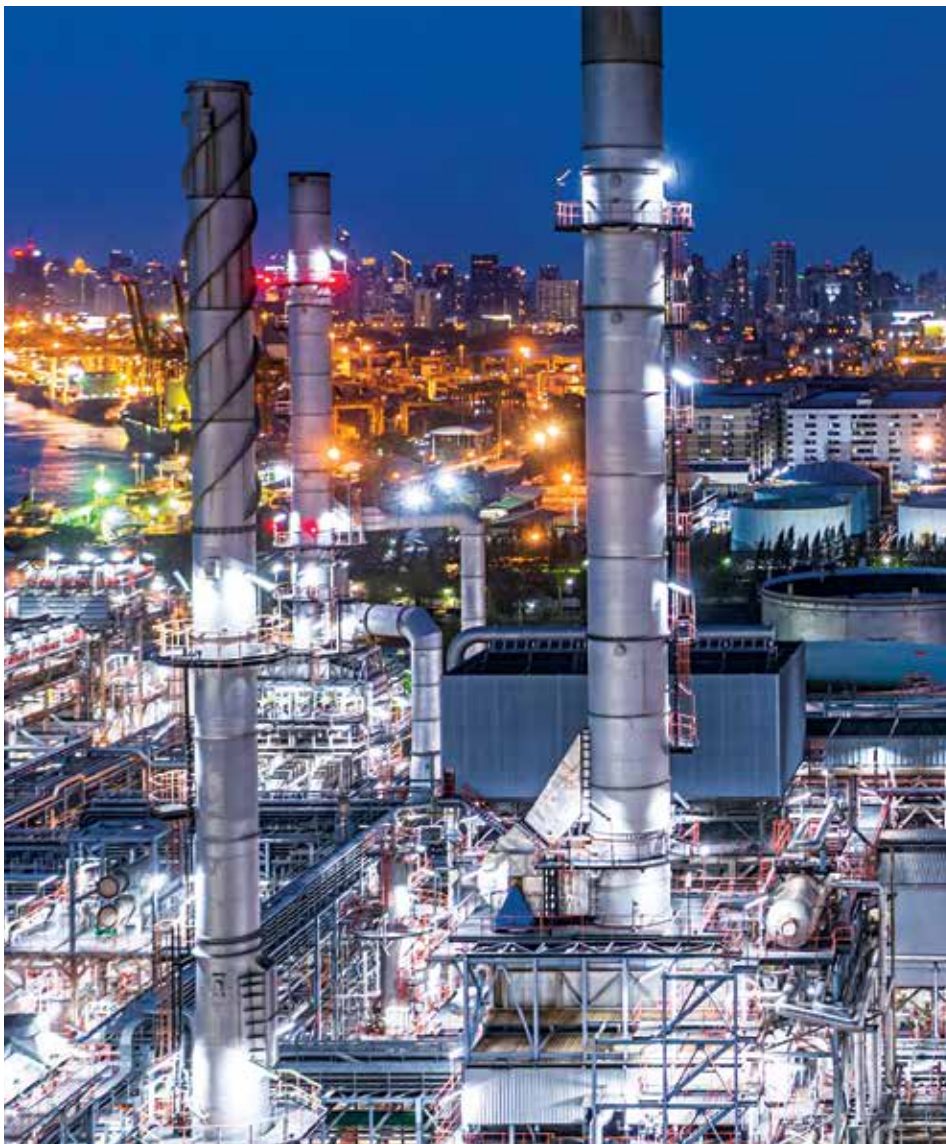


- Enables placement of standard stainless steel dissolved oxygen sensor into Single-Use bioreactor bag without touching the process solution
- Sensor can be used for multiple batches, reducing disposable costs of single-use instrumentation



Rosemount Combustion Analysis

Meet regulatory requirements while improving combustion efficiency and uptime



Optimize your Combustion Processes with Confidence

Combustion analysis solutions from Emerson offer reliable and accurate measurement to help you maintain safe operation and efficient control.

Using the right technology solutions to optimize your combustion process, you can lower energy costs, minimize flue gas emissions, and meet regulatory requirements.

Emerson's Rosemount Combustion product portfolio has you covered for a wide-range of applications from a power plant, to a refining/ petrochemical plant, a cement kiln, or a chemical plant.

- Industrial and commercial boilers
- Process heater furnaces
- Incinerators
- Catalyst regeneration
- Cement and lime kilns
- Gas turbines
- Flue gas analysis



"When operating a boiler, the reliable measurement of oxygen is critical for safe and efficient operation. The Rosemount in situ oxygen probes have provided us with years of reliable service without failure."

**- Instrument Supervisor,
Power Cooperative**

Maintain optimal oxygen levels in flue gases

Robust In Situ Oxygen Analyzer for Multiple Applications



- Provides accurate measurement of excess oxygen in flue gas, reducing energy costs, increasing safety, and lowering emissions
- Achieve a reduction in downtime and maintenance with the optional autocalibration capability embedded within the probe and durable zirconia oxygen-sensor cell

Oxygen and Combustibles Analyzer



- Patented zirconia oxygen sensor coupled with a combustible sensor provide accurate, reliable continuous measurement of combustion flue gases in reducing conditions and high temperatures
- Compact explosion-proof design is easy to mount and integral or remote electronics and autocalibration options simplify maintenance

Reduce installation time, maintenance costs, and environmental impacts

Commercial and Light Industrial In Situ Oxygen Analyzers



- Offers the same reliable zirconia oxygen-sensing cell used in larger industrial technology, but is uniquely designed to meet the needs of small and mid-sized boiler applications
- Leak-proof design improves reliability and simplified maintenance can save time and money

In Situ Oxygen Analyzer for Harsh Environments



- Optimizes flue gas measurement with an explosion-proof rating, offering reliable measurement for maximum efficiency in hazardous areas
- Option to mount electronics to probe or remotely minimizes installation costs, and the field-repairable design enables ease of serviceability

Rosemount Gas Analysis

Control and optimize your process while ensuring environmental compliance



Reduce Fiscal Measurement Uncertainty

- Expand your insight with critical compositional data to reduce lost and unaccounted-for gas
- Avoid two-phase flow measurement errors with reliable hydrocarbon dew point calculations

Improve Process Control

- Gain faster insight into your process with multi-component measurement
- Analysis of up to eight different gases in a single device provides broader application flexibility

Ensure Continuous Emissions Monitoring

- Simplify emissions monitoring with modular dry or wet systems that can be mounted closer to the sample probe for significant cost savings
- Avoid fines and meet regulations with reliable measurements of complex gases and emissions

Designed for the Rigors of the Real World

From C6+ natural gas measurement to complex process applications and emission monitoring solutions for regulatory compliance, Emerson's Rosemount Analyzers solve the toughest gas analysis challenges for a wide range of industries and applications. The hardened explosion-proof, field-mountable style of Emerson's Rosemount Gas Analyzers enables increased efficiency and cost savings by minimizing or sometimes eliminating the need for additional flammable area protection or sample transport lines.

Meet specific gas composition analysis needs and save costs with scalable solutions

Field-mountable, Transmitter-style Gas Chromatographs



- Ensure easier and cost effective installation and operation with explosion-proof, airless oven gas chromatographs
- Enable close-to-tap field mounting and reduce the need for costly enclosures or long sample lines

Rugged Air-Bath Oven Gas Chromatographs



- Achieve faster analysis and cycle time in simultaneous, complex applications with concurrent analysis
- Enable installation flexibility with extended temperature performance

Ensure simultaneous measurement of up to eight gas components in a single analyzer

High Resolution Quantum Cascade Laser Analyzers for Superior Target Gas Selectivity



- Hybrid Quantum Cascade Laser (QCL)/Tunable Diode Laser (TDL) spectroscopic technology expands gas analysis to both the near and mid-infrared range for enhanced process insight
- Accurate gas component detection and analysis without interference, filtration, reference cells, or chemometric manipulations
- Real-time validation assures analyzer performance and minimizes field maintenance intervention

Meet application needs with flexible multi-component and multi-method continuous gas analysis

Reliable Process Gas Analyzers for Selective Detection of more than 60 Gases



- Enable customized process gas analysis solutions with various cost-effective technologies and housing options to meet the needs of the most demanding of oil and gas, chemical, refining, environmental, medical, and automotive gas sensing applications
- Gain significant cost savings with the flexibility to combine non-dispersive infrared (NDIR)/ultraviolet (UV), paramagnetic, electrochemical oxygen, and thermal conductivity sensor technologies in one powerful instrument

A South Korea Refinery Gets Tighter Control of Ammonia Slip and Saves Over \$300K in Costs



A petroleum and refinery company in South Korea needed consistent measurement and control of ammonia to meet environmental regulations of nitrogen oxide (NOx) emissions and minimize waste during the combustion process.

Using the plant's legacy equipment, they relied on periodic validation of the analyzer and used lab reference values to inject ammonia, causing ammonia overdosing issues leading to economic and environmental problems.

In addition, maintaining the legacy analyzers required frequent calibration, costly consumables, and complex sample treatments to try to limit overdosing. Even with this effort, they experienced the formation of ammonia salts, plugging, and corroding in downstream components

and, during the process of removing NOx, experienced unreacted ammonia and ammonia slips.

The problem was solved by installing Emerson's Rosemount CT5100 Quantum Cascade Laser (QCL) Gas Analyzer, which delivered the needed precision (0–20 ppm) with an NH₃



The results

- **Prevention of regulatory fines** up to \$175K U.S.
- **Increased plant efficiency and process control** with reliable, direct ammonia measurement
- **More than \$150K saved in operating costs** annually due to reduction of ammonia overdosing

“The Rosemount CT5100 helped the plant achieve savings of more than \$150,000 U.S. in operating costs annually.”

limit of detection down to 0.1 ppmv (parts per million by volume) and repeatability of ±1 percent to ensure the efficiency of the selective catalytic reduction (SCR) performance. This helped the plant achieve savings of more than \$150K in operating costs annually due to reduction of ammonia overdosing.

Since the Rosemount CT5100 is a compact system capable of handling high sample gas temperatures (up to 374 °F/190 °C), the analyzer could be brought closer to the sample probe for speed and added reliability. Furthermore, it helped the plant prevent the formation of ammonia salts, which could plug or corrode downstream components.

Rosemount Quantum Cascade Laser Technology

Make a quantum leap in process gas analysis and packaging leak detection



Expand Real-Time Insights

- Emerson's Rosemount Quantum Cascade Laser (QCL) technology offers fast, high resolution spectroscopy to detect and identify a range of gas molecules in the mid-infrared wavelength range
- Coupled with Tunable Diode Laser (TDL) spectroscopy and a patented laser chirp technique, a single instrument is now able to provide greater insight and monitoring in both the near and mid-infrared range of spectroscopic light for real-time gas measurement and analysis down to sub ppm concentrations

Improve Process Gas Analysis Sensitivity and Selectivity

- Emerson's QCL process gas analyzers are the only solution able to analyze up to eight components simultaneously in a single instrument at parts per billion sensitivity levels. This enables even trace levels of gas to be identified, which is required in applications such as NOx reduction (DeNOx), ethylene purity and natural gas custody transfer.
- Interference-free measurements help create greater and faster process insight, supporting both process efficiency improvements and emissions monitoring compliance



Detect Package and Container Leaks with QCL Technology

Leverage QCL technology to improve measurement performance and reliability in Aerosol, Food, Beverage and Pharmaceutical industries.

Food packaging: Help ensure product quality and improve productivity in Modified Atmosphere Packaging (MAP) by testing every package on the line and eliminating manual batch testing.

Aerosol packaging: Achieve applicable regulatory and quality compliance with instantaneous, contactless detection of propellants for leak-proof testing in aerosol manufacturing.

Pharmaceutical packaging: Realize instant ROI with automated leak detection and rejection that reduces costs and eliminates inefficiencies in existing test methods.



Measurement Systems

Reduce cost, risk, and complexity with one source, integrated systems and solutions.



Get the expertise you need - in one trusted partner

Rely on Emerson to help design a measurement system that is able to meet your flow, analytical or blending needs over its entire lifetime.

- Implement a custom engineered or pre-engineered end-to-end solution that's right for your operation.
- Get the design expertise and technologies you need for success— all in one place.
- From concept to commissioning and beyond, Emerson's experts can help you not only design a more optimal system, but also execute it and provide the end-to-end support needed to keep it profitable.

Solutions for every challenge

The rigorous demands of your process operations require you to have reliable, accurate systems that give you the measurements you need - every time. Emerson understands the challenges and can help you with complete solutions for every flow measurement, analytical, and blending application.

- **Flow measurement systems:** Oil and gas measurement systems that assure commercial and regulatory compliance
- **Analytical systems:** Liquid and gas analytical solutions that accurately quantify and manage your product quality
- **Blending systems:** Solutions that enable on-spec production with greater flexibility

Meet measurement accuracy requirements

Oil and Gas Custody Transfer Metering Systems



- Achieve precise measurement despite varying operating conditions with dependable and seamless integration of all system components
- Minimize financial risk with reliable turnkey fiscal metering solutions that reduce overall system uncertainty and ensure regulatory compliance
- Ensure safe and reliable measurement of product flow with state-of-the-art technologies and proven flow measurement expertise

Ensure effective and efficient validation process

Proving Systems for Liquid Hydrocarbons



- Meet every installation need with tailored bi-directional ball provers and uni-directional compact provers
- Validate process meters across varying operating conditions with proven master meter systems
- Ensure the ongoing accuracy of your flow metering system and avoid audits with effective proving solutions

Enhance visibility to system health and reduce measurement uncertainty

Plantweb Advisor for Metrology



- Remotely monitor the health of your metering systems and integrated instruments anytime and anywhere with the latest IIOT technology
- Reduce time on site and ensure measurement confidence with intuitive dashboards that provide a bird's-eye-view of the health of all of your systems
- Ensure system reliability and contractual compliance using predictive diagnostics and automated reporting built upon industry standards

Improve quality and process control

Integrated Gas Analysis Systems



- Manage product quality with turnkey gas analysis solutions backed by more than 70 years of analytical expertise
- Full portfolio of probes, fast loop and sample handling systems, auxiliary instrumentation, and more than 100 analyzers and detectors
- Custom solutions with reliable long-term performance to help you control your process and accurately quantify your product

Control emissions to meet changing regulations

Continuous Emissions Monitoring Systems (CEMS)



- Reduce emissions and optimize energy use with cost-effective, pre-engineered and custom solutions
- Reduce risk of fines with highly accurate measurement from ppm to percent concentrations
- Rugged, compact systems enable installation closer to the sample probe, reducing cost and complexity

Ensure on-line measurement of your process liquids

Accurate Liquid Analysis Systems



- Minimize corrosion and scaling and maximize plant availability with Steam and Water Analysis Systems (SWAS)
- Reagent-free Water Quality Systems (WQS) allows you to reduce the cost of consumables and maintenance
- Accurate measurement of pH, ORP, ozone, chlorine, dissolved oxygen, conductivity, silica, and turbidity

Blend right the first time, every time

Fuel and Crude Blending Systems



- Get the process insight needed to accommodate a wider range of crudes with Emerson's crude blending solutions, technologies and services
- Optimize your process for today's clean-fuels market with online property analysis and advanced in-line blending control systems
- Guaranteed process design gives you the operational agility to confidently meet changing market demands and production targets

Hit lube and grease cost and quality targets with greater consistency

Lube and Grease Blending Systems



- Achieve blending cost reduction and quality improvement by relying on Emerson's blending experts to help you reduce cycle times and increase right-first-time blends
- High-accuracy, fully automated dosing systems eliminate manual dosing errors to consistently meet product quality requirements
- Improve operational flexibility with vertically integrated process control, allowing for better operational management and batch scheduling

Perform safer and cost-effective fluid transfers

Pigging and Transfer Systems



- Emerson's piggable solutions enable multiple successive product transfers through a single line without cross contamination
- The robust, modular design of Emerson's piggable equipment extends operating life and reduces the risk of valve leaks and maintenance
- Improve operator safety and efficiency by eliminating manual routing of open hose connections prone to product spills and safety hazards



Lifecycle Services, Project Management, and Workforce Training

A global network of service capabilities from your trusted partner



Emerson's global service network is the partner of choice for all your asset management needs. We employ innovative solutions to empower you in the field and help you maintain your competitive edge.

Our service offering extends beyond simple fix-and-replace activities:

- **Lifecycle Services** offers maintenance, reliability, and performance services – anytime, anywhere.
- **Project Management Services** can support you throughout your project duration, from plant concept to start-up.
- **Educational Services** can train your workforce throughout your plant life cycle and prepare them for any future changes.



We have the expertise and global resources to help you dependably define, execute and support a strategy throughout the lifecycle of your operation and ensure your workforce can meet the task.

Operate Safely, Consistently, and Economically

We provide you with service solutions that can help you solve your challenges, operate safely, improve your plant's reliability, and optimize your site's performance, which can help you increase profitability and realize the potential of your automation investment.

From start-up services to maintenance strategies, we partner with you to keep your plant running consistently and reliably to achieve your business goals.

- **Maintenance** Services help you get the technology and expertise you need to keep your process online
- **Reliability** Services help you consistently obtain accurate measurements, analysis, and diagnostics
- **Performance** Services help optimize plant performance to achieve business goals

One Less Project Risk

Expect your projects to proceed as planned as we manage your scope, schedule, budget, and align products to your specifications.

We provide:

- Project-dedicated teams
- Leadership by PMP® certified project managers
- Strategically located, globally connected resources
- Standardized project management processes
- Documentation management services

Enhance Skills Through Training

Empower your workforce by learning about new technologies and refining critical skill sets to maximize their performance.





Our courses are:

- Hands-on, in the Interactive Plant Environment
- Instructor-led, on-site at your facility or ours, as well as virtually
- Online, at your own pace
- Customizable curriculum to meet your specific needs



Emerson's field-proven instrumentation technologies execute in the toughest conditions, allowing you to maximize the performance, profitability, and safety of your applications.



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00803-1000-6114 Rev AD

