PlantWeb’s network of predictive intelligence enables you to detect process and equipment problems even before they occur. So you can move from reactive to proactive and profitable management.

TAKE BACK CONTROL WITH PREDICTIVE INTELLIGENCE

PlantWeb is the first proven digital plant architecture, delivering the future of process automation today. Grown from a network of predictive intelligence and integrated software, PlantWeb delivers reduced project risk and better operations.

From measurement and control devices to mechanical and process equipment, you can gain access to information you have never seen. And not simply more data, but better data...validated at its source to ensure reliability.

Now, with Emerson’s Smart Wireless solutions, the benefits of PlantWeb can be extended to areas that were previously out of physical or economic reach. With applications ranging from Process and Asset Monitoring to Workforce Productivity and Business and Plant Management, there are no limits to the benefits Smart Wireless can deliver.

The information PlantWeb delivers – whether wired or wireless – will empower your staff to work predictively, instead of reactively. Maintenance can focus on the repairs that are needed, instead of fixing things that aren’t broken. Operations can run production with greater confidence in automation, tuning the process for optimal throughput, quality and availability while reducing overall cost of operations.

You can finally achieve the promise of automation...better business results. Results you can quantify.

We’ve assembled a vast array of proof and organized it by the industries you work in. To see the results others have attained, visit us at PlantWeb.com/OPEX

PlantWeb now offers both wired and wireless capabilities for even more applications.
Detect worn seals, stem stiction, or process variations that may cause service interruption.

Detect sensor fouling or process variations with time to correct.

A secure view to remote assets enables predictive practices that improve operations and maintenance.

Extend insight and improve operations with wireless applications for:
- Process and Asset Monitoring
- Workforce Productivity
- Plant Management

Online monitoring of critical assets helps ensure reliability and avoid catastrophic incidents.

Online diagnostics alert you to failing sensors and environmental risks.

Integrated systems test all functions of the safety loop automatically so you know it’s always ready.

MEASUREMENT

REMOTE MONITORING

MACHINERY HEALTH

SAFETY SYSTEMS

FINAL CONTROL

ANALYTICAL

SMART WIRELESS

Extend insight and improve operations with wireless applications for:
- Process and Asset Monitoring
- Workforce Productivity
- Plant Management

Online diagnostics alert you to failing sensors and environmental risks.
Emerson’s Smart Wireless solutions extend PlantWeb’s predictive intelligence into areas that were previously out of physical or economic reach, opening the door for new possibilities in process improvement.

**SMART WIRELESS EXTENDS THE BENEFITS OF PLANTWEB**

Emerson’s Smart Wireless solutions help you touch more of your plant with predictive intelligence than ever before...with an installed cost savings of up to 90% over wired technologies. You can eliminate “blind spots” in your plant where it was previously too difficult or expensive to install wired instruments. Remote locations, physical obstructions, and the high cost of engineering and integrating the necessary technologies are no longer the barriers they were. Emerson Smart Wireless makes extending your “information reach” easy and affordable, enabling you to unleash your imagination and operation.

Emerson Smart Wireless seamlessly scales and integrates with your wired network. Self-organizing to provide near perfect reliability, Emerson Smart Wireless offers unparalleled ease of use. Installing and commissioning its open, WirelessHART standard-based wireless technologies can be a snap...going from box to fully commissioned in minutes.

Whether you want to access control and asset management information in the field, enhance your perimeter security with wireless video, provide cost-effective, secure communications wherever your staff moves, or enhance workforce safety with pinpoint monitoring of staff location, Emerson’s Smart Wireless leverages industrial Wi-Fi technologies and methods to help you protect your plant and people.

**Start anywhere. Go everywhere.**
The Smart Wireless approach gives you the freedom to choose your path. You can have as much or as little wireless as you want, where you want. With little to no up-front engineering and design required, scalable architecture and easy deployment.

Smart Wireless solutions reduce installation costs by up to 90%, allowing you to provide a solid ROI on your project.
IMAGINE THE POSSIBILITIES

EXTEND THE LIFE OF ASSETS

Equipment failures and the associated maintenance cost time, money, and reduce plant throughput and availability. Small problems, if undetected, can escalate into big problems and cause significant damage, turning a small maintenance task into major repairs, reducing asset life or requiring replacement. Imagine what you could do in these scenarios:

**HIDDEN ISSUE** The temperature dropped below freezing in your remote pumping station, putting your pumps at risk.

**SOLUTION** Rosemount 648 Wireless Temperature Transmitters provide remote monitoring to detect heater failure.

**HIDDEN ISSUE** A control valve’s response is decreasing or it cannot reach a desired position.

**SOLUTION** The Smart Wireless THUM Adapter with a Fisher FIELDVUE Digital Valve Controller can monitor the valve’s health and alert you before it affects the process.

**HIDDEN ISSUE** The bearing temperature on your motor has been trending upward, signaling an impending failure.

**SOLUTION** Rosemount 648 Wireless Temperature Transmitters measure bearing temperature, enabling proactive maintenance programs.

OPTIMIZE PROCESS UNIT EFFICIENCY

Increasing plant efficiency reduces material costs and can increase plant throughput. Small increases in efficiency can bring a substantial improvement in plant profits. Smart Wireless solutions can cost-effectively enable additional measurements needed to optimize plant efficiency. These include points that were not possible to monitor in the past, such as points on moving or rotating equipment, or points in harsh environmental conditions.

**HIDDEN ISSUE** Mineral deposits are forming in your cooling water system and reducing its effectiveness.

**SOLUTION** Rosemount Analytical Model 6081 Wireless pH Transmitters can monitor water quality, minimize scale formation and keep your plant at optimal efficiency.

**HIDDEN ISSUE** Operations does not notice a manual valve is in the wrong state.

**SOLUTION** A Wireless Position Monitor can provide consistent position feedback which reduces operation delays.

**HIDDEN ISSUE** Pump performance has been slowly degrading, resulting in reduced performance and increased energy costs.

**SOLUTION** Rosemount 3051S Wireless Transmitters can be used to measure suction and discharge pressures to monitor pump efficiency.
Maintaining plant assets is expensive. Most plants still rely on preventative or reactive maintenance practices even though these practices reduce the availability of plant assets. Smart Wireless solutions can help you move to predictive and proactive maintenance practices.

**MINIMIZE MAINTENANCE**

**HIDDEN ISSUE** A difficult to reach but essential gearbox develops a fault, requiring maintenance.

**SOLUTION** CSI 9420 Wireless Vibration Transmitters alert you in time to schedule maintenance when it’s most convenient and cost-effective.

**HIDDEN ISSUE** A filter is plugging and this could damage the pump.

**SOLUTION** Rosemount 3051S Wireless Transmitters are used to measure differential pressure across filters to detect plugging and provide an alert.

**HIDDEN ISSUE** Water is pooling in your steam line, resulting in a cold spot that could cause corrosion.

**SOLUTION** Rosemount 848T Wireless Transmitters monitor the temperature profile in steam lines, enabling you to detect trouble spots.

**MEET SAFETY AND ENVIRONMENTAL GOALS**

**HIDDEN ISSUE** The caustic tank is about to overflow, resulting in an environmental issue.

**SOLUTION** Rosemount 702 Wireless Discrete Transmitters with a high level switch can provide overflow indication on caustic tanks to alert you to a potential overspill.

**HIDDEN ISSUE** The safety valve won’t be checked until the next shift and your fines are increasing.

**SOLUTION** Rosemount 3051S Wireless Transmitters can detect safety valve releases, and with frequent monitoring this can lead to reduced fines.

**HIDDEN ISSUE** An eyewash station has been activated and your emergency response team needs to be notified.

**SOLUTION** The Rosemount 702 Wireless Discrete Transmitters detect usage of safety equipment so you can respond as quickly as possible.

Smart Wireless solutions allow you to wirelessly monitor safety equipment such as eyewash stations so that action can be taken sooner, should an incident occur. You can also wirelessly monitor readings in hazardous areas of your plant, reducing personnel safety risks. Finally, wireless technology can minimize the hazard, clean-up and expense of environmental releases by providing fast notification and accurate logging of an environmental excursion, should it occur.
SMART WIRELESS DELIVERS COST-EFFECTIVE, EASY TO IMPLEMENT SOLUTIONS TO PROTECT ASSETS

CHALLENGE
A large power company in the United States utilizes two gas-fired turbines to produce electricity for the grid. The site includes eleven remote buildings that house water pumping and circulation equipment serving a variety of needs of the power generation infrastructure. Since winter brings freezing conditions, small heaters are located in each remote building to ensure the pumps operate properly. Freeze damage of a pump system would cost $10,000 to $20,000 to repair or replace and take that pump out of commission for up to three days. The customer wanted to find a technology to bring temperature measurement into the control room as part of an early warning system. Wiring of these points was not feasible, since running trays over the roads or conduit under existing structures was cost prohibitive.

SOLUTION
The customer installed Rosemount 648 Wireless Temperature Transmitters in all eleven remote buildings around the plant. The devices then communicated through a Smart Wireless Gateway back to the control room.

RESULT
Damage to the water pumping and circulation equipment was prevented by monitoring the temperature with Smart Wireless solutions from Emerson. An early warning detection system for rapid temperature change was achieved, at a fraction of the cost of a wired solution.

— MAINTENANCE SUPERVISOR

RATE-OF-RISE TEMPERATURE MONITORING CRITICAL FOR SAFETY AND PLANT PERFORMANCE

CHALLENGE
A major chemical manufacturing company requires large amounts of chemicals to be brought onsite by 24,000 gallon capacity railcars. The internal temperature of the railcars needs to be monitored, because an increase may indicate a hazardous reaction is occurring. Traditionally, an employee would climb to the top of each railcar to measure and record the temperature. This was a time consuming and dangerous procedure, especially during inclement weather. The railcars are being moved often, so there was no practical or cost-effective method to continuously monitor the temperatures to ensure a reaction was not taking place.

SOLUTION
The customer installed a Smart Wireless solution. No matter where the railcars are positioned at the plant, a Rosemount 648 Wireless Temperature Transmitter on each car sends minute-by-minute temperature readings to a central host. The wireless communications pass through a Smart Wireless Gateway and then on to the plant’s DeltaV™ digital automation system.

RESULT
The Smart Wireless solution eliminated the need for manual readings. This chemical company uses the information to improve the performance and safety of their facility. Operators are no longer required to climb on the railcars to measure temperature, thus improving personnel safety. In this way, Emerson’s wireless system contributes to overall plant safety, making operators aware of any unexpected temperature rise while saving the company about $14,600 per year in reduced maintenance costs. While the operators watch for rising temperatures, transmitter performance and diagnostic information is available in AMS Device Manager.

— I&E DESIGNER
INSIGHT FROM SMART WIRELESS SOLUTIONS PREVENTS SHUTDOWN

CHALLENGE
Plugged filter detection is critical to preventing damage to pumps. Previously, the refinery was using older generation pneumatic transmitters which required manual gauge readings to detect loss of suction. These devices were prone to error and required extensive maintenance. The customer wanted a technology to bring reliable and repeatable pressure information into the control room as an early warning system from six locations at the refinery. Wiring the points was not cost-effective and the customer did not want to run new instrument wiring and power lines to these pump filter applications.

SOLUTION
Emerson delivered Rosemount 3051S Wireless Pressure Transmitters and a Smart Wireless Gateway. The pressure transmitters were installed in the Coker Unit, monitoring all of the filter areas. The devices communicated through the Smart Wireless Gateway back to the control room.

RESULT
After installation of the network, when a filter started to plug, the transmitter information was relayed back to the legacy host which indicated an alarm. The filter unit was shut down prior to the filter completely plugging, which would have caused a process upset, leading to a shutdown. The filter was then cleaned and put back in a matter of hours, resulting in huge cost savings and a significant reduction in downtime, since replacing a filter pump takes three days. Overall, the reduction in labor costs, reduced operating and maintenance costs, and improved throughput rate at each filter added up to a total savings of $80,540 for the customer.

FLEXIBILITY, SCALABILITY, AND COST SAVINGS PROVIDED WITH WIRELESS TECHNOLOGY

CHALLENGE
At a manufacturing company specializing in chemicals and specialty materials, monitoring of a high number of pressure, temperature and vibration points was expensive when device installation and wiring costs were taken into consideration. The customer also required that a wireless measurement solution coexist with other wireless systems in their facility. The solution also needed to be scalable and expandable. To help find a solution to this problem, the customer put together a cross-functional team to evaluate and guide the adoption of wireless technology in the plant environment.

SOLUTION
The customer installed Rosemount 648 Wireless Temperature Transmitters for profiling of plant steam headers. Redundant level measurement on caustic tanks was done through measurements from Rosemount 3051S Wireless Pressure Transmitters. The customer also monitored vibration of brine centrifuges at this site using the CSI 9420 Wireless Vibration Transmitter.

RESULT
The conduit and wire savings justified the investment in wireless technology and allowed the customer to measure points they historically could not access. The CSI 9420 identified centrifuge bearings that developed lubrication problems, allowing the maintenance staff to correct the problem before permanent damage occurred. The self-organizing network provided both flexibility to work around obstacles and the scalability necessary for adding more measurement points in the future.

When Emerson first approached me with their industrial wireless solution, they said ‘We’re plug and play.’ I have to admit I laughed; nothing I’d seen so far was that easy. But I’m a believer now. Five minutes after installing it, the network came to life. It’s been there ever since.

– SENIOR DESIGN ENGINEER

ASSETS
EFFICIENCY
MAINTENANCE
SAFETY
ENVIRONMENT

[Insight] from predictive wireless filter plugging alerts prevented a shutdown. Operators were able to shut down the pump, clean the filter and get it back on line in a matter of hours. If the alerts were not present, the filter pump would have been damaged and would have needed to be completely replaced.

– PROJECT MANAGER, MAJOR REFINING COMPANY
GROSS OIL PRODUCTION MONITORING OPTIMIZES PRODUCTION

**CHALLENGE**

The customer has several oil fields they would like to monitor more closely to optimize production. Oil and gas companies compete for the same underground reservoirs, so it is a race to get the oil out first. Good field monitoring is important to quickly identify anomalies in production; however, wired solutions are expensive and hard to maintain due to the physical layout of the oil fields. Traditionally, gross production monitoring at production headers was not made due to the cost of running wires. As a result, it sometimes takes several days to determine what sections of the field are experiencing production losses. This troubleshooting period is very costly, resulting in lower production and less efficient worker utilization.

**SOLUTION**

The customer purchased ten Rosemount 3051S Wireless Pressure Transmitters as well as a Smart Wireless Gateway. The 3051S pressure transmitters are installed across orifice meters placed on gross production headers (trunk lines). These gross production headers have 15 to 25 wells flowing into them. The 3051S pressure transmitters are also used to monitor gauge pressure on these same headers. The devices connect to a PC through the gateway that is integrated into a historian used to capture the production information and send it to site operators and corporate management facilities.

**RESULT**

Production trends are developed for these headers and a quick check of the header production in the morning can identify major production shortfalls. Operators can be sent out to determine the cause of these shortfalls immediately. With wireless monitoring of gross production headers, the customer has rapid detection of production loss, allowing operators to accurately understand how to take corrective action and restore production much sooner than had previously been possible.

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SMART WIRELESS SOLUTION INCREASES THROUGHPUT OF ROTATING KILN

**CHALLENGE**

A pulp and paper mill struggled to properly control calcining in a lime kiln. To do this the customer needed to measure the internal temperature on a rotating lime kiln. Due to the restrictions of wiring, this measurement was inferred, decreasing throughput of the kiln.

**SOLUTION**

The customer purchased two Rosemount 648 Wireless Temperature Transmitters with thermocouples and a Smart Wireless Gateway. The customer requested shipment as soon as possible, and all items were on site in a matter of days. The sensors were installed on opposite sides of the kiln’s mid-zone, 180 degrees apart. The temperature transmitters were mounted on a pipe that extends away from the kiln. This installation took less than one day to complete. Temperature updates are sent to the control room through the gateway.

**RESULT**

Since the installation, the mill is enjoying improvement of throughput with this kiln. The inferred temperatures were found to be off by 350° F. The Smart Wireless solution circumvented the constraints of the rotating kiln and made the measurements possible.

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Four days after the order was placed we could see minute-by-minute mid-zone temperatures trending on the control system... Since the wireless system has been installed, we can see if there’s build-up of lime in the midzone area. Overall, we have improved operation of the lime kiln, and increased throughput by 5%.

– PULP MILL LEADER
ENVIRONMENTAL COMPLIANCE SIMPLIFIED WITH SMART WIRELESS SOLUTIONS

CHALLENGE
Many midstream gas processing facilities have compressor stations which utilize internal combustion engines that are regulated by local environmental agencies for emissions compliance. They are required to monitor and report the inlet temperature and differential pressure across a catalyst that burns harmful chemicals prior to being released into the air. If they are not compliant with the environmental regulations, they face large fines that can accumulate over time.

SOLUTION
Emerson proposed a Smart Wireless solution to monitor the inlet temperature and differential pressure across the exhaust catalyst. These measurements are made with the Rosemount 648 Wireless Temperature Transmitter and Rosemount 3051S Wireless Pressure Transmitter, which report their measurements every 15 minutes. The customer’s engineers decided they could integrate the data with the company’s business Ethernet network through the Smart Wireless Gateway. This allowed the company to easily log data remotely.

RESULT
Emerson provided a reliable and cost-effective wireless solution that reduced the total installed cost, including wiring and labor. In this particular situation, there was a shortage of qualified electricians, so reducing the installation time was a key benefit. By integrating the measurement data into the business Ethernet network, environmental engineers were allowed to pull measurement data from the system to create standard reports for the environmental agency. This reduced the amount of time spent generating the report. Now the environmental engineers can spend more time analyzing the data to predict potential problems, resulting in lower fines and cost-effective compliance with local regulations.

STRATEGIC PLACEMENT OF WIRELESS DEVICES SOLVES BENZENE VENTING PROBLEM AT REFINERY

CHALLENGE
A refinery was experiencing issues with their benzene tanks venting into the atmosphere. The local environmental regulatory agency requires the monitoring of nitrogen blanket pressure on benzene tanks to ensure no venting has occurred.

SOLUTION
Five Rosemount 3051S Wireless Pressure Transmitters were installed on three tanks to measure nitrogen pressure. These were strategically installed in order to monitor the venting of benzene and to help find the cause of the leak.

RESULT
The customer was experiencing unmonitored benzene venting on their tanks, and with Smart Wireless solutions their tanks could be monitored and the data time-stamped. If venting should occur, the event would be documented accurately. This results in a decrease of regulatory fines and better environmental compliance.
SMART WIRELESS SOLUTIONS IMPROVE QUALITY, INCREASING PROFITABILITY

We are building an infrastructure that opens up opportunities for more applications. The result is better information from difficult-to-reach areas of the mill, and this is helping our personnel prevent unscheduled downtime, meet customers’ quality requirements, and optimize productivity.

— OPERATIONS MANAGER

CHALLENGE
A progressive manufacturer and fabricator of selected metal products expanded their product mix to include a heavier and wider material that required more run-out table cooling water to maintain the proper grain structure throughout the strip. Unfortunately, as the new product was being rolled, the target coiling temperature could not be achieved. The mill loses profit when the wrong amount of cooling water is used. Loss of pressure in cooling water lines results in costly production delays and damaged product if the grease system clogs or fails.

SOLUTION
The customer installed Rosemount 3051S Wireless Pressure Transmitters to measure flow and one Smart Wireless Gateway. The measurements were then integrated into their host system utilizing Modbus® output from the gateway. The transmitters monitored coiling water flow in the Hot Strip Mill, cooling water flow to work rolls in the Roughing Mill, and the pressure of the grease system. The customer also installed Rosemount 648 Wireless Temperature Transmitters on the drains of the back-up roll bearings to determine any increase in the inlet and outlet temperatures.

RESULT
It was discovered that the grease system was malfunctioning and not adequately lubricating the roll bearings, creating downtime and impacting productivity. The ability to wirelessly monitor these points has eliminated downtime from rolls freezing up. Wireless pressure transmitters installed on each roughing stand ensure a practice of maintaining constant flow and pressure of coolant to the work rolls. Since the addition of the Smart Wireless solutions, roll failures have disappeared. The additional data also decreased the amount of out-of-spec steel that would have been sold at a lower profit. The combined benefits have resulted in improved productivity.

PERFORMANCE AND EFFICIENCY IMPROVED ON TURBINE UNITS AT POWER PLANT

CHALLENGE
A customer at a power plant wanted to instrument multiple points that previously were too expensive to justify funding, in an effort to reduce downtime and improve plant performance.

SOLUTION
Wireless devices are used to measure steam turbines, pumps, economizers, feed water heaters, boilers, generators, air heaters and other assets. To make these measurements, the customer purchased 117 Smart Wireless devices installed on five turbine units. The order was comprised of 56 Rosemount 3051S Wireless Pressure Transmitters, 61 Rosemount 648 Wireless Temperature Transmitters, and seven Smart Wireless Gateways. The data from the self-organizing network is integrated into an existing Ovation® system.

RESULT
The customer compared Emerson to the other vendors in ten categories. Emerson was the clear leader in robustness, dependability, security, networking, expandability, polling rate, interface to legacy system and operating cost. Justification for this project became very easy when the customer performed a return on investment (ROI) calculation. Downtime was reduced by getting predictive measurements, operator efficiency has increased and maintenance costs have decreased by eliminating operator rounds. There are many plant performance improvements from improved reporting and increased boiler and turbine efficiency. Total rework and waste was also reduced.
SMART WIRELESS VIBRATION MONITORING USED TO REDUCE ENVIRONMENTAL DAMAGE

CHALLENGE
In refineries, there are parts of the plant that are hazardous. In one such area, a customer had a series of pumps that moved hydrocarbon-based products and needed to avoid any release of hydrocarbons into the atmosphere. Since high vibration is an early indicator of a machine problem that can lead to emissions, the customer was collecting vibration data by sending plant personnel into the area. Because the area could be hazardous, the customer wanted to collect this data remotely. Various permanently installed vibration monitoring solutions had been explored, but none readily met the challenge. Wired vibration monitoring systems are often an expensive and time-consuming proposition that the customer wanted to avoid.

SOLUTION
The customer installed a network of Rosemount Wireless Transmitters and CSI 9420 Wireless Vibration Transmitters for monitoring pump vibration levels. The monitoring solution, including the devices and the gateway, was installed in just a few days. The information was routed back to the plant historian for trending and the information was available to operators so the vibration levels could be monitored throughout each shift.

RESULT
With Emerson’s Smart Wireless solution, the customer avoided an expensive and lengthy installation process. The CSI 9420 enabled plant personnel to monitor the vibration levels of these assets without having to walk into a potentially hazardous area. With the permanent installation, the data was available more often than before. Now the customer’s vibration analysts only have to enter the area if a problem is identified.

SAFETY IMPROVED THROUGH WIRELESS MONITORING OF SAFETY STATIONS

CHALLENGE
At a paper mill in North America, the customer wanted to monitor eye wash and safety shower stations in the process safety management areas. The mill wanted their operators to be able to respond quickly to emergencies in these areas. A traditional wired solution was cost prohibitive, so an alternative wireless solution was explored.

SOLUTION
The customer installed five Rosemount 702 Wireless Discrete Transmitters at their site. Since the 702 can take two inputs, three of the transmitters were connected to six of the eye wash and safety shower stations. The remaining 702 transmitters were each connected to a single station. Along with the transmitters, one Smart Wireless Gateway was mounted on top of a five story building.

RESULT
The mill is now able to monitor the switches every fifteen seconds, and has the capability to time stamp the devices to ensure each one is updating properly. Not only did this improve the overall safety of the plant, but by utilizing a wireless solution versus a traditional wired solution, the mill was able to save nearly sixty percent in installation costs.
SMART WIRELESS ARCHITECTURE

EASILY EXTEND THE BENEFITS OF PLANTWEB

Our DeltaV and Ovation systems natively support wireless by providing the necessary engineering capabilities to define and manage wireless field devices – without requiring special wireless or communication know-how. The system can also auto-sense the Smart Wireless Gateway and the wireless devices for quick and easy startup and commissioning.

COMPREHENSIVE ASSET MANAGEMENT SOLUTION FOR YOUR WIRELESS DEVICES AND NETWORK

AMS Suite predictive maintenance software enables you to easily plan a secure, reliable wireless network using online tools, while also validating the network against factory-recommended best practices.

START ANYWHERE

Smart Wireless is not a top-down or bottom-up model. You can begin anywhere based on what your highest priority needs are. Whether you start from the Field Network to monitor plant and process information, or from the Plant Network to improve workforce productivity or business and plant management, you can seamlessly and easily expand.
SCALABLE WIRELESS NETWORK THAT SEAMLESSLY INTEGRATES WITH YOUR WIRED NETWORK

Using Modbus Serial, Modbus TCP, or OPC, Smart Wireless integrates directly into your existing automation architecture, without the need for upfront engineering, site surveys or special commissioning. And to your operators and maintenance staff, each Smart Wireless device looks and behaves like a wired one, no matter how many you install.

SIMPLE INTEGRATION WITH ANY LEGACY HOST FOR NEW INSIGHT THAT ONLY WIRELESS CAN OFFER

With the Smart Wireless THUM Adapter, you can upgrade existing wired HART devices already installed in your plant to WirelessHART, gaining wireless access to valuable diagnostic and process data that was previously inaccessible.
SELF-ORGANIZING, ADAPTIVE MESH ROUTING

• No wireless expertise required. Devices automatically find multiple, efficient communication paths
• Network continuously monitors paths for degradation and repairs itself
• Adaptive behavior provides reliable, hands-off operation and simplifies network deployments, expansion and reconfiguration
• Supports both star and mesh topologies

INDUSTRY STANDARD RADIO WITH CHANNEL HOPPING

• Standard IEEE 802.15.4 radios
• 2.4 GHz ISM band sliced into 16 radio-channels
• Continually “hop” across channels to avoid interference and increase reliability
• Frequency hopping spread spectrum (FHSS) technology delivers high reliability in challenging radio environment

SELF-HEALING NETWORK

• The self-organizing, self-healing network manages multiple communication paths for any given device. If an obstruction is introduced into the network, the device has already established paths and data continues to flow. The network will then lay in additional paths as needed for that device.

SEAMLESS INTEGRATION TO EXISTING HOSTS

• Transparent and seamless integration
• Same control system applications
• Gateways connect using industry protocols
The newest version of the HART protocol, HART 7, moves this field-proven technology into the world of wireless communication with the introduction of the WirelessHART standard.

WirelessHART encompasses evolutionary enhancements that build on the solid foundation of HART technology used in more than 24 million installed devices worldwide. WirelessHART is a backward compatible, cost-effective, common sense approach to wireless communication that supports industry requirements for a Simple, Reliable and Secure wireless communication technology. WirelessHART complements, but does not replace, wired HART technology, providing an additional capability that can benefit both existing wired applications and new monitoring and control applications.

The new WirelessHART standard was developed under the guidance of the HART Communication Foundation (HCF) through the combined, cooperative efforts of HCF member companies, leaders in wireless technology and the input of industry users.

**RELIEABLE**
- Data reliability >99%
- Channel hopping to avoid interference
- Redundant self-healing network

**SECURE**
- Robust, multi-tiered, always-on security
- Device authentication and passwords
- Industry approved data encryption

**SIMPLE**
- Easy set-up of HART® network and devices
- Seamless integration to existing hosts
- Self-organizing, adaptive network

**EASY INSTALLATION & COMMISSIONING**

Easier than traditional 4-20mA wired installations...
Same tools and know-how, but with no wires!

- 4-20mA
- WirelessHART
- Plan cable runs & junction boxes
- Locate wireless devices
- Install I/O modules
- Install gateway
- Install cable & make connections
- Add devices to network
- Commission device

**STANDARD SPECIFICATIONS**

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<td>Standards</td>
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<td>Burst Rate</td>
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PREDICTIVE DIAGNOSTICS
• Real-time device information allows plant staff to respond faster and make informed decisions
• Achieve faster startup and increased availability through more cost-effective maintenance and improved device performance
• Capture stranded and advanced diagnostics when used with the Smart Wireless THUM™ Adapter

EASIER CONFIGURATION
• Streamline wireless device configuration
• Confirm, compare or change configurations from the maintenance shop or control room
• Increase safety by eliminating trips to hazardous or difficult to reach areas

STREAMLINED CALIBRATION
• Calibration management ensures devices are accurate and reduces process variability
• Electronic documentation streamlines audits and provides easy access to calibration records

AUTOMATED DOCUMENTATION
• The Audit Trail option automatically records all device activities, making it easy to meet regulatory compliance
• Link device database to other documentation, such as manuals and support websites
HOST INTEGRATION WITH DELTAV™ AND OVATION®

• Gain real-time information on process and assets with intuitive operator interface
• Native interface between control system and gateway

LEGACY INTEGRATION

• Smart Wireless Gateway connects legacy hosts, Serial Modbus®, and Ethernet or OPC output

COMPLETE ASSET MANAGEMENT WITH AMS DEVICE MANAGER

• Manage predictive diagnostics from wired and wireless field devices to identify problems before the process is affected
• Streamline wireless device configuration through Smart Wireless Gateway

DEVICE SPECIFICATIONS

• Burst rate: User Selectable 8, 16, 32 second or 1 to 60 minutes
• Network Size: Up to 100 devices with 8 second burst rates
• Output: Ethernet, Modbus, OPC
• Approvals: FM, CSA, ATEX, IECEx

OTHER INTERFACES

• Web interface and AMS Wireless Configurator are standard with every gateway for set-up and initial configuration of wireless devices
• Data historian connectivity for documentation and compliance information
DEVICE SPECIFICATIONS
• Approvals: FM, CSA, ATEX, IECEx
• Input: Either 2 or 4 wire HART 5.0 or newer device
• SmartPower™: Power scavenging technology (no battery required)

UNLEASH THE FULL POTENTIAL OF YOUR HART DEVICES

ENABLE ENHANCED VALVE CAPABILITIES
• Online, in-service valve testing
• Monitor alerts such as travel deviation, supply pressure, and electronics health
• Trend actual valve positions

GAIN ACCESS TO ADVANCED INSTRUMENT DIAGNOSTICS
• Rosemount 3051S with Advanced Process Diagnostics
• Micro Motion Coriolis Meter Verification
• Rosemount Radar Echo Curve
• Rosemount Magnetic Flow Meter Verification

EFFICIENTLY GATHER DATA FROM MULTIVARIABLE DEVICES
• Rosemount 3051SMV MultiVariable™ Mass Flow Transmitter
• Rosemount 3300 and 5300 Radar Level Transmitters
• Micro Motion Coriolis Meters
• Rosemount Vortex Flowmeters

MAKE ANY HART DEVICE WIRELESS TO ENABLE NEW MEASUREMENT POINTS
• Pressure
• Flow
• Temperature
• Valves
• Level
• Liquid and Gas Analytical

REMOTELY MANAGE DEVICES AND MONITOR HEALTH
• Reduce troubleshooting time
• As found, as left data
• Calibration tracking
ENGINEERED FOR SAFETY, LONG LIFE, AND EASE OF USE

SMARTPOWER SOLUTIONS POWER MODULE
- The only power solution optimized for both user and process safety
- Intrinsically safe power module allows field replacements without removing transmitter from the process, keeping personnel safe and reducing maintenance costs
- Integral, short circuit protection delivers a safe and proven power solution

EASY TO USE
- Installation practices require no special training
- Keyed connection eliminates the risk of incorrect installation
- No need to handle individual battery cells that can be misplaced or installed incorrectly

RELIABLE
- Advanced power technology and circuitry design provide robust power solution for the process industry
- Contains two lithium-thionyl chloride battery cells which have the highest energy density, shelf-life, and working temperature range available
- Casing design creates a water-tight seal for the power module and provides reverse polarity protection

POWER MODULE SPECIFICATIONS
- Approvals FM, CSA, ATEX, IECEx Intrinsically Safe
- Short circuit protection
- Keyed connection
SCALABLE PRESSURE, FLOW, AND LEVEL SOLUTIONS DELIVER BETTER EFFICIENCY AND MORE PRODUCTIVITY

INNOVATIVE SCALABLE PLATFORM

• The Rosemount 3051S is the world's first scalable platform that provides a foundation for integrated pressure, flow, and level solutions
• Allows you to customize performance, functionality and process connections for your application

MAINTENANCE-FREE PERFORMANCE

• 12-year limited warranty
• 10-year stability
• 10-year Power Module life

DEVICE SPECIFICATIONS

• Stability: ± 0.2% of URL for 10 years
• Reference accuracy: ± 0.025% of span
• Approvals: FM, CSA, ATEX, IECEx
• Power Module life:
  1 minute burst rate – 10 years
• Four user configurable alerts for advanced process monitoring
• Available with aluminum or SST housing
• Calibrated DP spans from 0.1 inH2O to 2000 psi (0.25 mbar to 140 bar)
• Calibrated pressure spans from 0.3 to 10,000 psi (20.7 mbar to 689 bar)

INSTALLATION-READY PRESSURE, FLOW, AND LEVEL SOLUTIONS

• Standardize on compact, rugged and versatile platform with the Coplanar™ design
• Accelerate start-up with seamless integration of flanges, manifolds, diaphragm seals and flow elements
• Reduce maintenance and enhance safety with direct mount capabilities

Ty
Typical
Ultra, Ultra for Flow
Classic Base

Performance

WirelessHART
Expanding the Possibilities
INDUSTRY LEADING CAPABILITIES
DELIVER ROBUST SOLUTIONS TO MEET YOUR APPLICATION NEEDS

MINIMIZE MAINTENANCE
• Monitor DP across filters
• Upgrade pneumatic transmitters
• Automate clipboard rounds

EXTEND THE LIFE OF ASSETS
• Inlet/outlet pump pressure
• Compressor suction line
• Gage replacement

INCREASE EFFICIENCY
• Trunk line flow monitoring
• Measure pump efficiency
• Gage replacement

SAFETY AND ENVIRONMENTAL
• Redundant level measurements
• Safety valve release tracking
• Nitrogen blanket tank pressure
DEVICE SPECIFICATIONS

• Four independently configurable input channels that support thermocouple, RTD, millivolt, ohm and 4 – 20 mA inputs
• Reference accuracy: ± 0.3°C (± 0.5°F) PT100 @ 20°C
• Stability: ± 0.15% of reading or 0.15°C for 24 months
• Approvals: FM, CSA, ATEX, IECEx
• Power Module Life:
  1 minute burst rate – 4 years
  10 minute burst rate – 10 years
• Eight user configurable alerts for advanced process monitoring
• NEMA 4X, IP66 housing allows installation in harsh process environments

ASSET MANAGEMENT

• Bearings on motors, fans, pumps and compressors
• Lube oil
• Heat exchangers
• Steam traps
• Boiler and furnace tube skin

ENVIRONMENTAL APPLICATIONS

• Emissions monitoring on compressors, motors and turbines
• Effluent temperatures
APPLICATION & INDUSTRY SOLUTION (AIS) SENSORS

• Rosemount 1075 high temperature sensor
• Rosemount non-intrusive pipe clamp sensor

GENERAL USE SENSORS AND THERMOWELLS

• English and metric thermocouple and RTD offering
• Wide variety of thermowell styles

ROSEMOUNT SENSOR PORTFOLIO MEETS WIDE RANGE OF APPLICATION REQUIREMENTS

DEVICE SPECIFICATIONS

• Reference accuracy: ± 0.23°C (± 0.41°F) PT100 @ 20°C
• Stability: ± 0.3% of reading or 0.3°C for 24 months
• Approvals: FM, CSA, ATEX, IECEx
• Power Module Life:
  1 minute burst rate – 8 years
  10 minute burst rate – 10 years
• Transmitter-Sensor Matching for improved accuracy
• Four user configurable alerts for advanced process monitoring
• 5-point calibration
• Available in aluminum and SST housing
CSI 9420 WIRELESS VIBRATION TRANSMITTER

CSI 9420 ENABLES WIRELESS VIBRATION MONITORING OF ANY MECHANICAL ASSET

MACHINE APPLICATIONS
- Motors
- Horizontal Pumps
- Cooling Tower Fans
- Gearboxes
- Fans
- Vertical Pumps
- Compressors

DETECT TYPICAL MACHINE PROBLEMS
- Imbalance, misalignment, looseness
- Rolling element bearing defects
- Gear defects
- Pump cavitation

MONITORING BENEFITS
- Advance indication of developing problems
- Keep people out of hazardous areas
- Protect health, safety, and environment
- Monitor inaccessible equipment
- Complement portable monitoring programs

DEVICE SPECIFICATIONS
- Approvals: FM, CSA, ATEX
- Inputs: 2 single low power accelerometers or one low power accelerometer with embedded temperature
- Outputs: Overall Velocity and PeakVue® per sensor
- Power Module Life (with two sensors): 30 minute burst rate – 3 years, 60 minute burst rate – 6 years
- Available in aluminum housing

WirelessHART
Expanding the Possibilities
ROSEMOUNT ANALYTICAL pH TRANSMITTERS OFFER HIGHLY ACCURATE AND RELIABLE PROCESS MONITORING

**DEVICE SPECIFICATIONS**
- Approvals: FM, CSA, ATEX
- Power Module Life: 1 minute burst rate – 3 years
- Accuracy: ±1 mV @ 25°C ± 0.01 pH
- Repeatability: ±1 mV @ 25°C ± 0.01 pH
- Intrinsically safe
- Two-line character display
- Two point calibration
- Automatic temperature compensation
- Cast aluminum enclosure: NEMA 4X (IP65)

**WIRELESS pH APPLICATIONS**
- Cooling water measurement
- Raw receiving water analysis
- Hazardous areas monitoring
- Effluent / waste water monitoring
- Environmental monitoring

**COMPATIBLE WITH EXISTING ROSEMOUNT ANALYTICAL pH SENSORS FOR WIDE APPLICATION COVERAGE**
- Optimum versatility for various mounting options
- Enhanced performance and increased life
- Maximum chemical and environmental resistance
- Embedded smart sensor technology

**APPLICATIONS BENEFITS**
- High accuracy and reliability for monitoring applications
- Continuously monitor sensor performance through intelligent diagnostics
- Eliminate cable runs to transmitters
The Rosemount 702 Wireless Discrete Transmitter takes a variety of non-powered switch types such as pressure, flow and level switches as input. It has single or dual channel capacity which cost-effectively enables access to discrete points that are not connected to the control system due to wiring costs and lack of I/O.

**DEVICE SPECIFICATIONS**
- Input – Two single pole single throw switches or one single pole double throw switch
- Approvals: FM, CSA, ATEX, IECEx
- Power Module life: 1 minute burst rate – 8 years
  Optional module – 10 years
- Available in aluminum and SST housing

The Fisher 4320 Wireless Position Monitor can detect linear and rotary movement using non-contact technology. It can provide both % of span feedback like a position transmitter and on/off or open/closed feedback using two limit switches. It can be used to monitor equipment such as valves, sliding stem regulators, displacement and float level sensors, relief valves and many other types of equipment.

**DEVICE SPECIFICATIONS**
- Input – rotary or linear movement
- Position transmitter (% of span) plus two limit switches (soft switches – no contacts)
- Approvals: FM, CSA, ATEX, IECEx
- Power module life: 1 minute burst rate – 8 years
  Optional module – 10 years
- Engineered resin housing, designed for use in higher chemical concentrated locations

The TopWorx 4310 Wireless Position Monitor can detect linear and rotary movement using non-contact technology with limit switch feedback. It can be used to monitor the on/off status of equipment such as valves, sliding stem regulators, displacement and float level sensors, relief valves, and many other types of equipment.

**DEVICE SPECIFICATIONS**
- Input – rotary or linear movement
- Two limit switches (soft switches – no contacts)
- Approvals: FM, CSA, ATEX, IECEx
- Power module life: 1 minute burst rate – 8 years
  Optional module – 10 years
- Engineered resin housing, designed for use in higher chemical concentrated locations
CONTROL VALVE APPLICATIONS
- Valves with only an I/P transducer installed
- Valves controlled with a local pneumatic controller
- % of span plus on/off or open/close

MANUAL VALVES
- Reduce manual verification
- Incremental valve state information

QUARTER TURN APPLICATIONS
- Valves with only a solenoid installed
- Independent feedback of on/off or open/closed status

REGULATOR APPLICATIONS
- Travel limit detection

PRESSURE, LEVEL AND FLOW SWITCH APPLICATIONS
- DP across filters
- Hydraulic system pressures
- Overflow detection
- Pump protection
- Hi/Low alarms

CONVEYOR APPLICATIONS
- Belt break detection
- Faster response versus manual monitoring

SAFETY AND ENVIRONMENTAL APPLICATIONS
- Safety showers
- Eyewash stations
- Hazardous spill prevention
- New environmental regulations

DISCRETE SOLUTIONS TO MEET YOUR APPLICATION NEEDS
SMART WIRELESS BEST PRACTICES OVERVIEW

All wireless field networks are easier and less costly to install than traditional wired systems, simply because they’re wireless. But not all wireless networks are created equal. Self-organizing networks are a proven wireless solution for the process industry, in part because they’re so easy to plan, commission, and install. Unlike other wireless field network solutions, such as line-of-sight or point-to-point networks, self-organizing networks don’t require detailed site surveys or specialized equipment to implement. They’re also much easier to expand. Planning, in advance and for the future using best practices, is key to successful implementation.

SCOPE THE PROJECT

Every process facility in every industry is different in design, but there are many common features that allow us to apply best practices for network design.

For a large facility such as a refinery or chemical plant, the network should be scoped to a single process unit. For vertically arranged facilities such as power plants or factories, the self-organizing network should be scoped to a single floor.

PLOT THE DEVICES & NETWORK CONNECTIONS

Emerson’s AMS Device Manager with the AMS Wireless SNAP-ON™ application includes tools to help you easily plan and incorporate best practices into your design. Instead of needing an in-depth site survey, you can upload an image of the plant into the application to plan the wireless network.

The next step is to identify all the Smart Wireless solutions available in a single process unit. You can simply drag and drop devices and gateways on the plant image. Emerson has developed guidelines to help you design a robust self-organizing network and the AMS Wireless SNAP-ON application will validate your network against best practices.

PLACE THE SMART WIRELESS GATEWAY

In small networks, the Smart Wireless Gateway should be located in the center of the network. The Smart Wireless Gateway has many integration options including Ethernet, Modbus, and OPC. For large networks or applications that require the Smart Wireless Gateway to be mounted inside a control room or rack room with a remote antenna, it is best practice to build the initial self-organizing network around the location of the Smart Wireless Gateway. Then the network can be expanded to reach remote areas of the process unit. These practices will provide a solid foundation on which to expand your network.
SMART WIRELESS RESOURCES

Emerson offers a variety of resources to ensure that Smart Wireless solutions provide you with optimal results:

PLANTWEB UNIVERSITY WIRELESS COURSES

Emerson’s online wireless courses at PlantWeb University are fast, free and will teach you everything you need to know about taking your process or plant wireless – from security and power management to implementation considerations and typical use cases. Get started today at PlantWebUniversity.com.

SMART WIRELESS WEBSITE

Visit us at www.EmersonProcess.com/SmartWireless for information on:

- Wireless Applications
- Technology & Products
- Getting Started
- News & Resources

INDUSTRY EXPERTS

While our wireless architecture and applications are designed for ease of engineering, installation, and use, we also offer a broad range of services to help you get up and running quickly – and make the most of wireless technology. Our wireless experts ensure that your business needs are met and help you decide and implement the best combination of wired and wireless technologies and products to meet your goals.

Emerson also offers SmartStartSM Services, which include on-the-job training in network fundamentals, basic operation and troubleshooting. Our skilled technicians will provide training on how to use the equipment correctly, perform routine maintenance, and diagnose and resolve any potential issues.