Emerson's Pervasive Sensing™ strategies enable plants to realize full potential of Industrial IoT

Enhanced sensing capabilities provide the information necessary to drive operational excellence in safety, reliability, production, energy management and environmental compliance.

With the increasing availability of low-cost sensors and wireless technology, today's plants have the opportunity to dramatically improve overall operational performance if they can leverage and enhance the existing sensing capabilities within their operations. While sensors have traditionally been used to control large industrial facilities, they also can serve as a natural source of data for driving operational excellence in key areas such as safety, reliability, energy management and environmental compliance. All that's needed is the right strategy.

Emerson's Pervasive Sensing Strategies expand the use of sensor and analytics technology into new operational performance areas through a new generation of low-cost sensors that are easy to install and maintain, take advantage of wireless communications as part of a secure, integrated industrial network and use new analytic algorithms to create insights into the performance of a plant's assets.

By enhancing and adding sensor points to a plant's infrastructure, critical information on assets and processes can be collected and analyzed in real time by powerful applications that rely on embedded analytics to transform vast amounts of information into actionable insights. And getting the right information to the right people at the right time can transform a reactive operation into a proactive one, effectively lowering risk and driving profitability.

Emerson's Pervasive Sensing is part of its Plantweb™ digital ecosystem, next-generation Industrial IoT architecture that delivers actionable insight through strategic interpretation of information harvested by innovative sensing technologies and analyzed by applications that leverage Emerson's industry expertise.

Emerson's expanding portfolio of pervasive sensing technologies includes capabilities in the areas of hazardous gas sensing, wireless corrosion monitoring, wireless medium voltage equipment monitoring, wireless gas monitoring, wireless non-intrusive surface-sensing temperature measurement, wireless power metering and pressure gauge measurement.

Wireless corrosion monitoring

Emerson's Permasense Wireless Corrosion Monitoring is a permanently-installed technology that uses unique sensor technology, wireless data delivery and advanced analytics to continuously monitor for metal loss from corrosion or erosion in pipes, pipelines or vessels.

Designed to operate without maintenance for years, this monitoring technology reliably delivers high-integrity data even in the harshest environments, providing ongoing visibility of corrosion and erosion trends in real-time and direct to the engineer.

Central to these corrosion-monitoring systems are sensors that employ proven ultrasonic wall thickness measurement principles. These sensors are battery-powered and communicate wirelessly, which minimizes the cost of installation and enables use in remote areas and on a large scale. The sensors are also designed so they can be deployed in hazardous and remote areas. Furthermore, the analytic software accurately forecasts corrosion and erosion issues/ locations in pipelines or vessels, allowing operations to run at peak performance while keeping integrity in focus. The entire system can be configured for integration with virtually any existing IT architecture, enabling quick and easy deployment.

Wireless medium voltage equipment monitoring

Emerson's IntelliSAW wireless medium voltage equipment monitoring systems offer real-time, continuous monitoring of electric power switchgear temperatures and smart grid monitoring, providing accurate temperature data for key points in a power transmission network.

These analytic insights help power companies identify and prevent failures within a network that can result in significant damage, power outages and potentially fatal accidents.

The system features noninvasive, highly scalable wireless temperature sensors that require no external power and are capable of simultaneously measuring all relevant hot-spots such as bus bars, breaker inputs, breaker outputs and cables. IntelliSAW wireless monitoring capabilities consist of SAW-based temperature sensing, RF-based partial discharge detection, and humidity monitoring instruments along with an advanced human-machine interface. A suite of software tools seamlessly integrates the information into the user's asset management infrastructure, including standard historians and alarm systems.

Wireless gas monitoring

Emerson's Rosemount™ 928 Wireless Gas Monitor is the world's first integrated *Wireless*HART® toxic gas detection solution. Maintaining remote sites like wellheads and natural gas metering stations is difficult and dangerous because workers approaching these sites may be exposed to unplanned releases of toxic gas. Due to the prohibitive costs to install and operate conventional gas detection systems at these sites, operators have been forced to rely on portable gas detection devices or, even worse, carry on with no gas detection at all. In all these cases, workers may run the risk of exposure when approaching these remote sites to perform maintenance.

The gas monitor delivers actionable insights that keep operators updated on changing field conditions remotely – reducing manual operator rounds and improving safety by keeping personnel out of hazardous areas and safeguarding against catastrophic events.

Remote sites and previously unmonitored portions of existing facilities can now continuously monitor for the presence of toxic hydrogen sulfide gas to protect facilities and more importantly, help keep personnel safe.

Wireless non-intrusive surface-sensing temperature measurement

Emerson's Rosemount X-well Technology is a surface-sensing temperature measurement solution that eliminates the need for thermowell process penetration when measuring process

temperatures in pipe applications and removes leak points to reduce compliance costs and increase safety. X-well technology eliminates the need to drill device connections to get process temperatures, allowing users to avoid the risk of corrosion.

The technology works by measuring pipe surface temperature and ambient temperature, and combining this information with an understanding of the thermal conductivity properties of the installation and process piping. It's designed for use in pipelines, high velocity flows, slurries, heavy particulate fluids, wellheads, clean-in-place processes, high-viscosity fluids and harsh processes in the oil and gas, chemical, refining, food and beverage, metals and mining, and pulp and paper industries.

This technology provides an accurate and repeatable internal process temperature measurement without requiring any intrusions or penetrations into the process, allowing for quicker and easier installation along with simplified long-term maintenance. Users do not have to design, size or maintain thermowells. Wake Frequency Calculations are eliminated, as well as time spent determining material compatibility, correct insertion length and the necessary profile. In addition, temperature measurement points can be added without shutting down a process.

Wireless power metering

The Emerson SensEnable™ 56WM wireless power meter is designed to monitor voltage, current, power, energy, and other electrical parameters on single and three phase electrical systems with revenue-grade accuracy. The power meter delivers early detection of machine problems through continuous measurement of power consumption and power quality of submeters. Submeters are physical metering devices that monitor electricity, gas, water, steam, and other utilities.

The wireless gas monitor provides infrastructure management and monitoring for business-critical continuity by monitoring energy consumption and health status of electrically-powered equipment in real-time, for minimal cost. In addition, the power meter provides granular data that enables better operations management decision making, and optimized predictive maintenance of facility assets based on energy consumption and power quality.

Pressure gauge measurement

Emerson's Rosemount Wireless Pressure Gauge delivers safer and more reliable readings, enabling remote collection of field data as frequently as once per minute. Accurate, wireless readings keep operators updated on changing field conditions remotely – reducing manual operator rounds and improving safety by keeping personnel out of hazardous areas and safeguarding against catastrophic events.

The first pressure gauge in the industry to utilize *Wireless*HART, this device has a 10-year life and features field-proven pressure sensor technology. It provides up to 150 times overpressure protection compared to traditional gauges and two layers of process isolation for a safer field environment. The gauge also reduces maintenance costs and time by eliminating common weak points found in mechanical gauges through the removal of components that inhibit the device from displaying pressure.

About Plantweb

Emerson's Plantweb™ digital ecosystem is a next-generation industrial IoT portfolio that extends the power of automation beyond process control to the entire enterprise to enable Top Quartile performance. The ecosystem supports Emerson's Operational Certainty program, which is designed to help companies improve earnings as much as 15 percent. It meets four critical needs to do this: real-time operating data across the business, secure transport of that data where it is needed, robust and scalable software applications to convert that data into actionable insights, and the domain expertise to make decisions and drive outcomes. Flexible, integrated and scalable, the Plantweb digital ecosystem features robust, real-time visibility from Pervasive Sensing™ technologies, protected by Secure First Mile™ connectivity. Applications including Plantweb Insight, Plantweb Advisor and the AMS ARES™ Platform provide embedded domain expertise across the enterprise. Emerson Connected Services offer secure cloud-based access to experts and analytics for real-time asset monitoring and performance optimization with no-to-low capital investment.