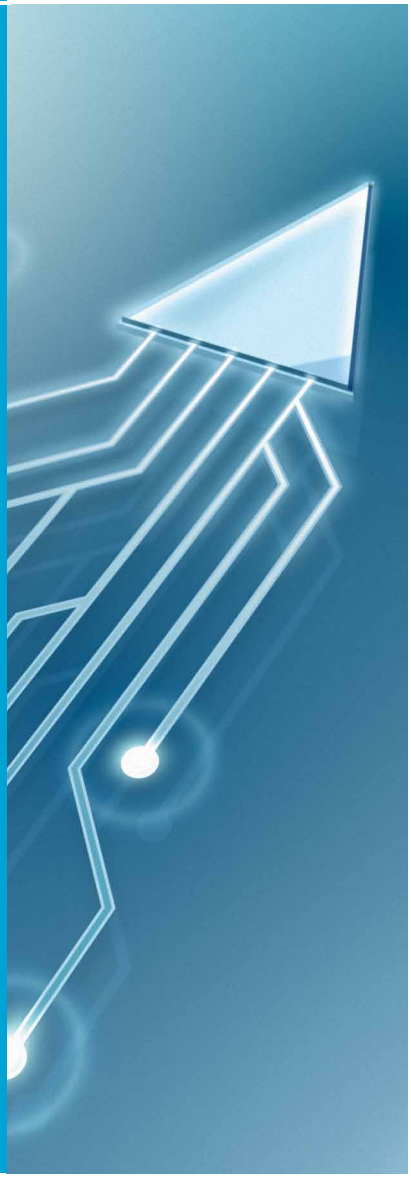
Wireless solutions

Your digitalization enabler



Endress+Hauser

People for Process Automation

Why go wireless?

Project costs Endress+Hauser's Wireless solutions provide you with more information about your process and plant. Your project costs are also reduced thanks to more efficient planning and rapid installation.

- **Process monitoring and optimization**
  Wireless technology allows you to better monitor your process. With the additional information it provides, your processes can be more precisely monitored and optimized. This results in increased efficiency and higher flexibility of production, as well as reduced energy consumption. Measuring tasks that are normally not realized due to the high cost of wiring, e.g. tank farms, now become feasible.

- **Plant Asset Management**
  Critical points in a plant, e.g. valves, can be more efficiently integrated into your maintenance strategy by using wireless technologies. The improved data flow and additional diagnostic information favor predictive maintenance. This increases the reliability and safety of your plant, while reducing repair costs and unplanned shutdowns.

- **Tank Monitoring / Inventory Control**
  Working as part of a wireless system, connected devices acquire measured levels or material flow at regular intervals. The system transmits the information obtained to SCADA or inventory management software and, depending on application, onward to an ERP system. As a result, your inventory cost can be reduced and gaps in supply chains can be closed. This allows you to maintain your competitiveness in an increasingly globalized production environment.

Advantages of wireless technology:

- Remote and difficult-to-access measuring points connected without expensive cables
- Simple planning, rapid installation, quick integration into the plant infrastructure
- High level of reliability due to redundant communication paths
- Easiest upgrade of Endress+Hauser and 3rd party devices
- Optimal point of installation in every application thanks to the flexible adapter concept
- Autonomous operation of the field device due to battery operation
- Simple parameterization and monitoring of entire plant sections using DTM and DD technology with e.g. FieldCare, Endress+Hauser's Plant Asset Management software

Wireless portfolio

Our wireless products offer cost-efficient integration of moving, changing and remote measuring points. They provide an extremely flexible method of integrating measuring points into monitoring systems. The wireless products can be used in systems subject to regular expansion (e.g. well heads), those constantly on the move, as well as on rotating or moving machinery. As the systems are self-organizing, they require a minimum of time to set up, integrate and commission. Endress+Hauser's adapter concept also allows wireless communication to be quickly added to the existing infrastructure.

FieldPort SWA50

- any HART instrument
- loop powered
- only one instrument can be connected
- easy setup using Bluetooth and SmartBlue app
- voltage drop: 3.2 Volts

Bluetooth® WirelessHART

FieldPort SWA70

- any 4...20 mA and/or HART instrument
- battery or external power (solar)
- battery powers field instruments
- multidrop connection up to 4 HART instruments

WirelessHART

FieldEdge SGC200

- edge device with direct connection to Netilion
- supports up to 5 Bluetooth instruments
- LTE communication with SIM Card
- dedicated to compact applications

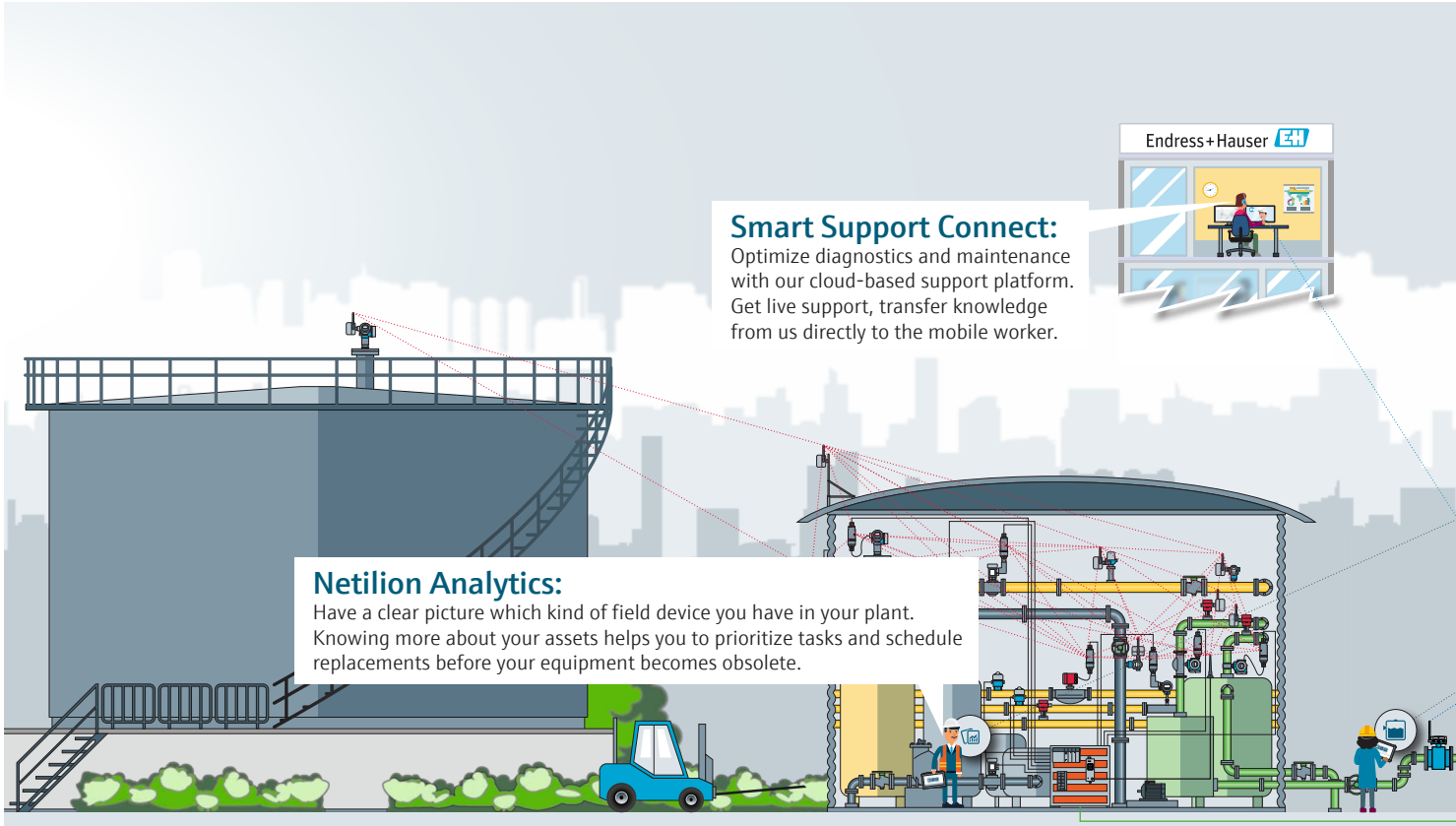
Bluetooth®

Fieldgate SWG50

- supports up to 100 WirelessHART instruments
- protocols: HART-IP, Modbus TCP-IP
- different types of antenna options for hazardous and non-hazardous areas

WirelessHART

Wireless network, plant retrofit and IIoT services



In a wireless mesh network, all devices communicate with each other, allowing alternative communication paths should the shortest path be broken.

FieldPort SWA70:

The WirelessHART adapter FieldPort SWA70 is an interface module for the wireless transmission of 4 to 20 mA/HART signals.

It transmits data from connected field devices to a WirelessHART gateway, FieldGate SWG50.

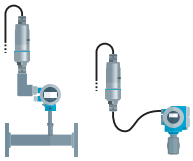
WirelessHART adapter combined with a radar level measurement device.

FieldPort SWA50:

FieldPort SWA50 converts the HART signal of the connected HART field device to a reliable and encrypted Bluetooth® or WirelessHART signal.

Bluetooth® can be utilized for connected field device configuration by using Field Xpert.

FieldPort SWA50 can be mounted directly or remotely.



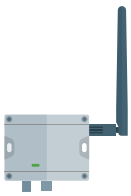
FieldEdge SGC500:

FieldEdge SGC500 establishes internet connectivity between industrial plant devices and Netilion.

It regularly collects data for Netilion Services, providing insights for process optimization and condition monitoring.

FieldEdge SGC500 as a cloud interface with connectivity for Heartbeat Verification.

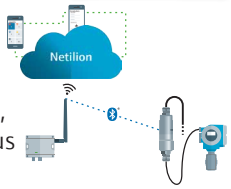
FieldEdge SGC200:



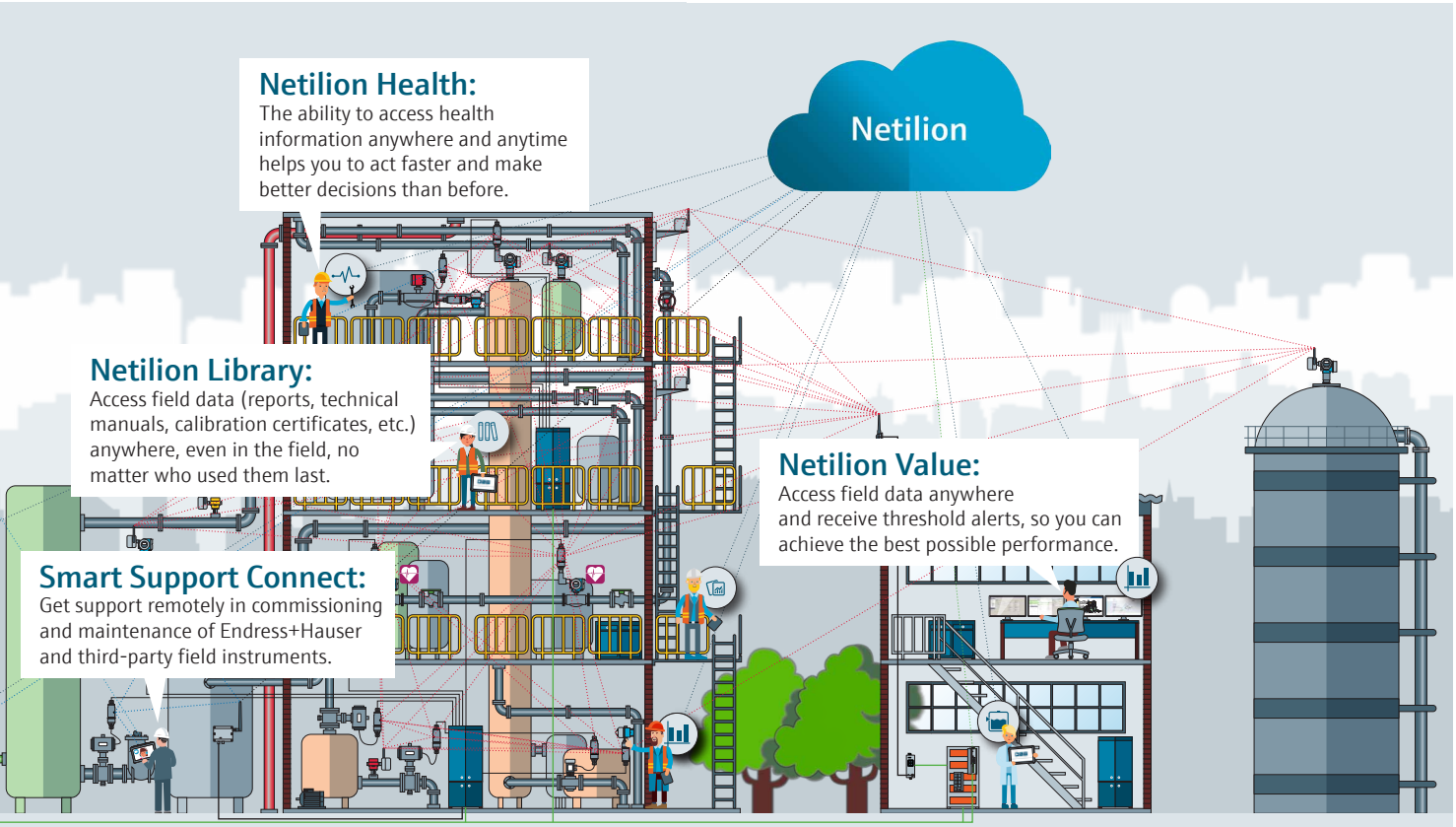
FieldEdge SGC200 enables the connection of Endress+Hauser Bluetooth® devices to the Netilion Cloud.

Data is transmitted via a global SIM card and LTE network. Device IDs, device readings and NAMUR NE 107 status information are transmitted.

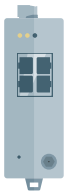
Our FieldEdge SGC200 communicates with the cloud.



with Netilion

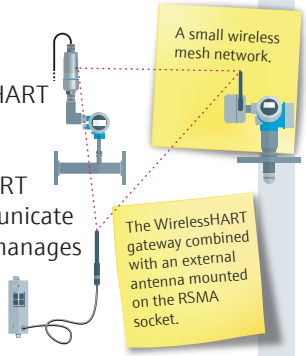


FieldGate SWG50:



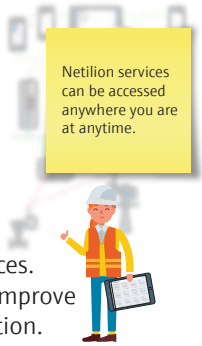
FieldGate SWG50 is a gateway for WirelessHART networks.

It enables WirelessHART field devices to communicate with each other and manages network security and connectivity.



Netilion:

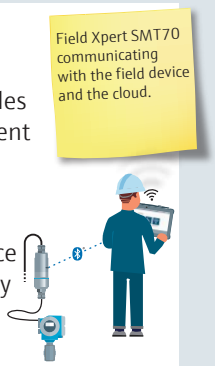
Netilion is a cloud-based IIoT ecosystem, designed for industrial processes. It connects the physical and digital world to send valuable information from the field straight to your phone, tablet or other devices. Netilion empowers you to improve efficiency and drive innovation.



Field Xpert SMT70:

Field Xpert SMT70 tablet PC for device configuration enables mobile plant asset management in hazardous (Ex zone 2) and non-hazardous areas.

It is suitable for commissioning and maintenance staff to manage Endress+Hauser and third-party field instruments with a digital communication interface via wireless or wired connection.



Legend:

- WirelessHART
- Bluetooth®
- WAN
- WLAN
- WWAN, LTE
- Ethernet
- Analog
- Heartbeat Technology

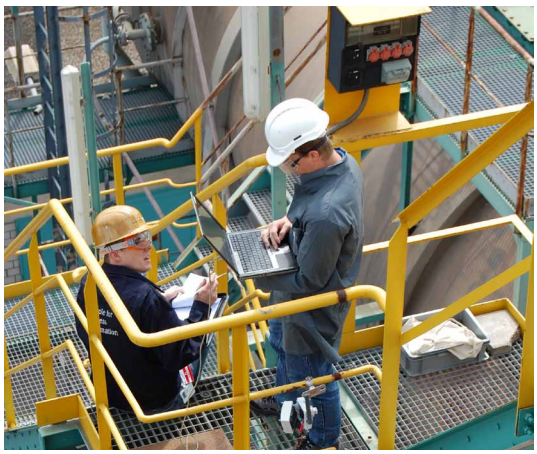
Experts across industries

Managing your challenges in demanding environments
We are your trusted partner for all measuring tasks, offering deep application know-how, extensive experience across seven industries, and a global presence. Our distinctiveness lies in a comprehensive range of wireless instruments, tailor-made solutions, and services, built on various application parameters and measurement principles. This enables optimal adaptation to every challenge and environment, with our mission being to ensure your success.

Many possibilities for your specific application
Successful wireless solutions have been implemented worldwide.

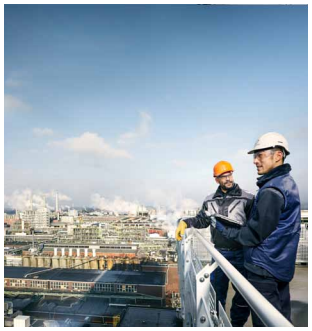
Our specialists have realized numerous challenging projects professionally and to the full satisfaction of our customers – across industries:

- Food & Beverage
- Water & Wastewater
- Oil & Gas
- Life Sciences
- Chemical
- Power & Energy
- Mining, Minerals & Metals



At Endress+Hauser we understand the unique challenges of your industry. By combining our portfolio and cutting-edge technologies with expert consulting, requirements analysis, design, and engineering capabilities, along with seamless data integration into your systems, we collaborate with you to deliver optimal industrial process solutions. These solutions unlock the highest levels of performance for your plant.

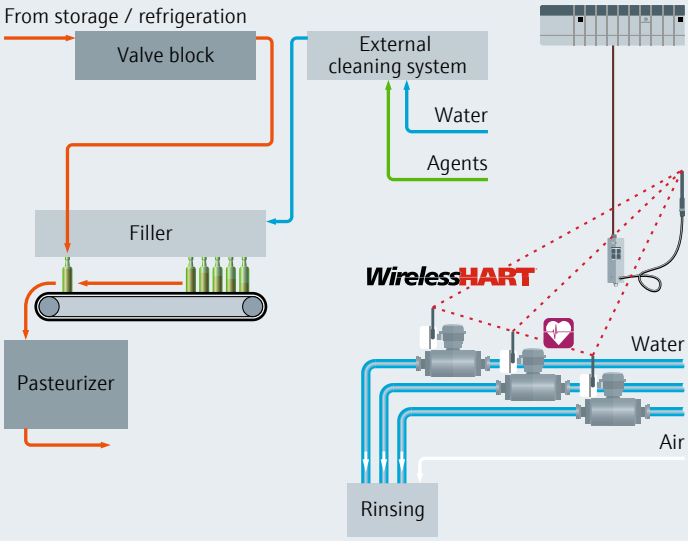
Experts across industries



Food & Beverage: Trust in quality
We help you to improve quality while reducing operational costs.

Constant demand for consistency in product quality and taste makes Food & Beverage a demanding industry. Complexity increases as ever more stringent hygiene regulations for food safety add cost pressures. Endress+Hauser's industry leading portfolio of reliable instrumentation, expert global consulting and accredited calibration services all combine to enable greater plant availability, resource conservation and high repeatability in processing with traceable compliance.

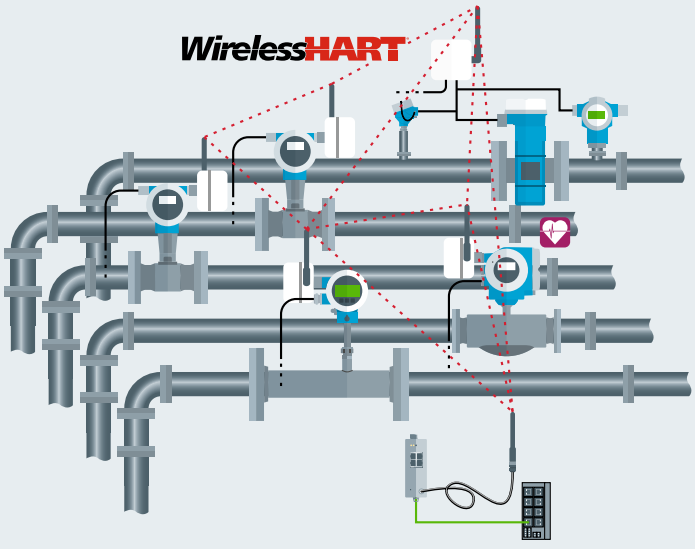
Water consumption monitoring – bottle filling/rinsing



Challenges:
- Labor-intensive manual logging of utilities from water consumption
- Translating water consumption savings into reduction of energy costs

Benefits:
- Easy to implement by retrofitting existing flowmeters with WirelessHART
- Automatic regular information about the water flow measurements over wireless channel helps to optimize the process for water consumption and energy savings

Energy monitoring



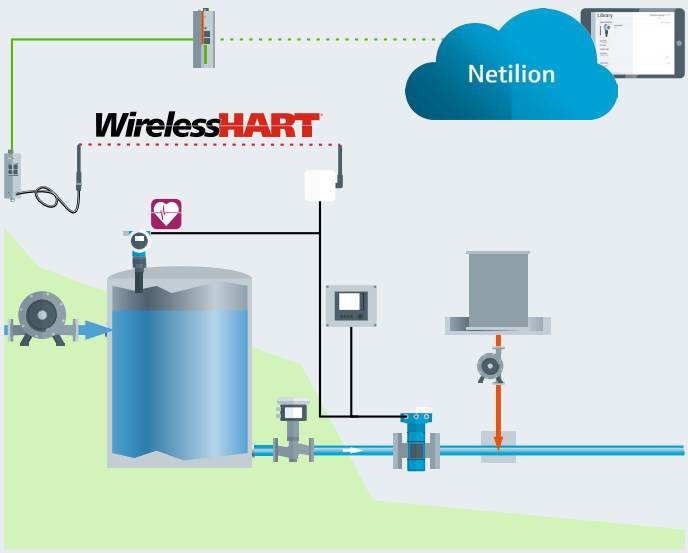
Challenges:
- Local power is available but no signal transmission
- Distance between measurement points
- Need for a cost-effective yet reliable solution

Benefits:
- One adapter FieldPort SWA70 supports up to 4 HART field devices
- Local power keeps the device online without using battery power, but all the information is transmitted wirelessly
- Online access to flow values and totalization

Water & Wastewater: Water is our life
Increase your efficiency and ensure compliance with an experienced and trusted partner.

Today more than ever the Water & Wastewater industry must balance the opposing pressures of improving water safety and shrinking budgets. Whether treating for consumption or discharge, process complexity is rising. Endress+Hauser combines a wide portfolio of smart measuring instruments with industry-experienced consulting and expert services to flexibly and efficiently ensure water safety with verifiable regulatory compliance.

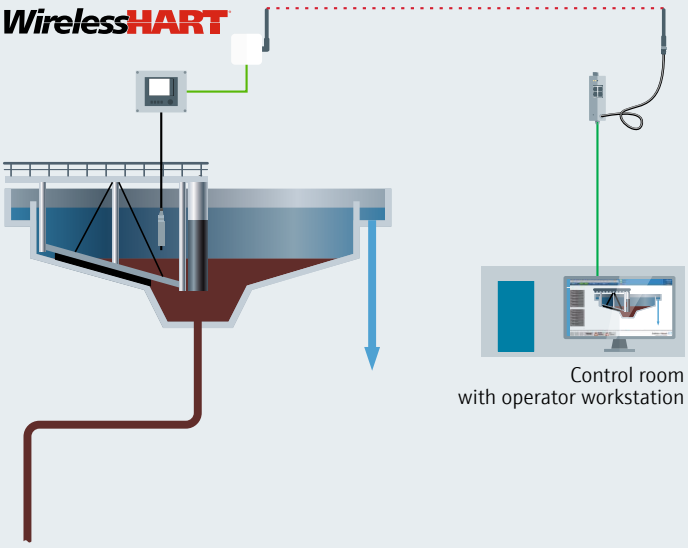
Monitoring wastewater treatment



Challenges:
- Manual process for determining water quality causes high operating costs
- Proof of regulatory requirements for water quality added to urban water infrastructure
- Administration of sensor maintenance in remote locations

Benefits:
- One adapter FieldPort SWA70 supports up to 4 HART field devices
- Manual effort to determine water quality becomes obsolete
- Netilion services provide diagnostics from field devices anywhere at any time, helping optimize asset health management for connected instruments

Level monitoring at primary/secondary clarifiers



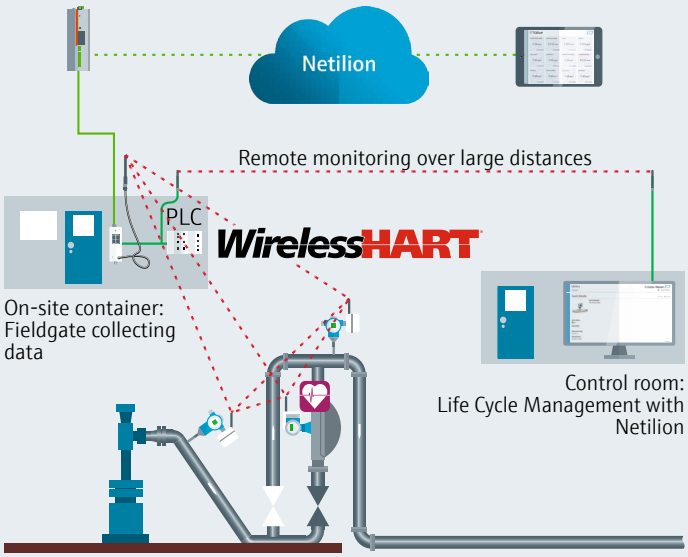
Challenges:
- Communication channel between the rotating platform and operating room
- Manual process for determining water quality leads to high operating costs

Benefits:
- Regular monitoring over the wireless channel ensures that settled solids are efficiently removed from the bottom of the clarifier
- Proper sludge collection and withdrawal maintain consistently high primary effluent quality

Oil & Gas: Fueling energy transition to net zero
A wide portfolio of innovative measurement technologies, crafted to meet current and future challenges.

Plant availability, safety and efficiency have long been vital in the Oil & Gas industry. The challenge to reduce carbon emissions and achieve decarbonization goals added an additional dimension to the industry. Energy transition and digital transformation are re-shaping the industry. With our breadth of instruments, services and solutions in combination with our deep industry expertise, we enable process improvements to achieve reliability in operation and net zero goals.

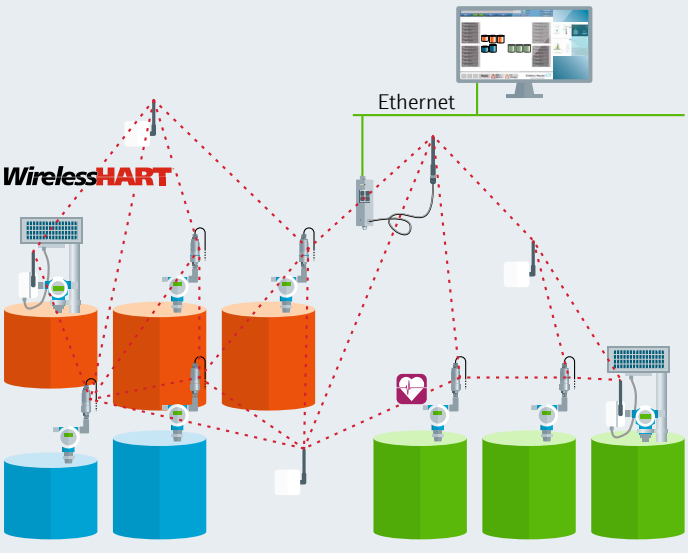
Monitoring of of crude oil extraction



Challenges:
- Oil wells scattered over large territories
- Regular cable breakages due to work on wells

Benefits:
- 2-wire field devices are powered by FieldPort SWA70
- No cables used for communication to on-site container
- Spare parts stock optimization due to universal adapters

Inventory control in an oil tank farm



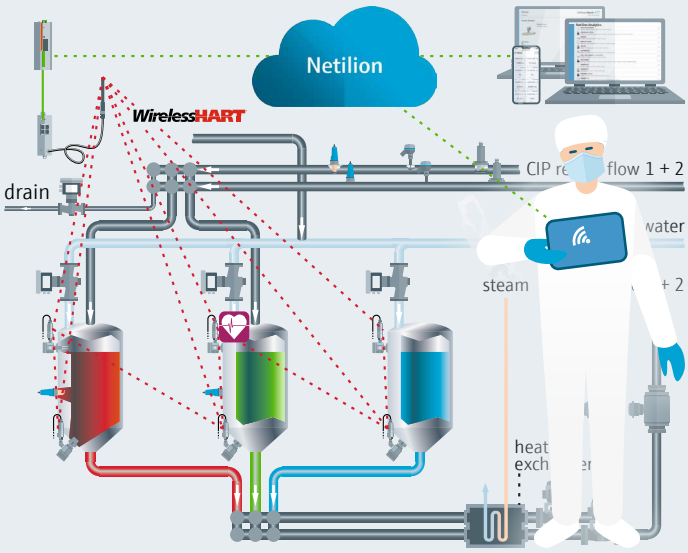
Challenges:
- Time-consuming, high-risk manual monitoring
- No control system for data integration in the operator room
- Cost issues related to cable management

Benefits:
- Operator collects process values using the automatic data collection
- Quick project implementation due to wireless technology

Life Sciences: The pulse of life sciences
Trust a reliable partner who helps you achieve operational excellence.

Today's thriving biopharmaceutical industry demands high productivity and efficiency balanced with meticulous alignment to GMP standards. From our innovative ASME-BPE compliant product portfolio enabling standardized production automation, reliable monitoring and predictive maintenance, to our expert consulting in process scale-up and operations optimization, Endress+Hauser offers the full solution. We speed time to market, sustain operational excellence, enhance productivity, and reduce risk.

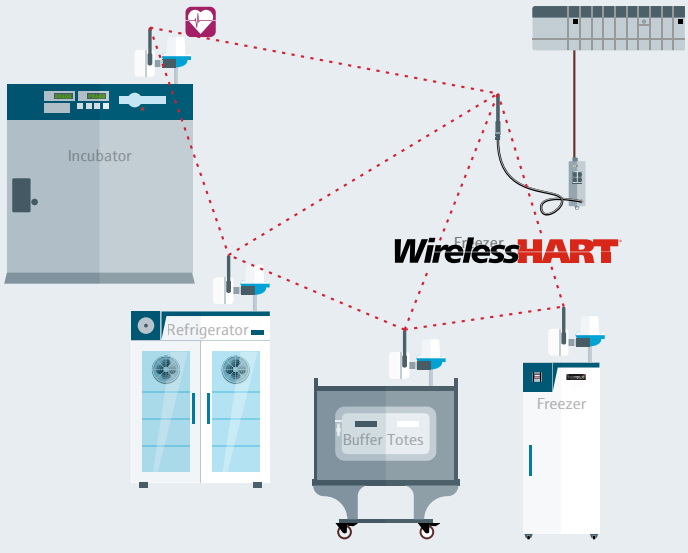
Cleaning in Place (CIP) process: data from the field up to the cloud



Challenges:
- Optimization and improvement of the overall CIP process performance

Benefits:
- Data collection using a second wireless channel without interruption of the existing CIP process
- Enhanced comprehensive data collection and analysis to optimize CIP processes and ensure regulatory compliance

Remote monitoring of portable units



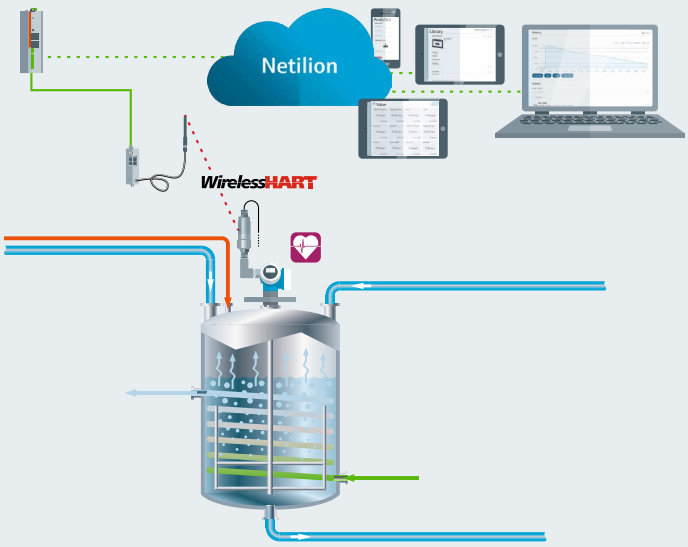
Challenges:
- Managing measurement visibility for portable units to address temperature fluctuations promptly
- Overcoming the need for an operator to be physically present at the plant
- Tackling energy cost reduction

Benefits:
- Seamless integration of battery-powered temperature sensors
- Recording temperatures without operator rounds, saving hundreds of hours and errors
- Real-time data providing insights for process optimization and energy savings

Chemical: Competitive and safe
We help you boost your plant's safety and performance.

Maximizing productivity and profitability while meeting toughening safety and sustainability standards is the greatest challenge facing the Chemical industry today. Technological innovation brings opportunity, but reliability is vital. Plant modernization is expedient, yet project delivery complex. Our innovatory instrumentation with safety built-in, allied to expert safety and project consulting, enables Endress+Hauser to deliver solutions to safely and reliably attain peak plant performance.

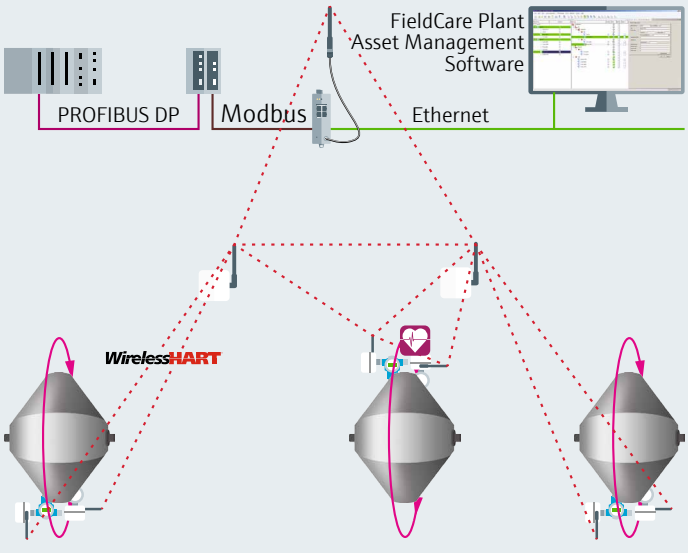
Core process: batch reactors



Challenges:
- Batch reactors often require frequent process adjustments for different recipes, making it complex to optimize parameters and maximize efficiency

Benefits:
- Additional data for measurements over the second wireless channel includes extended diagnostics, process optimization, and condition monitoring using Heartbeat Technology
- Continuous monitoring and the integration of sensors and actuators help to improve control and overall performance in batch reactors

Production of catalyzers



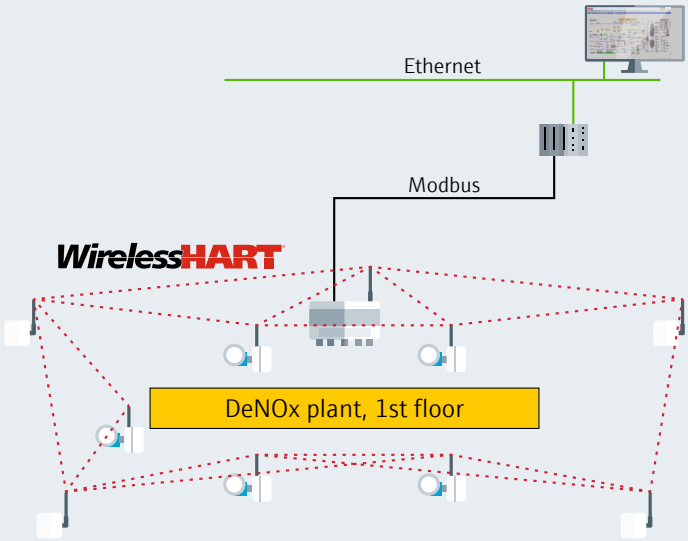
Challenges:
- Improving a batch process where an operator must stop the operation to manually sample moisture content
- No power supply or signal cables on rotating dryers

Benefits:
- Cost savings on installation and assembly
- Significant reduction of energy and laboratory costs through increased efficiency
- Improved process control and product quality
- Improved availability through condition-based maintenance strategy and centralized device performance monitoring

Power & Energy: Power up your plant
Power plants play a vital role, we help maximize uptime while delivering safety and productivity.

Today's Power & Energy industry must strike a complex balance: meeting spiraling demand for affordable and reliable energy while increasing cleaner and renewable sources in the energy mix. As cost and regulatory pressures grow, modernization is essential for efficient, safe resource use. As renewables advance, so does the need for energy storage. With best-fit instrumentation, deep power application expertise, services and solutions, Endress+Hauser brings efficient, reliable productivity.

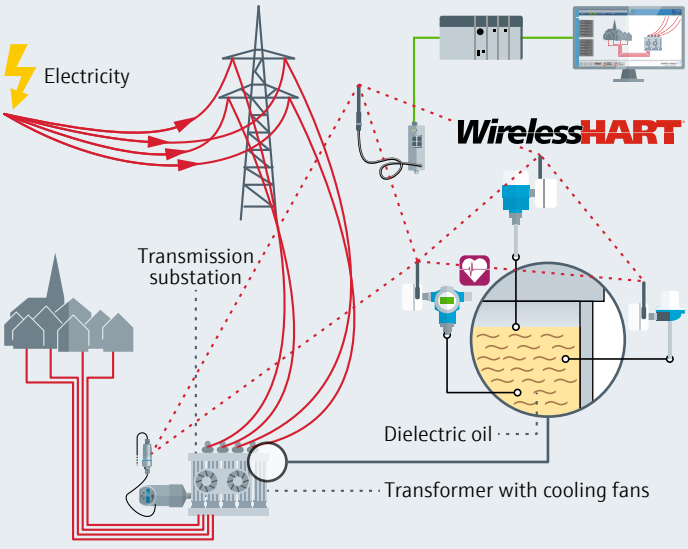
Pressure and temperature monitoring in toxic waste incineration



Challenges:
- Complexity of installation of the sensors to measure pressure and temperature inside heat exchanger to precisely localize the deposits

Benefits:
- Fast project implementation
- Thanks to temperature and pressure measurements via WirelessHART, monitoring of the process is precise and easy to maintain
- Time reductions and locally optimized cleaning processes lead to considerable cost reductions

Electrical substations – transformer monitoring



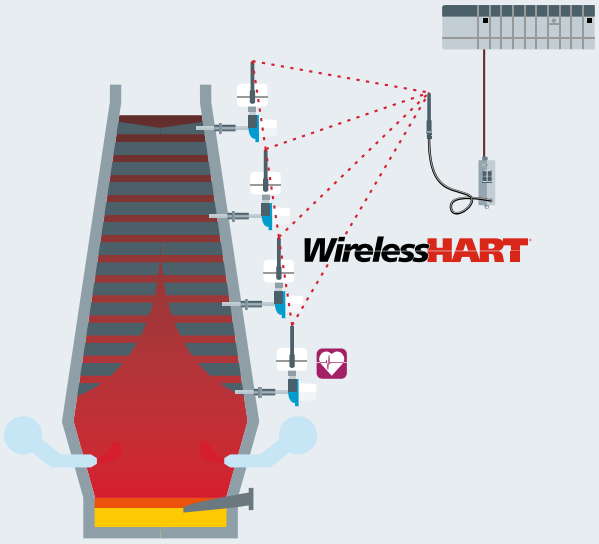
Challenges:
- Lightning, high electromagnetic field and voltage changes cause problems with 4 to 20 mA signal wires
- Ensuring continuous and reliable data transmission to prevent monitoring interruptions critical for transformer health

Benefits:
- Reduced installation costs by minimizing the need for extensive cabling, lowering overall installation and maintenance expenses
- Real-time monitoring enabling data transmission for proactive maintenance and timely detection of potential transformer issues
- Versatile placement of monitoring sensors, enhancing the ability to cover critical points without wiring constraints

Mining, Minerals & Metals: Extracting more from less
In a world of lower ore grades, skill gaps and excavation challenges we can help you hit your target.

Never more so than today has the Mining, Minerals & Metals industry had to manage such tension between soaring demand, increased scarcity, lower ore grades, fluctuating prices, and toughening safety and sustainability criteria. Combining our innovative product portfolio with our deep application and industry knowledge enables Endress+Hauser customers to optimize processes, boost productivity, and ensure safety and environmental compliance.

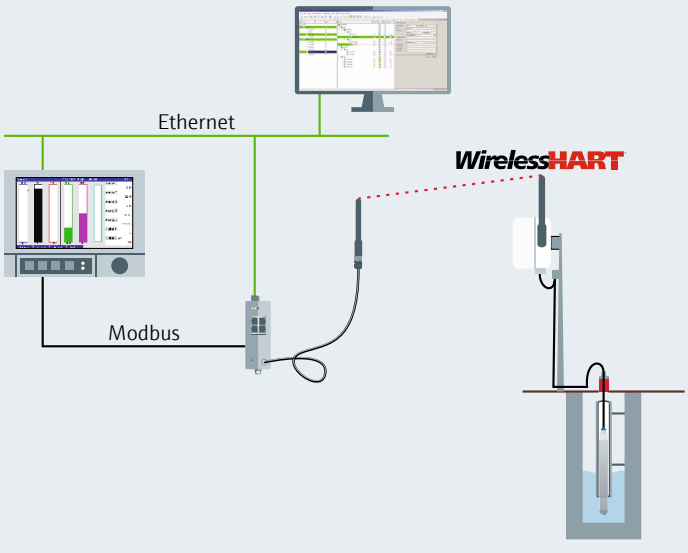
Blast furnace temperature monitoring



Challenges:
- Ensuring cables can withstand extreme heat, dust, and corrosive elements in the harshest environmental conditions
- Managing the installation of temperature sensors and wiring maintenance around the furnace, especially in hard-to-reach areas, which is complex and costly

Benefits:
- Simplified installation with reduced complexity and cost of installation by eliminating extensive and expensive (heat-shielded) cabling
- Enhanced mobility allowing easy relocation, reconfiguration and exchange of sensors as needed without wiring constraints
- Real-time access providing temperature data to optimize furnace operations and enhance safety

Groundwater monitoring



Challenges:
- Tailing dams, being a dynamic process that constantly changes with new layers, require a flexible solution for monitoring water levels
- Since considerable distances are involved, the operator must cover significant ground to collect measurements

Benefits:
- Simple implementation saves time by eliminating manual data collection and reduces electrical installation costs
- Scalable and flexible sensor placement allows for repositioning or installation of new points based on monitoring needs

Supported wireless technologies

WirelessHART

WirelessHART - flexibility in process management
Reduce your project costs thanks to more efficient planning and rapid installation.

WirelessHART is a wireless technology specifically conceived for process automation. It adds wireless capabilities to the HART protocol while maintaining compatibility with existing HART devices, commands and tools. WirelessHART has a number of features, e.g. self-organization and self-healing, that ensure reliable operation, flexibility and quick installation. Security and integrity are guaranteed by time synchronized communication, key management and encryption according to AES128.

Advantages:
- Remote and difficult-to-access measuring points connected without expensive cables
- Simple planning, rapid installation, quick integration into the plant infrastructure
- High level of reliability due to redundant communication paths
- Easiest upgrade of Endress+Hauser and 3rd party HART devices
- Simple parameterization and monitoring of entire plant sections using DTM and DD technology with e.g. FieldCare, Plant Asset Management software

Bluetooth®

Bluetooth® - simple, secure device communication
Bluetooth® technology is a wireless communication standard that allows devices to exchange data over short distances using radio waves.
It operates in the 2.4 GHz ISM (industrial, scientific, and medical) band and is designed for low power consumption, making it suitable for battery-powered devices.

The technology supports various profiles, which are sets of protocols that define the capabilities and communication methods between devices. These profiles include audio streaming (A2DP), file transfer (FTP), hands-free calling (HFP), and many others.

Advantages:
- Wireless convenience with easy setup and arrangements of devices - enabling seamless data transmission
- Reduced costs associated with cabling and physical connectors
- Bluetooth® Low Energy (BLE) supports prolonged battery life for IIoT devices
- High interoperability thanks to seamless integration into your plant
- Enhanced security with secure data transmission for industrial IoT applications

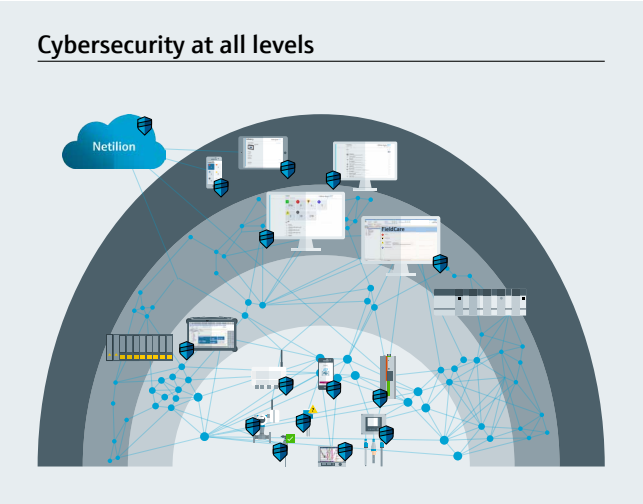
Security at the highest level

Cybersecurity at Endress+Hauser is taken very seriously
Through our cybersecurity program, we ensure a holistic approach of security for our products, processes and infrastructure.

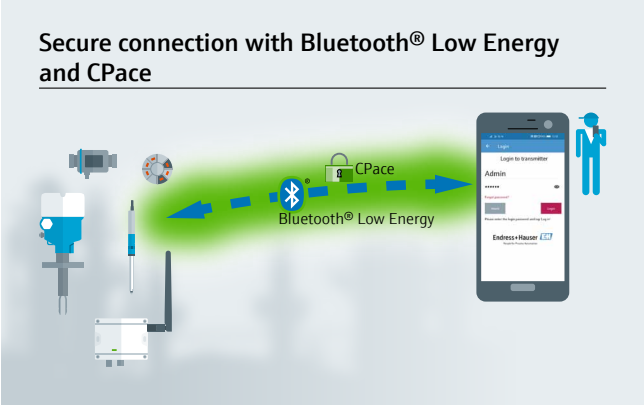
This commitment is underlined by the security certifications we maintain. To ensure that the products you are using in your plant are securely developed, our secure development lifecycle process has been certified by TÜV Rheinland against the IEC 62443-4-1, an established security standard for the industry.

Furthermore, the environment in which the products are developed is under constant scrutiny. In the context of our cloud offering Netilion, Endress+Hauser went the extra mile and achieved certification by the SQS, that the processes and systems behind this offering are compliant to ISO 27001, one of the most accepted standards for IT security. For Netilion itself we are also following industry best practices stated in ISO 27017, a cloud security control catalog.

Combining these disciplines in one certification strategy, validated through independent certification bodies, Endress+Hauser aims to provide you with all the reinsurance possible to qualify as your trusted partner for a secure process automation.



Keep your plant secure with Endress+Hauser's expertise



All our measuring instruments with Bluetooth® connection are supported

Secure Bluetooth® connection by Endress+Hauser
This secure low energy technology for the process industry developed was by Endress+Hauser, as convenient wireless access to field instruments is of increasing interest.

Significant security risks emerge with the growing frequency with which instruments are accessed remotely. Developments in the Industrial Internet of Things (IIoT) are leading to interconnected process control components. To tackle this, we have developed a security layer for Bluetooth® that protects the passwords, using CPace as its core component. With CPace, notorious attacks on the Bluetooth® pairing-step are prevented.

Secure WirelessHART connection
WirelessHART employs robust security measures to protect your network and secure data at all times. These measures include the latest security techniques to provide the highest levels of protection available.

Security features associated with privacy aim to prevent eavesdropping by unauthorized devices inside or outside the network. A WirelessHART sensor network provides end-to-end CCM mode 128-bit AES encryption at the network/transport layer for every message in the network. In addition to individual session keys, a common network key is shared among all devices on a network to facilitate broadcast activity as needed. Encryption keys can be rotated to provide an even higher level of protection.
A separate 128-bit join encryption key is used to keep data private that is sent and received during the joining process.

Supplementary documentation

- Netilion, IIoT Ecosystem
  Publication – PU01165S/04/EN
- Field Xpert SMT70
  Innovation – IN01069S/04/EN
- Field Xpert SMT50
  Innovation – IN01172S/04/EN

Additional information

- Gain more expertise from a variety of trainings
  www.endress.com/en/events/training
- Download the free infographic on "Wireless network, plant retrofit and IIoT services with Netilion"
  cx.endress.com/wireless-infographic
- More information on WirelessHART solutions
  www.endress.com/WirelessHART-solutions

www.addresses.endress.com

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