

WirelessHART™

The first Simple, Reliable and Secure wireless standard for process monitoring and control



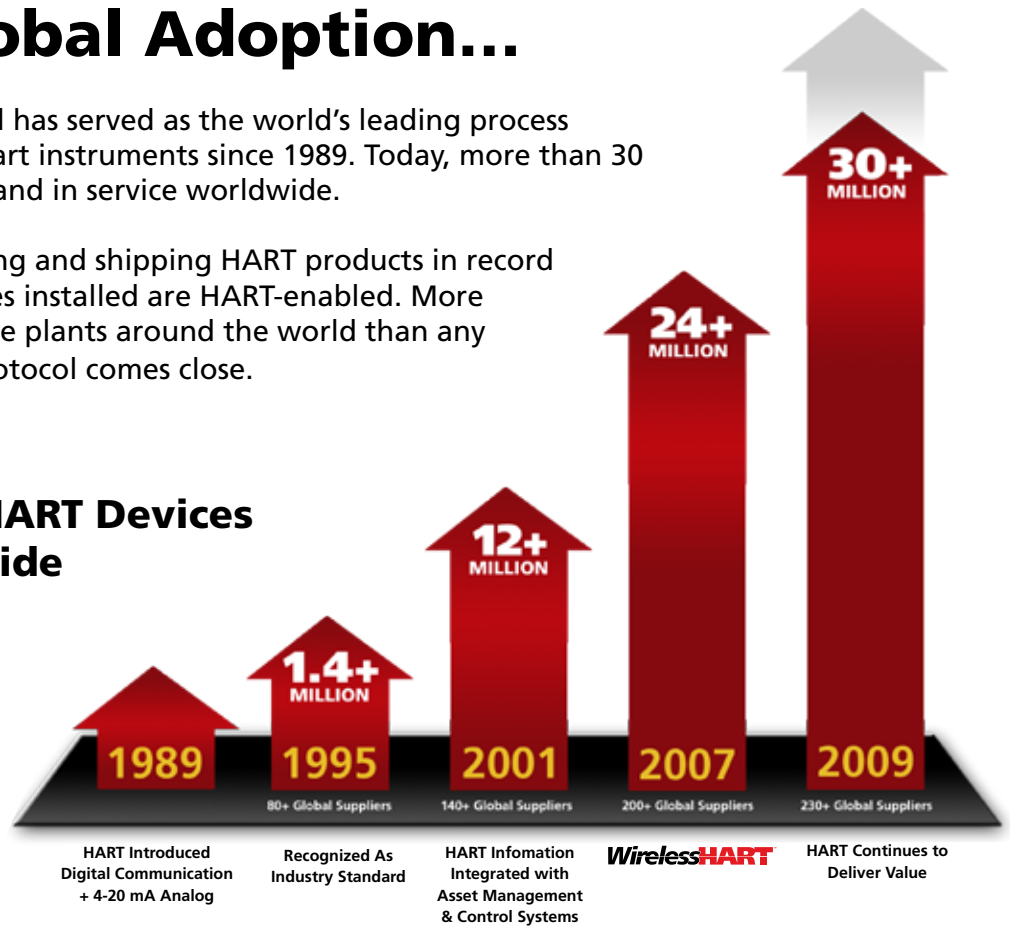
Simple. Reliable. Secure.

Decades of Global Adoption...

The HART Communication Protocol has served as the world's leading process communication technology for smart instruments since 1989. Today, more than 30 million HART devices are installed and in service worldwide.

Industry suppliers are manufacturing and shipping HART products in record numbers—75% of the smart devices installed are HART-enabled. More HART products are installed in more plants around the world than any other. No other communication protocol comes close.

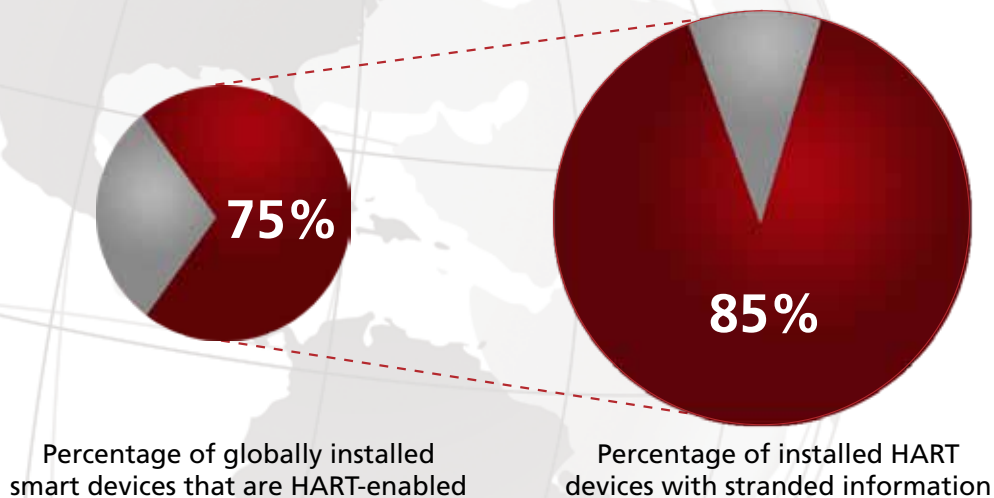
Over 30 Million HART Devices Installed Worldwide



...Yet the Value Isn't Always Realized

Even though millions of HART devices are installed worldwide, in most cases the valuable information they can provide is stranded in the devices. An estimated 85% of all installed HART devices are not being accessed to deliver device diagnostics information with only the Process Variable data communicated via the 4-20mA analog signal. This is often due to the cost and the difficulty of accessing the HART information.

Wireless technology allows users to access the vast amount of unused information stranded in these installed HART smart devices—85% of the installed HART devices. It also provides a cost-effective, simple and reliable way to deploy new points of measurement and control without the wiring costs.



Benefits of HART Communication...

- Fast and easy device commissioning and loop troubleshooting
- Remote access to all device information and diagnostics
 - Streamline maintenance procedures
 - Enables predictive maintenance
 - Increases plant availability
- Low cost access to stranded process information
- Large selection of devices that work together
- Industry standards reduce overall costs

...made even easier with *WirelessHART* technology!

Improves Operations

- Wireless access to stranded device information
- Additional measurements are fast and easy
 - Aids in regulatory compliance
 - Eliminates manual data collection
 - Temporary measurements for process studies
 - Extends visibility to remote plant areas (tank farms, utilities, etc.)
 - Instrument movable assets (railcars, rotating equipment, etc.)

Lowers Cost with Easy and Flexible Implementation

- Self-configuring and self-healing network
- Reduction of labor, wiring and materials
- Easy to extend network to remote areas
- Reduced engineering and project time
- Works with existing and new HART devices
- Uses existing tools and knowledge

WirelessHART technology is backward compatible with currently installed HART devices. The technology uses existing HART tools protecting your investment today and in the future.

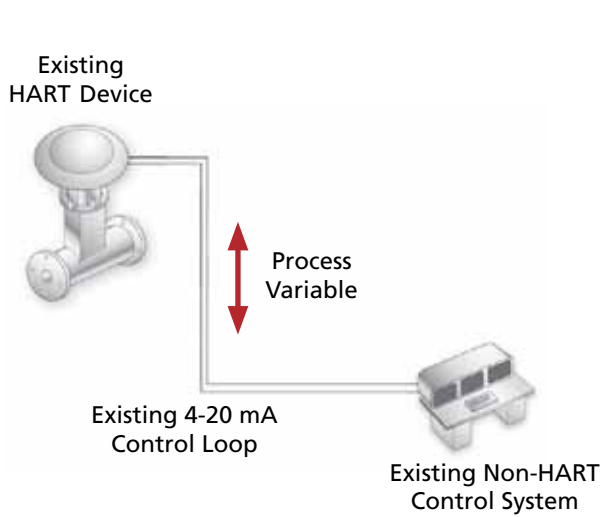


From Wired to Wireless ...

WirelessHART technology is a complementary enhancement to the HART Protocol, providing an additional capability that can benefit both existing and new monitoring and control applications. Wired or wireless, HART technology provides the tools and the flexibility you need to better manage your field measurement assets.

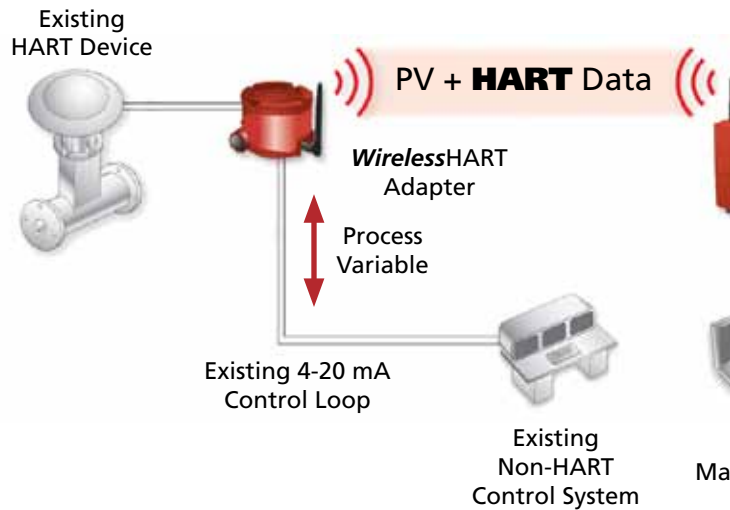
Wired

When HART devices are deployed the Process Variable (PV) is read at the control system via the 4-20mA loop. Though used during commissioning, the HART data is not connected to the control system in real-time, limiting the value of your asset investment.



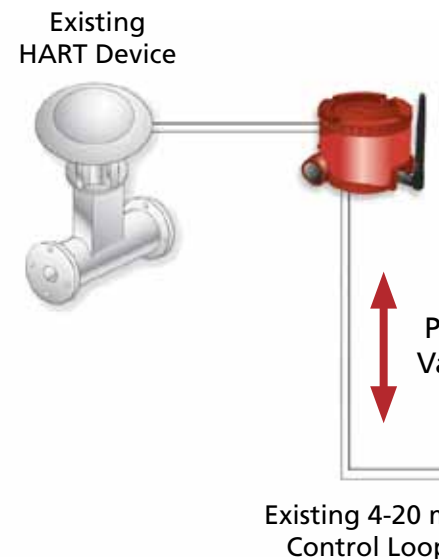
Wired + *WirelessHART* Adapter

Retrofitting a wired connection to retrieve HART data is feasible. By connecting a *WirelessHART* Adapter to an existing HART device, the stranded information can be easily accessed. The HART data is transmitted to a *WirelessHART* Gateway and interfaced to an asset management system.



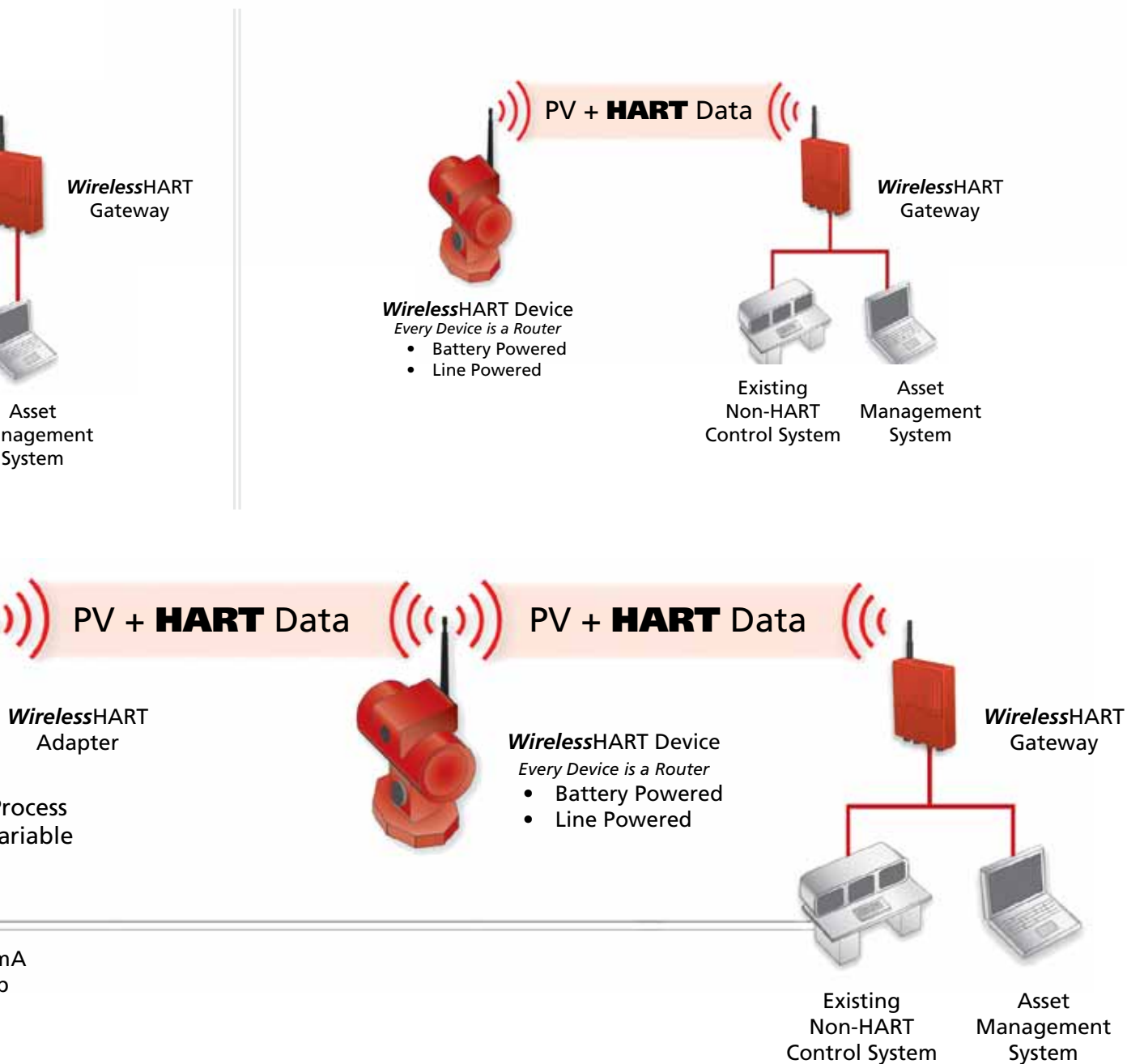
Wired + *WirelessHART* – Works Together!

In the real world, using a combination of both wired HART + *WirelessHART* technology provides a cost-effective, low-risk communication solution. Working together, your investment in installed HART devices is protected and additional HART devices can be added quickly and economically.



WirelessHART

A *WirelessHART* device is a free-standing device that eliminates the analog connection to the control system. The device can be installed anywhere in the plant without the cost of wires. The PV and HART data is connected to a control or asset management system via a *WirelessHART* Gateway.



Simple.

WirelessHART is a robust technology that is simple to implement. It enables users to quickly and easily gain the benefits of wireless technology while maintaining compatibility with existing HART devices, tools and systems. *WirelessHART* is the Simple, Reliable and Secure way to address your process monitoring, control and asset management applications.

Easy Installation and Commissioning

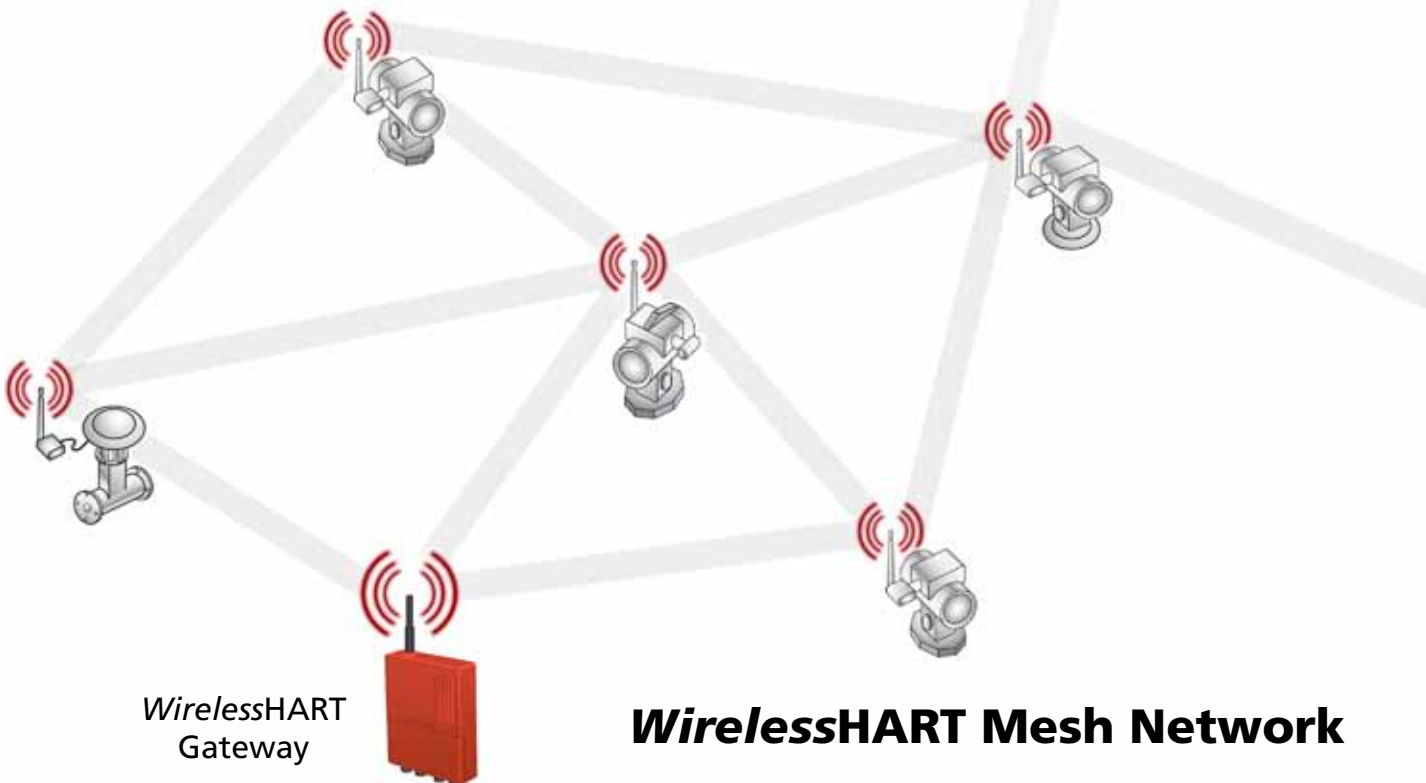
- Familiar tools, work flow and procedures
- Multiple power options
- Reduced installation and wiring costs
- Coexistence with other wireless networks
- Supports both star and mesh topologies
- Add devices one at a time

Automatic Network Features

- Self-organizing and self-healing
- Always on security
- Adjusts as new instruments are added
- Adjusts to changes in plant infrastructure

② Add devices Point-by-Point as your needs arise

① Begin with as few as 5 devices and a gateway



Reliable.

Industrial facilities with dense infrastructures, frequent movement of large equipment, changing conditions, or numerous sources of radio-frequency and electromagnetic interference may have communication challenges. *WirelessHART* includes several features to provide reliable communications in all industrial environments.

Standard Radio with Channel Hopping

- Radios comply with IEEE 802.15.4-2006
- 2.4GHz license free frequency band
- "Hops" across channels to avoid interference
- Delivers high reliability in challenging radio environments

Self-Healing Network

- Adjusts communication paths for optimal performance
- Monitors paths for degradation and repairs itself
- Finds alternate paths around obstructions
- Mesh network and multiple access points

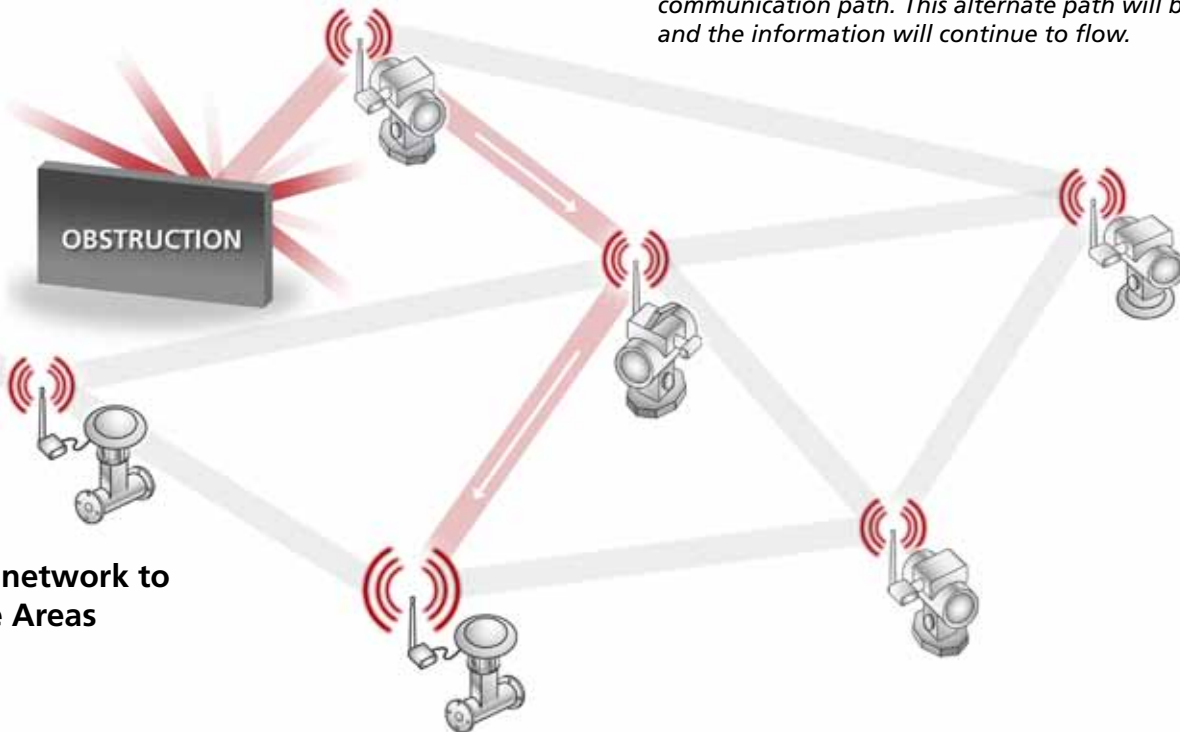
Coexistence with Other Wireless Networks

- Clear Channel Assessments tests for available channels
- Blacklisting avoids frequently used channels
- Optimizes bandwidth and radio time
- Time synchronization for on-time messaging

Built-in 99.9% End-to-End Reliability for industrial process applications

If an obstruction is introduced into the mesh network, devices will automatically find the best alternate communication path. This alternate path will be created and the information will continue to flow.

③ Extend network to Remote Areas



Secure.

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

Protects Valuable Information

- Robust, multi-tiered, always-on security
- Industry standard 128-bit AES encryption
- Unique encryption key for each message
- Data integrity and device authentication
- Rotate encryption keys used to join the network

Protects Wireless Network

- Channel hopping
- Adjustable transmit power levels
- Multiple levels of security keys for access
- Indication of failed access attempts
- Reports message integrity failures
- Reports authentication failures
- Safe from Wi-Fi type Internet attacks

***WirelessHART* technology provides multi-layered security—protecting your information and your network.**



The Global Standard

Continuing 15 years of open standards development, the HART Communication Foundation and its 230+ member companies sought a wireless standard designed for the unique demands of the process industries. With the latest evolutionary enhancement to the global HART standard, the Foundation takes the proven field communications, networking and security protocols and integrates them into a simple, reliable and secure wireless standard.

- Built on proven industry standards
- Created by industry and technology experts
- Multi-vendor support and interoperable devices
- Uses existing devices, tools and knowledge

Flexible Applications

- Reduced installation costs – no wires!
- Process monitoring, control and asset management
- Health, safety and environmental compliance monitoring

Supports All Phases of the Plant Life Cycle

- Fast engineering, deployment and commissioning
- Cost-effective move from scheduled to predictive maintenance
- Easy diagnosing and troubleshooting

Attributes of *WirelessHART*

| ITEM | DESCRIPTION |
|-------------------------------|---|
| Based on Industrial Standards | HART- IEC 61158 <i>WirelessHART</i> - IEC/PAS 62591Ed.1 EDDL - IEC 61804-3 Radio & MAC - IEEE 802.15.4(TM)-2006 IEC/PA |
| Radio standard | IEEE 802.15.4-2006 @ 250kbps |
| Frequency Band | 2.4GHz |
| Frequency Management | Channel hopping on a per packet basis |
| Distance | Up to 250m line-of-sight between devices |
| Power Options | Line Powered or Battery Powered |
| Topologies | Mesh, Star, Combined Star & Mesh |

Simple. Reliable. Secure.

ABB Automation • Agar Corporation • All Measures
• Alstom Power • AMETEK Drexelbrook • AMETEK
Thermox • Analog Devices • Analytical Technology •
Anderson Instrument • Aplisens • Applied System Technologies
• Apprion • Armstrong International • ASA Srl • A.T.C. Control •
AW-Lake Company • Badger Meter • Bartec • Battelle Energy Alliance •
Baumer • BD Sensors • Beamex Oy • Bei Jing ConST Instruments Technology
• Beijing Capstar Automation Instrument • BEKA Associates • Berthold
Technologies • Bharat Heavy Electricals • BIFFI Italia • Bopp & Reuther • Broadley-
James • Brooks Instrument • BTG Instruments • Burns Engineering • Chetas Control
Systems • Chongqing Sichuan Instrument • CiDRA Corporate Services • CNPC Lanlian
Instruments • Crossbow Technology • Cypress Systems • Daehan Control Tech • Daniel
Measurement and Control • DEA-University of Brescia • Detcon • Detector Electronics • DKK-
TOA • Draeger Safety • Duon System • Dust Networks • Dwyer Instruments • Dynisco Instruments
• ecom instruments • EJMiller Consulting • Elemer Research and Production • ELPRO Technologies •
Emerson Process Management • Emerson Machinery Health Mgmt • Endress+Hauser • ENOTEC • E-Senza
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Electric Systems • Fujian Wideplus Precision Instruments • FuZhou Firstrate Automation Equipment • GE Industrial
Sensing • GE Infrastructure-Energy • General Monitors • GP: 50 New York • Hach Lange • Harold Beck & Sons •
HAWK Measurement Systems • Heinrichs Messtechnik • Hengesbach • HIMA Paul Hildebrandt • Hitachi High Tech
Control Systems • Hoffer Flow Controls • Honeywell • Huakong Technology • ifak system • ifm prover • INOR Process •
Invensys/Foxboro • ISE-Magtech • Itron • Jogler • Kajaani Process Measurements • Klay Instruments • Knick Elektronische
• Kongsberg Maritime Systems • Konics • Koso America • Koso Engineering • Krohne • KSB • KSR Kuebler • K-TEK •
KTH-School of Electrical Engineering • Kurz Instruments • LABOM • Lee College • MACTek • Magnetrol • Masoneilan •
Mecon • Meriam Process Technologies • Mesco Engineering • Metran • Metroval Controle de Fluidos • Metso Automation
• Mettler-Toledo • Micro Motion • Microcyber • Microflex • Millennial Net • Mine Safety Appliances • Mitsubishi Electric
Europe • Mobrey • Moore Industries • M-System • MTL • MTS Systems • Net Safety Monitoring • Nivelco Process Control •
NIVIS • Ohmart/Vega • Omnex Control Systems • Open Field Communications • Orange Instruments • Oval Corporation •
Pepperl+Fuchs • Phase Dynamics • Phoenix Contact • PMV Palmstiernas • PR Electronics • Process Measurement & Controls
• ProComSol • Pyromation • R. Stahl • Richter Chemie-Technik • Rockwell Automation • Rohrback Cosasco Systems •
Ronan Engineering • ROOST-95 • Rosemount Analytical • Rosemount • Rosemount Tank Radar • Rotork Process Controls •
RUEGER • Samson • Satron Instruments • SBEM • Schneider Canada Services • Sense Technics Instruments • Seojin Instech
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Milltronics Process Instruments • SkoFlo Industries • Smar • SMC Corporation • Softing • Software Technologies Group •
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