# SIEMENS

# Increasing transparency and flexibility at the field level

**Field instrumentation with WirelessHART communication for innovative and cost-effective solutions**

**Answers for industry.**

# New possibilities
# in the process industry

**Wireless products have fundamentally changed our lives – and they are also playing an increasingly important role in the industrial environment. Here too, the enormous potential of wireless technology opens up totally new perspectives. In addition to industrial wireless LAN (IWLAN) for local wireless networking, GPRS- and UMTS-based telecontrol systems are already widely used in the world of automation because they are ideal for monitoring and controlling remote plants and facilities. WirelessHART is the first industrial and open standard (IEC 62591) for wireless field communication that fully meets the requirements of the process industry.**

### Success factor: wireless communication

To achieve lasting success in the face of global competition, companies need to permanently improve their productivity while minimizing the total cost of ownership. This calls for new measures and new concepts.
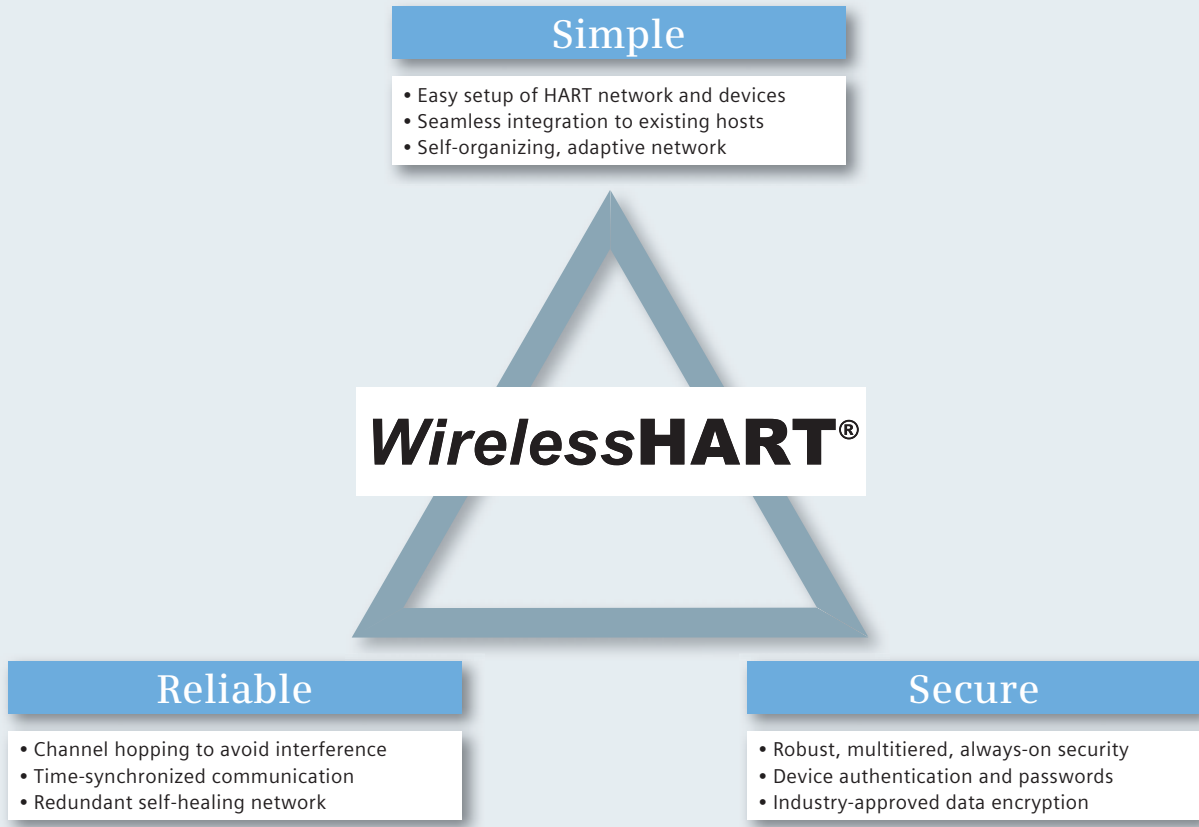
Wireless solutions offer many more benefits than just the elimination of cabling and installation costs. Users also profit from significantly faster commissioning and more efficient maintenance as well as greater flexibility and mobility. Wireless technology ensures improvements in production quality and plant safety. All of these advantages add up to greater overall plant availability.

### WirelessHART: simple, reliable, secure

With over 35 million devices installed worldwide, HART technology is the most widely used field communication protocol for intelligent process instrumentation.

WirelessHART is an intelligent evolution of the proven 4 – 20 mA HART technology released by the HART Communication Foundation (HCF) as part of Specification V7. WirelessHART is backward compatible with wired HART technology, and as such offers maximum protection for investments in hardware and software, tools and expertise.

WirelessHART is an open industrial standard (IEC 62591) developed to meet the special requirements of wireless communication at field level in the process industry. It consistently fulfills all specific requirements for reliability, security, cost-efficiency, and ease of use.

## Simple

- Easy setup of HART network and devices
- Seamless integration to existing hosts
- Self-organizing, adaptive network

# WirelessHART®

## Reliable

- Channel hopping to avoid interference
- Time-synchronized communication
- Redundant self-healing network

## Secure

- Robust, multitiered, always-on security
- Device authentication and passwords
- Industry-approved data encryption

**Standard specifications at a glance**

The interoperability of WirelessHART devices, regardless of vendor is guaranteed by standardization, registration, and testing at HART Communication Foundation (HCF).

| Standards | WirelessHART – IEC 62591<br>HART – IEC 61158<br>EDDL – IEC 61804-3 |
|---|---|
| Radio standard | IEEE 802.15.4-2006 @ 250 kbps |
| Frequency band | 2.4 GHz |
| Frequency management | Frequency-hopping spread spectrum |
| Distance | Up to 200 m line of sight |
| Power supply | Battery-powered, line-powered, solar-powered |
| Topologies | Mesh, star, combined star, and mesh |
| Number of devices | Limit not specified. Number of devices will depend on the application requirements and gateway constraints. |

# Groundbreaking solutions for industrial wireless communication

Based on our in-depth experience in process automation and industrial wireless technology, we offer a range of first-class WirelessHART products as part of a unique portfolio for the process industry. It also includes products and systems for wireless remote networks and industrial wireless LAN (IWLAN), as well as a comprehensive instrumentation product portfolio.
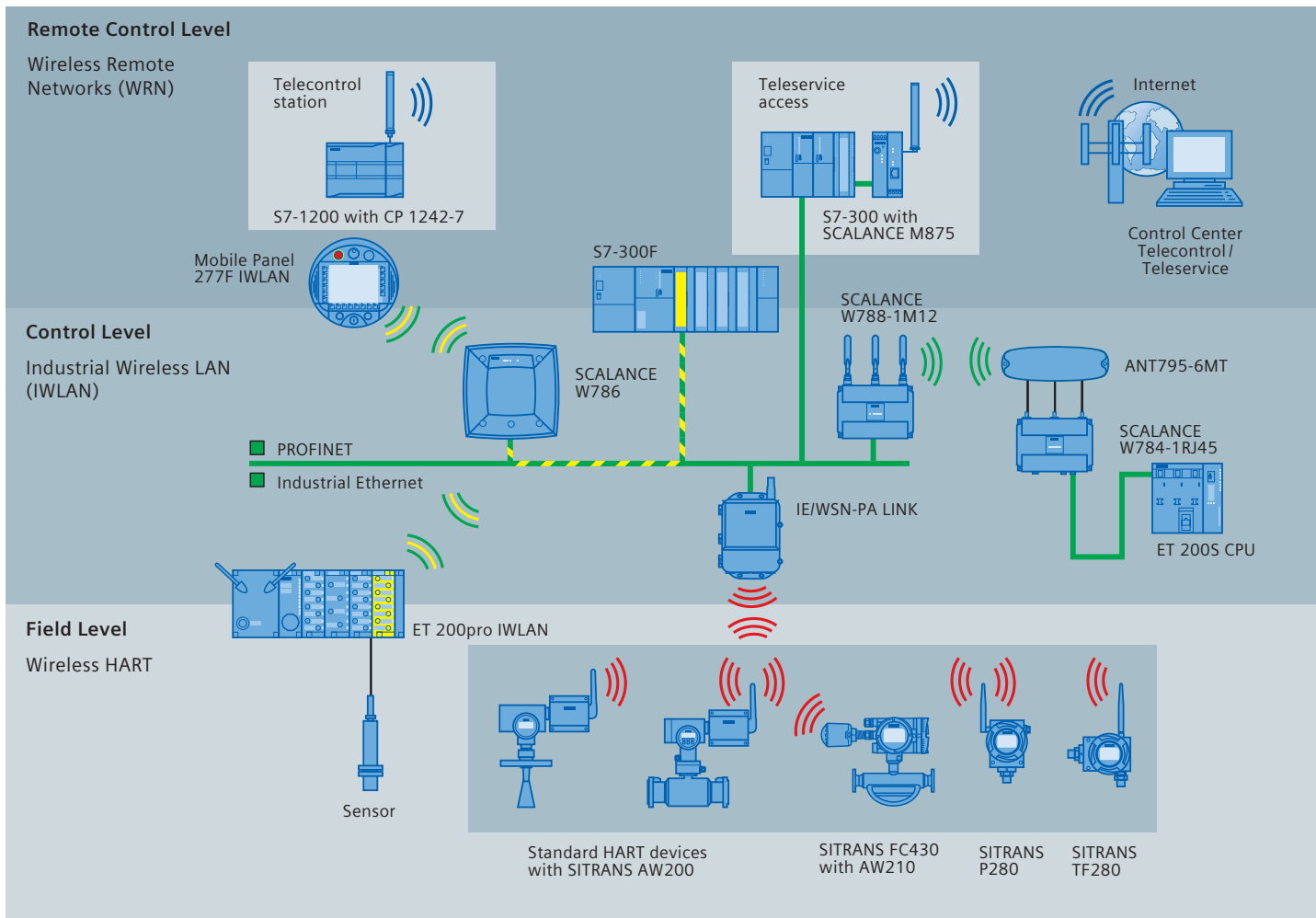
## WirelessHART product family

- **Battery-powered WirelessHART transmitters** are ideal for remote measurements, for deployment in harsh environments, for temporary ad hoc measurements, and for the expansion and replacement of field devices.

- **WirelessHART adapters** provide wireless communication capability for existing wired HART devices.

- **The WirelessHART gateway** manages the network as well as the security of the network and of the data in the network. It also serves as a proxy to higher levels in the automation pyramid (for example, to SIMATIC PCS 7, SIMATIC PLCs or to systems of third-party suppliers), and is a link to access the devices in the network.

## Industrial wireless LAN

SCALANCE W access points and client modules allow optimal configuration of IWLAN networks according to the international standard IEEE 802.11. They feature a high degree of ruggedness, and security in all applications, even in explosion hazard zone 2.

## Wireless remote networks

Wireless remote network products are used for the wireless monitoring and control of widely distributed process stations via private and public networks. Siemens offers GSM, (E)GPRS, and UMTS modems that allow secure and efficient remote communication.

**Remote Control Level**

Wireless Remote Networks (WRN)

Telecontrol station
S7-1200 with CP 1242-7

Mobile Panel 277F IWLAN

Teleservice access
S7-300 with SCALANCE M875

Internet

Control Center Teleservice / Teleservice

S7-300F

SCALANCE W786

SCALANCE W788-1M12

ANT795-6MT

SCALANCE W784-1RJ45

**Control Level**

Industrial Wireless LAN (IWLAN)

■ PROFINET
■ Industrial Ethernet

IE/WSN-PA LINK

ET 200S CPU

**Field Level**

Wireless HART

ET 200pro IWLAN

Sensor

Standard HART devices with SITRANS AW200

SITRANS FC430 with AW210

SITRANS P280

SITRANS TF280

## WirelessHART answers your challenge

WirelessHART opens up new communications options that were either not practical or simply not possible in the past due to the given operating environment or for economic reasons.

■ Flexible for installation, replacement, or upgrading; ideal for temporary measurements and for measurements on rotating equipment.

■ Cost-efficient for remote facilities and locations difficult to access due to environmental or technical conditions: significant cost-savings for cabling, commissioning, and engineering, as well as reduced operating costs thanks to increased plant efficiency and lower maintenance expenditures.

■ Maintenance-friendly thanks to access to valuable diagnostic information for enabling predictive maintenance strategies. Maintenance expenses for cables and connections as well as manual checking of equipment status are a thing of the past.

■ High plant availability and production quality through optimized wireless installation, reduced black measurement points, higher transparency throughout the plant.

With our WirelessHART solutions, users profit not only from lower total cost of ownership but also from significantly improved security, reliability, and productivity.

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# SITRANS TF280

**The SITRANS TF280 is a WirelessHART temperature transmitter that provides all measured process values as well as diagnostic information, parameters, and functions via radio. The device is powered by an internal battery and is designed ultralow power consumption. Its compact and rugged design makes it especially suitable for direct mounting on tanks and pipes in remote areas of plants, and on moving or rotating equipment for process monitoring and asset management applications.**



## Features:

- LCD display with functional display items and icons, English or German display
- Practical push buttons: three push buttons for maximum efficiency for setup, diagnostics, communication, and security settings with no additional devices or tools
- Maintenance-friendly backlight function
- Sleep mode for efficient battery life management
- Battery status display on LCD and in network overview
- Precise measurement accuracy for higher productivity
- Adjustable 90 and 180 degree display
- Configurable with standard tools that support EDD – for example, SIMATIC PDM
- Extension cable for separate installation of the sensor
- Physical HART maintenance port for commissioning

| Technical data: | |
| --- | --- |
| **Input** | |
| Sensor type | Pt100 (IEC 60751) |
| Characteristic | Temperature-linear |
| Connection type | 2-, 3-, or 4-wire circuit |
| Accuracy incl. hysteresis and repeatability | Typical ± 0.25 °C, max ± 0.5 °C |
| Ambient temperature effect | ± 0.1 °C/10 K |
| Sensor current | 100 mA |
| Measurement range | −200 °C ... +850 °C/ −328 °F ... +1,562 °F |
| Measurement unit | °C or °F |
| | |
| **Output** | WirelessHART radio in 2.4 GHz |
| | |
| **Power supply** | |
| Power source | Lithium thionyl battery D-cell 3.6 V |
| Supply voltage | 3.6 VDC |
| Maximum current (IMAX) | 100 mA |
| Battery life | Five years with one update per minute |
| | |
| **Approvals** | Please ask your regional Siemens representative for details. |

# SITRANS P280

The SITRANS P280 is a WirelessHART pressure transmitter that provides all measured process values as well as diagnostic information, parameters, and functions via radio. The device is powered by an internal battery and is designed for ultralow power consumption. The compact and rugged design makes it especially suitable for direct mounting on tanks and pipes in remote areas of plants, and on moving or rotating equipment for process monitoring and asset management applications.

## Features:

- Various pressure ranges available (1.6, 10, 50, 200, 320 bar)

- LCD display with functional display items and icons, English or German display

- Practical push buttons: three push buttons for maximum efficiency for setup, diagnostics, communication, and security settings with no additional devices or tools

- Maintenance-friendly backlight function

- Sleep mode for efficient battery life management

- Battery status display on LCD and in network overview

- Precise measurement accuracy for more productivity

- Adjustable 90 and 180 degree display

- Configurable with standard tools supporting EDD – for example, with SIMATIC PDM

- Physical HART maintenance port for commissioning

## Technical data:

| Input | |
|---|---|
| Sensor type | Ceramic |
| Characteristic | Linear |
| Connection type | G 1/2" or 1/2"-14NPT |
| Accuracy incl. hysteresis and repeatability | Max ± 0.25 % of sensor's span |
| Ambient temperature effect | ± 0.2 %/10 K of sensor's span |
| Sensor current | N/A |
| Measurement range | 0...1.6, 0...10, 0...50, 0...200, 0...320 bar |
| Measurement unit | mbar, bar, $m4H_2O$, $i4H_2O$, ATM, TORR, $Gcm^2$, $KGcm^2$, MPa, KPa, Pa, Psi, mmHG, $mmH_2O$, $FTH_2O$, inHG, $inH_2O$ |
| | |
| **Output** | WirelessHART radio at 2.4 GHz |
| | |
| **Power supply** | |
| Power source | Lithium thionyl battery D-cell 3.6 V |
| Supply voltage | 3.6 VDC |
| Maximum current (IMAX) | 100 mA |
| Battery life | Five years with one update per minute |
| | |
| **Approvals** | Please ask your regional Siemens representative for details. |

# SITRANS AW200

The SITRANS AW200 is a WirelessHART adapter that allows standard wired HART/4...20 mA devices to be connected to a WirelessHART network. By installing the SITRANS AW200 on an existing analog-wired HART device, users can utilize all diagnostic information at the maintenance station without any risk of impairing operation. In the case of a new installation, a variety of proven HART transmitters can be used in combination with SITRANS AW200 for efficient measurement implementation.

**Features:**

- HART/4...20 mA signal transmission via wireless
- Connection of up to four devices in multidrop mode
- Scan rate down to one second
- Configurable with standard tools that support EDD – for example, SIMATIC PDM, HART handheld communicator
- Supports burst mode and event notification for adapter and subdevices
- Power-up single connected device with battery, or devices can be powered externally
- Antenna position adjustable in vertical position
- Direct mounting on the field device or separate mounting with mounting kit

**Technical data:**

| Input | |
|---|---|
| One-device input channel | Single point-to-point with HART device or 4...20 mA device |
| | Up to four externally powered HART devices can be operated in multidrop mode |
| Communication type | HART communication in multidrop mode (compatible with HART V7.0 or previous version), 4...20 mA current signal in point-to-point connection |

| Output | WirelessHART radio in 2.4 GHz |
|---|---|

| Power supply | |
|---|---|
| Power source | Special long-life lithium thionyl chloride battery pack |
| Supply voltage | 5 VDC to 7.2 VDC |
| Battery life | Five to seven years with one update per hour, depending on the configuration |

| Approvals | Please ask your regional Siemens representative for details. |
|---|---|

# SITRANS AW210

The SITRANS AW210 is a WirelessHART adapter that allows up to eight standard wired HART devices or one 4 ... 20 mA to be connected to a WirelessHART network. The SITRANS AW210 can be used in hazardous areas. The integrated power management enables efficient usage of external batteries or energy harvesting components like solar panels. By installing the SITRANS AW210 on an existing analog-wired HART device, users can utilize all diagnostic information at the maintenance station without the risk of impaired operation. In this case, the adapter is powered by the loop.

**Features:**

- HART/4...20 mA signal transmission via wireless
- Connection of up to eight devices in multidrop mode
- Scan rate down to one second
- Configurable with standard tools to support EDD – for example, SIMATIC PDM, HART handheld communicator
- Supports burst mode and event notification for adapter and subdevices
- Can be powered by external power supply with no battery needed, and from 4 – 20 mA loop using StepVolt™
- In Direct Power mode, can switch field device on/off to take periodic readings and to save power
- Direct mounting on the field device or separate mounting using a connection box
- Temperature range: –40 °C to +85 °C
- Relative humidity range up to 100%
- Enclosure rating IP68, NEMA 6P
- Approved as intrinsically safe and explosion-proof
- Rugged housing

**Technical data:**

| Input | |
|---|---|
| General | One point-to-point device with 4...20 mA |
| | Up to eight externally powered HART devices in multidrop mode |
| Options | Basic: up to 2 devices<br>Extended: up to 8 devices |
| **Output** | WirelessHART radio in 2.4 GHz 10 dBm |
| **Power supply** | |
| Loop powered | 1.0 VDC – 2.5 VDC, user settable in 0.5 VDC steps |
| Direct powered | +7 VDC to +32 VDC, reverse voltage protection |
| **Approvals** | |
| Radio approvals | FCC Part 15<br>Industry Canada: RS 210<br>R&TTE Directive 1995/5/EC |
| Hazardous area approvals | For use in hazardous areas. ATEX, IEC, and FM-US/CAN. |
| Further approvals | Please ask your regional Siemens representative for details. |

# IE/WSN-PA LINK

**The IE/WSN-PA LINK is a WirelessHART gateway for connecting a WirelessHART network to a plant host application. With the integrated network manager, it is easy to configure WirelessHART networks and optimize network performance. The integrated security manager takes care of network and data security.**

**Features:**

- Integrated Web interface allows simple configuration of LINK and network as well as monitoring
- State-of-the-art security for wireless network and data communication
- Higher availability for WirelessHART applications thanks to redundancy to the WirelessHART network and to connected hosts
- Integrated or remote antenna
- Open standardized user interface through use of the HART OPC server from HART Communication Foundation
- Connection of up to 100 WirelessHART devices
- Simple connection to SIMATIC PCS 7, SIMATIC S7, and host systems of third-party providers
- Installation possible in explosion hazard zone 2
- Housing of protection type IP65

**Interfaces:**

- 2x Ethernet, 10base-T/100base-TX Ethernet communication
- RS 485

**Configuration:**

Configuration of network and monitoring is performed using Web browser generated by IE/WSN-PA LINK.
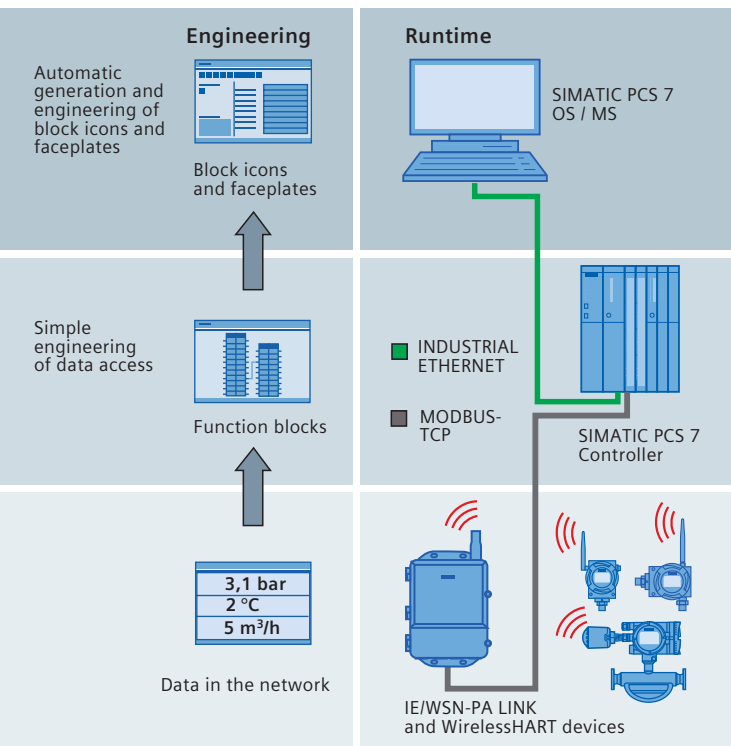
**Power supply:**

24 VDC, 500 mA

# SITRANS MDS

**The SITRANS MDS (maintenance and diagnostic station) is a Windows-based application for retrieving and managing maintenance information from field devices.**

**Features:**

- Use of SIMATIC PDM retrieves maintenance information from field devices
- Device list is shown in tree form, with properties and maintenance information in a column on the right-hand side
- Selectable update interval for all devices
- Visualization of the maintenance status with SIMATIC-specific icons or NAMUR (NE 107) icons
- Archiving of recent events for each device
- User-editable report

## Engineering

**Automatic generation and engineering of block icons and faceplates**

Block icons and faceplates

**Simple engineering of data access**

Function blocks

| 3,1 bar |
| 2 °C |
| 5 m³/h |

Data in the network

## Runtime

SIMATIC PCS 7 OS / MS

INDUSTRIAL ETHERNET

MODBUS-TCP

SIMATIC PCS 7 Controller

IE/WSN-PA LINK and WirelessHART devices

# PCS 7 function block library

**The library provides easy integration of WirelessHART into SIMATIC PCS 7. Using this library the engineering and commissioning time will be reduced significantly. Solutions based on the tested and released function blocks, block icons and faceplates show a high quality and especially in the engineering phase a reduction in costs.**

## Features:

### Block icons and faceplates to build up HMI

- Block icons are added automatically in process pictures
- Faceplates will be generated automatically
- Process data in block icons and faceplates are connected automatically
- Block icons and faceplates are linked

### Function blocks to build up control strategy

- Allows easy access to process values and status
- Supports integration of additional network data and diagnostic information
- Setup MODBUS-TCP communication implicitly

### Data in the network at field level

- Process values and status
- Network data
- Diagnostic information

## Features:

- Software to set up communication between SIMATIC systems and IE/WSN-PA LINK based on MODBUS-TCP
- Easy to use: no detailed MODBUS expertise is needed
- Wizard reduces time and costs in the engineering phase
- Support of many target systems (for example, S7-400, S7-300, IM151-8 PN/DP CPU)
- Support of CPU integrated PROFINET ports
- Support of CP443-1 and CP343-1 (communication processors for S7-400 and S7-300)

# Open MODBUS-TCP Library for SIMATIC systems

**Library to set up communication between SIMATIC PLCs and IE/WSN-PA LINK based on MODBUS-TCP.**

# Applications

**The use of WirelessHART products in process**

**industry applications can be classified as follows:**

### Application type 1:
### Wireless makes stranded information airborne

In many plants, HART devices are analog-wired in a distributed control system (DCS). This means that a great deal of valuable diagnostic information is not accessible in the field, and devices must be maintained manually at regular intervals. This leads in turn to high maintenance costs and the risk of unscheduled downtimes. Installation of a WirelessHART adapter on existing 4 – 20 mA HART instruments means that equipment information is accessible from maintenance stations without changing the system that is running. Access to valuable diagnostic and device information offers a wide range of advantages, including higher process performance and reliability and improved maintenance approaches.

### Application type 2:
### Wireless instead of wired communication

WirelessHART solutions are considerably more cost-efficient and flexible than conventional concepts for improving production quality, plant safety, and process transparency through the addition of new measuring points. WirelessHART significantly reduces costly and time-consuming cable installations and allows much faster commissioning of field instrumentation and loop tests.

WirelessHART works perfectly with either moving or rotating measurement points. Using WirelessHART for monitoring levels in tanks, including tank farms, results in short commissioning times and significantly reduced costs. Digital communication means that process variables are available in control systems with no loss of accuracy. Up to eight process variables can be sent at once. The balanced and intelligent use of both wired and wireless communication in automation solutions results in the highest possible performance across the entire life cycle of your plant.
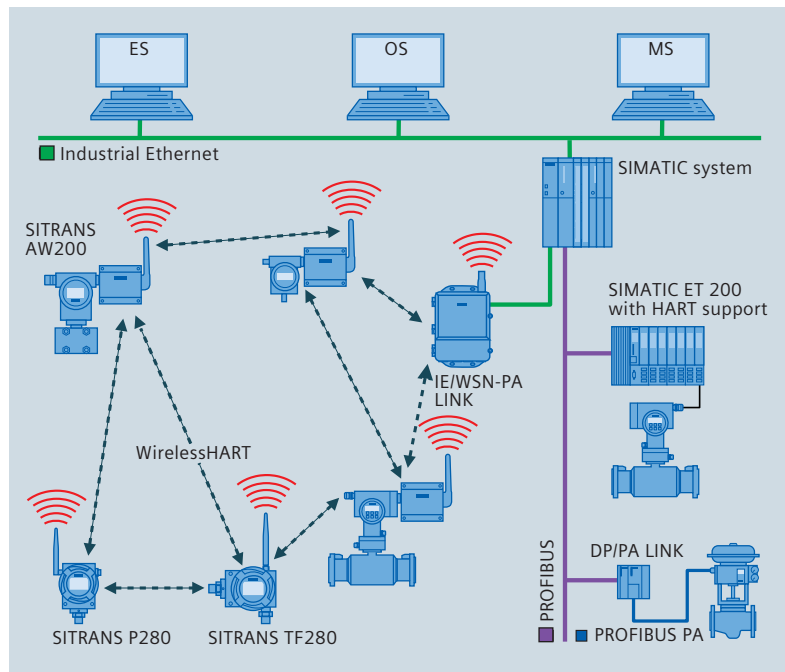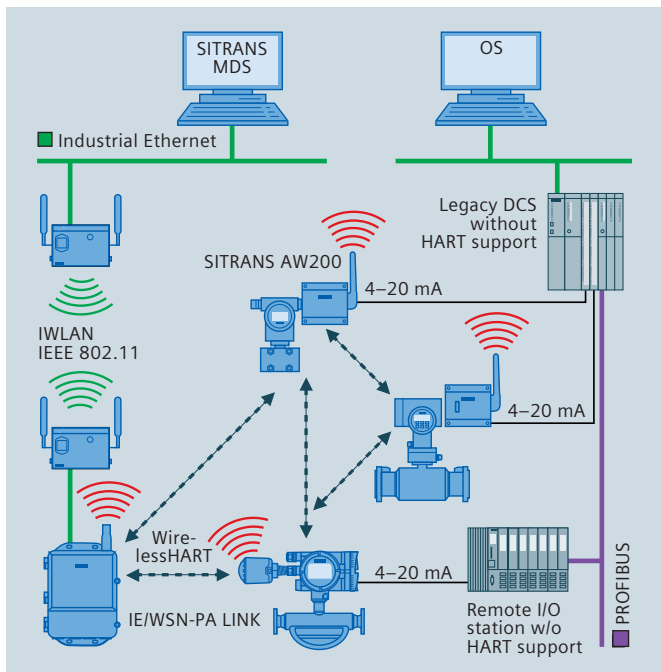
# Examples of use

**WirelessHART opens the door to enhanced performance in your plant. This is not only true for new plants but also for existing plants that will still operate for many years. The advantage for operators lies in a significant increase in plant transparency, productivity, and performance.**

The list below shows a number of typical, industry-neutral applications for WirelessHART devices.

**Process monitoring and control**
- Supervisory and noncritical process control
- Process efficiency calculations
- Monitoring tank levels
- Plant expansion and instrument replacement

**Asset management**
- Maintenance
  - Calibration
  - Recording of valve signatures
  - Radar echo
- Diagnostics
  - Valve position feedback
  - Device health status

**Health, safety, and environmental monitoring**
- Area gas detectors
- Water effluent
- Gas emissions
- Relief valves
- Steam traps
- Oil pressure
- Safety showers

**Temporary measurement**
- Test measurement
- Ad hoc measurement
- Redundant measurement

**Get more information:**

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