Overview

WirelessHART is the first international industry standard for wireless communication at field level in the area of process automation. Hence this is the first time users are provided with a standard for wireless communication at field level which ensures the interoperability of instruments and components from different manufacturers.

Benefits

WirelessHART enables access to the following:

- Measuring and control values
- Parameters

of field devices with HART interface. These usually include pressure, temperature, level or flow transmitters or actuators.

WirelessHART allows for the following:

- wireless transmission of measured values and their status
- wireless parameterization and diagnosis of field devices

The WirelessHART adapter can be used to enable field devices with HART interfaces (that are designed for wired communication) for wireless communication. This allows users to continue using their proven devices while benefiting from and participate in addition in advantages offered by wireless communication.

Application

Looking at the large number of possible applications and configurations, we generally differentiate between two application types.

Background for the first type is the fact that according to estimates forwarded by the HART Communication Foundation (HCF), approximately 85% of the over 30 million HART devices in operation are used in an environment where only the 4...20 mA interface rather than the HART interface of the device is used on a system level. Generally, data on the device can only be read on site. This is of particular disadvantage with devices that contain self-diagnostic functions - that's what we call "stranded diagnosis".

In these cases, a WirelessHART adapter can offer assistance. Connected to the 4...20 mA loop, it allows central access to the device based on wireless communication. It does not affect process control systems which continue to receive the measured value using the 4...20 mA loop.

Central access is enabled through a diagnostic station with SIMATIC PDM and SITRANS MDS software.

Main advantages:

- Increases the availability of the plant
- Increases plant transparency
- Reduces costs due to employing a predictive rather than preventative maintenance concept
- Reduces travel time in larger systems based on central access to field instrumentation

In the second application the 4...20 mA loop is omitted, all data including measured process values and diagnostic information are transmitted wirelessly to a process control system, for example.

Main advantages are:

- No planning and installation of data cables, resulting in significant cost reductions
- Higher system transparency due to additional and hitherto unfeasible installation of measuring points
- Process optimization due to flexible, temporary and cost-effective measuring points via wireless communication
- Utilization of proven devices by using adapters
- The WirelessHART meshed network also makes it possible to bridge longer distances

Design

This section introduces the application types described in the previous section in greater detail.

The figure below shows a typical situation for the first application type.

The adapter is connected to the 4...20 mA loop, which is used to transmit the measured value to the control system, or transmit the setpoint to an actuator. The existing control system is not affected by the WirelessHART adapter.

The data, in particular diagnostic data from the devices is transmitted to the IE/WSN-PA via the connected adapter and the WirelessHART network. The link provides this data to a diagnostic and maintenance station with installed SITRANS MDS software and SIMATIC PDM via an industrial Ethernet. Industrial wireless LAN can be used to save on the installation costs required for Ethernet wiring. An extensive product portfolio of Scalance W components is available for this purpose.

The functionality of related to the SITRANS MDS is described in great detail on page 9/14 of this catalog.
WirelessHART is integrated into SIMATIC systems parallel to the wire-connected devices with HART or PROFIBUS interfaces. In this case, the 4 ... 20 mA line to the control system is not required: all data, i.e., process values, parameters, diagnostic information, and functions, is supplied to the automation system on a wireless basis. This is mainly useful for replacement and expansion measures related to existing systems, and of course also new systems, but also for temporary and mobile measurements.

The field devices are standard instruments with connected adapters, or those with integrated wireless communication.

In principle, a differentiation needs to be made between wireless communication and the power supply for the devices. When installing a field device, the planning and installation of the data cable to the control system is usually considered a significant cost driver. This factor is greatly reduced when using wireless communication. When using 4 ... 20 mA/HART field devices with adapters, the question of powering up always arises - in contrast to battery-powered field devices with integrated wireless modules.

It is important to distinguish between two and four-wire devices here. Under certain circumstances, the SITRANS AW200 adapter can take over the supply of a connected two-wire device. The power consumption of the field device plays an important role here. If it is too high, an additional power supply becomes necessary. If more than one device is connected to the SITRANS AW200 adapter, an additional power supply is always required. Four-wire devices always require an additional power supply.

The figure below shows a typical situation for the second application type.

### Function

The properties of WirelessHART can be summarized as follows:

- **Simplicity in handling and engineering**
- **Secure communication**
- **Availability in network**

#### Simplicity in handling and engineering

- Utilize current tools, same workflow
  - The description of devices and adapter is carried out using proven EDDL technology. SIMATIC PDM continues to be used as a tool.
- Multiple power supply options
  - Devices can be operated externally with 24 V DC, external or integrated battery packs as well as solar cells. The option of using energy from the process or the environment has been researched at universities and industry for some time. It is expected that results and products will be available in the medium term.
- Reduced installation costs
  - Depending on use, installation costs for data cables or power supply cables are not required.
- Coexists with other wireless networks
  - WirelessHART only uses the ISM band in the 2.4 GHz area, since it is available across the globe. However, it is also used by Industrial Wireless LAN (IWLAN), for example. For this reason, a requirement to allow WirelessHART to co-exist with Wireless LAN networks was an absolute requirement when this technology was defined. This coexistence has been achieved by constantly changing the channels and hence frequencies. This is also called "channel hopping". Moreover, individual channels can be completely disabled through so-called "blacklisting", for example if they are locally used by IWLAN.
- Support of star-shaped and meshed network topologies
  - Networks can be built in both a star-shaped as well as meshed structure. The advantage of star-shaped networks with a gateway as the centre is that it allows for fast update cycles. However, the range of the network is limited to a maximum of approx. 200 m without obstacles between the gateway and the devices.
- Faster commissioning
  - Once the device is installed, it can usually be commissioned right away, since the usual waiting time for completing the installation of the cables does not apply in this case.
- Self-organizing and self-healing networks
  - WirelessHART networks are automatically organized, built, and administered by the Network Manager. Engineering is usually not required. The Network Manager is implemented in the IE/WSN-PA, the WirelessHART gateway from Siemens. It calculates the optimal connection routes between the network participants and defines an alternative path that can be used in the case of disruptions in advance. In that sense, the network can be considered self-healing. In addition, the Network manager also defines the channels or frequencies to be used for all communication. Statistics regarding communication are compiled automatically and are available to users.
- Security - always active
  - All designated mechanisms with regard to security are available automatically, and do not require any engineering.
- Make changes in the network without the need for configuration
  - The Network Manager automatically adds and withdraws participants to/from the network.

#### Security

- Blacklisting
- Encryption
- Authentication
- Access control
- Non-repudiation
- Secure key exchange
- Secure communication
- Secure password exchange
- Secure network discovery

### Communication and software

- **Function**
- **Arguments**
- **Properties**
- **Protocols**
- **Standards**
- **Installation**
- **Configuration**
- **diagram**

---

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Secure communication
- Encryption - All information is automatically encrypted with 128 bit AES prior to transmission
- Specific keys for each data packet
- Data integrity - Each data packet is checked for changes or damage during transport.
- Device authentication
  Each device must know the network identification number as well as the join key. Otherwise the Network Manager does not include it in the network.
- Channel Hopping
  The channel which is used will be changed according to the Network manager’s specifications after each telegram. This provides an added level of security against spying activities.
- Failed authentication report
  Each unsuccessful attempt by a participant to join the network will be recorded and made available to the user.

Availability in network
- Communication based on IEEE 802.15.4-2006
  Wireless communication takes place on the basis of a proven industry standard. It allows for very minimal power consumption.

Software Overview
Applications 1 and 2 will require the following software products.

<table>
<thead>
<tr>
<th>Component</th>
<th>Products</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance Diagnostic Station</td>
<td>SITRANS MDS</td>
<td></td>
</tr>
<tr>
<td>Application type 1</td>
<td>SIMATIC PDM and Options</td>
<td>6ES7 658-3AX06-0YA5</td>
</tr>
<tr>
<td></td>
<td>SIMATIC PDM Basic (4 Tags)</td>
<td>6ES7 658-3XA06-2YB5</td>
</tr>
<tr>
<td></td>
<td>Extend Basic to 128 Tags</td>
<td>6ES7 658-3XB06-2YB5</td>
</tr>
<tr>
<td></td>
<td>Extend Basic to up to 512 Tags</td>
<td>6ES7 658-3XC06-2YB5</td>
</tr>
<tr>
<td></td>
<td>Extend Basic to up to 1,024 Tags</td>
<td>6ES7 658-3XD06-2YB5</td>
</tr>
<tr>
<td></td>
<td>Extend Basic to up to 2,048 Tags</td>
<td>6ES7 658-3XE06-0YB5</td>
</tr>
<tr>
<td></td>
<td>SIMATIC PDM service (128 Tags)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SIMATIC PDM Option HART Mux</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HART OPC Server V3.0</td>
<td>Included in SIMATIC PDM (^1)</td>
</tr>
<tr>
<td>WirelessHART gateway</td>
<td>IE/WSN-PA LINK with integrated non-removable antenna</td>
<td>6GK1 411-6CA40-0AA0</td>
</tr>
<tr>
<td>WirelessHART adapter</td>
<td>SITRANS AW200(^2)</td>
<td>7MP3112-1AA00-0AA0</td>
</tr>
<tr>
<td>Application type 2</td>
<td>SIMATIC PCS 7</td>
<td></td>
</tr>
<tr>
<td>Process control system</td>
<td>SIMATIC S7/SIMATIC PCS 7 function blocks for communicating with WirelessHART devices using the IE/WSN-PA LINK</td>
<td>9AE4110-3AA00</td>
</tr>
<tr>
<td>WirelessHART gateway</td>
<td>IE/WSN-PA LINK with integrated non-removable antenna(^2)</td>
<td>6GK1 411-6CA40-0AA0</td>
</tr>
<tr>
<td>Field devices</td>
<td>SITRANS AW200(^2)</td>
<td>7MP3112-1AA00-0AA0</td>
</tr>
<tr>
<td></td>
<td>SITRANS P280(^2)</td>
<td>7MP1120-...</td>
</tr>
<tr>
<td></td>
<td>SITRANS TF280(^2)</td>
<td>MP1110-...</td>
</tr>
</tbody>
</table>

\(^1\) You can also contact your Siemens contact person.
\(^2\) Other versions and accessories can be found in the product descriptions of this catalog.

More detailed information on the required WirelessHART software and hardware components can be found in the FI 01 catalog or at [www.siemens.com/wirelesshart](http://www.siemens.com/wirelesshart).
Overview

The SITRANS AW200 WirelessHART adapter is a battery-powered communication component, which integrates HART and 4 ... 20 mA field devices into a WirelessHART network. On the wireless communication side, the adapter supports the WirelessHART standard. HART and 4 ... 20 mA field devices are connected on the field device side.

The SITRANS AW200 WirelessHART adapter
- supports the WirelessHART standard (HART V 7.1)
- features a very high degree of security for wireless data transmission
- integrates one 4 ... 20 mA field device or up to four HART field devices (in multidrop mode) into a WirelessHART network
- features intelligent energy management for the power supply of connected field devices
- can be easily parameterized using SIMATIC PDM

Benefits

- High quality and service life
- Save on wiring costs for difficult installation conditions (e.g. moveable equipment parts) or for temporary installations
- Subsequent integration of an installed field device with HART interface into maintenance and diagnostic systems if the control system does not feature the required communication mechanisms. This application is described in Section 9 of this catalogue under “WirelessHART - Technical Description”.
- Proven HART devices can continue to be used for wireless communication, without any limitations.
- Field devices with a 4 ... 20 mA interface (without HART) can also be connected.
- Intelligent energy management to achieve the best possible life time for the installed battery unit.
- Optimum addition to wired communication and expansion of solution options for system solutions in process automation.
- Burst mode and event notification parameterization for the adapter and connected field devices.

Application

The WirelessHART adapter can be used in a number of different applications, e.g.
- Access to installed basis
  Diagnostic information is obtained from existing wired HART devices through a permanent electrical connection of a WirelessHART adapter, and is sent to an asset management software near the system, e.g. SITRANS MDS

Design

The SITRANS AW200 WirelessHART adapter consists of
- a housing with mounted antenna
- electronics
- a high-performance lithium battery unit

SITRANS AW200 WirelessHART adapter, assembly
The housing can be opened by loosening 4 screws. This allows to access the electronics and battery unit. The battery unit can be removed without the use of tools, since it is connected to the housing with clips.

The back of the housing features a connection part with a fixing nut onto which different replaceable connecting pieces can be screwed to mount the adapter directly on a field device.

The bottom of the housing contains an optional cable opening which can be used for a cable gland. In the case of an offset mounted adapter, it is possible to feed up to 2 cables.
**Communication and software**

**WirelessHART products**

**SITRANS AW200 - WirelessHART adapter**

### Function

**SITRANS AW200 WirelessHART adapter functional diagram**

Measured values and diagnostic information of connected field devices with HART communication are transmitted via a wired connection to the WirelessHART adapter. The adapter transmits this information in the form of wireless signals to the IE/WSN-PA LINK, the Siemens WirelessHART gateway. From here, the information is available to the network of the system.

Where a field device with a 4 ... 20 mA output signal is connected to the adapter, only the measured value will be transmitted.

Following parameterization and integration into a WirelessHART network, each WirelessHART adapter is able to recognize its neighbors. It notes the strength of the wireless signal, synchronizes itself, receives network information and then establishes connections to the neighbors in the wireless network. A WirelessHART network organizes itself. Manual settings for organizational purposes are not required.

Two- and four-wire field devices can be connected to a WirelessHART adapter. In the case of a connected two-wire field device, power can be supplied by the adapter. Where multiple two-wire field devices are connected (multi drop operation), the adapter must be connected to an external power supply.

The WirelessHART adapter may also be connected in parallel to an already existing installation which consists of a power supply and a HART field device.

<table>
<thead>
<tr>
<th>Interface</th>
<th>Connection</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Power supply for the field device</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>HART/4 ... 20 mA</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>External supply/Dimensions</td>
</tr>
<tr>
<td>4, 7</td>
<td></td>
<td>High-resistance HART connection</td>
</tr>
<tr>
<td>5, 8</td>
<td></td>
<td>Mass, high-resistance connection</td>
</tr>
</tbody>
</table>

**Terminal block with 6 screw connection clamps**

### Parameterization

The SITRANS AW200 configured via HART. This can be done using a handheld communicator or even more conveniently with a HART modem and the SIMATIC PDM parameterization software.

Initial start-up of the adapter is usually carried out via SIMATIC PDM and HART modem or a handheld communicator. During initial start-up, the network ID and join key is set up in the adapter, among others. Using these parameters, the adapter is then integrated into an existing WirelessHART network.

Once it is integrated into the network, the adapter and connected HART devices can be conveniently operated via the WirelessHART network or with the onsite HART modem.

### Siemens HART field devices for the adapter

HART and 4 ... 20mA field devices can be connected to the SITRANS AW200 WirelessHART adapter. Depending on the electrical data of the field devices, they can receive their power supply from the WirelessHART adapter or will require an external power supply. The table below illustrates the different options for Siemens HART field devices.

<table>
<thead>
<tr>
<th>Field device</th>
<th>Power supply from WirelessHART adapter</th>
<th>External power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS P DSIII</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS P300</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS TF</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS TH300</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS F M MAG 5000/6000</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS F M MAG 5100 W</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS F M TRANSMAG 2</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS F C MASS 6000</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS F M MAG 1100</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS F M MAG 3100 HT</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS fus060</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS LR 250</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS LR 460</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS Probe LU</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS Probe LR</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS LR200</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS LR300</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS LR400</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SITRANS FX300</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>LG200</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SIPART PS2</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**

Siemens will only approve the Siemens HART field devices listed in the table for the adapter, and will only supply technical support for these devices.

Based on HART specifications, it is generally possible to connect devices that are not listed, however with the following limitations:

- All warranties and liabilities will be excluded
- No technical support
## Technical specifications

### SITRANS AW200 WirelessHART adapter

<table>
<thead>
<tr>
<th>Input</th>
<th>Point-to-Point connection to a HART field device or up to four HART field devices with external power supply which are integrated using the multidrop method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>HART communication using multidrop method, 4 ... 20 mA power signal with Point-to-Point connection</td>
</tr>
<tr>
<td>Protocol</td>
<td>HART V7 (compatible with previous HART versions)</td>
</tr>
<tr>
<td>Transfer rate</td>
<td>1200 bits/s using HART multidrop method</td>
</tr>
</tbody>
</table>

### Output

| Communication | WirelessHART V7 |
| Transfer rate | Nominal 250 kBits/s |
| Transmission frequency band | 2.4 GHz (ISM band) |
| Range (under reference conditions) | Outside areas up to 250 m, within buildings up to 50 m |
| RF signal strength | Can be configured: 0 dBm and 10 dBm |
| Output signals | Measured voltage and up to three other variables may be selected from the following: adapter temperature, battery voltage, energy consumed, expected battery life time |
| # | Scaled or linearized process values |
| • WirelessHART adapter | Up to four process variables, can be configured via PDM or gateway |
| • 4 ... 20 mA field device | |
| • HART field device | |

### Measuring accuracy (as per reference conditions IEC 61298-2)

- Max. measuring error (4 ... 20 mA circuit): 0.125 % re: measuring range
- Effect of ambient temperature (4 ... 20 mA circuit): 5 µA/°K

### Rated conditions

- Location: Outside/Inside
- Ambient conditions:
  - Ambient temperature: -40 ... +80 °C (-40 ... +176 °F)
  - Storage temperature: -40 ... +85 °C (-40 ... +185 °F) without batteries, < 21 °C with batteries
  - Relative humidity: Max 90 % at 25 °C (non-condensing)
  - Resistance to vibration: 20 ≤ f ≤ 2000 Hz: 0.01 g²/Hz as per IEC 68-2-64
  - Shock resistance: 15 g, 11 ms as per IEC 68-2-27
  - Electromagnetic compatibility: As per EN 61326, EN 501 489-1/17 and NAMUR NE 21

### Design

- Weight: 0.5 kg without battery, 0.75 kg with battery
- Enclosure:
  - Material: Polyester (PBT FR)
  - Cable entry: 2x M20x1.5
- Degree of protection: IP65, IP66; NEMA 4
- Antenna: Omnidirectional dipolar aerial, vertical rotation
- Mounting adapter: M20x1.5 on M20x1.5, M20x1.5 on G½, M20x1.5 on ½ - 14 NPT, M20x1.5 on ¾ - 14 NPT

### Power supply

- Battery: Lithium thionylchlorid high-performance battery unit
- Supply voltage: 5 V DC ... 7.2 V DC
- Capacity: 19 AH at 20 °C
- Service life: up to 5 years, depending on update rate, connected field device and ambient conditions
- Voltage supply for one field device (independent of multidrop):
  - No-load voltage: 8 ... 23 V DC
  - Current: 4 ... 20 mA DC (as per NAMUR recommendation NE 43)
  - Fault current: I ≤ 3.6 mA or I ≥ 21 mA
  - Protection: Short-circuit proof, activated at voltages > 25 mA
- External voltage supply for one or more field devices (multidrop):
  - Voltage: < 30 V DC
  - Current: < 25 mA

### Certificates and approvals

- Wireless communication approvals:
  - ETSI (R&TTE)
  - FCC Part 15.247 for wireless applications in the 2.4 GHz transmission frequency band
- EN 300 328
## SITRANS AW200 - WirelessHART adapter

<table>
<thead>
<tr>
<th>Selection and ordering data</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITRANS AW200; adapter for WirelessHART communication</td>
<td>7MP3112 - 0 - 0 AA 0</td>
</tr>
<tr>
<td>WirelessHART adapter AW200 with 4 ... 20 mA- or HART interface</td>
<td>1</td>
</tr>
<tr>
<td>Without battery</td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td></td>
</tr>
<tr>
<td>Battery powered</td>
<td>A</td>
</tr>
<tr>
<td>Certificates and approvals¹)</td>
<td></td>
</tr>
<tr>
<td>Without</td>
<td>A</td>
</tr>
<tr>
<td>Enclosure</td>
<td></td>
</tr>
<tr>
<td>Polyester</td>
<td>0</td>
</tr>
</tbody>
</table>

### Accessories

| Lithium battery for SITRANS AW200 | 7MP3990-0AA00 |
| Thread adapter for direct mounting of the adapter to a field device | |
| M20 thread adapter | 7MP3990-0BA00 |
| Thread adapter G½ | 7MP3990-0BB00 |
| Thread adapter ½ - 14 NPT | 7MP3990-0BC00 |
| Thread adapter ¾ - 14 NPT | 7MP3990-0BD00 |
| Mounting bracket for attaching to wall/pipe, material: stainless steel SS304, including cable gland | 7MP3990-0CA00 |

¹) Additional approvals in process.
Dimensional drawings

SITRANS AW200 WirelessHART adapter, dimensions in mm (inch)
SITRANS AW200 - WirelessHART adapter

SITRANS AW200 with built-in mounting bracket for wall or pipe mounting

**Schematics**

Connection of a two-wire field device, power supply provided by adapter

Connection of a four-wire field device

Connection of a two-wire field device with external power supply

Connection of adapter parallel to wired 4 ... 20 mA communication
Overview

The IE/WSN-PA LINK is a gateway for the connection of WirelessHART field devices (HART V7.1) to Industrial Ethernet, as an alternative or supplement to the wired connection.

- Connection of up to 100 WirelessHART devices
- Approved for operation in hazardous areas in Zone 2
- Open TCP/IP communication and Modbus TCP via the Ethernet interface
- Can be used with HART-OPC servers of the HART Communication Foundation

Note:
A general introduction to WirelessHART and information on the WirelessHART adapter and the WirelessHART field devices can be found in Catalog FI 01 or on the Internet at www.siemens.com/wirelesshart

Benefits

- Extended possible solutions for connecting field devices of the process industry by means of alternative or supplementary WirelessHART communication
- Reliable data transmission using intermeshed network technology; the self-organizing network with alternative paths enables radio obstacles to be bypassed
- Saving of cabling costs under difficult installation conditions, e.g. if the field devices are located on inaccessible plant components or are only required temporarily
- To improve process monitoring and for maintenance tasks, sensors can be retrofitted
- Existing transmitters can be integrated wirelessly into maintenance and diagnostics systems by means of WirelessHART adapters
- Without additional software, restricted monitoring is possible via web services and the integrated web server of the IE/WSN-PA LINK.

Application

The IE/WSN-PA LINK connects wireless HART field devices by radio to the Ethernet. On the radio side, the IE/WSN-PA LINK supports the WirelessHART standard and on the Ethernet side the TCP/IP and Modbus TCP communication.

The IE/WSN-PA LINK thus enables wireless diagnostics, maintenance and process monitoring.

Monitoring

WirelessHART is particularly suitable for use in plant sections that are to be included in monitoring, but which do not have any existing MSR cabling, e.g. external tank stores or other installations where high cabling costs are anticipated. Data for the visualization can be retrieved from the IE/WSN-PA LINK via Industrial Ethernet or Modbus TCP.

Retrofitting for diagnostics and maintenance

For this application, wireless adapters are looped into the 4-20 mA interface or screwed directly onto the HART device. The acyclic HART message frames are transmitted by radio between IE/WSN-PA LINK and a wireless adapter. Without affecting the operation of the plant, the wireless adapter modulates the acyclic HART message frames to the 4-20 mA interface or extracts them from the 4-20 mA interface.

The IE/WSN-PA LINK collects the data of all wireless adapters and transfers it via Industrial Ethernet to the diagnostics and maintenance station.

If greater distances between the IE/WSN-PA LINK and the monitoring station are to be spanned without cabling, this can be implemented by means of Industrial Wireless LAN with the access points and client modules of the SCALANCE W family.
Communication and software

**WirelessHART products**

**IE/WSN-PA LINK**

**Design**
- 2 x 10/100/1000 Mbit/s RJ45 ports, electrical (no integral switch; interfaces can be used, for example, for continuous connection to the plant network as well as the temporary connection of a PC)
- 1 x screw terminal for connection to Modbus RTU via RS485
- 1 x screw terminal for the 24 V DC connection
- Rugged metal enclosure with degree of protection IP65 for use outdoors, also in hazardous zone 2
- Mounting: wall or mast mounting (vertical); U-bolts for mast mounting are included in the scope of delivery.

**Product versions**
- With integral, non-detachable antenna
- With N connector for connection of external antennas

**Function**

**WirelessHART**
The IE/WSN-PA LINK establishes on the radio side an inter-meshed wireless sensor network for communication with wireless field devices (e.g. transmitters). The data from the wireless field devices is received by the IE/WSN-PA LINK and transmitted via Industrial Ethernet to the connected systems. The supported wireless network is an open wireless network specified by the HART Communication Foundation (HCF) in accordance with the WirelessHART (HART V7.1) standard.

On the field device side, the IE/WSN-PA LINK requires field devices that support WirelessHART (HART). Existing field devices can be integrated by means of wireless adapters into the WirelessHART communication. To this end, the adapters are looped into the 4-20 mA interface. The HART message frames are transmitted from the HART device to a maintenance or diagnostics station device without affecting the 4-20 mA interface.

In addition, as many as four standard HART field devices can be connected directly to the adapter. In this case, the 4-20 mA cabling is omitted completely.

The adapter wirelessly transmits all data and process values of the connected devices. The advantage of this solution is that tried and tested devices can continue to be used.

**Industrial Ethernet**
Via the Ethernet interface the IE/WSN-PA LINK supports the use of the HART OPC server and the Modbus TCP protocol.

**Configuration**
The configuration is web-based, without additional software, and performed from the PC. By means of the web user interface it is also possible to display the device states and measured values of the WirelessHART devices.

**Integration**

**Integration into automation systems**
The IE/WSN-PA LINK can be integrated into automation systems via Ethernet or Modbus TCP. For connection of the IE/WSN-PA LINK to SIMATIC S7-300/400 you can obtain function blocks and technical support from the following address:

Siemens AG
Industrial Technologies
IT4Industry Customer Support
Werner-von-Siemens-Strasse 60
91052 Erlangen
Germany
Phone: +49 91 31 7-461 11
Fax: +49 91 31 7-447 57
E-mail: it4.industry@siemens.com

**Integration in PCS 7**
For integration of the IE/WSN-PA LINK into PCS 7 you can obtain function blocks and technical support from the following address:

Siemens AG
ISIN E&C OC A KHE
Siemensallee 84
76187 Karlsruhe
Germany
Phone: +49 721 595-6380
E-mail: function.blocks.industry@siemens.com
Selection and ordering Data

<table>
<thead>
<tr>
<th>Network components for IWLAN</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network transition between WirelessHART and Industrial Ethernet; transmission frequency: 2.4 GHz</td>
<td>6GK1 411-6CA40-0AA0</td>
</tr>
<tr>
<td>• With integral, non-detachable antenna</td>
<td>6GK1 411-6CA40-0BA0</td>
</tr>
<tr>
<td>• N connector for connection of external antennas</td>
<td></td>
</tr>
</tbody>
</table>

Antennas

Antennas with omni-directional characteristics; country permits, compact instructions (hard copy), German/English

Wall or mast-mounting

- **ANT792-6MN antenna**
  Antenna gain including N-Connect connector 6 dBi, 2.4 GHz
  Order No.: 6GK5 792-6MN00-0AA6

Roof mounting

- **ANT795-6MN antenna**
  Antenna gain incl. N-Connect connector 6/8 dBi, 2.4/5 GHz
  Order No.: 6GK5 795-6MN00-0AA6

- **Antenna mounting tool (ANT795-6MN)**
  Mounting tool for installation of ANT795-6MN under a roof
  Order No.: 6GK5 795-6MN01-0AA6

**LP798-1N lightning protector**

Lightning protector with N/N female/female connector, IP65 (-40 ... +100 °C)

Order No.: 6GK5 798-2LP00-2AA6

Antenna cables

IWLAN N-Connect male/male flexible connection cable

Flexible connecting cable for connecting external antennas; assembled with two N-Connect male connectors

- 1 m
  Order No.: 6XV1 875-5AH10
- 2 m
  Order No.: 6XV1 875-5AH20
- 5 m
  Order No.: 6XV1 875-5AH50
- 10 m
  Order No.: 6XV1 875-5AN10

**HF coupling**

Order No.: 6GK5 798-0CP00-1AA00

**N-Connect coupler for connecting the LP798-1N lightning protector**

**IE FC M12 Plug PRO**

M12 plug-in connector (D-coded, IP65/IP67) that can be assembled in the field, metal enclosure, Fast-Connect connection method, for SCALANCE X208PRO and IM 154-4 PN

Order No.: 6GK1 901-0DB20-6AA0

**IE FC TP Standard Cable GP 2 x 2 (Type A)**

4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval;

Sold by the meter

Max. length 1,000 m; minimum order 20 m

Order No.: 6XV1 840-2AH10

**HARTING adapter cable**

M12 female NPT 1/2 thread to RJ45 11cm;
(minimum order quantity: 10);
The adapter is provided for easy connection of the link to the Industrial Ethernet;

Order No.: 21 03 683 6420

Not included in the scope of delivery of the IE/WSN-PA LINK; You can find ordering information in the Internet at: http://www.harting.de/kontakt/adressen

When using the Harting adapter cable for the Ethernet connection, the requirements for intrinsic safety approval are not applicable. When used in an application relevant to intrinsic safety guidelines, it requires acceptance by the appropriate approval agency.
Communication and software

WirelessHART products

Communication blocks

■ Overview

The WirelessHART communication blocks implement the communication between S7/PCS 7 automation systems and WirelessHART field devices. They communicate via the IE/WSN-PA LINK using the Modbus TCP/IP protocol. Preconfigured communication blocks simplify the engineering process. Symbols and face plates are included in the delivery for use with SIMATIC PCS 7 OS or SIMATIC WinCC.

■ Benefits

A library, which can be installed, offers pre-fabricated blocks and hence an easy way to integrate WirelessHART devices into the SIMATIC automation world.

Simple configuration thanks to:
• Prefabricated function blocks for IE/WSN-PA LINK and WirelessHART devices
• SIMATIC PCS 7 OS or SIMATIC WinCC symbols and face plates are included
• Configuring help for IE/WSN-PA LINK in line with function blocks
• Output of quality codes for respective process values
• Analysis of IE/WSN-PA LINK diagnostic information

■ Application

WirelessHART communication blocks are used where SIMATIC automation systems communicate with WirelessHART devices via the IE/WSN-PA LINK gateway.

■ Function

The function blocks cyclically communicate with the IE/WSN-PA LINK via Modbus TCP/IP. Process values of WirelessHART devices as well as their status are read and made available at the function block outputs. Furthermore, selected status information of the IE/WSN-PA LINK is also made available at another building block. This information includes connection status, condition of the wireless network and other diagnostics.

■ Configuration

The standard S7 or PCS 7 engineering tools CFC, KOP, FUP can be used for the communication block engineering. Connection planning is done in NetPro. A configuration example for configuring the IE/WSN-PA LINK makes it easy to assign the WirelessHART devices to the communication blocks which need to be engineered.

More information

You can obtain function blocks and technical support for integrating the IE/WSN-PA LINK in PCS 7 at the following address:

Siemens AG
Industry Sector
Industry Solutions Division
Industrial Technologies
Roland Heid
Siemensallee 84
76187 Karlsruhe
Germany
Tel: +49 721 595-6380
E-Mail: function.blocks.industry@siemens.com

Selection and ordering Data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>S7/PCS 7 function blocks for communicating with WirelessHART devices using the IE/WSN-PA LINK</th>
</tr>
</thead>
<tbody>
<tr>
<td>9AE4110-3AA00</td>
<td>S7-300 or S7-400, including face plate</td>
</tr>
</tbody>
</table>

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Communication and software

WirelessHART products

SITRANS MDS - Maintenance Diagnostic Station

Overview

SITRANS MDS for flexible and automated diagnostic processing:
- Central display of diagnostic information from HART devices, which was only readable on site until now.
- Adjustable updating period for each device
- Clear visualization of diagnostic status of all devices
- Simply transfer of SIMATIC PDM configuring data
- Windows-based application

Benefits

SITRANS MDS in cooperation with SIMATIC PDM increases significantly the transparency of a plant.
The main advantages of SIMATIC MDS are as follows:
- Increase transparency of the plant by reading diagnostic information from accessible devices and providing a well-organized representation of this information
- Representation of diagnostic status of a device as in SIMATIC PCS 7 or NAMUR NE 107 (switchable)
- Ease of use through use of SIMATIC PDM project data
- The update cycle for the diagnostic status can be uniformly set as the default value for all devices ...
- ... as well as for each device individually

Application

SITRANS MDS increases the transparency of a plant by centrally collecting diagnostic information, directly from the accessible field devices. In principle, all devices that are integrated in SIMATIC PDM can be included in the collecting process.
SITRANS MDS can be used where the installed automation system does not support an integrated acyclic communication of parameters and diagnostic information with the devices. In the case of HART devices, this applies to 85% of all installed devices.
The modern SIMATIC PCS 7 process control system allows for this type of continuous communication from the engineering system up to the devices. It also features a decidedly higher performance asset management system. The use of SIMATIC MDS therefore does not make sense in a SIMATIC PCS 7 environment and is hence not approved for that purpose.

Design

SITRANS MDS uses SIMATIC PDM project data to read and display diagnostic data from accessible devices.

Integration

SITRANS MDS is installed on a PC together with SIMATIC PDM. Only the stand-alone version is used in this case.

Configuration

Configuration required for SITRANS MDS is adopted from SIMATIC PDM. Only the project name must be entered.
Very few other entries are required, such as the definition of update periods.

Technical specifications

SITRANS MDS Maintenance Diagnostic Station

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Microsoft Windows XP professional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additionally required software</td>
<td></td>
</tr>
<tr>
<td>SIMATIC PDM as of V 6.05 and options</td>
<td></td>
</tr>
<tr>
<td>• SIMATIC PDM Basic (4 Tags)</td>
<td>6ES7 658-3AX06-0YA5</td>
</tr>
<tr>
<td>• SIMATIC PDM service (128 Tags)</td>
<td>6ES7 658-3JX06-0YA5</td>
</tr>
<tr>
<td>• SIMATIC PDM Option HART Mux</td>
<td>6ES7 658-3EX06-0YB5</td>
</tr>
<tr>
<td>Additional options to increase number of measuring points</td>
<td></td>
</tr>
<tr>
<td>PC hardware</td>
<td></td>
</tr>
<tr>
<td>600 MHz</td>
<td></td>
</tr>
<tr>
<td>256 MB *)</td>
<td></td>
</tr>
<tr>
<td>XGA 1024 x 768</td>
<td></td>
</tr>
<tr>
<td>16 Bit color depth</td>
<td></td>
</tr>
</tbody>
</table>

*) main memory of at least 512 MB is recommended
Up-to-date information can be found in the description for SIMATIC PDM

Selection and Ordering Data

SITRANS MDS is a software package which is delivered together with the IE/WSN-PA LINK for Version 1.0.