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Wireless Line



WirelessHART™

Wireless Networks

In the past few years the wireless network technology underwent great technological development, one that can provide: safety, reliability, stability, self-organizations (mesh), low consumption, power management systems and long life batteries.



In terms of benefits, among others the following can be mentioned:

- Reduction of costs and simplification of installations;
- Maintenance costs reductions due to the simplicity of installations;
- Monitoring in location of difficult access or exposed to risk situations;
- Scalability;
- Physical integrity of installations with less probability of mechanical and electrical damages like cable breaking, bus short circuits, chemical attacks, etc.

WirelessHART™ has grown as user choice, as a complementary technology standing side-by-side with other digital wireless field networks.

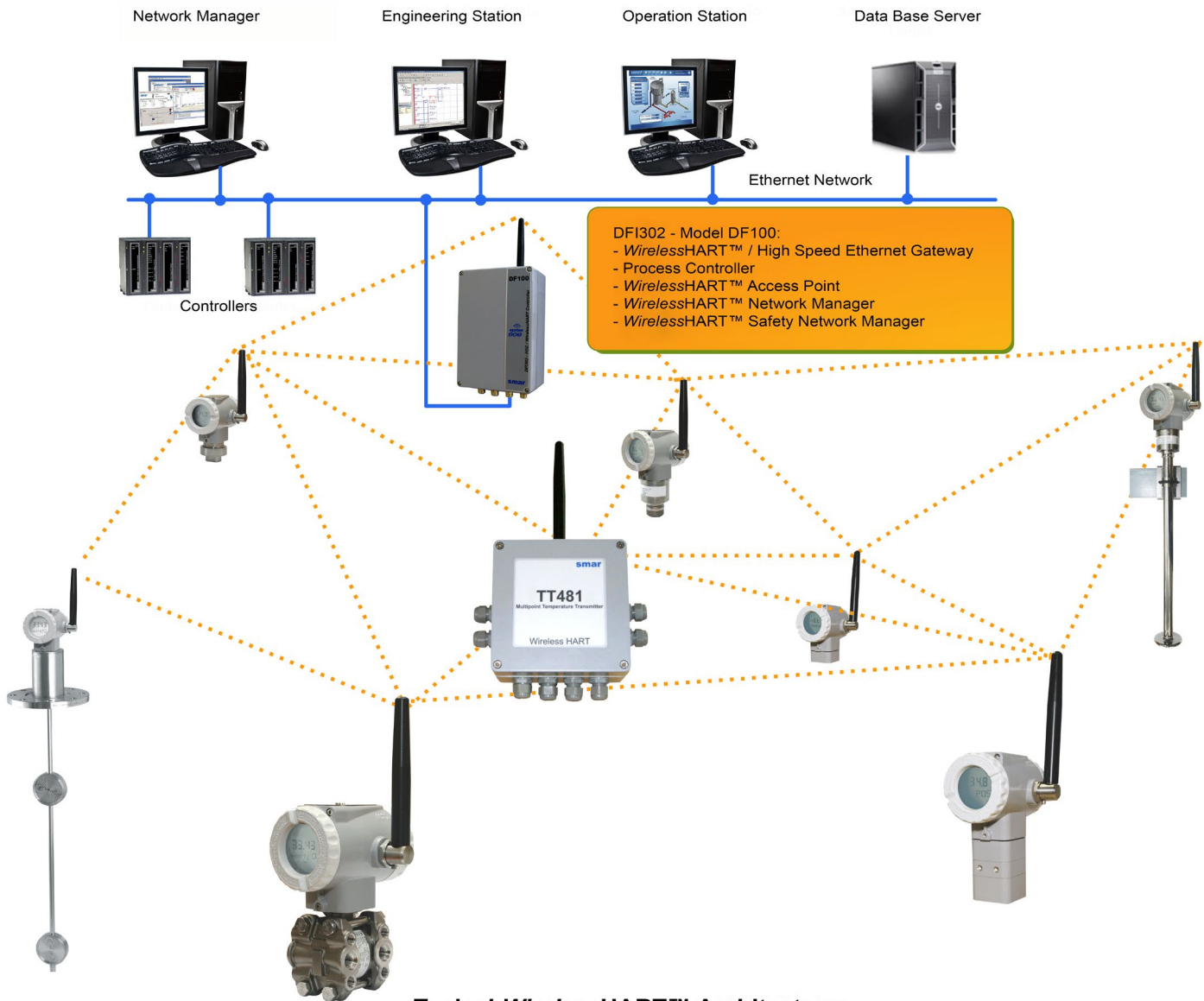
WirelessHART™ Technology

The internationally recognized HART® technology now offers a robust protocol designed for numerous applications, with the advantage of the wireless feature. Installation economy and efficient management of energy, quick access to information from the field, robust communication, information integrity and network security: this and many other advantages make up the *WirelessHART™* technology (learn more at www.hartcomm.org), which came to the universe of automation to innovate and revolutionize.

Based on a wireless mesh network communication protocol, the *WirelessHART™* protocol ensures compatibility between existing HART® devices, commands and tools. Basically, a network *WirelessHART™* is composed of elements as shown in the figure below.

The figure elements, on the network, constitute the mesh network. They are:

- **Host** - workstation that allows interaction with the process. Through the *WirelessHART™* Gateway, the host gathers data from instruments connected to the network in question. It uses protocols such as Profibus, High Speed Ethernet (HSE), among others.
- **WirelessHART™ Gateway** - it converts data between the host and devices connected to the network. The Gateway DF100 is used combined with Smar wireless transmitters. It incorporates Network Manager, Security Manager and Access Point features.
- **Security Manager** - In general, it is an application embedded in the *WirelessHART™* Gateway that can serve several *WirelessHART™* networks.



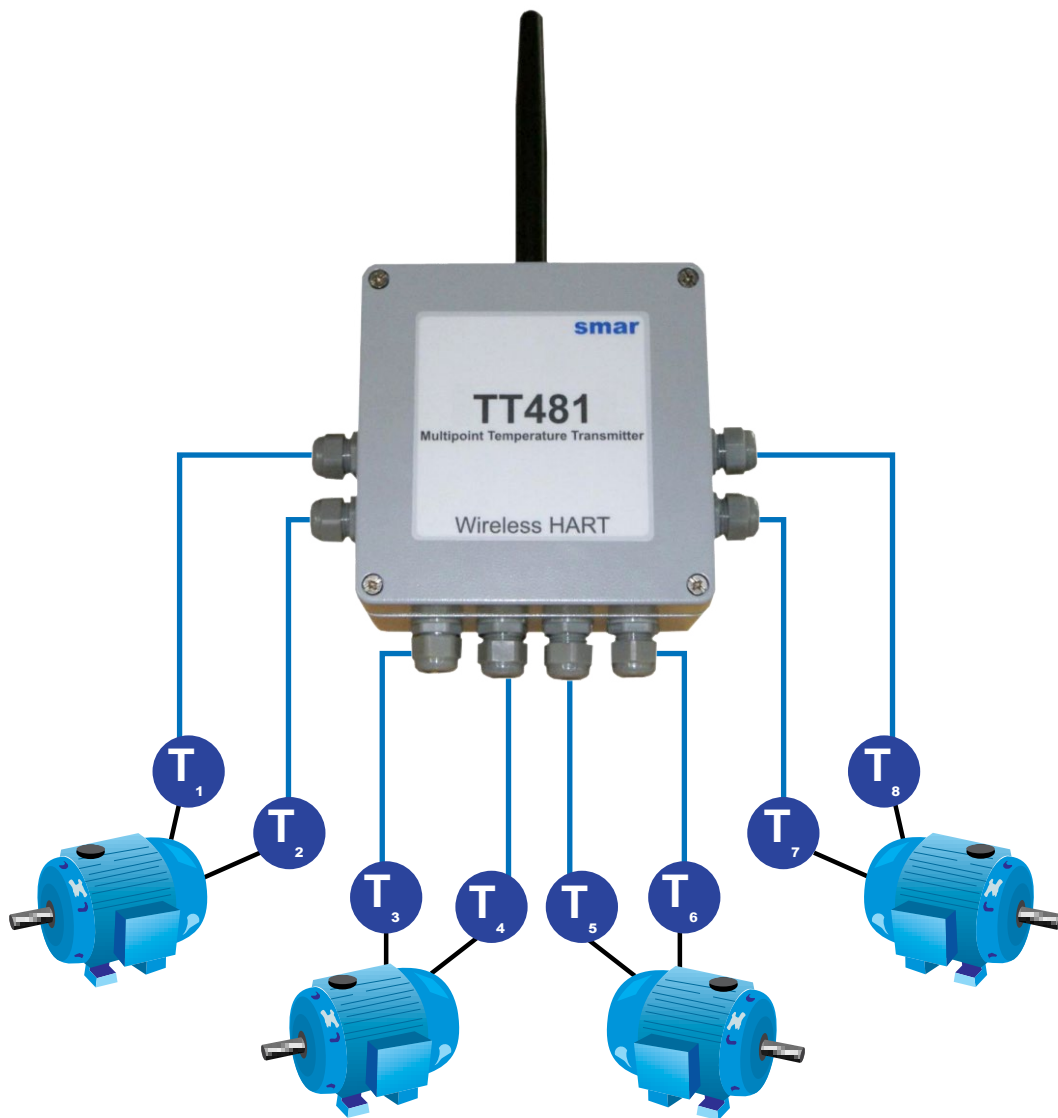
Typical *WirelessHART™* Architecture

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- **Network Manager** - it distributes, among other responsibilities, the network identity, publicizing its existence; distributes individual security keys to the devices; assigns a communication band to them; manages the communication routes between them, etc. It is an application that can be embedded in the *WirelessHART™* Gateway.
- **Access Point** - in a simple way, can be understood as the *WirelessHART™* radio installed in the gateway.
- **WirelessHART™ Field Devices** - work, beyond their functionalities as transmitters, as routers (repeaters), i.e., they are able to retransmit messages to/from other devices on the network.
- **WirelessHART™ Adapter** - it is a bridge-type device capable of providing wired data from a HART® + 4 to 20mA field device to the host via *WirelessHART™*, which then allows a conventional HART® field device to be part of a *WirelessHART™* network such as on the current example.

WirelessHART™ devices should be installed on field and configured the same way as conventional wired HART® devices. This is possible by updating and uploading properly the DD files on the configurator. This, on its part, can also be used normally.

It is noteworthy also that these devices can be either configured previously, in workbench, as well as at the time of installation.



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302
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Controller

DF100

HSE/WirelessHART™ Controller

The DF100 controller is a key element in the distributed architecture of the field control systems. Combines powerful communication features with access to field devices via *WirelessHART™* protocol.

This controller has features entirely new when compared with the DF1302 modular line. The DF100 can be used in outdoors, because it has ingress protection IP66. In addition, it makes possible to work with the new specification HSE WIO of Fieldbus Foundation, and Modbus communication via EIA-485 port.

- 1 *WirelessHART™* channel (HART® 7 specification of HART® Communication Foundation);
- 2 10/100 Mbps Ethernet ports;
- 1 EIA-485 port (for Modbus communication)
- It integrates up to 100 *WirelessHART™* devices;
- Modbus gateway;
- Integrated webserver for diagnostic and parameterization;
- Real Time Clock (RTC) and watchdog;
- Support for HSE WIO of Fieldbus Foundation architecture;
- Ingress protection IP66 (supports outdoor);
- Operation temperature: -40 °C to 60 °C;
- Operation voltage: 20 Vdc to 30 Vdc, 11W maximum.



Field Devices

Pressure, Level and Flow *WirelessHART™* Transmitters

LD400 *WirelessHART™*

The LD400 *WirelessHART™* Series is a complete line of smart transmitters for differential, absolute, gauge, high static differential pressure and flow measurement as well as models for level, remote seal and sanitary applications. LD400 *WirelessHART™* offers the best solution for all field applications demanding wireless data transmission and highest performance. It is a robust and highly reliable solution for pressure, level and flow measurement, working in a self-organizing mesh network. These devices have low power consumption and long life battery.

- $\pm 0.045\%$ accuracy;
- $\pm 0.2\%$ of URL Stability - Guarantee for 12 years;
- 200:1 rangeability;
- Advanced diagnostics;
- Support for DD, EDDL and FDT/DTM;
- Local adjustment (zero and span calibration) and complete;
- Low Total Probable Error;
- Repeater/router function in mesh network;
- "Burst Mode" for sending periodical statements;
- Battery operation for long duration;
- *WirelessHART™* Protocol.



LD400G *WirelessHART™*

The LD400 Inline *WirelessHART™* transmitter allow liquid, vapors and gas gage pressure measurement, or liquid level measurement in open or closed non-pressurized tanks. Several process connection options are available for installations directly on the pipe or tank, without impulse lines and bracketing in most installations.

- $\pm 0.075\%$ accuracy;
- Wetted parts: AISI 316L or Hastelloy C276



LD400I *WirelessHART*™

The LD400 Insertion *WirelessHART*™ level transmitter with extended probe is a simple option for measuring liquids in open tanks, closed non-pressurized tanks, canals, wells etc. Several types of bracketing enable a quick and fast installation on the top of the tank, for example, using existing manholes, to avoid tank drilling.

- $\pm 0.2\%$ accuracy;
- Several probe lengths up to 3200 mm;
- Extended probe material: AISI304L or AISI316L;
- Diaphragm material: AISI316L or Hastelloy C276.



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DT400 *WirelessHART*™ Density Transmitter

The DT400 is a *WirelessHART*™ density transmitter with digital communication designed for the continuous online measurement of liquid density, directly in industrial process. The DT400 *WirelessHART*™ consists of a probe with two repeaters diaphragms immersed in the process.

A temperature sensor located in the probe, between the two repeaters diaphragms automatically compensates temperature variations in the process.

Special techniques in the production and assembly probe and temperature sensor ensure that small variations in the process temperature are quickly informed to the transmitter, which calculates the fluid density process accurately through dedicated software.

Depending on the industrial process, density can be expressed in Density, Relative Density, Brix degree, Baumé degree, Plato degree, % of Solids, Concentration, etc.

Locally, via HART® configurator, it is possible to perform calibration, monitoring and check diagnostics.



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TT400 *WirelessHART*™ Temperature Transmitter

TT400 *WirelessHART*™ is used in all field applications demanding data wireless transition. It is a transmitter mainly intended for temperature measuring using RTDs or thermocouples, providing a *WirelessHART*™ output. This device can operate even with two sensors and in the following conditions:

- o Simple measurement, by using only one sensor;
- o Differential measurement, with two sensors (same type);
- o Backup measurement, with two sensors (same type);
- o Maximum, minimum or average measurement, two sensors (same type).

TT400 *WirelessHART*™ also has:

- $\pm 0.02\%$ accuracy;
- Single unit and several options for sensors and connections;
- Advanced diagnostics;
- Support for DD/EDDL and FDT/DTM;
- Sensor back-up.



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Field Devices

TT481 *WirelessHART*™ Multipoint Temperature Transmitter

The TT481 *WirelessHART*™ is a temperature transmitter for 4 or 8 inputs that simplifies the installation and provides a temperature measurement per point cheaper.

Temperature information is available via *WirelessHART*™ digital communication protocol. The TT481 offers:

- $\pm 0.03\%$ accuracy;
- RTDs and thermocouples linearization;
- Lightweight and compact;
- Simple or differential measuring;
- Several type of sensors, 2 or 3-wire;
- Supports DD/EDDL and FDT/DTM;
- Inputs accept 4-20 mA signal for easy integration between 4-20 mA devices to *WirelessHART*™ network.



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TP400 *WirelessHART*™ Position Transmitter

The TP400 is a *WirelessHART*™ transmitter for position measurement and it is part of the family of Smar devices.

It can measure displacement or movement of rotary or linear type based on Hall effect non-contact sensor. The digital technology and wireless communication provide an easy interface between the field and control room and several interesting features that considerably reduce the installation, operation and maintenance cost.

The TP400 *WirelessHART*™ may be installed to monitor valves and actuators position or in any equipment with linear or rotary motion such as skylights, dampers, rollers spacing, crushers, etc. There is an option for remote sensor with cable length up to 20 m.



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RP400 *WirelessHART*™ Repeater

The RP400 is a *WirelessHART*™ network dedicated device and its main function is to extend the network range working as a router manager, simplifying the design and implementation of a wireless network. The device is passive and has no actuation in the industrial process. The *WirelessHART*™ communication network is structured as a mesh. The Mesh network allows the network nodes to communicate with each other establishing redundant paths to the gateway, increasing the network availability. This type of networks also allows scalability simply by adding additional nodes or the RP400 repeaters into the network. Another characteristic is that the bigger is the network, the more reliable it becomes because more alternative paths will be created.

The main characteristics of the RP400 are:

- *WirelessHART*™ digital communication;
- Increase of communication routes, facilitating the *WirelessHART*™ network scalability;
- Availability increase through alternative paths in the Mesh network;
- Excellent payout solution.



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