

Product Overview

Wireless**HART**[™]

WirelessHART®...

The evolution of a technology

HART® (Highway Addressable Remote Transducer) protocol is the global standard for smart process instrumentation. More than 30 million HART-enabled devices are currently installed in plants around the world, but only 10 percent of the devices are used to their fullest potential. A wireless standard was developed to help users more effectively utilize their HART-enabled devices.



HART devices represent 40% (30 million devices) of all process instrumentation products worldwide.





HART 7: WirelessHART, 4-20 mA signal with digital data

- Report by exception
- Time stamp
- Wireless networking, devices and diagnostics

2007

HART 6: AMS Integration

- 32 character tag
- All variables with status
- Digital loop check

2001

HART server introduced

1999

HART accepted by instrument technicians

1995

HART 5: 4-20 mA signal with digital data

- Process variable
- Device status
- Device configuration

1989

WirelessHART™

For more information about HART and WirelessHART, visit the HART Communication Foundation website at www.hartcomm.org

WirelessHART enhances existing systems and enables new applications

☑ Wired HART systems can be expanded without replacing legacy equipment.

- **Stranded I/O points and diagnostics can be integrated into a process without decommissioning the existing system**

☑ New systems can be installed in a fraction of the time it takes to install a hardwired network resulting in:

- **Lower installation costs vs. wired solutions**
- **Labor savings**
- **Reduction of permits and delays**
- **Lower material cost**

WirelessHART

- **Uses the same maintenance and diagnostic tools as traditional wired HART devices**
- **Requires little additional training**
- **Does not require extensive RF planning**



There are 3 basic WirelessHART device types defined in the HART 7 standard:



WirelessHART Gateway

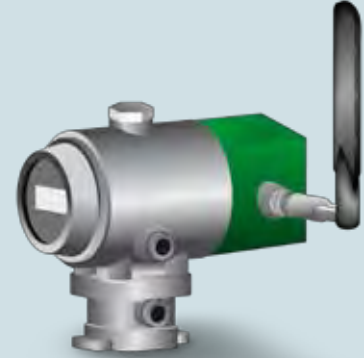
Consists of 3 pieces according to HART 7

- **Access Point Radio:** The **WirelessHART** radio that communicates with the remote devices
- **Network Manager Software:** Controls the mesh networking and security
- **Gateway Connection:** The interface to the host, includes protocols and physical connections



WirelessHART Instrument

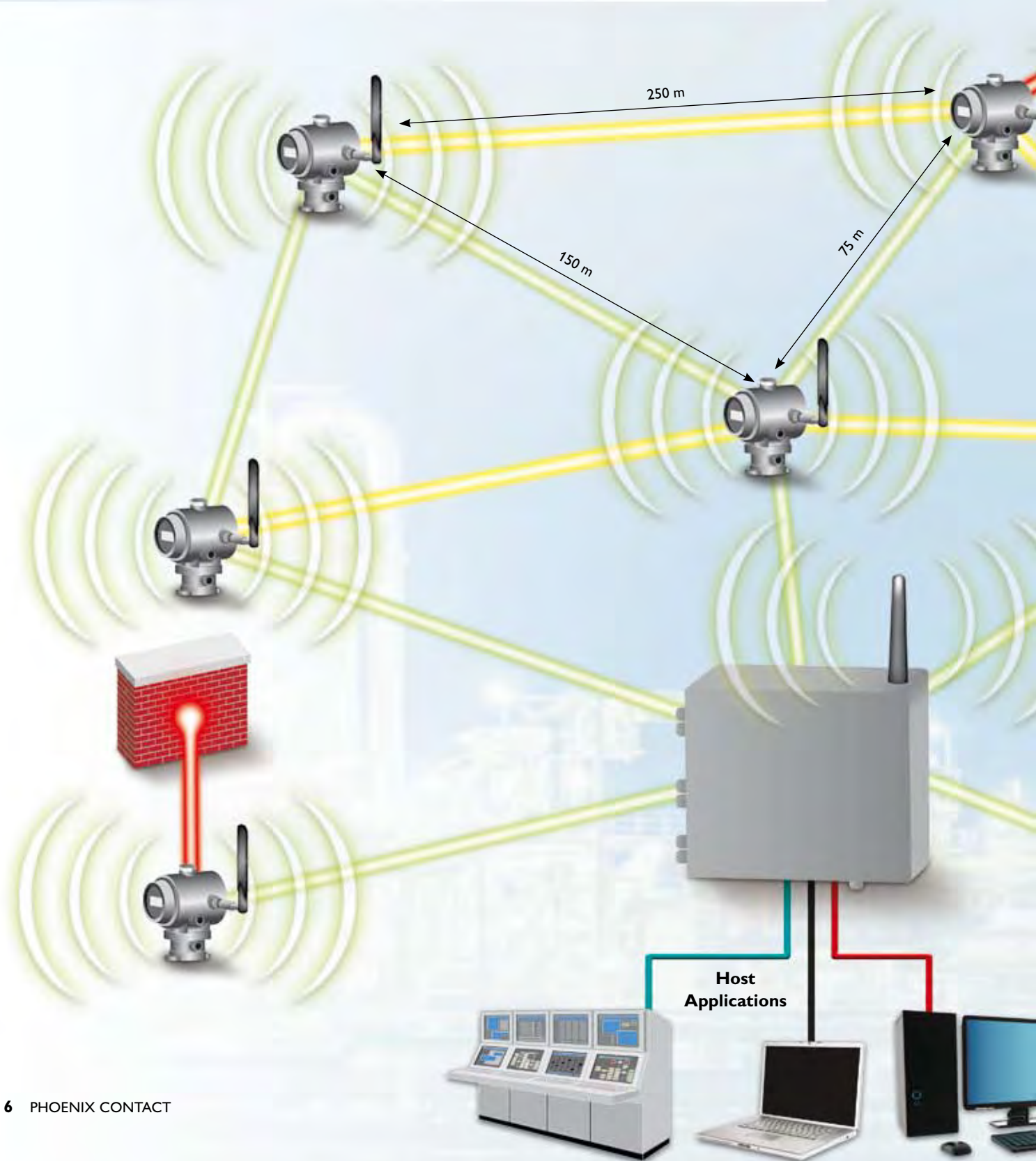
- Contains a radio integrated with process measurement or monitoring capabilities
- No wiring is required, all diagnostic and process variable data is transmitted to the **WirelessHART** gateway
- May be solar, line, loop or battery powered



WirelessHART Adapter

- Connects an existing wired **HART** device into a **WirelessHART** network
- The original 4-20 mA signal remains intact and functional
- **HART** data is transmitted to the **WirelessHART** gateway
- The adapter can be line, loop or battery powered

WirelessHART™ network topology



Features

- **IEEE 802.15.4 radio**

- 250 kbps over-the-air
- Uses 2.4 GHz ISM band with 15 channels
- 10 mW radio for global use

- **Time-synchronized communication**

- Utilizes pre-scheduled time slots for transmission to avoid collisions
- Ultra low power draw allows devices to be battery powered
- Implements channel "hopping" to tolerate interference - each transmission is sent on a different channel

- **Full-mesh routing**

- Automatic network formation for easy network installation
- Every device has multiple communication paths
- Self-organizing and self-healing capabilities keep the network stable over time

- **Secure message transfer**

- Encryption guarantees information cannot be read by other parties
- Authentication verifies the sender's validity
- Integrity ensures that the message is delivered unaltered



 **Active path**

 **Alternate path**

 **Obstructed path**

WirelessHART device

WirelessHART Gateway with Integrated WLAN

Extend the reach of WirelessHART

A WirelessHART gateway typically connects to an Asset Management System (AMS) or host via RS-485 or Ethernet. This is very simple to install, but the control room is often farther than the reach of WirelessHART, requiring long runs of network cable.

The RAD-WHG/WLAN-XD is a WirelessHART gateway with integrated 802.11b/g WLAN transceiver. It can connect up to 250 WirelessHART field devices and convert the HART data to Modbus TCP or HART UDP for easy integration into almost any host system, including the HART Server.

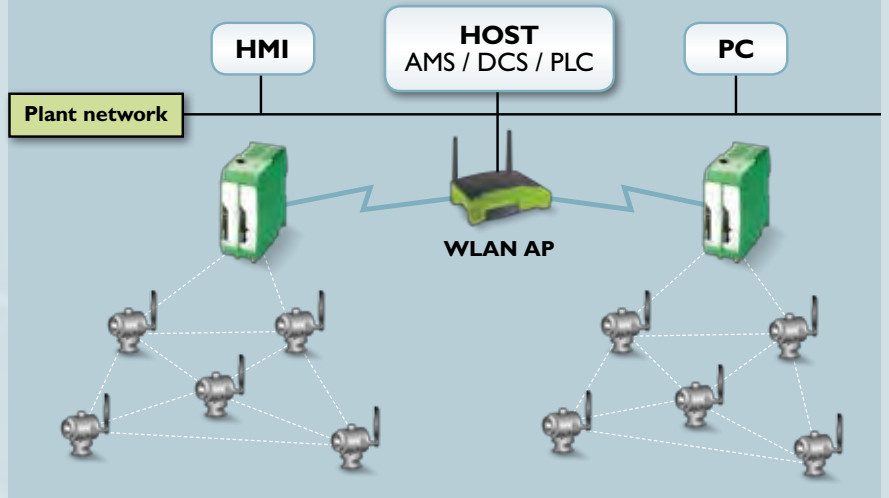
The WLAN transceiver can also be disabled, and the host connection can be made via the standard Ethernet port.

The integrated WLAN can be used as the backhaul connection, allowing the gateway to be installed in the field, closer to the monitored devices. This also allows the user to create a “clustered” network topology. Clustered topology reduces demand on battery-powered nodes for routing, resulting in increased battery life.



WIRELESS BACKHAUL

Eliminates Ethernet cabling to control room



Ethernet port

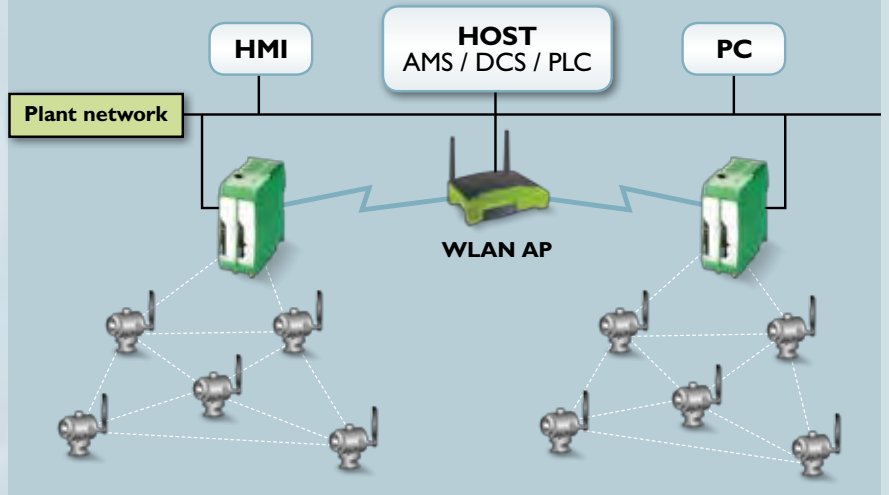
- For simple programming and diagnostics using embedded web server

HART maintenance port

- Allows HART programmer to be connected for gateway programming

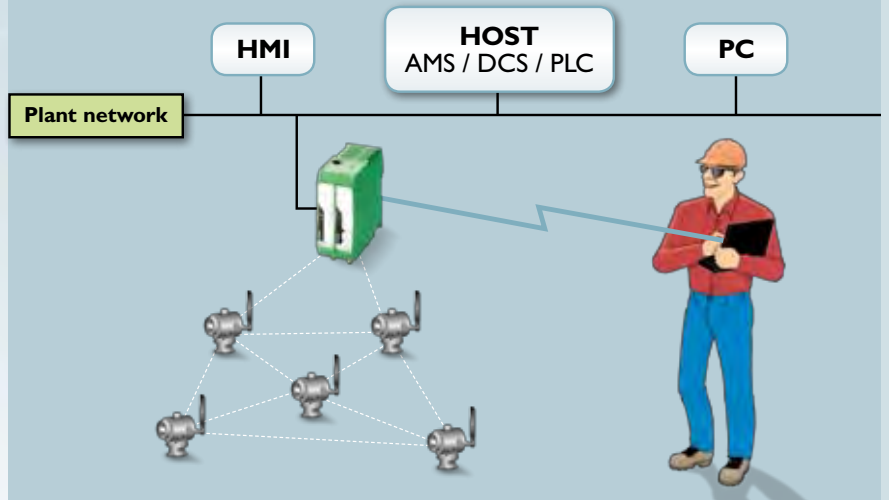
"REDUNDANT" BACKHAUL

Uses WLAN as backup to Ethernet cable



MOBILE WORKER

Allows remote connection to gateway for diagnostics or programming



Dual WLAN antenna connection

- RPSMA connectors allow the use of high-gain antennas



WirelessHART adapter

Flexibility for field connections

The RAD-WHA-1/2NPT is a WirelessHART adapter designed to connect up to four HART devices for the wireless transmission of the HART data.

The adapter can be connected in series with a HART device (loop powered) or in parallel with up to four HART devices (24 V DC powered). When 24 V DC powered, the adapter is capable of supplying loop current to the HART devices.

The RAD-WHA-1/2NPT can also be connected to a single 4...20 mA device for the wireless transmission of the digitized signal.

WirelessHART is a low cost, low risk alternative to installing multiplexers, as no re-work is necessary, and it provides rich diagnostic information about the status of the devices as well as the network.

Removable external antenna

- Can be remotely mounted or replaced with high gain antennas for enhanced performance

Rugged aluminum housing with hinged compartment

- No separate housing components to lose or break

1/2-inch NPT female fitting

- Provides quick and flexible mounting options

HART modem loops

- Provides quick and flexible mounting options

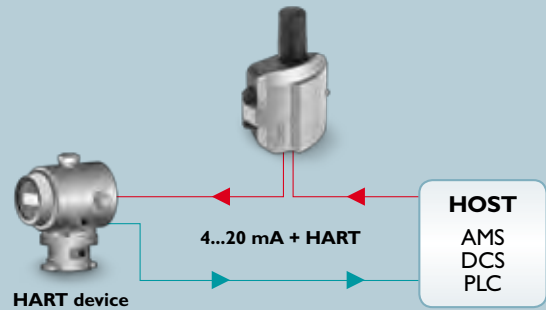


RAD-WHA-1/2NPT
(Part number 2900100)



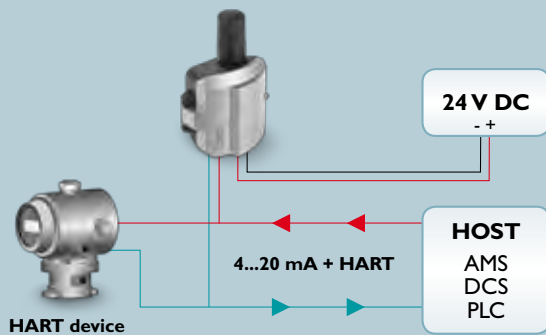
LOOP POWERED ADAPTER

No additional power supply or wiring is needed



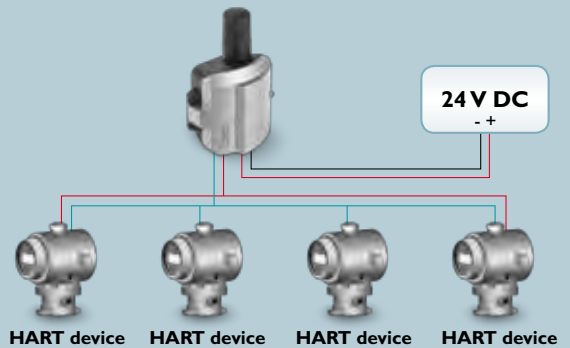
LINE POWERED ADAPTER

The adapter is powered from a separate 11-30 V DC power supply



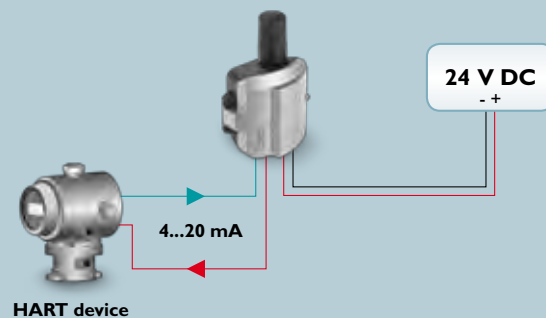
MULTI-DROP ADAPTER

Up to 4 HART devices can be connected to 1 adapter



LINE POWERED FOR 4...20 mA DEVICES

The adapter powers the device and measures the loop current



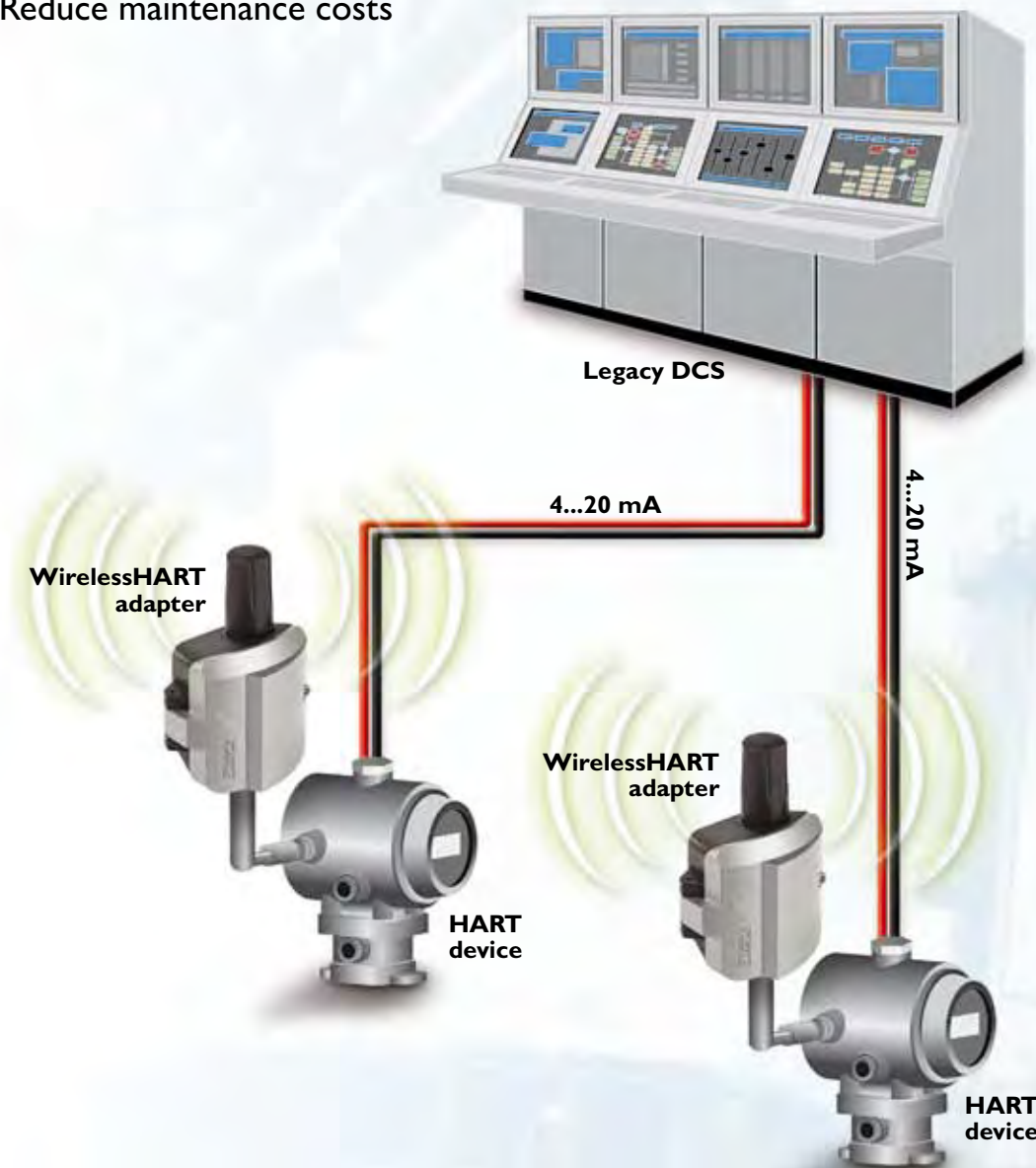
WirelessHART

The solution for retrofit and new installations

RETROFIT INSTALLATION

WirelessHART can:

- Meet new directives
- Increase efficiency
- Reduce maintenance costs



NEW INSTALLATION

WirelessHART can:

- Speed plant expansion
- Reduct start-up time
- Reduce capital costs



WirelessHART
Gateway
with WLAN



WLAN access point

New host system

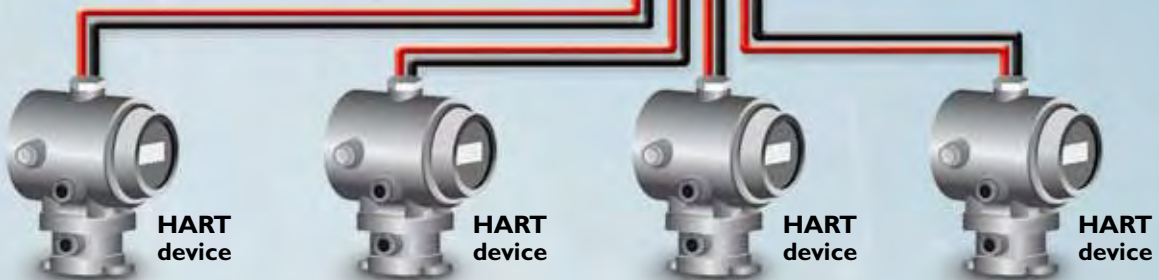
WirelessHART
adapter



4...20 mA
device



JUNCTION
BOX



HART
device

HART
device

HART
device

HART
device

Wireless solutions



The first step toward building a reliable mesh network is mapping each device. Phoenix Contact's WirelessHART network planner simplifies the process.

- Predicts links in the mesh
- Aids in locating repeaters
- Identifies potential weak points





Whether serial or I/O data, fieldbus or Ethernet communications, Phoenix Contact offers the solution for every application, utilizing technologies ranging from Bluetooth to WLAN, GSM/GPRS, proprietary Trusted Wireless or WirelessHART.

For more information about WirelessHART, visit:
www.phoenixcontact.net/wirelesshart

Wireless I/O

Wireless I/O systems are optimized for the transmission of analog and digital signals. **Wireless I/O** can be used in point-to-point or point-to-multipoint configurations for both monitoring and control.

Wireless Serial

With wireless serial modems, the limitations of RS-232/422/485 can be overcome with flexible network configurations and long distance communication.

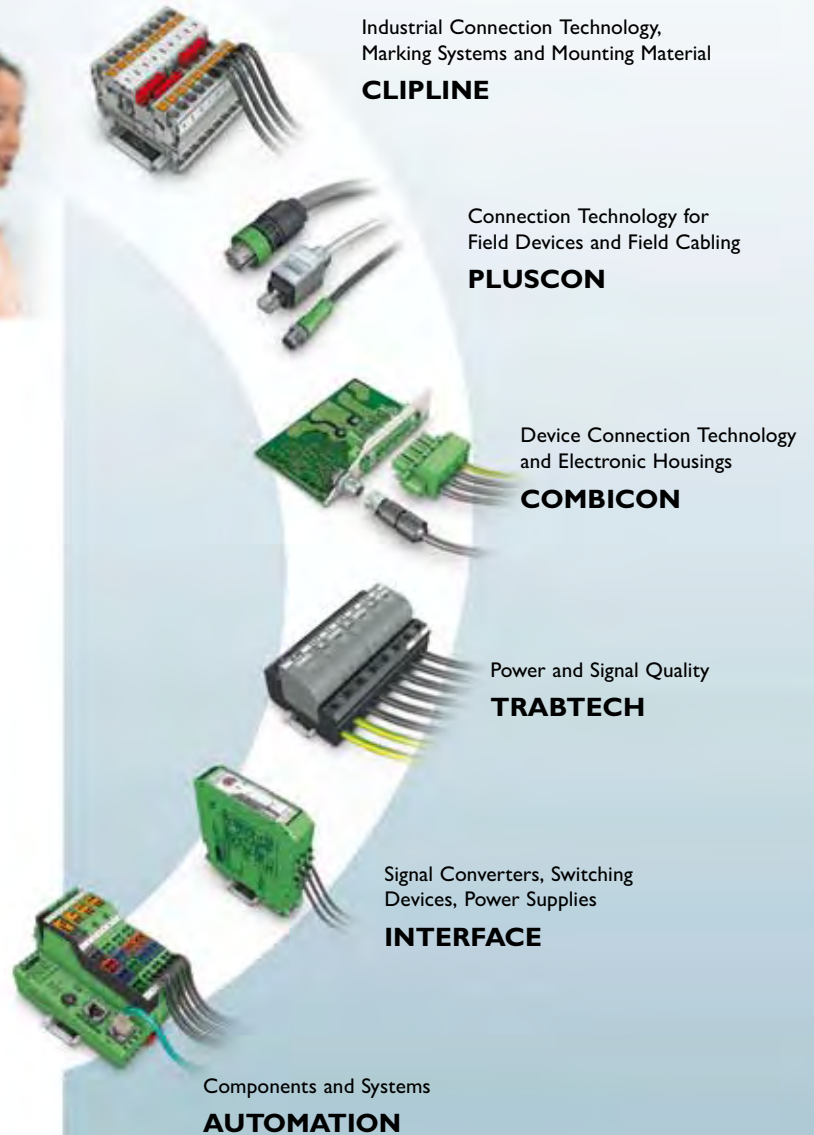
Wireless Ethernet

Wireless Ethernet modems allow IP-based protocols such as TCP/IP, Modbus TCP or Profinet to be easily transmitted over short or long ranges, and use different wireless technologies optimized for the application.

Further information on the products presented here and on the world of solutions from Phoenix Contact can be found at www.phoenixcontact.net/catalog



Or contact us directly.



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