



## **RP400 SERIES**

### **WirelessHART™**

#### **WirelessHART™ Repeater**

- **WirelessHART™** digital communication, HART® Protocol, version 7
- Increased communication routes facilitating the *WirelessHART™* network scalability
- Increased reliability through alternate paths in the mesh network
- Solution with excellent cost/benefit
- Lithium primary batteries (Li-SOCl<sub>2</sub>) lasting up to 6 years
- Maximum use with the Smar gateway DF100



### 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](http://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.

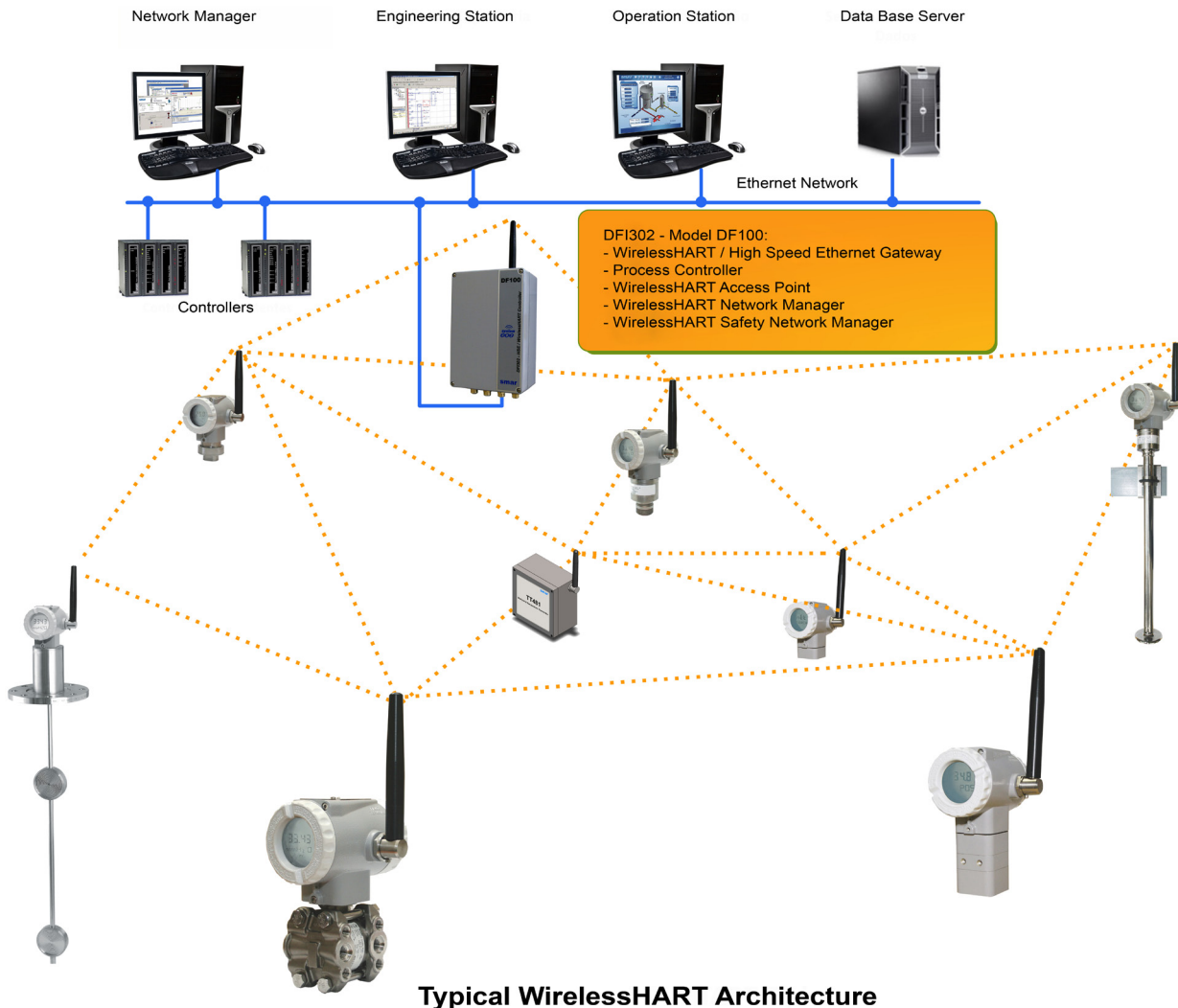


Figure 1 - Mesh network, wireless - *WirelessHART™* concept

- 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 - they 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.

Depending on the architecture, usage conditions of transmitters and obstacles, elements such as repeaters may be necessary. Smar offers, for these cases, the RP400 - *WirelessHART™* Repeater.

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

## RP400 *WirelessHART™*

The **RP400** is not a process element, but a network element. The concept of *WirelessHART™* network is that each of its devices acts as a repeater, hence the absence of the "repeater" element in the structure description of this type of network.

The **RP400** is a device dedicated to the *WirelessHART™* network and has the primary function to extend the range of this network, being a router agent that simplifies the project and implementation of a wireless network. It has no role in the industrial process. A *WirelessHART™* communication network is structured in loops and adopts an architecture using "Mesh" network. "Mesh" networks allow network nodes to communicate with each other by establishing redundant paths to the base, increasing reliability, because if one path is blocked alternative routes will exist so that the message reaches its final destination. This type of network also enables scalability by simply adding to the network more nodes or **RP400** repeaters. Another feature is that the larger the network the more reliable because more alternative paths are created automatically.

The **RP400** does not do any kind of measurement, unless the voltage of the Battery Module. The **RP400** constantly checks the status of the wireless network.

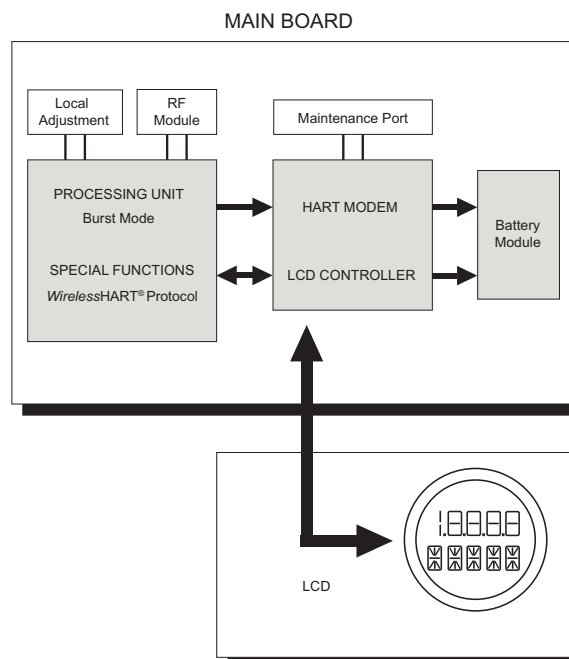


Figure 2 - Block Diagram of RP400 *WirelessHART™*

**DF100 - HSE/WirelessHART™ controller with 2 100 Mbps Ethernet ports, 1 RS-485 port and 1 HSE/WirelessHART™ channel**

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 DFI302 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.



**Technical Characteristics**

**Functional Specifications**

<p><b>Battery Module</b></p>	<p>The module consists of 2 primary lithium batteries (Li - SOCl2 ) of 3.6 V, totaling 7.2 V.</p> <p><b>Duration</b> Burst Mode at 8 seconds, @25°C, network with at least 3 neighbors devices: 6 years.</p> <p>Note: The Battery Module used in the repeaters must be provided exclusively by Smar (Battery Module - Code 400-1209).</p>
<p><b>Display</b></p>	<p>Liquid crystal display with 4 ½ numeric digits, 5 alphanumeric digits, function and status icons;</p>
<p><b>Communication Protocol</b></p>	<p>HART protocol Version 7, with the commands set of <b>RP400 WirelessHART™</b>. HART® is a registered trademark of HART Communication Foundation.</p>
<p><b>Output Signal</b></p>	<p>Digital output via radio frequency 2.4 GHz, according to HCF_SPEC-65 Rev. 1.0</p>
<p><b>Measurement Type</b></p>	<p>Voltage of Battery Module</p>
<p><b>Configuration</b></p>	<p>Remotely with external configurator via <i>WirelessHART™</i> network Locally with wired configurator in the maintenance port.</p>
<p><b>Temperature Limits</b></p>	<p>-40 °C to 85 °C</p>

### Physical Specifications

<b>Mounting</b>	In SAE 1020 Carbon Steel with electrostatic polyester painting or 316 stainless steel Accessories (screws, nuts, washers and U-clamps) in carbon steel or 316 stainless steel
<b>Housing</b>	Aluminum or stainless steel
<b>Electronic Circuit</b>	2.4GHz omnidirectional antenna Coaxial cable to connect the antenna to the radio board Battery module with 2 units Type 'C'
<b>Identification Plate</b>	316 stainless steel plate with label in special plastic

### Specifications of Operation Protection

<b>Operation Counter</b>	Counting of configuration change operations
<b>Configuration Protection</b>	Write protection via hardware and software
<b>Certification</b>	Intrinsic safety (pending) and weather proof

### Specifications of Human Machine Interface

	ITEM	ICON	DEFINITION
<b>Status Indication on Display</b>	1	PV	Primary variable indication
	2	↑	Blinking when the repeater is searching the wireless network
	3	↑↓	Blinking when the repeater is connecting to the wireless network
	4	MD	Repeater is operating on a wireless network
	5	↓	Failed to connect to the wireless network
	6	ACK	Repeater in burst mode
	7	F(t)	Turn on when sending command in burst mode
	8	SP	Turn on when an event is sent by the device

MODEL RP400		WIRELESSHART REPEATER	
<b>COD.</b>		<b>Mounting Bracket</b>	
0		Without bracket	
1		Carbon steel bracket	
2		Stainless steel bracket	
<b>COD.</b>		<b>Housing Material</b>	
A		Aluminum (default) (IP/TYPE)	
I		316 Stainless steel - CF8M (ASTM - A351) (IP/TYPE)	
<b>COD.</b>		<b>Painting</b>	
0		Gray Munsell N 6.5 Polyester (Default)	
8		Without painting (1)	
<b>COD.</b>		<b>Certification Type (2)</b>	
I		Intrinsic safety	
N		Without certification	
<b>COD.</b>		<b>Certifier Body (2)</b>	
0		Without certifier body	
5		CEPEL (pending for intrinsic safety)	
<b>COD.</b>		<b>Tag Plate (3)</b>	
0		With TAG, when specified	
1		Blank	
2		User specification	

RP400 - - - - - \*

\* Leave blank if no special options

**Notes:**  
 (1) Not available for aluminum housing.  
 (2) For hazardous areas.  
 (3) Rectangular plate in 316 stainless steel.

**Special Options**

Certification for telecommunications	W1	ANATEL - Brazil
--------------------------------------	----	-----------------

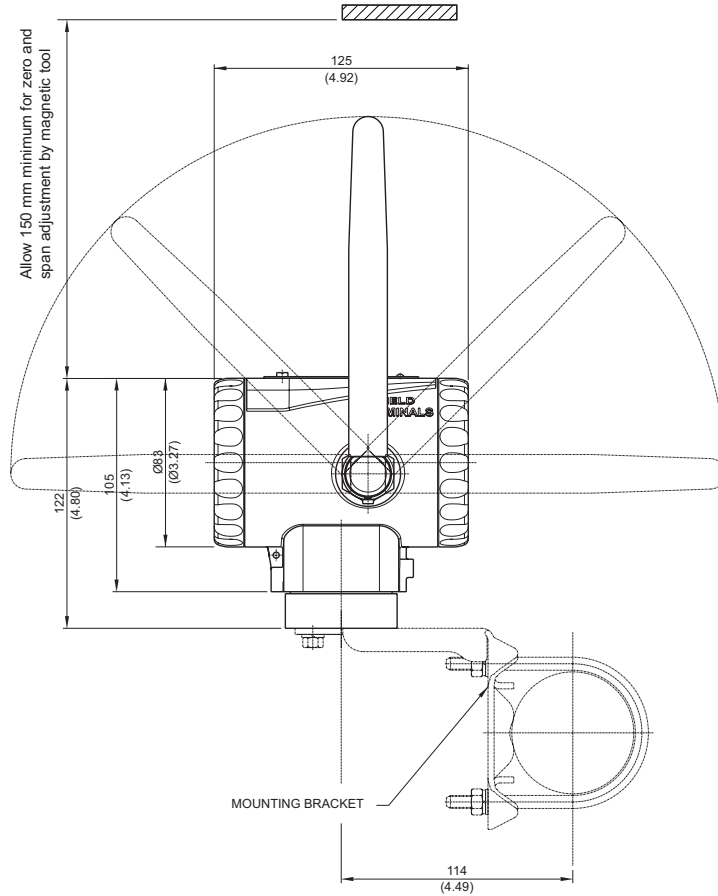


Figure 3 - Mounting of RP400 WirelessHART™ in vertical

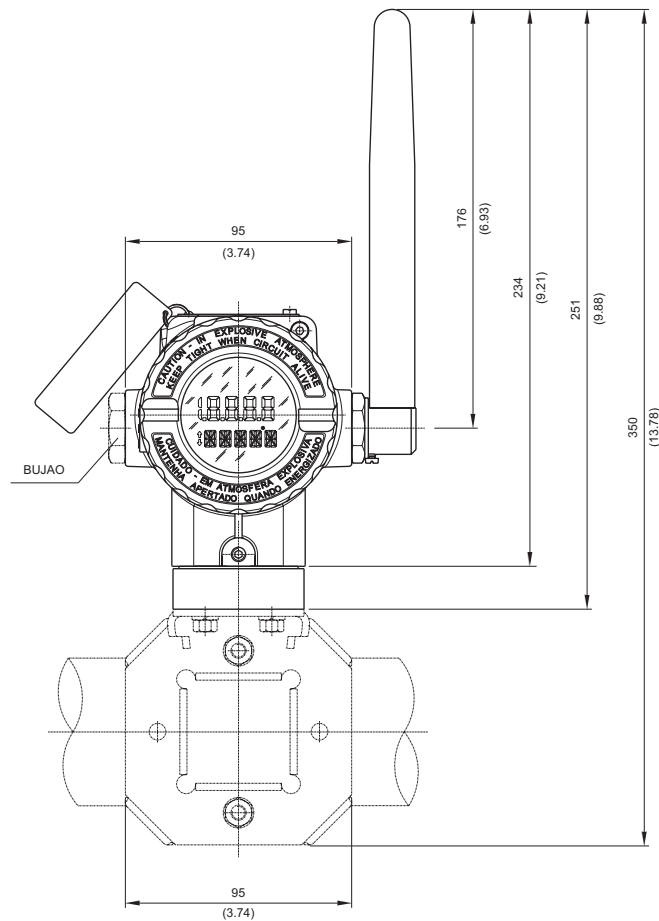
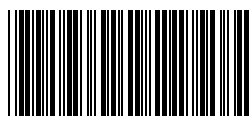


Figure 4 - Mounting of RP400 WirelessHART™ in vertical

**smar**  
**www.smar.com**

Specifications and information are subject to change without notice.  
Up-to-date address information is available on our website.

web: [www.smar.com/contactus.asp](http://www.smar.com/contactus.asp)



RP 4 0 0 CE