1420 Wireless Gateway

- *Highest level of wireless security in the industry*

- *>99% data reliability*

- *No site survey required*

- *Seamless and flexible host integration*

- *Integrated web server for access to field device and process data*

- *Easy network expansion up to 100 devices*

- *Trending with local historian*

Contents

EMERSON

Process Management

Smart Wireless Solutions

A robust wireless solution is much more than the sum of its parts; it is the result of innovative integration with consideration given to every aspect of the overall system. A Smart Wireless solution consists of the measurement device, the self-organizing network and easy host integration. Emerson Process Management will offer a full portfolio of wireless solutions enabled by self-organizing networks.

SELF-ORGANIZING NETWORKS

Self-organizing networks combine the high reliability of wired networks with the flexibility and low cost of wireless networks.

Two key components of reliability are the availability of multiple communication paths for each device and automatic path configuration.These innovations result in data reliability over 99%. Data reliability is an indication of the amount of measurement data that is lost due to communication failures. The multi-path communications used enable the wireless networks to be deployed without a site survey - saving the end user time and money.

Robust networks in challenging environments

Self-organizing networks are inherently well suited for use in challenging environments. The multi-path communication routes and self-forming characteristics are able to eliminate the effects of obstacles such as scaffolding and infrastructure by re-organizing the network around the obstacles.

1420 Wireless Gateway is scalable

The 1420 Wireless Gateway is capable of supporting up to 100 wireless field devices. Once your initial network has been installed, it is quick and easy to add additional devices allowing you to plan a large installation and add devices over time.

Powers PlantWeb

 The 1420 Wireless Gateway powers *PlantWeb*® by working together with AMS™ Suite software to deliver the power of wireless connectivity with Emerson field devices.

LAYERED SECURITY KEEPS YOUR NETWORK SAFE

In today's digital world, communication security is becoming a concern for everyone. Emerson understands the needs of users to be able to control the level of security in wireless networks. Communication security is the ability to pass verifiable data from a trusted source to a trusted recipient without third party interference. Emerson has a layered approach to security comprised of the following five mitigation strategies:

Authentication - Authenticate sender and receiver

Verification - Verify that the data is valid

Encryption - Encrypt the data

Key Management - Periodic changes to encryption keys managed automatically by the 1420 Wireless Gateway

Anti-jamming - Avoid interference and blocked communication spaces

This multi-dimensional approach gives users the flexibility to control the level of security required for their networks. These five layers of protection, when properly deployed, are very effective at thwarting attacks on the network.

The self-organizing network uses 128 bit encryption, user definable key rotation and frequency hopping spread spectrum. It also does not support TCP/IP-based communication.

The gateway and information system uses Secure HTTP and SSL-enabled connections for Ethernet communications with the host system. All other ports remain closed.Wireless technology offers cost and performance benefits - as long as communication security is maintained. Best practices have been tested and validated with customers and wireless experts, and are available to help you secure your network.

SMART WIRELESS SOLUTIONS

Rosemount 648 Wireless Temperature Transmitter

The 648 integrates temperature measurement into a self-organizing network, providing best in class security, reliability, SmartPower, and network scalability, optimizing plant performance while minimizing maintenance.

Rosemount 3051S Wireless Series

The scalable 3051S enables fully integrated pressure, flow and level self-organizing network solutions to optimize plant performance and reduce risk.

Wireless Overview

Devices

The devices that are integrated into Smart Wireless solutions are the same high quality, reliable and proven instruments that are in use today. These devices have been equipped with a wireless output that simply takes the measurement and transmits the digital HART data wirelessly.

Gateway

The 1420 Wireless Gateway enables the most robust security available, easy host integration with no additional software and continuously is optimizing network performance to maximize data reliability and battery life of the wireless devices.

Seamless Integration

Smart Wireless devices from Emerson Process Management provide measurement data and diagnostics data back to any type of information system including Serial Modbus, Modbus TCP, OPC, legacy systems and data historians.
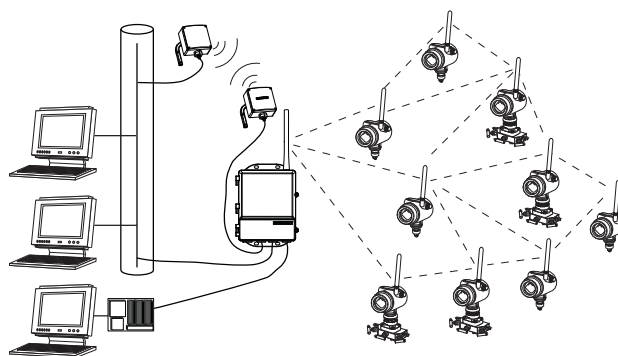
INFORMATION MANAGEMENT

Trending with Local Historian

The 1420 Wireless Gateway enables trending capabilities both in the web server and in the host system. Multiple trends may be collected in the web server, with each trend able to collect and display data from a single measurement point, or a group of points. Trends may also be exported in Excel, CSV or XML formats.

OPC Interface

The 1420 Wireless Gateway supports communication with host applications using OPC. Any standard output or parameter can be made available to the OPC client application.

Modbus Interface

The 1420 Wireless Gateway can communicate with the host system using the Modbus protocol. Any standard measurement, status, or other parameter can be read by any Modbus host system. Register number assignments are completely configurable, allowing the 1420 registers to match the requirements of the Modbus host application. The Modbus RS485 serial interface supports data rates from 9600 bps to 57600 bps. Modbus TCP/IP integration is available using the Ethernet interface.

Webserver

Configuration of the 1420 Wireless Gateway is accomplished using any PC with a standard web browser and secure Ethernet connection, eliminating the need for special software. User configurable monitoring pages allow measured values to be grouped and easily viewed with the web interface. Web pages can be viewed either over a dedicated network or connected to the user's Intranet. Username and Password security is provided to prevent unauthorized access to the data.

Asset Management

The 1420 Wireless Gateway extends all the capabilities of AMS Suite to field devices. Comprehensive asset management capabilities such as device configuration, comparing configurations, audit trail, calibration, alerts and more are now available when using AMS Suite with the 1420. When used with AMS Asset Portal, AMS Suite can provide a means to make critical device data from the 1420 available over an entire enterprise using a standard web browser over a secure Ethernet connection.

User configurable alerts have also been added to the wireless output allowing users to add value to monitoring points. These alerts can be set to flag maintenance notifications, environmental emissions, use of safety showers, tank levels - the applications are unlimited.

MEASUREMENT DEVICES

The devices that are integrated into Smart Wireless solutions are the same high quality, reliable and proven instruments that are in use today. These devices have been equipped with a wireless output that simply takes the measurement and transmits the digital HART data wirelessly, instead of the traditional 4-20 mA loop signal. The devices are installed exactly the same as wired devices without the added cost of wiring.

Instruments are HART based, providing the same rich data they do today - only now, there is a means to extract the additional HART information that formerly has been stranded in the device because analog control systems are unable to tap this wealth of information via the 4-20 mA loop.

Rugged Housing

The 1420 Wireless Gateway is suitable for field mounting in any Zone 2/Division 2, general purpose area and is NEMA 4X/IP65 rated.

Specifications

Functional Specifications

Power Input Options
24 V dc

500 milliamps required to power the 1420 Wireless Gateway module.

Environmental
Operating Temperature Range:
-40 to 140 °F (-40 to 60 °C)

Operating Humidity Range:
0-95% relative humidity

Lightning and Surge Protection
Meets the requirements of EN61000-4-5.

Physical Specifications

Weight
10 lb (4.54 kg)

Material of Construction

Housing
Low-copper aluminum, NEMA 4X

Pollution Degree 2

Paint
Polyurethane

Cover Gasket
Silicone Rubber

Antenna
PBT/PC integrated omnidirectional antenna

Certifications
Class I Division 2 (U.S.)

Equivalent Worldwide

Communication Specifications

RS485
2-wire communication link for Modbus multidrop connections

Baud rate: 57600, 38400, 19200, or 9600

Protocol: Modbus RTU

Wiring: Single twisted shielded pair, 18 AWG. Wiring distance is approximately 5,000 ft. (1,524 m)

Ethernet
10baseT/ 100base-TX Ethernet communication port,

Supports Modbus TCP/IP and OPC with 32 bit floating point values. Scaled integers are supported with Modbus TCP/IP.

Modbus registers and OPC tags may be assigned to measurement inputs from self-organizing network.

Assignment of tags include measurement values, status, timestamp, alarm, and battery voltage of self-organizing transmitters.

The configuration of the tags and monitoring is performed using web pages generated by the 1420 Wireless Gateway.

AMS management of self-organizing network transmitters.

Self-Organizing Network Specifications

Network Protocol and Synchronization
Wireless enabled HART® devices. Capable of regular PV transmission, two way HART® configuration and diagnostics, and AMS management.

Network Size/ Transmit Rate
100 Wireless enabled HART® devices/ max transmit rate 60 s.

50 Wireless enabled HART® devices/ max transmit rate 15 s.

Network Latency
100 Wireless enabled HART® devices: 10 s.

50 Wireless enabled HART® devices: 5 s.

Data Reliability
>99%

Antenna
Integrated Omnidirectional Antenna

Optional remote mount omnidirectional antenna

Radio Frequencies
902-928 MHz FHSS

2.4-2.5 GHz DSSS

System Security Specifications

Ethernet
SSL-enabled TCP/IP

1420 Wireless Gateway
Role-based Access Controlled

Unused Ethernet Ports are Closed

Self-Organizing Network
Encrypted Wireless enabled HART® with rotating keys and user controlled join keys

Applications
Monitoring solution for automated operator route, redundant measurements, and other non-critical applications.

Not for mission critical safety or control applications.

Remote Antenna Specifications[1]
6 dB gain antenna, [length 11.5 in. (300 mm)] N type connector, for use with up to 50 ft. (15,2 m) of LMR-400 coaxial cable.

Lightening Protection
50 Ohm Gastube type, bulkhead mount, weatherized, 0.5 dB insertion loss.

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(1) *For remote antenna applications, the WL1 through WL4 options are required to maintain all applicable certifications, approvals, and network performance specifications. Increasing antenna gain or remote cable length may result in loss of certification and/or network performance.*

Product Certifications

Approved Manufacturing Locations

Rosemount Inc. – Chanhassen, Minnesota, USA

Telecommunication Compliance

All wireless devices require certification to ensure that they adhere to regulations regarding the use of the RF spectrum. Nearly every country requires this type of product certification. Emerson is working with governmental agencies around the world to supply fully compliant products and remove the risk of violating country directives or laws governing wireless device usage. To see which countries our devices have received certification for use in, see www.rosemount.com/smartwireless.

European Union Directive Information

The EC declaration of conformity for all applicable European directives for this product can be found on the Rosemount website at www.rosemount.com. A hard copy may be obtained by contacting your local sales representative.

ATEX Directive (94/9/EC)

Emerson Process Management complies with the ATEX Directive.

Electro Magnetic Compatibility (EMC) (2004/108/EC)

EN 61326-1: 1997 with amendments A1, A2, and A3 - Industrial

Radio and Telecommunications Terminal Equipment Directive (R&TTE)(1999/S/EC)

Emerson Process Management complies with the R&TTE Directive

CE   EMC Marking

Compliance with European Union EMC

Hazardous Location Certifications[1]

North American Certifications

Factory Mutual (FM) Approvals

N5   FM Division 2 (Non-incendive)
Certificate Number: 3028321
Nonincendive for Class I, Division 2, Groups A,B,C, and D;
Dust Ignitionproof for Class II,III, Division 1,
Groups E,F, and G; Indoor/outdoor locations;
NEMA Type 4X
Temperature Code: T4 (T_{amb}=-40°C TO +60°C)

Canadian Standards Association (CSA)

N6   CSA Division 2 & Dust Ignitionproof
Certificate Number: 1849337
Suitable for Class I, Division 2, Groups A,B,C,D;
Dust Ignitionproof for Class II, Groups E,F, and G;
Suitable for Class III Hazardous Locations.
Install per Rosemount drawing 01420-1011.
Temperature Code: T4(-40°C < T_a < 60°C)
CSA Enclosure Type 4X

European Certification

N1   ATEX Type n (ATEX)
See note below
Certificate Number: BASEEFA07ATEX0057X
ATEX Marking: Ex II 3 G
EEx nA nL IIC T4 (-40°C < T_a < 60°C)

ND   ATEX Dust Ignition-proof Approval
Certificate Number: BASEEFA07ATEX0056x
Ex tD A22 IP66 T135 (-40 °C< Ta < +60)
EEx nA nL IIC T4 (-40°C < T_a < 60°C)   ⟨Ex⟩ II 3D
Vmax = 28V

IECEx Certification

N7   IECEx Type n
See note below
Certificate Number:IECEx BAS 07.0012x
Ex nC IIC T4 (-40°C =< T_a <= +60°C)
Rated Voltage: 28V

NF   IECEx Dust Ignition-proof Approval
Certificate Number: IECEx BAS 07.0013
Ex tD A22 IP66 T135 (-40°C < T_a < 60°C)
Vmax = 28V

CE ⓘ
TABLE 1.

Country	Restriction
Bulgaria	General authorization required for outdoor use and public service
France	Outdoor use limited to 10mW e.i.r.p.
Italy	If used outside of own premises, general authorization is required.
Norway	May be restricted in the geographical area within a radius of 20 km from the center of Ny-Alesund.
Romania	Use on a secondary basis. Individual license required.

CONDITIONS OF INSTALLING N1 AND N7:

The Apparatus is not capable of withstanding the 500V insulation test required by Clause 9.4 of EN 60079-15: 2005. This must be taken into account when installing the apparatus.

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(1)   *Includes remote antenna as required.* **For approval, all cabling for Modbus, Ethernet, and power must be shielded.**
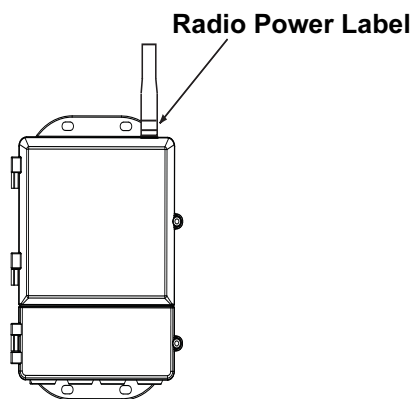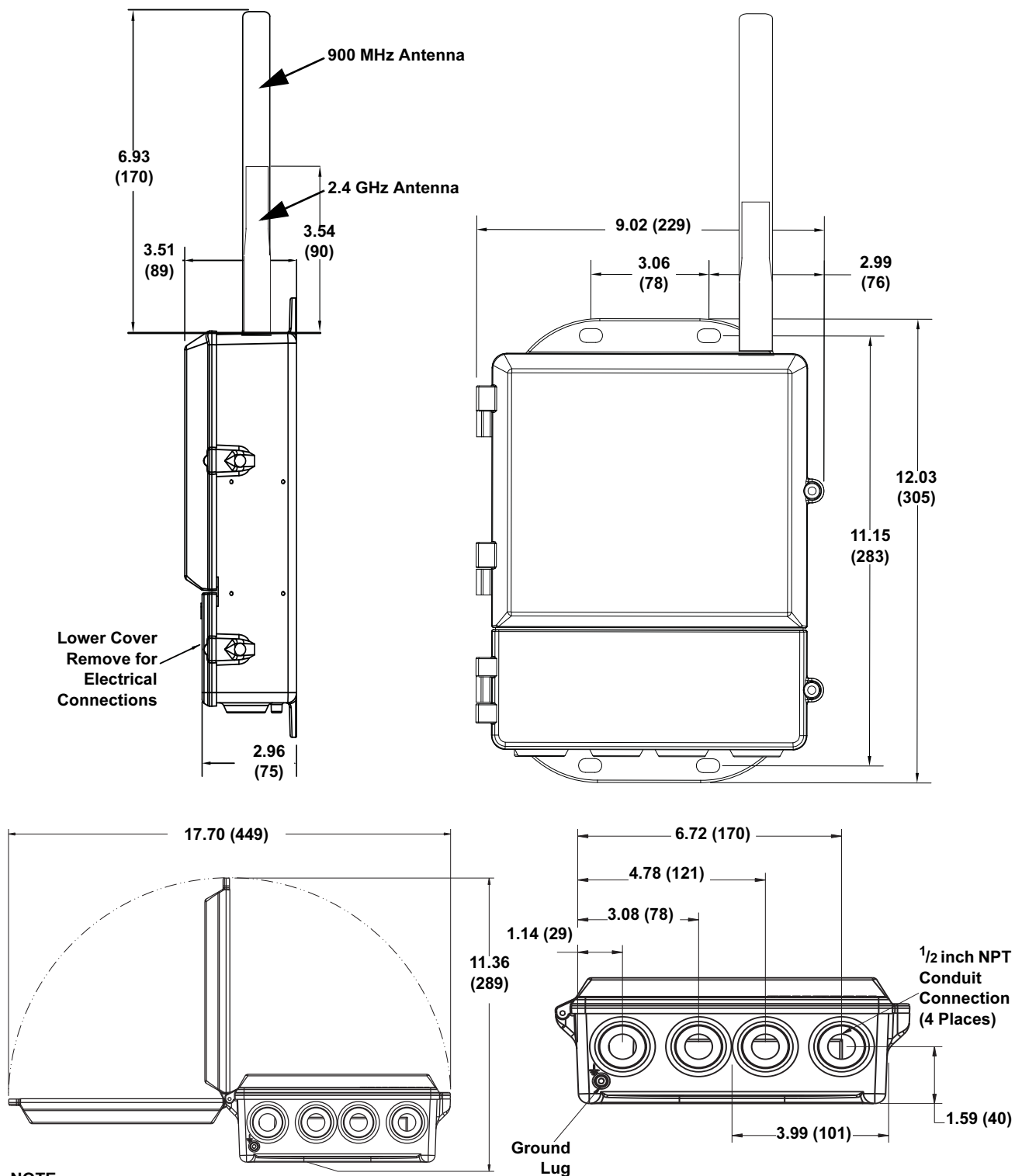
Radio Power Label - see Figure 1 - indicates output power configuration of the radio. Devices with this label are configured for output power less than 10 mW e.i.r.p. At time of purchase the customer must specify ultimate country of installation and operation.
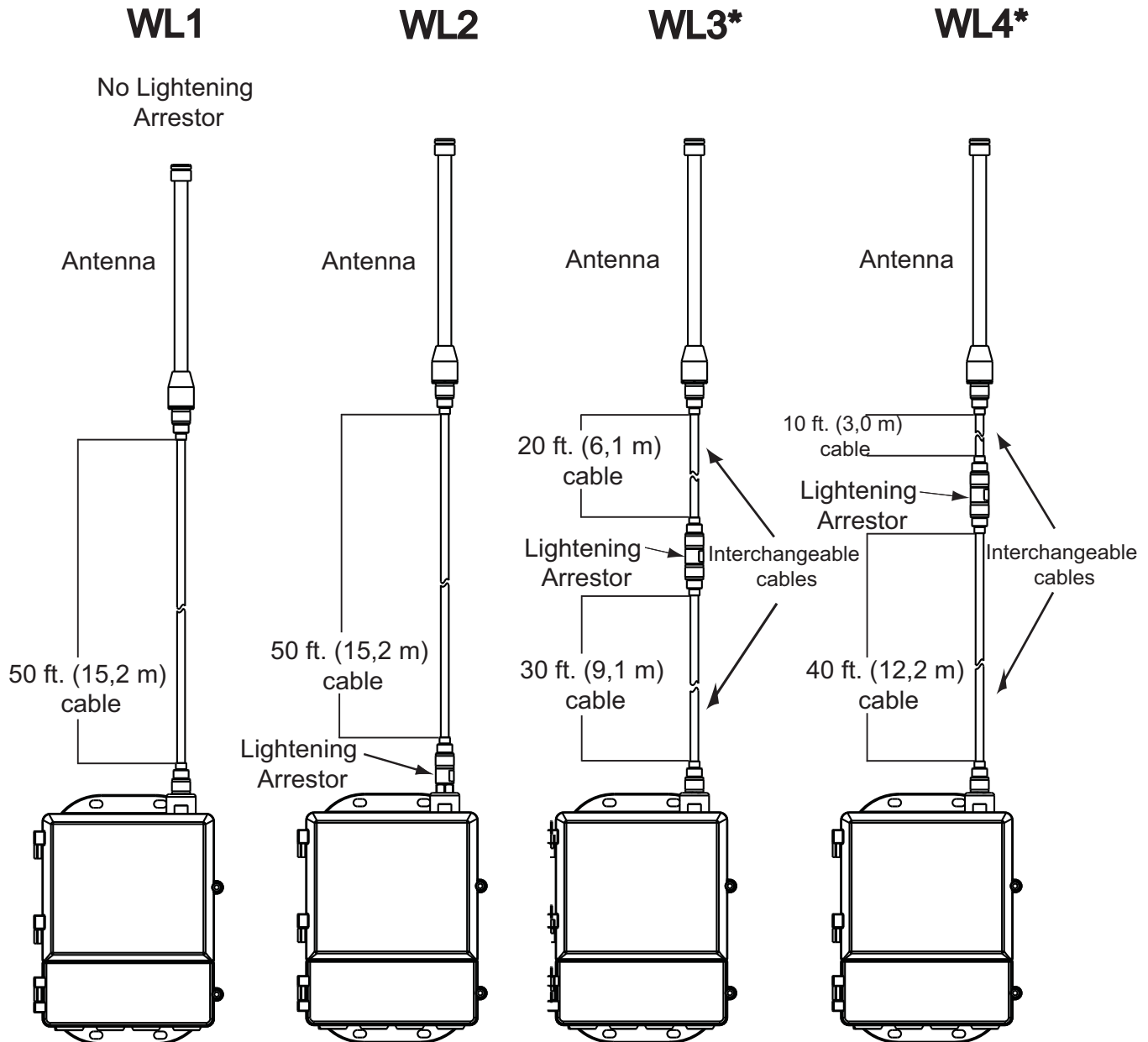
FIGURE 1.

Radio Power Label

Dimensional Drawings

FIGURE 2. 1420 Wireless Gateway

900 MHz Antenna

6.93 (170)

2.4 GHz Antenna

3.51 (89)

3.54 (90)

Lower Cover Remove for Electrical Connections

2.96 (75)

9.02 (229)

3.06 (78)

2.99 (76)

12.03 (305)

11.15 (283)

17.70 (449)

11.36 (289)

6.72 (170)

4.78 (121)

3.08 (78)

1.14 (29)

¹/₂ inch NPT Conduit Connection (4 Places)

1.59 (40)

3.99 (101)

Ground Lug

NOTE
Dimensions are in inches (millimeters).

Remote Omni-Antenna Kit

The Remote Omni-Antenna kit includes sealant tape for remote antenna connection, as well as mounting brackets for the antenna, Lightning Arrestor, and the 1420.

W1 is used in indoor applications with the 1420 and remote antenna mounted indoors.

W2 is used in outdoor applications with the 1420 and remote antenna mounted outdoors.

W3 and W4 are for applications where the 1420 is mounted indoors, the Lightening Arrestor is mounted on the exterior wall, and the remote antenna is mounted outdoors.

*Note that the cables on the Wireless Options WL3 and WL4 are interchangeable.

1420 Wireless Gateway

Ordering Information

Model	Product Description
1420	Wireless Gateway
Code	**Power Input**
A	24 VDC
Code	**Output**
1	RS485 + Ethernet
2	RS485 + Redundant Ethernet
3	RS485 + Fiber Optic Ethernet
Code	**Operating Frequency and Protocol**
A1	HART, Self-Organizing Network - 2.4 GHz DSSS
A2	HART, Self-Organizing Network - 900 MHz FHSS
Code	**RS-485 Communication**
N	No RS-485 Communication
A	Modbus RTU
Code	**Ethernet Communication**
0	Webserver and Modbus TCP/IP
1	OPC with Webserver and Modbus TCP/IP
2	AMS Ready Connectivity with Webserver and Modbus TCP/IP
4	AMS Ready Connectivity with OPC, Webserver and Modbus TCP/IP
Code	**Other Options**
	Software Configuration
C1	Custom Software Configuration
	Product Certifications
N5	FM Division 2, Dust Ignition-proof
N6	CSA Division 2, Dust Ignition-proof
N1	ATEX Type n
ND	ATEX Dust Ignition-proof
N7	IECEx Type n
NF	IECEx Dust Ignition-proof
	Adapters
J1	CM 20 Conduit Adapter
J2	PG 13.5 Conduit Adapter
	Wireless Options[1][2]
WL1	Remote Omni-Antenna Kit, 50 ft. (15.2 m) cable
WL2	Remote Omni-Antenna Kit, 50 ft. (15.2 m) cable, Lightning Arrestor
WL3	Remote Omni-Antenna Kit, 20 ft. (6.1 m) and 30 ft. (9.1 m) cables, Lightning Arrestor
WL4	Remote Omni-antenna Kit, 10 ft. (3.0 m) and 40 ft. (12.2 m) cables, Lightning Arrestor
Typical Model Number:	**1420 A 1 A2 A 2 C1 N5**

(1) The WL1 - WL4 options may not be available in all world areas.

(2) The WL1 - WL4 options require minor assembly.

Standard Terms and Conditions of Sale can be found at www.rosemount.com\terms_of_sale

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Modbus is a trademark of Modicon, Inc.
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