Emerson Wireless 1420 Gateway

IEC

WirelessHART

- Gateway connects wireless self-organizing networks with any host system

- Easy configuration and management of self-organizing networks

- Easy integration into control systems and data applications through serial and Ethernet LAN connections

- Seamless integration into AMS Device Manager and DeltaV™ automation system

- Greater than 99% reliability with industry proven security

- Wireless capabilities extends the full benefit of Plantweb™ architecture to previously inaccessible locations

EMERSON.

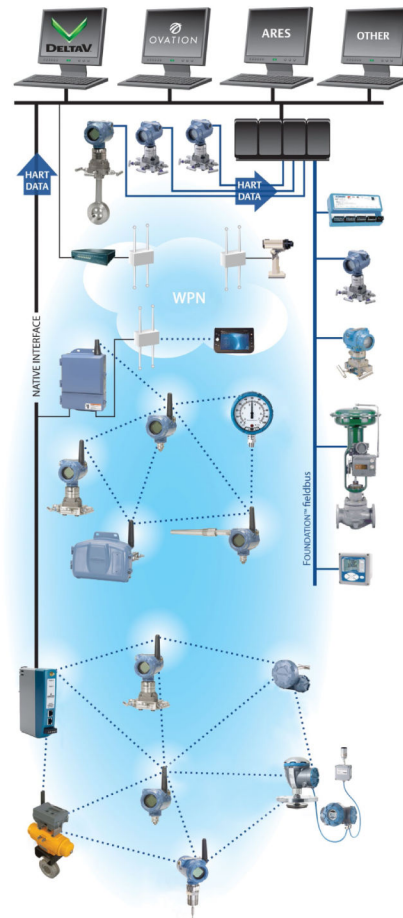# Emerson's wireless solution

IEC 62591 (*Wireless*HART®)... The industry standard

Self-organizing, adaptive mesh routing

- No wireless expertise required, network automatically finds the best communication paths

- The self-organizing, self-healing network manages multiple communication paths for any given device. If an obstruction is introduced into the network, data will continue to flow because the device already has other established paths. The network will then lay in more communication paths as needed for that device.

Reliable wireless architecture

- Standard IEEE 802.15.4 radios

- 2.4 GHz ISM band sliced into 15 radio-channels

- Time Synchronized Channel Hopping to avoid interference from other radios, Wi-Fi, and EMC sources and increase reliability

- Direct sequence spread spectrum (DSSS) technology delivers high reliability in challenging radio environment

Contents

Emerson's wireless

Seamless integration via LAN to all existing host systems

■ Native integration into DeltaV and Ovation™ is transparent and seamless

■ Gateways interface with existing host systems via LAN, using industry standard protocols including OPC, Modbus® TCP/IP, Modbus RTU, and EtherNet/IP™

Layered security keeps your network safe

■ Ensures data transmissions are received only by the wireless Gateway

■ Network devices implement industry standard Encryption, Authentication, Verification, Anti-Jamming, and Key Management

■ Third party security verification including Achilles and FIPS197- User based login and enforced password strength. Password strength monitoring, user based log in, password reset requirements, automatic lockout, password expiration requirements. Based on guidelines from ISA99.03.03 standard approved level two.

SmartPower™ solutions

■ Optimized Emerson instrumentation, both hardware and software, to extend power module life

■ SmartPower technologies enable predictable power life

Emerson Wireless 1420 Gateway

Gain real-time process information with greater than 99% wireless data reliability

- The Wireless Gateway automatically manages wireless communications in constantly changing environments.

- Native integration with DeltaV and Ovation automation systems provides simple and fast commissioning for wireless field networks.

- Connect to data historians, legacy host systems, and other via a LAN applications through Ethernet, Modbus TCP/IP, Modbus RTU, OPC, EtherNet/IP, and HART® outputs.

Guarantee system availability with redundant Wireless Gateways

- Never lose the wireless network with hot standby capability and automatic fault detection

- Wireless Gateways function as a single system, eliminating the need for duplicate host integration.

- One-click configuration and plug-and-play architecture

Complete wireless network configuration tools provided with each Gateway

- The integrated web interface allows easy configuration of the wireless network and data integration without the need to install additional software.

- Complimentary AMS Wireless Configurator software provides Emerson Device Dashboards to configure devices and view diagnostic data.

- Drag and drop device provisioning enables a secure method to add new wireless devices to the wireless field network.

Ordering information

Specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See Material selection for more information on material selection.

Table 1: Wireless 1420 Gateway Ordering Information

The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

Model	Product description	
1420	Wireless Gateway	★
Wireless configuration		
A	100 device network (10.5-30 VDC)	★
Ethernet Communications - Physical Connection		
1[1][2]	Single Ethernet connection	★
2[3][4]	Dual Ethernet connection	★
Operating Frequency, and Protocol		
A3	2.4 GHz DSSS, *Wireless*HART	★
Serial Communication		
N	None	★
A[5]	Modbus RTU via RS485	★
Ethernet Communication - Data Protocols		
2	Webserver, Modbus TCP/IP, AMS ready, HART-IP™	★
4	Webserver, Modbus TCP/IP, AMS ready, HART-IP, OPC	★
5[6]	DeltaV ready	★
6[6]	Ovation ready	★
8	Webserver, EtherNet/IP, AMS ready, HART-IP	★
9	Webserver, EtherNet/IP, Modbus TCP/IP, AMS ready, HART-IP	★

(1) *Single active 10/100 baseT Ethernet port with RJ45 connector.*
(2) *Additional ports disabled.*
(3) *Dual active 10/100 baseT Ethernet ports with RJ45 connectors.*
(4) *Multiple active ports have separate IP addresses, firewall isolation, and no packet forwarding.*
(5) *Convertible to RS232 via adaptor, not included with Gateway.*
(6) *Includes Webserver, Modbus TCP, AMS Ready, HART-IP, and OPC.*

Table 2: Options (Include with selected model number)

Model	Product description	
Product Certifications		
N5	U.S.A. Division 2	★
N6	CSA Division 2, Non-incendive	★
N1[1]	ATEX Type n	★
ND[1]	ATEX Dust	★
N7[1]	IECEx Type n	★

Table 2: Options (Include with selected model number) *(continued)*

Model	Product description	
NF[1]	IECEx Dust	★
KD[1]	USA and Canada Division 2, Non-incendive and ATEX Type n	★
N2[1]	INMETRO Type n	★
N3[1]	China Type n	★
N4[1]	TIIS Type n	★
NM	Technical Regulation Customs Union (EAC) Type N	★
Redundancy options[2][3][4]		
RD	Gateway redundancy	★
Adapters		
J1	CM 20 conduit adapters	★
J2	PG 13.5 conduit adapters	★
J3	3/4 NPT conduit adapters	★
Antenna options[5]		
WL2	Remote antenna kit, 50 ft (15,2 m) cable, lightning arrestor	★
WL3	Remote antenna kit, 20 ft (6,1 m) and 30 ft (9,1 m) cables, lightning arrestor	★
WL4	Remote antenna kit, 10 ft (3,0 m) and 40 ft (12,2 m) cables, lightning arrestor	★
WN2[6]	High-gain, remote antenna kit, 25 ft (7,6m) cable, lightning arrestor	
Typical model number: 1420 A 2 A3 A 2 N5		

(1)   *Options may or may not come with POE. See terminal block configuration for determination if the device is compatible with POE or see the 1420 Manual.*
(2)   *Requires the selection of Dual Ethernet option code 2.*
(3)   *Not available with DeltaV Ready option code 5.*
(4)   *Not available with EtherNet/IP option codes 8 and 9.*
(5)   *The WL2, WL3, WL4, and WN2 options require minor assembly.*
(6)   *Not available in all countries.*

Table 3: Spare Parts

Item description	Part number
Spare kit, WL2 replacement[1], remote antenna, 50 ft (15,2 m) cable, and lightning arrestor	01420-1615-0302
Spare kit, WL3 replacement[1], remote antenna, 20/30 ft (6,1/9,1 m) cables, and lightning arrestor	01420-1615-0303
Spare kit, WL4 replacement[1], remote antenna, 10/40 ft (3,0/12,2 m) cables, and lightning arrestor	01420-1615-0304
Spare kit, WN2 replacement[1], high gain, remote antenna, 25 ft (7,6 m) cable, and lightning arrestor[2]	01420-1615-0402

(1)   *Can not upgrade from integral to remote antenna.*
(2)   *Not available in all countries.*

Specifications
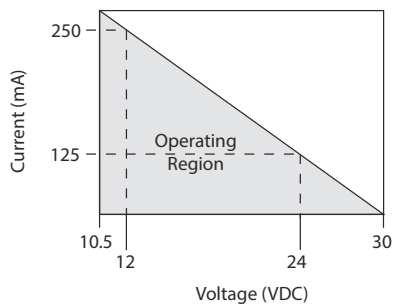
Functional specifications

Input power

10.5–30 VDC

Current draw

For non-POE enabled Gateways, the operation current draw is based on 3.6 Watts average power consumption.

Momentary startup Current Draw up to twice Operating Current Draw.

Power and Ethernet

PSE mode

50 v–57 vDC Output 9 per IEEE 802.3at-2009) 25.5 W maximum

Radio frequency power output from antenna

Maximum of 10 mW (10 dBm) EIRP

Maximum of 40 mW (16 dBm) EIRP for WN2 High Gain option[1]

Environmental

Operating Temperature Range

-40 to 158 °F (-40 to 70 °C)

Operating Humidity Range

10–90% relative humidity

EMC performance

Meets all industrial environment requirements of EN61326 and NAMUR NE-21. Maximum deviation <1% span during EMC disturbance.[2]

Antenna options

Integrated Omni-directional Antenna

Optional remote mount Omni-directional Antenna

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(1) Not available in all countries.
(2) During surge event, device may exceed maximum EMC deviation limit or reset; however, device will self-recover and return to normal operation within specified start-up time.

Physical specifications

Material selection

Emerson provides a variety of Rosemount product with various product options and configurations including materials of construction that can be expected to perform well in a wide range of applications. The Rosemount product information presented is intended as a guide for the purchaser to make an appropriate selection for the application. It is the purchaser's sole responsibility to make a careful analysis of all process parameters (such as all chemical components, temperature, pressure, flow rate, abrasives, contaminants, etc.), when specifying product, materials, options and components for the particular application. Emerson is not in a position to evaluate or guarantee the compatibility of the process fluid or other process parameters with the product, options, configuration or materials of construction selected.

Weight

10 lb (4.54 kg)

Material of construction

Housing

Low-copper aluminum, NEMA 4X

Paint

Polyurethane

Cover gasket

Silicone rubber

Antenna

Integrated Antenna: PBT/PC

Remote Antenna: Fiber Glass

Certifications

Class I Division 2 (U.S.)

Equivalent Worldwide

Communication specifications

Isolated RS485

2-wire communication link for Modbus RTU multi drop connections

Baud rate: 57600, 38400, 19200, or 9600

Protocol: Modbus RTU

Wiring: Single twisted shielded pair, 18 AWG

Wiring distance: up to 4,000 ft. (1,524 m)

Ethernet

10/100base-TX Ethernet communication port

Protocols: EtherNet/IP, Modbus TCP, OPC, HART-IP, https (for Web Interface)

Wiring: Cat5E shielded cable

Wiring distance: 328 ft (100 m)

Modbus

Supports Modbus RTU and Modbus TCP with 32-bit floating point values, integers, and scaled integers.

Modbus Registers are user-specified.

OPC

OPC server supports OPC DA v2, v3

EtherNet/IP

Supports EtherNet/IP protocol with 32-bit Floating Point values and Integers.

EtherNet/IP Assembly Input-Output instances are user configurable.

EtherNet/IP specifications are managed and distributed by ODVA.

For details on capabilities, see the Wireless Gateway Reference Manual.

Self-organizing network specifications

Protocol

IEC 62591 (*Wireless*HART), 2.4–2.5 GHz DSSS.

Maximum network size

100 wireless devices @ eight seconds or more

50 wireless devices @ four seconds

25 wireless devices @ two seconds

12 wireless devices @ one second

For information on network size and update rate, see the capacity estimator tool on the Wireless homepage.

Supported device update rates

1, 2, 4, 8, 16, 32 seconds or 1–60 minutes

Network size/latency

100 Devices: less than 10 sec.

50 Devices: less than five sec.

Data reliability

>99%

PoE

Supports IEEE 802.11 PoE as a PD or a PSE on either Port; jumper selectable.

PSE ratings: IEEE 802.11af for 12VDC input and IEEE 802.11at for 24 VDC input

System security specifications

Ethernet

Secure Sockets Layer (SSL)- enabled (default) TCP/IP communications

Wireless Gateway Access

Role-based Access Control (RBAC) including Administrator, Maintenance, Operator, and Executive. Administrator has complete control of the gateway and connections to host systems and the self-organizing network.

Self-organizing network

AES-128 Encrypted *Wireless*HART, including individual session keys. Drag and drop device provisioning, including unique join keys and white listing.

Internal firewall

User Configurable TCP ports for communications protocols, including Enable/Disable and user specified port numbers. Inspects both incoming and outgoing packets.

Third party certification

Wurldtech: Achilles Level 1 certified for network resiliency.

National Institute of Standards and Technology (NIST): Advanced Encryption Standard (AES) Algorithm conforming to Federal Information Processing Standard Publication 197 (FIPS-197)

Product certifications

Rev 2.1

European Directive Information

A copy of the EC Declaration of Conformity can be found at the end of the Quick Start Guide. The most recent revision of the EC Declaration of Conformity can be found at Emerson.com/Rosemount.

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.

FCC and IC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation. This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.

Ordinary Location Certification

As standard, the transmitter has been examined and tested to determine that the design meets the basic electrical, mechanical, and fire protection requirements by a nationally recognized test laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

Installing Equipment in North America

The US National Electrical Code® (NEC) and the Canadian Electrical Code (CEC) permit the use of Division marked equipment in Zones and Zone marked equipment in Divisions. The markings must be suitable for the area classification, gas, and temperature class. This information is clearly defined in the respective codes.

USA

N5 U.S.A. Division 2

Certificate	CSA 70010780
Standards	FM Class 3600 - 2011, FM Class 3611 - 2004, FM Class 3616 - 2011, UL 50 - 11th Ed, ANSI/ISA 61010-1 - 2012
Markings	NI CL 1, DIV 2, GP A, B, C, D T4; Suitable for use in CL II, III, DIV 2, GP F, G T4; T4(-40 °C ≤ T_a ≤ +60 °C); Nonincendive outputs to remote antenna when connected per Rosemount drawing 01420-1011; Type 4X

Special Conditions for Safe Use(X):

1. Explosion Hazard. Do not disconnect equipment when a flammable or combustible atmosphere is present.

Canada

N6 Canada Division 2

Certificate   CSA 70010780

Standards   CAN/CSA C22.2 No. 0-M91 (R2001), CAN/CSA Std C22.2 No. 94-M91 (R2001), CSA Std C22.2 No. 142-M1987, CSA Std C22.2 No. 213-M1987, CSA C22.2 No. 61010-1 – 2012

Markings   Suitable for Class 1, Division 2, Groups A, B, C, and D, T4; when connected per Rosemount drawing 01420-1011; Type 4X

Special Conditions for Safe Use(X)

1. Explosion Hazard. Do not disconnect equipment when a flammable or combustible atmosphere is present.

Europe

N1 ATEX Type n

Certificate   Baseefa07ATEX0056X

Standards   EN 60079-0: 2012, EN 60079-15: 2010

Markings   ⟨Ex⟩ II 3 G Ex nA IIC T4 Gc, T4(-40 °C ≤ T_a ≤ +65 °C), V_{MAX} = 28 Vdc

Special Conditions for Safe Use(X)

1. The equipment is not capable of withstanding the 500V insulation test required by clause 6.5.1 of EN 60079-15:2010. This must be taken into account when installing the equipment.

2. The surface resistivity of the antenna is greater than 1GΩ. To avoid electrostatic charge build-up, it must not be rubbed with a dry cloth or cleaned with solvents.

ND ATEX Dust

Certificate   Baseefa07ATEX0057X

Standards   EN 60079-0: 2012, EN 60079-31: 2009

Markings   ⟨Ex⟩ II 3 D Ex tc IIIC T135 °C Dc, (-40 °C ≤ T_a ≤ +65 °C)

Special Conditions for Safe Use(X)

1. The surface resistivity of the antenna is greater than 1GΩ. To avoid electrostatic charge build-up, it must not be rubbed with a dry cloth or cleaned with solvents.

International

N7 IECEx Type n

Certificate   IECEx BAS 07.0012X

Standards   IEC 60079-0: 2011, IEC 60079-15: 2010

Markings   Ex nA IIC T4 Gc, T4(-40 °C ≤ T_a ≤ +65 °C), V_{MAX} = 28 Vdc

Special Conditions for Safe Use(X)

1. The apparatus is not capable of withstanding the 500 V electrical strength test as defined in Clause 6.5.1 of IEC 60079-15:2012. This must be taken into account during installation.

2. The surface resistivity of the antenna is greater than 1GΩ. To avoid electrostatic charge build-up, it must not be rubbed with a dry cloth or cleaned with solvents.

NF IECEx Dust

Certificate	IECEx BAS 07.0013
Standards	IEC 60079-0: 2011, IEC 60079-31: 2008
Markings	Ex tc IIIC T135 °C Dc, (-40 °C ≤ T_a ≤ +65 °C)

Special Conditions for Safe Use(X)

1. The surface resistivity of the antenna is greater than 1GΩ. To avoid electrostatic charge build-up, it must not be rubbed with a dry cloth or cleaned with solvents.

Brazil

N2 INMETRO Type n

Certificate	UL-BR 15.0350X
Standards	ABNT NBR IEC 60079-0:2008 + Errata 1:2011, IEC 60079-15:2012;
Markings	Ex nA IIC T4 Gc, T4(-40 °C ≤ T_a ≤ +65 °C)

Special Conditions for Safe Use(X)

1. See certificate for special conditions.

China

N3 China Type n

Certificate	CNEx13.1929X
Standards	GB3836.1 – 2010, GB3836.8 - 2003
Markings	Ex nA nL IIC T4 Gc

Special Conditions for Safe Use(X)

1. See certificate for special conditions.

Japan

N4 TIIS Type n

Certificate	T64855
Markings	Ex nA nL IIC T4

EAC – Belarus, Kazakhstan, Russia

NM Technical Regulation Customs Union (EAC) Type n

Certificate	RU C-US.ГБ05.B.00578

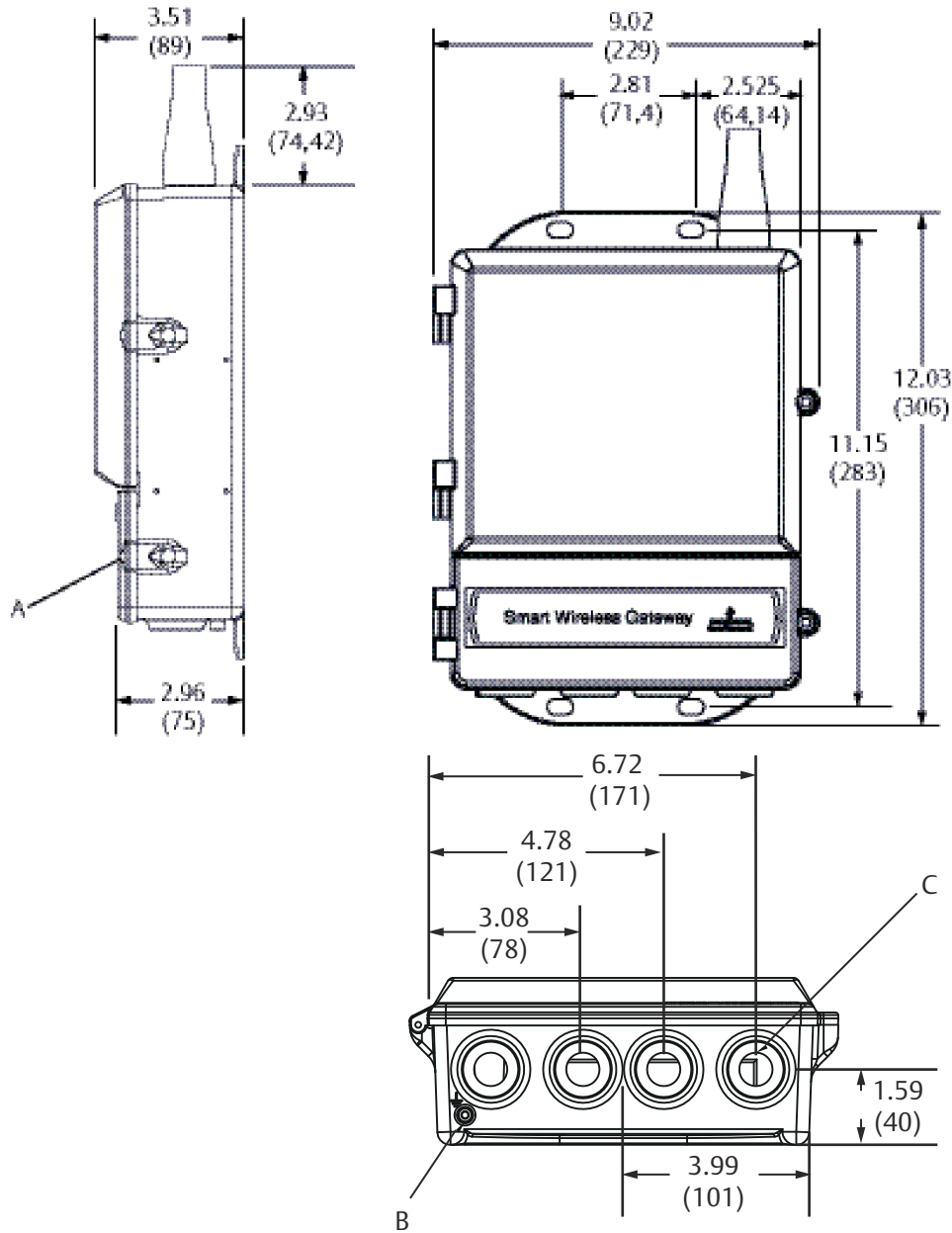**Markings**   2Ex nA IIC T4 X; T4(-40 °C ≤ T$_a$ ≤ +65 °C) IP66;

Combinations

KD   Combination of N1, N5, and N6

Dimensional drawings
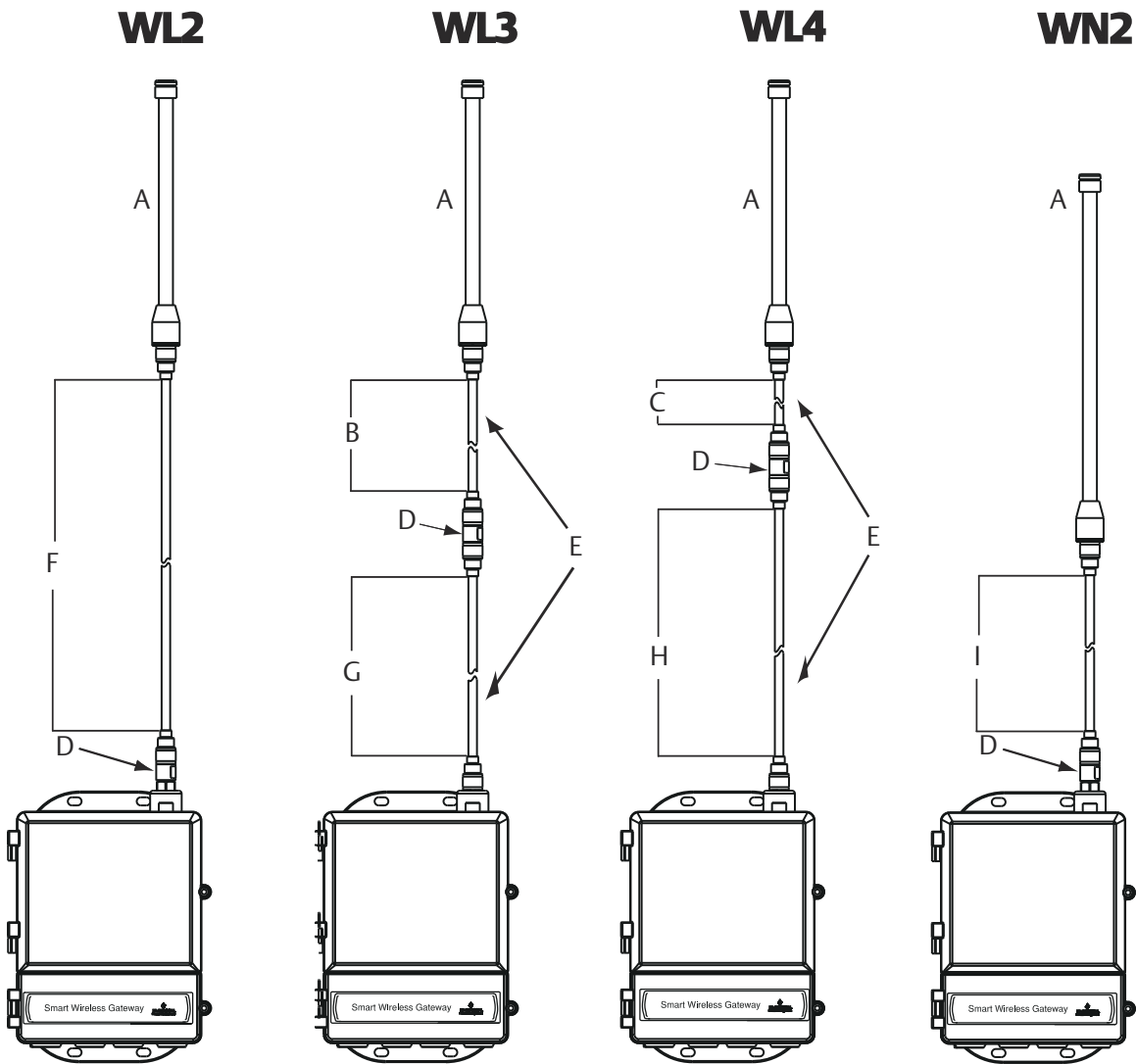
Figure 1: Wireless Gateway

A   Lower cover (remove for electrical connections)

B   Ground lug

C   ½-in. NPT conduit connection (4 places)

Dimensions are in inches (millimeters).

Figure 2: Remote Antenna Kit

A	Antenna	**F**	50 ft (15,2 m) cable
B	20 ft (6,1 m) cable	**G**	30 ft (9,1 m) cable
C	10 ft (3,0 m) cable	**H**	40 ft (12,2 m) cable
D	Lightning arrestor	**I**	25 ft (7,6 m) cable
E	Interchangeable cables		

The Remote Antenna kit includes sealant tape for remote antenna connection, as well as mounting brackets for the antenna, lightning arrestor, and the Wireless Gateway.

Lightning protection is included on all the options.

Note
The cables lengths on the remote antenna options WL3 and WL4 are interchangeable for installation convenience.

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