Emerson Wireless 1410S Gateway with 781S Smart Antenna

- Gateway connects the *Wireless*HART® 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 connections
- Greater than 99 percent data reliability with industry proven security
- Ability to leverage sensor data from critical assets to eliminate blind spots, and improve productivity and safety of operations
- Integration to the new Cisco® Catalyst IW6300 Heavy Duty Access Point providing the latest Wi-Fi® technology

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Emerson Wireless solution

IEC62591 (WirelessHART®)...the industry standard

Self-organizing, adaptive mesh routing

- No wireless expertise required; network automatically establishes 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, then 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 for increased reliability and avoidance of interference from other radios, Wi-Fi, and EMC sources

- Direct Sequence Spread Spectrum (DSSS) technology delivers high reliability in challenging radio environment

Emerson wireless

Seamless integration via LAN or serial communications to other existing host systems

- Native integration into Ovation™ and DeltaV™[1] is transparent and seamless.

- Gateways interface with existing host systems via Local Area Network (LAN) or serial communications using industry standard protocols including OPC DA, OPC UA, Modbus® TCP/IP, Ethernet/IP & HART®-IP, and Modbus RTU

Layered security keeps your network safe

- All wireless data is 128 bit AES encrypted so your data is kept safe

- All wireless devices are authenticated so you know exactly what is on your network

- Complete control of your network using the Gateway secure web interface

SmartPower solutions

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

- SmartPower™ technologies enable predictable power life

Contents

(1) DeltaV currently has limitations with the 1410S Gateway hardware. DeltaV does not support Gateway Redundancy and only supports a capacity of up to 100 WirelessHART devices. Potential alternatives to bring data from 200 units to DeltaV can be performed through Modbus RTU or OPC DA.

Features and benefits

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

The Emerson Wireless 1410S Gateway with 781S Smart Antenna automatically manages wireless communications in constantly changing environments. With the flexibility of installation, optimal network design and best practices can be easily implemented to achieve maximum data reliability. Connect to data historians, legacy host systems, and other applications via Ethernet using Modbus TCP, OPC, EtherNet/IP™, and HART-IP™ protocols, or serial Modbus™ RTU (RS485).

Simultaneous operation of two protocols on one gateway with leading wireless standards

- One wireless Gateway with the capabilities of two Smart Antenna connections for optimal network design and flexibility

- *Wireless*HART® gives users the ability to form large networks that self-form a wireless mesh giving the user an easy path to build and grow networks

- To support the transition from legacy protocols to *Wireless*HART, a separate 781S Smart Antenna can be used to connect to IEC 62734 instrumentation

- Connect to 200 *Wireless*HART devices at a single point of communication with the upgraded Emerson 781S Smart Antenna technology

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 *Wireless*HART devices and view diagnostic data

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

Access information when you need it with asset tags

Newly shipped devices include a unique QR code asset tag that enables you to access serialized information directly from the device. With this capability, you can:

- Access device drawings, diagrams, technical documentation, and troubleshooting information in your MyEmerson account

- Improve mean time to repair and maintain efficiency

- Ensure confidence that you have located the correct device

- Eliminate the time-consuming process of locating and transcribing nameplates to view asset information

Emerson Wireless 1410S Gateway ordering information

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Online product configurator

Many products are configurable online using our Product Configurator. Select the **Configure** button or visit Emerson.com to start. With this tool's built-in logic and continuous validation, you can configure your products more quickly and accurately.

Specifications and options

The purchaser of the equipment must specify and select the product materials, options, or components.

Model code

Model codes contain the details related to each product. Exact model codes will vary; an example of a typical model code is shown in Figure 1.

Figure 1: Model code example

1410S2BA32ND5NA   J3RD
         1   2

1. Required model components (choices available on most)

2. Additional options (variety of features and functions that may be added to products)

Optimizing lead time

The starred offerings (★) represent the most common options and should be selected for the fastest delivery times. The non-starred offerings are subject to additional delivery lead time.

Required model components

Model

Code	Description	
1410S	Wireless Gateway, 2.4 GHz DSSS, web server, AMS ready, HART-IP® protocol	★

Installation area

Code	Description	
1	Indoor rated housing (engineered polymer)	★
2	Outdoor rated housing (aluminum)	★

Intrinsically safe outputs

Code	Description	
A[1]	Zone 0/Div 1: Emerson 781S Smart Antenna may be installed in Zone 0/1/2 & Class I Div 1/2	★
B	Zone 2/Div 2: Emerson 781S Smart Antenna may be installed in Zone 2 & Class I Div 2	★
N	No approval outputs: Emerson 781S Smart Antenna installation in safe area	

(1)   *Option A cannot be selected with Wireless configuration option A6 or A7 for dual protocol support.*

Wireless configuration

Code	Description	
A3[1]	*Wireless*HART® protocol	★
A6[1][2]	*Wireless*HART (IEC 62591) and IEC 62734 protocols	★
A7[3]	Dual *Wireless*HART protocol	★

(1)   *Must order the Emerson 781SA WirelessHART Smart Antenna. Reference Emerson Wireless 781S Ordering Information for details.*
(2)   *Must order the Emerson 781SC Smart Antenna. Reference Emerson Wireless 781S Ordering Information for details.*
(3)   *Must order two Emerson 781SA WirelessHART Smart Antenna. Reference Emerson Wireless 781S Ordering Information for details.*

Ethernet communications – physical connection

Code	Description	
1	Single Ethernet connection	★
2	Dual Ethernet connection	★

Serial communication

Code	Description	
N	None	★
A	Modbus® RTU via RS485	★

Ethernet communications – data protocols

Code	Description	
D1	Modbus® TCP/IP	★
D2[1]	OPC DA (OPC UA available)	★
D3	EtherNet/IP™	★
D4	Modbus TCP/IP, OPC DA	★
D5	EtherNet/IP, Modbus TCP/IP	★
D6	EtherNet/IP, OPC DA	★

Code	Description	
E1[2]	DeltaV Ready	★
E2	Ovation ready	★
E3	Web server ready	★

(1)   *OPC UA Ethernet communication can be enabled by selecting OPC UA in the Features page of the Gateway Web Interface. D2 option only provides OPC DA capabilities from the factory.*

(2)   *The E1 (DeltaV™ ready) option has some initial limitations due to the DeltaV system's 100 device capacity limit. The Emerson 1410S and 781S can connect to 200 WirelessHART® devices but is limited to 100 devices when used with a DeltaV system.*

Product certifications

Code	Description	
N5	USA Division 2 Non-Incendive & Zone 2 Type ec	★
N6	Canada Division 2 Non-Incendive & Zone 2 Type ec	★
N1	ATEX Type ec	★
N7	IECEx Type ec	★
ND	ATEX Dust	★
NF	IECEx Dust	★
N2	INMETRO Type ec	★
N3	China Zone 2	★
N4	Japan Zone 2	★
NM	Technical Regulations Customs Union (EAC) Zone 2	★
NP	Korea Zone 2	★
NA	No approvals	★

Additional options

Conduit adapters

Code	Description	
J1	CM 20 Conduit adapters	★
J2	PG 13.5 Conduit adapters	★
J3	¾ NPT Conduit adapters	★
J5	CM 20, PG 13.5, & ¾ NPT Conduit adapters	★

Gateway redundancy options

Gateway redundancy is not available with wireless configuration option - A6.

Code	Description	
RD[1]	Gateway redundancy	★

(1)   *Option RD cannot be selected with communication protocol options D5 or D6 for Ethernet/IP, or option E1 for DeltaV Ready.*

Cisco® Wi-Fi® access point spectrum domain

Code	Description	
A63	Argentina, Bolivia, Canada, Chile, Columbia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Paraguay, Peru, Philippines, Uruguay	
E63	Albania, Algeria, Armenia, Austria, Bahamas, Belgium, Bosnia and Herzegovina, Bulgaria, Burundi, Cameroon, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Gabon, Germany, Ghana, Gibraltar, Greece, Hungary, Iceland, Ireland, Italy, Jamaica, Jordan, Kazakhstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Malta, Mauritius, Monaco, Mongolia, Montenegro, Morocco, Netherlands, Nigeria, Norway, Oman, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Trinidad, Turkey, UK, Tanzania	
Z63	Australia, Brazil, New Zealand	
S63	Brunei, Hong Kong, Macau, Singapore, Thailand, Vietnam	
C63	Egypt	
N63	Barbados, Fiji, Mexico, Panama	
G63	Pakistan	
B63	Puerto Rico, US	
M63	Kuwait, Qatar, Saudi Arabia, UAE	
I63	Bahrain, Belarus, Israel, Tunisia, Uzbekistan	
R63	Russian Federation	
D63	India	
Q63	Japan	
F63	Indonesia	
T63	Taiwan	
H63	China	
K63	Korea	
L63	Malaysia	

Note

By selecting a Cisco spectrum domain, you are selecting an IW6300 Wi-Fi access point and will need to also select an option from the following Cisco option tables.

The IW6300 Wi-Fi access point can only be integrally ordered in the 1410S2 Outdoor Rated Gateway model structure. The IW6300 is compatible with the 1410S1 Indoor Rated Gateway but must be ordered separately for use with this option.

Cisco Wi-Fi access point power options

Code	Description	
P1	High Dc power: 44 – 57 Vdc	
P2	Low Dc power: 10.8 – 36 Vdc	
P3	Ac power: 100 – 200 Vac	

Cisco Wi-Fi access point dual band antenna options

Further antenna options can be purchased through the spare parts page.

Code	Description	
D4	Dual band - 1 port, omnidirectional antenna with 4 dBi of gain	
D0	No antenna, ordered separately through spare parts	

Cisco Wi-Fi access point mounting options

Code	Description	
M1	Pole mount	

Note
All IW6300 units purchased through Emerson will automatically have 12 months of Cisco SmartNET service for product support and replacement devices.

Emerson Wireless 781S Smart Antenna ordering information

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Specifications and options

The purchaser of the equipment must specify and select the product materials, options, or components.

Model code

Model codes contain the details related to each product. Exact model codes will vary; an example of a typical model code is shown in Figure 2.

Figure 2: Model code example

$$\underline{781SA1PNANA1WP3}$$
$$1$$

1. Required model components (choices available on most)

Optimizing lead time

The starred offerings (★) represent the most common options and should be selected for the fastest delivery times. The non-starred offerings are subject to additional delivery lead time.

Required model components

Model

Code	Description	
781S	Wireless Smart Antenna	

Wireless protocol and operating frequency

Code	Description	
A	*Wireless*HART®, user configurable transmit rate, 2.4 GHz DSSS, IEC 62591	★
C	ISA100, user configurable transmit rate, 2.4 GHz DSSS, IEC 62734	★

Communication

Code	Description	
1	Legacy RS485 communication	★

Housing style

Code	Description	
P	Engineered polymer	★

Product certifications

Code	Description	
I5	USA Intrinsically Safe	★
I6	Canada Intrinsically Safe	★
I1	ATEX Intrinsic Safety	★
I7	IECEx Intrinsic Safety	★
I2	INMETRO Intrinsic Safety	★
I3	China (NEPSI) Intrinsic Safety	★
I4	Japan Intrinsic Safety	★
IM	Technical Regulation Customs Union (EAC) Intrinsic Safety	★
IP	Korea Type n	★
KD	USA & Canada Intrinsically Safe, ATEX Intrinsic Safety	★
KL	USA & Canada Intrinsically Safe, ATEX & IECEx Intrinsic Safety	★
NA	No approvals	★

Wireless network capacity

Code	Description	
NA1	200 device *Wireless*HART® network	★
NA5	25 device *Wireless*HART network	★
NC1	99 device ISA network	★

Wireless antenna options

Code	Description	
WP3	Internal antenna	★

Specifications

Emerson Wireless 1410S Gateway

Functional specifications

Power	10.5-30 Vdc
	1410S2 hardware revision 1.0.0 configured with Intrinsically Safe Outputs option "A" can only be powered by 24 Vdc power source. Check label on 1410S2 Gateway to verify hardware revision.
	Powered via PoE: 44-57 Vdc
	For best results, use a high quality industrial galvanically isolated power supply rated for at least 15W to account for initial inrush current during Gateway start-up.
	Overvoltage Category I
Power Consumption: Intrinsically Safe Output Option A	Steady state operating power consumption is 7.5W when one 781S Smart Antenna is connected to the Gateway and 8W when two 781S Smart Antennas are connected.[2]
Power Consumption: Intrinsically Safe Output Option B	Steady state operating power consumption is 6.5W when one 781S Smart Antenna is connected to the Gateway and 7W when two 781S Smart Antennas are connected.
Power over Ethernet (PoE)	Gateway supports IEEE 802.3af PoE as a Powered Device (PD) on either port.
Environmental	1410S1 Operating Temperature Range: -40 to 158 °F (-40 to 70 °C)
	1410S2 Operating Temperature Range: -40 to 149 °F (-40 to 65 °C)
	1410S2 hardware revision 1.0.0 operating temperature range limited to -40 to 149 °F (-40 to 65 °C). Check label on 1410S2 Gateway to verify hardware revision.
	Pollution: Degree 4
	Maximum altitude: 5,000 m
Operating humidity range	0 to 99 percent relative non condensing humidity
Antenna options	See Wireless antenna options.

Performance specifications

EMC performance	Meets all industrial environment requirements of EN61326.
Vibration effect	No effect when tested per the requirements of IEC60770-1 (1999):
	High vibration level - Field or pipeline (10 to 60 Hz 0.21 mm displacement peak amplitude/60 to 2000Hz 2g)

Physical specifications

1410S1 Indoor Rated Housing

Weight	1.30 lbs. (0.59 kg)
Housing size	5.19 in. x 6.77 in. x 1.83 in. (13.2 cm x 17.2 cm x 4.6 cm)

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(2) When operating at ambient conditions below -4 °F (-20 °C) steady state operating power consumption of up to 12W may be observed for Intrinsically Safe Output Option A Gateways.

Housing	Engineered polymer
Enclosure rating	See Product Certification section in Emerson Wireless 1410S Quick Start Guide for Ingress Protection requirements.
Mounting style	DIN-rail

1410S2 Outdoor Rated Housing

Weight	2.76 lb. (1.25 kg)
Housing size	6.25-in. x 8.8-in. x 2.5-in. (15.9 cm x 22.4 cm x 6.4 cm)
Housing	Low-copper aluminum
Paint	Polyurethane
Enclosure rating	IP66
Mounting style	Pole mount

Note
For more information on 1410S1 and 1410S2, see Dimensional drawings.

Network specifications

Self-organizing IEC 62591(*Wireless*HART®)	2.4 to 2.5 GHz DSSS
Maximum size for each *Wireless*HART network	Up to 200 devices
Capacity load	200 wireless devices at 16 seconds
	100 wireless devices at 8 seconds
	50 wireless devices at 4 seconds
	25 wireless devices at 2 seconds
	12 wireless devices at 1 second
Supported device update rates	1, 2, 4, 8, 16, 32 seconds or 1 to 60 minutes
Data reliability	Greater than 99 percent
Self-organizing IEC 62734	2.4 to 2.5 GHz DSSS
Maximum size for each IEC 62734 network	Up to 99 devices

System security specifications

EtherNet	Transport Layer Security (TLS) enabled (default) TCP/IP communications
Emerson Wireless Gateway access	Customizable Role-Based Access Control including Administrator, Maintenance, Operator, and Executive. Administrator has complete control of the Gateway and connections to host systems and the self-organizing network.
Internal port and protocol firewall	User configurable TCP ports for communications protocols, including Enable/Disable and user specified port numbers.

Emerson Wireless 781S Smart Antenna

Functional specifications

Wireless output	IEC 62591 (*Wireless*HART®), 2.4 GHz DSSS
	IEC 62743 (ISA100), 2.4 GHz DSSS
Environmental	0 to 99 percent non-condensing relative humidity
	781S Operating Temperature Range: -40 to 149 °F (-40 to 70 °C)
Radio Frequency power output from antenna	Internal antenna (WP3 option):
	Maximum of 40 mW (16 dBm) EIRP
Smart Antenna wiring distance	Wiring distance between Smart Antenna and Gateway:
	Up to 1,312 ft. (400 m) using single twisted shielded pair, 22-24 AWG
	30 ft. (9 m) of Belden 3084a comes attached to Emerson 781S

Physical specifications

Material selection

Emerson provides a variety of products 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.

Materials of construction

Enclosure housing	Engineered polymer
Mounting	Mounting brackets also permit remote mounting
Size	Diameter 3.7-in. (9.4 cm)
Weight	2.4 lb. (1.1 kg)
Enclosure ratings (Emerson 781S)	Type 4X and IP66/67 rated

Performance specifications

EMC performance	Meets all industrial environment requirements of EN61326 and NAMUR NE-21. Maximum deviation less than one percent span during EMC disturbance.
Vibration effect	No effect when tested per the requirements of IEC60770-1 (1999):
	High vibration level - field or pipeline (10 to 60 Hz 0.21 mm displacement peak amplitude/60 to 2000Hz 2g)

For more information: **Emerson.com/global**

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