

Emerson Wireless 781S Smart Antenna



Safety messages

NOTICE

This guide provides basic guidelines for the Emerson Wireless 7815 Smart Antenna. It does not provide instructions for diagnostics, maintenance, service, or troubleshooting. Refer to the Emerson Wireless 1410S Gateway and 7815 Smart Antenna Reference Manual for more information and instructions. The manuals and this guide are available electronically on Emerson.com/Rosemount. 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.

WARNING

Failure to follow these installation guidelines could result in death or serious injury.

Ensure only qualified personnel perform the installation.

Explosions could result in death or serious injury.

Installation of the transmitters in a hazardous environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the Product Certifications section for any restrictions associated with a safe installation.

Electrical shock could cause death or serious injury.

Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

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 8-in. (20 cm) from all persons.

Physical access

Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

Contents

Wireless planning..... 5
Intended use..... 7
Physical installation..... 8
Best practices..... 10

Verify operation..... 11

Product certifications..... 12

Reference data..... 23

1 Wireless planning

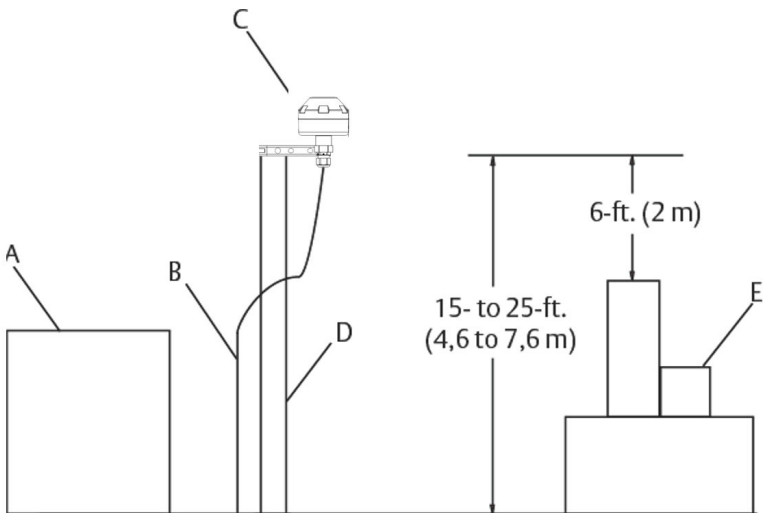
1.1 Power up sequence

The Emerson Wireless Smart Antenna and wireless I/O should be installed and functioning properly before the power modules are installed in any wireless field devices. Wireless field devices should also be powered up in order of proximity from the antenna beginning with the closest. This will result in a simpler and faster network installation.

1.2 Antenna location

The antenna should be mounted in a location that allows convenient access to the host system network (wireless I/O) as well as the wireless field device network.

Figure 1-1: Antenna Mounting Location

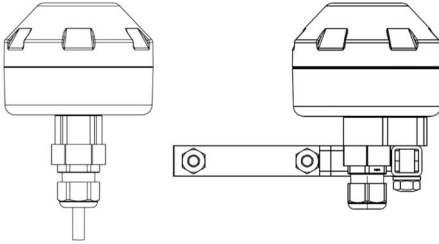


- A. Control room
- B. RS-485 cable
- C. Emerson Wireless 781S Smart Antenna
- D. Mast or pipe
- E. Infrastructure

1.3 Antenna position

The Emerson 781S Smart Antennas should be positioned vertically and approximately 3 ft. (1 m) from large structures, buildings, or conductive surfaces to allow for clear communication to other devices. If installing multiple antennas, it is important that the antennas have three feet of horizontal separation from one another.

Figure 1-2: Antenna Position

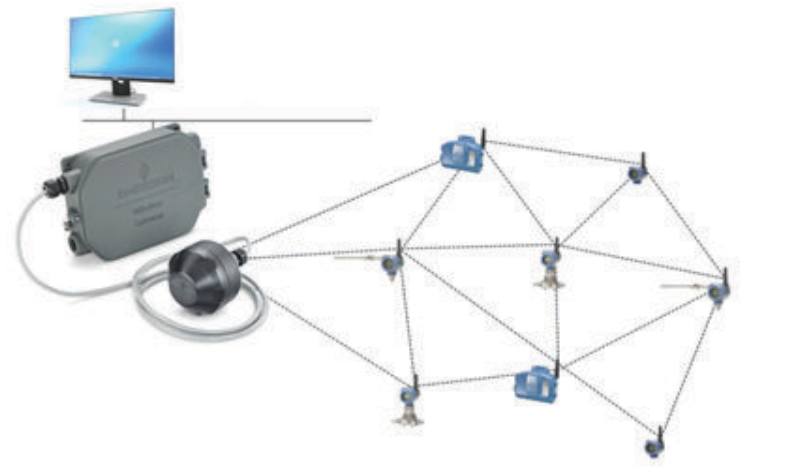


2 Intended use

2.1 System architecture

The smart antenna must be used in conjunction with a network manager or network gateway. The smart antenna then functions as a translator between the wired network and a wireless field network.

Figure 2-1: Example System Architecture



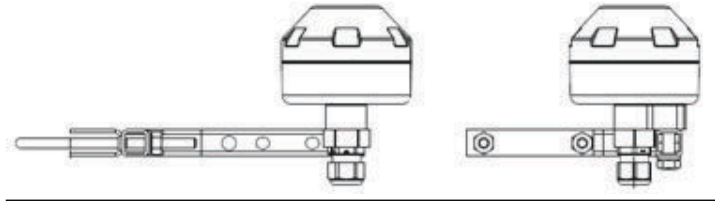
3 Physical installation

3.1 Pipe mounting

Procedure

1. Insert U-bolt around 2-in. pipe or mast, through the saddle, through the L-shaped bracket, and through the washer plate.
2. Use a ½-in. socket-head wrench to fasten the nuts to the U-bolt.
3. Secure the antenna to the L-shaped bracket with a 5/16-in. threaded bolt.
4. Use a 5/16-in. wrench to tighten the screw into the housing.

Figure 3-1: Mounting



3.2 Power and data wiring

The Emerson 781S is completely prewired and only needs to be connected and powered on the Gateway end. The housing is permanently sealed on the Emerson 781S. In the Gateway:

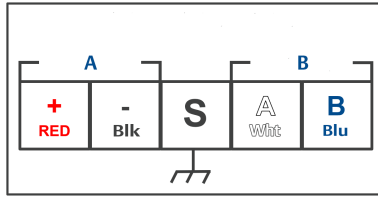
Prerequisites

If operating with more than one antenna, it is important the antenna is always connected to the antenna terminal connection 1 port.

Procedure

1. Connect the positive power lead to the “+” power terminal and the negative power lead to the “-” terminal.
2. Connect the data + lead to the “A (+)” terminal and the data - lead to the “B (-)” terminal.
3. Connect the grounding wire to the Gateway’s shield connection.
4. If connecting multiple antennas, repeat this process for terminal connection 2.

Figure 3-2: Wiring Guide



A. Power

B. Data

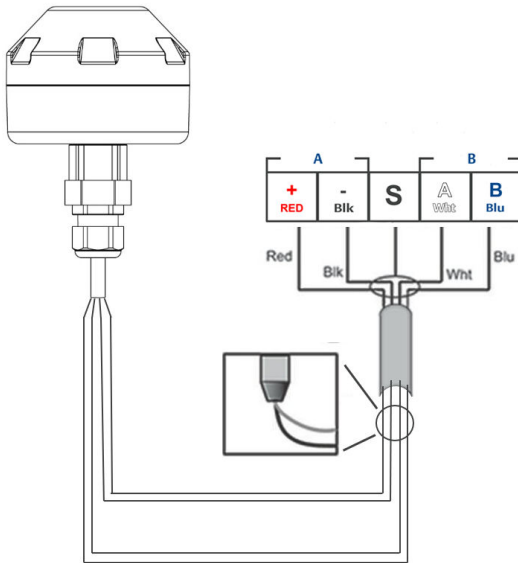
Red - positive

Blk - negative

Wht - RS-485 comm A

Blu - RS-485 comm B

Figure 3-3: Emerson Wireless 781S



A. Power output

B. RS-485 comm

4 Best practices

Twisted shielded pair cable is generally used to wire the serial connection to the Gateway. The Smart Antenna should be installed in a central location of the wireless field network so that it has the most direct connections to wireless devices as possible.

5 Verify operation

5.1 Emerson 781S Smart Antenna

The antenna has no exterior lights or LCD displays. Therefore, once it is powered up through the Gateway, its operation must be verified through the Gateway end of the connection.

5.2 Power up sequence

The second and third LED's in the Emerson 1410S correlate to the first and second terminal connections. These lights should be green when the antenna is connected properly.

5.3 Normal operation

The operation of the *WirelessHART*[®] Smart Antenna can be assessed within the Gateway user interface. The connection can be seen by allowing the link to be seen as a field device. The operability can be verified by attempting to connect to a device.

6 Product certifications

Rev 1.3

6.1 European Directive Information

A copy of the EU Declaration of Conformity can be found at the end of the Quick Start Guide. The most recent revision of the EU Declaration of Conformity can be found at [Emerson.com](https://www.emerson.com).

6.2 Telecommunications compliance

All wireless devices require certification to ensure 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.

6.3 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.

This device complies with Industry Canada license-exempt RSS-247. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Changes or modification to the equipment not expressly approved by Rosemount, Inc. could void the user's authority to operate the equipment.

Cet appareil est conforme à la Partie 15 de la réglementation FCC. Son fonctionnement est soumis aux conditions suivantes: Cet appareil ne doit pas causer d'interférences nuisibles. Cet appareil doit accepter toute interférence reçue, incluant toute interférence pouvant causer un fonctionnement indésirable. Cet appareil doit être installé pour assurer une distance minimum de l'antenne de séparation de 20 cm de toute personne.

Cet appareil est conforme à la norme RSS-247 Industrie Canada exempt de licence. Son fonctionnement est soumis aux deux conditions suivantes: (1) cet appareil ne doit pas provoquer d'interférences et (2) cet appareil doit accepter toute interférence, y compris les interférences pouvant causer un mauvais fonctionnement du dispositif.

Les changements ou les modifications apportés à l'équipement qui n'est pas expressément approuvé par Rosemount, Inc. pourraient annuler l'autorité de l'utilisateur à utiliser cet équipement.

6.4 Ordinary location certification

As standard, the device 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).

6.5 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.

6.6 USA

I5 USA Intrinsic Safety

Certificate 80011697

Markings Class I, Division 1, 2, Groups A, B, C, D T4 (-40 °C ≤ Ta ≤ +70 °C); Class I Zone 0, AEx ia IIC T4; Class I Zone 2, AEx ic IIC T4

Standards FM 3600:2011, FM 3610:2018, FM 3611:2018, ANSI/UL 60079-0:2019, ANSI/UL 60079-11:2014

Warnings/Conditions of Acceptability

1. Potential electrostatic charging hazard: See instructions.
2. Installed as per Control drawing 01410-1300 for hazardous and non-hazardous areas.
3. When NOT installed with the 1410S (CSA Certificate #80009647), the associated apparatus is required to have a minimum of 114R(Ro) output resistance for RS-485/power connections.

6.7 Canada

I1 Canada Intrinsic Safety

Certificate 80011697

Markings Class I, Division 1, 2, Groups A, B, C, D T4 (-40 °C ≤ Ta ≤ +70 °C); Ex ia IIC T4; Ex ic IIC T4

Standards CAN/CSA C22.2 No 60079-0:2019, CAN/CSA C22.2 No. 60079-11:2014, CSA C22.2 No.213 – 2017

Warnings

1. Potential electrostatic charging hazard - see instructions.
Avertissement - risque d'explosion: Ne pas débrancher pendant que le circuit est sous tension.
2. Installed as per Control drawing 01410-1300 for hazardous and non-hazardous areas.
3. When NOT installed with the 1410S (CSA Certificate 80009647), the associated apparatus is required to have a minimum of 114R(Ro) output resistance for RS-485/power connections.

6.8 Europe

11 ATEX Intrinsic Safety

Certificate SGS20ATEX0038X

Markings Ex ia IIC T4 Ga (-40 °C ≤ Ta ≤ +70 °C)

Standards EN IEC 60079-0: 2018, EN 60079-11: 2012

Special Conditions for Safe Use (X):

1. The plastic enclosure may constitute a potential electrostatic ignition risk and must not be rubbed or cleaned with a dry cloth.
2. The equipment is not capable of withstanding the 500 V electrical strength test as defined in clause 6.1.13 or EN 60079-11:2012. This must be taken into account during installation.
3. The measured capacitance between the equipment enclosure and metallic conduit adapter is 21pF. This must be considered only when the Model 781S is integrated into a system where the process connection is not grounded.

ATEX Intrinsic Safety

Certificate SGSATEX0053X

Markings Ex ic IIC T4 Gc (-40 °C ≤ Ta ≤ +70 °C)

Standards EN IEC 60079-0: 2018, EN 60079-11: 2012

Special Conditions for Safe Use (X):

1. The plastic enclosure may constitute a potential electrostatic ignition risk and must not be rubbed or cleaned with a dry cloth.

2. The equipment is not capable of withstanding the 500 V electrical strength test as defined in clause 6.3.13 of EN 60079-11:2012. This must be taken into account during installation.
3. The measured capacitance between the equipment enclosure and metallic conduit adapter is 21pF. This must be considered only when the Model 781S is integrated into a system where the process connection is not grounded.

6.9 International

17 IECEx Intrinsic Safety

Certificate IECEx BAS.20.0021X

Markings Ex ia IIC T4 Ga ($-40\text{ }^{\circ}\text{C} \leq T_a \leq +70\text{ }^{\circ}\text{C}$), Ex ic IIC T4 Gc ($-40\text{ }^{\circ}\text{C} \leq T_a \leq +70\text{ }^{\circ}\text{C}$)



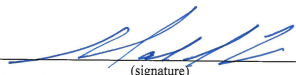
Standards IEC 60079-0: 2017, IEC 60079-11: 2011

Special Conditions for Safe Use (X):

1. The plastic enclosure may constitute a potential electrostatic ignition risk and must not be rubbed or cleaned with a dry cloth.
2. The equipment is not capable of withstanding the 500 V dielectric strength test as defined in clause 6.3.13 of IEC 60079-11: 2011. This must be taken into account during installation.
3. The measured capacitance between the equipment enclosure and metallic conduit adapter is 21pF. This must be considered only when the Model 781S is integrated into a system where the process connection is not grounded.

6.10 Declaration of Conformity

Emerson Wireless 781SA Smart Antenna

	
EU Declaration of Conformity No: RMD 1155 Rev. D	
We,	
Rosemount Inc. 6021 Innovation Blvd. Shakopee, MN 55379 USA	
declare under our sole responsibility that the product,	
Emerson™ Wireless 781SA Smart Antenna, WirelessHART	
manufactured by,	
Rosemount Inc. 6021 Innovation Blvd. Shakopee, MN 55379 USA	
to which this declaration relates, is in conformity with the provisions of the European Community Directives, including the latest amendments, as shown in the attached schedule.	
Assumption of conformity is based on the application of the harmonized standards and, when applicable or required, a European Community notified body certification, as shown in the attached schedule.	
 _____ (signature)	Vice President of Global Quality _____ (function name - printed)
Mark Lee _____ (name - printed)	<i>October 27, 2020</i> _____ (date of issue)
<small>Page 1 of 3</small>	



EU Declaration of Conformity

No: RMD 1155 Rev. D

Radio Equipment Directive (RED) (2014/53/EU)

Emerson™ Wireless 781SA Smart Antenna, WirelessHART

IEC 61010-1:2010, AMD1:2016

EN 300 328 V2.1.1:2016

EN 301 489-17 V3.1.1:2017

ATEX Directive (2014/34/EU)

Emerson™ Wireless 781SA Smart Antenna, WirelessHART

SGS20ATEX0038X – Intrinsic Safety

Equipment Group II Category 1 G

Ex ia IIC T4 Ga (-40°C ≤ T_a ≤ +70°C)

Harmonized Standards:

EN IEC 60079-0:2018

EN 60079-11:2012

SGS20ATEX0053X – Intrinsic Safety

Equipment Group II Category 3 G

Ex ic IIC T4 Gc (-40°C ≤ T_a ≤ +70°C)

Harmonized Standards:

EN IEC 60079-0:2018

EN 60079-11:2012

ATEX Notified Bodies

SGS FIMKO OY [Notified Body Number: 0598]

P. O. Box 30 (Särkiniementie 3)

00211 HELSINKI

Finland



EU Declaration of Conformity

No: RMD 1155 Rev. D

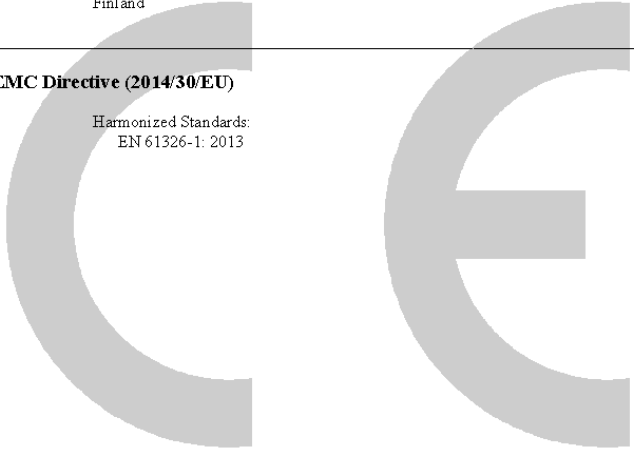


ATEX Notified Body for Quality Assurance

SGS FIMKO OY [Notified Body Number: 0598]
P.O. Box 30 (Särkiniementie 3)
00211 HELSINKI
Finland



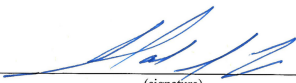
EMC Directive (2014/30/EU)

Harmonized Standards:
EN 61326-1: 2013



6.11 Declaration of Conformity

Emerson Wireless 781SC Smart Antenna

	
EU Declaration of Conformity No: RMD 1156 Rev. D	
<p>We,</p> <p>Rosemount Inc. 6021 Innovation Blvd. Shakopee, MN 55379 USA</p> <p>declare under our sole responsibility that the product,</p> <p style="text-align: center;">Emerson™ Wireless 781SC Smart Antenna, ISA100</p> <p>manufactured by,</p> <p>Rosemount Inc. 6021 Innovation Blvd. Shakopee, MN 55379 USA</p> <p>to which this declaration relates, is in conformity with the provisions of the European Community Directives, including the latest amendments, as shown in the attached schedule.</p> <p>Assumption of conformity is based on the application of the harmonized standards and, when applicable or required, a European Community notified body certification, as shown in the attached schedule.</p>	
 _____ (signature)	Vice President of Global Quality _____ (function name - printed)
Mark Lee _____ (name - printed)	<i>October 27, 2020</i> _____ (date of issue)
<small>Page 1 of 3</small>	



EU Declaration of Conformity

No: RMD 1156 Rev. D



Radio Equipment Directive (RED) (2014/53/EU)

Emerson™ Wireless 781SC Smart Antenna, ISA100

IEC 61010-1:2010, AMD1:2016
 EN 300 328 V2.1.1:2016
 EN 301 489-17 V3.1.1:2017
 IEC 60529: 2001

A TEX Directive (2014/34/EU)

Emerson™ Wireless 781SC Smart Antenna, ISA100

SG S20ATEX0038X – Intrinsic Safety

Equipment Group II Category 1 G
 Ex ia IIC T4 Ga (-40°C ≤ T_a ≤ +70°C)

Harmonized Standards:
 EN IEC 60079-0:2018
 EN 60079-11:2012

SG S20ATEX0053X – Intrinsic Safety

Equipment Group II Category 3 G
 Ex ic IIC T4 Gc (-40°C ≤ T_a ≤ +70°C)

Harmonized Standards:
 EN IEC 60079-0:2018
 EN 60079-11:2012

A TEX Notified Bodies

SGS FIMKO OY [Notified Body Number: 0598]
 P.O. Box 30 (Sarkiniementie 3)
 00211 HELSINKI
 Finland



EU Declaration of Conformity

No: RMD 1156 Rev. D

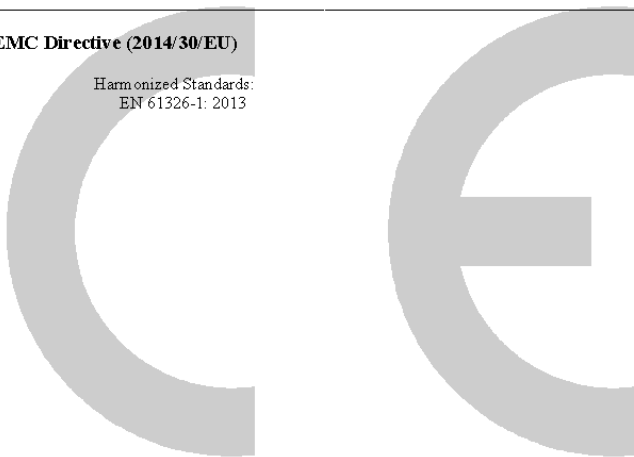


ATEX Notified Body for Quality Assurance

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00211 HELSINKI
Finland

EMC Directive (2014/30/EU)

Harmonized Standards:
EN 61326-1: 2013



6.12 China RoHS table

含有China RoHS 管控物质超过最大浓度限值的部件型号列表 781S
List of 781S Parts with China RoHS Concentration above MCVs

部件名称 Part Name	有害物质 / Hazardous Substances					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr +6)	多溴联苯 Polybrominated biphenyls (PBB)	多溴联苯醚 Polybrominated diphenyl ethers (PBDE)
电子组件 Electronics Assembly	0	0	0	0	0	0
壳体组件 Housing Assembly	0	0	0	0	0	0

SJ/T11364的规定而制作。

This table is proposed in accordance with the provision of SJ/T11364.

O: 意为该部件的所有均质材料中该有害物质的含量均低于GB/T 26572所规定的限量要求。

O: Indicate that said hazardous substance in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

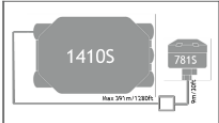
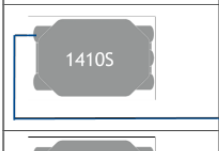
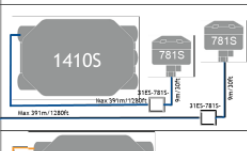
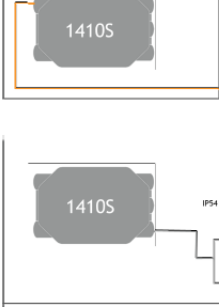
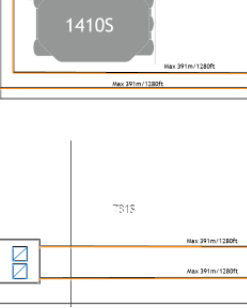
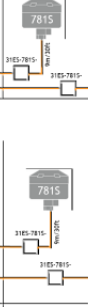

X: 意为在该部件所使用的均质材料中，至少有一类均质材料中该有害物质的含量高于GB/T 26572所规定的限量要求。

X: Indicate that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

7 Reference data

For information on product specs, dimensional drawings, ordering information or the complete reference manual, see Emerson.com.


Figure 7-1: Hazardous Location Installation


Safe Area	Zone 2/C11 Div 2	Zone 1	Zone 0/C11 Div 1	Option N: Ex No intrinsically safe (IS) outputs, for installation in safe areas only
				Option B Ex [ic] IS output for 781 installation in Zone 2/C11 Div 2
				Option A: Ex ec [ia] IS output for 781 installation in Zone 0, 1+2 / C11 Div 1+2 (31ES-781S in Zone 1 or 2)
				Option N: External IS outputs (24 Vdc and RS-485) for installation of 1410S in safe areas only: 781S may be installed in Zone 2, 1, or 0 (C11 Div 2/1)



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