Rosemount[™] 3051S Series Pressure Transmitter and Rosemount 3051SF Series Flow Meter

with WirelessHART® Protocol





Safety messages

A WARNING

Explosions could result in death or serious injury.

Installation of device in an explosive environment must be in accordance with appropriate local, national, and international standards, codes, and practices.

Review Rosemount 3051S and 3051SMV Wireless of this guide for any restrictions associated with a safe installation.

Before connecting a handheld communicator in an explosive atmosphere, ensure that the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.

WARNING

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.

WARNING

This device complies with Part 15 of the Federal Communication Commission (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.

A WARNING

Power module considerations:

The power module may be replaced in a hazardous area. The power module has surface resistivity greater than one gigaohm and must be properly installed in the wireless device enclosure. Care must be taken during transportation to and from the point of installation to prevent electrostatic charge build-up.

A CAUTION

Shipping considerations for wireless products.

The unit was shipped without the power module installed. Prior to re-shipment, ensure that the power module has been removed.

Each power module contains two "C" size primary lithium batteries. Primary lithium batteries are regulated in transportation by the U.S. Department of Transportation, and are also covered by International Air Transport Association (IATA), International Civil Aviation Organization (ICAO), and European Ground Transportation of Dangerous Goods (ARD). It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Consult current regulations and requirements before shipping.

NOTICE

This guide provides basic guidelines for Rosemount 3051S and 3051S MultiVariable™ Wireless Transmitters. It does not provide instructions for diagnostics, maintenance, service, or troubleshooting. For more information, refer to the Rosemount 3051S and 3051S MultiVariable Wireless Reference Manual. This document is also available electronically on Emerson.com/Global.

A WARNING

Refer to the *Product certifications* section of this Quick Start Guide documentation when using the RFID tag (option code Y3) for required installation conditions.

Contents

Contents	
Wireless considerations	5
Mounting the transmitter	8
Connecting the power module	21
Trimming the transmitter	22
Closing the housing	
Verify operation	24
Reference information	27
Rosemount 3051S and 3051SMV Wireless	28

1 Wireless considerations

1.1 Power up sequence

The Emerson Wireless Gateway should be installed and functioning properly before any wireless field devices are powered. Commission the Rosemount ET310 and install the BP20E power module to power the device only after the Gateway has been installed and is functioning. Wireless devices should be powered up in order of proximity from the Gateway, beginning with the closest device, then working outward from the Gateway. This results in a simpler and faster network formation. Enable Active Advertising on the Gateway to ensure new devices are able to join the network faster. For more information, see the Emerson Wireless 1410S Gateway.

1.2 Antenna position

Position the antenna vertically, either straight up or straight down, and approximately 3 ft. (1 m) from any large structure, building, or conductive surface to allow for clear communication to other devices.

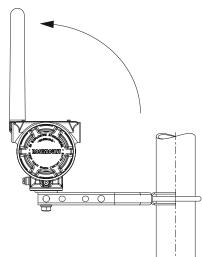


Figure 1-1: Antenna Position

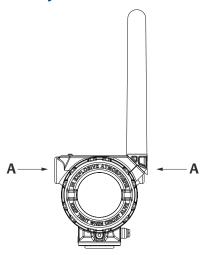
1.3 Conduit entry

Upon installation, ensure each conduit entry is either sealed with a conduit plug using approved thread sealant, or has an installed conduit fitting or cable gland with appropriate threaded sealant.

Note

The conduit entries are threaded ½-14 NPT.

Figure 1-2: Conduit Entry

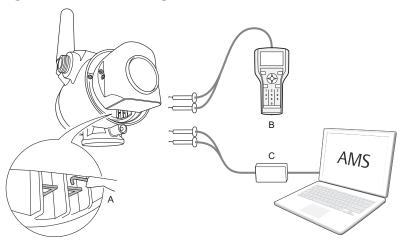


A. Conduit entry

1.4 Field Communicator connections

The power module must be installed before the Field Communicator can interface with the Rosemount Wireless Discrete Transmitter. For HART® Wireless Transmitter communication via a Field Communicator, a Rosemount 702 Wireless Device Dashboard (DD) is required. To obtain the latest DD, visit the Field Communicator System Software and Device Description site at: Emerson.com/Field-Communicator. This transmitter uses the Black Power Module; Order model number 701PBKKF.

Figure 1-3: Connection Diagram



- A. Communication terminals
- B. Handheld communicator
- C. HART modem

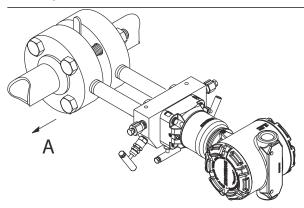
After the Wireless Gateway has been installed and is functioning properly, set up the transmitter and all other wireless devices.

2 Mounting the transmitter

2.1 Liquid flow applications

Procedure

- 1. Place taps to the side of the line.
- 2. Mount beside or below the taps.
- 3. When mounting the transmitter, orientate the drain/vent valves upward.



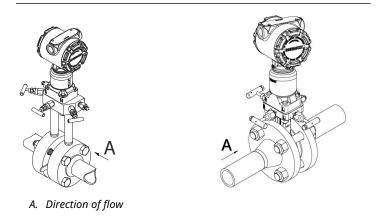
A. Direction of flow

2.2 Gas flow applications

Procedure

1. Place taps in the top or side of the line.

2. Mount beside or above the taps.

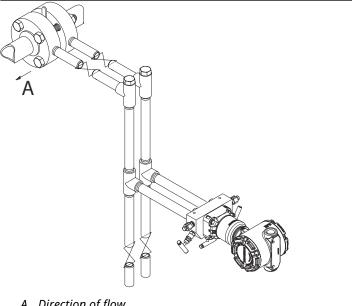


2.3 Steam flow applications

Procedure

- 1. Place taps to the side of the line.
- 2. Mount beside or below the taps.

3. Fill impulse lines with water.



A. Direction of flow

2.4 Mounting options

Panel mounting

Figure 2-1: Coplanar Flange

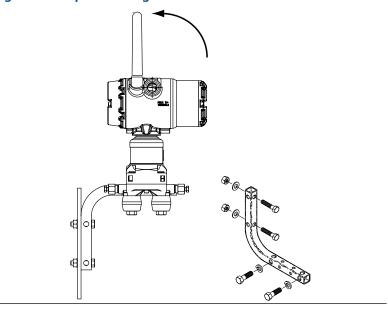


Figure 2-2: Traditional Flange

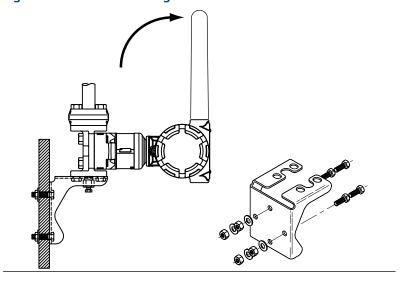
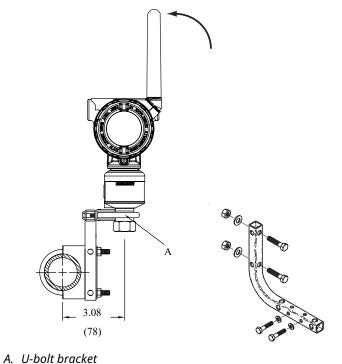


Figure 2-3: In-line Device



Pipe mounting

Figure 2-4: Coplanar Flange

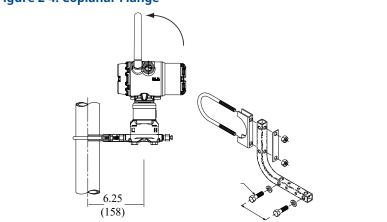


Figure 2-5: Traditional Flange

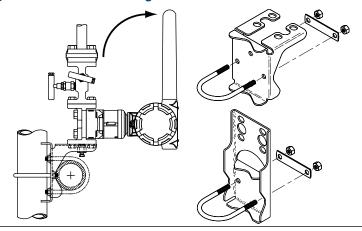
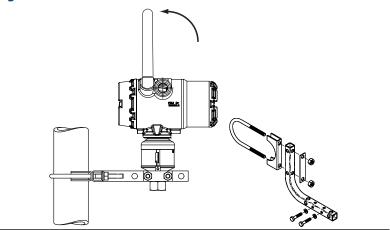


Figure 2-6: In-line Device



2.5 Bolting considerations

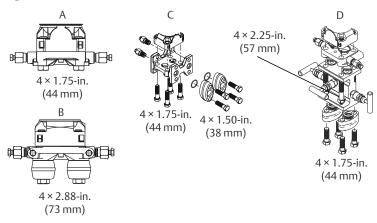
If the transmitter installation requires assembly of a process flange, manifold, or flange adapters, follow these assembly guidelines to ensure a tight seal for optimal transmitter performance characteristics.

NOTICE

Only use bolts supplied with the transmitter or sold by Emerson as spare parts.

<u>Figure 2-7</u> illustrates common transmitter assemblies with the bolt length required for proper transmitter assembly.

Figure 2-7: Common transmitter assemblies



- A. Transmitter with Coplanar[™] flange
- B. Transmitter with Coplanar flange and optional flange adapters
- C. Transmitter with traditional flange and optional flange adapters
- D. Transmitter with Coplanar flange and optional Rosemount Conventional Manifold and flange adapters

Note

For all other manifolds, visit Emerson.com/global.

Table 2-1: Torque values for the flange and flange adapter bolts

Bolt material	Head markings	Initial torque	Final torque
Carbon steel (CS)	B7M B7M	300 in-lb.	650 in-lb.

Table 2-1: Torque values for the flange and flange adapter bolts *(continued)*

Bolt material	Head markings	Initial torque	Final torque
Stainless steel (SST)	316 B8M 316 STM SW 316 SW 316	150 in-lb.	300 in-lb.

Bolts are typically carbon steel or stainless steel. Confirm the material by viewing the markings on the head of the bolt and referencing <u>Table 2-1</u>. If bolt material is not shown in <u>Table 2-1</u>, contact your local Emerson representative for more information.

NOTICE

Do not apply additional lubricant when installing either type of bolt. Carbon steel bolts do not require lubrication. Stainless steel bolts are coated with a lubricant to ease installation.

To install bolts:

Procedure

- 1. Finger-tighten the bolts.
- 2. Torque the bolts to the initial torque value using a crossing pattern.

See Table 2-1 for initial torque value.

Torque the bolts to the final torque value using the same crossing pattern.

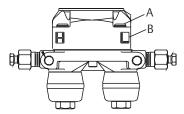
See <u>Table 2-1</u> for final torque value.

4. Verify the flange bolts are protruding through the sensor module before applying pressure.

See Figure 2-8.

Example

Figure 2-8: Proper bolt installation



- A. Bolt
- B. Sensor module

2.6 O-rings with flange adapters

A WARNING

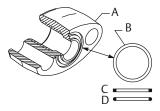
Process leak

Improperly installed flange adapter O-rings could cause process leaks which could result in death or serious injury.

Only use the O-ring that is designed for its specific flange adapter.

A WARNING

Figure 2-9: O-Ring flange adapter



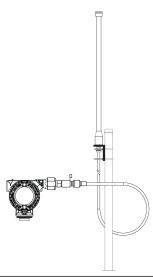
- A. Flange adapter
- B. O-ring
- C. PTFE-based profile (square)
- D. Elastomer profile (round)

Whenever the flange or adapters are removed, visually inspect the Orings. Replace them if there are any signs of damage, such as nicks or cuts. If the Orings are replaced, re-torque the flange bolts and alignment screws after installation to compensate for seating of the Orings.

2.7 Remote antenna (optional)

The high-gain remote antenna options provide flexibility for mounting the device based on wireless connectivity, lightning protection, and current work practices.

Figure 2-10: Rosemount Wireless Discrete Transmitter with Remote Antenna



2.7.1 Remote antenna installation (WN/WJ option)

Prerequisites

Find a location where the remote antenna has optimal wireless performance. In most instances, this is 15–25 ft. (4.6–7.6 m) above the ground or 6 ft. (2 m) above obstructions or major infrastructure.

A WARNING

When installing remote mount antennas for the transmitter, always use established safety procedures to avoid falling or contact with high-power electrical lines.

Install remote antenna components for the transmitter in compliance with local and national electrical codes and use best practices for lightning protection.

Before installing, consult with the local area electrical inspector, electrical officer, and work area supervisor.

The transmitter remote antenna option is specifically engineered to provide installation flexibility while optimizing wireless performance and local spectrum approvals. To maintain wireless performance and avoid non-compliance with spectrum regulations, do not change the length of cable or the antenna type.

If the supplied remote mount antenna kit is not installed per these instructions, Emerson is not responsible for wireless performance or non-compliance with spectrum regulations.

Procedure

- 1. Mount the antenna on a 1.5 to 2-in. (3.81–5.08 cm) pipe mast using the supplied mounting equipment.
- 2. Connect the lightning arrestor directly to the top of the Rosemount Wireless Discrete Transmitter.
- 3. Install the grounding lug, lock washer, and nut on top of lightning arrestor.

Note

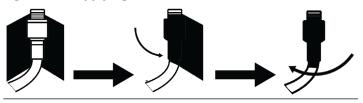
When connecting the antenna to the lightning arrestor, ensure the drip loop is not closer than 1 ft. (0.3 m) from the lightning arrestor.

- 4. Using the supplied LMR-400 coaxial cable, connect the antenna to the lightning arrestor.
- 5. Use the coaxial sealant to seal each connection between the wireless field device, lightning arrestor, cable, and antenna.

Note

The remote mount antenna kit includes coaxial sealant for weatherproofing the cable connections for the lightning arrestor, antenna, and Rosemount . Coaxial sealant must be applied to guarantee performance of the wireless field network. See Figure 2-11 for details on how to apply coaxial sealant.

Figure 2-11: Applying Coaxial Sealant to Cable Connections



6. Ensure the mounting mast and lightning arrestor are grounded according to local/national electrical code.

Any spare lengths of coaxial cable should be placed in 12-in. (0.3 m) coils.

3 Connecting the power module

Procedure

1. Remove the housing cover on the field terminal side.

2. Connect the black power module.

4 Trimming the transmitter

Transmitters are shipped fully calibrated per request or by the factory default of full scale (span = upper range limit).

4.1 Zero trim

A zero trim is a single-point adjustment used for compensating mounting position and line pressure effects. When performing a zero trim, ensure the equalizing valve is open and all wet legs are filled to the correct level.

5 Closing the housing

Procedure

- 1. Close the housing cover and tighten to safety specification.
- 2. Always ensure a proper seal by installing the electronics housing covers so that metal contacts metal.

NOTICE

Do not overtighten.

6 Verify operation

There are four methods available to verify operation:

- Using the optional local display (LCD)
- Using the Field Communicator
- Using the Wireless Gateway's integrated web interface
- Using AMS Suite Wireless Configurator

If the device was configured with the **Network ID** and **Join Key**, and sufficient time has passed, the transmitter will be connected to the network.

6.1 Local display (LCD display)

The LCD display will show the output values based on the wireless update rate. Refer to the Rosemount 3051S and 3051SMV Wireless manuals for error codes and other LCD display messages..

Procedure

Press and hold the **Diagnostic** button for at least five seconds to display the **TAG**, **Device ID**, **Network ID**, **Network Join Status**, and **Device Status** screens.

Searching for network	Joining network	Connected with limited bandwidth	Connected
NETWK	NETWK	NETWK	NE TWK
SRCHNG	NEGOT	LIM-OP	

6.2 Field Communicator

For HART® Wireless transmitter communication, an appropriate DD is required. For connecting with a Field Communicator, refer to Field Communicator connections.

Function	Fast Key sequence	Menu Items
Communications	3, 4	Join Status, Wireless Mode, Join Mode, Number of Available Neighbors, Number of Advertisements Heard, Number of Join Attempts

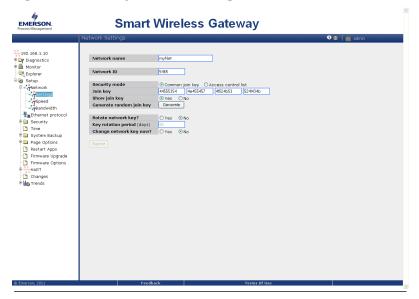
6.3 Wireless Gateway

In the Gateway's integrated web interface, navigate to the **Explorer** > **Status** page. This page will show whether the device has joined the network and if it is communicating properly.

Note

It may take several minutes for the device to join the network.

Figure 6-1: Gateway Network Settings



6.4 AMS Wireless Configurator

When the device has joined the network, it will appear in AMS Wireless Configurator. See <u>Figure 6-2</u>.

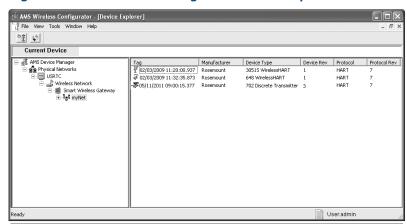


Figure 6-2: AMS Wireless Configurator, Device Explorer Screen

6.5 Troubleshooting

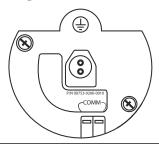
If the device is not joined to the network after power up, verify the correct configuration of the network ID and join key, and verify the active advertising has been enabled on the Gateway. The network ID and join key in the device must match the network ID and join key of the Gateway.

The network ID and join key may be obtained from the Gateway on the **Setup** → **Network** → **Settings** page on the web interface (see <u>Figure 6-1</u>). The network ID and join key may be changed in the wireless device by using the following Fast Key sequence.

Function	Fast Key sequence	Menu items
Communications	3, 4	Join Status, Wireless Mode, Join Mode, Number of Available Neighbors, Number of Advertisements Heard, Number of Join Attempts

7 Reference information

Figure 7-1: Terminal Diagram



Note

To connect with a Field Communicator, refer to Figure 1-3.

Table 7-1: HART Fast Key Sequence

Function	Fast Key sequence	Menu items
Device Info	2, 2, 9	Manufacturer, Model, Final Assembly Number, Universal, Field Device, Software, Hardware, Descriptor, Message, Date, Model Number I, II, III, SI Unit Restriction, Country
Guided Setup	2, 1	Configure Basic Setup, Zero Sensor Trim, Join Device to Network, Update Rate, Device Display, Alert Setup, Scaled Variable
Manual Setup	2, 2	Configure, Manual Setup, Wireless, Pressure, Device Temperatures, Device Information, Display, Scaled Variable, Other
Wireless	2, 2, 1	Network ID, Join Device to Network, Configure Update Rate, Configure Broadcast Power Level, Power Mode, Power Source

Note

If using Rosemount 3051SMV, use the Fast Key sequence **2**, **2**. Then navigate to **Device Information**.

8 Rosemount 3051S and 3051SMV Wireless

Rev 3.0

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 www.rosemount.com.

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.

8.1 USA

8.1.1 I5 USA Intrinsically Safe (IS), Nonincendive (NI), and Dust-Ignitionproof (DIP)

Certificate FM18US0009X

Markings IS CL I, DIV 1, GP A, B, C, D; CL II, DIV 1, GP E, F,

G; CL III T4; CL 1, Zone 0 AEx ia IIC T4; NI CL 1, DIV 2, GP A, B, C, D T4; DIP CL II, DIV 1, GP E, F, G; CL III, T5; T4 (-50 °C \leq T_a \leq +70 °C) T5 (-50 °C \leq T_a \leq +85 °C); when connected per Rosemount drawing

03151-1000; Type 4X

Certificate CSA 80193971

Markings IS Class I Division 1, Groups A, B, C, D, T4; IS

Class II, Division 1, Groups E, F, G, T4; Class III; Class I, Zone 0 AEx ia IIC T4; Ga Ta = -50 °C to 70 °C; when connected per Rosemount drawing

03151-1010 Type 4X

Special Conditions for Safe Use (X):

- The Model 3051S and SMV Wireless Transmitters shall only be used with the 701PBKKF Rosemount Smartpower Battery Pack (P/N 00753-9220-0001), Computational Systems Inc Battery Pack (P/N MHM-89004) or alternatively the Perpetuum Intelligent Power Module Vibration Harvester (P/N IPM71008).
- The transmitter may contain more than 10% aluminum and is considered a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact and friction.
- 3. The surface resistivity of the antenna is greater than $1G\Omega$. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.

8.2 Canada

8.2.1 I6 Canada Intrinsic Safety

Certificate CSA 80193971

Markings Ex ia IIC Ga IS Class I, Division 1, Groups A, B, C,

D T4; $(T_a = 70 \, ^{\circ}\text{C})$ when connected per Rosemount

drawing 03151-1010 Type 4X

8.3 Europe

8.3.1 I1 ATEX Intrinsic Safety

Certificate Baseefa13ATEX0127X

Markings B II 1 G Ex ia IIC T4 Ga, T4 (-60 °C \leq T_a \leq +70 °C)

Special Conditions for Safe Use (X):

 The Rosemount 3051S Wireless and Rosemount 3051SMV Wireless enclosure may be made of aluminum alloy and given a protective polyurethane paint finish; however, care must be taken to protect it from impact or abrasion if located in a zone 0 area.

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

8.4 International

8.4.1 I7 IECEx Intrinsic Safety

Certificate IECEx BAS 13.0068X

Markings Ex ia IIC T4 Ga, T4 (-60 °C \leq T_a \leq +70 °C)

Special Conditions for Safe Use (X):

- The Rosemount 3051S Wireless and Rosemount 3051SMV Wireless enclosure may be made of aluminum alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion if located in a zone 0 area.
- 2. The surface resistivity of the antenna is greater than $1G\Omega$. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or dry cloth.

8.5 Brazil

8.5.1 I2 Brazil (INMETRO) Intrinsic Safety

Certificate UL-BR 14.0760X

Markings Ex ia IIC T4 Ga, T4 (-60 °C \leq T_a \leq +70 °C)

Special Condition for Safe Use (X):

See certificate.

8.6 China

8.6.1 I3 China (NEPSI) Intrinsic Safety

Certificate 3051S Wireless: GYJ21.1121X

3051SFx: GYJ21.3301X [Flowmeters]

Markings Ex ia IIC T4 Ga, T4 (-60 \sim 70 °C)

Special Condition for Safe Use (X):

See appropriate certificate.

Note

Not currently available on the Rosemount 3051S MultiVariable Wireless Transmitter.

8.7 Japan

8.7.1 I4 CML Intrinsic Safety

Certificate CML20JPN2011X

Markings Ex ia IIC T4 Ga (-60 °C \leq T_a \leq +70 °C), Ex ia IIC T5 Ga

 $(-60 \, ^{\circ}\text{C} \le T_a \le +40 \, ^{\circ}\text{C})$

8.8 EAC (Belarus, Kazakhstan, Kyrgyzstan, Armenia)

8.8.1 IM TOO (T-Standard) Intrinsic Safety

Certificate EAЭC KZ 7500525.01.01.00672

Markings 0Ex ia IIC T4 Ga X (-60 °C \leq T_a \leq +70 °C)

Special Condition for Safe Use (X):

See certificate for special conditions.

8.9 Republic of Korea

8.9.1 IP Korea Intrinsic Safety

Certificate 24-KA4B0-0514X

Markings Ex ia IIC T4, (-60 °C \leq T_a \leq +70 °C)

Special Condition for Safe Use (X):

See certificate for special conditions.

Note

Not currently available on the 3051S MultiVariable Wireless Transmitter.

8.10 Combinations

KQ Combination of I1, I5, and I6

8.11 Y3 ATEX/IECEx RFID tag approvals

Certificate IECEx EPS 15.0042X, EPS 15 ATEX 1 1011 X

Markings II 2G Ex ia IIC T6/T4 Gb, II 2D Ex ia IIC T80/T130C

Db

Conditions of certification

Maximum operating temperature: -58 °F (-50 °C) to +158 °F (+70 °C)

The RFID tags shall never be exposed to high electromagnetic field strengths according to IEC 60079-14.

Electrostatic charges shall be avoided. The tags shall never be used next to strong charge generating processes.

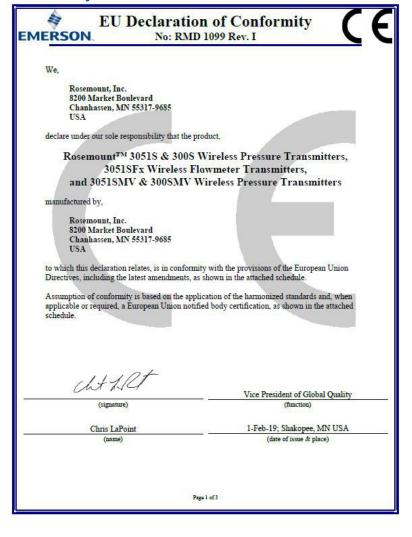
▲ WARNING

Additional warnings

The plastic enclosure may present a potential electrostatic ignition hazard.

RFID tag has limitations in ambient temperature and zone installation areas (Zones 1 & 21) as compared to the gauge.

8.12 Rosemount 3051S Wireless Declaration of Conformity





EU Declaration of Conformity No: RMD 1099 Rev. I



EMC Directive (2014/30/EU)

Harmonized Standards: EN 61326-1:2013 EN 61326-2-3:2013

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

Harmonized Standards: EN 300 328 V2.1.1 EN 301 489-1 V2.2.0 EN 301 489-17 V3.2.0 EN 61010-1: 2010 EN 62311: 2008

PED Directive (2014/68/EU)

RosemountTM 3051S_CA4; 3051S_CD2, 3, 4, 5 (also with P0 & P9 option)

QS Certificate of Assessment – EC Certificate No. 12698-2018-CE-ACCREDIA

Module H Conformity Assessment

Other Standards Used:

ANSI / ISA 61010-1:2004 IEC 60770-1:1999

Note - previous PED Certificate No. 59552-2009-CE-HOU-DNV

All other RosemountTM 3051S & 3051SMV Pressure Transmitters Sound Engineering Practice

Transmitter Attachments: Diaphragm Seal, Process Flange, or Manifold Sound Engineering Practice

Rosemount 3051SFx Series Flowmeter Pressure Transmitters Refer to Declaration of Conformity DSI1000

Page 2 of 3



EU Declaration of Conformity No: RMD 1099 Rev. I



ATEX Directive (2014/34/EU)

Baseefal3ATEX0127X - Intrinsic Safety Certificate

Equipment Group II, Category 1 G Ex ia IIC T4 Ga Harmonized Standards: EN 60079-0:2012+A11:2013 EN 60079-11:2012

PED Notified Body

DNV GL Business Assurance Italia S.r.l. [Notified Body Number: 0496]

Via Energy Park 14, N-20871

Vimercate (MB), Italy

Note - equipment manufactured prior to 20 October 2018 may be marked with the previous PED Notified Body number; previous PED Notified Body information was as follows:

Det Norske Veritas (DNV) [Notified Body Number: 057.5]

Veritasveien 1, N-1322 Hovik, Norway

ATEX Notified Body

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

ATEX Notified Body for Quality Assurance

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

Page 3 of 3



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