**Quick Start Guide** 

00825-0100-5007, Rev DE August 2023

# Rosemount<sup>™</sup> 3051 Pressure Transmitter





ROSEMOUNT

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# 1 About this guide

This guide provides basic guidelines for Rosemount 3051 Pressure Transmitters. It does not provide instructions for configuration, diagnostics, maintenance, service, troubleshooting, Explosion-proof, Flameproof, or Intrinsically Safe (IS) installations. Refer to the Rosemount 3051 Manual for more instructions. This guide is also available electronically at Emerson.com.

# 1.1 Safety messages

# A WARNING

#### Explosions

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 the approvals section of the Rosemount 3051 Manual for any restrictions associated with a safe installation.

In an explosionproof/flameproof installation, do not remove the transmitter covers when power is applied to the transmitter.

# **A** WARNING

#### **Process leaks**

Process leaks may cause harm or result in death.

To avoid process leaks, only use the O-ring designed to seal with the corresponding flange adapter.

# A WARNING

#### **Electrical shock**

Electrical shock can result in death or serious injury.

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

# **A** WARNING

#### **Conduit/cable entries**

Unless otherwise marked, the conduit/cable entries in the housing enclosure use a  $\frac{1}{2}$ -14 NPT form. Only use plugs, adapters, glands, or conduit with a compatible thread form when closing these entries.

Entries marked M20 are M20 x 1.5 thread form. On devices with multiple conduit entries, all entries will have the same thread form.

When installing in a hazardous location, use only appropriately listed or Ex certified plugs, glands, or adapters in cable/conduit entries.

## **A** WARNING

#### 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 in protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

# 2 System readiness

#### **Confirm HART® revision capability**

- If using HART-based control or asset management systems, confirm the HART capability of those systems prior to transmitter installation. Not all systems are capable of communicating with HART Revision 7. You can configure this transmitter for either HART Revision 5 or 7.
- For instructions on how to change the HART revision of your transmitter, see Switch HART<sup>®</sup> revision mode.

# 2.1 Confirm correct device driver

- Verify the latest device driver (DD/DTM<sup>™</sup>) is loaded on your systems to ensure proper communications.
- Download the latest device driver from Emerson.com or Fieldcommgroup.org.

#### **Rosemount 3051 device revisions and drivers**

Table 2-1 provides the information necessary to ensure you have the correct device driver and documentation for your device.

# Table 2-1: Rosemount 3051 with 4-20 mA HART<sup>®</sup> protocol device revisions and files

Release date	Device identification		Device driver identification		Review instruc- tions	Review function ality	
	NAMUR hard- ware revision (1)	(1)	HART soft- ware revision (2)	HART univer- sal revision	Device revision (3)	Rose- mount 2088, 2090P, and 2090F pres- sure trans- mitters	Change descrip- tion
Aug-16	1.1.xx	1.0.xx	3	7	10	with	(4)
				5	9	HART and 1–5	
Jan-13	N/A	1.0.xx	1	7	10	Vdc Low Power Protocol Refer- ence Manual	(5)
				5	9		

Release date	Device identification		Device ide	Device dr identifica		Review instruc- tions	Review function ality
	NAMUR hard- ware revision ⑴	(1)	HART soft- ware revision (2)	HART univer- sal revision	Device revision (3)	Rose- mount 2088, 2090P, and 2090F pres- sure trans- mitters	Change descrip- tion
Jan-98	N/A	N/A	178	5	3	with 4– 20 mA HART and 1–5 Vdc Low Power Protocol Refer- ence Manual	N/A

# Table 2-1: Rosemount 3051 with 4-20 mA HART<sup>®</sup> protocol device revisions and files *(continued)*

- (1) NAMUR revision is located on the hardware tag of the device. Differences in level 3 changes, signified above by xx, represent minor product changes as defined per NE53. Compatibility and functionality are preserved and product can be used interchangeably.
- (2) HART software revision can be read using a HART capable configuration tool. Value shown is minimum revision that could correspond to NAMUR revisions.
- (3) Device driver file names use Device and DD Revision, (such as 10\_01). HART protocol is designed to enable legacy device driver revisions to continue to communicate with new HART devices. To access new functionality, download the new device driver. Emerson recommends downloading new device driver files to ensure full functionality.
- (4) HART revision 5 and 7 selectable, Local Operator Interface (LOI), scaled variable, configurable alarms, and expanded engineering units.
- (5) Rosemount 3051G Pressure Transmitter updated electronics hardware design. Intrinsic Safety temperature classification change.

# 3 Transmitter installation

- 3.1 Mounting the transmitter
- 3.1.1 Mount the transmitter in liquid applications

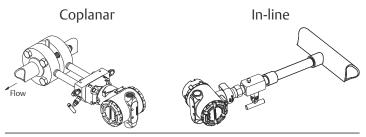
#### Procedure

- 1. Place taps to the side of the line.
- 2. Note

When mount the transmitter, verify the drain/vent valves are oriented upward.

Mount the transmitter beside or below the taps.

#### Figure 3-1: Coplanar and in-line liquid applications

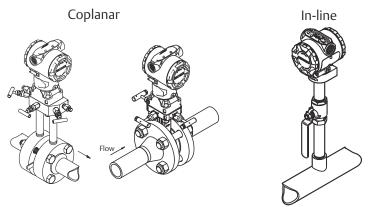


### 3.1.2 Mount the transmitter in gas applications

#### Procedure

- 1. Place taps in the top or side of the line.
- 2. Mount the transmitter beside or above the taps.

#### Figure 3-2: Coplanar and in-line gas applications

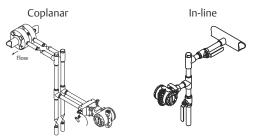


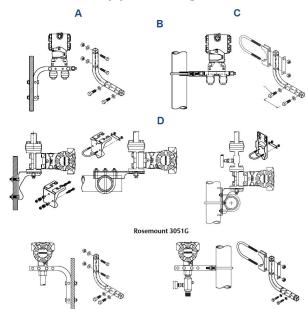
#### 3.1.3 Mount the transmitter in steam applications

#### Procedure

- 1. Place taps to the side of the line.
- 2. Mount the transmitter beside or below the taps.
- 3. Fill impulse lines with water.

#### Figure 3-3: Coplanar and in-line steam applications



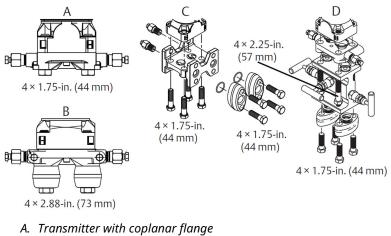


#### Figure 3-4: Panel and pipe mounting

- A. Panel mount (5/6 x 1½ panel bolts are customer supplied
- B. Coplanar flange
- C. Pipe mount
- D. Traditional flange

#### 3.1.4 Assemble the transmitter

If the transmitter installation requires assembly of the process flanges, manifolds, or flange adapters, follow the assembly guidelines to ensure a tight seal for optimal performance. Use only bolts supplied with the transmitter or sold by Emerson as spare parts. Figure 3-5 illustrates common transmitter assemblies with the required bolt lengths.



#### Figure 3-5: Common transmitter assemblies

- *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 manifold and flange adapters

Bolts are typically Carbon Steel (CS) or Stainless Steel (SST). Confirm the material by viewing the markings on the head of the bolt and referencing Table 3-1. If bolt material is not shown in Table 3-1, contact a local Emerson representative for more information.

Bolt material	Head markings	Initial torque	Final torque
cs	И ВТМ	300 in-lb	650 in-lb
SST	316         BBM         W           316         STM         316           (6)         STM         SW           316         SW         316	150 in-lb	300 in-lb

#### Table 3-1: Torque values for the flange and flange adapter bolts

CS bolts do not require lubrication, and SST bolts are coated with a lubricant to ease installation. When installing either type of bolt, do not apply additional lubricant.

#### Procedure

1. Finger-tighten the bolts.

2. Torque the bolts to the initial torque value using a crossing pattern.

See Table 3-1 for initial torque value.

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

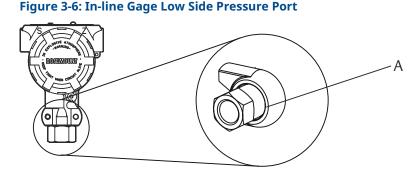
See Table 3-1 for final torque value.

4. Before applying pressure, verify that the flange bolts are protruding through the isolator plate.

#### 3.1.5 In-line gage transmitter orientation

The low side pressure port (atmospheric reference) on the in-line gage transmitter is located in the neck of the transmitter, behind the housing. The vent path is 360° around the transmitter between the housing and sensor. (See Figure 3-6)

Mounting the transmitter so that the process can drain away keeps the vent path free of any obstruction, including but not limited to paint, dust, and lubrication.



A. Low side pressure port (atmospheric reference)

#### 3.1.6 Consider housing rotation

To improve field access to wiring or to better view the optional LCD display:

#### Procedure

1. Loosen the housing rotation set screw using a

 $\frac{5}{64}$ 

" hex wrench.

2. Turn the housing left or right maximum up to 180° from its original position.<sup>(1)</sup>

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Note
Over-rotating can damage the transmitter.
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3. When desired location is reached, re-tighten the housing rotation set screw to no more than 7 in-lb.

#### Figure 3-7: Housing Rotation Set Screw



A. Housing rotation set screw (



### **A** CAUTION

Overrotation of housing may cause damage to module communication cable.

## 3.2 Set the switches

#### Procedure

1. Set alarm and security switch configuration before installation as shown in Figure 3-8.

<sup>(1)</sup> Rosemount 3051D original position aligns with "H" side; Rosemount 3051G original position is the opposite side of bracket holes.

- 2. If the transmitter is installed, secure the loop and remove power.
- 3. Note

Do not remove the instrument cover in explosive atmospheres when the circuit is live.

Remove the housing cover opposite the field terminal side.

4. NOTICE

The alarm switch sets the analog output alarm to **High** or **Low**. Default alarm is **High**.

NOTICE

The security switch allows (unlocked symbol) or prevents (locked symbol) any configuration of the transmitter. Default security is **Off** (unlocked symbol).

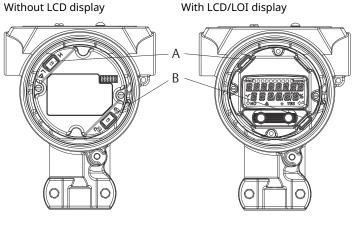
Slide the security and alarm switches into the preferred position using a small screwdriver.

5. Note

The cover must be fully engaged to comply with explosionproof requirements.

Reattach the transmitter cover.



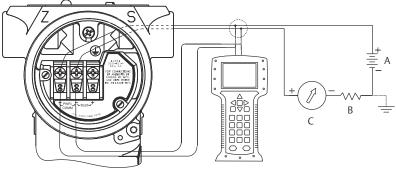


A. Alarm

B. Security

# 3.3 Connect the wiring and power up

#### Figure 3-9: Transmitter Wiring Diagrams (4–20 mA)



- A. 24 Vdc supply
- B.  $R_L \ge 250$
- C. Current meter (optional)

Shielded twisted pair cable should be used for best results. Use 24 AWG or larger wire that does not exceed 5,000 ft. (1500 m) in length. If applicable, install wiring with a drip loop. Arrange the drip loop so

the bottom is lower than the conduit connections and the transmitter housing.

# **A** CAUTION

Installation of the transient protection terminal block does not provide transient protection unless the Rosemount 3051 case is properly grounded.

Do not run signal wiring in conduit or open trays with power wiring, or near heavy electrical equipment.

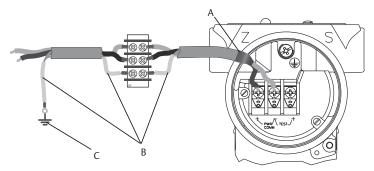
Do not connect the powered signal wiring to the test terminals. Power could damage the test diode in the terminal block.

To wire the transmitter:

#### Procedure

- 1. Remove the housing cover on the FIELD TERMINALS side.
- 2. Connect the positive lead to the "+" terminal (PWR/COMM) and the negative lead to the "-" terminal.
- 3. Ground housing to fulfill local grounding regulations.
- 4. Ensure proper grounding. It is important that the instrument cable shield be:
  - a) Trimmed close and insulated from touching the transmitter housing
  - b) Connected to the next shield if cable is routed through a junction box
  - c) Connected to a good earth ground at the power supply end
- 5. If transient protection is needed, refer to "Grounding for transient terminal block" for grounding instructions.
- 6. Plug and seal unused conduit connections.
- 7. Replace the housing cover.





- A. Insulate shield and shield drain wire.
- B. Insulate exposed shield drain wire.
- C. Connect shield back to the power supply ground.

#### 3.3 Grounding for transient terminal block

Ground termination is provided on the outside of the electronics housing and inside the terminal compartment. These grounds are used when the transient protection terminal blocks are installed. It is recommended that 18 AWG or larger wire is used to connect housing ground to earth ground (internal or external).

If the transmitter is currently not wired for power up and communication, follow Connect the wiring and power up. When the transmitter is properly wired, refer to Figure 3-10 for internal and external transient grounding locations.

# 3.4 Verifying configuration

Verify the configuration using any HART<sup>®</sup>-capable configuration tool. Configuration instructions for a Field Communicator are included in this step. See Rosemount 3051 Reference Manual for configuration instructions using AMS Device Manager.

#### 3.4.1 Verifying configuration with a Field Communicator

A Rosemount 3051 DD must be installed on the Field Communicator to verify configuration. Fast Key sequences for the latest DD are shown in Table 2-2. For Fast Key sequences using legacy DD's, contact your local Emerson representative.

#### Note

Emerson recommends installing the latest DD to access the complete functionality. Visit Field Communicator for information on updating the DD library.

#### **Procedure**

Verify device configuration using the Fast Key sequences in Table 2-2.

- A check (✓) indicates the basic configuration parameters. At minimum, these parameters should be verified as part of configuration and startup.
- A (7) indicates availability only in HART<sup>®</sup> Revision 7 mode.

	Function	Fast Key seque	ence
		HART <sup>®</sup> 7	HART 5
1	Alarm and Saturation Levels	2, 2, 2, 5, 7	2, 2, 2, 5, 7
1	Damping	2, 2, 1, 1, 5	2, 2, 1, 1, 5
1	Range Values	2, 2, 2,	2, 2, 2
1	Тад	2, 2, 7, 1, 1	2, 2, 7, 1, 1
1	Transfer Function	2, 2, 1, 1, 6	2, 2, 1, 1, 6
1	Units	2, 2, 1, 1, 4	2, 2, 1, 1, 4
	Burst Mode	2, 2, 5, 3	2, 2, 5, 3
	Custom Display Configuration	2, 2, 4	2, 2, 4
	Date	2, 2, 7, 1, 4	2, 2, 7, 1, 3
	Descriptor	2, 2, 7, 1, 5	2, 2, 7, 1, 4
	Digital to Analog Trim (4–20 mA output)	3, 4, 2	3, 4, 2
	Disable Configuration Buttons	2, 2, 6, 3	2, 2, 6, 3
	Rerange with Keypad	2, 2, 2, 1	2, 2, 2, 1
	Loop Test	3, 5, 1	3, 5, 1
	Lower Sensor Trim	3, 4, 1, 2	3, 4, 1, 2
	Message	2, 2, 7, 1, 6	2, 2, 7, 1, 5
	Scaled D/A Trim (4–20 mA output)	3, 4, 2	3, 4, 2
	Sensor Temperature/Trend (Rosemount 3051S)	3, 3, 3	3, 3, 3
	Upper Sensor Trim	3, 4, 1, 1	3, 4, 1, 1
	Digital Zero Trim	3, 4, 1, 3	3, 4, 1, 3

	Function	inction Fast Key sequence	
		HART <sup>®</sup> 7	HART 5
	Password	2, 2, 6, 5	2, 2, 6, 4
	Scaled Variable	3, 2, 2	3, 2, 2
	HART revision 5 to HART Revision 7 switch	2, 2, 5, 2, 3	2, 2, 5, 2, 3
1	Long Tag	2, 2, 7, 1, 2	N/A
1	Find Device	3, 4, 5	N/A
1	Simulate Digital Signal	3, 4, 5	N/A

Note

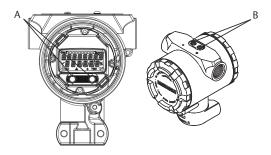
See Figure 3-10 to confirm external button functionality.

#### 3.4.2 Verify configuration with local operator interface (LOI)

The optional local operator interface (LOI) can be used for commissioning the device. The LOI is a two button design with internal and external buttons. The internal buttons are located on the display of the transmitter, while the external buttons are located underneath the top metal tag. LOI button functionality is shown on the bottom corners of the display.

To activate the LOI, push any button. See Table 3-2 and Figure 3-12 for button operation and menu information.

#### Figure 3-11: Internal and External LOI Buttons

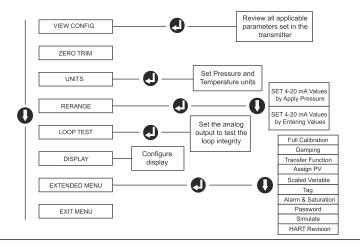


- A. Internal buttons
- B. External buttons

Table 3	-2: LOI	<b>Button</b>	Operation
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Button	ÉXÍT MENU? NO YES	ÉXÎT MENU ↓ ↓
Left	No	SCROLL
Right	Yes	ENTER

#### Figure 3-12: LOI Menu



### 3.4.3 Switch HART® revision mode

If the HART configuration tool is not capable of communicating with HART Revision 7, the Rosemount 3051 will load a generic menu with limited capability. The following procedures will switch the HART revision mode from the generic menu:

#### Procedure

#### $\textbf{Manual Setup} \rightarrow \textbf{Device Information} \rightarrow \textbf{Identification} \rightarrow \textbf{Message}$

- a) To change to HART Revision 5, Enter: "HART5" in the Message field
- b) To change to HART Revision 7, Enter: "HART7" in the Message field

# 3.5 Trim the transmitter

Devices are calibrated by the factory. Once installed, it is recommended to perform a zero trim on gage and differential pressure transmitters to eliminate error due to mounting position or static pressure effects. A zero trim can be performed using either a Field Communicator or configuration buttons.

For instructions using AMS Device Manager, see the Rosemount 3051 Reference Manual.

#### Note

When performing a zero trim, ensure that the equalization valve is open and all wet legs are filled to the correct level.

#### **Procedure**

- 1. Choose your trim procedure.
  - Analog zero trim Sets the analog output to 4 mA.
- 2. Also referred to as a "rerange," it sets the lower range value (LRV) equal to the measured pressure.
- 3. The display and digital HART output remains unchanged.
  - Digital zero trim Recalibrates the sensor zero.
- 4. The LRV is unaffected. The pressure value will be zero (on display and HART<sup>®</sup> output). 4 mA point may not be at zero.
- 5. This requires that the factory calibrated zero pressure is within a range of 3% of the URV [0 + 3% x URV].

Example: URV = 250 inH<sub>2</sub>O Applied Zero Pressure =  $+ 0.03 \times 250 \text{ inH}_2\text{O} = + 7.5 \text{ inH}_2\text{O}$  (compared to factory settings) values outside this range will be rejected by the transmitter.

#### 3.5.1 Trimming with a Field Communicator

#### Procedure

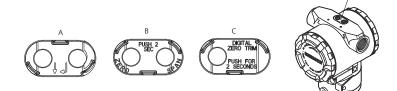
- 1. Connect the Field Communicator. See "Connect the wiring and power up" for instructions.
- 2. Follow the HART<sup>®</sup> menu to perform the desired zero trim.

#### Table 3-3: Zero Trim Fast Keys

	Analog zero (Set 4 mA)	Digital zero
Fast Key sequence	3, 4, 2	3, 4, 1, 3

D

#### Figure 3-13: External Configuration Buttons



- A. LOI
- B. Analog zero and span
- C. Digital zero
- D. Configuration buttons

Perform trim with LOI (option M4) for a zero trim.

- 3. Set the transmitter pressure.
- 4. See Figure 3-12 for the operating menu.
  - a) Perform an analog zero trim by selecting **Rerange**.
  - b) Perform a digital zero trim by selecting **Zero Trim**.

# 4 Safety instrumented systems installation

For safety certified installations, refer to the Rosemount 3051 Reference Manual for installation procedure and system requirements.

# 5 Product certifications

### 5.1 Rosemount 3051D Pressure Transmitter

Rev 3.10

#### 5.1.1 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 <u>Emerson.com</u>.

#### 5.1.2 Europe

#### E8 ATEX Flameproof and Dust

Certificate DEKRA12ATEX0212X (Ex d); Baseefa12ATEX0191 (Ex ta)

- Standards EN IEC 60079-0: 2018, EN60079-1: 2014, EN60079-26: 2015, EN60079-31: 2014
- Markings  $\underbrace{\&x}$  II 1/2 G Ex db IIC T6...T4 Ga/Gb, T6 (-60 °C ≤ T<sub>a</sub> ≤ +70 °C), T5/T4 (-60 °C ≤ T<sub>a</sub> ≤ +80 °C)

(E) II 1 D Ex ta IIIC T <sub>200</sub> 105 °C Da (-20 °C  $\leq$  T<sub>a</sub>  $\leq$  +85 °C) V <sub>max</sub> = 42.4 Vdc

#### Table 5-1: Process temperature

Temperature class	Process connection temperature	Ambient temperature
Т6	–60 to +70 °C	–60 to +70 °C
Т5	–60 to +80 °C	–60 to +80 °C
T4	–60 to +120 °C	–60 to +80 °C

#### Special Conditions for Safe Use (X):

- This device contains a thin wall diaphragm less than 1 mm thickness that forms a boundary between Category 1 (process connection) and Category 2 (all other parts of the equipment). The model code and datasheet are to be consulted for details of the diaphragm material. Installation, maintenance and use shall take into account the environmental conditions to which the diaphragm will be subjected. The manufacturer's instructions for installation and maintenance shall be followed in detail to assure safety during its expected lifetime.
- 2. Flameproof joints are not intended for repair.

- 3. Non-standard paint options may cause risk from electrostatic discharge. Avoid installations that could cause electrostatic build-up on painted surfaces and only clean the painted surfaces with a damp cloth. If paint is ordered through a special option code, contact the manufacturer for more information.
- Some variants of the equipment have reduced markings on the nameplate. Refer to the Certificate for full equipment marking.
- 5. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5 °C greater than maximum specified temperature for location where installed.

#### **I1 ATEX Intrinsic Safety and Dust**

Certificate Baseefa12ATEX0189X; Baseefa12ATEX0191

- Standards: EN IEC 60079-0: 2018, EN60079-11: 2012, EN 60079-31: 2014
- Markings: II 1 G Ex ia IIC T4 Ga (-60 °C ≤ T<sub>a</sub>≤ +70 °C), II 1 D Ex ta IIIC T<sub>200</sub>105 °C Da (-20 °C ≤ T<sub>a</sub>≤ +85 °C)

#### Table 5-2: Input parameters

Parameters	HART®
Voltage U <sub>i</sub>	30 V
Current I <sub>i</sub>	200 mA
Power P <sub>i</sub>	1.0 W
Capacitance C <sub>i</sub>	0.012 μF
Inductance L <sub>i</sub>	0 mH

#### Special Conditions for Safe Use (X):

- The equipment is not capable of withstanding the 500 V insulation test required by clause 6.3.13 of EN60079-11: 2012. This must be taken into account when installing the equipment.
- 2. The 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 Zone 0.
- 3. Some variants of the equipment have reduced markings on the nameplate. Refer to the Certificate for full equipment marking.

#### N1 ATEX Type n and Dust

**Certificate** Baseefa12ATEX0190X; Baseefa12ATEX0191

- Standards EN IEC 60079-0:2018, EN60079-15:2010, EN 60079-31:2014
- Markings  $\bigotimes$  II 3 G Ex nA IIC T5 Gc (-40 °C ≤ T<sub>a</sub> ≤ +70 °C),  $\bigotimes$  II 1 D Ex ta IIIC T<sub>200</sub> 105 °C Da (-20 °C ≤ T<sub>a</sub> ≤ +85 °C)

#### Special Conditions for Safe Use (X):

- The equipment is not capable of withstanding the 500 V insulation test required by clause 6.5.1 of EN60079-15: 2010. This must be taken into account when installing the equipment.
- 2. Some variants of the equipment have reduced markings on the nameplate. Refer to the Certificate for full equipment marking.

#### 5.1.3 International

#### **E7 IECEx Flameproof and Dust**

Certificate IECEx DEK 12.0067X (Ex d); IECEx BAS 12.0109 (Ex ta)

- Standards IEC 60079-0: 2017, IEC60079-1: 2014, IEC60079-26: 2014, IEC 60079-31: 2013
- Markings
   Ex db IIC T6...T4 Ga/Gb, T6 (-60 °C  $\leq$  T<sub>a</sub>  $\leq$  +70 °C), T5/T4 (-60 °C  $\leq$  T<sub>a</sub>  $\leq$  +80 °C)

   Ex ta IIIC T<sub>200</sub> 105 °C Da (-20 °C  $\leq$  T<sub>a</sub>  $\leq$  +85 °C)

#### Table 5-3: Process temperature

Temperature class	Process connection temperature	Ambient temperature
Т6	–60 to +70 °C	–60 to +70 °C
T5	–60 to +80 °C	–60 to +80 °C
T4	–60 to +120 °C	–60 to +80 °C

#### Special Conditions for Safe Use (X):

 This device contains a thin wall diaphragm with less than 1 mm thickness that forms a boundary between zone 0 (process connection) and zone 1 (all other parts of the equipment). The model code and datasheet are to be consulted for details of the diaphragm material. Installation, maintenance, and use shall take into account the environmental conditions to which the diaphragm will be subjected. The manufacturer's instructions for installation and maintenance shall be followed in detail to assure safety during its expected lifetime.

- 2. Flameproof joints are not intended for repair.
- 3. Some variants of the equipment have reduced markings on the nameplate. Refer to the Certificate for full equipment marking.
- 4. Appropriate cable, glands and plugs need to be suitable for a temperature of 5 °C greater than maximum specified temperature for location where installed.

#### **I7 IECEx Intrinsic Safety**

Certificate	IECEx BAS 12.0107X
Standards	IEC 60079-0: 2017, IEC60079-11: 2011
Markings	Ex ia IIC T4 Ga (–60 °C $\leq$ T <sub>a</sub> $\leq$ +70 °C)

#### Table 5-4: Input parameters

Parameters	HART <sup>®</sup>
Voltage U <sub>i</sub>	30 V
Current I <sub>i</sub>	200 mA
Power P <sub>i</sub>	1.0 W
Capacitance C <sub>i</sub>	0.012 μF
Inductance L <sub>i</sub>	0 mH

#### Special Conditions for Safe Use (X):

- The equipment is not capable of withstanding the 500 V insulation test required by clause 6.3.13 of IEC60079-11: 2011. This must be taken into account when installing the apparatus.
- 2. The 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 Zone 0.

#### N7 IECEx Type n

Certificate	IECEx BAS 12.0108X
Standards	IEC 60079-0: 2017, IEC60079-15: 2010
Markings	Ex nA IIC T5 Gc (–40 °C $\leq$ T <sub>a</sub> $\leq$ +70 °C)

#### Special Condition for Safe Use (X):

1. The apparatus is not capable of withstanding the 500 V insulation test required by IEC60079-15. This must be taken into account when installing the apparatus.

#### 5.1.4 China

#### E3 China Flameproof

Certificate GYJ22.3617X

- Standards GB/T3836.1-2021, GB/T3836.2-2021, GB3836.20-2010, GB/T 3836.31-2021
- Markings Ex db IIC T6…T4 Ga/Gb, Ex ta IIIC T200 105 °C Da

#### **I3 China Intrinsic Safety**

Certificate	GYJ22.3375X
Standards	GB3836.1-2021, GB/T3836.4-2021
Markings	Ex ia IIC T4 Ga

#### N3 China Type n

Certificate	GYJ23.1148X
Standards	GB/T 3836.1-2021, GB/T 38362021
Markings	Ex ec IIC T5 Gc

#### 5.1.5 Combinations

- **K7** Combination of E7, I7, and N7
- K8 Combination of E8, I1, and N1

## 5.2 Rosemount 3051G Pressure Transmitter

#### 5.2.1 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 <u>Emerson.com</u>.

#### 5.2.2 Ordinary Certification Location

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).

#### 5.2.3 North America

#### E5 USA Explosionproof (XP) and Dust Ignition-proof (DIP)

Certificate	1053834
Standards	FM 3600: 2022, FM 3610: 2021, FM 3615: 2022, FM 3616: 2022, ANSI/UL 61010-1-2019 Third Edition, ANSI-ISA-12.27.01–2022, ANSI/UL 50E (First Edition)
Markings	XP: CL I, DIV 1, GP B, C, D T5; SEAL NOT REQUIRED DIP: CL II, DIV 1, GP E, F, G; CL III T5; $-50 \ ^{\circ}C \le T_a \le +85 \ ^{\circ}C$

TYPE 4X IP 68

OPTIONAL SINGLE SEAL

#### Specific Conditions for Use:

- 1. The Rosemount 3051 Transmitter housing contains 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.
- 2. Equipment evaluated for atmospheric pressure range between 80 kPa (0,8 bar) to 110 kPa (1,1 bar).
- 3. Process temperature limits shall be in accordance with 03031-1053.
- 4. Flameproof joints are not intended for repair.

#### I5 USA Intrinsic Safety (IS) and Nonincendive (NI)

Certificate 1053834

Standards FM 3600: 2022, FM 3610: 2018, FM 3611: 2021, ANSI/UL 61010-1-2019 Third Edition, ANSI/UL 60079-0: 2017, ANSI/UL 60079-11: 2013, ANSI-ISA-12.27.01–2022, ANSI/UL 50E (First Edition)

MarkingsIS: CL I GP ABCD T4IS: CL II GP EFG CL III T4CL I ZN 0 AEx ia IIC T4 GaNI: CL 1 DIV 2 GP ABCD T4-60 °C  $\leq$  Ta  $\leq$  +70 °COPTIONAL SINGLE SEALTYPE 4X IP 68INSTALL PER 03031-1024

#### **Specific Conditions for Use:**

- 1. The Rosemount 3051G transmitter housing may contain 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.
- 2. The Rosemount 3051G with the transient terminal block (option code T1) will not pass the 500 Vrms dielectric strength test; this must be taken into account during installation.
- 3. Equipment evaluated for atmospheric pressure range between 80 kPa (0,8 bar) to 110 kPa (1,1 bar).
- 4. Maximum process temperature limits shall be in accordance with 03031-1053.

# C6 Canada Explosionproof, Dust Ignition-proof, Intrinsic Safety, and Division 2

- Certificate 1053834
- Standards
   CAN/CSA C22.2 No. 61010-1-12, CAN/CSA C22.2 No.
   94.2-20, CSA C22.2 No. 25-17, CAN/CSA C22.2 No.
   30:20, CAN/CSA C22.2 No. 213-17 +UPD1 (2018)+UPD2 (2019)+UPD3 (2021), CAN/CSA C22.2 No. 60079-0:19, CAN/CSA C22.2 No. 60079-1:16, CAN/CSA-60079-11:14, ANSI-ISA-12.27.01-202
- Markings XP: CL I DIV 1 GP B, C, D T5 Ex db IIC T5 Gb SEAL NOT REQUIRED DIP: CL II, DIV 1, GP E, F, G; CL III T5;

T5: -50 °C  $\leq$  Ta  $\leq$  85 °C IS: CL I GP ABCD T4 IS: CL II GP EFG, CL III T4 Ex ia IIC T4 Ga NI: CL I DIV 2 GP ABCD T4 T4: -60 °C  $\leq$  Ta  $\leq$  +70 °C INSTALL PER 03031-1024 (IS/NI ONLY) SINGLE SEAL - TEMP LIMITS PER 03031-1053 TYPE 4X, IP 68

#### **Specific Conditions for Use:**

- 1. The Rosemount 3051 Transmitter housing contains 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.
- 2. Equipment evaluated for atmospheric pressure range between 80 kPa (0,8 bar) to 110 kPa (1,1 bar).
- 3. The Rosemount 3051 Transmitter with the transient terminal block (Option code T1) will not pass the 500 Vrms dielectric strength test, and this must be taken into account during installation.
- 4. Flameproof joints are not intended for repair.

#### E6 Canada Explosionproof, Dust Ignition-proof, and Division 2

#### Certificate 1053834

- Standards
   CAN/CSA C22.2 No. 61010-1-12, CAN/CSA C22.2 No.
   94.2-20, CSA C22.2 No. 25-17, CAN/CSA C22.2 No.
   30:20, CAN/CSA C22.2 No. 213-17 +UPD1 (2018)+UPD2 (2019)+UPD3 (2021), CAN/CSA C22.2 No. 60079-0:19, CAN/CSA C22.2 No. 60079-1:16, ANSI-ISA-12.27.01-2021
- MarkingsXP: CL 1, DIV 1, GP B, C, D T5Ex db IIC T5 GbSEAL NOT REQUIREDDIP: CL II, DIV 1, GP E, F, G, CL III T5T5: -50 °C  $\leq$  Ta  $\leq$  +85 °CNI: CL I DIV 2 GP ABCD T4T4: -60 °C  $\leq$  Ta  $\leq$  +70 °CSINGLE SEAL TEMP LIMITS PER 03031-1053TYPE 4X, IP 68

#### **Specific Conditions for Use:**

- 1. The Rosemount 3051 Transmitter housing contains 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.
- 2. Equipment evaluated for atmospheric pressure range between 80 kPa (0,8 bar) to 110 kPa (1,1 bar).
- 3. Flameproof joints are not intended for repair.

#### 5.2.4 Europe

#### **E8 ATEX Flameproof and Dust**

- **Certificate** KEMA97ATEX2378X; BAS01ATEX1427X
- Standards EN60079-0:2012 + A11: 2013, EN60079-1: 2013, EN60079-26: 2015, EN60079-31: 2009
- Markings
   II 1/2 G Ex db IIC T6...T4 Ga/Gb, T6 (-60 °C ≤  $T_a ≤ +70$  °C), T5/T4 (-60 °C ≤  $T_a ≤ +80$  °C); II 1 D Ex t IIIC T50 °C T<sub>500</sub> 60 °C Da

#### Table 5-5: Process connection temperature

Temperature class	Process connection temperature	Ambient temperature
Т6	–60 to +70 °C	–60 to +70 °C
Т5	–60 to +80 °C	–60 to +80 °C
T4	–50 to +120 °C	–60 to +80 °C

#### Special Conditions for Safe Use (X):

- This device contains a thin wall diaphragm with less than 1 mm thickness that forms a boundary between zone 0 (process connection) and zone 1 (all other parts of the equipment). The model code and datasheet are to be consulted for details of the diaphragm material. Installation, maintenance, and use shall take into account the environmental conditions to which the diaphragm will be subjected. The manufacturer's instructions for installation and maintenance shall be followed in detail to assure safety during its expected lifetime.
- 2. Flameproof joints are not intended for repair.
- 3. Non-standard paint options may cause risk from electrostatic discharge. Avoid installations that could cause electrostatic

build-up on painted surfaces and only clean the painted surfaces with a damp cloth. If paint is ordered through a special option code, contact the manufacturer for more information.

- 4. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5 °C greater than maximum specified temperature for location where installed.
- 5. The user must ensure that the maximum rated voltage and current (36 volts, 24 milliamps, d.c.) are not exceeded. All connections to other apparatus or associated apparatus shall have control over this voltage and current equivalent to a category 'ib' circuit according to EN 50020.
- 6. Cable entries must be used which maintain the ingress protection of the enclosure to at least IP66.
- 7. Unused cable entries must be filled with suitable blanking plugs which maintain the ingress protection of the enclosure to at least IP66.
- Cable entries and blanking plugs must be suitable for the ambient range of the apparatus and capable of withstanding a 7J impact test.
- 9. Rosemount 2088/2090 sensor module must be securely screwed in place to maintain the ingress protection of the enclosure.
- 10. Some variants of the equipment have reduced markings on the nameplate. Refer to the Certificate for full equipment marking.

#### **I1 ATEX Intrinsic Safety and Dust**

Certificate	BAS00ATEX1166X
Standards	EN60079-0: 2012+A11: 2013, EN60079-11: 2012
Markings	𝔄 II 1 G Ex ia IIC T4 Ga (−55 °C ≤ T <sub>a</sub> ≤ +70 °C)

#### Table 5-6: Input parameters

Parameters	HART®
Voltage U <sub>i</sub>	30 V
Current I <sub>i</sub>	200 mA
Power P <sub>i</sub>	0.9 W
Capacitance C <sub>i</sub>	0.012 μF

#### Table 5-6: Input parameters (continued)

	Inductance L <sub>i</sub>	0 mH
1		

#### Special Conditions for Safe Use (X):

- 1. When fitted with a transient suppression terminal block, the equipment is not capable of withstanding the 500 V insulation test. This must be taken into account during installation.
- 2. The 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 Zone 0.

#### N1 ATEX Type n and Dust

#### Certificate BAS00ATEX3167X; BAS01ATEX1427X

Standards EN60079-0: 2012, EN60079-15: 2010, EN60079-31: 2009

Markings  $\bigotimes$  II 3 G Ex nA IIC T5 Gc (-40 °C ≤ T<sub>a</sub> ≤ +70 °C);  $\bigotimes$  II 1 D Ex t IIIC T50 °C T <sub>500</sub> 60 °C Da

#### Special Conditions for Safe Use (X):

- 1. This apparatus is not capable of withstanding the 500 V insulation test that is required by EN60079-15. This must be taken into account when installing the apparatus.
- 2. Some variants of the equipment have reduced markings on the nameplate. Refer to the Certificate for full equipment marking.

#### 5.2.5 International

#### **E7 IECEx Flameproof**

Certificate IECEx KEM 06.0021X

- Standards IEC 60079-0: 2011, IEC 60079-1: 2014, IEC 60079-26: 2014
- Markings Ex db IIC T6...T4 Ga/Gb T6 (-60 °C  $\leq$  T<sub>a</sub>  $\leq$  +70 °C), T5/T4 (-60 °C  $\leq$  T<sub>a</sub>  $\leq$  +80 °C)

Temperature class	Process connection temperature	Ambient temperature
Тб	–60 to +70 °C	–60 to +70 °C
Т5	–60 to +80 °C	–60 to +80 °C
T4	–50 to +120 °C	–60 to +80 °C

#### Special Conditions for Safe Use (X):

- This device contains a thin wall diaphragm with less than 1 mm thickness that forms a boundary between zone 0 (process connection) and zone 1 (all other parts of the equipment). The model code and datasheet are to be consulted for details of the diaphragm material. Installation, maintenance, and use shall take into account the environmental conditions to which the diaphragm will be subjected. The manufacturer's instructions for installation and maintenance shall be followed in detail to assure safety during its expected lifetime.
- 2. Flameproof joints are not intended for repair.
- 3. Non-standard paint options may cause risk from electrostatic discharge. Avoid installations that could cause electrostatic build-up on painted surfaces and only clean the painted surfaces with a damp cloth. If paint is ordered through a special option code, contact the manufacturer for more information.
- 4. Appropriate cable, glands and plugs need to be suitable for a temperature of 5 °C greater than maximum specified temperature for location where installed.

#### **I7 IECEx Intrinsic Safety**

Certificate	IECEx BAS 12.0071X
Standards	IEC60079-0: 2011, IEC60079-11: 2011
Markings	Ex ia IIC T4 Ga (55 °C $\leq$ T <sub>a</sub> $\leq$ +70 °C)

#### **Table 5-7: Input parameters**

Parameters	HART®
Voltage U <sub>i</sub>	30 V
Current I <sub>i</sub>	200 mA
Power P <sub>i</sub>	0.9 W
Capacitance C <sub>i</sub>	0.012 µF
Inductance L <sub>i</sub>	0 mH

#### Special Conditions for Safe Use (X):

 If the apparatus is fitted with an optional 90 V transient suppressor, it is not capable of withstanding the 500 V insulation test required by IEC60079-11. This must be taken into account when installing the apparatus. 2. The 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 Zone 0.

#### N7 IECEx Type n

Certificate	IECEx BAS 12.0072X
Standards	IEC60079-0: 2011, IEC60079-15: 2010
Markings	Ex nA IIC T5 Gc (–40 °C $\leq$ T <sub>a</sub> $\leq$ +70 °C)

#### Special Condition for Safe Use (X):

1. When fitted with a transient suppression terminal block, the Rosemount 2088 is incapable of passing the 500 V isolation test. This must be taken into account when installing the apparatus.

#### 5.2.6 Brazil

#### **E2 INMETRO Flameproof**

Certificate UL-BR 15.0728X

- Standards ABNT NBR IEC60079-0: 2013, ABNT NBR IEC 60079-1: 2016, ABNT NBR IEC 60079-26: 2016
- **Markings** Ex db IIC T6...T4 Ga/Gb T4/T5 (-60 °C  $\leq$  T<sub>a</sub>  $\leq$  +80 °C), T6 (-60 °C  $\leq$  T<sub>a</sub>  $\leq$  +70 °C)

#### Special Conditions for Safe Use (X):

- This device contains a thin wall diaphragm with less than 1 mm thickness that forms a boundary between zone 0 (process connection) and zone 1 (all other parts of the equipment). The model code and datasheet are to be consulted for details of the diaphragm material. Installation, maintenance, and use shall take into account the environmental conditions to which the diaphragm will be subjected. The manufacturer's instructions for installation and maintenance shall be followed in detail to assure safety during its expected lifetime.
- 2. Flameproof joints are not intended for repair.
- 3. Non-standard paint options may cause risk from electrostatic discharge. Avoid installations that could cause electrostatic build-up on painted surfaces and only clean the painted surfaces with a damp cloth. If paint is ordered through a special option code, contact the manufacturer for more information.

#### 5.2.7 China

#### E3 China Flameproof

Certificate	GYJ15.1300X
Standards	GB3836.1-2010, GB3836.2-2010
Markings	Ex d IIB+H <sub>2</sub> T5 Gb

#### Special Conditions for Safe Use (X):

- 1. Ambient temperature range: -20 °C ~ +85 °C.
- 2. The earth connection facility in the enclosure should be connected reliably.
- 3. During installation, there should be no mixture harmful to housing.
- 4. During installation in hazardous location, cable glands and blanking plugs, certified by state-appointed inspection bodies with Ex d IIC Gb type of protection should be used. Redundant cable entries should be blocked with blanking plugs.
- 5. During installation, use and maintenance of the product in explosive gas atmosphere, observe the warning: "Don't open the cover when the circuit is alive. "
- 6. End users are not permitted to change any internal components but to settle the problem in conjunction with the manufacturer to avoid damage to the product.
- 7. During installation, use and maintenance of this product, observe the following standards: GB3836.13-2013 *Explosive atmospheres-Part 13: Equipment repair, overhaul and reclamation* GB3836.15-2000 *Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous area* (other than mines) GB3836.16-2006 *Electrical apparatus for explosive gas atmospheres Part 16: Inspection an maintenance of electrical installation (other than mines),* and GB50257-2014 *Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering.*

#### **I3 China Intrinsic Safety**

Certificate	GYJ15.1301X
Standards	GB3836.1-2010, GB3836.4-2010, GB3836.20-2010
Markings	Ex ia IIC T4 Ga (–55 °C $\leq$ T <sub>a</sub> $\leq$ +70 °C)

#### Special Conditions for Safe Use (X):

- 1. The enclosure may contain non-metallic material; attention should be taken to avoid ignition hazard due to impact or friction when used in Zone 0.
- 2. When transient protection board is chosen (Option Code T1), this apparatus is not capable of withstanding the 500V r.m.s insulation test required by Clause 6.3.12 of GB3836.4-2010.

#### N3 China Type n

Certificate	GYJ13.1305X
Standards	GB3836.1-2010, GB3836.8-2003
Markings	Ex nA IIC T5 Gc (-40 °C $\leq$ T <sub>a</sub> $\leq$ +70 °C)

#### Special Condition for Safe Use (X):

1. When transient protection board is chosen (option code T1), this apparatus is not capable of withstanding the 500 V r.m.s insulation test required by Clause 6.3.12 of GB3836.4-2010.

#### 5.2.8 Combinations

K3 Combination	of E3 and I3	3
----------------	--------------	---

- K5 Combination of E5 and I5
- K6 Combination of C6, E8, and I1
- K8 Combination of E8, I1, and N1
- KB Combination of E5, I5, and C6
- **KD** Combination of E8, I1, E5, I5, and C6

### 5.2.9 Conduit plugs and adapters

#### **IECEx Flameproof and Increased Safety**

Certificate IECEx FMG 13.0032X

Standards IEC60079-0: 2011, IEC60079-1: 2007, IEC60079-7: 2006-2007

Markings Ex de IIC Gb

#### **ATEX Flameproof and Increased Safety**

Certificate	FM13ATEX0076X
Standards	EN60079-0: 2012, EN60079-1: 2007, IEC60079-7: 2007

## Markings 🛛 🖾 II 2 G Ex de IIC Gb

#### Table 5-8: Conduit plug thread sizes

Thread	Identification mark	
M20 x 1.5	M20	
1⁄2-14 NPT	½ NPT	

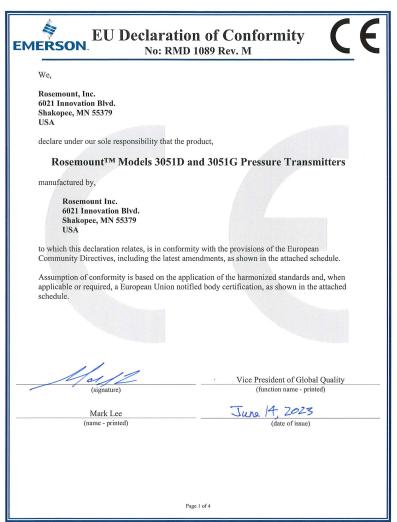
#### Table 5-9: Thread adapter thread sizes

Male thread	Identification mark	
M20 x 1.5–6g	M20	
1⁄2-14 NPT	1/2-14 NPT	
34-14 NPT	34-14 NPT	
Female thread	Identification mark	
M20 x 1.5–6H	M20	
1⁄2-14 NPT	1⁄2-14 NPT	
G½	G1⁄2	

#### Special Conditions for Safe Use (X):

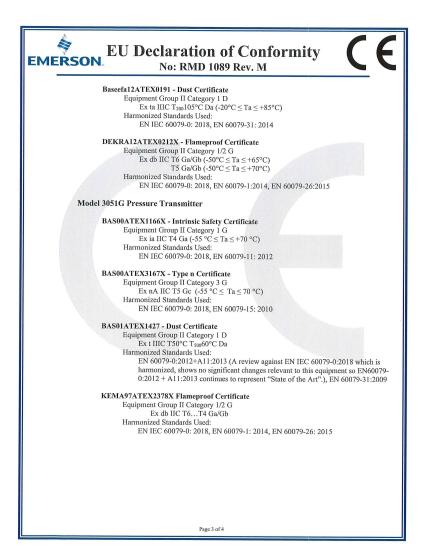
- 1. When the thread adapter or blanking plug is used with an enclosure in type of protection increased safety "e," the entry thread shall be suitably sealed in order to maintain the ingress protection rating (IP) of the enclosure.
- 2. The blanking plug shall not be used with an adapter.
- 3. Blanking plug and threaded adapter shall be either NPT or metric thread forms. G½ thread forms are only acceptable for existing (legacy) equipment installations.

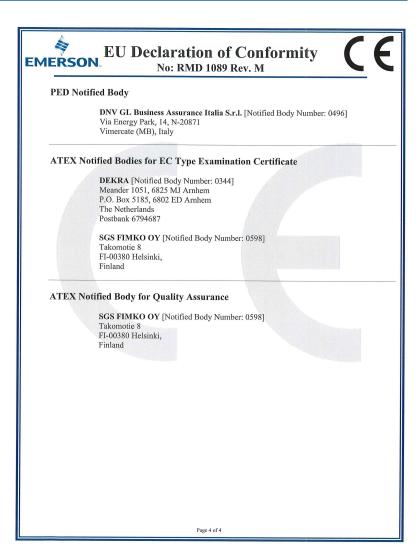
## 5.3 Declaration of Conformity





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## 5.4 China RoHS

		有害物质 / Hazardous Substances				
<b>部件名称</b> Part Name	<b>船</b> Lead (Pb)	汞 Mercury (Hg)	fin Cadmium (Cd)	<b>大价格</b> Hexavalent Chromium (Cr +6)	<b>多狭碳萃</b> Polybrominated biphenyls (PBB)	多狭底苯醛 Polybrominated diphenyl ethers (PBDE)
电子组件 Electronics Assembly	х	O	0	0	0	0
壳体组件 Housing Assembly	0	о	0	0	0	0
传感器组件 Sensor Assembly	×	o	0	0	0	0

#### 含有China RoHS 皆望物质超过最大浓度限值的部件型号列表 3051 List of 3051 Parts with China RoHS Concentration above MCVs

本表格系依据SJT11964的规定而制作。

This table is proposed in accordance with the provision of SJ/T11964.

O: 总为该部件的所有均质材料中该有書物质的含量均低于GB/T 26072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所有均质材料里,至少有一类均质材料中该有書物质的含量高于GB/T 26572所规定的限量要求. X: Indicate that said harandous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

<b>部件名称</b> Part Name	<b>組製各件</b> 遺明 Spare Parts Descriptions for Assemblies
电子组件 Electronics Assembly	电子线路倾组件 Electronic Board Assemblies 端子块组件 Terminal Block Assemblies 开修赛件 Vpgrade Kits 依晶显示屏或本地镂作东面 LCD or LOIDisplay
壳体组件 Housing Assembly	电子外壳 Electrical Housing
传感器组件 Sensor Assembly	传感器模块 Sensor Module

# 

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ROSEMOUNT