

Rosemount® 2088 Absolute and Gage Pressure Transmitter



- Performance of 0.065% with High Accuracy option
- Lightweight, compact design for cost-effective installation
- Protocols available include 4-20 mA HART® and 1-5 Vdc HART Low Power
- Absolute and gage pressure ranges up to 4,000 psi (276 bar)
- Rangeability of 50:1

Rosemount 2088 Pressure Transmitter Product Offering

Proven reliability for gage and absolute applications



- Available protocols include 4-20 mA HART and 1-5 Vdc HART Low Power
- Fully configurable LCD display to display process variable, percent of range, and diagnostic messages
- Lightweight, compact design enables easy installation
- Choice of stainless steel or Alloy C-276 wetted materials

Unlock the value of devices with the Smart Wireless THUM™ Adapter



- Gain access to field intelligence and improve quality, safety, availability, operations, and maintenance costs
- Remotely manage devices and monitor health
- Enable new wireless measurement points
- Utilize existing loop power

Proven, reliable, and innovative DP Level technologies



- Connect to virtually any process with a comprehensive offering of process connections, fill fluids, direct mount or capillary connections and materials
- Quantify and optimize total system performance with QZ option

Instrument manifolds – quality, convenient, and easy



- Designed and engineered for optimal performance with Rosemount transmitters
- Save installation time and money with factory assembly
- Offers a variety of styles, materials, and configurations

Contents

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Ordering Information

Rosemount 2088 In-Line Pressure Transmitter



Configuration	Transmitter output code
4-20 mA HART 2088 with Selectable HART	S
1-5 Vdc Low Power 2088 with Selectable HART	N

Additional information

Specifications : [page 8](#)

Product Certifications : [page 11](#)

Dimensional Drawings : [page 16](#)

Specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See [page 10](#) for more information on Material Selection.

Table 1. Rosemount 2088 Pressure Transmitter Ordering Information

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

Model	Product description		
2088	Pressure Transmitter		
Measurement type			
A	Absolute		
G	Gage		
Pressure ranges			
	2088G	2088A	
1	-14.7 to 30 psi /(-1,01 to 2,1 bar)	0 to 30 psi (0 to 2,1 bar)	★
2	-14.7 to 150 psi (-1,01 to 10,3 bar)	0 to 150 psi (0 to 10,3 bar)	★
3	-14.7 to 800 psi (-1,01 to 55,2 bar)	0 to 800 psi (0 to 55,2 bar)	★
4	-14.7 to 4,000 psi (-1,01 to 275,8 bar)	0 to 4,000 psi (0 to 275,8 bar)	★
Transmitter output			
S ⁽¹⁾	4–20 mA dc/Digital HART Protocol		
N ⁽¹⁾	1-5 Vdc Low Power/Digital HART protocol		
Materials of construction			
	Process connection	Isolating diaphragm	Fill fluid
22 ⁽²⁾	316L SST	316L SST	Silicone
33 ⁽²⁾	Alloy C-276	Alloy C-276	Silicone
2B ⁽²⁾	316L SST	316L SST	Inert

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Process connection		
A	½–14 NPT Female	★
B ⁽³⁾	DIN 16288 G ½ Male	★
D ⁽³⁾⁽⁴⁾	M20 3 1.5 Male	★
C ⁽³⁾⁽⁴⁾	RC ½ Female	
Conduit entry		
1	½–14 NPT	★
2 ⁽³⁾	M20 3 1.5	★
4 ⁽³⁾⁽⁵⁾	G ½	
Options (Include with selected model number)		
Extended product warranty		
WR3	3-year limited warranty	★
WR5	5-year limited warranty	★
Diaphragm seal assemblies		
S1 ⁽⁶⁾⁽⁷⁾	Assemble to one Rosemount 1199 Diaphragm Seal	★
Display and interface		
M4	LCD Display with Local Operator Interface	★
M5	LCD Display, configured for Engineering Units	★
Configuration buttons		
D4	Analog Zero and Span	★
DZ	Digital Zero Trim	★
Mounting brackets		
B4	SST mounting bracket with SST Bolts	★
Product certifications		
C6	CSA Explosion-Proof, Dust-ignition-proof, Intrinsic Safe, and NonIncendive	★
E2	INMETRO Flameproof	★
E3	China Flameproof	★
Product certifications		
E4 ⁽³⁾⁽⁸⁾	TIIS Flameproof	★
E5	FM Explosion-Proof (XP) and Dust Ignition-proof (DIP)	★
E7	IECEX Flameproof	★
ED	ATEX Flameproof	★

Table 1. Rosemount 2088 Pressure Transmitter Ordering Information

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EM	Technical Regulations Customs Union (EAC) Flameproof	★
I1 ⁽³⁾	ATEX Intrinsic Safety	★
I2	INMETRO Intrinsic Safety	★
I3	China Intrinsic Safety	★
I5	FM Intrinsically safe (IS) and Nonincendive	★
I7	IECEX Intrinsic Safety	★
IM	Technical Regulation Customs Union (EAC) Intrinsic Safety	★
K1	ATEX Flameproof, Intrinsic Safety, Type n, Dust	★
K2	INMETRO Flameproof, Intrinsic Safety	★
K5	FM Explosion-Proof, Dust Ignition-proof, Intrinsically Safe, Division 2	★
K6 ⁽³⁾	ATEX and CSA Explosion-Proof, Dust Ignition-proof, Intrinsically Safe, Division 2	★
K7	IECEX Flameproof, Intrinsic Safety, Type n, Dust	★
KB	FM and CSA Explosion-Proof, Dust Ignition-proof, Intrinsically Safe, Division 2	★
KM	Technical Regulation Customs Union (EAC) Flameproof and Intrinsic Safety	★
KH ⁽³⁾	FM Approvals and ATEX Explosion-Proof and Intrinsically Safe	★
N1 ⁽³⁾	ATEX Type n	★
N3	China Type n	★
N7	IECEX Type n	★
ND ⁽³⁾	ATEX Dust	★
NK	IECEX Dust	★
Shipboard approvals		
SBS	American Bureau of Shipping (ABS) Type Approval	★
SBV	Bureau Veritas (BV) Type Approval	★
SDN	Det Norske Veritas (DNV) Type Approval	★
SLL	Lloyd's Register (LR) Type Approval	★
Pressure testing		
P1	Hydrostatic testing	
Terminal blocks		
T1	Transient protection	★
Special cleaning		
P2	Cleaning for special service	
Calibration certificate		
Q4	Calibration certificate	★

Table 1. Rosemount 2088 Pressure Transmitter Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.

The Expanded offering is manufactured after receipt of order and is subject to additional delivery lead time.

Quality calibration certificate traceability certification		
Q8	Material Traceability Certification per EN 10204 3.1	★
Q15	Certificate of Compliance to NACE® MR0175/ISO 15156 for wetted materials	★
Q25	Certificate of Compliance to NACE MR0103 for wetted materials	★
Digital signal		
C4 ⁽³⁾	NAMUR alarm and saturation levels, high alarm	★
CN ⁽³⁾	NAMUR alarm and saturation levels, low alarm	★
C5 ⁽⁹⁾⁽¹⁰⁾	Custom alarm and saturation levels, high alarm, (requires C9 and Configuration Data Sheet)	★
C7 ⁽⁹⁾⁽¹⁰⁾	Custom alarm and saturation levels, low alarm (requires C9 and Configuration Data Sheet)	★
C8 ⁽¹⁰⁾	Low alarm (Standard Rosemount Alarm and Saturation Levels)	★
Configuration		
C9	Software configuration	★
Manifold assemblies		
S5 ⁽⁶⁾⁽⁷⁾	Assemble to Rosemount 306 integral manifold	★
Calibration accuracy		
P8 ⁽¹¹⁾	0.065% accuracy to 10:1 turndown	★
Water approval		
DW ⁽¹²⁾	NSF drinking water approval	★
Surface finish		
Q16	Surface finish certification for sanitary remote seals	★
Toolkit total system performance reports		
QZ	Remote Seal System Performance Calculation Report	★
HART Revision configuration		
HR 5 ⁽¹⁰⁾⁽¹³⁾	Configured for HART Revision 5	★
HR7 ⁽¹⁰⁾⁽¹⁴⁾	Configured for HART Revision 7	★
Typical model number: 2088 G 2 S 22 A 1 B4 M5		

- HART Revision 5 is the default HART output. The 2088 with selectable HART can be factory or field configured to HART Revision 7. To order HART Revision 7 factory configured, add option code HR7.
- Materials of Construction comply with recommendations per NACE MR0175/ISO 15156 for sour oil field production environments. Environmental limits apply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.
- Not available with low-power Transmitter Output code N.
- Not available with Alloy C-276, Material of Construction code 33.
- Consists of a 1/2-14 NPT housing with a G1/2 adapter.
- Use 1/2- 14 NPT Female Process Connection code A.
- "Assemble-to" items are specified separately and require a completed model number.

8. Only available with Conduit Thread code 4.
9. Only available with 4-20 mA HART Output (Output Code A).
10. Select Configuration Buttons (option code D4 or DZ) or Local Operator Interface (option code M4) if local configuration buttons are required.
11. Requires Transmitter Output code S with either Materials of Construction code 22 or 23.
12. Requires Materials of Construction code 22 with Process Connection code A.
13. Configures the HART output to HART Revision 5. The device can be field configured to HART Revision 7 if needed.
14. Configures the HART output to HART Revision 7. The device can be field configured to HART Revision 5 if needed.

Specifications

Performance specifications

For zero-based spans, reference conditions, silicone oil fill, 316L SST isolating diaphragm.

Reference accuracy

±0.075% of calibrated span. Includes combined effects of linearity, hysteresis, and repeatability

±0.065% of calibrated span (high accuracy option - P8)

For spans less than 10:1, accuracy = $\pm \left[0.009 \left(\frac{URL}{Span} \right) \right]$ % of Span

Ambient temperature effect

Expressed as a total effect per 50 °F (28 °C)

Total effect includes zero and span effects.

± (0.15% URL + 0.15% of span)

Stability

Ranges 2-4: ±0.10% of URL for 3 years

Range 1: ±0.10% of URL for 1 year

Warranty⁽¹⁾

All Rosemount 2088 models:

- 1-year limited warranty is standard⁽²⁾
- Extended 3-year and 5-year limited warranties available if ordered.⁽³⁾ (Select option WR3 or WR5 in model string respectively)

Vibration effect

Less than ±0.1% of URL when tested per the requirements of IEC60770-1 field or pipeline with high vibration level (10 - 60 Hz 0.21 mm displacement peak amplitude / 60 - 2000 Hz 3g).

Power supply effect

Less than ±0.005% of calibrated span per volt change in voltage at the transmitter terminals.

Mounting position effect

Zero shifts to ±2.5 inH₂O (6,22 mbar), which can be zeroed
Span: no effect

Transient protection

Tested in accordance with IEEE C62.41.2-2002,

Location Category B

6 kV crest (0.5 μs - 100 kHz)

3 kA crest (8 x 20 microseconds)

6 kV crest (1.2 x 50 microseconds)

General specifications

Tested to IEC 801-3

Functional specifications

Table 2. 2088 Range Values

Range	Minimum span	Upper (URL)	Lower (LRL)	Lower ⁽¹⁾ (LRL) (gage)
1	0.60 psi (41,37 mbar)	30.00 psi (2,07 bar)	0 psia (0 bar)	-14.70 psig (-1,01 bar)
2	3.00 psi (206,85 mbar)	150.00 psi (10,34 bar)	0 psia (0 bar)	-14.70 psig (-1,01 bar)
3	16.00 psi (1,11 bar)	800.00 psi (55,16 bar)	0 psia (0 bar)	-14.70 psig (-1,01 bar)
4	80.00 psi (5,52 bar)	4000.00 psi (275,79 bar)	0 psia (0 bar)	-14.70 psig (-1,01 bar)

1. Assumes atmospheric pressure of 14.70 psia (1,01 bar-a).

Output

Code S: 4–20 mA

Code N: 1-5 Vdc, low power

(Outputs are directly proportional to the input pressure)

Selectable HART

Digital communications based on HART Revision 5 (default) or Revision 7 (option code HR7) protocol can be selected. The HART revision can be switched in the field using any HART based configuration tool or the optional local operator interface (LOI).

Service

Liquid, gas, and vapor applications

1. Warranty details can be found in Emerson™ Process Management Terms & Conditions of Sale, Document 63445, Rev G (10/6).

2. Goods are warranted for twelve (12) months from the date of initial installation or eighteen (18) months from the date of shipment by seller, whichever period expires first.

3. 3-year and 5-year warranty period begins on date of shipment by seller.

Power supply

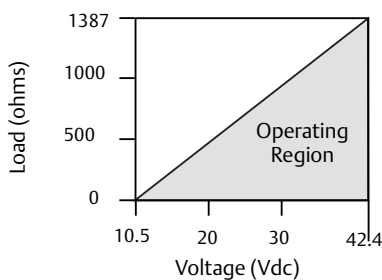
External power supply required. Transmitter operates on 10.5–42.4 Vdc with no load (5.8-28 V for Low Power). Reverse polarity protection is standard.

Load Limitations

Reverse polarity protection is standard. Maximum loop resistance is determined by the power supply voltage as described by the following equations:

Figure 1. Maximum Loop Resistance

Max. Loop Resistance = 43.5 (Power Supply Voltage – 10.5)



The Field Communicator requires a minimum loop resistance of 250Ω for communication.

Indication

Optional two line LCD/LOI Display.

Zero and span adjustment requirements

Zero and span values can be set anywhere within the range limits stated in Table 2. Span must be greater than or equal to the minimum span stated in Table 2.

Local operator interface

The LOI utilizes a two-button menu with internal and external configuration buttons. Internal buttons are always configured for Local Operator Interface. External buttons can be configured for either LOI, (option code M4), Analog Zero and Span (option code D4) or Digital Zero Trim (option code DZ) for LOI configuration menu.

Current draw

Output Code N: ≤ 3 mA.

Overpressure limits

Range 1: 120 psig max

All other ranges: two times the URL

Burst pressure

11,000 psi for all ranges

Zero elevation and suppression

Zero can be suppressed between atmosphere for gage transmitters or 0 psia for absolute transmitters and upper range limit, provided the calibrated span is equal to or greater than the minimum span, and the upper range value does not exceed the upper range limit.

Dynamic performance

Total Response Time: 145 milliseconds

Update rate: 20 times per second minimum

Temperature limits

Ambient:

-40 to 185 °F (-40 to 85 °C)

With LCD display⁽¹⁾: -40 to 176 °F (-40 to 80 °C)

Storage⁽²⁾:

-50 to 230 °F (-46 to 110 °C)

With LCD display: -40 to 185 °F (-40 to 85 °C)

Process

Silicone fill sensor: -40 to 250 °F (-40 to 121 °C)⁽³⁾

Inert fill sensor: -22 to 250 °F (-30 to 121 °C)⁽³⁾

Process temperatures above 185 °F (85 °C) require derating the ambient limits by a 1.5:1 ratio. For example, for process temperature of 195 °F (91 °C), new ambient temperature limit is equal to 170 °F (77 °C). This can be determined as follows: (195 °F - 185 °F) × 1.5 = 15 °F, 185 °F - 15 °F = 170 °F

Humidity limits

0–100% relative humidity

Volumetric displacement

Less than 0.0005 in³ (0,008 cm³)

Damping

Analog output response time to a step change is user-selectable from 0 to 60 seconds for one time constant. Software damping is in addition to sensor module response time.

1. For the output code N, LCD display may not be readable and LCD display updates will be slower at temperatures below -22 °F (-30 °C).
2. If storage temperature is above 85 °C, perform a sensor trim prior to installation.
3. 220 °F (104 °C) limit in vacuum service; 130 °F (54 °C) for pressures below 0.5 psia.

Turn-on time

2.0 seconds, no warm-up required

Transmitter security

Activating the transmitter security function prevents changes to the transmitter configuration, including local zero and span adjustments. Security is activated by an internal switch.

Failure mode alarm

If self-diagnostics detect a sensor or microprocessor failure, the analog signal will be driven either high or low to alert the user. High or low failure mode is user-selectable with a jumper on the transmitter. The values to which the transmitter drives its output in failure mode depend on whether it is factory-configured to standard or NAMUR-compliant operation. The values for each are as follows:

Table 3. Standard Operation

Output code	Linear output	Fail high	Fail low
S	$3.9 \leq I \leq 20.8$	$I \geq 21.75 \text{ mA}$	$I \leq 3.75 \text{ mA}$
N	$0.97 \leq V \leq 5.2$	$V \geq 5.4 \text{ V}$	$V \leq 0.95 \text{ V}$

Table 4. NAMUR-Compliant Operation

Output code	Linear output	Fail high	Fail low
S	$3.8 \leq I \leq 20.5$	$I \geq 22.5 \text{ mA}$	$I \leq 3.6 \text{ mA}$

Physical specifications**Material selection**

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

Electrical connections

$1/2$ -14 NPT, M20 3 1.5 (CM20), or
G $1/2$ female (PF $1/2$ female) conduit entry

Process connections

$1/2$ -14 NPT female, DIN 16288 G $1/2$ male, RC $1/2$ female
(PT $1/2$ female), M20 3 1.5 (CM20) male

Process-wetted parts**Isolating diaphragm**

316L SST (UNS S31603), Alloy C-276 (UNS N10276)

Process connector

316L stainless steel CF-3M (Cast version of 316L SST, material per ASTM_A743) or Alloy C-276

Non-wetted parts**Electronics housing**

Low-copper aluminum, NEMA 4X, IP65, IP67,
CSA enclosure Type 4X

Paint for aluminum housing

Polyurethane

Cover O-rings

Buna-N

Fill fluid

Silicone or inert fill

Weight

Output Code S and N: Approximately 2.44 lb (1, 11 kg)

Product Certifications

Rev 1.1

European Directive Information

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

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).

North America

E5 USA Explosionproof (XP) and Dust-Ignitionproof (DIP)
 Certificate: 1V2A8.AE
 Standards: FM Class 3600 - 2011, FM, Class 3615 - 2006, FM class 3616 - 2011, FM Class 3810 - 2005, ANSI/NEMA 250 - 1991
 Markings: XP CL I, DIV 1, GP B, C, D; DIP CL II, DIV 1, GP E, F, G; CL III; T5(-40°C ≤ Ta ≤ +85°C); Factory Sealed; Type 4X

I5 USA Intrinsic Safety (IS) and Nonincendive (NI)
 Certificate: 0V9A7.AX
 Standards: FM Class 3600 - 1998, FM Class 3610 - 2010, FM Class 3611 - 2004, FM Class 3810 - 1989
 Markings: IS CL I, DIV 1, GP A, B, C, D; CL II, DIV 1, GP E, F, G; Class III; DIV 1 when connected per Rosemount drawing 02088-1018; NI CL 1, DIV 2, GP A, B, C, D; T4(-40°C ≤ Ta ≤ +70°C); Type 4x

Special Condition for Safe Use (X):

1. The Model 2088 transmitter with the transient terminal block (Option code T1) will not pass the 500Vrms dielectric strength test and this must be taken into account during installation.

C6 CSA Explosionproof, Dust-Ignitionproof, Intrinsic Safety and Nonincendive
 Certificate: 1015441

Standards: CAN/CSA C22.2 No. 0-M91 (R2001), CSA Std C22.2 No. 25-1966, CSA Std C22.2 No. 30-M1986, CAN/CSA-C22.2 No. 94-M91, CSA Std C22.2 No. 142-M1987, CAN/CSA-C22.2 No. 157-92, CSA Std C22.2 No. 213-M1987, ANSI-ISA-12.27.01-2003

Markings: Explosionproof for Class I, Division 1, Groups B, C and D; Dust-Ignitionproof Class II, Division 1, Groups E, F, G; Class III Division 1; Intrinsically Safe Class I, Division 1 Groups A, B, C, D when connected in accordance with Rosemount drawing 02088-1024, Temperature Code T3C; Class I Division 2 Groups A, B, C and D; Type 4X; Factory Sealed; Single Seal

Europe

ED ATEX Flameproof
 Certificate: KEMA97ATEX2378X
 Standards: EN60079-0:2006, EN60079-1:2007, EN60079-26:2007
 Markings: Ⓔ II 1/2 G Ex d IIC T6/T4, T6(-40 °C ≤ Ta ≤ +40 °C), T4(-40 °C ≤ Ta ≤ +80 °C)

Special Conditions for Safe Use (X):

1. This device contains a thin wall diaphragm. 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. For information on the dimensions of the flameproof joints the manufacturer shall be contacted.

I1 ATEX Intrinsic Safety
 Certificate: BAS00ATEX1166X
 Standards: EN60079-0:2012, EN60079-11:2012
 Markings: Ⓔ II 1 G Ex ia IIC T5/T4 Ga, T5(-55 °C ≤ Ta ≤ +40 °C), T4(-55 °C ≤ Ta ≤ +70 °C)

Table 5. Input Parameters

Parameter	HART
Voltage U _i	30 V
Current I _i	200 mA
Power P _i	0.9 W
Capacitance C _i	0.012 μF

Special Condition For Safe Use (X):

1. The apparatus is not capable of withstanding the 500V insulation test required by EN60079-11. This must be taken into account when installing the apparatus.

N1 ATEX Type n
 Certificate: BAS00ATEX3167X
 Standards: EN60079-0:2012, EN60079-15:2010
 Markings: Ⓔ II 3 G Ex nA IIC T5 Gc (-40 °C ≤ Ta ≤ +70 °C)

Special Condition For Safe Use (X):

1. The apparatus is not capable of withstanding the 500 V insulation test required by EN60079-15. This must be taken into account when installing the apparatus.

ND ATEX Dust

Certificate: BAS01ATEX1427X
 Standards: EN60079-0:2012, EN60079-31:2009
 Markings: $\text{Ex} \text{ II } 1 \text{ D Ex t IIIC T50 } ^\circ\text{C T}_{500} 60 ^\circ\text{C Da}$

Special Conditions For Safe Use (X):

1. The user must ensure that the maximum rated voltage and current (36 volts, 24 milliamps, d.c.) are not exceeded. All connection to other apparatus or associated apparatus shall have control over this voltage and current to a category 'ib' circuit.
2. Cable entries must be used which maintain the ingress protection of the enclosure to at least IP66.
3. Unused cable entries must be filled with suitable blanking plugs which maintain the ingress protection of the enclosure to at least IP66.
4. Cable entries and blanking plugs must be suitable for the ambient range of the apparatus and capable of withstanding a 7J impact test.
5. The 2088/2090 sensor module must be securely screwed in place to maintain the ingress protection of the enclosure.

International

E7 IECEx Flameproof

Certificate: IECEx KEM 06.0021X
 Standards: IEC60079-0:2004, IEC60079-1:2003, IEC60079-26:2004,
 Markings: $\text{Ex d IIC T4...T6, T6}(-20 ^\circ\text{C} \leq T_a \leq +40 ^\circ\text{C}), T4(-20 ^\circ\text{C} \leq T_a \leq +80 ^\circ\text{C})$

Special Condition For Safe Use (x):

1. The material of the diaphragm shall not be subjected to environmental conditions that might adversely affect the partition wall.

I7 IECEx Intrinsic Safety

Certificate: IECEx BAS 12.0071X
 Standards: IEC60079-0:2011, IEC60079-11:2011
 Markings: $\text{Ex ia IIC T5/T4 Ga, T5}(-55 ^\circ\text{C} \leq T_a \leq +40 ^\circ\text{C}), T4(-55 ^\circ\text{C} \leq T_a \leq +70 ^\circ\text{C})$

Table 6. Entity Parameters

Parameter	HART
Voltage U_i	30 V
Current I_i	200 mA
Power P_i	0.9 W
Capacitance C_i	0.012 μF

Special Conditions for Safe Use (X):

1. When fitted with a transient suppression terminal block, the Model 2088 is incapable of passing the 500 V isolation 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 a Zone 0 environment.

N7 IECEx Type n

Certificate: IECEx BAS 12.0072X
 Standards: IEC60079-0:2011, IEC60079-15:2010
 Markings: $\text{Ex nA IIC T5 Gc} (-40 ^\circ\text{C} \leq T_a \leq +70 ^\circ\text{C})$

Special Condition for Safe Use (X):

1. When fitted with a transient suppression terminal block, the Model 2088 is incapable of passing the 500 V isolation test. This must be taking into account during installation.

NK IECEx Dust

Certificate: IECEx BAS12.0073X
 Standards: IEC60079-0:2011, IEC60079-31: 2008
 Markings: $\text{Ex t IIIC T50 } ^\circ\text{C T}_{500} 60 ^\circ\text{C Da}$

Table 7. Input Parameters

Parameter	HART
Voltage U_i	36 V
Current I_i	24 mA

Special Conditions For Safe Use (x):

1. Cable entries must be used which maintain the ingress protection of the enclosure to at least IP66.
2. Unused cable entries must be filled with suitable blanking plugs which maintain the ingress protection of the enclosure to at least IP66.
3. Cable entries and blanking plugs must be suitable for the ambient range of the apparatus and capable of withstanding a 7J impact.

Brazil

I2 INMETRO Intrinsic Safety

Certificate: UL-BR 13.0246X
 Standards: ABNT NBR IEC60079-0:2008 + Errata 1:2011, ABNT NBR IEC60079-11:2009
 Markings: $\text{Ex ia IIC T5/T4 Ga, T5}(-55 ^\circ\text{C} \leq T_a \leq +40 ^\circ\text{C}), T4(-55 ^\circ\text{C} \leq T_a \leq +70 ^\circ\text{C})$

Table 8. Input Parameters

Parameter	HART
Voltage U_i	30 V
Current I_i	200 mA
Power P_i	0.9 W
Capacitance C_i	0.012 μF

Special Conditions For Safe Use (x):

1. When fitted with a transient suppression terminal block, the model 2088 is incapable of passing the 500 V isolation 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 a zone 0 environment.

China

E3 China Flameproof
 Certificate: GYJ111062
 Standards: GB3836.1-2000, GB3836.2-2010
 Markings: Ex d IIC T4/T6, T6(-20 °C ≤ T_a ≤ +40 °C),
 T4(-20 °C ≤ T_a ≤ +80 °C)

Special Conditions For Safe Use (X):

1. The ambient temperature is as follows:

T _a	Temperature class
-20 °C ≤ T _a ≤ 80 °C	T4
-20 °C ≤ T _a ≤ 40 °C	T6

2. The earth connection facility in the enclosure should be connected reliably.
3. During installation in hazardous location, cable glands, conduits, and blanking plugs, certified by state-appointed inspection bodies with Ex d IIC type of protection, should be used.
4. Obey the warning “Do not open when energized.”
5. Installation and maintenance should be done in a non-hazardous environment.
6. End user is not permitted to change any internal component.
7. During installation, use and maintenance of this product, observe the following standards:
 GB3836.13-1997 “Electrical apparatus for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres”
 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 and maintenance of electrical installation (other than mines)”
 GB50257-1996 “Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering”

I3 China Intrinsic Safety
 Certificate: GYJ111063X
 Standards: GB3836.1-2000, GB3836.4-2000
 Markings: Ex ia IIC T4

Special Conditions For Safe Use (X):

1. This apparatus is not capable of withstanding the 500 V r.m.s. insulation test required by Clause 6.4.12 of GB3836.4-2000.
2. The ambient temperature is:

T _a	Temperature class
-55 °C ≤ T _a ≤ 40 °C	T5
-55 °C ≤ T _a ≤ 70 °C	T4

3. Intrinsically safe parameters:

Parameter	HART
Voltage U _i	30 V
Current I _i	200 mA
Power P _i	0.9 W
Capacitance C _i	0.012 μF
Inductance L _i	0 mH

4. The product should be used with Ex-certified linear associated apparatus to establish explosion protection system that can be used in explosive gas atmospheres. Wiring and terminals should comply with the instruction manual of the product and associated apparatus.
5. The cables between this product and associated apparatus should be shielded cables (the cables must have insulated shields). The shield has to be grounded reliably in a non-hazardous area.
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:
 GB3836.13-1997 “Electrical apparatus for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres”
 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 and maintenance of electrical installation (other than mines)”
 GB50257-1996 “Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering”

N3 China Type n
 Certificate: GYJ15.1108X
 Standards: GB3836.1-2000, GB3836. 8-2003
 Markings: Ex nA nL IIC T5 Gc (-40 °C ≤ T_a ≤ +70 °C)

Special Conditions For Safe Use (X):

1. The apparatus is not capable of withstanding the 500V r.m.s. insulation test required by GB3836.8-2003.
2. The ambient temperature range is -40 °C ≤ T_a ≤ +70 °C.
3. Maximum input voltage: 50 V.

4. Cable glands, conduit or blanking plugs, certified by NEPSI with Ex e or Ex n protection types should be used on external connections and redundant cable entries.
5. Maintenance should be done in non-hazardous location.
6. End users are not permitted to change any internal components, but to settle the problem in conjunction with manufacturer to avoid damage to the product.
7. During installation, use and maintenance of this product, observe the following standards:
 GB3836.13-2013 “Electrical apparatus for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres”
 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 and maintenance of electrical installation (other than mines)”
 GB50257-1996 “Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering”

Japan

E4 Japan Flameproof
 Certificate: TC15871, TC15872, TC15873, TC15874, TC20869, TC20870
 Markings: Ex d IIC T6

Technical Regulations Customs Union (EAC)

EM, IM, KM Contact an Emerson Process Management representative for additional information

Combinations

- K1** Combination of ED, I1, ND, and N1
- K2** Combination of E2 and I2
- K5** Combination of E5 and I5
- K6** Combination of C6, ED, and I1
- K7** Combination of E7, I7, NK, and N7
- KB** Combination of K5 and C6
- KH** Combination of ED, I1, K5

Conduit Plugs and Adapters

IECEx Flameproof and Increased Safety
 Certificate: IECEx FMG 13.0032X
 Standards: IEC60079-0:2011, IEC60079-1:2007-04, IEC60079-7:2006-07

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 9. Conduit Plug Thread Sizes

Thread	Identification mark
M20 x 1.5	M20
1/2 - 14 NPT	1/2 NPT
G1/2A	G1/2

Table 10. Thread Adapter Thread Sizes

Male thread	Identification mark
M20 x 1.5 – 6H	M20
1/2 - 14 NPT	1/2 - 14 NPT
3/4 - 14 NPT	3/4 - 14 NPT
Female thread	Identification mark
M20 x 1.5 – 6H	M20
1/2 - 14 NPT	1/2 - 14 NPT
PG 13.5	PG 13.5
G1/2	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. G1/2 and PG 13.5 thread forms are only acceptable for existing (legacy) equipment installations.

Additional Certifications

SBS American Bureau of Shipping (ABS) Type Approval

Certificate: 09-HS446883D-3-PDA

Intended Use: Measure gauge or absolute pressure of liquid, gas or vapor applications on ABS classed vessels, marine, and offshore installations.

ABS Rules: 2014 Steel Vessels Rules 1-1-4/7.7, 1-1-Appendix 3, 4-8-3/1.7, 4-8-3/13.1, 4-8-3/13.3.1 & 13.3.2, 4-8-4/27.5.1

SBV Bureau Veritas (BV) Type Approval

Certificate: 23156/A2 BV

Requirements: Bureau Veritas Rules for the Classification of Steel Ships

Application: Class notations: AUT-UMS, AUT-CCS, AUT-PORT and AUT-IMS; Pressure transmitter type 2088 cannot be installed on diesel engines.

SDN Det Norske Veritas (DNV) Type Approval

Certificate: A-14185

Intended Use: Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft; Det Norske Veritas' Offshore Standards

Application:

Location classes	
Temperature	D
Humidity	B
Vibration	A
EMC	B
Enclosure	D

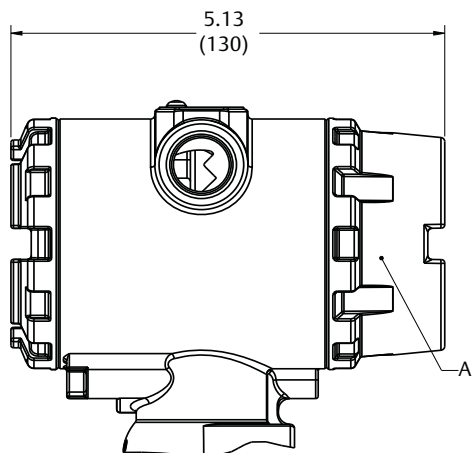
SLL Lloyds Register (LR) Type Approval

Certificate: 11/60002

Application: Environmental categories ENV1, ENV2, ENV3 and ENV5

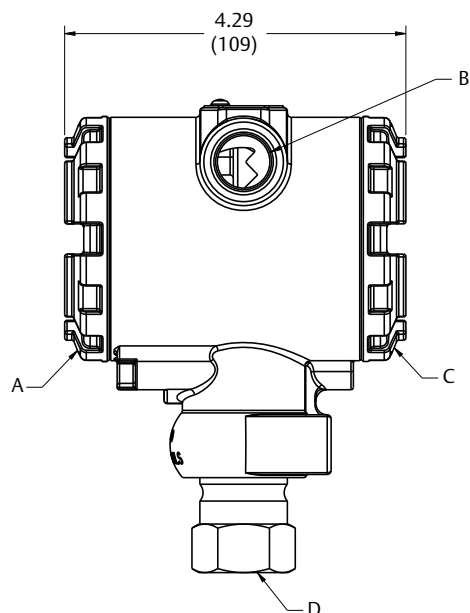
Dimensional Drawings

Figure 2. Rosemount 2088 with Optional Digital Display



- A. Digital display cover
- B. 2 x 1/2-14 NPT conduit connection

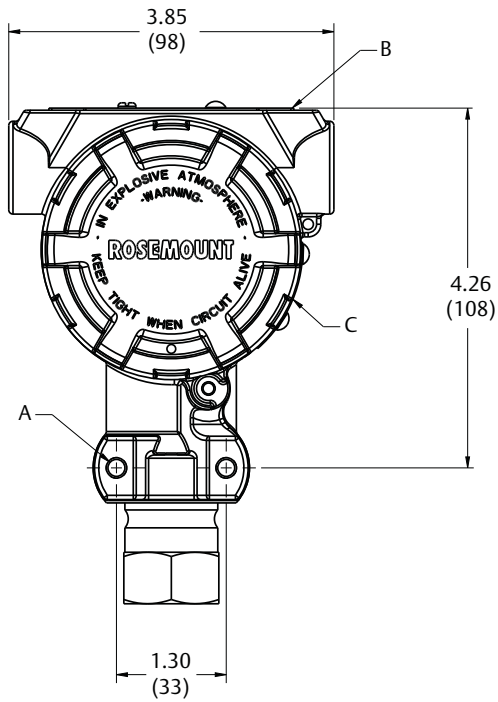
Figure 3. Rosemount 2088 Process Connection



- A. Field terminals
- B. Conduit connection
- C. Transmitter electronics
- D. 1/2-14 NPT female connection⁽¹⁾

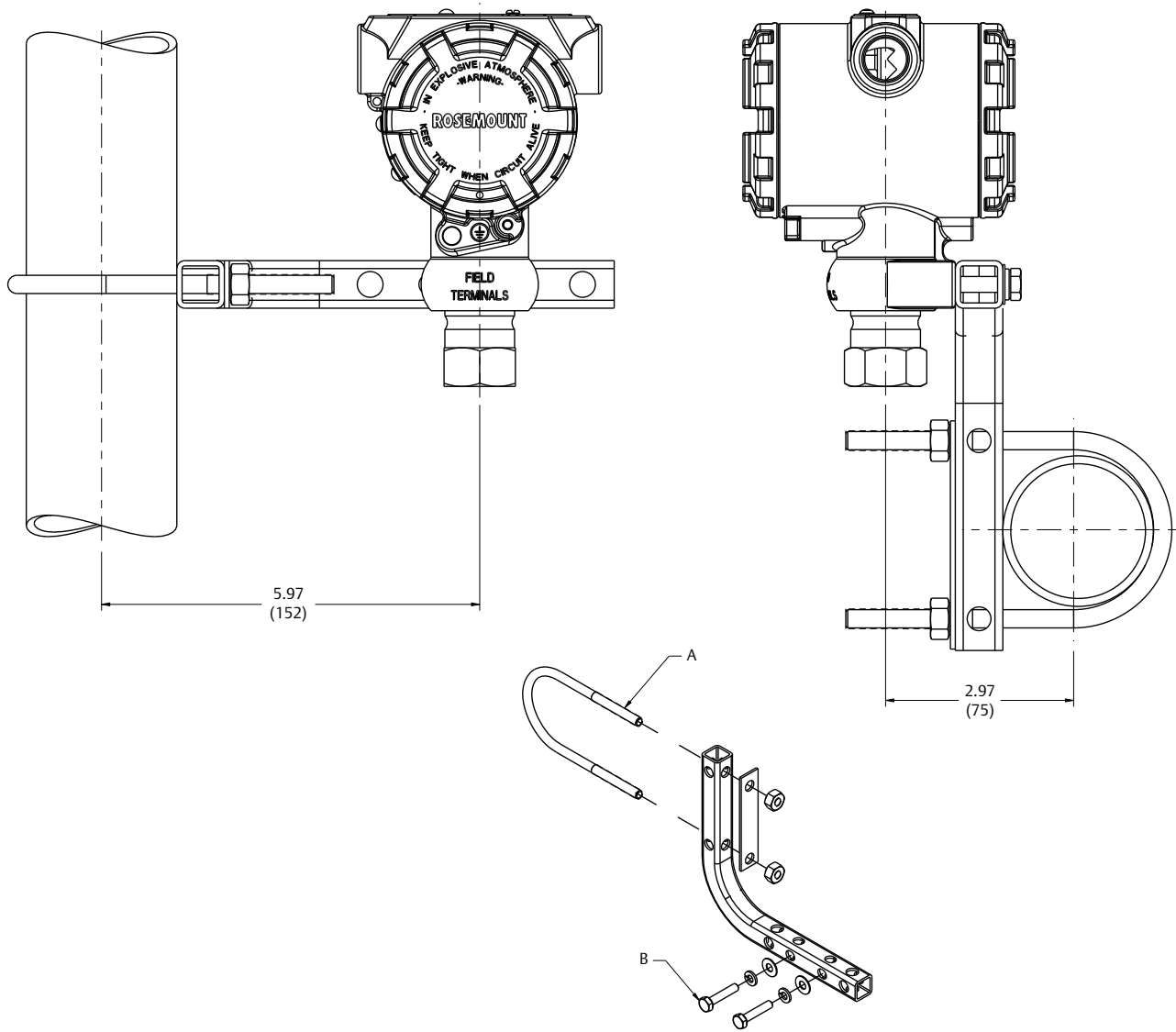
1. RC 1/2 female (PT 1/2 female), and M20 female also available as options

Figure 4. Rosemount 2088 Nameplate and Labels



- A. Bracket mounting holes ($1/4$ -20 UNC)
- B. Nameplate
- C. Certification label (located on side)

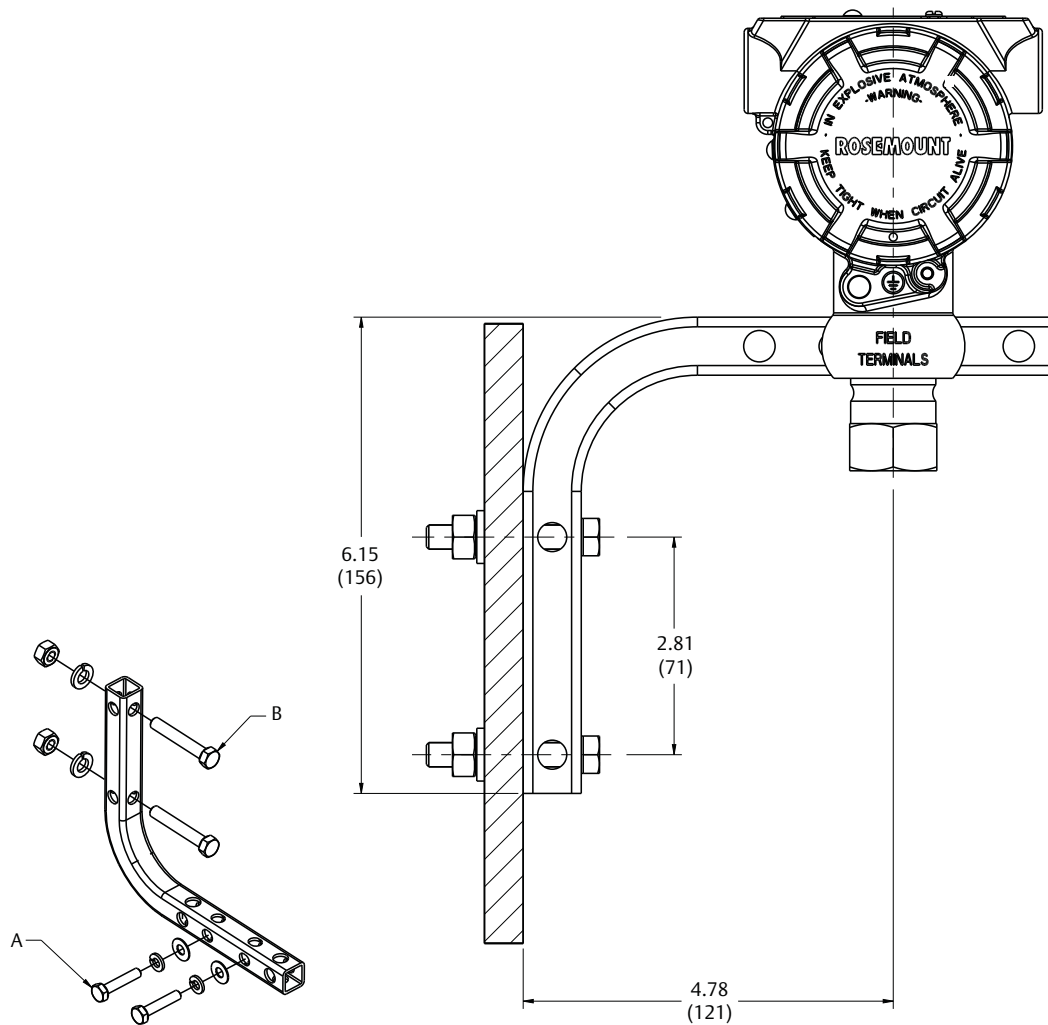
Figure 5. Rosemount 2088 with Optional Pipe Mounting Bracket



- A. 2-in. U-bolt for pipe mounting (clamp shown)
- B. 1/4 x 1 1/4 bolts for transmitter mounting

Dimensions are in inches (millimeters).

Figure 6. Rosemount 2088 with Optional Panel Mounting Bracket



- A. $\frac{1}{4} \times 1\frac{1}{4}$ bolts for transmitter mounting
- B. $\frac{5}{16} \times 1\frac{1}{2}$ bolts for panel mounting (not supplied)

Dimensions are in inches (millimeters).

Options

Standard configuration

Unless otherwise specified, transmitter is shipped as follows:

Engineering units	psi (all ranges)
4 mA (1 Vdc)	0 (engineering units)
20 mA (5 Vdc)	Upper range limit
Output	Linear
Flange type	Specified model code option
Flange material	Specified model code option
O-ring material	Specified model code option
Drain/vent	Specified model code option
LCD display	Installed or none
Alarm	High
Software tag	(Blank)

Custom configuration

If Option Code C9 is ordered, the customer may specify the following data in addition to the standard configuration parameters.

- Output Information
- Transmitter Information
- LCD display Configuration
- Hardware Selectable Information
- Signal Selection

Refer to the “Rosemount 2088 Configuration Data Sheet” document number 00806-0100-4690.

Tagging (3 options available)

- Standard SST hardware tag is permanently affixed on transmitter. Tag character height is 0.125 in. (3,18 mm), 84 characters maximum.
- Tag may be wired to the transmitter nameplate upon request, 85 characters maximum.
- For HART protocols, the tag may be stored in transmitter memory (eight characters maximum). Software tag is left blank unless specified.
- HART Revision 5: 8 characters
- HART Revision 7: 32 characters

Optional Rosemount 306 Integral Manifold

Factory assembled to 2088 transmitters. Refer to Product Data Sheet (document number 00813-0100-4733 for Rosemount 306) for additional information.

Other seals

Refer to Product Data Sheet (document number 00813-0100-4016 or 00813-0201-4016) for additional information.

Output information

Output range points must be the same unit of measure. Available units of measure include:

Pressure units ⁽¹⁾		
torr	psf ⁽¹⁾	cmH ₂ O @ 4 °C ⁽¹⁾
atm	inH ₂ O	mH ₂ O @ 4 °C ⁽¹⁾
Pa	inH ₂ O @ 4 °C ⁽¹⁾	inHg
kPa	inH ₂ O @ 60 °F ⁽¹⁾	mmHg
MPa ⁽¹⁾	ftH ₂ O	cmHG @ 0 °C ⁽¹⁾
hPa ⁽¹⁾	ftH ₂ O @ 4 °C ⁽¹⁾	mHG @ 0 °C ⁽¹⁾
mbar	ftH ₂ O @ 60 °F ⁽¹⁾	g/cm ²
bar	mmH ₂ O	kg/m ² ⁽¹⁾
psi	mmH ₂ O @ 4 °C ⁽¹⁾	kg/cm ²

1. Field configurable only, not available for factory calibration or custom configuration (option code C9 “Software configuration”).

Display and interface options

- M4** Digital Display with Local Operator Interface (LOI)
 - Available for 4-20 mA HART, 4-20 mA HART Low Power
- M5** Digital Meter
 - 2-Line, 5-digit LCD display for 4-20 mA HART
 - 2-Line, 5-digit LCD display for 1-5 Vdc HART Low Power
 - Direct reading of digital data for higher accuracy
 - Displays user-defined flow, level, volume, or pressure units
 - Displays diagnostic messages for local troubleshooting
 - 90-degree rotation capability for easy viewing

Configuration buttons

Rosemount 2088 now offers optional internal and external configuration buttons.

- Selecting option D4 will add external Analog Zero and Span configuration buttons
- Selecting option DZ will add an external Digital Zero Trim configuration button
- Selecting option M4 (LOI) adds both internal and external local configuration buttons.

Certain button options can also be combined as shown below:

Table 11. Button Configuration

Option codes	Internal	External
DZ	N/A	Digital Zero Trim
D4	N/A	Analog Zero & Trim
M4	LOI	LOI
M4 + DZ	LOI	Digital Zero Trim
M4 + D4	LOI	Analog Zero & Trim

Rosemount 2088 bracket option

- B4** Bracket for 2-in. pipe or panel mounting
- Bracket for mounting of transmitter on 2-in. pipe or panel
 - Stainless steel construction with stainless steel bolts

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