

Rosemount™ 2090P Pulp and Paper Pressure Transmitter



- 1-inch flush mount compatible with a PMC process connection, or 1½-inch threaded mounting connection
- Absolute or gauge pressure ranges up to 300 psi
- 20:1 turndown
- 4-20 mA selectable HART® protocol
- Performance of 0.10 percent with high-accuracy option

Accurate, stable, and reliable pressure measurements for the pulp and paper industry

1-inch flush mount compatible with PMC process connection, or 1-½-inch threaded mounting connection

The Rosemount 2090P has process connections that position the isolation diaphragm flush with vessel or pipe walls, eliminating clogging problems associated with highly viscous processes that tend to crystallize, polymerize, or precipitate, such as those in the pulp and paper industry.

Absolute or gauge pressure ranges up to 300 psi and 20:1 turndown

Higher turndown allows for lower inventories by allowing you to measure pressures from 1.5 psi to 300 psi with only three transmitter ranges.

Communicates via the 4–20 mA Selectable HART® Protocol

The Rosemount 2090P utilizes the advantages of HART communication, enabling quick and easy reranging, calibration and troubleshooting.

0.10 percent reference accuracy performance with P8 high-accuracy option

The single-filled sensor system of the Rosemount 2090P leads to outstanding accuracy due to full sensor compensation.

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Ordering information

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

Table 1: Rosemount 2090P Pulp and Paper 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			
2090P	Pulp and Paper Pressure Transmitter			
Transmitter type				
A	Absolute			★
G	Gage			★
Pressure ranges (range/minimum span)				
	Rosemount 2090PG		Rosemount 2090PA	
1	-14.7 to 30 psi/1.5 psi (-1.01 to 2.1 bar/103 mbar)		0 to 30 psia/1.5 psi (0 to 2.1 bar/103 mbar)	★
2	-14.7 to 150 psi/7.5 psi (-1.01 to 10,3 bar/517 mbar)		0 to 150 psia/7.5 psi (0 to 10.3 bar/517 mbar)	★
3	-14.7 to 300 psi/40 psi (-1.01 to 20.7 bar/2,8 bar)		0 to 300 psia/40 psi (0 to 20.7 bar/2.8 bar)	★
Output				
S	4 to 20 mA dc/digital HART Protocol			
Material of construction				
	Process Connection	Isolating Diaphragm	Oil Fill	
22	316L SST	316L SST	Silicone	
Process connection				
A	1 ½-inch threaded, no weld spud, 1 ½-inch PTFE gasket			★
C	1 ½-inch threaded, 316L SST weld spud with stress isolation and PTFE gasket			★
D	1-inch flush mount			★
G	1-inch flush mount with weld-on nipple			★
J	G1 threaded, no weld spud, PTFE gasket			★
K	G1 threaded, 316L SST weld spud with stress isolation and PTFE gasket			★
Conduit entry				
1	½-14 NPT			★
2	M20 3 1.5 female			★

Table 2: Options (Include with selected model number)

★ 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.

Extended product warranty		
WR3	3-year limited warranty	★
WR5	5-year limited warranty	★

Digital display		
M5	LCD display	★
Mounting brackets		
B4	SST mounting bracket with SST bolts	★
Product certifications		
E5	USA Explosion-proof (XP) and Dust-Ignitionproof (DIP)	★
ED	ATEX Flameproof	★
EM	Technical Regulations Customs Union (EAC) Flameproof	★
I5	USA Intrinsic Safety (IS) and Nonincendive (NI)	★
K5	USA Explosion-proof (XP), Dust-Ignitionproof (DIP), Intrinsic Safety (IS), and Nonincendive (NI)	★
I1	ATEX Intrinsic Safety	★
N1	ATEX Type n	★
C6	Canada Explosion-proof, Intrinsic Safety, Division 2, and Dust-Ignitionproof	★
KB	USA Explosion-proof, Dust-Ignitionproof, Intrinsic Safety, Nonincendive and Canada Explosion-proof, Intrinsic Safety, Division 2, and Dust-Ignitionproof	★
KM	Technical Regulation Customs Union (EAC) Flameproof and Intrinsic Safety	★
KH	ATEX Flameproof, Intrinsic Safety, USA Explosion-proof, Dust-Ignitionproof, Intrinsic Safety, and Nonincendive	★
ND	ATEX Dust	★
NK	IECEX Dust	★
K7	IECEX Flameproof, Dust, Intrinsic Safety, Type n	★
K1	ATEX Flameproof, Dust, Intrinsic Safety, Type n	★
K6	Canada Explosion-Proof, Intrinsic Safety, Division 2, Dust-ignitionproof and ATEX Flameproof, Intrinsic Safety	★
I3	China Intrinsic Safety	★
IM	Technical Regulation Customs Union (EAC) Intrinsic Safety	★
E3	China Flameproof	★
IP	Republic of Korea Intrinsic Safety	★
KP	Republic of Korea Flameproof, Intrinsic Safety	★
Terminal blocks		
T1	Transient protection	★
Special certificate		
Q4	Calibration certificate	★
Quality calibration certificate traceability certification		
Q8	Material traceability certification per EN 10204 3.1	★
Alarm limit		
C4	NAMUR alarm and saturation levels, high alarm	★
CN	NAMUR alarm and saturation levels, low alarm	★

Wetted O-ring material		
W2	Buna-N	★
W3	Ethylene-Propylene	★
Special procedures		
P2	Cleaning for special service	
Calibration accuracy		
P8	0.1 percent accuracy to 10:1 turndown	★
Typical Model Number: 2090P G 2 S 22 A 1		

Standard configuration

Unless otherwise specified, the transmitter is shipped as follows:

Engineering units	psi
4 mA	0 psi
20 mA	Upper range limit
Alarm output	High
LCD display	0 to 100 percent

Custom configuration

Calibration

Calibration is at ambient temperature and pressure. Transmitters are factory calibrated to customer's specified range. If calibration is not specified, transmitters are calibrated at maximum range.

Tagging

The transmitter is tagged, at no charge, in accordance with customer requirements. All tags are stainless steel. The standard tag is wired to the transmitter. Tag character height is 1/8 in. (0.318 cm). A permanently attached tag is available upon request.

Accessories

Item description	Part number
Calibration adapter ⁽¹⁾ Use to connect a calibration device to a transmitter. See Figure 4 .	02088-0197-0001
316 SST plug/heat sink Use during installation to prevent welding damage. See Figure 4 .	02088-0196-0001
316SST plug/heat sink for G1 flush mount	02088-0196-0002
1-in. flush mount calibration adapter ⁽²⁾ Use to connect a calibration device to the 1-in. flush mount. See Figure 4 .	02088-0198-0002
1-in. flush mount weld spud See Figure 4 .	02088-0285-0001

Item description	Part number
1 ½-in. threaded weld spud kit Includes PTFE O-ring.	02088-0295-0003
Calibration adapter for G1 flush mount process connection	02088-0197-0002
G1 flush mount weld spud	02088-0295-0013
G1 flush mount teflon gasket	02088-0078-0003

- (1) *Process connection codes A and C only.*
- (2) *Process connection codes D and G only.*

Specifications

Functional specifications

Service

Liquid, gas, vapor, and high-viscosity applications

Ranges

Range	Minimum span	Upper (URL)	Lower (LRL)	Lower ⁽¹⁾ (LRL) (gage)
1	1.5 psi (103 mbar)	30 psi (2.1 bar)	0 psia (0 bar)	-14.7 psig (-1.01 bar)
2	7.5 psi (517 mbar)	150 psi (10.3 bar)	0 psia (0 bar)	-14.7 psig (-1.01 bar)
3	40 psi (2.76 bar)	300 psi (20.7 bar)	0 psia (0 bar)	-14.7 psig (-1.01 bar)

(1) Assumes atmospheric pressure of 14.7 psig.

Output

4-20 mA selectable HART[®] protocol

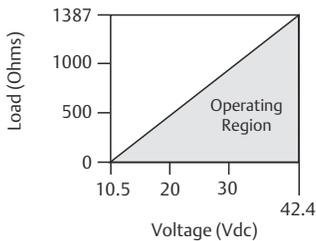
Rangedown

20:1

Load Limitations

Maximum loop resistance is determined by the power supply voltage as described by the following equation:

$$\text{Maximum loop resistance} = 43.5 (\text{Power supply voltage} - 10.5)$$



The field communicator requires a minimum loop resistance of 250 Ω for communication.

Note

For hazardous location approvals, power supply must not exceed 36 V.

Power Supply

External power supply required. Transmitter operates on 10.5 to 42.4 Vdc with no load. Reverse polarity protection is standard.

Overpressure Limits

Range	Overpressure limit ⁽¹⁾
1	120 psi (8.3 bar)
2	300 psi (20.7 bar)
3	600 psi (41.4 bar)

(1) Overpressure limit is dependent on the clamp/pressure adapter or sensor rating (whichever is lower).

Temperature Limits

Process

Process connection codes A and C: -40 to +250 °F (-40 to +121 °C)

Process connection codes D and G: -4 to +250 °F (-20 °C to +121 °C)

Ambient

-4 to +185 °F (-20 to +85 °C)

Storage

-50 to +185 °F (-46 to +85 °C)

Process temperatures above +185 °F (+85 °C) require derating the ambient limits by a 1.5:1 ratio.

Max. ambient temperature in °F = $\frac{185 - (\text{Process Temp} - 185)}{1.5}$

Max. ambient temperature in °C = $\frac{85 - (\text{Process Temp} - 85)}{1.5}$

Humidity Limits

0 to 100% relative humidity

Volumetric Displacement

Less than 0.0005 in³ (0.008 cm³)

Turn-on Time

Performance within specifications less than 2.0 seconds after power is applied to the transmitter

Failure Alarm

If self-diagnostics detect a sensor or microprocessor failure, the analog signal is 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:

Standard operation

Linear output: $3.9 \leq I \leq 20.8$

Fail high: $I \geq 21.75 \text{ mA}$

Low: $I \leq 3.75 \text{ mA}$

NAMUR-compliant operation

Linear output: $3.8 \leq I \leq 20.5$

Fail high: $I \geq 22.5 \text{ mA}$

Low: $I \leq 3.6 \text{ mA}$

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 jumper.

Performance specifications

Zero-based spans, reference conditions, and 316 SST isolating diaphragm.

Reference Accuracy

± 0.20 percent of calibrated span. Includes combined effects of linearity, hysteresis, and repeatability.

High accuracy (P8) option: ± 0.10 percent of calibrated span to 10:1 turndown

Ambient Temperature Effect per 50 °F (28 °C)

$\pm(0.15 \text{ percent URL} + 0.15 \text{ percent span})$ from 1:1 to 20:1

Stability

± 0.10 percent of URL for 1 year, reference stability

Time Response

145 ms (at 75 °F [24 °C] reference conditions)

Vibration Effect

Less than ± 0.1 percent of upper range limit when subjected to vibration of peak to peak constant displacement of 4 mm (5 to 15 Hz) and constant acceleration of 2 g (15 to 150 Hz) and 1 g (150 to 2000 Hz).

Power Supply Effect

Less than ± 0.005 percent of calibrated span per volt

Electromagnetic compatibility

Meets all industrial environment requirements of EN61326 and NAMUR NE-21. Maximum deviation < 1 % span during EMC disturbance.

Note

NAMUR NE-21 does not apply to Wireless (transmitter output code X).

Note

During surge event, device with 4-20 mA (transmitter output option code A) may exceed maximum EMC deviation limit reset. Within the specified start-up time, device self-recovers and return to normal operation.

Mounting Position Effect

Zero shift of up to 5.0 inH₂O (12.4 mbar), which can be calibrated out. No span effect.

Physical specifications**Material selection**

Emerson 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 Connection

1/2-14 NPT or M20 3 1.5 conduit entry

Process Wetted Parts**Isolating Diaphragm**

316L stainless steel

Process Connector

316L stainless steel

Process Connection Size

1½ -11.5 NPT or 1-in. flush mount

Process Connector Gasket (1 ½/-in.)

TFE

Process Connection O-rings (1-in.)

Standard: Viton®

Optional: Buna-N or Ethylene propylene

Non-wetted Parts**Electronics Housing**

Low-copper aluminum

Enclosures meet NEMA® Type 4X, IP66 and IP68 when properly installed.

Paint

Polyurethane

Cover O-rings

Buna-N

Fill Fluid

Silicone oil

Weight

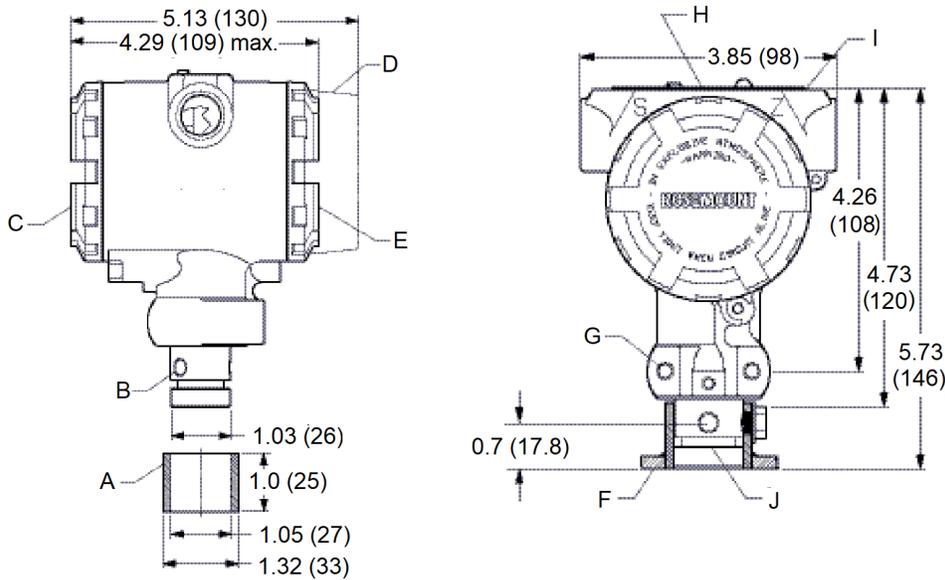
Approximately 2.96 lb. (1.34 kg)

Product Certifications

For product certification information, refer to [Quick Start Guide: Rosemount™ 2088, 2090P, and 2090F Pressure Transmitters](#).

Dimensional drawings

Figure 1: Rosemount 2090P 1-in. Flush Mount

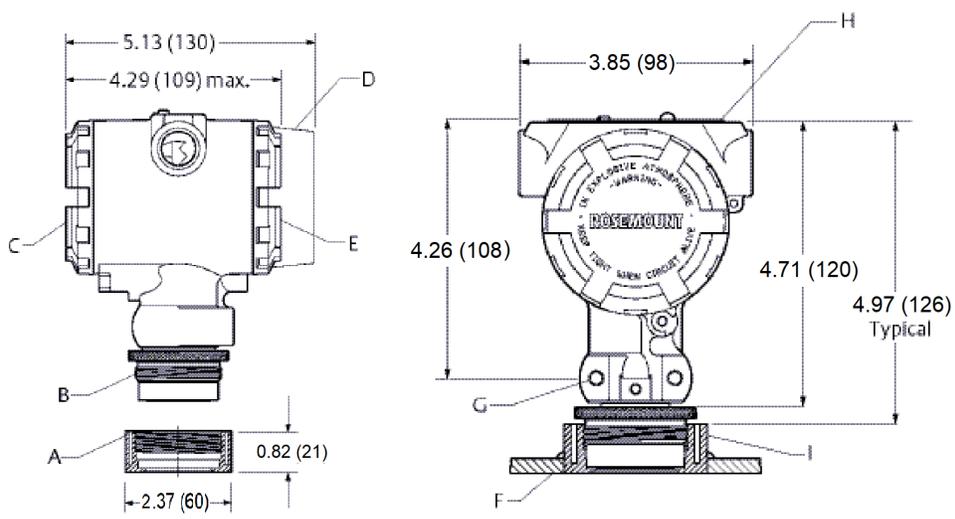


- A. Weld spud
- B. 3 X 5/16-18 UNC mounting holes for rotational mounting
- C. Terminal connections side
- D. Optional display cover
- E. Transmitter circuitry side
- F. Vessel wall
- G. 2 X 1/4-20 UNC-2BX 0.60 deep mounting bracket holes
- H. External zero/span under nameplate
- I. Nameplate
- J. O-ring (Viton standard)

Note

Dimensions are in inches (millimeters).

Figure 2: Rosemount 2090P 1½-inch Flush Mount

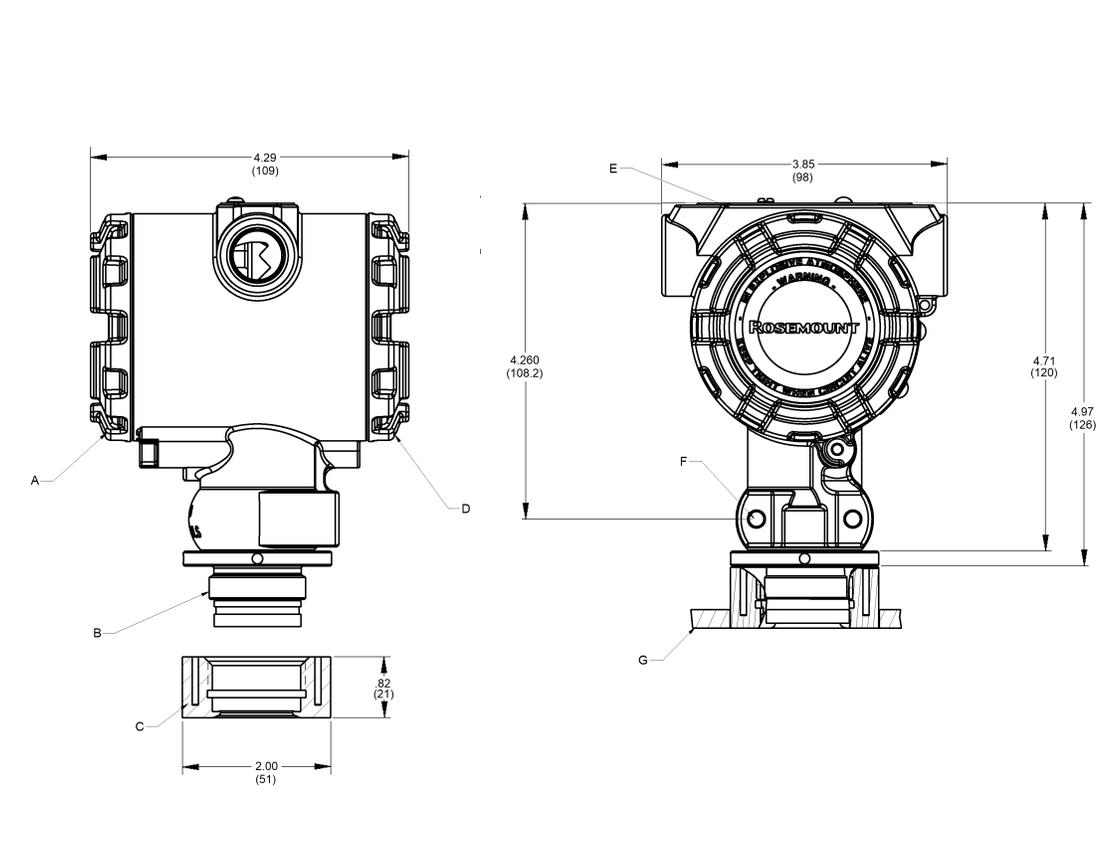


- A. Weld spud
- B. M44 X 1.25
- C. Terminal connections
- D. Optional display cover
- E. Transmitter circuitry
- F. Vessel wall
- G. 2 X ¼ -20 UBC -2BX depth 0.60 mounting bracket holes
- H. Nameplate
- I. Stress isolator groove

Note

Dimensions are in inches (millimeters).

Figure 3: Rosemount 2090P Transmitter G1 in Flush Mount Process Connection

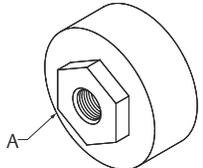
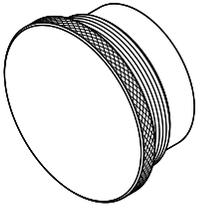
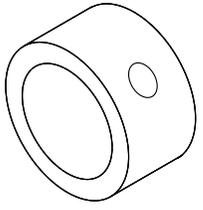


- A. Field Terminals
- B. G1 inch per DIN-EN-ISO 228.15 Class A
- C. Weld spud
- D. Transmitter circuitry
- E. Nameplate
- F. Bracket mounting holes (1/4-20 UNC)
- G. Vessel wall

Note

Dimensions are in inches (millimeters).

Figure 4: 2090P Process Connection Accessories

Calibration adapter ⁽¹⁾	316 SST plug/heat sink for process connection codes A and C	Weld spud for process connection codes D and G
		

(1) See ordering information.

Note

See [Accessories](#) for part numbers.

For more information: [Emerson.com/global](https://emerson.com/global)

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