Product Data Sheet
00813-0100-4592, Rev BA
January 2003

Model 2024 Differential Pressure Transmitter

FEATURING

- *Ranges from 0–50 to 0–1,000 inH2O*
- *0.25% accuracy*
- *5:1 rangeability*
- *2-wire, 4–20 mA output or*
- *Low Power, 3-wire, 1–5 V output*

Product Discontinued

Content

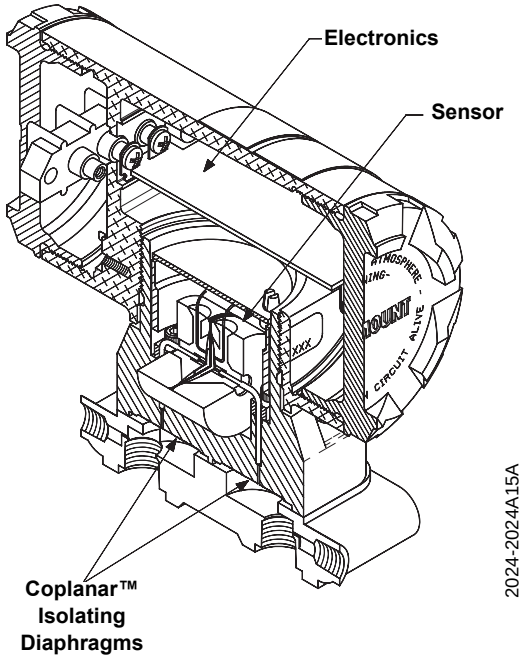
FEATURES

The Model 2024 Differential Pressure Transmitter is one member of a comprehensive line of pressure instruments. This transmitter uses capacitance sensing technology that is recognized around the world for its proven reliability and performance. The Model 2024 provides performance in a lightweight package at a low initial cost.

The sensor and electronics have been environmentally sealed in the electronics housing. This, along with the patented Coplanar isolator design, greatly reduces the size and weight of the transmitter. This allows the Model 2024 to be mounted directly to the process in many applications. The Model 2024 is ideal for use where low initial cost, direct mounting, and the repair-by-replacement concept are desired.

OPERATION

Process pressure is transmitted through isolator diaphragms and silicone fill fluid to a sensing diaphragm located in the electronics housing. The sensing diaphragm is a stretched-spring element that deflects in response to differential pressure across it. Its displacement is proportional to the differential pressure. The differential capacitance between the sensing diaphragm and the capacitor plates is converted electronically to a 4–20 mA or 1–5 V signal



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Rosemount® Pressure Solutions

Model 3051S Series of Instrumentation

The next evolution in scalable pressure, flow and level measurement solutions with a limited lifetime warranty and 10-year stability. See product data sheet 00813-0100-4801.

Model 305 and 306 Integral Manifolds

Factory-assembled, calibrated and seal-tested manifolds reduce on-site installation costs. See product data sheet 00813-0100-4733.

Model 1151 Pressure Transmitter

Provides reliable measure of differential, gage, and absolute pressure or liquid level. Ranges from 0.5 inH20 to 0-6000 psig. See product data sheet 00813-0100-4360.

Model 1195 Integral Orifice and ProPlate/Mass ProPlate Flowmeters

Convenient ready-to-install assembly designed for small-bore flow measurement of any clean gas, liquid, or vapor. See product data sheet 00813-0100-4686.

Annubar Flowmeter Series

A series of highly accurate and repeatable insertion-type flowmeters available in 2-in. to 72-in. (50.8 to 1829 mm) line sizes. See product data sheet 00813-0100-4809.

Model 405P Compact Orifice

A wafer style primary element with an integral three-valve manifold. See product data sheet 00813-0100-4810.

Specifications

Functional Specifications

Service
Liquid, gas, and vapor

Range
Code 2: 0–50 to 0–250 inH_2O (0–12.4 to 0–62.2 kPa)
Code 3: 0–200 to 0–1,000 inH_2O (0–49.7 to 0–248.6 kPa)

Output
Code A: 4–20 mA dc
Code M: 1–5 V dc, low power

Power Supply
External power supply required

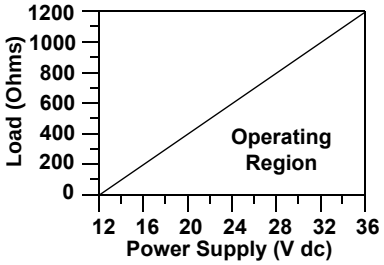
Output Code A: Operates on 12 to 36 V dc, with no load

Output Code M: Operates on 6 to 14 V dc

Load Limitations

Output Code A

Maximum Load = 50 × (Power Supply Voltage – 12)



Output Code M

Requires a minimum load impedance of 1 MΩ.

Span and Zero
Continuously adjustable

Zero Elevation and Suppression
4 mA (1 V dc for Low Power) point adjustable between:

Range 2: –125 and 125 inH_2O (–31.1 to 31.1 kPa)
Range 3: –500 and 500 inH_2O (–124.3 to 124.3 kPa)

Zero elevation and suppression must be such that the minimum and maximum span limits and the upper range limit are not exceeded.

Temperature Limits

Process
–20 to 220 °F (–29 to 104 °C)

Ambient
–40 to 185 °F (–40 to 85 °C)(1)

Storage
–50 to 185 °F (–46 to 85 °C)

Static Pressure and Overpressure Limits
0 psia to 2,000 psig (0 to 13.79 MPa) on either side without damage to the transmitter. Operates within specifications between static line pressures of 14.7 psia and 2,000 psig (0.1 to 13.79 MPa). 6,000 psig (41.37 MPa) burst pressure

Humidity Limits
0 to 100% relative humidity

Volumetric Displacement
Less than 0.005 cubic in. (0.08 cm^3)

Damping
Fixed at a maximum of 0.2 second at reference conditions

Turn-on Time

Output Code A
1.5 seconds maximum at reference operating conditions

Output Code M
0.1 second maximum at reference operating conditions

Performance Specifications

(Zero-based spans, reference conditions, and 316L SST isolating diaphragms)

Accuracy
±0.25% of calibrated span. Includes combined effects of linearity, hysteresis, and repeatability.

Dead Band
None

Stability
±0.25% of upper range limit for six months

Temperature Effect (Total)
Less than ±1.5% of upper range limit per 100 °F (55 °C)

Static Pressure Effect

Zero Error
Less than ±0.5% of upper range limit per 1,000 psi (6.9 MPa). Correctable through rezeroing at line pressure

Span Error
Less than ±0.5% of reading per 1,000 psi (6.9 MPa)

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(1) Electronics temperature limits decrease three degrees for every one degree increase in process temperature above 185 °F (85 °C).

Vibration Effect

Less than ±0.1% of upper range limit shift per test condition of SAMA PMC 31.1 Section 5.3

Power Supply Effect

Less than ±0.01% of calibrated span per volt

Load Effect

Output Code A

No load effect other than the change in voltage supplied to the transmitter

Output Code M

Less than ±0.09% of calibrated span for a load change of 1 MΩ to infinity

Mounting Position Effect

Zero shift of up to 3.0 inH_2O (0.75 kPa), which can be calibrated

Physical Specifications

Materials of Construction

Isolating Diaphragms

316L SST, Hastelloy® C-276

Drain/Vent Valves (if selected)

316 SST, Hastelloy C

Flange

316 SST

Adapters

Plated carbon steel, 316 SST

Wetted O-rings

Glass filled TFE

Fill Fluid

Silicone oil or inert (Halocarbon) fill

Bolts

Plated carbon steel

Electronics Housing

Low-copper aluminum. NEMA 4X

Paint

Polyurethane

Process Connections

1/4–18 NPT on 2 1/8-inch (54 mm) center or 1/2–14 NPT on 2-, 2 1/8-, or 2 1/4-inch (51, 54, or 57 mm) centers with adapters

Electrical Connections

1/2–14 NPT conduit connection, screw terminals, and internal grounding stud

Weight

6 lb. (2.7 kg) excluding options

Calibration

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

Optional Three-Valve Manifolds (packaged separately)

Part No. 01151-0150-0001

3-Valve Manifold, Carbon Steel

Part No. 01151-0150-0002

3-Valve Manifold, 316 SST

Hazardous Locations Certifications

Factory Mutual (FM) Approvals

E5 Explosion Proof for Class I, Division 1, Groups B, C, and D; Dust-Ignition Proof for Class II, Division 1, Groups E, F, and G. Suitable for Class III, Division 1, indoor and outdoor (NEMA 4X) hazardous locations.

I5 Intrinsically safe for use in Class I, Division 1, Groups A, B, C, and D; Class II Division 1, Groups E, F, and G; and Class III, Division 1 when connected in accordance with Rosemount drawing 02024-0150. Temp. Code T4. Non-incendive for Class I, Division 2, Groups A, B, C, and D.

K5 Combined **E5** and **I5**.

Canadian Standards Association (CSA) Approvals

C6 Explosion Proof for Class I, Division 1, Groups C and D; Dust-ignition Proof for Class II, Division 1, Groups E, F, and G; Suitable for Class III, indoor and outdoor hazardous locations, CSA enclosure 4. Approved for Class I, Division 2, Groups A, B, C, and D.

Intrinsically safe for Class I, Division I, Groups A, B, C, and D when connected in accordance with Rosemount drawing 02024-1064. Temp. Code T3C.

BASEEFA/CENELEC Intrinsically Safe Approval

I1 EEx ia IIC T5 (T_{amb} = 40 °C).
EEx ia IIC T4 (T_{amb} = 70 °C).

BASEEFA Type N Approval

N1 Ex N II T5 (T_{amb} = 70 °C). IP54.

Standards Association of Australia (SAA) Approvals

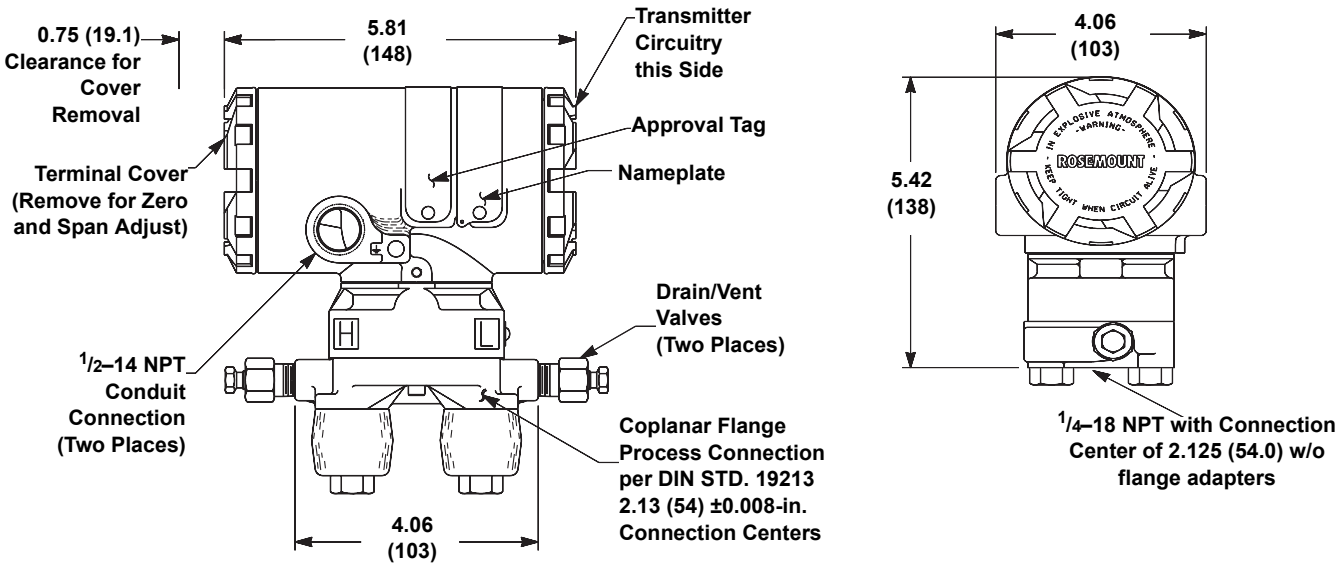
I7 Intrinsically Safe Approval
Ex ia IIC T5 (T_{amb} = 40 °C).
Ex ia IIC T4 (T_{amb} = 70 °C).
Class I, Zone 0.
IP54.

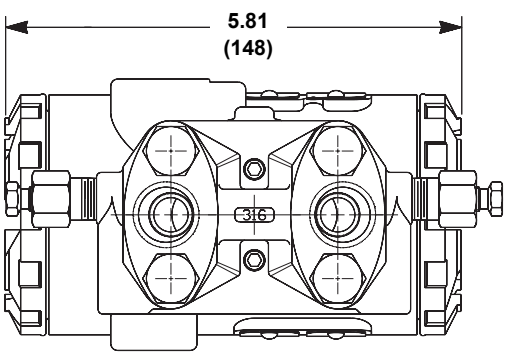
N7 Type N Approval
Ex n IIC T5 (T_{amb} = 40 °C).
Ex n IIC T4 (T_{amb} = 70 °C).
Class I, Zone 2. IP54.

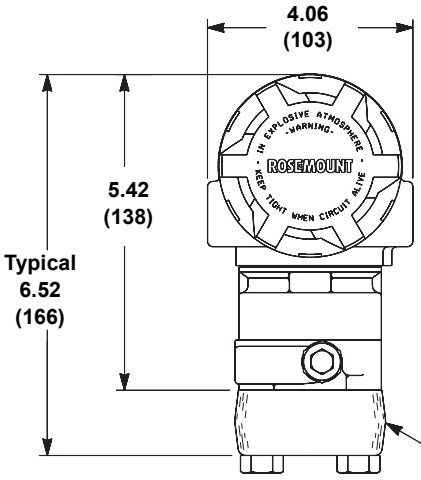
E7 Flameproof Approval
Ex d IIC T6. Class I, Zone 1. IP65.

Dimensional Drawings

Model 2024 Dimensional Drawings



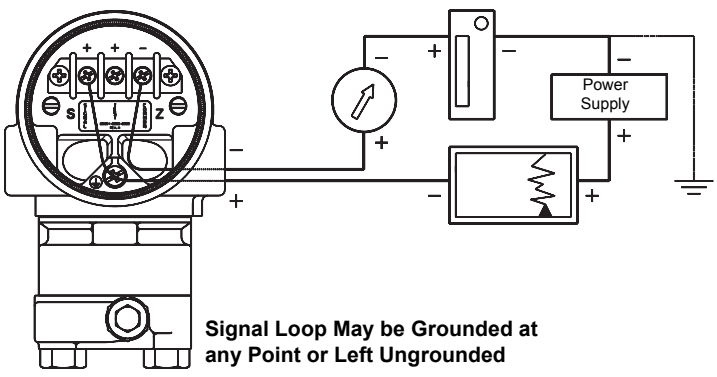


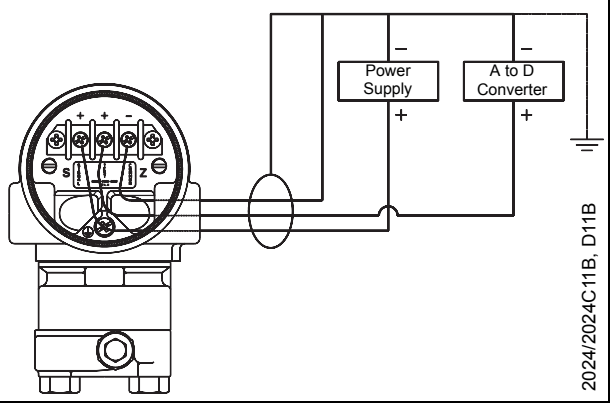


NOTE
Dimensions are in inches (millimeters).

2024/2024B11B, A11C, G11B, C11B

4—20 mA output Wiring Diagrams 1— 5 V DC output

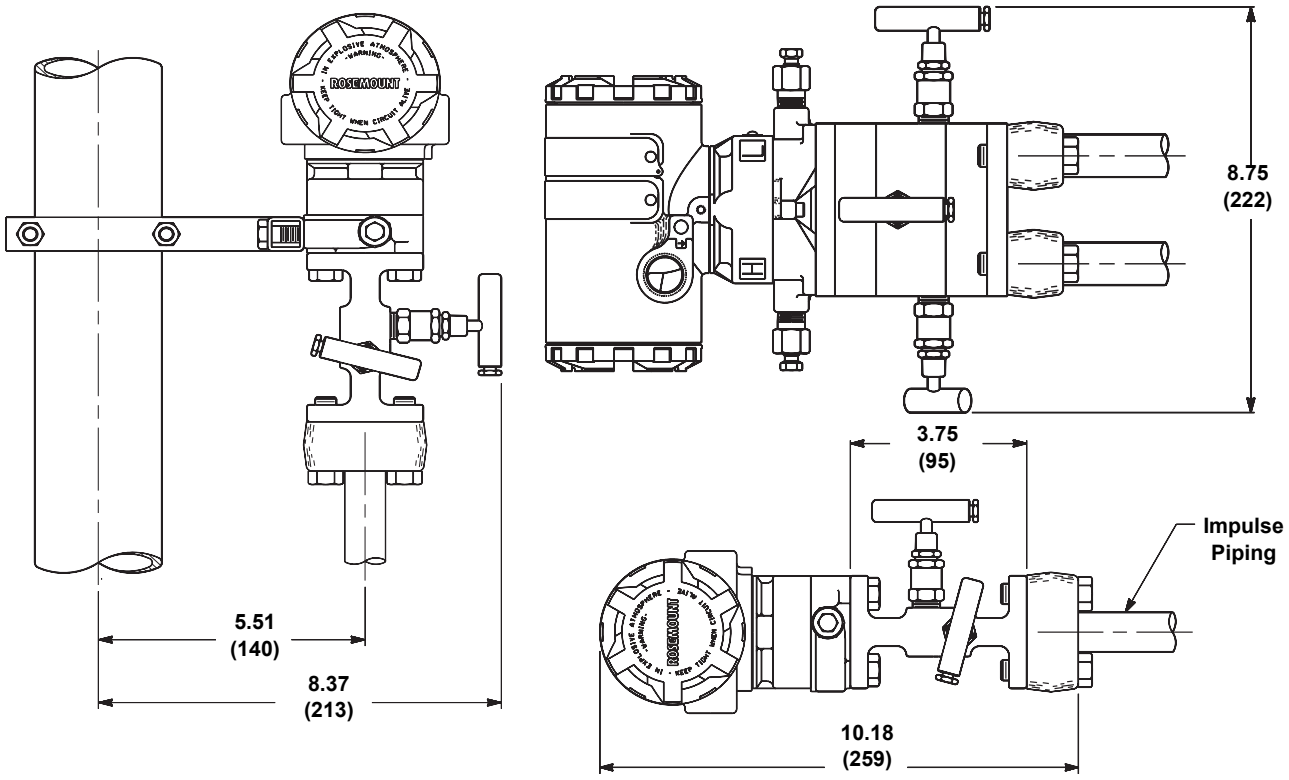




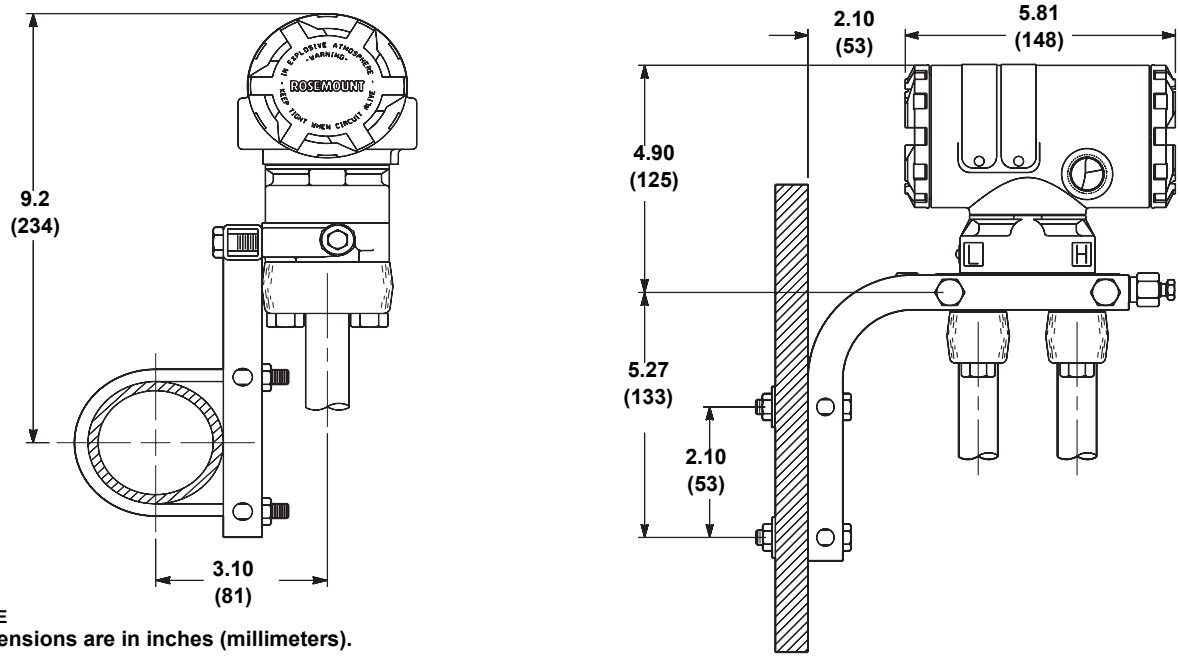
2024/2024C11B, D11B

Model 2024 Mounting Configurations

TRANSMITTER WITH ACCESSORY 3-VALVE MANIFOLD
CAN BE DIRECT-MOUNTED OR MOUNTED TO 2-INCH PIPE



OPTIONAL UNIVERSAL MOUNTING BRACKET
FOR 2-INCH PIPE OR PANEL MOUNTING



NOTE
Dimensions are in inches (millimeters).

2024/2024A10B,C10B,D10B, B10B, E10B

Ordering Information

Model	Transmitter Type	
2024D	Differential Pressure Transmitter	
Code		
2	0–50 to 0–250 in H_2O (0–12.4 to 0–62.2 kPa)	
3	0–200 to 0–1,000 in H_2O (0–49.7 to 0–248.6 kPa)	
Code	**Output**	
A	4–20 mA Linear with Input	
M	1–5 V dc Low Power	
	MATERIALS OF CONSTRUCTION	
Code	**Flange Adapters**	**Isolating Diaphragms**
12A	Plated CS	316L SST
22A	316 SST	316L SST
22B	None	316L SST
19A(1)	Plated CS	Hastelloy C-276
29A(1)	316 SST	Hastelloy C-276
29B(1)	None	Hastelloy C-276
NOTE Coplanar flange is 316 SST with all ordering codes.		
Code	**Drain/Vent Valves**	
0(1)	None	
2	316 SST	
3(1)	Hastelloy C	
Code	**Fill Fluid**	
S	Silicone Oil	
I	Inert Fill	
Code	**Housing Conduit Thread**	
1	1/2–14 NPT	
Code	**Options**	
S5	Assemble to Model 305 Integral Manifold (Requires materials of construction codes 22B or 29B.)	
L4	Austenitic 316 SST Flange and Adapter Bolts	
B4	Universal Mounting Bracket for 2-in. pipe and panel mounting, SST bolts	
E5	Factory Mutual (FM) Explosion-Proof Approval	
I5	Factory Mutual (FM) Non-incendive and Intrinsic Safety Approval (entity concepts)	
C6	Canadian Standards Association (CSA) Explosion-Proof, Intrinsic Safety and Non-Incendive Approval	
I1	BASEEFA Intrinsic Safety Approval	
N1	BASEEFA Type N Approval	
I7	Standard Association of Australia (SAA) Intrinsic Safety Approval	
N7	Standard Association of Australia (SAA) Type N Approval	
E7	Standard Association of Australia (SAA) Flameproof Approval	
K5	FM Explosion-Proof and Intrinsic Safety Approval	
P2	Cleaning for Special Service	
Q4	Calibration Data Sheet	
Typical Model Number: 2024D 2 A 22B 0 S 1 B4		

(1) Meets NACE material requirements per MR 01–75.

Product Data Sheet
00813-0100-4592, Rev BA
January 2003

Model 2024

Emerson Process Management

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