

# Rosemount 4600 Oil & Gas Panel Pressure Transmitter

## TRANSMITTER FEATURES:

- A compact, lightweight, all-welded stainless steel design
- 40:1 rangeability for increased flexibility and reduced inventories
- 3-year stability guarantee reduces maintenance costs
- Leading edge capacitance sensor with integral temperature measurement for improved total performance
- 4-20 mA HART® Smart capabilities and 0.25% of calibrated span reference accuracy



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## Legendary Rosemount Performance, Customized For Your Panel Applications

The Rosemount 4600 Oil & Gas Panel Transmitter is a compact, reliable transmitter designed to meet your panel-mount monitoring needs. The Rosemount 4600 continues the Emerson tradition of delivering superior performance, industry leading reliability, and exceptional value.

### A compact, lightweight, all-welded stainless steel design

You asked for it and we've delivered — the stability, performance and reliability of Rosemount products are now available in a compact transmitter for your space and weight constrained panel applications. The entire transmitter weighs less than 1.5 pounds (0,6 kg) and the all-welded, hermetic enclosure maximizes reliability by minimizing environmental effects, such as salt spray and humidity, on the electronics and sensor.

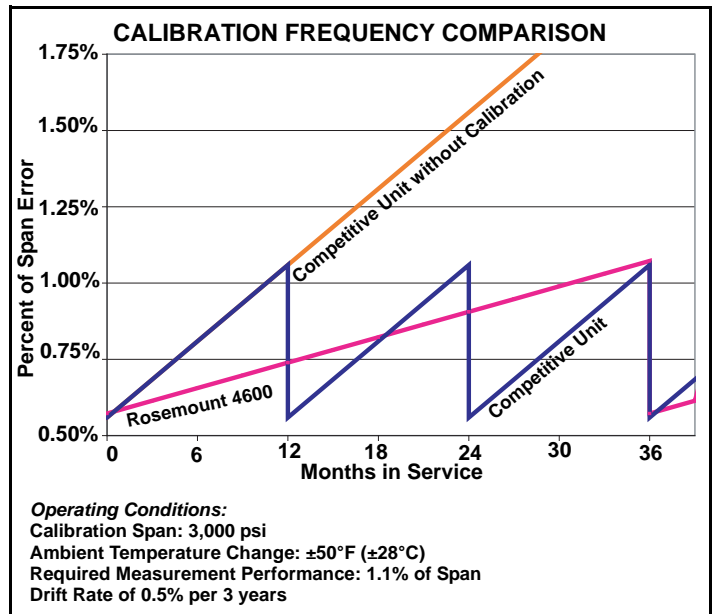
### 40:1 rangeability for increased flexibility and reduced inventories

Emerson understands that Oil & Gas Well Pressures are sometimes unpredictable, and that's why we've incorporated 40:1 rangeability into the Rosemount 4600 Oil & Gas Panel Transmitter. Not only does 40:1 rangeability allow you incredible flexibility, it also lowers your transmitter inventories by allowing you to measure pressure ranges from 20 psi to 20,000 psi with only 4 transmitter ranges.

### Leading edge capacitance sensor with integral temperature measurement for improved total performance

Integral temperature measurement means the Rosemount 4600 provides superior temperature compensation and therefore, a more precise pressure measurement over the entire operating temperature range.

### 3-year stability guarantee reduces maintenance costs



Most competitive devices can drift out of specification after just a few months and require recalibration, which consumes both your time and money. The Rosemount 4600 carries a 3-year "Set and Forget" stability guarantee to reduce the frequency of calibration and lower maintenance costs.

### 4-20 mA HART Smart capabilities and 0.25% of calibrated span reference accuracy

The HART protocol enables quick and easy reranging, calibration and troubleshooting for nearly effortless field adjustments. As always, reference accuracy is specified as a percent of *calibrated span*, not as a percent of full scale, so you're guaranteed 0.25% reference accuracy whether you're measuring 20,000 psi or 20 psi.

## Ordering Information

Table 1. Rosemount 4600 Oil and Gas 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 subject to additional delivery lead time.

Model	Transmitter Type	
4600	Oil and Gas Panel Pressure Transmitter	
<b>Measurement Type</b>		
<b>Standard</b>		<b>Standard</b>
G	Sealed Gauge	★
A	Absolute	★
<b>Pressure Range</b>		
<b>Standard</b>		<b>Standard</b>
2	0-20 to 0-150 psi	★
4	0-125 to 0-5000 psi	★
<b>Expanded</b>		
5	0-330 to 0-10,000 psi	
6	0-660 to 0-20,000 psi (available only with H11)	
<b>Isolating Diaphragm/ Process Connection Materials</b>		
<b>Standard</b>		<b>Standard</b>
2	316L SST <sup>(1)</sup>	★
3	Alloy C-276 <sup>(1)</sup>	★
<b>Process Connection Style</b>		
<b>Standard</b>		<b>Standard</b>
E09 <sup>(2)</sup>	1/4-18 NPT Female	★
E11 <sup>(3)</sup>	1/2-14 NPT Female	★
H11 <sup>(4)</sup>	Coned and Threaded, compatible with autoclave type F-250-C	★
<b>Output</b>		
<b>Standard</b>		<b>Standard</b>
A	4-20 mA with Digital Signal Based on HART protocol	★
<b>Electrical Connection</b>		
<b>Standard</b>		<b>Standard</b>
5A	1/2-14 NPT Male with 72 in. Flying Lead	★

### Options (Include with selected model number)

<b>Software Configuration</b>		
<b>Standard</b>		<b>Standard</b>
C1	Custom Software Configuration (CDS required with order)	★
<b>Alarm Limits</b>		
<b>Standard</b>		<b>Standard</b>
C6	Custom Alarm and Saturation Signal Levels, High Alarm	★
C7	Custom Alarm and Saturation Signal Levels, Low Alarm	★
<b>Hardware Adjustments</b>		
<b>Standard</b>		<b>Standard</b>
D1	Zero and Span Adjustments	★
<b>External Ground Screw Assembly</b>		
<b>Standard</b>		<b>Standard</b>
D4	External Ground Screw Assembly	★

# Rosemount 4600

Table 1. Rosemount 4600 Oil and Gas 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 subject to additional delivery lead time.

<b>Product Certifications</b>		
<b>Standard</b>		<b>Standard</b>
E1	ATEX Flameproof	★
I1	ATEX Intrinsic Safety	★
K1	ATEX Flameproof, Intrinsic Safety, Type n (combination of E1, I1, and N1)	★
N1	ATEX Type n	★
ND	ATEX Dust Ignition-Proof	★
E5	FM Approval Explosionproof	★
I5	FM Approval Intrinsic Safety, Non-incendive	★
K5	FM Approval Explosionproof, Intrinsic Safety, Non-incendive (combination of E5 and I5)	★
E6	CSA Explosionproof, Division 2	★
I6	CSA Intrinsic Safety	★
K6	CSA Explosionproof, Intrinsic Safety, Division 2 (combination of E6 and I6)	★
KA	ATEX/ CSA Flameproof and Intrinsic Safety (combination of E1, I1, E6, and I6)	★
KB	FM Approval and CSA Explosionproof and Intrinsic Safety (combination of E5, E6, I5, and I6)	★
KC	FM Approval and ATEX Explosionproof and Intrinsic Safety (combination of E5, E1, I5, and I1)	★
<b>Calibration Certifications</b>		
<b>Standard</b>		<b>Standard</b>
Q4	Calibration Data Certificate consistent with ISO 104742.1 or EN 10204 2.1	★
<b>Material Traceability Certification</b>		
<b>Standard</b>		<b>Standard</b>
Q8	Material Traceability Certification per EN 10204 3.1B	★
<b>Transient Protection</b>		
<b>Standard</b>		<b>Standard</b>
T1	Transient Protection	★
<b>Quality Certification for Safety</b>		
<b>Standard</b>		<b>Standard</b>
QS	Prior-use certificate of FMEDA data	★
<b>Typical Model Number: 4600 G 4 2 E11 A 5A D1 E5</b>		

- (1) Materials of Construction comply with recommendations per NACE MR0175/ISO 15156 for sour oilfield production environments. Environmental limits apply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.
- (2) Not available with Pressure Range 6.
- (3) Not available with Pressure Range 5 or 6.
- (4) Only available with Pressure Range 5 or 6.

## Specifications

### PERFORMANCE SPECIFICATIONS

*For zero-based spans, reference conditions, silicone oil fill, SST materials, 1/2 in. - 14 NPT process connections, digital trim values set to equal range points. Does not include any error due to the effects of sealed gauge.*

#### Conformance to specification ( $\pm 3$ Sigma)

*Technology leadership, advanced manufacturing techniques and statistical process control ensure specification conformance to at least  $\pm 3$  sigma.*

#### Reference Accuracy

Includes the effects of terminal based linearity, hysteresis, and repeatability.

Range 2:  $\pm 0.25\%$  of calibrated span from 1:1 to 7.5:1 rangedown

Range 4:  $\pm 0.25\%$  of calibrated span from 1:1 to 40:1 rangedown

Range 5:  $\pm 0.25\%$  of calibrated span from 1:1 to 30:1 rangedown

Range 6:  $\pm 0.25\%$  of calibrated span from 1:1 to 30:1 rangedown

#### Long Term Stability

0.5% of span for 3 years under normal operating conditions

#### Vibration Effect

Less than  $\pm 0.1\%$  of URL when tested per the requirements of IEC 60770.84 pipeline (general and extreme vibration level) (10-60 Hz 0.21mm peak to peak displacement/60-2000 Hz 3g).

#### Electromagnetic Compatibility (EMC)

Meets all relevant requirements of EN 61326

#### Transient Protection (Option T1)

Meets IEEE C62.41, Category B

6 kV crest (0.5  $\mu$ s - 100 kHz)

3 kA crest (8 x 20 microseconds)

6 kV crest (1.2 x 50 microseconds)

Meets IEEE C37.90.1, Surge Withstand Capability

SWC 2.5 kV crest, 1.25 MHz wave form

General Specifications:

Response Time: < 1 nanosecond

Peak Surge Current: 5000 amps to housing

Peak Transient Voltage: 100 V dc

Loop Impedance: < 25 ohms

Applicable Standards: IEC61000-4-4, IEC61000-4-5

#### NOTE:

Calibrations at 68 °F (20 °C) per ASME Z210.1 (ANSI)

### Range and Sensor Limits

Rosemount 4600 Oil & Gas Panel Transmitter Range Limits								
Units	Range 2		Range 4 Span		Range 5		Range 6	
	min.	max.	min.	max.	min.	max.	min.	max.
psi	20	150	125	5,000	330	10,000	660	20,000
MPa	0.14	1.03	125	34.47	2.28	68.95	4.55	137.90
bar	1.38	10.34	125	344.74	22.75	689.48	45.51	1378.95
kg/cm <sup>2</sup>	1.41	10.55	125	351.535	23.20	703.07	46.40	1406.14

# Rosemount 4600

## FUNCTIONAL SPECIFICATIONS

### Dynamic Performance

500 Milliseconds (response time + dead time)

### Ambient Temperature Effect per 100°F (56°C)

±0.03% URL + 1.0% span from 1:1 to maximum rangedown

### Service

Liquid, gas, and vapor applications

### 4–20 mA (output code A)

#### Zero and Span Adjustment

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

#### Output

Digital process variable superimposed on 4–20 mA signal, available to any host that conforms to the HART protocol.

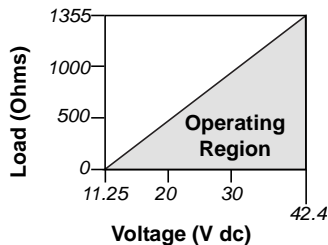
#### Power Supply

External power supply required. Standard transmitter (4–20 mA) operates on 11.25 to 42.4 V dc with no load.

#### Load Limitations

Maximum loop resistance is determined by the voltage level of the external power supply, as described by:

$$\text{Max. Loop Resistance} = 43.5 (\text{Power Supply Voltage} - 11.25)$$



Communication requires a minimum loop resistance of 250 ohms.

### Overpressure Limits

Transmitters withstand the following pressure without damage:

- Range 2: 1,500 psi (103,4 bar)
- Range 4: 7,500 psi (517,1 bar)
- Range 5: 15,000 psi (1034 bar)
- Range 6: 24,000 psi (1655 bar)

### Burst Pressure Limits

- Range 2: 11,000 psi (758,4 bar)
- Range 4: 11,000 psi (758,4 bar)
- Range 5: 26,000 psi (1793 bar)
- Range 6: 31,000 psi (2137 bar)

### Temperature Limits

#### Ambient

–40 to 185 °F (–40 to 85 °C)

#### Storage

–50 to 230 °F (–46 to 110 °C)

#### Process Temperature Limits

–40 to 200 °F (–40 to 93°C)

### Turn-On Time

Performance within specifications less than 2.5 seconds after power is applied to the transmitter

### Damping

Analog output response to a step input change is user-selectable from 0.3 to 60 seconds for one time constant. This software damping is in addition to sensor module response time.

### Failure Mode Alarm

#### HART 4-20mA (output code A)

If self-diagnostics detect a gross transmitter failure, the analog signal will be driven offscale to alert the user. Rosemount standard and custom alarm levels are available.

High or low alarm signal is software-selectable.

#### Alarm Configuration

##### Rosemount

High Alarm: ≥ 21.75 mA

Low Alarm: ≤ 3.75 mA

##### Custom Level <sup>(1)</sup>

High Alarm: 20.2 - 23.0 mA

Low Alarm: 3.6 - 3.8 mA

(1) Low alarm must be 0.1 mA less than low saturation and high alarm must be 0.1 mA greater than high saturation.

## PHYSICAL SPECIFICATIONS

### Electrical Connections

$\frac{1}{2}$ -14 NPT Male, 72in. flying leads (polyvinyl chloride insulated #18 AWG copper wire)

### Conduit Seal

Integral conduit seal meets the requirements of NEC<sup>®</sup> 2002 section 501.5 (A), 501.5 (B) and 505.16 (B)(1). No additional conduit seal required.

### Process Connections

- $\frac{1}{2}$ -14 NPT female (Available on Ranges 2 and 4 only)
- $\frac{1}{4}$ -18 NPT female (Not available on Range 6)
- Autoclave type F-250-C (Pressure relieved  $\frac{9}{16}$ -18 gland thread:  $\frac{1}{4}$  OD high pressure tube 60° cone: available Range 5 and 6 transmitters only.

### Process Sealing

Reliable dual process seal design meets the requirements NEC<sup>®</sup> 2002 section 501.5 (F)(3), 505.16 (E)(3) and API 14F/14FZ 6.8.2.2. No additional process sealing is required.

### Process-Wetted Parts

#### Process Isolating Diaphragms

316L SST <sup>(1)</sup>  
Alloy C-276 <sup>(1)</sup>

### Non-Wetted Parts

#### Electronics Housing

316L SST  
NEMA 4X  
IP 68, IP 66

### Sensor Module Fill Fluid

Silicone

### Shipping Weights for Rosemount 4600

Range 2 and 4: 1.34 lb. (0,61 kg.)  
Range 5 and 6: 2.03 lb. (0,92 kg.)

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(1) *Materials of Construction comply with recommendations per NACE MR0175/ISO 15156 for sour oilfield production environments. Environmental limits apply to certain materials. Consult latest standard for details. Selected materials also conform to NACE MR0103 for sour refining environments.*

## Product Certifications

### Approved Manufacturing Locations

Rosemount Inc. — Chanhassen, Minnesota, USA

### Ordinary Locations Certifications

As standard, the transmitter has been examined and tested to determine that the design meets basic electrical, mechanical, and fire protection requirements by FM, a nationally recognized testing laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

### European Directive Information

The EC declaration of conformity for all applicable European directives for this product can be found on the Rosemount website at [www.rosemount.com](http://www.rosemount.com). A hard copy may be obtained by contacting our local sales office.

#### ATEX Directive (94/9/EC)

Emerson Process Management complies with the ATEX Directive.

#### European Pressure Equipment Directive (PED) (97/23/EC)

Model 4600 Pressure Transmitters-  
Sound Engineering Practice

#### Electro Magnetic Compatibility (EMC) (89/336/EEC)

All Models: EN 50081-1: 1992; EN 50082-2:1995;  
EN 61326-1:1997 + A1, A2, and A3 – Industrial

### Process Sealing Certification

#### FM Approved Dual Process Seal

Certified to the requirements of ANSI / ISA 12.27.01

No additional sealing required.

### Hazardous Locations Certifications

#### North American Certifications

##### Factory Mutual (FM) Approvals

- E5** Explosion-Proof for Class I, Division 1, Groups B, C, and D; dust-ignition proof for Class II and Class III, Division 1, Groups E, F, and G hazardous locations; Temperature Code T5 ( $T_{amb} = -40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ ); Explosion-Proof for Class 1, Zone 1 AEx d IIC T5 ( $T_{amb} = -40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ ); Enclosure Type 4X  
Conduit seal not required
- I5** Intrinsically Safe for use in Class I, Division 1, Groups A, B, C, and D; Temperature Code T4 ( $T_{amb} = -50^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ ); Intrinsically Safe for use in Class I, Zone 0 AEx ia IIC T4 ( $T_{amb} = -50^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ ); Non-incendive for Class I, Division 2, Groups A, B, C, and D; When connected in accordance with Rosemount drawing 04620-5007; Enclosure Type 4X  
For entity parameters see control drawing 04620-5007

#### Canadian Standards Association (CSA) Approvals

- E6** Explosion-Proof for Class I, Division 1, Groups B, C, and D; dust-ignition proof for Class II and Class III, Division 1, Groups E, F, and G hazardous locations; Temperature Code T5 ( $T_{amb} = -50^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ ); Explosion-Proof for Class 1, Zone 1 Ex d IIC T5 ( $T_{amb} = -20^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ ); Suitable for Class I, Division 2, Groups A, B, C, and D, when installed per Rosemount drawing 04620-5005; Enclosure Type 4X  
Conduit seal not required
- I6** Intrinsically Safe for use in Class I, Division 1, Groups A, B, C, and D; Temperature Code T3C ( $T_{amb} = -50^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ ); Intrinsically Safe for use in Class I, Zone 0 Ex ia IIC T4 ( $T_{amb} = -50^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ ); When connected in accordance with Rosemount drawing 04620-5005; Enclosure Type 4X  
For entity parameters see control drawing 04620-5005

# Product Data Sheet

00813-0100-4022, Rev GA

October 2011

# Rosemount 4600

## European Certifications

**I1 ATEX Intrinsic Safety**  
**Certificate No. Baseefa03ATEX0114X**  
**ATEX Marking:** Ⓔ II 1 G  
Ex ia IIC T4 (-40 ≤ Ta ≤ 70°C)  
**CE** 1180  
Input Parameters:  
U<sub>i</sub> = 30V  
I<sub>i</sub> = 200mA  
P<sub>i</sub> = 1.0W  
C<sub>i</sub> = 35nF  
L<sub>i</sub> = 390μH

### SPECIAL CONDITIONS FOR SAFE USE (X):

The Apparatus with the Transient Protection (T1) option is not capable of withstanding the 500V insulation test required by Clause 6.3.12 of EN60079-11:2007. This must be taken into account when installing the apparatus.

**E1 ATEX Flame-Proof**  
**Certificate No. KEMA02ATEX2231X**  
**ATEX Marking:** Ⓔ II 1/2 G  
Ex d IIC T6 (-40 ≤ Ta ≤ 70°C)  
**CE** 1180

### SPECIAL CONDITIONS FOR SAFE USE (X):

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.

The Model 4600 Pressure transmitter is provided with a permanently connected unterminated cable. The free end of the cable shall be connected using a suitable junction box, e.g. in type of explosion protection flameproof enclosure "d" or increased safety "e".

**N1 ATEX Type n**  
**Certificate No. Baseefa03ATEX0115X**  
**ATEX Marking:** Ⓔ II 3 G  
Ex nA II T5 (-40 ≤ Ta ≤ 70°C)  
U<sub>i</sub> = 42.4V MAXIMUM

### SPECIAL CONDITIONS FOR SAFE USE (X):

The Apparatus with the Transient Protection (T1) option is not capable of withstanding the 500V insulation test required by Clause 6.8.1 of EN60079-15:2005. This must be taken into account when installing the apparatus.

**ND ATEX Dust Ignition-Proof**  
**Certificate No. KEMA02ATEX2231X**  
**ATEX Marking:** Ⓔ II 1 D  
Dust Rating: Ex tD A20 T85°C  
IP66, IP68  
**CE** 1180  
V = 42.4 Volts MAX  
A = 24mA

### SPECIAL CONDITIONS FOR SAFE USE (X):

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.

The Model 4600 Pressure transmitter is provided with a permanently connected unterminated cable. The free end of the cable shall be connected using a suitable junction box, e.g. in type of explosion protection flameproof enclosure "d" or increased safety "e".

## Combinations of Certifications

A certification tag is provided when optional approval is specified. Once a device labeled with multiple approval types is installed, it should not be reinstalled using any other approval types. Permanently mark the approval label to distinguish it from unused approval types.

- K1** Combination of **E1**, **I1**, and **N1**
- K5** Combination of **E5** and **I5**
- K6** Combination of **E6** and **I6**
- KA** Combination of **E1**, **I1**, **E6**, and **I6**
- KB** Combination of **E5**, **I5**, **I6** and **E6**
- KC** Combination of **E5**, **E1**, **I5** and **I1**

## Dimensional Drawings

Figure 1. Dimensional Drawings for the Rosemount 4600 Oil & Gas Panel Pressure Transmitter

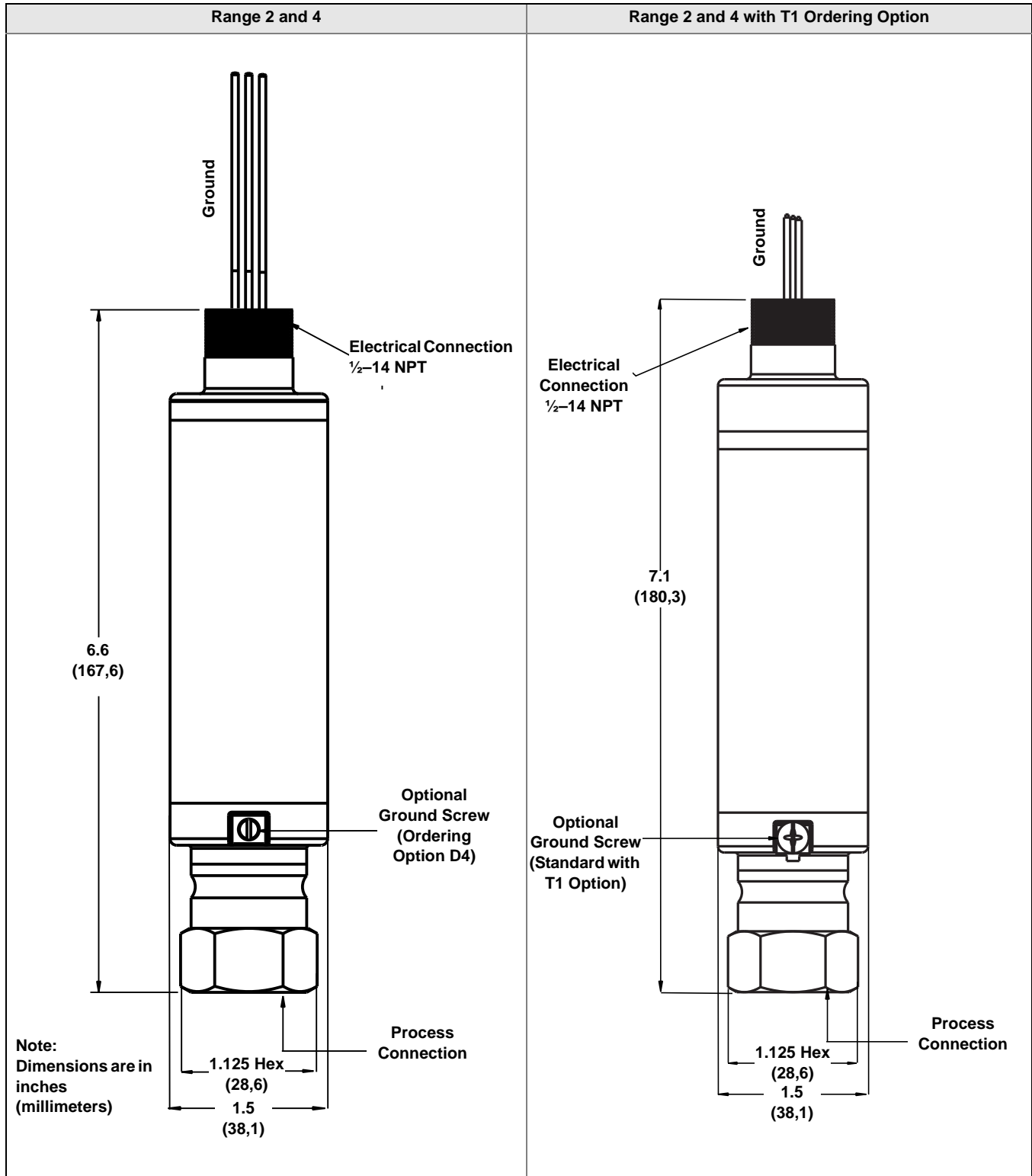
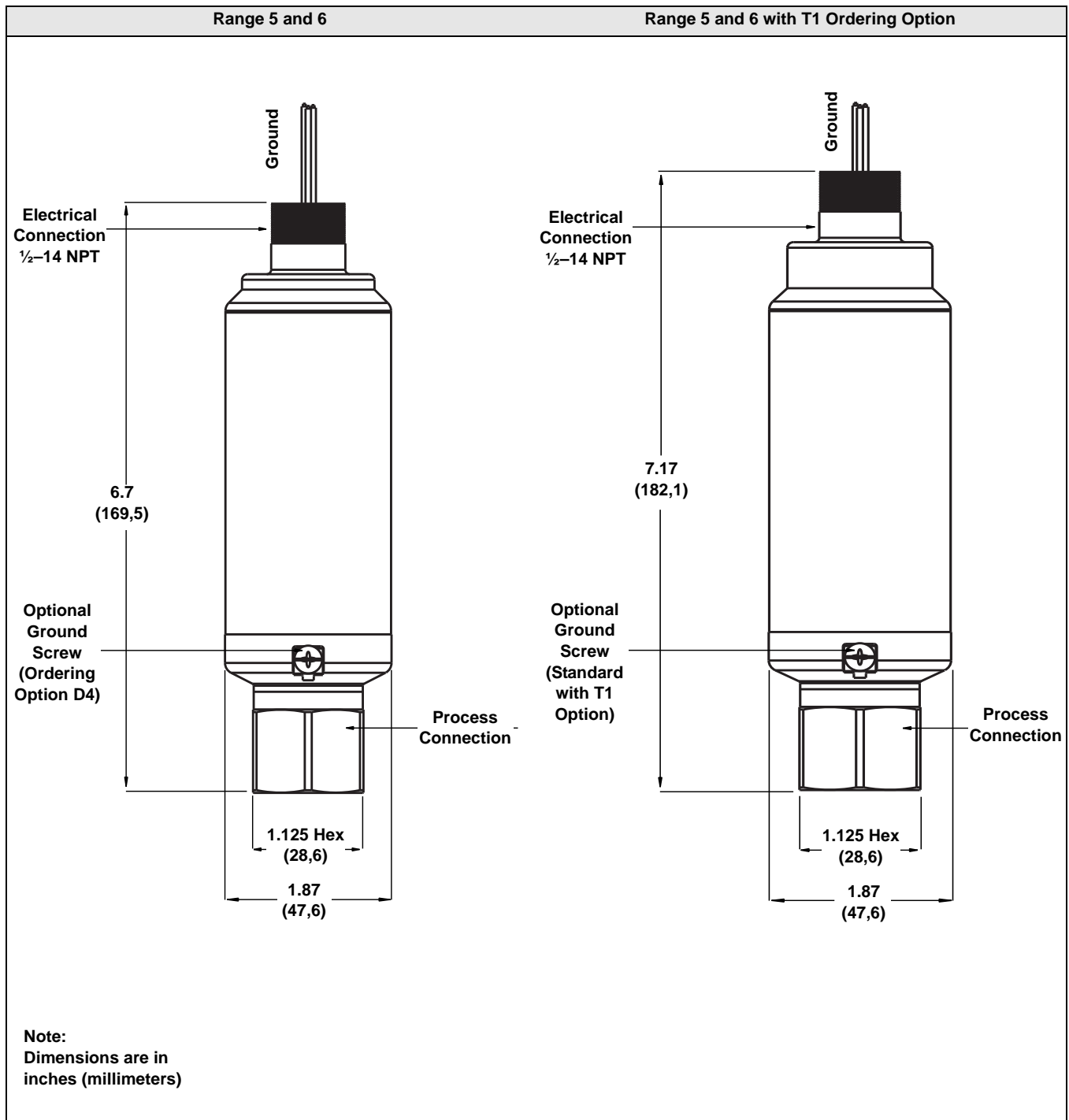


Figure 2. Dimensional Drawings for the Rosemount 4600 Oil & Gas Panel Pressure Transmitter



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