

# Hygienic Pressure Transmitter for Life Sciences Applications

## TRANSMITTER FEATURES:

- *Hygienic design conforms to 3-A and EHEDG standards*
- *Demonstrated best-in-class performance during SIP/CIP for process temperatures up to 400°F (204°C)*
- *Proven, trusted Rosemount technology improves process reliability and robustness*
- *Unparalleled stability reduces calibration frequency*
- *4-20mA/HART<sup>®</sup> output and AMS<sup>™</sup> Suite: Intelligent Device Manager compatibility ensures easier configurations, calibrations, and operation*



## Contents

Specifications . . . . .	page 3
Product Certifications . . . . .	page 5
Dimensional Drawings . . . . .	page 6
Ordering Information . . . . .	page 9
Configuration Data Sheet . . . . .	page 10

## Now you can have the best, most reliable performance... in a hygienic package

The Rosemount 4500 Hygienic Pressure Transmitter brings best-in-class performance, application expertise, operational and maintenance cost savings to the Life Sciences Industry.

### **Hygienic design conforms to 3-A and EHEDG standards**

The hygienic design of the Rosemount 4500 feature 15  $\mu$ -inch Ra mechanically polished and 10  $\mu$ -inch Ra electropolished wetted surfaces and an all stainless steel design that is free of voids and crevices to ensure easy cleaning and wipedowns. The 4500 is also 3-A authorized, EHEDG approved and designed according to strict ASME BPE guidelines.

### **Demonstrated best-in-class performance during SIP/CIP for process temperatures up to 400°F (204°C)**

The 4500 was designed and thoroughly tested to ensure that not only does the 4500 minimize temperature induced errors from SIP/CIP processes, but that it also recovers rapidly. This can reduce your downtime between cleaning cycles, enabling faster turnarounds and increased plant availability.

### **Proven, trusted Rosemount technology improves process reliability and robustness**

The Rosemount 4500 uses the same proven sensor and electronics technology found in other industry leading Rosemount products ensuring that the transmitter is robust and reliable, improving your process reliability and increasing plant availability.

### **Unparalleled stability reduces calibration frequency**

Competitor devices can drift out of specification in just a few months and require re-calibration, consuming your time and money and risking regulatory non-compliance. The 4500 provides a better stability so that you can confidently extend calibration frequencies to reduce maintenance costs.

### **4-20mA/HART output and AMS Suite™ compatibility ensures easier configurations, calibrations and operation**

Using AMS Suite software can lower maintenance costs, improve device performance and enable easier configuration and setup. Combining AMS Suite with the 4500 can also provide you with advanced functionality such as predictive diagnostics and audit trail information to make FDA compliance simpler and paper free.

## Specifications

### PERFORMANCE SPECIFICATIONS

*For zero-based spans, reference conditions, Neobee M-20 oil fill, SST materials, 1 1/2 in. tri-clamp process connections, digital trim values set to equal range points.*

#### Conformance to specification (±3 Sigma)

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

#### Reference Accuracy

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

±0.15% of calibrated span (CS) from 1:1 to 15:1 rangedown

±0.01  $\left(\frac{URL}{Span}\right)$  % of calibrated span from 15:1 to 50:1 rangedown

on Range 1 GP

#### Long Term Stability

0.1% of Upper Range Limit (URL) for 3 years under normal operating conditions

#### Batch to Batch Repeatability

One batch is an exposure to a Clean in Place / Steam in Place (CIP/SIP) process with maximum temperature of 400°F (204°C) for 2 hours.

±0.025 psi (0.0017 bar) for 100 batches

#### Vibration Effect

Less than ±0.1% of URL when tested per the requirements of IEC 60770 control room level

#### RFI Effects

±0.15% of span from 20 MHz to 1000 MHz for field strength up to 10 V/m.

### Range and Sensor Limits

Rosemount 4500 Sanitary Pressure Transmitter Range Limits						
Units	Range 1 AP		Range 1 GP		Range 2	
	min.	max.	min.	max.	min.	max.
psi	2	30	0.6	30	10	150
kPa	13.78	206.8	4.136	206.8	68.94	1034
bar	0.138	2.068	0.041	2.068	0.689	10.34
kg/cm <sup>2</sup>	0.141	2.109	0.042	2.109	0.703	10.54

### FUNCTIONAL SPECIFICATIONS

#### Dynamic Performance

250 milliseconds (response time + dead time)

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

0.2% CS + 0.02% URL

#### Process Temperature Effect per 104°F (58°C)

0.3% CS + 0.03% URL

#### Service

Liquid, gas, vapor, and steam 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.

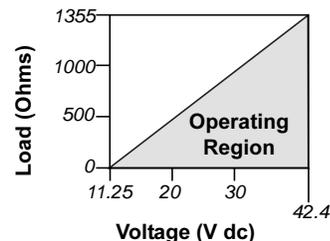
#### Power Supply

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 1: 150 psi (10.34 bar)

Range 2: 300 psi (20.68 bar)

### Burst Pressure Limits

Range 1: 300 psi (20.68 bar)

Range 2: 450 psi (31.02 bar)

### Temperature Limits

#### Ambient

32 to 140 °F (0 to 60 °C)

#### Storage

-22 to 185 °F (-30 to 85 °C)

#### Process Temperature Limits

32 to 400°F (0 to 204°C)

#### Horizontal Mount

For process temperatures above 293°F (145°C), derate ambient temperature by 7°F (4°C) for every 18°F (10°C) increase in process temperature.

#### Top Mount

For process temperatures above 266°F (130°C), derate ambient temperature by 9°F (5°C) for every 18°F (10°C) increase in process temperature.

### Turn-On Time

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

### Damping

Analog output response to a step input change is user-selectable from 0 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:  $\geq 21.75$  mA

Low Alarm:  $\leq 3.75$  mA

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

High Alarm: 20.2 - 23.0 mA

Low Alarm: 3.6 - 3.8 mA

### Humidity Limits

0-100% relative humidity

## PHYSICAL SPECIFICATIONS

### Process Connections

- 1½ inch Tri-Clamp Connection
- 2 inch Tri-Clamp Connection
- 1½ inch Fractional Line Connection

### Process-Wetted Parts

#### Process Isolating Diaphragms

316L SST <sup>(2)</sup>

Hastelloy C-276<sup>®</sup> <sup>(2)</sup>

#### Surface Finish

15 µ-inch (0.38µ-m) Ra mechanically polished

10 µ-inch (0.25µ-m) Ra electropolished

### Non-Wetted Parts

#### Electronics Housing

304 SST

NEMA 4X

IP 66

#### Surface Finish

32 µ-inch Ra mechanically polished

### Sensor Module Fill Fluid

Neobee M-20

### Shipping Weight for Rosemount 4500

3.0 lb. (1.36 kg.)

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

(2) 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.

## 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).

- NO** Factory Mutual (FM) Ordinary Location;  
Canadian Ordinary Location  
CE Marking  
3-A Symbol Authorization #876  
EHEDG Type EL  
Certified to meet Hygienic Equipment Design Criteria of Document 8 per TNO evaluation #V6069 and certificate #C05-6288

### 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)

Rosemount 4500 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 1998— Industrial

### Hazardous Locations Certifications

#### North American Certifications

##### Factory Mutual (FM) Approvals

- I5** Intrinsically Safe for use in Class I, II, III, Division 1, Groups A, B, C, D, E, F, and G;  
Temperature Code T4 ( $T_{amb} = 0$  to  $60^{\circ}\text{C}$ );  
Intrinsically Safe for use in Class I, Zone 0 AEx ia IIC T4 ( $T_{amb} = 0$  to  $60^{\circ}\text{C}$ );  
Non-incendive for Class I, Division 2, Groups A, B, C, and D;  
When connected in accordance with  
Rosemount drawing 04500-5001;  
Enclosure Type 4X  
For entity parameters see control drawing 04500-5001;

##### Canadian Standards Association (CSA) Approvals (Pending)

- I6** Intrinsically Safe for use in Class I, Division 1, Groups A, B, C, and D;  
Temperature Code T3C ( $T_{amb} = 0$  to  $60^{\circ}\text{C}$ );  
Intrinsically Safe for use in Class I, Zone 0 Ex ia IIC T4 ( $T_{amb} = 0$  to  $60^{\circ}\text{C}$ );  
When connected in accordance with  
Rosemount drawing 04500-5002;  
Enclosure Type 4X  
For entity parameters see control drawing 04500-5002;

##### European Certifications

- I1** ATEX Intrinsic Safety  
Certificate No. Baseefa05ATEX0091X  
ATEX Marking:  II 1 G  
EEx ia IIC T4 ( $T_{amb} = 60^{\circ}\text{C}$ )  
IP66  
 1180  
Input Parameters:  
 $U_i = 30\text{V}$   
 $I_i = 200\text{mA}$   
 $P_i = 1.0\text{W}$   
 $C_i = 0\text{nF}$   
 $L_i = 2.4\mu\text{H}$

##### Special Conditions For Safe Use (x)

The plastic meter cover does not meet the surface resistivity requirements and, to avoid electrostatic charging, it must not be rubbed or cleaned with solvents.

- N1** ATEX Type n (Pending)  
Certificate No. Baseefa05ATEX0092X  
ATEX Marking:  II 3 G  
EEx nA nL IIC T5 ( $T_{amb} = 60^{\circ}\text{C}$ )  
 $U_i = 42.4\text{V MAXIMUM}$   
IP66  


## Dimensional Drawings

FIGURE 1. Dimensional Drawings for the Rosemount 4500 Hygienic Pressure Transmitter

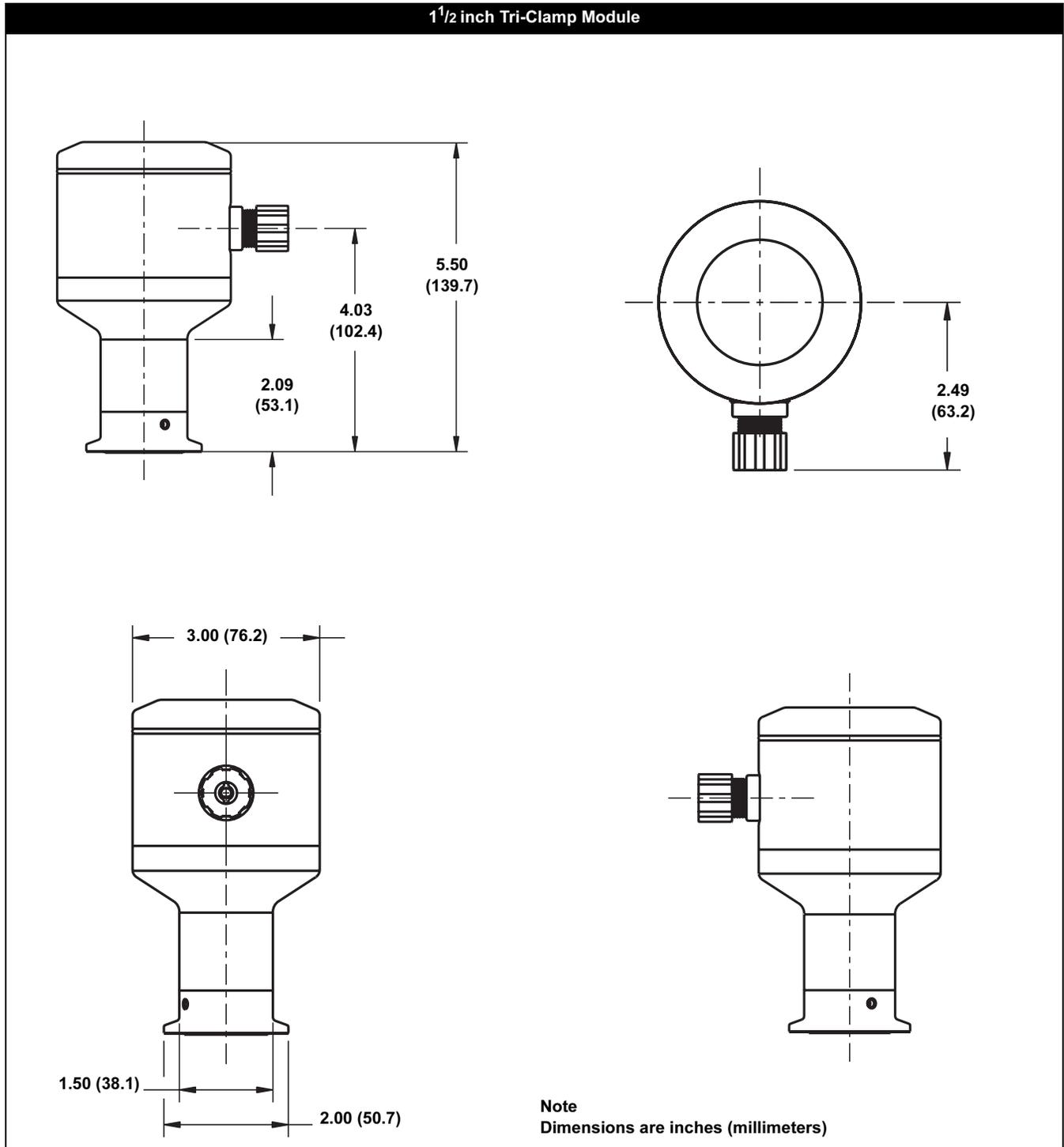


FIGURE 2. Dimensional Drawings for the Rosemount 4500 Hygienic Pressure Transmitter

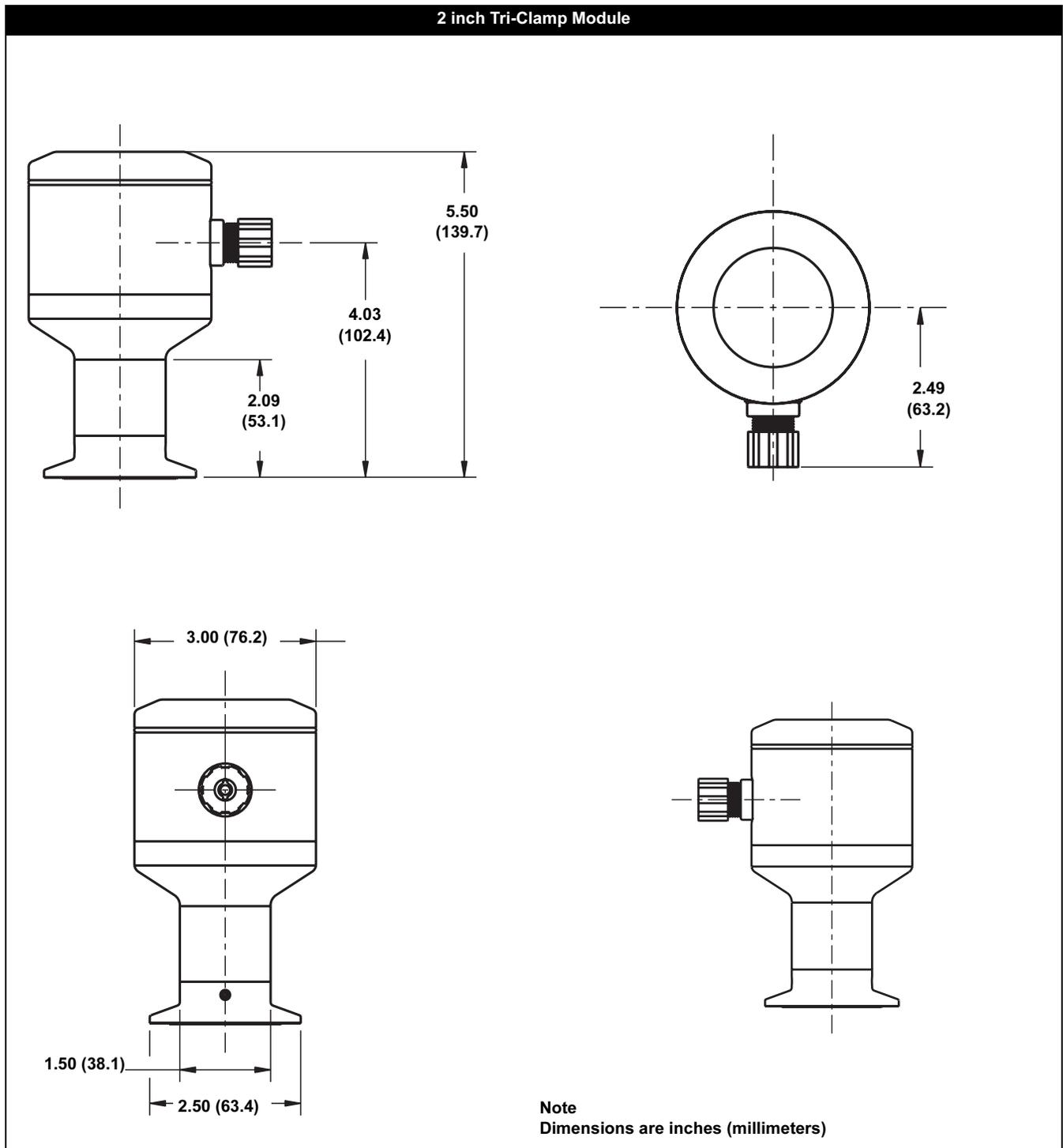
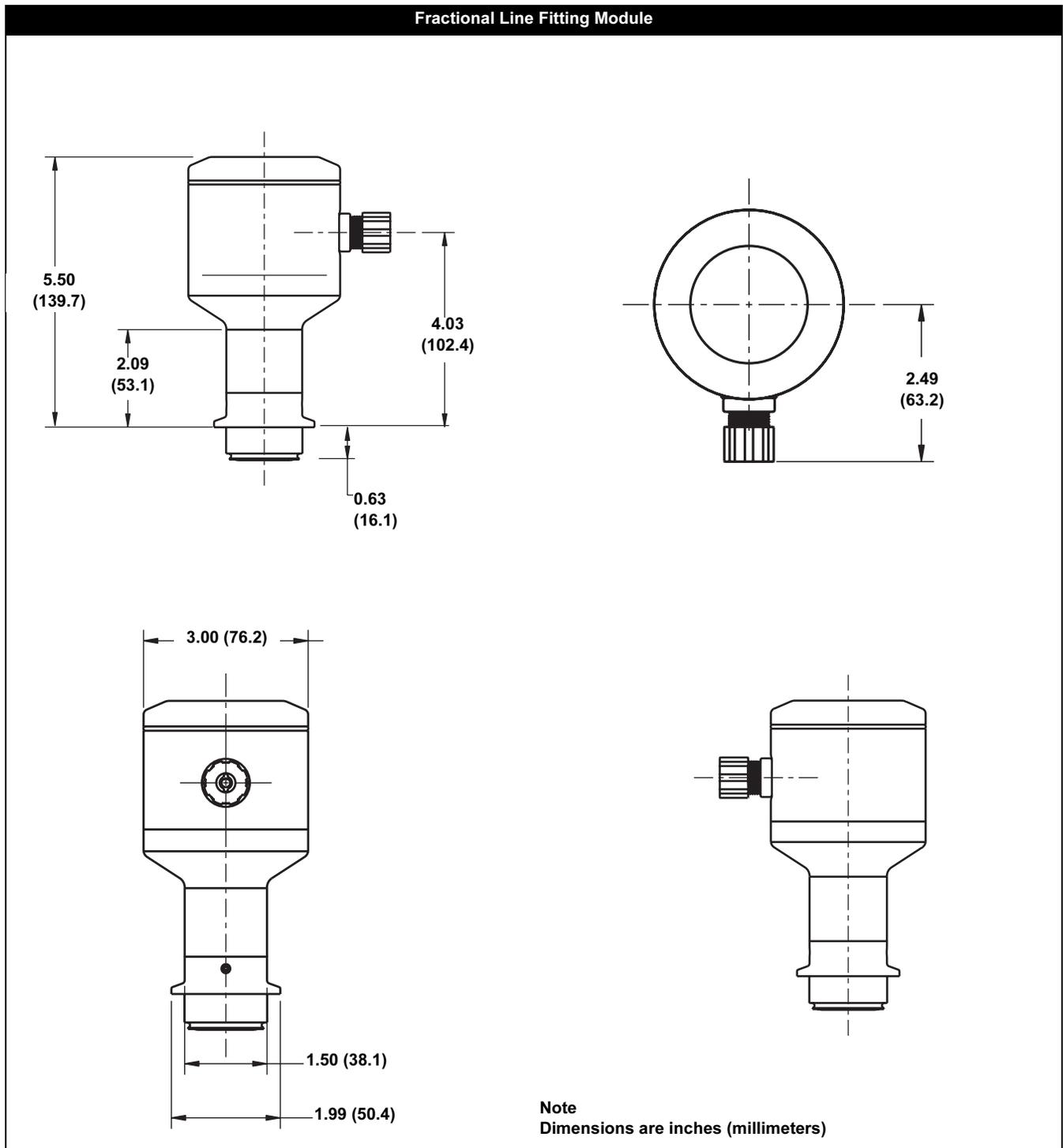


FIGURE 3. Dimensional Drawings for the Rosemount 4500 Hygienic Pressure Transmitter



4500\_20\_AA, 4500\_21\_AA, 4500\_22\_AA, 4500\_23\_AA.EPS

## Ordering Information

<b>Model</b>	<b>Transmitter Type</b>	
4500	Hygienic Pressure Transmitter	
<b>Code</b>	<b>Measurement Type</b>	
G	Gauge	
A	Absolute	
<b>Code</b>	<b>Pressure Range</b>	
	<b>Gauge</b>	<b>Absolute</b>
1	-14.7 to 30 psi	0 to 30 psia
2	-14.7 to 150 psi	0 to 150 psia
<b>Code</b>	<b>Wetted Materials</b>	
2	316L SST	
3	Hastelloy C-276	
<b>Code</b>	<b>Process Connection Style</b>	
C11	1-1/2 inch Tri-Clamp Connection	
C12	2 inch Tri-Clamp Connection	
C13	1-1/2 inch Fractional Line Fitting Connection	
<b>Code</b>	<b>Oil Fill</b>	
A	Neobee M-20	
<b>Code</b>	<b>Transmitter Output</b>	
A	4-20 mA with Digital Signal Based on HART protocol	
<b>Code</b>	<b>Cable Entry</b>	
2A	Cable Gland	
<b>Code</b>	<b>Options</b>	
	<b>Wetted Surface Finish</b>	
F1	Electro polished to 10 μ-inch (0.25μ-m) Ra	
	<b>Software Configuration</b>	
C1	Custom Software Configuration (CDS required with order)	
	<b>Alarm Limits</b>	
C6	Custom Alarm & Saturation Signal Levels, High Alarm	
C7	Custom Alarm & Saturation Signal Levels, Low Alarm	
	<b>Hardware Adjustments</b>	
D1	Zero & Span Adjustments	
	<b>Digital Display</b>	
M5	LCD Display	
	<b>Calibration Data Certificate</b>	
Q4	Calibration data certificate consistent with ISO 10474 2.1 or EN 10204 2.1	
QP	Calibration Certificate and Tamper Evident Seal	
	<b>Material Traceability Certification</b>	
Q8	Material traceability certification per EN 10204 3.1.B	
	<b>Surface Finish Certification</b>	
Q16	Surface Finish Certification	
	<b>Product Certifications</b>	
I1	CENELEC Intrinsically Safe, Non-incendive, Type n	
I5	FM Intrinsically Safe, Non-incendive	
I6	CSA Intrinsically Safe, Non-incendive	
<b>Typical Model Number: 4500 G 2 2 C12 A A 2A</b>		