

Rosemount Ultrasonic

3107 Level and 3108 Flow Transmitters



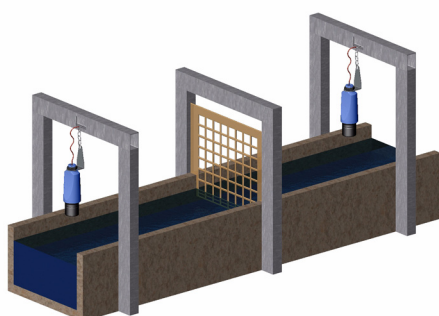
- Non-contacting measurement with no moving parts
- Fast and simple to install and configure
- Continuous measurement of level, contents (volume), or open channel flow
- MCERTS-certified Rosemount 3108 when used with a Rosemount 3490 Series Control Unit
- Loop-powered 4-20mA with HART® output
- Factory sealed (IP68) for use in wet-wells and sumps up to 39 ft. (12 m) deep
- Rugged all UPVC construction ideal for application on exposed sites such as reservoirs, rivers, remote works, and effluent treatment plants

Overview of the Rosemount 3107 and 3108

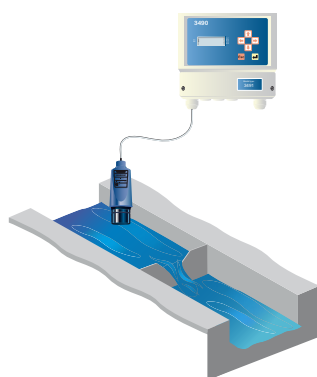


**Rosemount 3107
Level Transmitter**

**Rosemount 3108
Flow Transmitter**



**Differential measurement with
two Rosemount 3107 transmitters**



**Open channel Flow Measurement
with a Rosemount 3107 transmitter and
Rosemount 3490 controller unit**

Measurement principle

The 3107 and the 3108 are based on ultrasonic technology. Ultrasonic pulse signals are transmitted and reflected from the liquid surface. The transmitter 'listens' for reflected signals (echoes) and measures the time-delay between transmitting and receiving.

The distance to the liquid surface is automatically calculated using the computed time-delay.

The 3107 has an integrated sensor for automatically compensating the Distance for temperature effects.

The 3108 has a factory fitted remote temperature sensor to continuously measure the air temperature around the transmitter. It then computes the speed of sound in air, automatically compensating Distance for temperature effects.

The level measurement (Bottom Reference minus Distance) is sent through the 4–20 mA and HART output.

Features and benefits

- Eliminates problems experienced with contacting instrumentation
- Simple set-up and operation
- Minimal maintenance after installed
- Low cost of installation and commissioning
- Process downtime minimized
- Non-contacting measurement with no moving parts
- Sealed rugged UPVC housing
- Corrosion resistant UPVC wetted material
- Factory fitted with up to 164 ft. (50 m) of two-core cable
- 4–20 mA loop-powered
- Operating range to 39 ft. (12 m)
- Measures liquid height, distance to liquid, volume, or flow in open channels
- Certified Intrinsically Safe and used for level (or distance) measurements in hazardous areas
- Automatic temperature compensation

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Special features

Advanced software features

■ Learn routine (false echo registration)

The transmitter can learn to ignore up to four false echoes caused by the pulse signal reflecting off obstructions, until the actual level is seen.

■ Empty tank mapping

When a tank is empty, the transmitter can learn to ignore up to four false echoes, without the need for user interaction.

■ Present depth

The bottom reference can be automatically set using a known user-entered depth.

■ Set as empty

When the tank is empty, the bottom reference can be automatically reset to the measured distance.

■ Distance offset

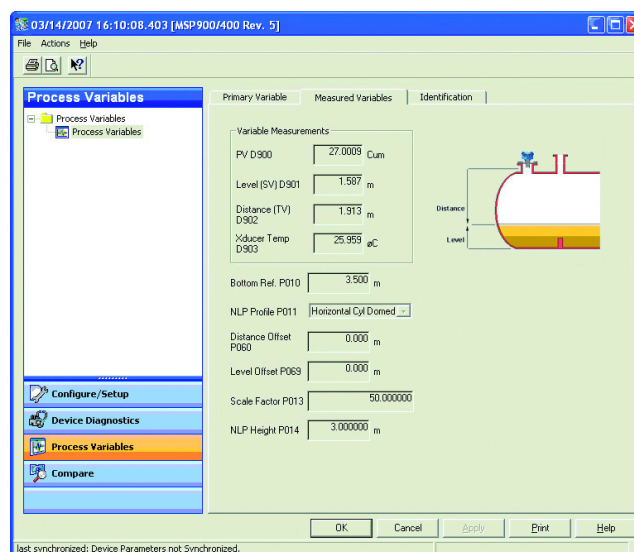
The distance to the surface can be adjusted by a user-entered positive or negative offset value.

■ Level offset

The level can be adjusted by a user-entered positive or negative offset value

■ Bottom blanking

The transmitter can be set to ignore an area of the tank bottom to avoid false echoes from obstructions.



**Easy Programming Using A Field Communicator Or AMS™ Suite:
Intelligent Device Manager**

Applications

- Storage tank levels
- Open channel flow
- Effluent pits
- Reservoir level
- Buffer tanks
- Filter bed level

Choosing the right model

- Each model of the 3100 Series has been designed for a specific purpose, as shown in the table here:

Application	Model	Range
Simple level measurement within a tank, sump, or reservoir	3107	39-ft. (12 m) range
Differential level measurement (2 x Transmitters and 1 x Rosemount 3490)	3107 3108	39-ft. (12 m) range 11-ft. (3,3 m) range
Open channel flow or volume measurement	3108	11-ft. (3,3 m) range

Rosemount 3107 Level Transmitter Ordering

Specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See [page 7](#) for more information on Material Selections.

Table 1. Rosemount 3107 ordering information

★ The Standard offering represents the most common models and options. These 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	
3107	Ultrasonic level transmitter, 39 ft. (12 m) range	
Signal Output		
Standard		Standard
H	4–20 mA with HART communication	★
Housing Material		
Standard		Standard
P	UVPC	★
Cable Lengths		
Standard		Standard
1	10 ft. (3 m)	★
2	65 ft. (20 m)	★
3	164 ft. (50 m)	★
Wet-side Material		
Standard		Standard
P	UVPC	★
Process Connection		
Standard		Standard
N1 ⁽¹⁾	1-in. NPT thread	★
G1 ⁽²⁾	1-in. BSPP thread	★
Certificates		
Standard		Standard
I1	ATEX Intrinsically Safe	★
I2	INMETRO Intrinsically Safe	★
I3	NEPSI Intrinsically Safe	★
I5	FM Intrinsically Safe	★
I6	CSA Intrinsically Safe	★
I7	IECEx Intrinsically Safe	★
IM ⁽³⁾	Technical Regulation Customs Union (EAC) Intrinsically Safe	★
Special Alarm Options⁽⁴⁾⁽⁵⁾		
Standard		Standard
C4	Namur NE43 alarm and saturation levels, high alarm	★
C5	Namur NE43 alarm and saturation levels, low alarm	★
C8	Standard Rosemount alarm and saturation levels, low alarm	★
Special Certification Option		
Standard		Standard
Q4	Certificate of functional test	★
Typical Model Number: 3107 H P 1 P G1 I1		

(1) Choosing this option implies US (Imperial) units of measurement are required for the default configuration. Configuration can be changed on-site.

(2) Choosing this option implies Metric units of measurement are required for the default configuration. Configuration can be changed on-site.

(3) Contact an Emerson representative for additional information.

(4) When no Special Alarm option code is selected, the configuration is a high alarm, and standard Rosemount alarm and saturation levels.

(5) See “Electrical” on [page 7](#) for more information about the saturation levels and alarm signal indication.

Rosemount 3108 Flow Transmitter Ordering

Specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See [page 7](#) for more information on Material Selections.

Table 2. Rosemount 3108 ordering Information

★ The Standard offering represents the most common models and options. These 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	
3108	Ultrasonic Open Channel Flow Transmitter with remote temperature sensor, 11 ft. (3,3 m) range	
Signal Output		
Standard		Standard
H	4–20 mA with HART communication	★
Housing Material		
Standard		Standard
P	UVPC	★
Cable Lengths		
Standard		Standard
2	65 ft. (20 m)	★
Wet-side Material		
Standard		Standard
P	UVPC	★
Process Connection		
Standard		Standard
N1 ⁽¹⁾	1-in. NPT thread	★
N2 ⁽¹⁾	1-in. NPT thread with 1-in. NPT to 3/4-in. NPT female conduit adaptor	★
G1 ⁽²⁾	1-in. BSPP thread	★
G2 ⁽²⁾	1-in. BSPP thread with 1-in. BSPP to M20 female conduit adaptor	★
Certificates		
Standard		Standard
I1	ATEX Intrinsically Safe	★
I2	INMETRO Intrinsically Safe	★
I3	NEPSI Intrinsically Safe	★
I5	FM Intrinsically Safe	★
I6	CSA Intrinsically Safe	★
I7	IECEx Intrinsically Safe	★
IM ⁽³⁾	Technical Regulation Customs Union (EAC) Intrinsically Safe	★
Special Alarm Options⁽⁴⁾⁽⁵⁾		
Standard		Standard
C4	Namur NE43 alarm and saturation levels, high alarm	★
C5	Namur NE43 alarm and saturation levels, low alarm	★
C8	Standard Rosemount alarm and saturation levels, low alarm	★
Special Certification Option		
Standard		Standard
Q4	Certificate of functional test	★
Typical Model Number: 3108 H P 2 P N 1 I5		

(1) Choosing this option implies US (Imperial) units of measurement are required for the default configuration. Configuration can be changed on-site.

(2) Choosing this option implies Metric units of measurement are required for the default configuration. Configuration can be changed on-site.

(3) Contact an Emerson representative for additional information.

(4) When no Special Alarm option code is selected, the configuration is a high alarm, and standard Rosemount alarm and saturation levels.

(5) See “Electrical” on [page 7](#) for more information about the saturation levels and alarm signal indication.

Rosemount 3107 and 3108 Spares and Accessories

Specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See [page 7](#) for more information on Material Selections.

Table 3. Rosemount 3107 and 3108 spare parts and accessories

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

Spares and Accessories		
Standard		Standard
03107-7001-0001	Flange Mounting, 1-in. NPT to 3-in. ASME B16.5 Class 150, PVC	★
03107-7001-0002	Flange Mounting, 1-in. NPT to 4-in. ASME B16.5 Class 150, PVC	★
03107-7002-0001	Flange Mounting, 1-in. BSPP to PN10 DN80, PVC	★
03100-7002-0002	Flange Mounting, 1-in. BSPP to PN10 DN100, PVC	★
03107-7003-0001	Submersion shield for the 3107/3108	★
03107-7003-0002	316 Stainless Steel Suspension Bracket and 1-in. locknut (supplied with the 3107 and the 3108)	★
03107-7003-0003	Conduit adaptor boss, 1-in. BSPP female to M20 x 1.5 female	★
03107-7003-0004	Conduit adaptor boss, 1-in. NPT female to 3/4-in. NPT female	★
03107-7003-0005	Head Verification Device 304 stainless steel for use with 3107 or 3108 transmitters (Figure 1)	★

Figure 1. Rosemount Head Verification Device



The HVD is recommended for open channel flow applications to allow checking and certification of the transmitter. It features a target plate at a fixed distance from the transmitter face. The target plate is moved under the transmitter to verify the transmitter accuracy.

Specifications

General

Product

- Rosemount 3107 and 3108 Ultrasonic Transmitters: Level, Content (Volume), and Open channel flow measurement

Measurement principle

- Ultrasonic, time-of-flight

Measuring performance

Measurement range

- 3107: 1 to 39 ft (0,3 to 12 m)
- 3108: 1 to 11 ft (0,3 to 3,3 m)

Blanking distance (dead zone)

- 12 in. (0,3 m)

Level resolution

- Better than 0.06 in. (1 mm)

Level accuracy under reference conditions⁽¹⁾

- ± 0.1 in. (2,5 mm) for measured distance < 3.3 ft. (1 m)
- $\pm 0.25\%$ of distance for measured distance > 3.3 ft. (1 m)

Ultrasonic pulse rate

- 1 per second (user configurable 0.5 to 2.0 seconds)

Configuration

Output Process Variable (PV)

- Level (Linear or Scaled), Content (Volume), or Open Channel Flow

Configuration tools

- Field Communicator, Rosemount 3490 Series Universal Control Unit, or Rosemount AMS™ Suite

Electrical

Cable

- Factory fitted 2-core shielded cable for external power supply and communication

Cable sheath

- PVC

Cable length

- 10, 65, or 164 ft. (3, 20, or 50 m). All cables may be shortened or extended on site

External power supply

- 12 to 40 Vdc (non-hazardous area)
- 12 to 30 Vdc (hazardous area)

Earthing

- Connect the cable screen to earth

Communication (signal output)

- Analog 4–20 mA, HART

Signal on alarm

- Standard: Low = 3.75 mA. High = 21.75 mA
- Namur NE43: Low = 3.6 mA. High = 22.5 mA

Saturation levels

- Standard: Low = 3.9 mA. High = 20.8 mA
- Namur NE43: Low = 3.8 mA. High = 20.5 mA

Electrical parameters

- $U_i = 30$ V, $I_i = 120$ mA, $P_i = 0,82$ W, $C_i = 5$ nF, $L_i = 27$ mH

Physical specifications

Materials 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.

Materials used in construction of Rosemount 3107 and 3108

Body and wet-side material

- UPVC (stabilized)

(1) Temperature: 68 °F (20 °C), Pressure: 1013 mbar (atmospheric pressure), Relative Humidity: 50%, calm and stable water surface.

Lock nut

- Glass filled nylon

Mechanical

Mounting thread size

- 1-in. NPT or 1-in. BSPP
- See “Rosemount 3107 and 3108 Spares and Accessories” on [page 6](#) for optional mounting accessories

Weight of transmitter

- 3.1 lb with 10 ft. cable, 4.1 lb with 65 ft. cable, and 5.8 lb with 164 ft. cable
(1,4 kg with 3 m cable, 1,9 kg with 20 m cable, and 2,6 kg with 50 m cable)

Measuring

Temperature compensation

- 3107: Automatic with integral temperature compensation
- 3108: Automatic with factory fitted remote temperature sensor for dynamic temperature compensation

Environment

Ambient temperature

- -40 to 140 °F (-40 to 60 °C)

Process temperature

- -40 to 140 °F (-40 to 60 °C)

Process pressure

- -4 to 44 psi (-0,25 to 3,0 bar)

Ingress protection

- IP68 to 33 ft. (10 m)

Electromagnetic compatibility

- EN 61326-1:2006

Certifications

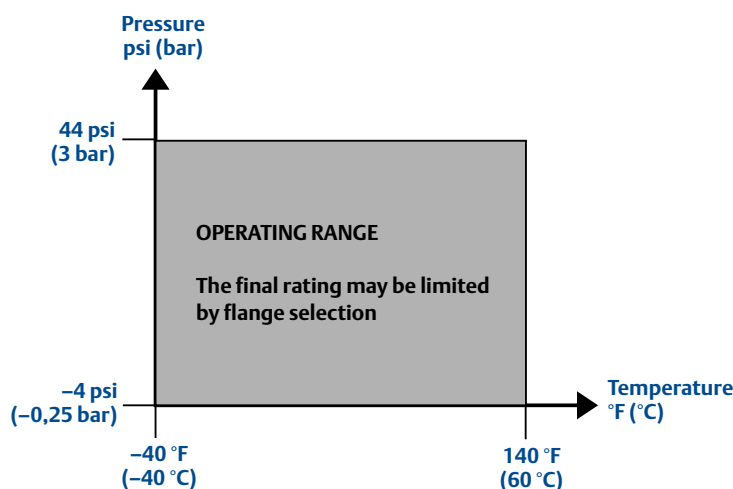
- CE-mark, FM, CSA, EAC⁽¹⁾, INMETRO, NEPSI, ATEX, or IECEx, dependent on order code
- The Rosemount 3108 is MCERTS⁽²⁾ certified

(1) Contact an Emerson representative for additional information.

(2) The Rosemount 3108 forms part of an MCERTS certified system when used with a Rosemount 3490 Series Control Unit.

Temperature and pressure ratings

The process temperature and pressure rating depends on the design of the transmitter in combination with the flange materials.

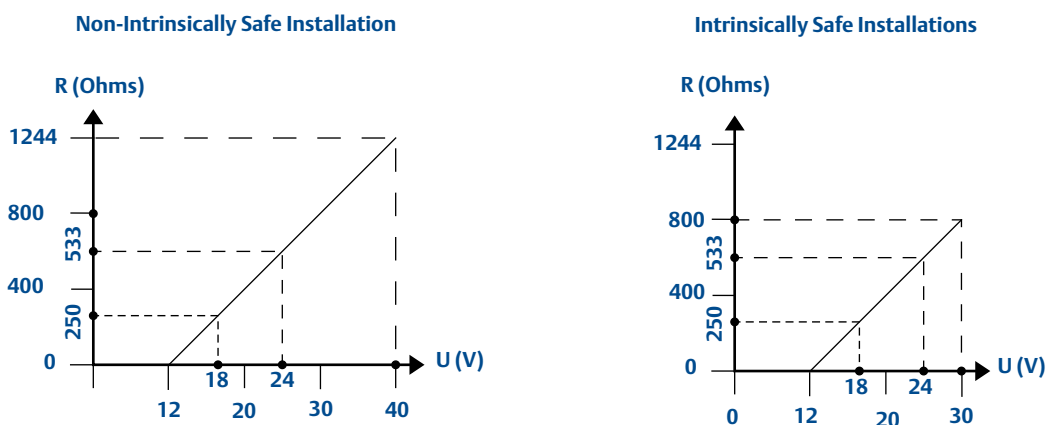


Process Temperature and Pressure Diagram for Rosemount 3107 and 3108

Load limitations

A Field Communicator requires a minimum load resistance of 250 Ohms within the loop in order to function properly. Communication with a Rosemount 3490 Series control unit does not require additional resistance.

The maximum load resistance can be determined from these diagrams:



Rosemount 3107 and Rosemount 3108

Note

R = Maximum Load Resistance

U = External Power Supply Voltage

Product Certifications

Approved manufacturing locations

- Rosemount Inc.
 - Chanhassen, Minnesota, USA
- Mobrey Limited
 - Slough, United Kingdom
- Emerson Asia Pacific Private Limited
 - Singapore

European directive information

The EC declaration of conformity for all applicable European directives for this product can be found on the Rosemount website at Emerson.com/Rosemount. A hard copy may be obtained by contacting your local sales office.

ATEX directive (94/9/EC)

- Emerson complies with the ATEX Directive

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

- The 3107 and 3108 are outside the scope of PED Directive

Electro Magnetic Compatibility (EMC) (2004/108/EC)

- EN 61326-1:2006

MCERTS certification (3108 only)

- Sira certificate number: MC080131

Hazardous locations certifications

European approvals

ATEX intrinsically safe approval

- I1** Certificate Number: SIRA 09ATEX2299X
 Intrinsically Safe for II 1 G, Ex ia IIC Ga
 T6 (T_{amb} -40 to 55 °C), T4 (T_{amb} -40 to 60 °C)
 U_i = 30 V, I_i = 120 mA, P_i = 0,82 W, C_i = 5 nF, L_i = 27 μ H
 IP66, IP68

American and Canadian approvals

Factory Mutual (FM) intrinsically safe approval

- I5** Intrinsically Safe for Class 1, Division 1, Groups A, B, C, D
 Zone Marking: Class I, Zone 0, AEx ia IIC
 Temperature Code T6 (T_a = 55 °C)
 Temperature Code T4 (T_a = 60 °C)
 Intrinsically Safe when installed in accordance with
 Rosemount drawing 71097/1300
 IP66, IP68

Canadian Standards Association (CSA) intrinsically safe approval

- I6** Certificate Number: 02 CSA 1352094 X
 Ex ia IIC
 Intrinsically Safe when installed with certified barriers
 meeting transmitter entity parameters:
 U_i = 30 V, I_i = 120 mA, P_i = 0,82 W, C_i = 5 nF, L_i = 27 μ H
 Temperature Codes:
 T4 at T_a = -40 to 60 °C or T6 at T_a = -40 to 55 °C

Rest of the world approvals

INMETRO Intrinsic safety approval

- I2** Certificate: NCC 12.1229 X
 Intrinsic safety:
 Ex ia IIC T6 Ga ($-40^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$),
 Ex ia IIC T4 Ga ($-40^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$)

NEPSI intrinsically safe approval

- I3** 3107 certificate: GYJ111055X
 Intrinsic safety:
 Ex ia IIC T4/T6
 T_a (see table in the certificate)

 3108 certificate: GYJ111056X
 Intrinsic safety:
 Ex ia IIC T4/T6
 T_a (see table in the certificate)

IECEx intrinsically safe approval

- I7** Certificate Number: IECEx SIR 09.0124X
 Ex ia IIC Ga
 T6 (T_a = -40 to 55 °C), T4 (T_a = -40 to 60 °C)
 U_i = 30 V, I_i = 120 mA, P_i = 0,82 W, C_i = 5 nF, L_i = 27 μ H
 IP66, IP68

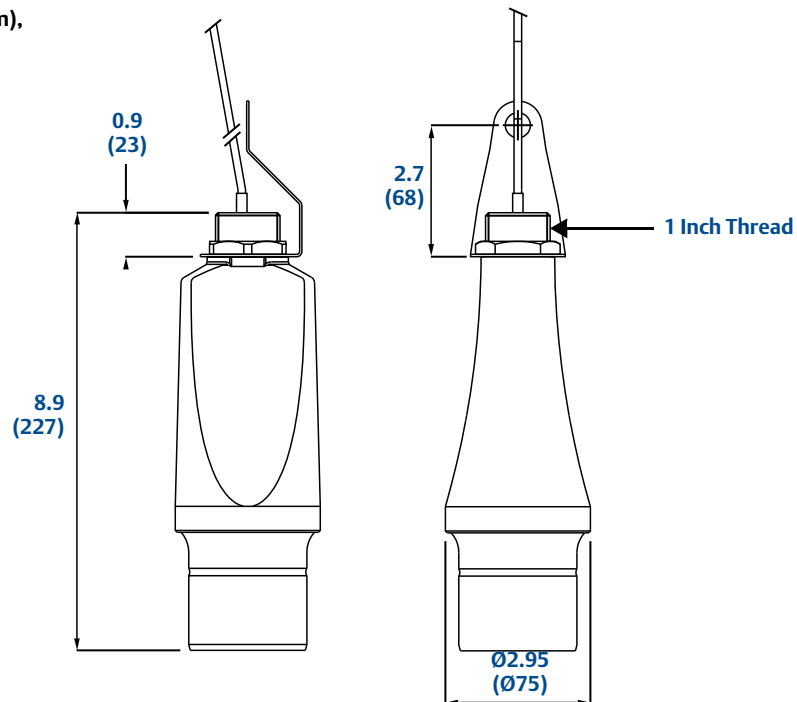
Technical Regulation Customs Union (EAC) intrinsically safe approval

- IM** Contact an Emerson representative
 for additional information.

Dimensional Drawings

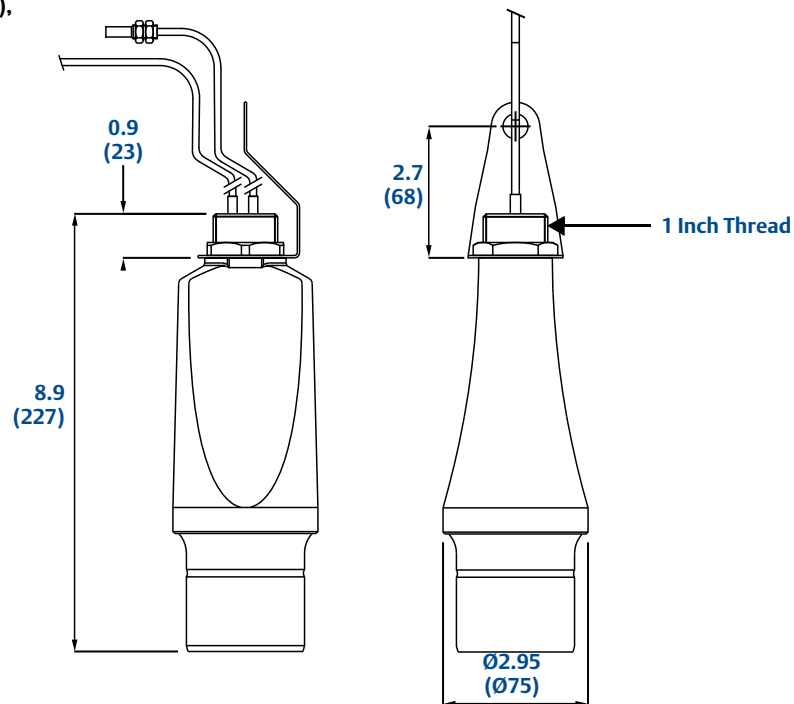
3107 threaded mounting

Note: Dimensions are in inches (mm),



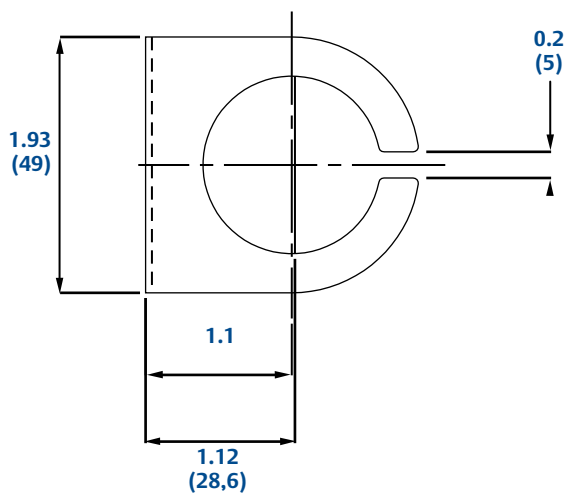
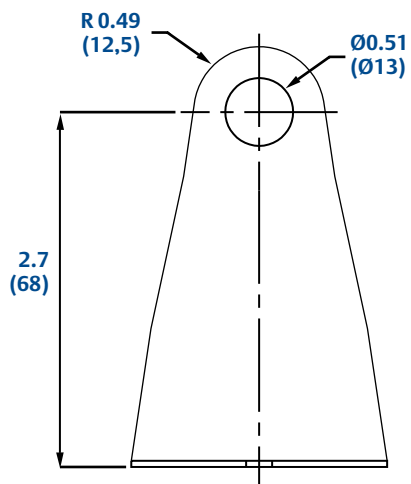
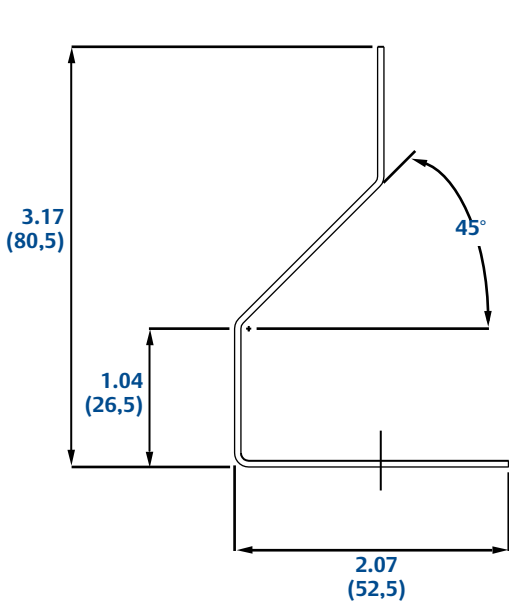
3108 threaded mounting

Note: Dimensions are in inches (mm),



1-inch NPT/BSPP Bracket Kits

Note: Dimensions are in inches (mm).



Global Headquarters

Emerson Automation Solutions
6021 Innovation Blvd
Shakopee, MN 55379 USA

📞 +1 800 999 9307 or +1 952 906 8888
☎️ +1 952 949 7001
✉️ RFQ.RMD-RCC@Emerson.com

North America Regional Office

Emerson Automation Solutions
8200 Market Blvd.
Chanhassen, MN 55317, USA

📞 +1 800 999 9307 or +1 952 906 8888
☎️ +1 952 949 7001
✉️ RFQ.RMD-RCC@Emerson.com

Latin America Regional Office

Emerson Automation Solutions
Sunrise, FL 33323, USA

📞 T +1 954 846 5030
☎️ +1 954 846 5121
✉️ RFQ.RMD-RCC@Emerson.com

EUROPE

Emerson Automation Solutions
Neuhofstrasse 19a PO Box 1046
CH-6340 Baar
Switzerland

📞 T +41 (0) 41 768 6111
☎️ +41 (0) 41 768 6300
✉️ RFQ.RMD-RCC@Emerson.com

ASIA-PACIFIC

Emerson Automation Solutions
1 Pandan Crescent
Singapore 128461
Republic of Singapore

📞 +65 6 777 8211
☎️ +65 6 777 0947
✉️ Enquiries@AP.Emerson.com

MIDDLE EAST AND AFRICA

Emerson Automation Solutions
Emerson FZE
Jebel Ali Free Zone
Dubai, United Arab Emirates, P.O. Box 17033

📞 +971 4 811 8100
☎️ +971 4 886 5465
✉️ RFQ.RMTMEA@Emerson.com

🌐 [Linkedin.com/company/Emerson-Automation-Solutions](https://www.linkedin.com/company/Emerson-Automation-Solutions)

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