

# Rosemount™ 1208A Level and Flow Transmitter

## Non-Contacting Radar



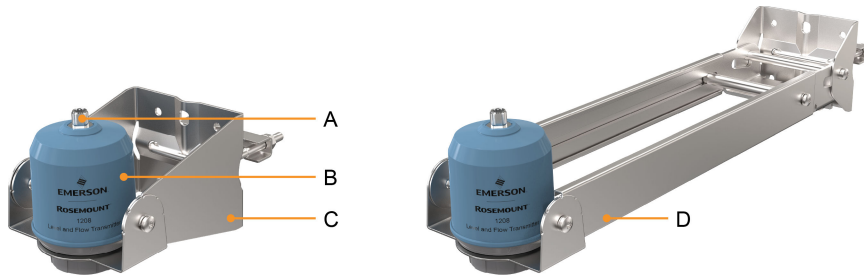
- Cost-effective FMCW radar with 80 GHz technology
- Compact and robust housing that withstands outdoor conditions and is submersible
- Ideal for level measurement in small tanks and open air applications
- Volume flow measurement in open channels
- Maintenance free solution unaffected by process conditions such as density, viscosity, temperature, and pressure
- 4-20 mA output, IO-Link, digital output, and models with Bluetooth® connectivity deliver ease of integration to existing and new systems

# Introduction

## Good fit for open air applications

Rosemount 1208A delivers reliable level measurements regardless of challenging weather conditions such as condensation, wind, sunlight, and changing temperature. The transmitter can also be used in open channel applications to determine the volume flow.

**Figure 1: Bracket Mounting**



- A. M12 connector for simple commissioning
- B. PVDF housing
- C. Standard bracket
- D. Extendable bracket

## Installation flexibility on tanks

The compact design of the transmitter allows it to be installed in tight spaces and small vessels, either by using a threaded flange or a threaded fitting.




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## Contents

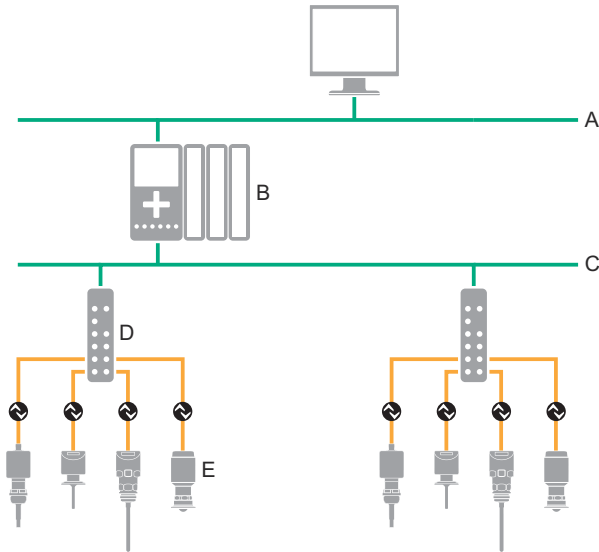
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## Easy integration with IO-Link

The Rosemount 1208A provides both conventional 4-20 mA and digital switch outputs, enabled by IO-Link connectivity. This supports easy integration into any automation system.

Each IO-Link system consists of an IO-Link master and one or more IO-Link devices (sensors and actuators). The connection between the master and the device is established via unshielded standard cables using standard connectors such as M12. Process data, events and parameters are transferred to the master via IO-Link. The IO-Link master then transfers the data to the controller (PLC) and its fieldbus or industrial ethernet network.

**Figure 2: Example of an IO-Link System**



- A. Industrial ethernet
- B. Programmable logic controller (PLC)
- C. Industrial Fieldbus
- D. IO-Link master
- E. IO-Link devices

## Non-contacting radar technology

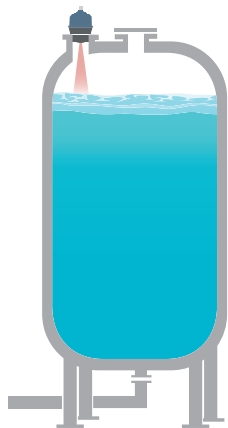
Non-contacting radar technology is ideal for a wide range of applications as it is maintenance-free, has a top-down installation that reduces the risk of leakages, and is unaffected by process conditions such as density, viscosity, temperature, pressure, and pH.

The Rosemount 1208A uses Frequency Modulated Continuous Wave (FMCW) technology and smart algorithms to maximize measurement accuracy and reliability, even in small tanks and challenging fast-filling vessels.

## Application examples

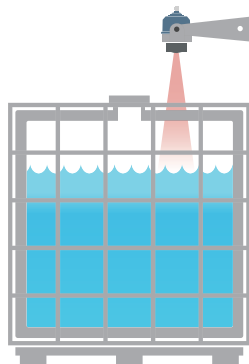
### Storage tanks

Gain insights into your tank and ensure production runs smoothly without interruption.



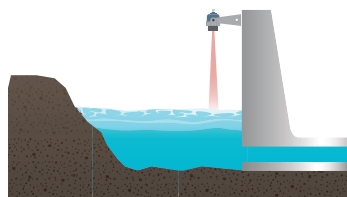
### Plastic tanks

Monitor the inventory of your small and medium sized plastic tanks by measuring through the plastic roof.



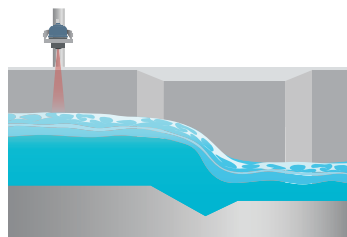
### Open air applications

Get reliable level measurements of sumps or ponds, regardless of challenging surface and weather conditions.



### Open channel flow

Use the Rosemount 1208A for volume flow measurement of water and wastewater in open channels.



## Access information when you need it with asset tags

Newly shipped devices include a unique QR code asset tag that enables you to access serialized information directly from the device. With this capability, you can:

- Access device drawings, diagrams, technical documentation, and troubleshooting information in your MyEmerson account
- Improve mean time to repair and maintain efficiency
- Ensure confidence that you have located the correct device
- Eliminate the time-consuming process of locating and transcribing nameplates to view asset information

## Ordering information

### Rosemount 1208A Level and Flow Transmitter



The Rosemount 1208A is a non-contacting radar transmitter for continuous measurement of level, and volume flow in open channels.

[VIEW PRODUCT >](#)

### Models

Description	Communication protocol	Thread type	Model number
Rosemount 1208AN Level and Flow Transmitter	4-20 mA (3-wire), IO-Link	NPT 1½-in.	1208AN
Rosemount 1208AG Level and Flow Transmitter	4-20 mA (3-wire), IO-Link	G 1½-in.	1208AG
Rosemount 1208ANB Level and Flow Transmitter	4-20 mA (3-wire), IO-Link, Bluetooth® connectivity	NPT 1½-in.	1208ANB
Rosemount 1208AGB Level and Flow Transmitter	4-20 mA (3-wire), IO-Link, Bluetooth connectivity	G 1½-in.	1208AGB

### Accessories

#### Mounting brackets

Description	Material	Part number
Mounting bracket, standard, for pipe/ceiling/wall	316L	01208-5000-0001
Mounting bracket, extendable, for pipe/wall	316L	01208-5000-0002

### Process connection adapters and flanges

Description	Inner thread	Material	Part number
2-in. Class 150 flange for non-pressurized applications	NPT 1½-in.	PE100	01208-5000-0003
3-in. Class 150 flange for non-pressurized applications	NPT 1½-in.	PE100	01208-5000-0004
4-in. Class 150 flange for non-pressurized applications	NPT 1½-in.	PE100	01208-5000-0005
2-in. Class 150 flange, ASME B16.5	NPT 1½-in.	316/316L	01208-5000-0006
3-in. Class 150 flange, ASME B16.5	NPT 1½-in.	316/316L	01208-5000-0007
4-in. Class 150 flange, ASME B16.5	NPT 1½-in.	316/316L	01208-5000-0008
2-in. NPT adapter	NPT 1½-in.	316/316L/1.4404	01208-5000-0009
DN50 PN10/PN16 flange for non-pressurized applications	G 1½-in.	PE100	01208-5000-0010
DN80 PN10/PN16 flange for non-pressurized applications	G 1½-in.	PE100	01208-5000-0011
DN100 PN10/PN16 flange for non-pressurized applications	G 1½-in.	PE100	01208-5000-0012
DN50 PN10/PN16 flange, EN1092-1	G 1½-in.	1.4404	01208-5000-0013
DN80 PN10/PN16 flange, EN1092-1	G 1½-in.	1.4404	01208-5000-0014
DN100 PN10/PN16 flange, EN1092-1	G 1½-in.	1.4404	01208-5000-0015

### Gasket for G threaded version

The transmitter is shipped with an EPDM gasket.

Description	Approvals	Material	Part number
Gasket 1½-in., dia 60/47.8/2.0	N/A	FKM GLT	01208-5000-0016
	FDA, EC 1935/2004, NSF, WRAS	EPDM	01208-5000-0017

### Nut

The applicable nut is also shipped with each transmitter.

Description	Material	Part number
Nut G1½-in.	PVDF	01208-5000-0018
Nut NPT1½-in.	PVDF	01208-5000-0019

## Cables and connectors

Description	Length	Part number
Cable assembly, 4P A-code, M12 female angled - M12 male straight, IP66/IP68	6.6 ft. (2 m)	01208-5000-0020
	16.4 ft. (5 m)	01208-5000-0021
	32.8 ft. (10 m)	01208-5000-0022
	65.6 ft. (20 m)	01208-5000-0023
Cable assembly, 4P A-code, M12 female straight - M12 male straight, IP66/IP68	6.6 ft. (2 m)	01208-5000-0024
	16.4 ft. (5 m)	01208-5000-0025
	32.8 ft. (10 m)	01208-5000-0026
	65.6 ft. (20 m)	01208-5000-0027
Cable assembly, 4P A-code, M12 female angled - Unterminated, IP66/IP68	6.6 ft. (2 m)	01208-5000-0028
	16.4 ft. (5 m)	01208-5000-0029
	32.8 ft. (10 m)	01208-5000-0030
	65.6 ft. (20 m)	01208-5000-0031
	164 ft. (50 m) <sup>(1)</sup>	01208-5000-0032
Cable assembly, 4P A-code, M12 female straight - Unterminated, IP66/IP68	6.6 ft. (2 m)	01208-5000-0033
	16.4 ft. (5 m)	01208-5000-0034
	32.8 ft. (10 m)	01208-5000-0035
	65.6 ft. (20 m)	01208-5000-0036
	164 ft. (50 m) <sup>(1)</sup>	01208-5000-0037
Power supply cable for IO-Link Master, L-code, M12 male straight - flying leads	16.4 ft. (5 m)	V15L-G-5M-PUR-U
Ethernet cable for IO-Link Master, D-code, M12 male straight - male RJ45	9.8 ft. (3 m)	V1SD-G-GN2M-TPEA1S-V45-G
Connector <sup>(2)</sup> , 4P A-code, M12 female straight - Field attachable, IP67	N/A	01208-5000-0038

(1) For IO-Link communication, the maximum cable length is 65.6 ft. (20 m) between device and master.

(2) A connector is shipped with each transmitter.

## IO-Link Masters

Description	IO-Link ports	Part number
IO-Link Master, Class A, IP67, PROFINET®, Modbus® TCP, OPC-UA, and MQTT	8	OMIOLM001
Rosemount IO-Link USB Communicator	1	FB-5301

## Configuration software

Description	Part number
Rosemount IO-Link Assistant	FB-5401

# Performance specifications

## General

### Reference conditions

- Measurement target: Stationary metal plate, no disturbing objects
- Temperature: 59 to 77 °F (15 to 25 °C)
- Ambient pressure: 14 to 15 psi (960 to 1060 mbar)
- Relative humidity: 25-75%
- Damping: Default value, 2 s

### Instrument accuracy (under reference conditions)

±0.08 in. (±2 mm)<sup>(1)</sup>

### Repeatability

±0.04 in. (±1 mm)

### Ambient temperature effect

±0.04 in. (±1 mm)/10 K

### Sensor update rate

Minimum 1 update per second (typically 5 updates per second)

### Maximum level rate

200 mm/s

## Measuring range

### Maximum measuring range

49 ft. (15 m)<sup>(2)</sup>

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(1) Refers to inaccuracy according to IEC 60770-1 when excluding installation dependent offset. See the IEC 60770-1 standard for a definition of radar specific performance parameters and if applicable corresponding test procedures.

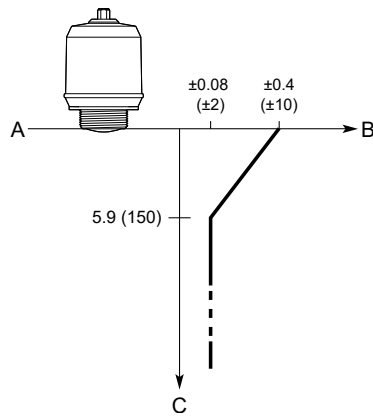
(2) The measuring range is limited to 33 ft. (10 m) for oil-based media (dielectric constant < 10). Also note that a combination of adverse process conditions, such as heavy turbulence, foam, and condensation, together with products with poor reflection may affect the measuring range.



## Accuracy over measuring range

Figure 3 illustrates the accuracy over measuring range at reference conditions.

**Figure 3: Accuracy Over Measuring Range**



- A. Device Reference Point
- B. Accuracy in inches (millimeters)
- C. Distance in inches (millimeters)

## Environment

### Vibration resistance

2 g at 10-1000 Hz according to IEC 61298-3, level “field with general application”

### Electromagnetic compatibility (EMC)

- EMC Directive (2014/30/EU): EN 61326-1
- NAMUR recommendations NE21 (only 4-20 mA output)

### Pressure Equipment Directive (PED)

Complies with 2014/68/EU article 4.3

### Radio approvals

- Radio Equipment Directive (2014/53/EU) and Radio Equipment Regulations (S.I. 2017/1206):
  - ETSI EN 302 372
  - ETSI EN 302 729
  - EN 62479
- Part 15 of the FCC Rules
- Industry Canada RSS 211

### Related information

[Product certifications](#)

# Functional specifications

## General

### Field of application

Continuous measurement of level and open channel flow.

### Solids level measurement

The Rosemount 1208A is capable of measuring in many solids applications, including limestone and fly ash tanks.

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#### Note

Sensitivity and performance in solids applications may vary on the reflectivity properties of the media. These properties include dielectric constant, consistency, humidity, grain size, and angle of repose.

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### Minimum dielectric constant

2

### Measurement principle

Frequency Modulated Continuous Wave (FMCW)

### Frequency range

77 to 81 GHz

### Maximum output power

3 dBm (2 mW)

### Internal power consumption

< 2 W (normal operation at 24 Vdc, no outputs)

< 3.6 W (normal operation at 24 Vdc, digital and analog outputs active)

### Humidity

0 - 100% relative humidity, non-condensing

### Turn-on time

< 15 s<sup>(3)</sup>

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(3) Time from when power is applied to the transmitter until performance is within specifications.

## Outputs

The transmitter provides two configurable outputs:

- Output 1**     Digital output / IO-Link mode
- Output 2**     Digital output or active 4-20 mA analog output

## Digital output

Switching signal for high and low limits (using the same pin)

### Output type

PNP/NPN configurable

### Switching function

Normally open

### Permanent current rating

< 50 mA

### Maximum voltage drop

2.5 V

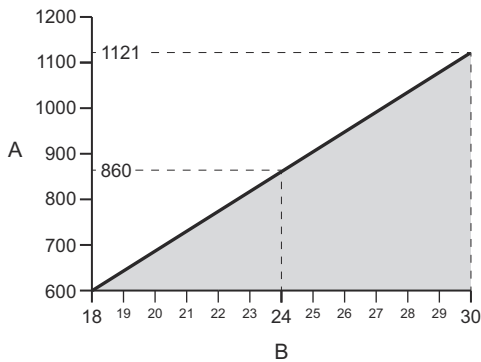
## 4-20 mA analog output

### Load limitations

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

$$\text{Maximum Loop Resistance} = 43.5 \times (\text{External Power Supply Voltage} - 18) + 600 \Omega$$

**Figure 4: Load Limits**



A. Loop Resistance (Ω)

B. External Power Supply Voltage (Vdc)

## Analog signal on alarm

The transmitter automatically and continuously performs self-diagnostic routines. If a failure or a measurement error is detected, the analog signal will be driven offscale to alert the user. High or low failure mode is user-configurable.

**Table 1: Signal on Alarm**

Level	Custom levels	NAMUR NE43 (default)
Low	3.5 to 4.0 mA	3.5 mA (NAMUR $\leq$ 3.6 mA)
High	20.0 to 22.5 mA	21.5 mA (NAMUR $\geq$ 21.0 mA)

## Analog saturation levels

The transmitter will continue to set a current that corresponds to the measurement until reaching the associated saturation limit (and then freeze).

**Table 2: Saturation Levels**

Level	Custom levels	NAMUR NE43 (default)
Low	3.5 to 4.0 mA	3.8 mA
High	20.0 to 22.5 mA	20.5 mA

## IO-Link specifications

### IO-Link revision

1.1

### Transfer type

COM2 (38.4 kBaud)

### SIO mode

Yes

### IO-Link master port

Class A

### Minimum cycle time

6 ms

## Bluetooth® connectivity

### Typical range

At least 50 ft. (15 m) line of sight.

Maximum communication range will vary depending on orientation, obstacles (person, metal, wall, etc.) or electromagnetic environment.

**Related information**

[Emerson.com/Automation-Solutions-Bluetooth](https://emerson.com/Automation-Solutions-Bluetooth)

## Configuration

**Configuration tools**

- Rosemount IO-Link Assistant (available as accessory)
- FDT® frame applications, e.g. PACTware
- Emerson's configuration tools with Bluetooth® wireless technology capabilities

**Related information**

[Emerson.com/RosemountIO-LinkAssistant](https://emerson.com/RosemountIO-LinkAssistant)  
[Emerson.com/AMSDeviceConfigurator](https://emerson.com/AMSDeviceConfigurator)

**Damping**

User selectable (default is 2 s, minimum is 0 s)

**Output units**

- Level: in., m
- Temperature: °F, °C
- Volume flow: US gal/h, m<sup>3</sup>/h
- Signal strength: mV

**Output variables**

Variable	4-20 mA	DO1 and DO2	Digital, service tools using IODD	IO-Link PDIn (to the PLC)
Level	✓	✓	✓	✓
Distance (ullage)	N/A	N/A	✓	N/A
Volume flow	✓	✓	✓	✓
Electronics temperature	N/A	N/A	✓	N/A
Signal strength	N/A	N/A	✓	N/A

**Volume flow calculations**

- Linearization table
- Parshall flume
- Khafagi-Venturi flume

## Process pressure

-15 to 43.5 psig (-1 to 3 bar)

### Note

The PE100 flanges must be used only in non-pressurized applications.

## Temperature limits

### Process temperature

-40 to 176 °F (-40 to 80 °C)

### Ambient temperature

-40 to 176 °F (-40 to 80 °C)

### Storage temperature

-40 °F to 194 °F (-40 °C to 90 °C)

## Physical specifications

### Material selection

Emerson provides a variety of Rosemount products 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.

## Housing and enclosure

### Process connection

NPT 1½-in. or ISO 228/1-G1½-in. thread with a choice of different brackets, adapters, and flanges

### Materials

- Transmitter housing: Polyvinylidene fluoride (PVDF)

### Related information

[Declaration of Material Traceability](#)

### Transmitter weight

0.8 lb (0.35 kg)

## Ingress protection

Enclosures meet NEMA® Type 4X/6P, IP66, and IP68 (33 ft. [10 m] for 1000 hours<sup>(4)</sup>) when properly installed.

## Impact protection

IK07 (4 J impact test)

## Mounting bracket

### Materials

- Bracket: Stainless steel 316L
- Nut: PVDF

## Flanges

### Materials

- Polyethylene PE100
- Stainless steel 316/316L
- Stainless steel 1.4404

## Threaded adapters

### Materials

Stainless steel 316/316L/1.4404

## Material exposed to tank atmosphere

- Antenna and housing: PVDF
- Gasket: EPDM or FKM GLT
- Flange: PE100, 316/316L, or 1.4404
- Threaded adapter: 316/316L/1.4404

## Electrical connection

### Power supply

The transmitter operates on 18-30 Vdc at the transmitter terminals.

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(4) Verified with selection of cables from Weidmuller; for other cable selections IP68 conditions may vary.

## Connector type

M12 male (A-coded)

## Protection class

III

## Wiring diagram

Figure 5: Connection

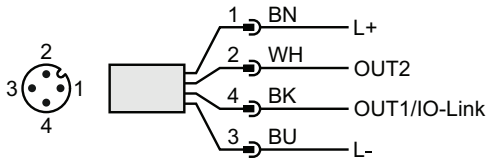


Table 3: Pin Assignment

Pin	Wire color <sup>(1)</sup>		Signal	
1	BN	Brown	L+	24 V
2	WH	White	OUT2	Digital output or active 4-20 mA analog output
3	BU	Blue	L-	0 V
4	BK	Black	OUT1/IO-Link	Digital output or IO-Link mode

(1) According to IEC 60947-5-2.

## Installation considerations

Before installing the transmitter, follow recommendations for mounting position, sufficient free space, nozzle requirements, etc.

### Mounting position

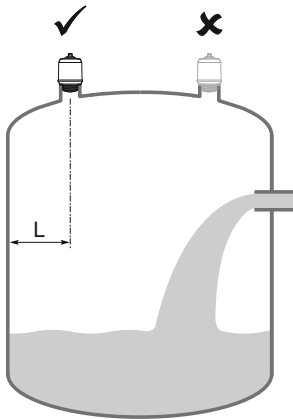
When finding an appropriate location on the tank for the transmitter, the conditions of the tank must be carefully considered.

Consider the following guidelines when mounting the transmitter:

- For optimal performance, the transmitter should be installed in locations with a clear and unobstructed view of the product surface.
- The transmitter should be mounted with as few internal structures as possible within the signal beam.
- Do not mount close to or above the inlet stream.
- Do not mount the transmitter on a manway cover.
- Do not position the transmitter directly over a side manway door.
- Multiple Rosemount 1208A transmitters can be used in the same tank without interfering with each other.



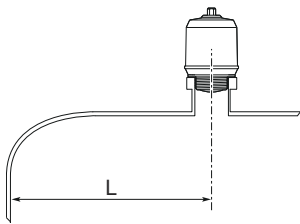
**Figure 6: Recommended Mounting Position**



### Free space requirements

If the transmitter is mounted close to a wall or other tank obstruction such as heating coils and ladders, noise might appear in the measurement signal. See [Table 4](#) for recommended clearance.

**Figure 7: Free Space Requirements**



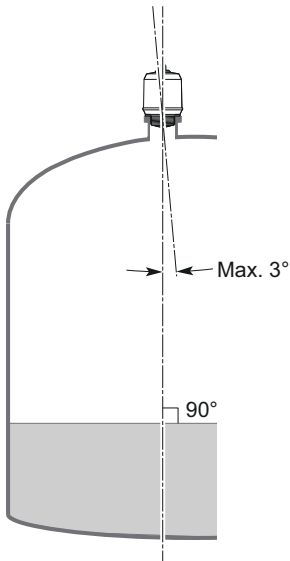
**Table 4: Distance to Tank Wall (L)**

Minimum	Recommended
8 in. (200 mm)	½ of tank radius

## Inclination

The transmitter should be mounted vertically to ensure a good echo from the product surface. See [Figure 8](#) for recommended maximum inclination.

**Figure 8: Inclination**



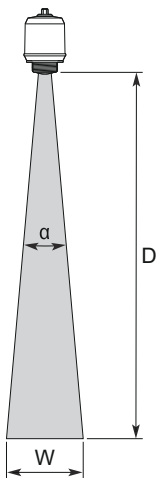
## Non-metallic tanks

Nearby objects outside the tank may cause disturbing radar echoes. Wherever possible, the transmitter should be positioned so that objects close to the tank are kept outside the signal beam.

## Beam angle and beam width

The transmitter should be mounted with as few internal structures as possible within the signal beam.

**Figure 9: Beam Angle and Beam Width**



**Beam angle ( $\alpha$ )**

8°

**Beam width**

See [Table 5](#) for beam width at different distances.

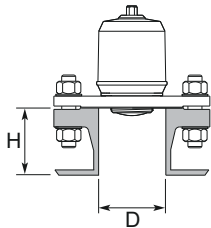
**Table 5: Beam Width**

Distance (D)	Beam width (W)
6.6 ft. (2 m)	0.9 ft. (0.3 m)
13.1 ft. (4 m)	1.8 ft. (0.6 m)
19.7 ft. (6 m)	2.8 ft. (0.8 m)
26.2 ft. (8 m)	3.7 ft. (1.1 m)
32.8 ft. (10 m)	4.6 ft. (1.4 m)
49.2 ft. (15 m)	6.9 ft. (2.1 m)

## Nozzle requirements

To allow the microwaves to propagate undisturbed, the nozzle dimensions should be kept within the specified limits as given in [Table 6](#). The inside of the nozzle must be smooth (i.e. avoid bad welding, rust, or deposit).

**Figure 10: Mounting in Nozzles**



**Table 6: Nozzle Requirements**

Nozzle diameter (D)	Maximum nozzle height (H)
1.5 in. (40 mm)	5.9 in. (150 mm)
2 in. (50 mm)	7.9 in. (200 mm)
3 in. (80 mm)	11.8 in. (300 mm)
4 in. (100 mm)	15.8 in. (400 mm)
6 in. (150 mm)	23.6 in. (600 mm)

## Product certifications

See the Rosemount 1208A [Product Certifications](#) document for detailed information on the existing approvals and certifications.

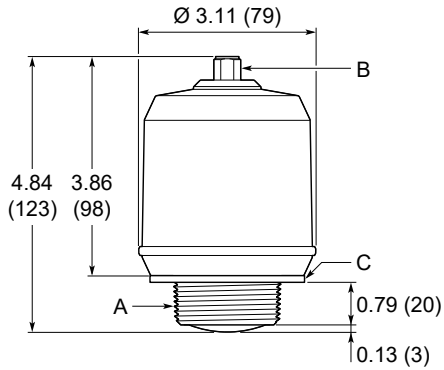
# Dimensional drawings

## Related information

[Type 1 Drawing](#)

## Transmitter

**Figure 11: Rosemount 1208A**

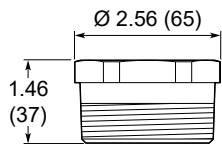


- A. NPT 1½-in. or ISO 228/1-G1½-in. thread
- B. M12 male connector (A-coded)
- C. Gasket for G threaded version

Dimensions are in inches (millimeters).

## Threaded adapter

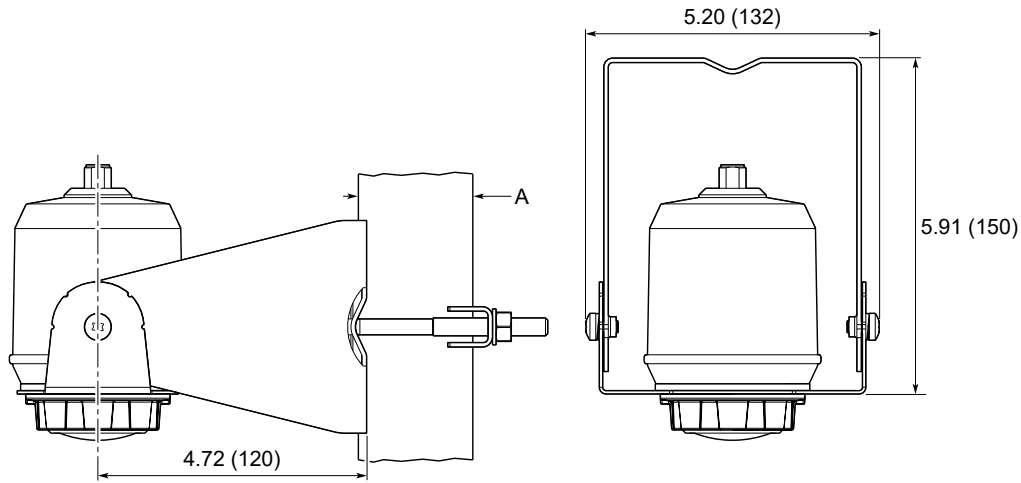
**Figure 12: 2-in. NPT Threaded Adapter**



Dimensions are in inches (millimeters).

## Mounting brackets

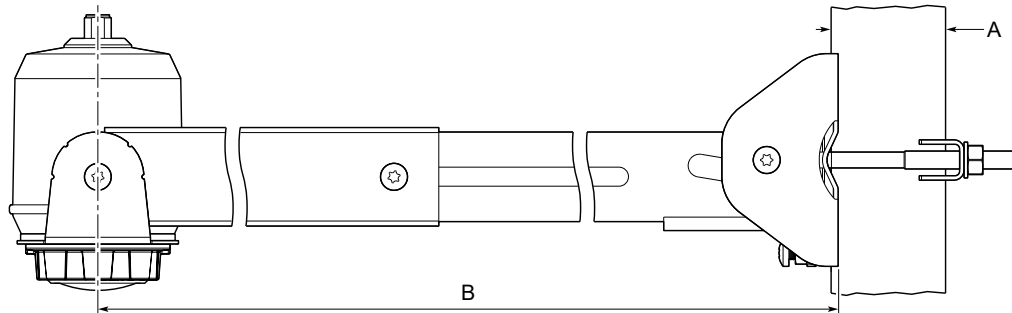
**Figure 13: Standard Version**



A. For 1- to 2-in. nominal pipe sizes; 2-in. pipe is the recommended size

Dimensions are in inches (millimeters).

**Figure 14: Extendable Version**

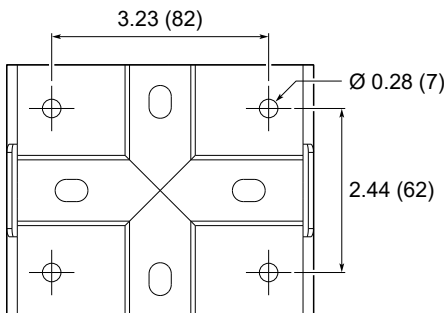


A. For 1- to 2-in. nominal pipe sizes; 2-in. pipe is the recommended size

B. Adjustable length: 17.5 to 28.9 in. (445 to 735 mm)

## Bracket hole pattern

**Figure 15: Hole Pattern for Wall Mounting**



Dimensions are in inches (millimeters).





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

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