

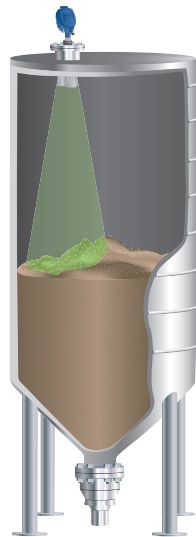
# Rosemount™ 5708 Series

## 3D Solids Scanner

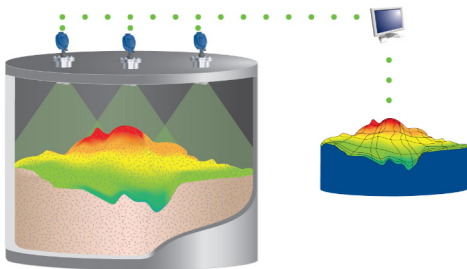


- Make informed decisions about inventory control with unique, dust-penetrating technology for measuring bulk solids and powders accurately
- Take the guesswork out of measuring the level, volume, and mass of materials with 3D visualization of actual distribution of product within the container
- Operate with practically any material stored in a variety of silos, bins, stockpiles, and warehouses
- Avoid maintenance issues with long term, reliable performance and self-cleaning capabilities

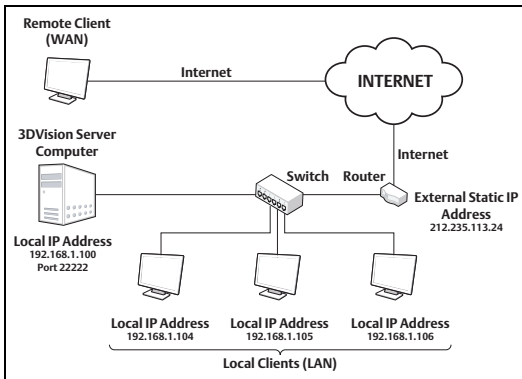
# Overview



Single scanner connection



Multi scanner connection



3DVision computer topology

## Measurement principle

The Rosemount 5708 Series 3D Solids Scanners use a multiple point measurement technology.

The Rosemount 5708L, 5708V, and 5708S deliver accurate volume and level measurement of bulk solids and powders – regardless of material type, product characteristics, storage silo type, size, or harshness of the storage environment.

The device includes an integral array of three antennas that generate unique dust-penetrating low frequency acoustic waves and receive echoes from the contents. Using these antennas, the unit measures not only the time/distance of each echo, but also its direction.

Collecting multiple echoes from different directions and distances enables the scanner to accurately calculate the volume of stored material. It also enables the 3DVision software to generate the 3D visualization of the material.

The acoustic waves combined with self-cleaning capabilities prevent material from adhering to the internal workings of the antenna array, ensuring long-term reliable performance with very low maintenance requirements, regardless of harsh dusty conditions.

## Monitor multiple vessels easily

Monitoring vessels across multiple sites and remote geographic areas is a challenge. You need accurate information that is based on real-time conditions. Rosemount 3DVision/3DMultiVision™ software provides sophisticated analysis of current conditions as well as historical data that allows you to improve your workflows while reducing operating costs.

The software enables multiple accesses and is comprised of two components: a server and a client. The data is stored on the server computer which generates the reports and transfers the information to all connected 3DVision clients.

Authorized users, connected to the same LAN or via external connections (WAN), have access to both real-time and historical data for all scanners connected to the server.

The 3DVision Client is a graphical and interactive program, allowing the user to receive online data from scanners, view a 3-dimensional profile image of the material stored in the vessels, add or remove sites, vessels, and scanners, and manage alerts and reports.

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## Application Examples

The Rosemount 5708 Series 3D Solids Scanners enable efficient process measurement and true inventory management of bulk solid materials used in a broad range of industrial applications.

The devices can measure practically any kind of solid material, stored in a variety of containers, including large open bins, bulk solid storage rooms, stockpiles and warehouses, loads that randomly form over time inside silos, and many other challenging applications that were not possible previously. The scanner can measure ranges of up to 230 ft (70 m).

### Rosemount 5708L

- Highly accurate readings of level
- Provides the average level of the stored contents and average distance from the scanner to the surface of the material

### Rosemount 5708V

- Highly accurate readings of level and volume
- Provides minimum and maximum level/distance measurements
- Appropriate for vessels up to 40 ft (12 m) in diameter

### Rosemount 5708S

- Highly accurate readings of level and volume
- Monitors inventory in large vessels
- Provides minimum and maximum level/distance measurements
- Unlimited vessel diameter when using a system of multiple scanners
- Generates 3D visualization of the stored contents on a remote computer



## Ordering Information



The Rosemount 5708 Series 3D Solids Scanners incorporate best-in-class solutions for previously inaccessible process measurement applications in many manufacturing sectors. Characteristics include:

- Multiple point measurement
- Dust-penetrating, acoustic-based low-frequency technology
- Non-contacting measurement
- Unaffected by material type
- Long measurement range
- Low power consumption
- Remote configuration

### Additional information

Specifications: see [“Functional specifications” on page 9](#)

Certifications: see [“Product Certifications” on page 15](#)

Dimensional drawings: see [“Dimensional Drawings” on page 20](#)

Specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See [page 10](#) for more information on Material Selection.

**Table 1. Rosemount 5708 Series 3D Solids Scanner Ordering Information**

The starred options (★) represent the most common options and should be selected for best delivery. The non-starred offerings are subject to additional delivery lead time.

Model	Product description	
5708	3D Solids Scanner	★
<b>Model type</b>		
LNN	Average level measurement	★
VEN	Volume measurement up to 39.4 ft (12 m) in diameter	★
SEV	Volume measurement with visualization. Multi scanner system capable	★
<b>Housing material</b>		
A	Polyurethane covered aluminum	★
<b>Signal output</b>		
B <sup>(1)</sup>	4-20 mA and RS-485 with Modbus®	★
<b>Conduit/cable threads</b>		
1	½-in. NPT adapter (qty = 2) supplied separately in the box	★
2	M20 x 1.5 thread	★
<b>Hazardous locations certifications</b>		
NA <sup>(2)</sup>	No hazardous locations certifications	★
I1	ATEX intrinsic safety	★
I3	NEPSI intrinsic safety	★
I5	cFMus intrinsic safety	★

**Table 1. Rosemount 5708 Series 3D Solids Scanner Ordering Information**

The starred options (★) represent the most common options and should be selected for best delivery. The non-starred offerings are subject to additional delivery lead time.

I2	INMETRO Intrinsic Safety	
I7	IECEX Intrinsic Safety	
IW	PESO Intrinsic Safety	
<b>Process operating temperature</b>		
S	Standard temperature - 40... +185 °F (- 40... +85 °C)	★
H	High temperature - 40... +356 °F (- 40... +180 °C) (No hazardous locations certifications available.)	
<b>Material of antenna construction</b>		
P	Polyurethane painted aluminum antenna	★
8	PTFE coated aluminum antenna	
H	High temperature painted aluminum antenna	
I <sup>(3)</sup>	High temperature painted aluminum antenna supplied with 12-in. (300 mm) extended cable	
J <sup>(4)</sup>	High temperature painted aluminum antenna for angle adapter supplied with 15.75-in. (400 mm) extended cable	
K <sup>(3)</sup>	High temperature painted aluminum antenna supplied with 20-in. (500 mm) extended cable	
L <sup>(3)</sup>	High temperature painted aluminum antenna supplied with 39-in. (1 m) extended cable	
M <sup>(5)</sup>	High temperature painted aluminum antenna for ESP supplied with 59-in. (1.5 m) extended cable	
O <sup>(3)</sup>	High temperature painted aluminum antenna supplied with 78-in. (2 m) extended cable	
R <sup>(3)</sup>	High temperature painted aluminum antenna supplied with 118-in. (3 m) extended cable	
<b>O-ring material</b>		
B	Nitrile butadiene for standard temperature	★
S	Silicone for high temperature	

### Options (include with selected model number)

<b>Mounting plate/assembly</b>		
<b>Mounting plate</b>		
4AA	4-in. (100 mm) - Matches ANSI 4", Class 150 connection; painted carbon steel	
4AX	High temperature, 4-in. (100 mm) - Matches ANSI 4", Class 150 connection; painted carbon steel	
6AA	6-in. (150 mm) - Matches ANSI 6", Class 150 connection; painted carbon steel	
6AX	High temperature, 6-in. (150 mm) - Matches ANSI 6", Class 150 connection; painted carbon steel	
8AA	8-in. (200 mm) - Matches ANSI 8", Class 150 connection; painted carbon steel	
8AX	High temperature, 8-in. (200 mm) - Matches ANSI 8", Class 150 connection; painted carbon steel	
TAA	10-in. (250 mm) - Matches ANSI 10", Class 150 connection; painted carbon steel	
TAX	High temperature, 10-in. (250 mm) - Matches ANSI 10", Class 150 connection; painted carbon steel	
4DA	100 - Matches DN 100, PN 16 connection; painted carbon steel	
4DX	High temperature, 100 - Matches DN 100, PN 16 connection; painted carbon steel	
6DA	150 - Matches DN 150, PN 16 connection; painted carbon steel	

**Table 1. Rosemount 5708 Series 3D Solids Scanner Ordering Information**

The starred options (★) represent the most common options and should be selected for best delivery. The non-starred offerings are subject to additional delivery lead time.

6DX	High temperature, 150 - Matches DN 150, PN 16 connection; painted carbon steel	
8DA	200 - Matches DN 200, PN 16 connection; painted carbon steel	
8DX	High temperature, 200 - Matches DN 200, PN 16 connection; painted carbon steel	
TDA	250 - Matches DN 250, PN 16 connection; painted carbon steel	
TDX	High temperature, 250 - Matches DN 250, PN 16 connection; painted carbon steel	
<b>Mounting assembly (see page 26-27)</b>		
A00	0° Steel powder coated mounting assembly (supplied with mounting plate)	
A05	5° Steel powder coated mounting assembly (supplied with mounting plate)	
A10	10° Steel powder coated mounting assembly (supplied with mounting plate)	
A15	15° Steel powder coated mounting assembly (supplied with mounting plate)	
A20	20° Steel powder coated mounting assembly (supplied with mounting plate)	
A30	30° Steel powder coated mounting assembly (supplied with mounting plate)	
B00	High temperature 0° steel powder coated mounting assembly (supplied with mounting plate)	
B05	High temperature 5° steel powder coated mounting assembly (supplied with mounting plate)	
B10	High temperature 10° steel powder coated mounting assembly (supplied with mounting plate)	
B15	High temperature 15° steel powder coated mounting assembly (supplied with mounting plate)	
B20	High temperature 20° steel powder coated mounting assembly (supplied with mounting plate)	
B30	High temperature 30° steel powder coated mounting assembly (supplied with mounting plate)	
<b>Extended product warranty</b>		
WR5 <sup>(6)</sup>	5-year limited warranty	
<b>Example model string: 5708-SEV-A-B-2-I1-S-P-B means 3D scanner for volume measurement with visualization, ATEX intrinsic safety, with standard operation temperature antenna and O-ring.</b>		

1. The scanner supports communication with the Modbus RTU and provides the holding registers only. It is not used for configuration.
2. Use when ordering high temperature antenna or for non-hazardous locations.
3. Order mechanical parts separately (see Table 2).
4. Angle adapter must be selected separately (see Table 2).
5. ESP hopper mounting bracket must be selected separately (see Table 2).
6. Check with your local Emerson™ Process Management office for a 2-year extended warranty when prepaid startup is ordered with the Rosemount 5708.

## Accessories

**Table 2. Accessories Ordering Information**

The starred options (★) represent the most common options and should be selected for best delivery. The non-starred offerings are subject to additional delivery lead time.

<b>System controller and 3DLinkPro (see page 12)</b>		
05708-4000-0001	3D Solids System Controller	★
05708-5000-0001	3D Solids Scanner LinkPro	★
<b>Model type upgrade</b>		
05708-8001-0004	Upgrade 5708LNN to 5708VEN	
05708-8001-0006	Upgrade 5708LNN to 5708SEV	
05708-8001-0011	Upgrade 5708VEN to 5708SEV	
<b>3DMultiVision Software upgrade</b>		
05708-8001-0027	Rosemount 3DMultiVision software upgrade with unlimited clients and vessels	
<b>Head mounting extenders/adapters</b>		
<b>Neck extension (see page 21)</b>		
05708-8005-0001	12-in. (300 mm) neck extension with extender cable for standard temperature	
05708-8005-0002	20-in. (500 mm) neck extension with extender cable for standard temperature	
05708-8005-0010	39-in. (1 m) neck extension with extender cable for standard temperature	
05708-8005-0020	78-in. (2 m) neck extension with extender cable for standard temperature	
05708-8005-0030	118-in. (3 m) neck extension with extender cable for standard temperature	
05708-3012-0003 <sup>(1)</sup>	12-in. (300 mm) neck extension for high temperature	
05708-3012-0005 <sup>(1)</sup>	20-in. (500 mm) neck extension for high temperature	
05708-3012-0010 <sup>(1)</sup>	39-in. (1 m) neck extension for high temperature	
05708-3012-0020 <sup>(1)</sup>	78-in. (2 m) neck extension for high temperature	
05708-3012-0030 <sup>(1)</sup>	118-in. (3 m) neck extension for high temperature	
<b>Angle adapter (see page 22)</b>		
05708-8006-0001	10 degrees angle adapter with extender cable for standard temperature	
05708-8006-0002	20 degrees angle adapter with extender cable for standard temperature	
05708-3010-0010 <sup>(1)</sup>	10 degrees angle adapter for high temperature	
05708-3010-0020 <sup>(1)</sup>	20 degrees angle adapter for high temperature	
<b>Antenna cable extension (see page 23)</b>		
05708-3006-0003	12-in. (300 mm) antenna cable extender (for standard temperature only)	
05708-3006-0005	20-in. (500 mm) antenna cable extender (for standard temperature only)	
05708-3006-0010	39-in. (1 m) antenna cable extender (for standard temperature only)	
05708-3006-0020	78-in. (2 m) antenna cable extender (for standard temperature only)	
05708-3006-0030	118-in. (3 m) antenna cable extender (for standard temperature only)	

**Table 2. Accessories Ordering Information**

The starred options (★) represent the most common options and should be selected for best delivery. The non-starred offerings are subject to additional delivery lead time.

<b>ESP hopper mounting bracket (see <a href="#">page 24</a>)</b>	
05708-3014-0001 <sup>(1)</sup>	ESP hopper mounting bracket

1. Specify high temperature antenna cable length as part of the model code.



# Specifications

## Performance specifications

### Reference conditions

Temperature 77 °F ±9 °F (25 °C ±5 °C)  
 Relative humidity 25 - 75%

### Reference accuracy<sup>(1)</sup>

Distance ± 0.6 in. (15 mm) at reference conditions  
 Directional ± 2 degrees

### Temperature gradient

0.5% per 10.8 °F (6 °C) gradient

### Radio approvals

FCC 47 CFR part 15:2007, sub-part B, class A<sup>(2)(3)</sup>

## Functional specifications

### General

#### Field of application

Bulk solids

#### Measurement principle

Low frequency acoustic waves

#### Dead band

19.6 in. (0.5 m) from top of antenna assembly

#### Measurement range

Up to 230 ft. (70 m)

#### Minimum bulk density

12.5 lb/ft<sup>3</sup> (200 kg/m<sup>3</sup>)

#### Process fitting

Thread, angle adapter

#### Emitting frequency

2.3 kHz to 7 kHz

#### Power supply - 4-wire instrument (active) 4 - 20 mA

#### Supply voltage

18 - 32 Vdc

#### Power consumption

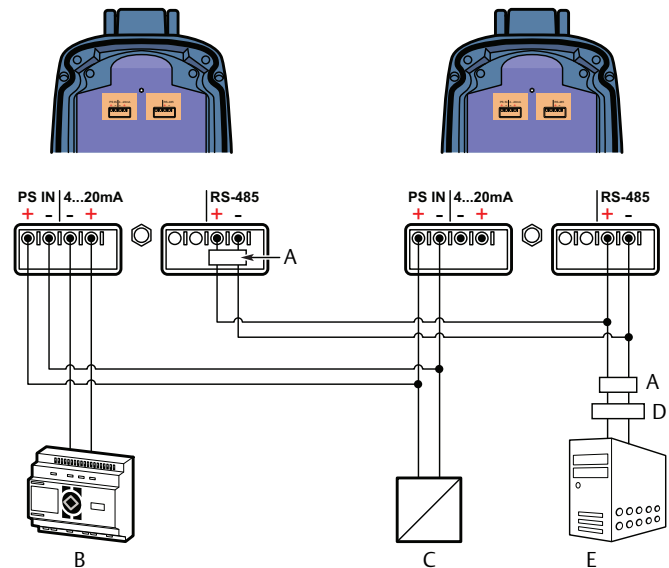
Max. 1.5 W @ 24 Vdc

## Output

### Output signal

4-20 mA<sup>(4)</sup> and Modbus<sup>(5)</sup>

Figure 1. Connection Example



- A. 120 Ω resistor
- B. PLC / DCS / Display
- C. 24 Vdc power supply
- D. RS-485 to USB converter
- E. 3D Vision Server

### Current resolution

10 μA

### Current limitation

22 mA

### Maximum load (Active output)

400 Ω

### Communication

#### Physical

RS-485

#### Protocol

Modbus<sup>(5)</sup>

1. Volume accuracy is dependent upon the position of devices in relation to the product surface. It can be estimated for every installation based upon mounting position, height, and width.
2. The device may not cause harmful interference.
3. The device must accept any interference received, including interference that may cause undesired operation.

4. 4-20 mA is a 2-wire connection, non-loop powered, and connected to an active device.
5. The scanner supports communication with the Modbus RTU and provides the holding registers only.

## Process pressure and temperature

### Vessel pressure

-0.29... 43.5 PSI (-20 mBar... 3 Bar)

### Process temperature measured on the process fitting

- Standard temperature: -40... +185 F° (-40... +85 °C)
- High temperature: -40... +356 °F (-40... +180 °C)

### Ambient, storage, and transport temperature

-40... +185 °F (-40... +85 °C)

### Ingress protection

IP66, IP67 according to IEC 60529

### Beam angle

Between 15 to 70 degrees

### Display and configuration

#### Output units

- Level and distance: feet (ft), meters (m)
- Volume: cubic meters (m<sup>3</sup>), cubic feet (ft<sup>3</sup>), liters, gallons, bushels
- Mass: tons (US short), tons (metric), pounds (lb)
- Bulk density: ton/m<sup>3</sup>, lbs/ft<sup>3</sup>
- Temperature: Fahrenheit (°F), Celsius (°C)

#### Output variables

	5708L	5708V	5708S
Level/distance	✓	✓	✓
Minimum and maximum level/distance	N/A	✓	✓
Volume	N/A	✓	✓
Mass	N/A	✓	✓
SNR	✓	✓	✓
Temperature at antenna	✓	✓	✓

#### Configuration tools

- LCD display with four-button keypad<sup>(1)</sup>
- Rosemount 3DVision software (for single site/vessel)
- Rosemount 3DMultiVision software (for multiple sites/vessels)

## Smart Wireless THUM™ Adapter<sup>(2)</sup>

The THUM Adapter can be connected to the 3D Solids Scanner by mounting it remotely using a remote mount kit.



See the [Rosemount Smart Wireless THUM adapter Product Data Sheet](#) (document number 00813-0100-4075) and [Smart Wireless THUM Adapter for Rosemount Process Level Transmitter Applications](#) (document number 00840-0100-4026).

## Physical specifications

### Material 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 Process Management is not in a position to evaluate or guarantee the compatibility of the process material or other process parameters with the product, options, configuration or materials of construction selected.

### Housing and enclosure

#### Housing

Painted aluminum die casting

#### Antenna

Painted aluminum die casting (optional PTFE coating available)

#### Display window in housing

Polycarbonate/PC-ABS

#### Electrical connection

M20 for cable glands or conduit entries

Recommended output cabling is low resistance, twisted shielded pairs, 20-24 AWG

#### Cable entry/plug

1 x M20x1.5 (cable Ø 8 mm to 13 mm)

1 x plug M20x1.5

2 x optional thread adapters M20, ½-in. NPT

1. The Rosemount 5708L can be completely configured via the LCD display. For the Rosemount 5708V and 5708S, the Rosemount 3DVision/3DMultiVision software is required.

2. The Rosemount 5708 with the THUM Adapter enables wireless access to the following parameters: 4-20mA current, Distance, Percentage, Temperature and SNR. Diagnostics and configuration are available through wired connection.

**Process fitting**

Requires mounting plate

**Weight**

12.35 lb (5.6 kg)

**Vessel connection**

Mounting plate<sup>(1)</sup>

**Minimum distance from filling points**

24 in. (600 mm)

**Minimum distance from side wall**

24 in. (600 mm)

**Mounting plate dimensions**

According to DIN PN16 or ANSI Class 150 size and holes pattern

**Display panel****LCD display**

4 lines x 20 characters

**Adjustment elements**

4 keys (ESC, +, -, E)

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1. Mounting plates are available to accommodate 4 to 10 in. (100 to 250 mm) openings. For openings smaller than 8 in. (200 mm), there are antenna extensions available to allow the antenna to be installed from the inside of the vessel below the nozzle.

# Specifications - Accessories

## 3D Solids System Controller

### General

#### Construction

Aluminum chassis with fanless design

#### Power requirements

ATX power mode

DC to DC power design on-board, support from 9 ~ 36 Vdc

Optional 19 V, 65 W power adapter

#### Data storage

1 x 2.5" SATA HDD drive bay

1x external CF socket

### Physical specifications

#### Dimensions (H x W x D)

19.7 x 11.8 x 5.9 in. (500 x 300 x 150 mm)



Front view

Back view

### Weight

26.9 lbs (12.2 kg)

### Operating temperature

#### Ambient with air flow

23 to 122 °F (-5 to 50 °C) indoor installation

#### Storage temperature

-4 to 176 °F (-20 to 80 °C)

#### Relative humidity

10% to 93% (non-condensing)

### Power supply

#### Voltage

20-28 Vdc

#### Power consumption

65 W

### I/O Interface

#### Front

2 x USB2.0 ports

#### Rear

9 ~ 36 Vdc input

1 x DB15 VGA port

1 x speaker out

2 x USB2.0 ports

2 x RS-485 with auto-flow control: isolation protection on COM1 and COM2

### Note

When the Rosemount 5708 Series 3D Solids Scanner is connected to the 3D Solids System Controller, the connection is active, not passive. Therefore, the device is the active module and the controller should be the passive module.

## 3D Solids Scanner LinkPro

### Physical specifications

#### Housing enclosure

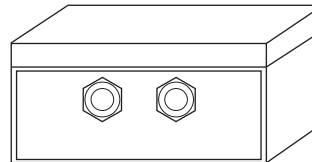
Polystyrene

#### Weight

3.13 lb (1.42 kg)

#### Dimensions (L x W x H)

10 x 7 x 3.5 in. (255 x 180 x 90 mm) - not including cable glands



### Protection

IP66

### Voltage supply

#### Operating voltage

10 Vdc to 30 Vdc (nominal 24 Vdc)

#### Average power consumption (idle mode)

1.5 W

#### Peak power consumption (transmit mode)

18 W

#### Power source limitation

2 A

### Ambient temperature

-22 to +158 °F (-30 to +70 °C)

**CE Conformity**

**EMC**

Emission EN 301 489-7 V1.3.1:2005 standard harmonized under R&TTE Directive 1995/5/EC and EMC Directive 2004/108/EC Article 6(2)

**Safety**

EN 60950-1:06; EN 60950-22:06

**Radio emissions**

EN 301 511 V9.0.2

**FCC Approval**

FCC 47 CFR part:15:2007, subpart B, class A

**Cable entry/plug**

2 x cable gland M20x1.5 (cable Ø 8 mm to 13 mm)

# Installation Requirements

## 3DVision Server

Processor	Intel™ Dual Core and above
RAM	At least 1 GB
Hard disk	At least 1 GB free space per year (2.8 MB per day for log files)
Graphic card resolution	Minimum 1024 x 768
Interfaces	Ethernet NIC card, serial port, USB port
Operating systems	Microsoft® Windows™ XP (SP2) or Windows 7

## 3DVision Client

Processor	Intel Dual Core and above
RAM	At least 1 GB
Hard disk	At least 1 GB free space on HD
Graphic card resolution	Minimum 1280 x 1024
Graphic card memory	1 GB
Interfaces	Ethernet NIC card, CD-ROM drive or USB port
Operating systems	Windows XP (SP2) or Windows 7
Framework	Microsoft .NET framework 4.0

# Product Certifications

## European Directive Information

A copy of the EC Declaration of Conformity can be found at the end of the Rosemount 5708 Series Quick Start Guide (document number 00825-0100-4570).

The most recent revision of the EC Declaration of Conformity can be found at [EmersonProcess.com/Rosemount](http://EmersonProcess.com/Rosemount).

## Ordinary Location Certification

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

## North America

### 15 US and Canada Intrinsic Safety (IS)

Certificate: 3052166

Standards: FM Class 3600 – 2011, FM Class 3610 – 2010, FM Class 3810 – 2005, ANSI/IEC 60529 – 2004, CSA Std. C22.2. No. 25-09, CSA Std. C22.2. No.157-92, CSA Std. C22.2 No. 1010 – 04, CAN/CSA E61241-1-1 - 2010

Markings: IS CL I, II DIV 1, GPC, D, E, F, G when connected per Rosemount drawing 05708-1900; T4 (-40 °C ≤ T<sub>a</sub> ≤ +85 °C); IP 6X

For electronic modules with serial number 836xxxxxxx:

Supplies - Terminals J5.1 (+), J5.2 (GND)

V<sub>max</sub> (U<sub>i</sub>) = 30 V, I<sub>max</sub> (I<sub>i</sub>) = 212 mA, P<sub>max</sub> (P<sub>i</sub>) = 1.2 W, C<sub>i</sub> = 8 nF, L<sub>i</sub> = 0

Interfaces - Terminals J5.4 (4 - 20 mA signal), J5.3 (GND common with J5.2):

V<sub>max</sub> (U<sub>i</sub>) = 10.5 V, I<sub>max</sub> (I<sub>i</sub>) = 106 mA, P<sub>max</sub> (P<sub>i</sub>) = 1.1 W, C<sub>i</sub> = 8 nF, L<sub>i</sub> = 0

RS-485 - Terminals J6.3 (P), J6.4 (N):

V<sub>max</sub> (U<sub>i</sub>) = 6.51 V, I<sub>max</sub> (I<sub>i</sub>) = 651 mA, P<sub>max</sub> (P<sub>i</sub>) = 1.06 W, C<sub>i</sub> = 0, L<sub>i</sub> = 0

Approval valid for HART® and Modbus options.

### Special Conditions for Safe Use (X):



1. The 3D Solids Scanner is only for use with electronics unit marked with serial number 836xxxxxxx, as these units are for use with the 3D Solids ambient temperature range.
2. Part of the enclosure is constructed of plastic. To prevent the risk of electrostatic sparking, the plastic surface should be cleaned with a damp cloth.

## Europe

### 11 ATEX Intrinsic Safety

Certificate: BVS14ATEXE060X

Standards: EN60079-0:2012, EN60079-11:2012

Markings:  II 2 G Ex ib [ia] IIB T4 Gb (-40°C ≤ T<sub>a</sub> ≤ +85°C)  
 II 1/2 D Ex ib [ia] IIIC T110°C Da/Db (-40°C ≤ T<sub>a</sub> ≤ +85°C)

See "Safety Instructions - BVS 14 ATEX E 060 X" on page 18.

**Table 3. Interface Parameters**

Parameter	4-20 mA	RS-485
Voltage U <sub>i</sub> / U <sub>o</sub>	10.5 V	6.51 V
Current I <sub>i</sub> / I <sub>o</sub>	106 mA	2 x 651 mA
Power P <sub>i</sub> / P <sub>o</sub>	1.1 W	2 x 1.06 W
Capacitance C <sub>i</sub>	8 nF	0 nF
Inductance L <sub>i</sub>	~0 mH	0 mH
Capacitance C <sub>o</sub>	16 μF	2 x 285 μF
Inductance L <sub>o</sub>	80 μH	83.9 μH
L <sub>o</sub> / R <sub>o</sub>	17.77 μH/Ω	67.12 μH/Ω
Characteristics	Trapezoid	Linear
Terminals	J5.3 (4-20 mA), J5.4 (GND)	J6.3 (+), J6.4 (RTN)

**Table 4. Supply Circuit Parameters**

Parameter	Input	Output
Voltage U <sub>i</sub> / U <sub>o</sub>	24 V	24 V
Current I <sub>i</sub>	Same values as the interconnected IS power supply	Same values as the interconnected IS power supply
Power P <sub>i</sub> / P <sub>o</sub>	3 W	3 W
Capacitance C <sub>i</sub> / C <sub>o</sub>	8 nF	Same values of the interconnected IS power supply reduced by C <sub>i</sub>
Inductance L <sub>i</sub> /L <sub>o</sub>	~0 mH	Same values of the interconnected IS power supply reduced by L <sub>i</sub>
L <sub>o</sub> / R <sub>o</sub> ratio	N/A	Same values of the interconnected IS power supply reduced by L <sub>i</sub>
Characteristics	N/A	Same values as the interconnected IS power supply
Terminals	J5.1 (+), J5.2 (GND)	N/A

**Special Condition for Safe Use (X):**

- Dust application:  
The installation of the 3D Solids Scanner or of the Antenna Unit of models providing head separation in the wall to areas requiring EPL Da (apparatus category 1D) equipment shall provide a degree of protection IP6X according to EN60529 and shall be carried out in such a way, that all metallic parts are integrated in the local equipotential bonding.  
Manufacturer's technical information related to use of the 3D Solids Scanner in contact with aggressive/corrosive media and to avoid any risk of mechanical impact shall be observed.

## International

- IECEx Intrinsic Safety  
Certificate: IECEx BVS 15.0042X  
Standards: IEC 60079-0: 2011, IEC 60079-11: 2011  
Markings: Ex ib [ia] IIB T4 Gb (-40 °C ≤ T<sub>a</sub> ≤ +85 °C)  
Ex ib [ia] IIIC T110°C Da/Db  
(-40 °C ≤ T<sub>a</sub> ≤ +85 °C)

**Table 5. Interface Parameters**

Parameter	4-20 mA	RS-485
Voltage U <sub>i</sub> / U <sub>o</sub>	10.5 V	6.51 V
Current I <sub>i</sub> / I <sub>o</sub>	106 mA	2 x 651 mA
Power P <sub>i</sub> / P <sub>o</sub>	1.1 W	2 x 1.06 W
Capacitance C <sub>i</sub>	8 nF	0 nF
Inductance L <sub>i</sub>	~0 mH	0 mH
Capacitance C <sub>o</sub>	16 μF	2 x 285 μF
Inductance L <sub>o</sub>	80 μH	83.9 μH
L <sub>o</sub> / R <sub>o</sub>	17.77 μH/Ω	67.12 μH/Ω
Characteristics	Trapezoid	Linear
Terminals	J5.3 (4-20 mA), J5.4 (GND)	J6.3 (+), J6.4 (RTN)

**Table 6. Supply Circuit Parameters**

Parameter	Input	Output
Voltage U <sub>i</sub> / U <sub>o</sub>	26.6 V	26.6 V
Current I <sub>i</sub>	Same values as the interconnected IS power supply	Same values as the interconnected IS power supply
Power P <sub>i</sub> / P <sub>o</sub>	3 W	3 W
Capacitance C <sub>i</sub> / C <sub>o</sub>	8 nF	Same values of the interconnected IS power supply reduced by C <sub>i</sub>
Inductance L <sub>i</sub> / L <sub>o</sub>	~0 mH	Same values of the interconnected IS power supply reduced by L <sub>i</sub>
L <sub>o</sub> / R <sub>o</sub> ratio	N/A	Same values of the interconnected IS power supply reduced by L <sub>i</sub>
Characteristics	N/A	Same values as the interconnected IS power supply
Terminals	J5.1 (+), J5.2 (GND)	N/A

**Special Condition for Safe Use (X):**

- Dust application:  
The installation of the 3D-Solids Scanner or of the Antenna Unit of models providing head separation in the wall to areas requiring EPL Da equipment shall provide a degree of protection IP6X according to IEC 60529 and shall be carried out in such a way, that all metallic parts are integrated in the local equipotential bonding.  
Manufacturer's technical information related to use of the 3D Solids Scanner in contact with aggressive / corrosive media and to avoid any risk of mechanical impact shall be observed.



## Brazil

- I2** INMETRO Intrinsic Safety  
 Certificate: UL-BR 15.0072X  
 Standards: ABNT NBR IEC 60079-0:2008 + Errata 1:2011,  
 ABNT NBR IEC 60079-11:2009  
 Markings: Ex ib [ia] IIB T4 Gb (- 40 °C ≤ Ta ≤ + 85 °C)  
 Ex ib [ia] IIIC T110°C Da/Db  
 (- 40 °C ≤ Ta ≤ + 85 °C)

**Table 7. Interface Parameters**

Parameter	4-20 mA	RS-485
Voltage $U_i / U_o$	10.5 V	6.51 V
Current $I_i / I_o$	106 mA	2 x 651 mA
Power $P_i / P_o$	1.1 W	2 x 1.06 W
Capacitance $C_i$	8 nF	0 nF
Inductance $L_i$	~0 mH	0 mH
Capacitance $C_o$	16 μF	2 x 285 μF
Inductance $L_o$	80 μH	83.9 μH
$L_o / R_o$	17.77 μH/Ω	67.12 μH/Ω
Characteristics	Trapezoid	Linear
Terminals	J5.3 (4-20 mA), J5.4 (GND)	J6.3 (+), J6.4 (RTN)

**Table 8. Supply Circuit Parameters**

Parameter	Input	Output
Voltage $U_i / U_o$	24 V	24 V
Current $I_i$	Same values as the interconnected IS power supply	Same values as the interconnected IS power supply
Power $P_i / P_o$	3 W	3 W
Capacitance $C_i / C_o$	8 nF	Same values of the interconnected IS power supply reduced by $C_i$
Inductance $L_i / L_o$	~0 mH	Same values of the interconnected IS power supply reduced by $L_i$
$L_o / R_o$ ratio	N/A	Same values of the interconnected IS power supply reduced by $L_i$
Characteristics	N/A	Same values as the interconnected IS power supply
Terminals	J5.1 (+), J5.2 (GND)	N/A

### Special Conditions for Safe Use (X):

- The installation of the 3D Solids Scanner or of the Antenna Unit of models providing head separation in the wall to areas requiring EPL Da (Zone 20) equipment shall provide a degree of protection IP6X according to ABNT NBR IEC 60529 and shall be carried out in such a way, that all metallic parts are integrated in the local equipotential bonding.
- Manufacturer's technical information related to use of the 3D Solids Scanner in contact with aggressive / corrosive media and to avoid any risk of mechanical impact shall be observed.

## China

- I3** China Intrinsic Safety  
 Certificate: GYJ14.1362X  
 Standards: GB3836.1-2010, GB3836.4-2010,  
 IEC61241-0 - 2004, GB12476.4-2010  
 Markings: Ex ib/ia IIB Gb T4  
 Ex ibD/iaD 21/20 T110°C

### Special Condition for Safe Use (X):

- The installation of the product shall provide a degree of protection IP6X according to GB4208-2008, and in such a way that all metallic parts are integrated in the local equipotential bonding.

## India

- IW** PESO Intrinsic Safety  
 Certificate: P351811/1  
 Standards: IEC 60079-0: 2012, IEC 60079-11: 2012  
 Markings: Ex ib [ia] IIB t4 Gb

## Safety Instructions - BVS 14 ATEX E 060 X

### Area of applicability

These safety instructions apply to the Rosemount 5708 Series 3D Solids Scanners according to the EC type approval BVS 14 ATEX E 060 X (certification number on the type label).

If the Rosemount 5708 Series 3D Solids Scanners are installed and operated in hazardous areas, the general Ex mounting instructions and these safety instructions must be observed.

These safety instructions are part of the Rosemount 5708 Series Reference Manual (document number 00809-0100-4570).

### General information

The volume measuring instrument 3D Solids Scanner is based on acoustic technology and is used to measure the volume of product using low frequency, acoustic waves in the 3-10 kHz range. The electronics uses the running time of the signals reflected by the product surface to calculate the volume of the product.

The Rosemount 5708 Series Solids Scanner is suitable for use in hazardous atmospheres for applications requiring instruments of category 2G or 1/2D. If the 3D Solids Scanners are installed and operated in hazardous areas, the general Ex mounting instructions and these safety instructions must be observed.

If the 3D Solids Scanners are installed and operated in hazardous areas, the general Ex installation regulations EN 60079-14 as well as these safety instructions must be observed.

The operating instructions as well as the valid Ex mounting regulations and standards for electrical equipment must be observed.

The installation of explosion-endangered systems and explosion-protected systems must always be carried out by qualified personnel.

### Technical data

#### Intrinsically safe supplied models

In ignition protection type intrinsic safety Ex ia IIB Only for connection to a certified intrinsically safe circuit. Maximum values:

- a. Power supply:  
Supplies - Terminals J5.1 (+), J5.2 (GND):  
 $V_{\max}(U_i) = 30 \text{ V}$ ,  $I_{\max}(I_i) = 212 \text{ mA}$ ,  $P_{\max}(P_i) = 1.2 \text{ W}$ ,  
 $C_i = 8 \text{ nF}$ ,  $L_i = 0$

#### Do not use J13.1, J13.2 or Do not use J6.1, J6.2 (24 Vdc output voltage)

- b. 4-20 mA/HART Communication circuit (ports 3, 4 - 2 right ports in the left green connector on the back side of the electronic card)  
 $U_i = 10.5 \text{ Vdc}$ ;  $I_i = 106 \text{ mA}$ ;  $P_i = 1.1 \text{ W}$ ;
- c. RS-485 / Modbus RTU Communication circuit (ports 3, 4 - 2 right ports in the right green connector on the back side of the electronic card)  
 $U_i = 5 \text{ Vdc}$ ;  $I_i = 0.5 \text{ A}$ ;  $P_i = 625 \text{ mW}$ ;
- d. Sonic radiation  
Radiated power (average power density)  $\leq 0.1 \text{ W/cm}^2$   
Pulse radiation  $\leq 2 \text{ mJ/cm}^2$   
Frequency range:  $3.5 \text{ kHz} \leq f \leq 10 \text{ kHz}$

### Application conditions

Ambient temperature range:  $-40 \text{ }^\circ\text{C} \leq T_a \leq +85 \text{ }^\circ\text{C}$

The pressure range must be  $-20 \text{ mBar} \leq P_i \leq 3 \text{ Bar}$   
( $-0.29 \text{ PSI} \leq P_i \leq 43.5 \text{ PSI}$ )

### Opening the housing

The electronics compartment may be opened for configuration via the key pads. If the instrument is operated with opened cover, or its keys pressed, make sure that no hazardous atmosphere exists.

The cover has to be screwed tightly after connection and adjustment.

### Impact and friction sparks

The 3D Solids Scanner must be mounted in such a way that sparks from impact and friction between the aluminum body and other material will not occur.

### Grounding

The 3D Solids Scanner has to be grounded electrostatically e.g. via the ground terminal both internally using the power cable ground and externally using the plant's earth potential equalization.

### Cable entries

A tight and tension-free cable entry must be provided. The outer diameter of the connection cable must be adapted to the cable gland. The gland pressure screw has to be tightened carefully.

Unused openings for cable entries have to be sealed tightly.

The cable wires must be at least 22 AWG and cable O.D. 8-13 mm.

**Selection of cables and wires**

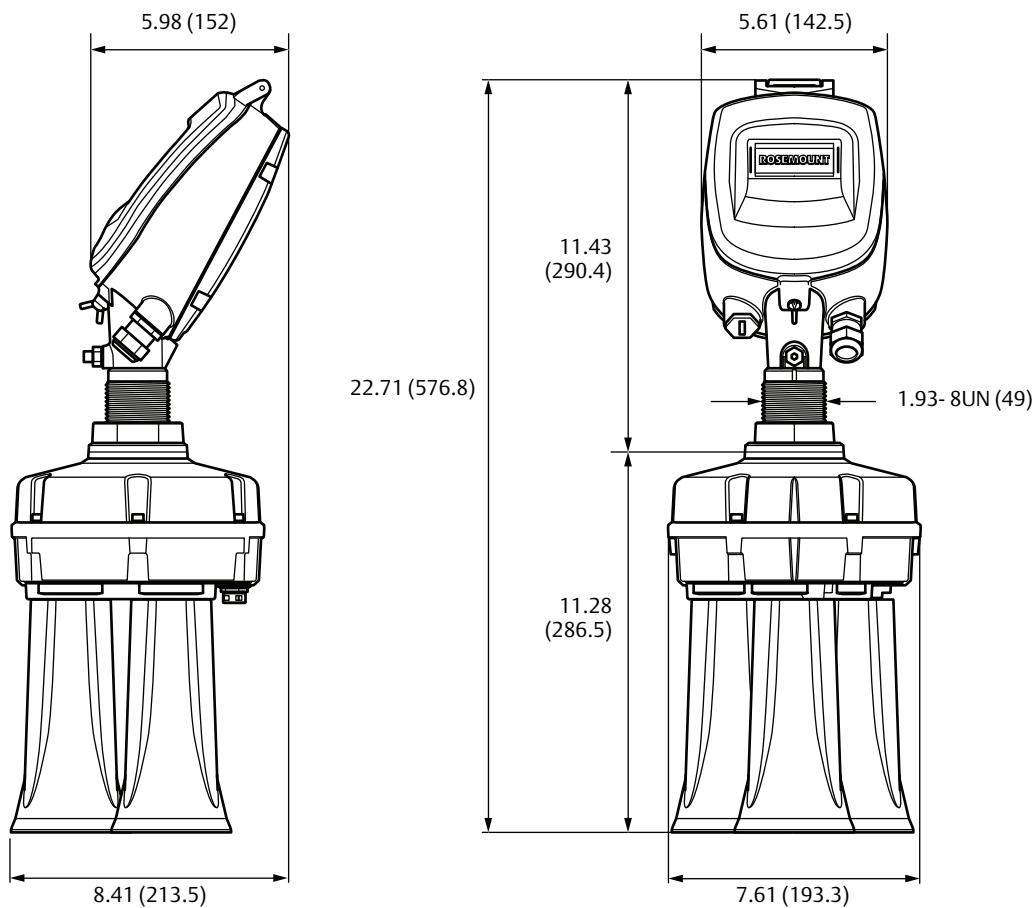
Make sure that the cables and wires used meet the operating temperature requirements and are suitable for these temperatures.

**Special considerations**

- The instrument must be installed and operated in a way that ensures there is no danger of ignition from electrostatic charge.  
Presence of gas, dust and air as a hybrid mixture is not within the scope of the ATEX certificate.
- The seal between lower part of the housing and cover must be correctly in place and in faultless condition. The cover must be tightened carefully.
- Unused openings for cable entries have to be sealed tightly.
- Mount the 3D Solids Scanner in a way that adequately ensures that the scanner will not touch the vessel wall due to the movements of other vessel installations and flow conditions in the vessel.

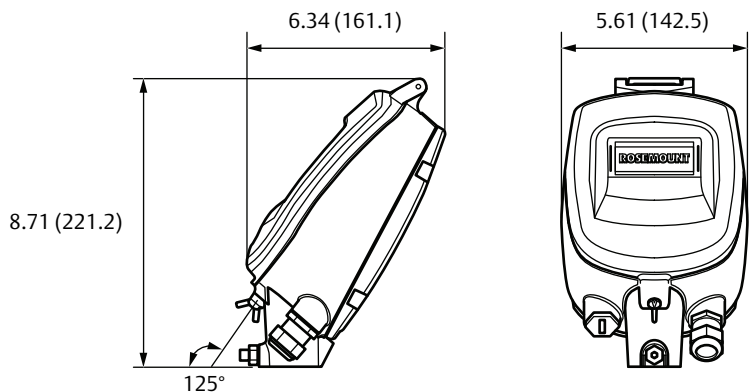
# Dimensional Drawings

**Figure 2. 3D Solids Scanner with Antenna Assembly**



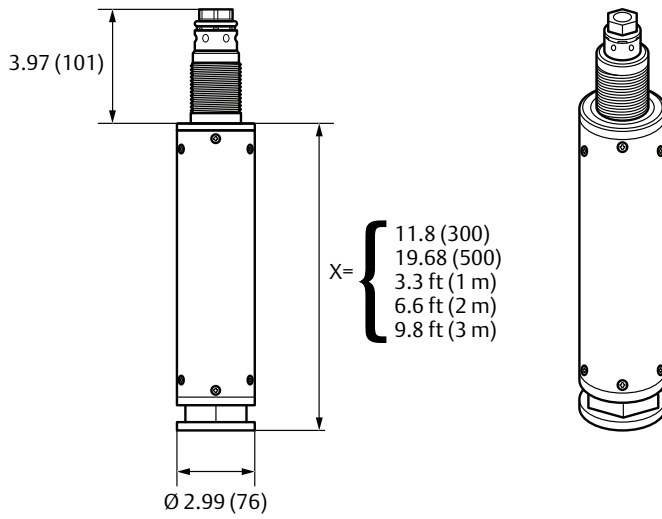
Dimensions are in inches (millimeters).

**Figure 3. 3D Solids Scanner Housing**



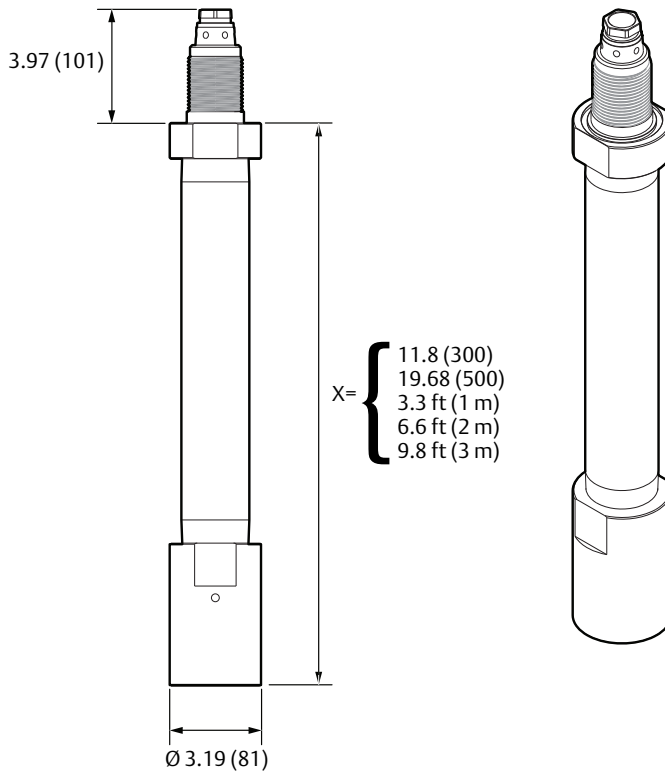
Dimensions are in inches (millimeters).

**Figure 4. Accessories - Neck Extension for Standard Temperature (Process Operating Temperature Code S)**



Dimensions are in inches (millimeters).

**Figure 5. Accessories - Neck Extension for High Temperature (Process Operating Temperature Code H)**

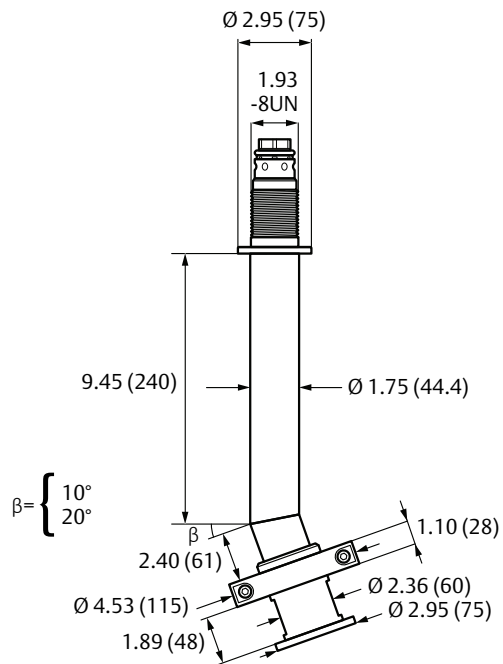


Dimensions are in inches (millimeters).

**Note**

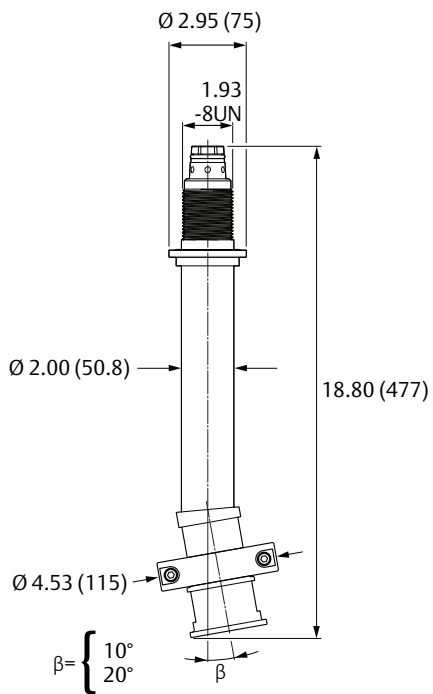
X represents the available options.

Figure 6. Accessories - Angle Adapter for Standard Temperature (Process Operating Temperature Code S)



Dimensions are in inches (millimeters).

Figure 7. Accessories - Angle Adapter for High Temperature (Process Operating Temperature Code H)



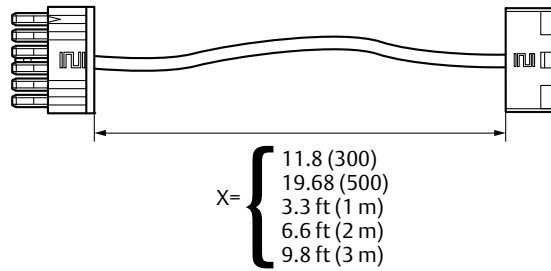
Dimensions are in inches (millimeters).

**Note**

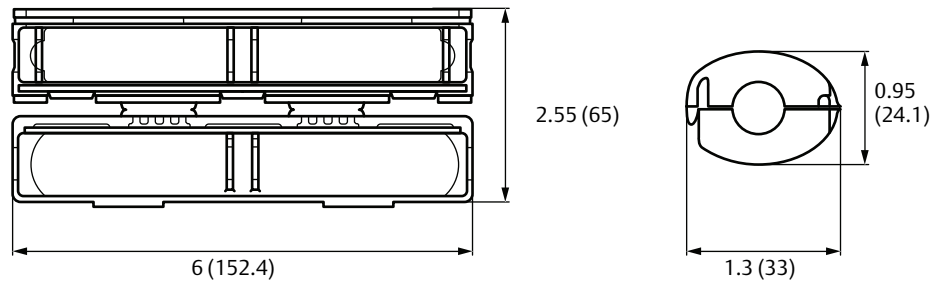
The minimum required opening for the angle adapter is 7.61 in. (193.3 mm).

**Figure 8. Accessories - Cable Extension**

**Cable extension**



**Cable extension connector**



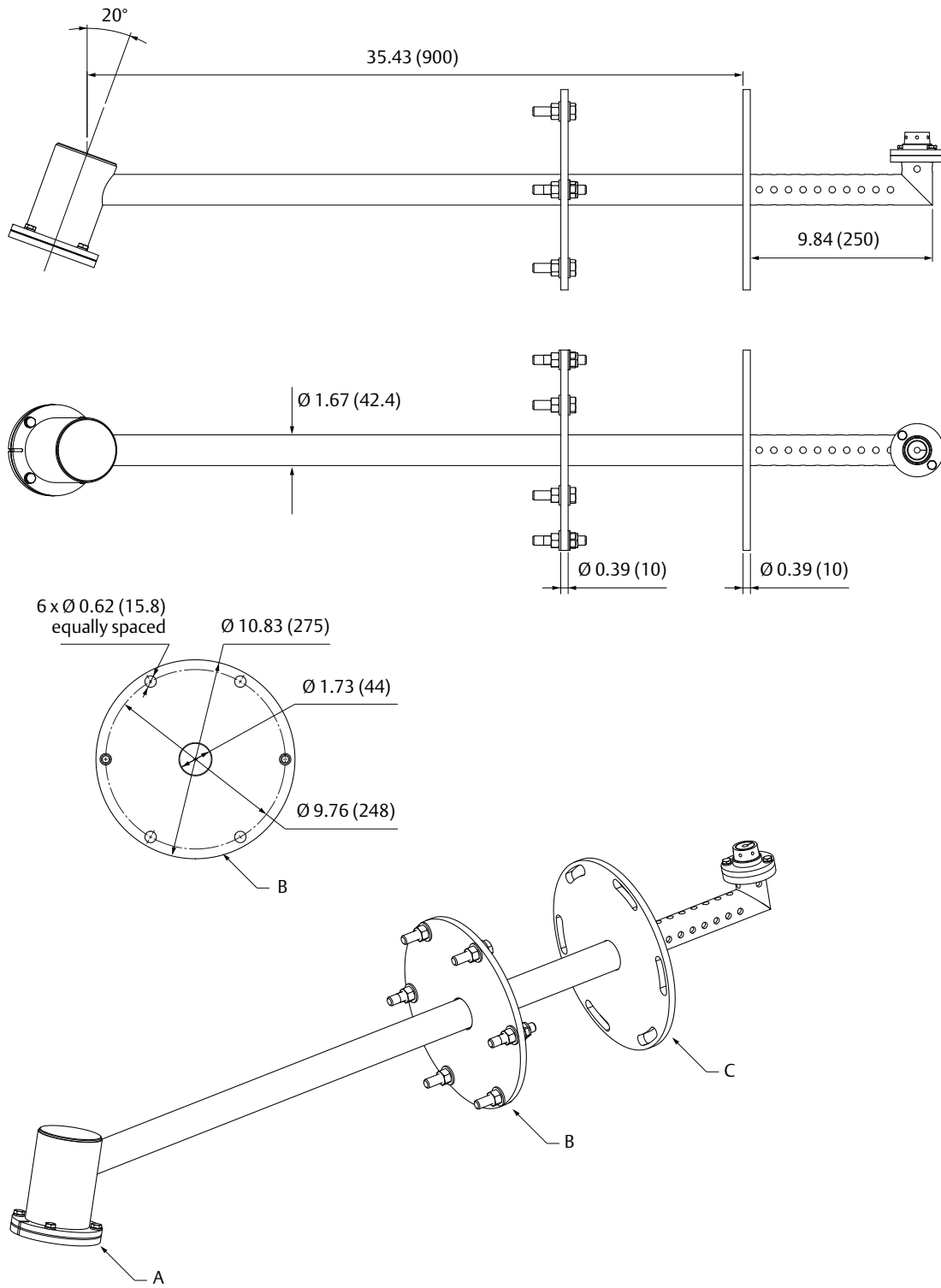
Dimensions are in inches (millimeters).

**Note**

X represents the available options.

The cable extension and connector are available for standard temperature only.

Figure 9. Accessories - ESP Hopper Mounting Adapter

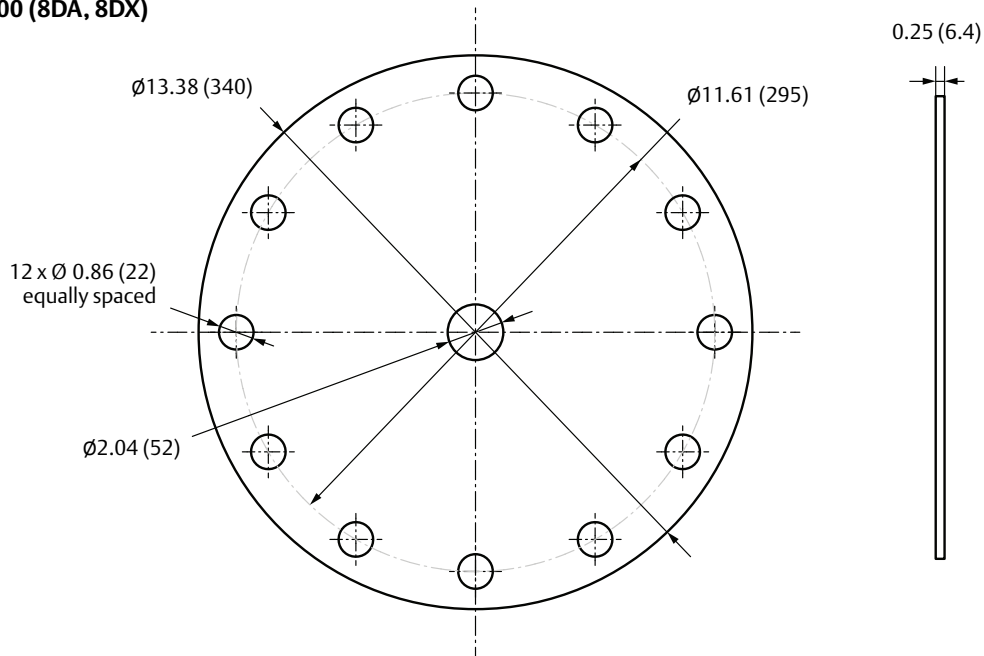


A. Antenna adapter  
 B. Support flange  
 C. Bracket flange  
 Dimensions are in inches (millimeters).

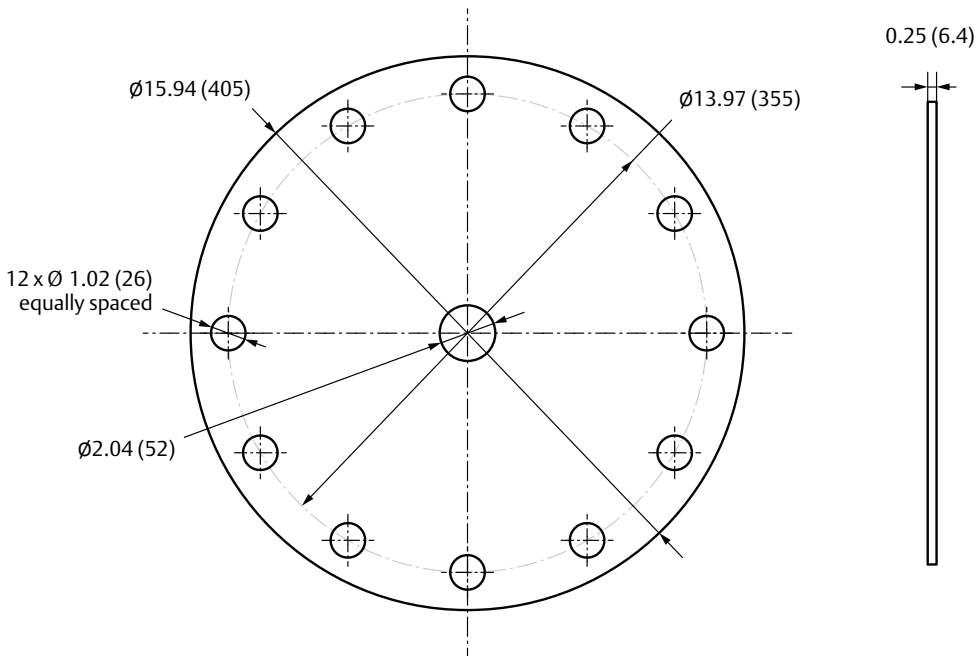


**Figure 10. Accessories - Mounting Plates**

**DN200 (8DA, 8DX)**



**DN250 (TDA, TDX)**



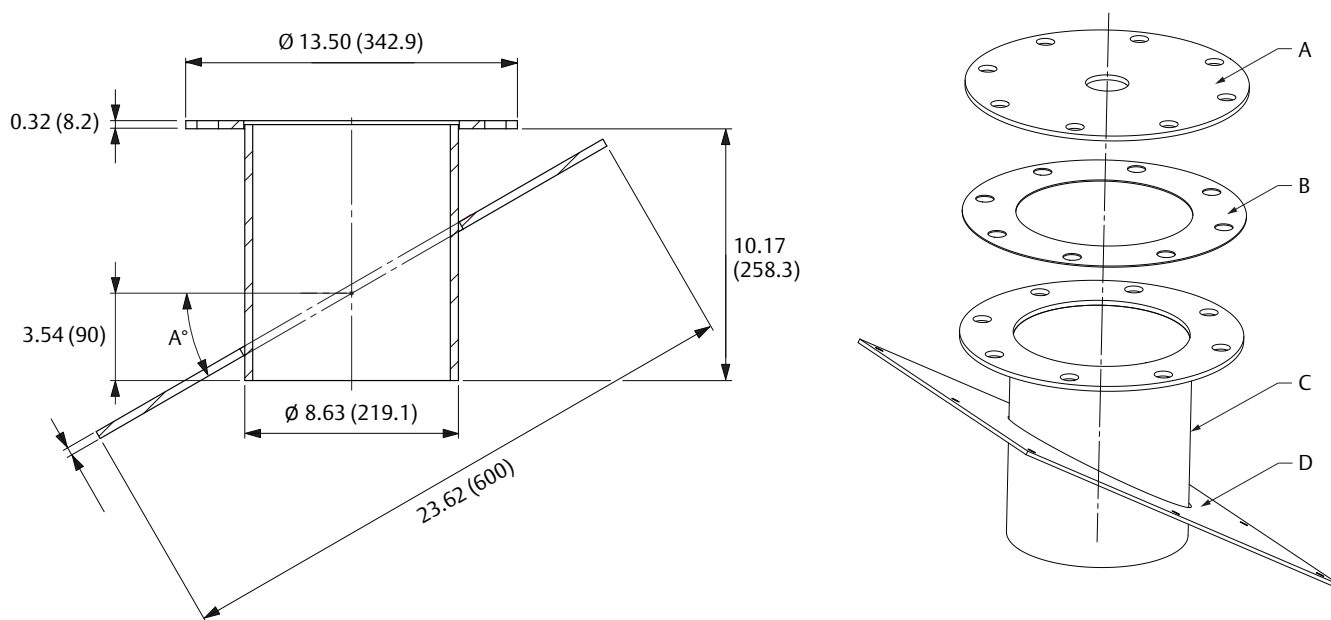
Dimensions are in inches (millimeters).

**Note**

Several different types of mounting plates are available. For detailed information, see the Rosemount 5708 Series Reference Manual (document number 00809-0100-4570).

Mounting plates are not pressure rated.

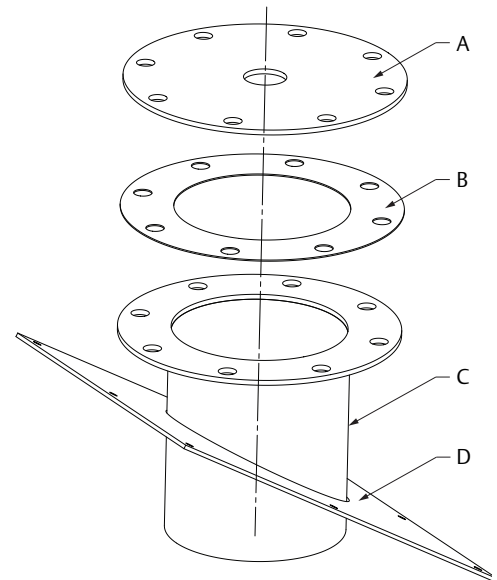
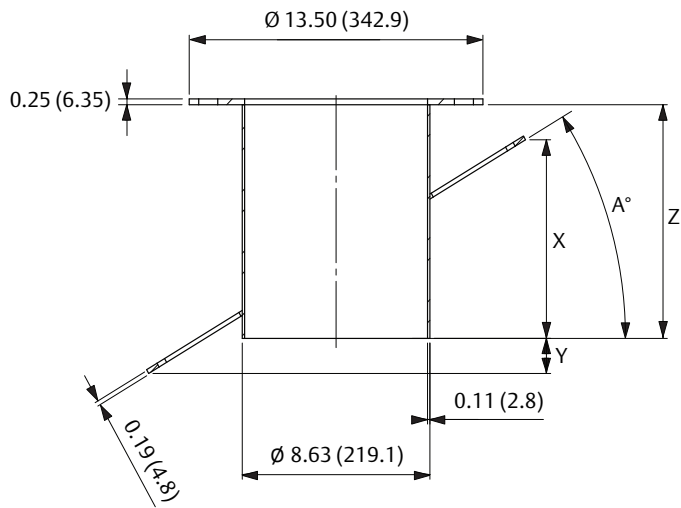
Figure 11. Standard Temperature Mounting Assembly



Option code	Angle A°
A00	0°
A05	5°
A10	10°
A15	15°
A20	20°
A30	30°

A. Mounting plate  
 B. Gasket  
 C. Adapter tube  
 D. Adapter plate  
 Dimensions are in inches (millimeters).

**Figure 12. High Temperature Mounting Assembly**



Option code	Angle $A^\circ$	X	Y	Z
B00	0°	2.41 (61.2)	N/A	5.0 (127)
B05	5°	1.95 (49.5)	0.55 (14.0)	5.0 (127)
B10	10°	2.69 (68.3)	0.09 (2.3)	5.0 (127)
B15	15°	7.64 (194.1)	2.98 (75.7)	10.0 (254)
B20	20°	7.40 (188.0)	1.25 (31.8)	10.0 (254)
B30	30°	8.50 (215.9)	1.50 (38.1)	10.0 (254)

A. Mounting plate  
 B. Gasket  
 C. Adapter tube  
 D. Adapter plate  
 Dimensions are in inches (millimeters).

**Global Headquarters****Emerson Process Management**

6021 Innovation Blvd.

Shakopee, MN 55379, USA

☎ +1 800 999 9307 or +1 952 906 8888

☎ +1 952 949 7001

✉ RFQ.RMD-RCC@EmersonProcess.com

**North America Regional Office****Emerson Process Management**

8200 Market Blvd.

Chanhassen, MN 55317, USA

☎ +1 800 999 9307 or +1 952 906 8888

☎ +1 952 949 7001

✉ RMT-NA.RCCRFQ@Emerson.com

**Latin America Regional Office****Emerson Process Management**

1300 Concord Terrace, Suite 400

Sunrise, Florida, 33323, USA

☎ +1 954 846 5030

☎ +1 954 846 5121

✉ RFQ.RMD-RCC@EmersonProcess.com

**Europe Regional Office****Emerson Process Management Europe GmbH**

Neuhofstrasse 19a P.O. Box 1046

CH 6340 Baar

Switzerland

☎ +41 (0) 41 768 6111

☎ +41 (0) 41 768 6300

✉ RFQ.RMD-RCC@EmersonProcess.com

**Asia Pacific Regional Office****Emerson Process Management Asia Pacific Pte Ltd**

1 Pandan Crescent

Singapore 128461

☎ +65 6777 8211

☎ +65 6777 0947

✉ Enquiries@AP.EmersonProcess.com

**Middle East and Africa Regional Office****Emerson Process Management**

Emerson FZE P.O. Box 17033,

Jebel Ali Free Zone - South 2

Dubai, United Arab Emirates

☎ +971 4 8118100

☎ +971 4 8865465

✉ RFQ.RMTMEA@Emerson.com

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