Product Data Sheet
00813-0100-4408, Rev BJ
March 2021

Rosemount™ 5408 and 5408:SIS Level Transmitters

Non-Contacting Radar

- Unique energy-efficient two-wire FMCW radar technology for optimal performance
- Engineered and user tested for best-in-class safety, reliability, and ease-of-use
- Forty years of continuous product improvement
- Intuitive commissioning experience driven by wizards and adaptive graphics
- Rosemount 5408:SIS, optimal for safety applications and IEC 61508 certified to SIL 2
- Safe, easy, and remote proof testing without process interruptions

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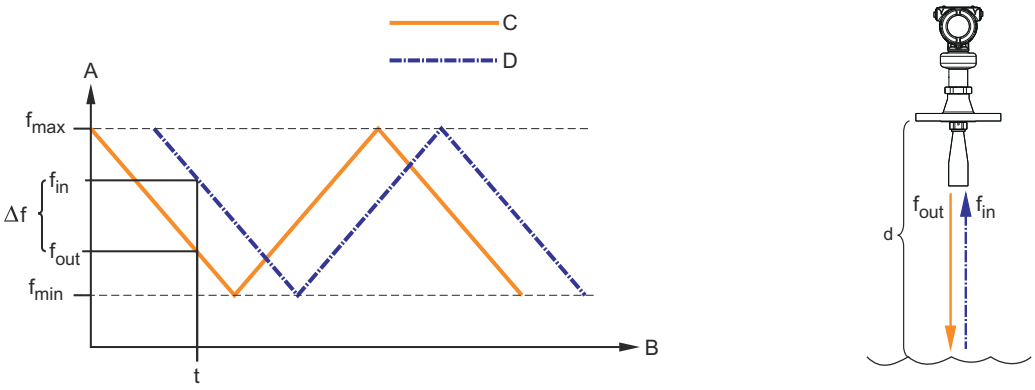
Introduction

Measurement principle

The Rosemount 5408 and 5408:SIS are two-wire transmitters for continuous level measurements over a broad range of liquids, slurries, and solids. The measurement principle is fast-sweep Frequency Modulated Continuous Wave (FMCW).

Radar signals are continuously transmitted toward the product surface with a microwave frequency modulated over a span. The level is proportional to the frequency difference between currently received and transmitted signal.

Figure 1: FMCW-method



Δf~d=distance

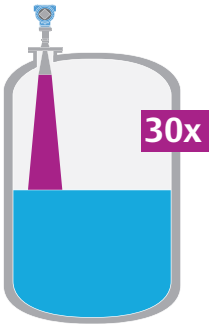
A. *Frequency (GHz)*
B. *Time (s)*
C. *Transmitted signal*
D. *Reflected signal*

Contents

Technology to redefine reliability

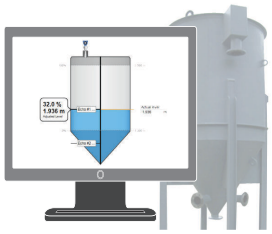
The Rosemount 5408 and 5408:SIS are optimized for reliable and accurate performance even in challenging process conditions. FMCW technology maximizes radar signal strength and produces a robust and reliable measurement (with 30 times more power on the surface than traditional two-wire non-contacting radars).

The transmitters are self-powered for up to two seconds to maintain operation despite cable glitches or lightning. The minimum lift-off voltage is 9 Vdc for FOUNDATION™ Fieldbus and 12 Vdc for HART®.



Ease-of-use at every touch point

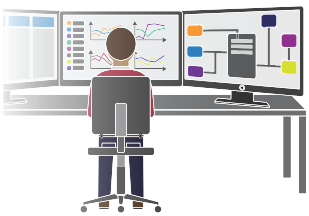
The Rosemount 5408 and 5408:SIS are designed to simplify operator tasks. They deliver ease-of-use at every touch point, from the pictorial user instructions and graphical intuitive wizards to the PTFE seal that requires no O-ring material for simplifying model selection.



Dedicated to safety

The Smart Diagnostics Suite provides operators with early alerts in case of antenna build-up, weak power supply, or abnormal surface conditions. Also, a local memory enables full insight into the last seven days of measurements, alerts, and echo profiles.

The Rosemount 5408:SIS is the ideal choice for functional safety such as overfill prevention. It is safety certified (SIL 2/SIL 3), supports long proof-test intervals guaranteed to suit your schedule, and can be tested remotely without any process interruption.

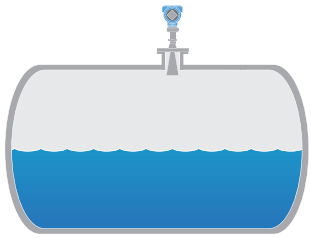


Application examples

The Rosemount 5408 and 5408:SIS are ideal for level measurements over a broad range of liquid and solids applications. The transmitters are virtually unaffected by changing density, temperature, pressure, media dielectric, pH, and viscosity. Non-contacting radar level is ideal for harsh conditions such as corrosive and sticky media, or when internal tank obstructions are a limiting factor.

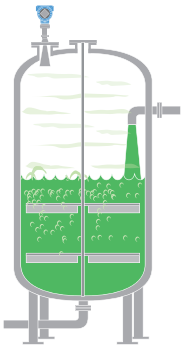
Storage and buffer tanks

The Rosemount 5408 provides accurate and reliable level measurement for both metallic or non-metallic vessels containing almost any liquid (e.g. oil, gas condensate, water, chemicals).



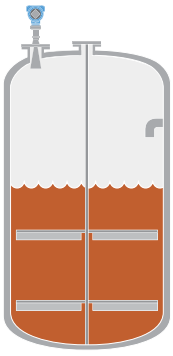
Reactors

The Rosemount 5408 is ideal for the most challenging applications, including reactors where there can be agitation, foaming, and condensation, as well as high temperatures and pressures.



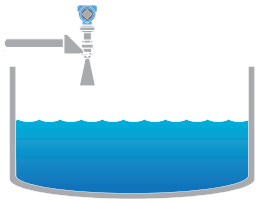
Blenders and mixers

The Rosemount 5408 can help you withstand the rigors of blenders and mixing tanks. Easy to install and commission, it is also unaffected by virtually any fluid property change.



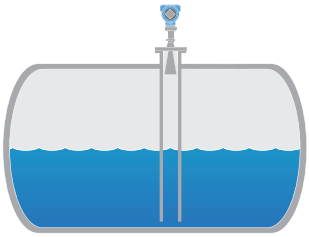
Open atmospheric applications

The Rosemount 5408 measures reliably in open applications, from short range sumps or ponds to long range dams.



Still pipe and chamber installations

The Rosemount 5408 is a great choice for level measurement in tanks with small diameter still pipes. It may also be used in chambers, but guided wave radar is generally the best fit for these applications. For more information on using the Rosemount 5408 in still pipes and chambers refer to the Best Practices for Using Radar in Still Pipes and Chambers Technical Note.

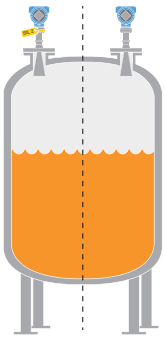


Bulk solids

The Rosemount 5408 is the ideal solution for small- to medium-sized silos with rapid level changes. The narrow beam avoids internal obstructions while still keeping good level measurement.

Safety applications

The Rosemount 5408:SIS is the ideal choice for safety functions such as overfill prevention, level deviation monitoring or dry-run prevention.



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

Online product configurator

Many products are configurable online using our Product Configurator. Select the **Configure** button or visit our website to start. With this tool's built-in logic and continuous validation, you can configure your products more quickly and accurately.

Specifications and options

See the Specifications and options section for more details on each configuration. Specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See the Material selection section for more information.

Related information

Specifications
Material selection

Model codes

Model codes contain the details related to each product. Exact model codes will vary; an example of a typical model code is shown in Figure 2.

Figure 2: Model Code Example

5408 F 1 S H A 1 E5 1 R 3 AB CAB 3	M5 DA1 EF2 QT
1	2

1. Required model components (choices available on most)
2. Additional options (variety of features and functions that may be added to products)

Optimizing lead time

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

Rosemount 5408 Level Transmitter ordering information

The Rosemount 5408 is a two-wire non-contacting radar transmitter for level measurements on both liquid and solid materials. It uses a unique energy efficient radar technology based on the FMCW principle to ensure reliable performance even in challenging conditions.

CONFIGURE > VIEW PRODUCT >

Required model components

Model

Code	Description	
5408	Radar Level Transmitter	★

Profile

Code	Description	
A	Standard monitoring & control applications	★

Measurement type

Code	Description	
1	Liquid level measurement	★
3	Solids level measurement	★
4	Liquid & solids level measurement	★

Performance class

Code	Description	Reference accuracy	
A	Ultra accuracy	±0.04 in. (±1 mm)	★
S	Standard	±0.08 in. (±2 mm)	★

Signal output

Code	Description	
H	4–20 mA with digital signal based on HART® revision 6 protocol (HART revision 7 available as option)	★
F	FOUNDATION™ Fieldbus	★
U(1)	Rosemount 2410 Tank Hub connectivity	★

(1) *Not available with performance class code A (ultra accuracy).*

Housing material

Code	Description	
A	Aluminum	★
S	Stainless steel (SST)	★

Conduit/cable threads

Code	Description	
1	½-14 NPT	★
2	M20 x 1.5	★
3(1)	G½	

(1) *G½ thread form is not available with hazardous locations approvals.*

Hazardous locations certifications

Code	Description	
NA	None	★
E1	ATEX Flameproof	★
I1	ATEX Intrinsic Safety	★
N1	ATEX Type n	★
IA	ATEX FISCO Intrinsic Safety	★
E5	USA Explosion-proof, Dust Ignition-proof	★
I5	USA Intrinsically Safe; Nonincendive	★
IE	USA FISCO Intrinsic Safety	★
E6	Canadian Explosion-proof, Dust Ignition-proof	★
I6	Canadian Intrinsically Safe; Nonincendive	★
IF	Canadian FISCO Intrinsic Safety	★
E7	IECEx Flameproof, Dust Ignition-proof	★
I7	IECEx Intrinsic Safety	★
N7	IECEx Type n	★
IG	IECEx FISCO Intrinsic Safety	★
E2	INMETRO Flameproof	★
I2	INMETRO Intrinsic Safety	★
N2	INMETRO Type n	★
IB	INMETRO FISCO Intrinsic Safety	★
E3	China Flameproof	★
I3	China Intrinsic Safety	★
N3	China Type n	★
IC	China FISCO Intrinsic Safety	★
E4	Japan Flameproof	★

Code	Description	
ID	Japan FISCO Intrinsic Safety	★
EP	Republic of Korea Flameproof	★
IP	Republic of Korea Intrinsic Safety	★
EM(1)	Technical Regulations Customs Union (EAC) Flameproof	★
IM(1)	Technical Regulations Customs Union (EAC) Intrinsic Safety	★
NM(1)	Technical Regulations Customs Union (EAC) Type n	★
IN(1)	Technical Regulations Customs Union (EAC) FISCO Intrinsic Safety	★

(1) *Not available with performance class code A (ultra accuracy).*

Materials of construction

Code	Description	Available antenna types	
1	316/316L/EN 1.4404	Cone, parabolic	★
7	All PTFE wetted parts	Process seal	★
2	Alloy C-276 (UNS N10276) with protective plate	Cone	
3	Alloy 400 (UNS N04400) with protective plate	Cone	
H	Alloy C-276 (UNS N10276) process connection, flange, and antenna	Cone	
M	Alloy 400 (UNS N04400) process connection, flange, and antenna	Cone	

Process connection type

Code	Description	Available antenna types	
F(1)	Flat Face flange	Cone, parabolic	★
R(2)	Raised Face flange	All	★
N	NPT thread	Cone	★
G	BSPP (G) thread	Cone, parabolic	★
B	Bracket mounting	All	★
C	Tri Clamp	Process seal	★
W	Welded connection	Parabolic	★
T	Ring Type Joint (RTJ) flange	Cone	

(1) *Type A flat face for EN 1092-1 flanges.*
(2) *Type B1 raised face for EN 1092-1 flanges.*

Related information

Availability of process connections

Process connection size

Code	Description	Available antenna types	
A	1½-in.	Cone	★
2	2-in./DN50/50A	Cone, process seal	★
3	3-in./DN80/80A	Cone, process seal	★
B	3½-in.	Parabolic	★
4	4-in./DN100/100A	Cone, process seal	★
6	6-in./DN150/150A	Cone	★
8	8-in./DN200/200A	Cone, parabolic	★
T	10-in./DN250/250A	Parabolic	★
Z	None (use when ordering bracket mounting)	All	★

Related information

Availability of process connections

Process connection rating

Code	Description		
ZZ	For use with non-flange process connection type		★
ASME flanges			
AA	ASME B16.5 Class 150		★
AB	ASME B16.5 Class 300		★
AC	ASME B16.5 Class 600		★
EN flanges		Note	
DK	EN1092-1 PN6		★
DA	EN1092-1 PN16	PN10 and PN16 dimensions are identical for DN50 to DN150	★
DB	EN1092-1 PN40	PN25 and PN40 dimensions are identical for DN50 to DN150	★
DC	EN1092-1 PN63		★
DD	EN1092-1 PN100		★
JIS flanges			
JK	JIS 5K		★
JA	JIS 10K		★
JB	JIS 20K		★

Related information

Availability of process connections

Antenna type

For applications where saturated steam may occur, consult factory.

Code	Description	Operating pressure	Operating temperature	
CAA	Cone antenna (PTFE seal)	-15 to 363 psig (-1 to 25 bar)	-76 to 392 °F (-60 to 200 °C)	★
CAB	Cone antenna (PTFE seal)	-15 to 725 psig (-1 to 50 bar)(1)	-40 to 302 °F (-40 to 150 °C)	★
CAC	Cone antenna (PTFE seal)	-15 to 1450 psig (-1 to 100 bar)	-40 to 212 °F (-40 to 100 °C)	★
CAD	Cone antenna (PTFE seal)	-15 to 44 psig (-1 to 3 bar)	-76 to 482 °F (-60 to 250 °C)	★
CBF	Cone antenna (PEEK seal, FVMQ)	-15 to 754 psig (-1 to 52 bar)	-76 to 338 °F (-60 to 170 °C)	★
CBK	Cone antenna (PEEK seal, Kalrez® 6375)	-15 to 754 psig (-1 to 52 bar)	5 to 482 °F (-15 to 250 °C)	★
CBM	Cone antenna (PEEK seal, FKM)	-15 to 754 psig (-1 to 52 bar)	-13 to 428 °F (-25 to 220 °C)	★
CBV	Cone antenna (PEEK seal, Viton®)	-15 to 754 psig (-1 to 52 bar)	-22 to 392 °F (-30 to 200 °C)	★
SAA	Process seal antenna	-15 to 363 psig (-1 to 25 bar)(2)	-76 to 392 °F (-60 to 200 °C)(2)	★
PAS	Parabolic antenna, swivel mount	-7 to 43 psig (-0.5 to 3 bar)	-67 to 392 °F (-55 to 200 °C)	★

(1) *Pressure limit is derated for process temperatures above 100 °F (38 °C), see Figure 7 for details.*
(2) *The final rating depends on the selected process connection. See Process temperature and pressure rating.*

Related information

Process temperature and pressure rating

Antenna size

Code	Description	Available antenna types	
A(1)	1½-in. (DN40)	Cone (PTFE seal)	★
2	2-in. (DN50)	Cone, process seal	★
3	3-in. (DN80)	Cone, process seal	★
4	4-in. (DN100)	Cone, process seal	★
8	8-in. (DN200)	Parabolic	★

(1) *1½-in. (DN40) cone antenna is available for 1½-in. NPT threaded connection and materials of construction code 1 (316/316L/EN 1.4404).*

Additional options

Antenna extensions

Code	Description (see Figure 27)	Total length	Available antenna sizes	
S1	Extended cone antenna	23.6-in. (600 mm)	All except 1½-in. (DN40)	★
S2	Extended cone antenna, segmented	47.2-in. (1200 mm)		★

Purging connection

Option code PC1 is for cone antennas only, and requires matching flange and antenna sizes. Note that all parabolic antennas come with an integrated air purge connection.

A minimum gasket thickness of 0.125 in. (3.2 mm) is required for flanges with protective plate design.

Code	Description	
PC1	Purging connector (purge ring)	★

Related information

Air purging

Display

Code	Description	
M5	LCD display	★

Related information

LCD display (option code M5)

Diagnostic functionality

Code	Description	
DA1	HART Smart Diagnostics Suite	★
D01	FOUNDATION Fieldbus Smart Diagnostics Suite	★

Related information

Smart Diagnostics Suite

HART revision configuration

Code	Description	
HR7	4-20 mA with digital signal based on HART revision 7 protocol	★

Open air applications configuration

This option is only available with parabolic antenna, 3-in. (DN80) and 4-in. (DN100) process seal antennas, and 4-in. (DN100) cone antenna.

Code	Description	
OA	Open air applications configuration; LPR (Level Probing Radar)	★

Factory configuration

Code	Description	
C1	Factory configuration per Configuration Data Sheet	★

Alarm limits

Code	Description	
C4	NAMUR alarm and saturation levels, high alarm	★
C5	NAMUR alarm and saturation levels, low alarm	★
C8(1)	Standard Rosemount alarm and saturation levels, low alarm	★

(1) *The standard alarm setting is high.*

Welding standard for flanges

Only applies to flanged process connections with welded construction or protective plate design; only applicable to cone antennas.

Flanged process connections with protective plate design are only available with ASME IX (option code AW).

Code	Description	
AW	According to ASME IX	★
EW	According to EN-ISO	★

Related information

Availability of process connections

Country certification

CRN is not available with EN1092-1 or JIS B2220 flanges, neither for ASME B16.5 flanges in materials of construction code M.

Code	Description	
J1	Canadian Registration (CRN)	★

Special quality assurance

Code	Description	
Q4	Calibration data certificate	★
QG	Calibration certificate and GOST verification certificate (only for end-destination country Russia)	

Hydrostatic testing

Hydrostatic testing is only available for cone antennas and process seal antennas with flanged process connections.

Code	Description	
Q5	Hydrostatic testing, including certificate	★

Material traceability certification

Certificate includes all pressure retaining and wetted parts.

Code	Description	
Q8	Material traceability certification per EN 10204 3.1 (2.1 for non-metallic)	★

Hygienic certification

Only available for process seal antennas with Tri Clamp connection.

Code	Description	
QA	Certificate of compliance to 3-A®	★

Food and Drug Administration (FDA) statement

Only available for process seal antennas with Tri Clamp connection.

Code	Description	
QH(1)	Certificate of compliance to FDA 21CFR110, Subpart C: Food and Drug Administration - Current Good Manufacturing Practice in Manufacturing, Packing, or Holding Human Food	★

(1) *Applicable only to wetted parts.*

Materials certification

The materials certification is not available with parabolic antenna.

Code	Description	
Q15	NACE® material recommendation per NACE MR0175/ISO 15156	★
Q25	NACE material recommendation per NACE MR0103/ISO 17945	★
Q35	NACE material recommendation per NACE MR0175/ISO 15156 and NACE MR0103/ISO 17945	★

Welding procedure qualification record documentation

Only applies to flanged process connections with welded construction or protective plate design; only applicable to cone antennas.

Code	Description	
Q66	Welding Procedure Qualification Record (WPQR)	★
Q67	Welder Performance Qualification (WPQ)	★
Q68	Welding Procedure Specification (WPS)	★
Q79	WPQR/WPQ/WPS	★

Related information

Availability of process connections

Dye penetration test certificate

Only applies to flanged process connections with welded construction or protective plate design; only applicable to cone antennas.

Code	Description	
Q73	Certificate of liquid penetrant inspection	★

Positive material identification certificate

Code	Description	
Q76	Positive material identification certificate of conformance	★

Overfill prevention

Code	Description	
U1	Overfill prevention according to WHG/TUV	★

Shipboard approvals

Transmitters with aluminum housing are not approved for open deck installations; for use only in engine room, pump room, etc.

Code	Description	
SBS	American Bureau of Shipping Type Approval	★
SDN	Det Norske Veritas Germanischer Lloyd (DNV GL) Type Approval	★
SLL	Lloyd's Register Type Approval	★
SBV	Bureau Veritas Type Approval	★

Extended product warranty

Rosemount extended warranties have a limited warranty of three or five years from date of shipment.

Code	Description	
WR3	3-year limited warranty	★
WR5	5-year limited warranty	★

Conduit electrical connector (shipped uninstalled)

Requires ½-14 NPT conduit/cable threads (code 1). Available with Intrinsically Safe approvals only.

Code	Description	
EC	M 12, 4-pin, male connector (eurofast®)	★
MC	A size Mini, 4-pin, male connector (minifast®)	★

Specials

Code	Description	
PXXXX	Custom engineered solutions beyond standard model codes. Consult factory for details.	

Related information

Engineered solutions

Rosemount 5408:SIS Level Transmitter ordering information

Safety certified to IEC 61508 for SIL2 applications with SIL3 capability, the Rosemount 5408:SIS reduces cost of risk, increases efficiency, and protects your staff and the environment.

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Required model components

Model

Code	Description	
5408	Radar Level Transmitter	★

Profile

Code	Description	
F(1)	Functional safety / SIS applications	★

(1) *The Rosemount 5408:SIS has two operational modes: Safety (SIS) and Control/Monitoring. Safety (SIS) mode must be set when used in Safety Instrumented Systems. Control/Monitoring mode is intended for use in a Basic Process Control System (BPCS).*

Measurement type

Code	Description	
1	Liquid level measurement	★
4(1)	Liquid & solids level measurement	★

(1) *Note that for the Rosemount 5408:SIS (profile code F), solids level measurement is only available when operating in Control/Monitoring mode.*

Performance class

Code	Description	Reference accuracy	
A	Ultra accuracy	±0.04 in. (±1 mm)	★
S	Standard	±0.08 in. (±2 mm)	★

Signal output

Code	Description	
H	4–20 mA with digital signal based on HART® revision 6 protocol (HART revision 7 available as option)	★

Housing material

Code	Description	
A	Aluminum	★
S	Stainless steel (SST)	★

Conduit/cable threads

Code	Description	
1	½-14 NPT	★
2	M20 x 1.5	★
3(1)	G½	

(1) *G½ thread form is not available with hazardous locations approvals.*

Hazardous locations certifications

Code	Description	
NA	None	★
E1	ATEX Flameproof	★
I1	ATEX Intrinsic Safety	★
N1	ATEX Type n	★
E5	USA Explosion-proof, Dust Ignition-proof	★
I5	USA Intrinsically Safe; Nonincendive	★
E6	Canadian Explosion-proof, Dust Ignition-proof	★
I6	Canadian Intrinsically Safe; Nonincendive	★
E7	IECEx Flameproof, Dust Ignition-proof	★
I7	IECEx Intrinsic Safety	★
N7	IECEx Type n	★
E2	INMETRO Flameproof	★
I2	INMETRO Intrinsic Safety	★
N2	INMETRO Type n	★
E3	China Flameproof	★
I3	China Intrinsic Safety	★
N3	China Type n	★
E4	Japan Flameproof	★
EP	Republic of Korea Flameproof	★
IP	Republic of Korea Intrinsic Safety	★
EM(1)	Technical Regulations Customs Union (EAC) Flameproof	★
IM(1)	Technical Regulations Customs Union (EAC) Intrinsic Safety	★
NM(1)	Technical Regulations Customs Union (EAC) Type n	★

(1) *Not available with performance class code A (ultra accuracy).*

Materials of construction

Code	Description	Available antenna types	
1	316/316L/EN 1.4404	Cone, parabolic	★
7	All PTFE wetted parts	Process seal	★
2	Alloy C-276 (UNS N10276) with protective plate	Cone	
3	Alloy 400 (UNS N04400) with protective plate	Cone	
H	Alloy C-276 (UNS N10276) process connection, flange, and antenna	Cone	
M	Alloy 400 (UNS N04400) process connection, flange, and antenna	Cone	

Process connection type

Code	Description	Available antenna types	
F(1)	Flat Face flange	Cone, parabolic	★
R(2)	Raised Face flange	All	★
N	NPT thread	Cone	★
G	BSPP (G) thread	Cone, parabolic	★
C	Tri Clamp	Process seal	★
W	Welded connection	Parabolic	★
T	Ring Type Joint (RTJ) flange	Cone	

(1) *Type A flat face for EN 1092-1 flanges.*
(2) *Type B1 raised face for EN 1092-1 flanges.*

Related information

Availability of process connections

Process connection size

Code	Description	Available antenna types	
A	1½-in.	Cone	★
2	2-in./DN50/50A	Cone, process seal	★
3	3-in./DN80/80A	Cone, process seal	★
B	3½-in.	Parabolic	★
4	4-in./DN100/100A	Cone, process seal	★
6	6-in./DN150/150A	Cone	★
8	8-in./DN200/200A	Cone, parabolic	★
T	10-in./DN250/250A	Parabolic	★

Related information

Availability of process connections

Process connection rating

Code	Description		
ZZ	For use with non-flange process connection type		★
ASME flanges			
AA	ASME B16.5 Class 150		★
AB	ASME B16.5 Class 300		★
AC	ASME B16.5 Class 600		★
EN flanges		Note	
DK	EN1092-1 PN6		★
DA	EN1092-1 PN16	PN10 and PN16 dimensions are identical for DN50 to DN150	★
DB	EN1092-1 PN40	PN25 and PN40 dimensions are identical for DN50 to DN150	★
DC	EN1092-1 PN63		★
DD	EN1092-1 PN100		★
JIS flanges			
JK	JIS 5K		★
JA	JIS 10K		★
JB	JIS 20K		★

Related information

Availability of process connections

Antenna type

For applications where saturated steam may occur, consult factory.

Code	Description	Operating pressure	Operating temperature	
CAA	Cone antenna (PTFE seal)	-15 to 363 psig (-1 to 25 bar)	-76 to 392 °F (-60 to 200 °C)	★
CAB	Cone antenna (PTFE seal)	-15 to 725 psig (-1 to 50 bar)(1)	-40 to 302 °F (-40 to 150 °C)	★
CAC	Cone antenna (PTFE seal)	-15 to 1450 psig (-1 to 100 bar)	-40 to 212 °F (-40 to 100 °C)	★
CAD	Cone antenna (PTFE seal)	-15 to 44 psig (-1 to 3 bar)	-76 to 482 °F (-60 to 250 °C)	★
CBF	Cone antenna (PEEK seal, FVMQ)	-15 to 754 psig (-1 to 52 bar)	-76 to 338 °F (-60 to 170 °C)	★
CBK	Cone antenna (PEEK seal, Kalrez® 6375)	-15 to 754 psig (-1 to 52 bar)	5 to 482 °F (-15 to 250 °C)	★
CBM	Cone antenna (PEEK seal, FKM)	-15 to 754 psig (-1 to 52 bar)	-13 to 428 °F (-25 to 220 °C)	★
CBV	Cone antenna (PEEK seal, Viton®)	-15 to 754 psig (-1 to 52 bar)	-22 to 392 °F (-30 to 200 °C)	★
SAA	Process seal antenna	-15 to 363 psig (-1 to 25 bar)(2)	-76 to 392 °F (-60 to 200 °C)(2)	★
PAS	Parabolic antenna, swivel mount	-7 to 43 psig (-0.5 to 3 bar)	-67 to 392 °F (-55 to 200 °C)	★

(1) *Pressure limit is derated for process temperatures above 100 °F (38 °C), see Figure 7 for details.*
(2) *The final rating depends on the selected process connection. See Process temperature and pressure rating.*

Related information

Process temperature and pressure rating

Antenna size

Code	Description	Available antenna types	
2	2-in. (DN50)	Cone, process seal	★
3	3-in. (DN80)	Cone, process seal	★
4	4-in. (DN100)	Cone, process seal	★
8	8-in. (DN200)	Parabolic	★

Additional options

Antenna extensions

Code	Description (see Figure 27)	Total length	Available antenna sizes	
S1	Extended cone antenna	23.6-in. (600 mm)	All except 1½-in. (DN40)	★
S2	Extended cone antenna, segmented	47.2-in. (1200 mm)		★

Purging connection

Option code PC1 is for cone antennas only, and requires matching flange and antenna sizes. Note that all parabolic antennas come with an integrated air purge connection.

A minimum gasket thickness of 0.125 in. (3.2 mm) is required for flanges with protective plate design.

Code	Description	
PC1	Purging connector (purge ring)	★

Related information

Air purging

Display

Code	Description	
M5	LCD display	★

Related information

LCD display (option code M5)

Functional safety options

Code	Description	
EF2	Extended SIS package	★

Diagnostic functionality

Code	Description	
DA1	HART Smart Diagnostics Suite	★

Related information

Smart Diagnostics Suite

HART revision configuration

Code	Description	
HR7	4-20 mA with digital signal based on HART revision 7 protocol	★

Factory configuration

Code	Description	
C1	Factory configuration per Configuration Data Sheet	★

Alarm limits

Code	Description	
C4	NAMUR alarm and saturation levels, high alarm	★
C5	NAMUR alarm and saturation levels, low alarm	★
C8(1)	Standard Rosemount alarm and saturation levels, low alarm	★

(1) *The standard alarm setting is high.*

Welding standard for flanges

Only applies to flanged process connections with welded construction or protective plate design; only applicable to cone antennas.

Flanged process connections with protective plate design are only available with ASME IX (option code AW).

Code	Description	
AW	According to ASME IX	★
EW	According to EN-ISO	★

Related information

Availability of process connections

Country certification

CRN is not available with EN1092-1 or JIS B2220 flanges, neither for ASME B16.5 flanges in materials of construction code M.

Code	Description	
J1	Canadian Registration (CRN)	★

Special quality assurance

Code	Description	
Q4	Calibration data certificate	★
QG	Calibration certificate and GOST verification certificate (only for end-destination country Russia)	

Hydrostatic testing

Hydrostatic testing is only available for cone antennas and process seal antennas with flanged process connections.

Code	Description	
Q5	Hydrostatic testing, including certificate	★

Material traceability certification

Certificate includes all pressure retaining and wetted parts.

Code	Description	
Q8	Material traceability certification per EN 10204 3.1 (2.1 for non-metallic)	★

Hygienic certification

Only available for process seal antennas with Tri Clamp connection.

Code	Description	
QA	Certificate of compliance to 3-A®	★

Food and Drug Administration (FDA) statement

Only available for process seal antennas with Tri Clamp connection.

Code	Description	
QH(1)	Certificate of compliance to FDA 21CFR110, Subpart C: Food and Drug Administration - Current Good Manufacturing Practice in Manufacturing, Packing, or Holding Human Food	★

(1) *Applicable only to wetted parts.*

Quality certification for safety

Code	Description	
QS	Certificate of FMEDA Data	★
QT	Safety-certified to IEC 61508 with certificate of FMEDA data	★

Materials certification

The materials certification is not available with parabolic antenna.

Code	Description	
Q15	NACE® material recommendation per NACE MR0175/ISO 15156	★
Q25	NACE material recommendation per NACE MR0103/ISO 17945	★
Q35	NACE material recommendation per NACE MR0175/ISO 15156 and NACE MR0103/ISO 17945	★

Welding procedure qualification record documentation

Only applies to flanged process connections with welded construction or protective plate design; only applicable to cone antennas.

Code	Description	
Q66	Welding Procedure Qualification Record (WPQR)	★

Code	Description	
Q67	Welder Performance Qualification (WPQ)	★
Q68	Welding Procedure Specification (WPS)	★
Q79	WPQR/WPQ/WPS	★

Related information

Availability of process connections

Dye penetration test certificate

Only applies to flanged process connections with welded construction or protective plate design; only applicable to cone antennas.

Code	Description	
Q73	Certificate of liquid penetrant inspection	★

Positive material identification certificate

Code	Description	
Q76	Positive material identification certificate of conformance	★

Overfill prevention

Code	Description	
U1	Overfill prevention according to WHG/TUV	★

Shipboard approvals

Transmitters with aluminum housing are not approved for open deck installations; for use only in engine room, pump room, etc.

Code	Description	
SBS	American Bureau of Shipping Type Approval	★
SDN	Det Norske Veritas Germanischer Lloyd (DNV GL) Type Approval	★
SLL	Lloyd's Register Type Approval	★
SBV	Bureau Veritas Type Approval	★

Extended product warranty

Rosemount extended warranties have a limited warranty of three or five years from date of shipment.

Code	Description	
WR3	3-year limited warranty	★
WR5	5-year limited warranty	★

Paint option for aluminum housing

Code	Description	
PY1	Housing and covers in yellow per RAL 1003	★
PY2	Covers in yellow per RAL 1003	★
PR1	Housing and covers in red per RAL 3002	★
PR2	Covers in red per RAL 3002	★
PO1	Housing and covers in orange per Munsell 2.5 YR 6/14	★
PO2	Covers in orange per Munsell 2.5 YR 6/14	★

Conduit electrical connector (shipped uninstalled)

Requires ½-14 NPT conduit/cable threads (code 1). Available with Intrinsically Safe approvals only.

Code	Description	
EC	M 12, 4-pin, male connector (eurofast®)	★
MC	A size Mini, 4-pin, male connector (minifast®)	★

Specials

Code	Description	
PXXXX	Custom engineered solutions beyond standard model codes. Consult factory for details.	

Related information

Engineered solutions

Availability of process connections

Table 1: Cone Antenna - 316/316L SST/EN 1.4404 (Type vs. Size and Rating)

Process connection size	Process connection rating									
	Thread[1]	ASME B16.5 flanges[2]			EN1092-1 flanges[2]				JIS B2220 flanges[2]	
		Class 150[3]	Class 300[3]	Class 600[3]	PN16[4]	PN40[4]	PN63[5]	PN100[5]	10K[3]	20K[5]
1½-in.	G, N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2-in./DN50/50A	G, N	R	R	R, T	F	F, R	F, R	F	R	R
3-in./DN80/80A	G, N	R	R	R, T	F, R	F, R	F, R	F, R	R	R
4-in./ DN100/100A	G, N	R	R	R, T	F, R	F, R	F	F	R	R
6-in./ DN150/150A	N/A	R	R	N/A	F, R	F, R	F	N/A	R	R
8-in./ DN200/200A	N/A	R	R	N/A	F, R	F, R	N/A	N/A	R	R

(1) *BSPP (G) thread (process connection type code G); N = NPT thread (process connection type code N)*
(2) *F = Flat Face (process connection type code F); R = Raised Face (process connection type code R); T = Ring Type Joint (process connection type code T)*
(3) *Forged one-piece flange or welded construction according to EN-ISO 1092-1 (see Figure 34).*
(4) *Welded construction for type A flat face; forged one-piece flange or welded construction for type B1 raised face.*
(5) *Welded construction (see Figure 34).*

Table 2: Cone Antenna - Alloy C-276 and Alloy 400 (Type vs. Size and Rating)

Process connection size	Process connection rating								
	Thread[1]	ASME B16.5 flanges[2][3]			EN1092-1 flanges[2][4][6]			JIS B2220 flanges[2][6]	
		Class 150	Class 300	Class 600	PN16	PN40	PN63	10K	20K
1½-in.	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2-in./DN50/50A	N	R[5]	R[5]	R[5]	R	R	R	R	R
3-in./DN80/80A	N/A	R[5]	R[5]	R[6]	R	R	R	R	R
4-in./DN100/100A	N/A	R[5]	R[5]	N/A	R	R	R	R	R
6-in./DN150/150A	N/A	R[5]	R[6]	N/A	R	R	R	R	R
8-in./DN200/200A	N/A	R[6]	N/A	N/A	R	R	N/A	R	R

(1) *N = NPT thread (process connection type code N)*
(2) *R = Raised Face (process connection type code R)*
(3) *Welded construction for materials of construction codes H and M (see Figure 34).*
(4) *Backing flange in flat face.*
(5) *Available with materials of construction codes 2, 3, H, and M.*
(6) *Only available with protective plate design (materials of construction codes 2 and 3).*

Table 3: Process Seal Antenna (Type vs. Size and Rating)

Process connection size	Process connection rating						
	Tri Clamp[1]	ASME B16.5 flanges[2][3]		EN1092-1 flanges[2][3]			JIS B2220 flanges[2][3]
		Class 150	Class 300	PN6	PN16	PN40	10K
2-in./DN50/50A	C	R	R	R	R	R	R
3-in./DN80/80A	C	R	R	R	R	R	R
4-in./DN100/100A	C	R	R	R	R	R	R

(1) *C = Tri Clamp (process connection type code C)*
(2) *Forged one-piece flange (see Figure 34).*
(3) *R = Raised Face (process connection type code R)*

Table 4: Parabolic Antenna (Type vs. Size and Rating)

Process connection size	Process connection rating				
	Thread[1]	Welded[2]	ASME B16.5 Class 150 flange[3]	EN1092-1 PN6 flange[4]	JIS B2220 5K flange[3]
3½-in.	G	W	N/A	N/A	N/A
8-in./DN200/200A	N/A	N/A	R	F	R
10-in./DN250/250A	N/A	N/A	R	F	R

(1) *G = BSPP (G) thread (process connection type code G)*
(2) *W = Welded connection (process connection type code W)*
(3) *R = Raised Face face (process connection type code R)*
(4) *F = Flat Face face (process connection type code F)*

Accessories

Table 5: Accessories

HART modem and cable	
03300-7004-0002	MACTek® VIATOR® HART modem and cables (USB connection)
Flushing connection rings for process seal antenna[1]	
DP0002-2111-S6	2-in. ANSI, ¼-in. NPT connection
DP0002-3111-S6	3-in. ANSI, ¼-in. NPT connection
DP0002-4111-S6	4-in. ANSI/DN100, ¼-in. NPT connection
DP0002-5111-S6	DN50, ¼-in. NPT connection
DP0002-8111-S6	DN80, ¼-in. NPT connection

(1) *Not available with Canadian Registration Number (CRN).*

Specifications

Performance specifications

General

Conformance to specification (±3σ [Sigma])

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

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 to1060 mbar)
- Relative humidity: 25-75%
- Damping: Default value, 2 s

Instrument accuracy (under reference conditions)

- Ultra accuracy: ±0.04 in. (±1 mm)(1)
- Standard: ±0.08 in. (±2 mm)(1)

Repeatability

±0.04 in. (±1 mm)

Ambient temperature effect

±0.04 in. (±1 mm)/10 K(2)

Sensor update rate

- 4-20 mA HART®: Minimum 1 update per second
- FOUNDATION™ Fieldbus: Minimum 2 updates per second

Maximum level rate

40 mm/s as default, adjustable up to 200 mm/s

(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) Ambient temperature effect specification valid over temperature range -40 °F to 176 °F (-40 °C to 80 °C).

Measuring range

Table 6: Maximum Measuring Range, ft. (m)

Model	Performance class	
	Standard	Ultra accuracy
Rosemount 5408	130 (40)	50 (15)
Rosemount 5408:SIS(1)	130 (40) in Control/Monitoring mode 82 (25) in Safety (SIS) mode	50 (15)

(1) *The Rosemount 5408:SIS has two operational modes: Safety (SIS) and Control/Monitoring. Safety (SIS) mode must be set when used in Safety Instrumented Systems. Control/Monitoring mode is intended for use in a Basic Process Control System (BPCS).*

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.

Measuring range for solids

The figures given in Table 7 should be considered as guidelines; the total measuring range may differ depending on other contributing application conditions such as product filling, how the product piles up, silo diameter vs. angle of repose, internal obstacles within the silo, dust, condensation, antenna build up, etc.

Table 7: Recommended Measuring Range for Solids, ft. (m)

Antenna	Light powder (1)	Light granulates and pellets(2)	Heavy powder (3)	Grains (4)	Larger particles (5)
1½-in. (DN40) cone	16 (5)	33 (10)	66 (20)	66 (20)	82 (25)
2-in. (DN50) cone/process seal(6)	16 (5)	33 (10)	82 (25)	82 (25)	98 (30)
3-in. (DN80) cone/process seal(6)	49 (15)	66 (20)	98 (30)	98 (30)	130 (40)
4-in. (DN100) process seal(6)					
4-in. (DN100) cone(6)	66 (20)	98 (30)	130 (40)	130 (40)	130 (40)
8-in. (DN200) parabolic(7)	115 (35)	130 (40)	130 (40)	130 (40)	130 (40)

(1) *Plastic powder, etc. (Dielectric constant: 1.2)*
(2) *Plastic pellets, etc. (Dielectric constant: 1.35)*
(3) *Lime powder, cement, sand, etc. (Dielectric constant: 1.5)*
(4) *Kernels, brans, etc. (Dielectric constant: 1.5)*
(5) *Wood chips/pellets, etc. (Dielectric constant: 1.7)*
(6) *Cone and process seal antennas are the preferred choice for most solid applications. For specific recommendations in dusty applications, see section "Dust management" in the Measuring Level and Volume of Solid Materials Technical Note.*
(7) *Recommended for longer measuring ranges, typically > 66 ft (20 m).*

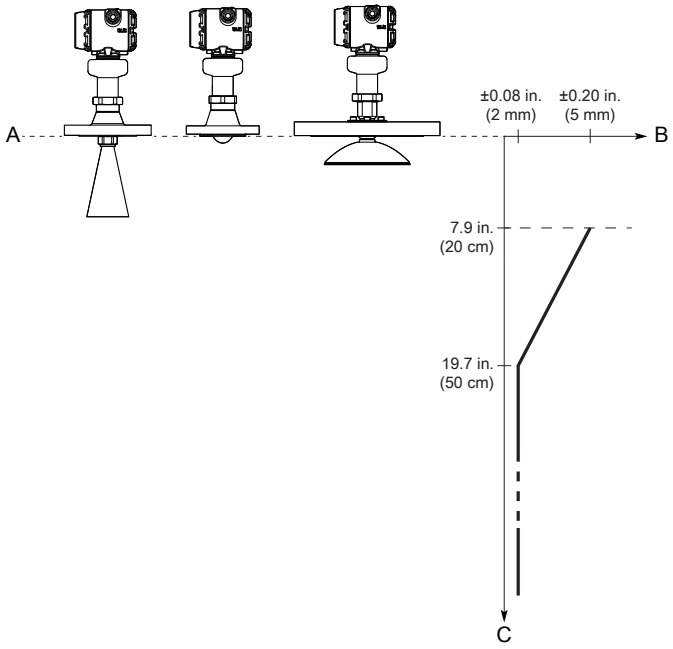
Accuracy over measuring range

The measuring range is limited by the blind zone at the very top of the tank. In the blind zone, the accuracy exceeds ±0.20 in. (±5 mm) and measurements may not be possible. Measurements close to the blind zone will have reduced accuracy (see Figure 3).

For the extended cone antennas, the reduced accuracy zone ends 11.8 in. (30 cm) below the antenna end.

The accuracy in still pipe/chamber installations depends on how well the antenna size matches the pipe size. For more details, refer to the Best Practices for Using Radar in Still Pipes and Chambers Technical Note.

Figure 3: Accuracy Over Measuring Range



A. Device Reference Point
B. Accuracy
C. Distance

Beam width and beam angle

The transmitter should be mounted with as few internal structures as possible within the signal beam. Refer to Table 8 for beam angle and Table 9 for beam width at different distances.

Figure 4: Beam Angle and Beam Width

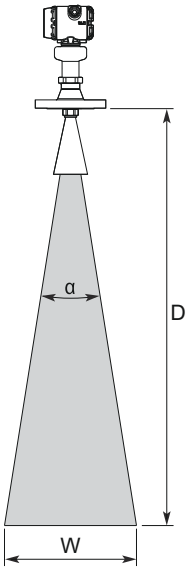


Table 8: Beam Angle

Antenna size	Beam angle (α)
1½-in. (DN 40) cone	22°
2-in. (DN50) cone/process seal	18°
3-in. (DN80) cone/process seal	14°
4-in. (DN100) cone/process seal	10°
8-in. (DN200) parabolic	4.5°

Table 9: Beam Width, ft. (m)

Distance (D)	Beam width (W)				
	1½-in. cone	2-in. cone/ process seal	3-in. cone/ process seal	4-in. cone/ process seal	Parabolic
16 (5)	6.2 (1.9)	5.2 (1.6)	4.0 (1.2)	2.9 (0.9)	1.3 (0.4)
33 (10)	12.8 (3.9)	10.4 (3.2)	8.1 (2.5)	5.7 (1.8)	2.6 (0.8)
49 (15)	19.0 (5.8)	15.6 (4.8)	12.1 (3.7)	8.6 (2.6)	3.9 (1.2)
66 (20)	25.6 (7.8)	20.8 (6.3)	16.1 (4.9)	11.5 (3.5)	5.2 (1.6)
82 (25)	31.8 (9.7)	26.0 (7.9)	20.1 (6.1)	14.3 (4.4)	6.4 (2.0)
98 (30)	38.4 (11.7)	31.2 (9.5)	24.2 (7.4)	17.2 (5.3)	7.7 (2.4)
131 (40)	51.2 (15.6)	41.6 (12.7)	32.2 (9.8)	23.0 (7.0)	10.3 (3.1)

Environment

Vibration resistance

- 2 g at 10-180 Hz according to IEC 61298-3, level “field with general application”
- IACS UR E10 test 7

For compliance with these standards, the transmitter housing must be fully engaged into the sensor module. This is achieved by rotating the transmitter housing clockwise to thread limit. For further details, see the Rosemount 5408 and 5408:SIS with HART® Reference Manual and Rosemount 5408 with FOUNDATION™ Fieldbus Reference Manual.

Electromagnetic compatibility (EMC)

- EMC Directive (2014/30/EU): EN 61326-1
- EN 61326-2-3
- NAMUR recommendations NE21(3)

For Rosemount 5408:SIS, the blue plug on the terminal block must be connected.

Pressure Equipment Directive (PED)

Complies with 2014/68/EU article 4.3

Built-in lightning protection

EN 61326, IEC 61000-4-5, level 6kV

(3) In challenging applications where the dynamic of the transmitter sensitivity is utilized by multiple factors such as small aperture antenna, very low product dielectric constant and/or turbulent surface, the margin for additional influence due to extreme EMC may be limited.

Radio approvals

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

Functional specifications

General

Field of application

Continuous level measurements for tank monitoring, process control, and overfill prevention on a broad range of liquids, slurries, and solids.

Ideal for applications with varying and harsh process conditions, such as heavy turbulence, foaming, product build-up, condensing vapors, sticky, viscous, corrosive, and crystallizing products.

Measurement principle

Frequency Modulated Continuous Wave (FMCW)

Frequency range

24.05 to 27.0 (26.5[4]) GHz

Maximum output power

-5 dBm (0.32 mW)

Internal power consumption

< 1 W in normal operation

Humidity

0 - 100% relative humidity, non-condensing

Turn-on time

< 40 s [5]

Functional safety

Safety Instrumented System (SIS) certification

The Rosemount 5408:SIS Level Transmitter is IEC 61508 certified accordingly:

- Low and high demand: Type B element
- SIL 2 for random integrity @ HFT=0
- SIL 3 for random integrity @ HFT=1
- SIL 3 for systematic capability

Safety deviation

±2.0% of analog output span

(4) 26.5 GHz in Australia, New Zealand, and Russia, and for LPR (Level Probing Radar), option code OA.
(5) Time from when power is applied to the transmitter until performance is within specifications.

Transmitter response time

- < 6 s at damping value 2 s (default)[6]
- < 2 s at damping value 0 s (minimum)[6]

The transmitter response time will be a function of the configured Damping value. Rosemount Radar Master Plus has a built-in function to calculate the transmitter's measurement response time (requires option code EF2).

Failure rates

Table 10: Failure Rates According to IEC 61508 in FIT (Failure In Time per billion hours)

λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}	SFF
0	260	736	79	92.7%

Proof testing

Table 11: Suggested Proof Tests

Proof test	Proof test coverage	Remaining dangerous, undetected failures
1-point level and analog output verification	74%	21 FIT
2-point level and analog output verification	84%	13 FIT
Analog output verification	35%	51 FIT
Level deviation monitoring	62%	30 FIT

Certificate and FMEDA report

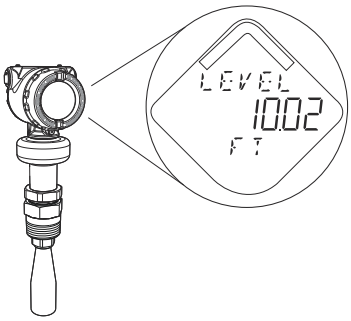
See the IEC 61508 Certificate and FMEDA report for additional details.

Display and configuration

LCD display (option code M5)

- Toggles between selected output variables
- Shows diagnostic information (alerts)

Figure 5: LCD Display



(6) Step response time as per IEC 61298-2.

Remote display

Data can be read remotely using the Rosemount 751 Field Signal Indicator for 4-20 mA / HART® (see Product Data Sheet), or the Rosemount 752 Remote Indicator for FOUNDATION™ Fieldbus (see Product Data Sheet).

Configuration tools

- Rosemount Radar Master Plus for Rosemount 5408 Series (accessible through any Field Device Integration (FDI) based tool, e.g Instrument Inspector™ Application(7))
- Device Descriptor (DD) based systems, e.g. AMS Device Manager, handheld communicator, and DeltaV™, or any other EDDL or enhanced-EDDL host
- Device Type Manager (DTM™) based systems, e.g. AMS Device Manager, Yokogawa Fieldmate/PRM, E+H FieldCare® , and PACTware™
- Field Device Integration (FDI) based systems, e.g. Instrument Inspector Application

Damping

User selectable (default is 2 s, minimum is 0 s)(8)

Output units

- Level and distance: ft., in., m, cm, mm
- Level rate: ft/s, in./min, in./s, m/h, m/s
- Volume: ft^3, $in.^3$, yd^3, US gal, imperial gal, barrel (bbl), m^3, l
- Temperature: °F, °C
- Signal strength: mV

Output variables

Variable	4-20 mA(1)	Digital output	LCD display
Level	✓	✓	✓
Distance (ullage)	✓	✓	✓
Volume	✓	✓	✓
Scaled variable(2)	✓	✓	✓
Electronics temperature	N/A	✓	✓
Signal quality(2)	N/A	✓	✓
Level rate	N/A	✓	✓
Signal strength	N/A	✓	✓
Percent of range(3)	N/A	✓	✓
Percent of range auxiliary	N/A	✓	✓
User-defined(2)	✓	✓	✓

(1) *Not applicable for FOUNDATION™ Fieldbus.*
(2) *Only for transmitters ordered with Smart Diagnostics Suite (option code DA1 or D01).*
(3) *4–20 mA HART® protocol only.*

(7) For additional information, visit Emerson.com/RosemountRadarMasterPlus.
(8) The Damping parameter defines how fast the device responds to level changes (step response). A high value makes the level steady but the device reacts slowly to level changes in the tank.

4-20 mA HART

Output

Two-wire, 4-20 mA. Digital process variable is superimposed on 4-20 mA signal, and available to any host that conforms to the HART protocol. The digital HART® signal can be used in multidrop mode.

HART Revision

- Revision 6 (default)
- Revision 7 (option code HR7)

The HART revision can be switched in field.

Power supply

Transmitter operates on 12-42.4 Vdc transmitter terminal voltage (12-30 Vdc in Intrinsically Safe installations).

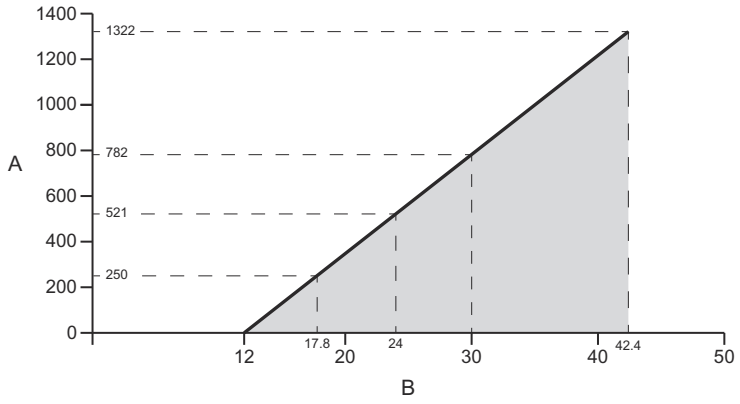
Power consumption

Max. 1 W, current max. 23 mA

Load limitations

For HART® communication, a minimum loop resistance of 250 Ω is required. Maximum loop resistance is determined by the voltage level of the external power supply.

Figure 6: Load Limits



Maximum Loop Resistance = 43.5 * (External Power Supply Voltage - 12)

A. Loop Resistance (Ohms)
B. External Power Supply Voltage (Vdc)

Cable selection

Use 24-14 AWG wire. Twisted pairs and shielded wiring are recommended for environments with high EMI (electromagnetic interference).

Use wire rated at least 5 °C above maximum ambient temperature.

Two wires can be safely connected to each terminal screw.

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 12: Signal on Alarm

Standard	High	Low
Rosemount standard	≥ 21.75 mA (default)	≤ 3.75 mA (option code C8)
NAMUR NE43	≥ 22.50 mA (option code C4)	≤ 3.6 mA (option code C5)

Analog saturation levels

The transmitter will drive the output to high or low saturation values if measurement goes outside the 4-20 mA range values.

Table 13: Saturation Levels

Standard	High	Low
Rosemount standard (default and option code C8)	20.8 mA	3.9 mA
NAMUR NE43 (option code C4 and C5)	20.5 mA	3.8 mA

FOUNDATION™ Fieldbus

Power supply

The transmitter operates on 9-32 Vdc (9-30 Vdc in Intrinsically Safe installations and 9-17.5 Vdc for FISCO) at the transmitter terminals.

Cable selection

Recommended wiring is 18 AWG twisted shielded pair, referred to as Fieldbus type A cable.

Use wire rated at least 5 °C above maximum ambient temperature.

Two wires can be safely connected to each terminal screw.

Quiescent current draw

22 mA

Blocks and execution time

Block	Execution time
1 Resource	N/A
2 Transducer	N/A
6 Analog Input (AI)	10 ms
1 Proportional/Integrate/Derivate (PID)	15 ms
1 Signal Characterizer (SGCR)	10 ms
1 Integrator (INT)	10 ms
1 Arithmetic (ARTH)	10 ms
1 Input Selector (ISEL)	10 ms
1 Control Selector (CS)	10 ms
1 Output Splitter (OS)	10 ms

FOUNDATION Fieldbus class (basic or Link Master)

Link Master (LAS)

Number of available VCRs

Maximum 20, including one fixed

FOUNDATION Fieldbus instantiation

Yes

Conforming FOUNDATION Fieldbus

ITK 6.3.1

FOUNDATION Fieldbus alerts

- Field diagnostics alerts
- Plantweb™ Insight alerts

Rosemount 2410 Tank Hub connectivity

Requires Rosemount 5408 with signal output code U.

Note
Rosemount 5408 Level Transmitter with signal output code F cannot be upgraded to signal output code U.

Power supply

The transmitter operates on FISCO 9.0 - 17.5 Vdc polarity insensitive (from Rosemount 2410 Tank Hub).

Cable selection

0.5-1.5 mm^2 (AWG 22-16), twisted shielded pairs, to be connected to the intrinsically safe side of the Rosemount 2410 Tank Hub.

Bus current draw

21 mA (nominal)

Built-in Tankbus terminator

Yes (to be connected if required)

Daisy chain possibility

Yes

Diagnostics

Alerts

The transmitter is compliant with NAMUR NE 107 Field Diagnostics for standardized device diagnostic information.

Tools and logging in Rosemount Radar Master Plus

- Echo curve
- Measurement and alert log

Rosemount Radar Master Plus, embedded in Instrument Inspector, enables easy and powerful troubleshooting with the echo curve tool as well as the measurement and alert log.

The measurement and alert log holds records of the last seven days of level readings and echo curve profiles, as well as the 50 last alert events. The logs can be transferred from the transmitter's internal memory to a local computer and be presented in a graphical time line, enabling analysis of historical behaviors.

Smart Diagnostics Suite

Signal Quality Metrics	Diagnostics package that monitors the relations between surface, noise, and threshold. The function can be used to detect abnormal conditions in the process such as antenna contamination or sudden loss of signal strength. Signal Quality is available as output variable and it comes with user configurable alerts.
Power Advisory	The transmitter automatically measures and monitors the input voltage. If the voltage is too low, operators will be provided with an early alert.
Scaled Variable	The scaled variable configuration allows the user to convert a transmitter variable into an alternative measurement, such as flow, mass, or calibrated level (e.g. five-point point verification).
User Defined Variable	Allows designating more than 200 variables in the device as output variable.

Process temperature and pressure rating

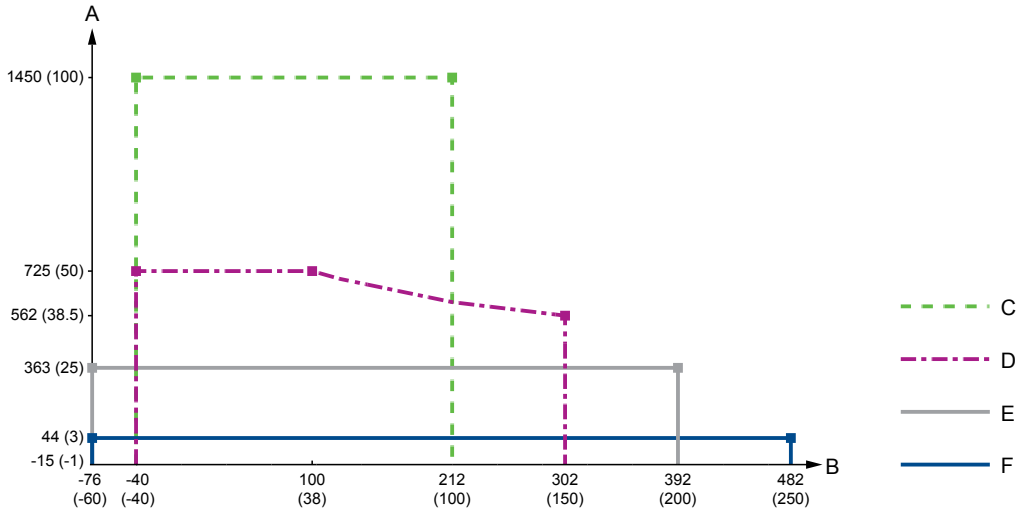
The following figures give the process temperature limits (measured at the lower part of the flange, Tri Clamp, or threaded connection) and pressure rating for different antenna types.

Final rating may be lower depending on flange selection.

For antenna type code CAB, at 100 °F (38 °C), the rating decreases with increasing temperature per ASME B16.5 Table 2-2.2, Class 300.

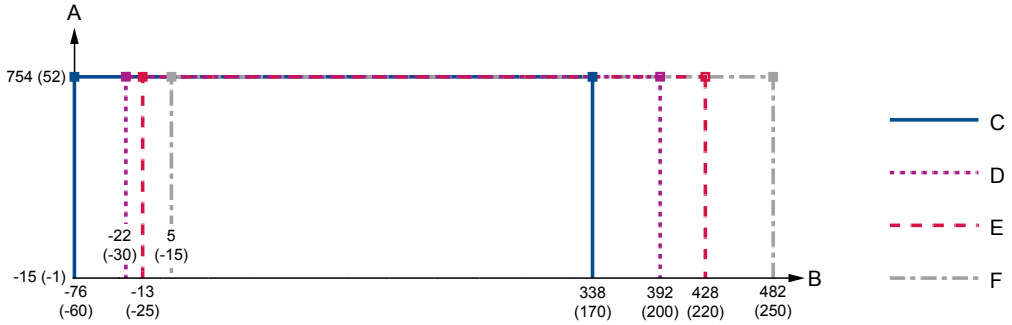
Note
For applications where saturated steam may occur, consult factory.

Figure 7: Cone Antenna (PTFE Seal)



A. Pressure psig (bar)
B. Temperature °F (°C)
C. Code CAC
D. Code CAB
E. Code CAA
F. Code CAD

Figure 8: Cone Antenna (PEEK Seal)



A. Pressure psig (bar)
B. Temperature °F (°C)
C. Code CBF (FVMQ)
D. Code CBV (Viton®)
E. Code CBM (FKM)
F. Code CBK (Kalrez® 6375)

Figure 9: Process Seal Antenna with Tri Clamp

A. Pressure psig (bar)
B. Temperature °F (°C)

Figure 10: 2-in. Process Seal Antenna with Flange

A. Pressure psig (bar)
B. Temperature °F (°C)

Figure 11: 3-in. Process Seal Antenna with Flange

A. Pressure psig (bar)
B. Temperature °F (°C)

Figure 12: 4-in. Process Seal Antenna with Flange

A. Pressure psig (bar)
B. Temperature °F (°C)

Figure 13: Parabolic Antenna

A. Pressure psig (bar)
B. Temperature °F (°C)

Cryogenic applications

Operating temperature at flange

See Figure 7 to Figure 13 for antenna type specific operating limits.

Operating temperature in tank

-320.8 to 482 °F (-196 to 250 °C)

Ambient temperature limits

Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications, see Product certifications.

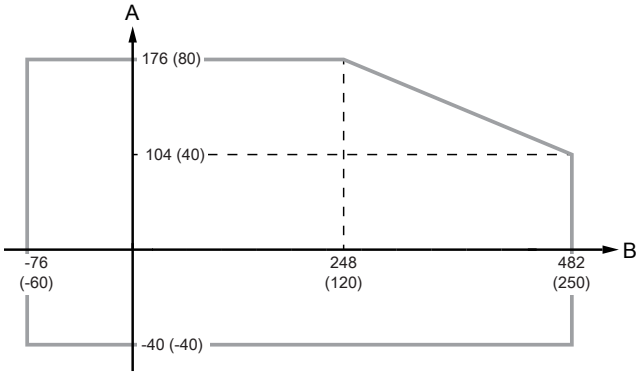
Table 14: Ambient Temperature Limits

Description	Operating limit	Storage limit(1)
Without LCD display	-40 °F to 176 °F (-40 °C to 80 °C)	-58 °F to 176 °F (-50 °C to 80 °C)
With LCD display(2)		-40 °F to 176 °F (-40 °C to 80 °C)

(1) *The minimum storage temperature is -22 °F (-30 °C) for the cone antenna with Kalrez® 6375 O-ring (antenna type code CBK).*
(2) *LCD display may not be readable and LCD display updates will be slower at temperatures below -4 °F (-20 °C).*

The ambient temperature limits may be further restricted by the process temperature as described by Figure 14.

Figure 14: Ambient Temperature vs. Process Temperature



A. Ambient temperature °F (°C)
B. Process temperature °F (°C)

Aside from ambient temperature variations, heat from the process may be transferred to the transmitter housing. Being exposed to a high process temperature without extra cooling for an extended period of time may cause the electronics temperature to exceed the allowed limit and thereby affect the transmitter's performance and reliability. The latter are potential risks whenever a transmitter has shut down due to high electronics temperature. The transmitter will warn about the electronics temperature being out of limits.

Flange rating

ASME

- 316 SST according to ASME B16.5 Table 2-2.2
- 316L SST according to ASME B16.5 Table 2-2.3 (for protective plate design)(9)
- Alloy C-276 (UNS N10276) according to ASME B16.5 Table 2-3.8
- Alloy 400 (UNS N04400) according to ASME B16.5 Table 2-3.4

EN

- 1.4404 according to EN 1092-1 material group 13E0

JIS

- 316 SST according to JIS B2220 material group No. 2.2
- 316L SST according to JIS B2220 material group No. 2.3 (for protective plate design)(9)

(9) Flange rating according to backing flange.

Conditions used for flange strength calculations

Table 15: 316/316L SST (EN 1.4404) Flanges

Item	ASME	EN, JIS
Bolting material	SA193 B8M CL.2, SA193 B7(1), or SA320 L7(1)	EN 1515-1/2, ISO 3506 A4-70, or Bumax® 88(1)
Gasket(2)	Soft (1a) with min. thickness 1.6 mm or Spiral wound gasket with nonmetallic filler (1b)	Soft (EN 1514-1) with min. thickness 1.6 mm or Spiral wound gasket with nonmetallic filler (EN 1514-2)
Flange material	Stainless steel A182 Gr. F316 and EN 10222-5-1.4404	
Hub material(3)	Stainless steel SA479 316 and EN 10272-1.4404	

(1) *Only applicable to forged one-piece flanges.*
(2) *Not applicable to process seal antenna (features an integrated gasket). Use of extra gasket may result in faulty installation.*
(3) *Only applicable to flanges with welded construction per Table 1.*

Table 16: Flanges with Protective Plate Design

Item	ASME	EN, JIS
Bolting material	SA193 B8M Cl.2	EN 1515-1/2, ISO 3506 A4-70
Gasket(1)	Soft (1a) with min. thickness 1.6 mm or Spiral wound gasket with nonmetallic filler (1b)	Soft (EN 1514-1) with min. thickness 1.6 mm or Spiral wound gasket with nonmetallic filler (EN 1514-2)
Flange material	Stainless steel A182 Gr. F316L/F316 and EN 10222-5-1.4404	
Hub material	SB574 Gr. N10276 (solution annealed condition) or SB164 Gr. N04400 (solution annealed condition)	

(1) *Note that a minimum gasket thickness of 0.125 in. (3.2 mm) is required when using an air purge ring (option code PC1).*

Table 17: Alloy C-276 (UNS N10276) Flanges

Item	ASME	EN, JIS
Bolting material	UNS N10276	UNS N10276
Gasket	Soft (1a) with min. thickness 1.6 mm or Spiral wound gasket with nonmetallic filler (1b)	Soft (EN 1514-1) with min. thickness 1.6 mm or Spiral wound gasket with nonmetallic filler (EN 1514-2)
Flange material	SB462 Gr. N10276 (solution annealed condition) or SB575 Gr. N10276 (solution annealed condition)	
Hub material	SB574 Gr. N10276 (solution annealed condition)	

Table 18: Alloy 400 (UNS N04400) Flanges

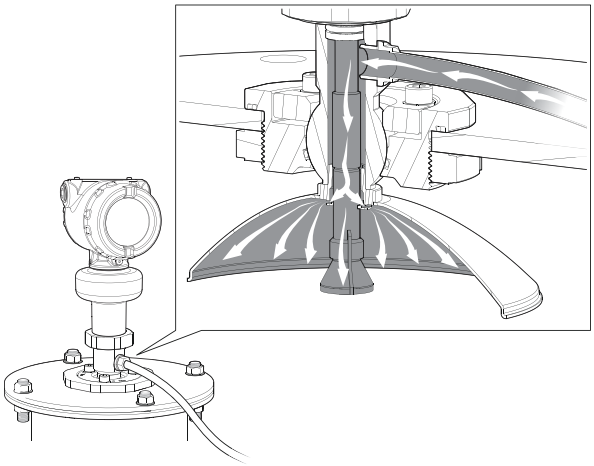
Item	ASME	EN, JIS
Bolting material	UNS N04400	UNS N04400
Gasket	Soft (1a) with min. thickness 1.6 mm or Spiral wound gasket with nonmetallic filler (1b)	Soft (EN 1514-1) with min. thickness 1.6 mm or Spiral wound gasket with nonmetallic filler (EN 1514-2)
Flange material	SB/B564 Gr. N04400 (solution annealed condition) or SB/B127 Gr. N04400 (solution annealed condition)	
Hub material	SB164 Gr. N04400 (solution annealed condition)	

Air purging

An air purge connection can prevent clogging of the antenna in extreme applications with dirt or heavy coating. To determine if air purging is needed, inspect the tank internal conditions at the location intended for the transmitter. If there is normally a thick layer of product build-up there, air purging is most likely needed. Typical purging media to use is air.

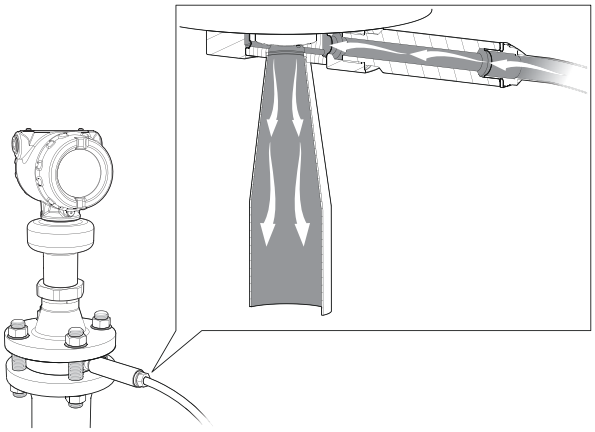
All parabolic antennas come with an integrated air purge connection (see Figure 15).

Figure 15: Air Purging for Parabolic Antenna



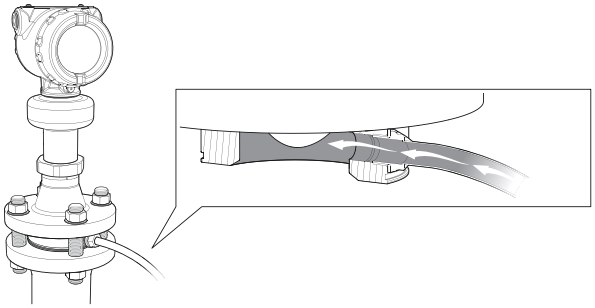
An air purge connection is also available for cone antennas with flanged connection by selecting option code PC1. This option consists of an antenna with purge holes and a separate air purge ring (see Figure 16).

Figure 16: Air Purging for Cone Antenna



Flushing connection rings are available as accessory for use with process seal antennas.

Figure 17: Air Purging for Process Seal Antenna



Incoming air supply specification

- Maximum pressure: 190 psi (13 bar)
- Recommended pressure: 100 to 115 psi (7 to 8 bar)
- Inlet/outlet connection: BSPP (G) ⅜-in.
- Air consumption: 252 gal/min at 65 psi (955 l/min at 4.5 bar)

System integration

Rosemount 333 HART® Tri-Loop™

By sending the digital HART signal to the optional HART Tri-Loop, it is possible to have up to three additional 4–20 mA analog signals.

See the Rosemount 333 HART Tri-Loop Product Data Sheet for additional information.

Emerson Wireless 775 THUM™ Adapter

The optional Emerson Wireless 775 THUM Adapter can be mounted directly on the transmitter or by using a remote mounting kit.

IEC 62591 (*Wireless*HART®) enables access to multivariable data and diagnostics, and adds wireless to almost any measurement point.

See the Emerson Wireless 775 THUM Adapter Product Data Sheet and Technical Note for additional information.

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.

Transmissible Spongiform Encephalopathy (TSE) Declaration

This declaration is applicable to Tri Clamp connections.

Emerson certifies no process wetted components used in hygienic seal products contain substances of animal origin. Materials used in the production or processing of wetted components for hygienic seals meet the requirements stated in EMA/410/01 Rev. 3 and ISO 22442-1:2015. Wetted components in hygienic seals are considered free of TSE.

Engineered solutions

When standard model codes are not sufficient to fulfill requirements, please consult the factory to explore possible Engineered Solutions. This is typically, but not exclusively, related to the choice of wetted materials or the design of a process connection. These Engineered Solutions are part of the expanded offerings and may be subject to additional delivery lead time. For ordering, factory will supply a special P-labeled numeric option code that should be added at the end of the standard model string.

Housing and enclosure

Electrical connections

Two cable/conduit entries (½-14 NPT, M20 x 1.5, or G½)

Optional adapters: M12 4-pin male eurofast connector or A size Mini 4-pin male minifast connector

Materials

- Electronics housing: Polyurethane-covered Aluminum or Stainless Steel Grade CF-8M (ASTM A743)
- Sensor module: 316L SST

Weight

- Aluminum housing: 6.2 lb (2.8 kg) [10]
- Stainless steel housing: 10.0 lb (4.5 kg)[10]

Ingress protection

IP 66/67/68[11] and NEMA® 4X

Tank connection

The tank connection consists of a tank seal, a flange, NPT or BSPP (G) threads, Tri Clamp, or a specific welded connection with swivel feature for parabolic antenna.

Flange dimensions

Follows ASME B16.5, JIS B2220, and EN 1092-1 standards. For more information, see Standard flanges.

Tri Clamp connection

Follows ISO 2852 standard.

Antenna versions

Cone antenna

- Best choice for most applications, including closed vessels, still pipe/chamber installations, and open air applications
- Extended cone antennas are available for tall nozzles (option code S1 and S2). Depending on measurement conditions, a reduction of sensitivity close to antenna end might be present.

Process seal antenna

- All PTFE wetted parts ideal for use in corrosive and hygienic applications
- Suitable for applications with heavy condensation/build-up

Parabolic antenna

- Alternative for long measuring ranges in combination with conditions such as low reflective media
- Suitable for a broad range of solid materials (may need air purging in dusty environments)

Material exposed to tank atmosphere

Cone antenna, PTFE seal

- 316/316L SST (EN 1.4404), Alloy C-276 (UNS N10276), or Alloy 400 (UNS N04400)
- PTFE fluoropolymer

Cone antenna, PEEK seal

- 316/316L SST (EN 1.4404), Alloy C-276 (UNS N10276), or Alloy 400 (UNS N04400)
- PEEK polyetheretherketone
- FVMQ fluorosilicone, Kalrez® 6375 perfluoroelastomer, FKM fluoroelastomer, or Viton® fluoroelastomer (O-ring)

(10) Fully functional transmitter with sensor module, housing, terminal block, LCD display, and covers.
(11) The transmitter meets IP 68 at 9.8 ft. (3 m) for 30 minutes.

Process seal antenna

- PTFE fluoropolymer

Parabolic antenna

- 316/316L SST (EN 1.4404)
- PTFE fluoropolymer
- FVMQ fluorosilicone (O-ring)

Installation and mounting considerations

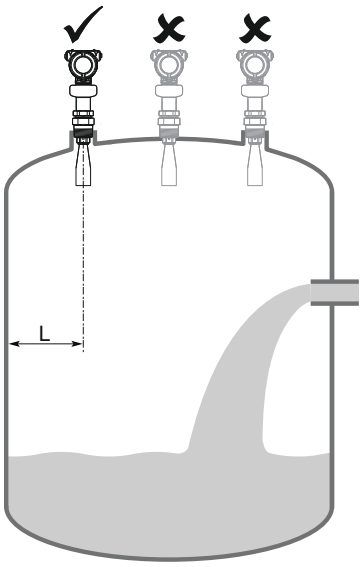
Tank installations

- 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, see Beam width and beam angle.
- Do not install the transmitter in the center of the tank.
- Do not mount close to or above the inlet stream.
- Multiple Rosemount 5408 and 5408:SIS Level Transmitters can be used in the same tank without interfering with each other.

Table 19: Distance to Tank Wall (L)

Application	Minimum	Recommended
Liquids	8 in. (200 mm)	½ of tank radius
Solids	8 in. (200 mm)	⅔ of tank radius

Figure 18: Recommended Mounting Position



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.

Antenna size

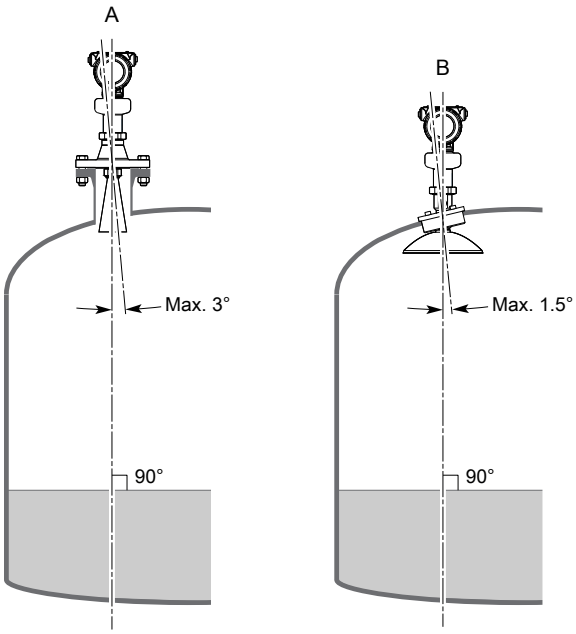
Choose as large antenna diameter as possible. A larger antenna diameter concentrates the radar beam, will be less susceptible to obstruction interference, and assures maximum antenna gain.

Antenna inclination

Ensure the antenna is aligned perpendicular to the product surface (see Figure 19). The parabolic antenna comes with a swivel connection that adjusts for angled tank roofs.

Note that if the surface echo is weak in solids applications, then a small inclination of the parabolic antenna toward the surface slope may improve the performance.

Figure 19: Inclination



A. Cone antenna/process seal antenna
B. Parabolic antenna

Nozzle requirements for cone antenna

For best performance, the cone antenna should extend at least 0.4 in. (10 mm) below the nozzle. If required, use the extended cone antenna versions (option code S1 or S2).

However, the antenna can be recessed in smooth nozzles up to 4 ft. (1.2 m). Note that if the inside of the nozzle has irregularities (e.g. due to bad welding, rust, or deposit), then use the extend cone antenna.

Figure 20: Mounting of the Cone Antenna

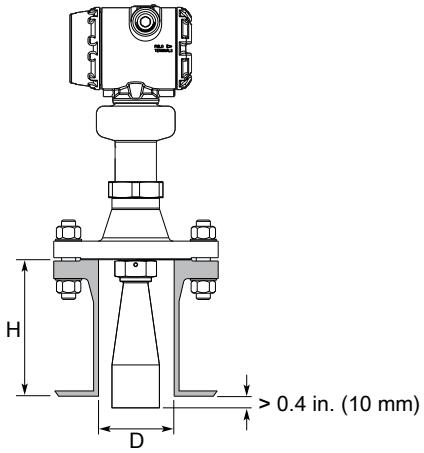


Table 20: Nozzle Requirements for Cone Antenna, in Inches (Millimeters)

Antenna size	Minimum nozzle diameter (D)(1)	Recommended maximum nozzle height (H)(2)(3)	
		Antenna	Antenna with air purge ring (code PC1)
1½-in. (DN 40)	1.50 (38.1)	5.59 (142)	N/A
2-in. (DN50)	1.94 (49.3)	5.71 (145)	4.69 (119)
3-in. (DN80)	2.80 (71.0)	5.63 (143)	4.61 (117)
4-in. (DN100)	3.78 (96.0)	6.54 (166)	5.51 (140)

(1) *The antennas are sized to fit within schedule 80 or lower schedules.*
(2) *The values are valid for cone antennas without antenna extension.*
(3) *For liquid applications, the cone antenna can be recessed in smooth nozzles up to 4 ft. (1.2 m), but note that the accuracy may be reduced in the region close to the nozzle.*

Nozzle requirements for process seal antenna

The antenna can be used on nozzles up to 4 ft. (1.2 m). Disturbing objects inside the nozzle may impact the measurement, and should therefore be avoided.

Figure 21: Mounting of the Process Seal Antenna

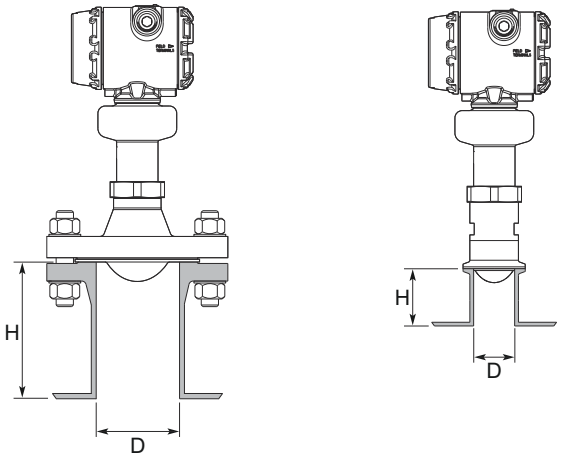


Table 21: Nozzle Requirements for Process Seal Antenna

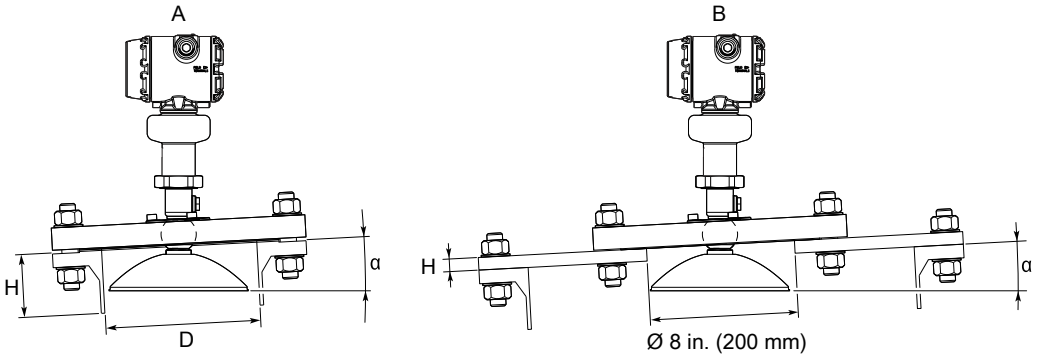
Antenna size	Minimum nozzle diameter (D)(1)	Recommended maximum nozzle height (H)(2)
2-in. (DN50)	1.77 in. (45 mm)	4 ft. (1.2 m)
3-in. (DN80)	2.76 in. (70 mm)	4 ft. (1.2 m)
4-in. (DN100)	2.76 in. (70 mm)	4 ft. (1.2 m)

(1) *The antennas are sized to fit within schedule 120 or lower schedules.*
(2) *For hygienic applications, the nozzle height (H) must not exceed two times the nozzle diameter (D) to ensure cleanability. Maximum nozzle height is 5 in. (127 mm).*

Nozzle requirements for parabolic antenna

See Table 22 for nozzle height recommendations at different inclination angle.

Figure 22: Mounting of the Parabolic Antenna



A. Nozzle mounting
B. Flange mounting in manhole cover

Table 22: Nozzle Requirements for Parabolic Antenna, in Inches (Millimeters)

Nozzle size (D)	Inclination angle (α)	Maximum nozzle height (H)(1)
Pipe schedule std, Ø 8 in. (200 mm)	0°	6.1 (155)
	3°	3.4 (85)
	6°	1.6 (40)
	9°	1.2 (30)
	12°	1.0 (25)
	15°	0.6 (15)
Pipe schedule std, Ø10 in. (250 mm)	0°	17.2 (440)
	3°	10.2 (260)
	6°	7.1 (180)
	9°	5.1 (130)
	12°	3.9 (100)
	15°	3.0 (75)

(1) *Note that the inside of the nozzle must be smooth (i.e. avoid bad welding, rust, or deposit).*

Still pipe/chamber installations

Installation in still pipe/chamber is recommended for tanks where there are excessive foaming or turbulence. Still pipe/chamber may also be used to avoid disturbing objects in the tank.

For more information and installation requirements, refer to the Best Practices for Using Radar in Still Pipes and Chambers Technical Note.

Still pipe

Consider the following still pipe requirements:

Pipe

- Pipes should be an all-metal material.
- Pipe should have a constant inside diameter.
- The inner surface must be smooth and clear of any rough edges. (Smooth pipe joints are acceptable, but may reduce accuracy.)
- The end of the pipe must extend beyond the zero level.

Holes

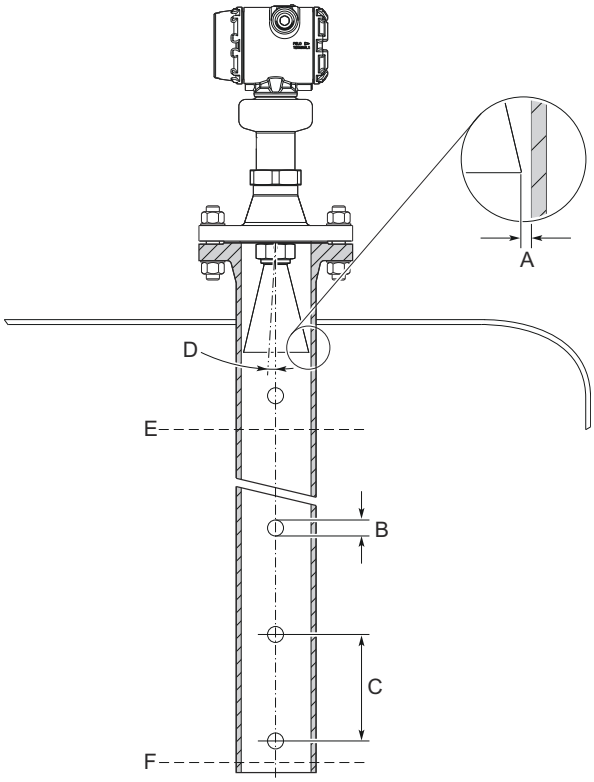
- Maximum hole diameter is 1 in. (25 mm).
- Minimum distance between holes is 6 in. (150 mm).
- Holes should be drilled on one side only and deburred.
- Drill one hole above maximum product surface.

Antenna

- All cone/process seal antenna sizes can be used for still pipe/chamber installations.
- The gap between the cone antenna and the still pipe should be maximum 0.2 in. (5 mm)[12]. Larger gaps may result in inaccuracies. If required, order a larger antenna and cut on location. See Table 38 for antenna dimensions.

(12) A larger gap is inevitable for the 4-in. cone antenna in pipes with a diameter larger than 4 in.

Figure 23: Still Pipe Requirements



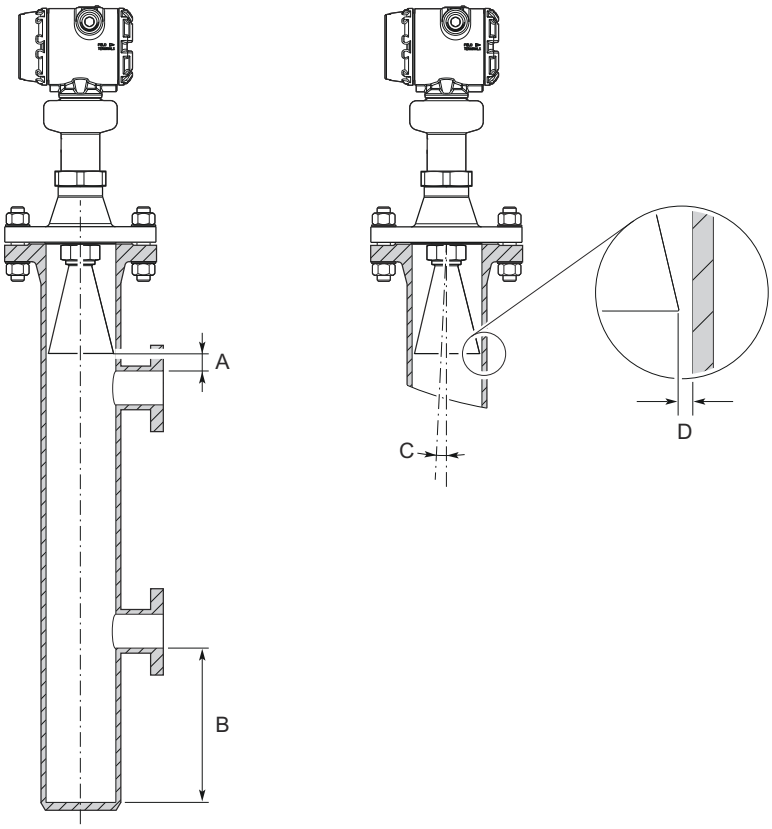
A. Maximum 0.2 in. (5 mm)
B. Maximum 1 in. (25 mm)
C. Minimum 6 in. (150 mm)
D. Maximum 1°
E. Level = 100%
F. Level = 0%

Chamber

Consider the following chamber requirements:

- Pipes should be an all-metal material.
- Pipe should have a constant inside diameter.
- Inlet pipes should not protrude into the inside of the stand pipe.
- The inner surface must be smooth and clear of any rough edges. (Smooth pipe joints are acceptable, but may reduce accuracy.)
- The gap between the cone antenna and the stand pipe should be maximum 0.2 in. (5 mm)[12]. Larger gaps may result in inaccuracies. If required, order a larger antenna and cut on location. See Table 38 for antenna dimensions.

Figure 24: Chamber Requirements



A. Minimum 0.4 in. (10 mm)
B. Minimum 6 in. (150 mm)
C. Maximum 1°
D. Maximum 0.2 in. (5 mm)

Ball valve installation

The transmitter can be isolated from the process by using a valve:

- Use a full-port ball valve.
- Ensure there is no edge between the ball valve and the nozzle or still pipe, the inside should be smooth.
- Valves can be combined with still pipes.
- The ball valve should have the same inner diameter as the still pipe.

Shipboard installations

Transmitters with aluminum housing are not approved for open deck installations; for use only in engine room, pump room, etc.

For application conditions and limitations refer to the applicable shipboard approval.

Product certifications

Rev 4.17

European directive information

A copy of the EU Declaration of Conformity can be found at the end of the Rosemount 5408 and 5408:SIS Product Certifications document. The most recent revision of the EU Declaration of Conformity can be found at Emerson.com/Rosemount.

Safety Instrumented Systems (SIS)

SIL 3 Capable: IEC 61508 certified for use in safety instrumented systems up to SIL 3 (Minimum requirement of single use (1oo1) for SIL 2 and redundant use (1oo2) for SIL 3).

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).

Telecommunication compliance

Measurement principle

Frequency Modulated Continuous Wave (FMCW), 26 GHz

Maximum output power

-5 dBm (0.32 mW)

Frequency range

24.05 to 27.0(13) GHz (TLPR)

24.05 to 26.5 GHz (LPR)

LPR (Level Probing Radar) equipment are devices for measurement of level in the open air or in a closed space. Model option “OA”. Hardware Version Identification Number (HVIN) is 5408L.

TLPR (Tank Level Probing Radar) equipment are devices for measurement of level in a closed space only (i.e metallic, concrete or reinforced fiberglass tanks, or similar enclosure structures made of comparable attenuating material). Hardware Version Identification Number (HVIN) is 5408T.

FCC

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the

(13) 26.5 GHz in Australia, New Zealand, and Russia.

instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC ID K8C5408L (for LPR)
K8C5408T (for TLPR)

IC

This device complies with Industry Canada's licence-exempt RSS standard. Operation is subject to the following conditions:

1. This device may not cause interference.
2. This device must accept any interference received, including interference that may cause undesired operation.
3. The installation of the LPR/TLPR device shall be done by trained installers in strict compliance with the manufacturer's instructions.
4. The use of this device is on a "no-interference, no-protection" basis. That is, the user shall accept operations of high-powered radar in the same frequency band which may interfere with or damage this device. However, devices found to interfere with primary licensing operations will be required to be removed at the user's expense.
5. Devices operating under TLPR conditions (i.e. not operating in "Open Air" Mode) shall be installed and operated in a completely enclosed container to prevent RF emissions, which can otherwise interfere with aeronautical navigation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage.
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
3. L'installation d'un dispositif LPR ou TLPR doit être effectuée par des installateurs qualifiés, en pleine conformité avec les instructions du fabricant.
4. Ce dispositif ne peut être exploité qu'en régime de non-brouillage et de non-protection, c'est-à-dire que l'utilisateur doit accepter que des radars de haute puissance de la même bande de fréquences puissent brouiller ce dispositif ou même l'endommager. D'autre part, les capteurs de niveau qui perturbent une exploitation autorisée par licence de fonctionnement principal doivent être enlevés aux frais de leur utilisateur.
5. Un dispositif visé comme TLPR doit être installé et exploité dans un réservoir entièrement fermé afin de prévenir les rayonnements RF qui pourraient autrement perturber la navigation aéronautique.

Certificate 2827A-5408L (for LPR)
2827A-5408T (for TLPR)

Radio Equipment Directive (RED) 2014/53/EU

This device complies with ETSI EN 302 372 (TLPR), ETSI EN 302 729 (LPR) and EN 62479.

For the receiver test that covers the influence of an interferer signal to the device, the performance criterion has at least the following level of performance according to ETSI TS 103 361 [6].

- Performance criterion: measurement value variation Δd over time during a distance measurement
- Level of performance: Δd ≤ ±2 mm

LPR (Level Probing Radar), model code "OA"

Install at a separation distance of >4 km from Radio Astronomy sites, unless a special authorization has been provided by the responsible National regulatory authority (a list of Radio Astronomy sites may be found at www.craf.eu).

Between 4 km to 40 km around any Radio Astronomy site the LPR antenna height shall not exceed 15 m height above ground.

TLPR (Tank Level Probing Radar)

The device must be installed in closed tanks. Install according to requirements in ETSI EN 302 372 (Annex E).

Installing equipment in North America

The US National Electrical Code® (NEC) and the Canadian Electrical Code (CEC) permit the use of Division marked equipment in Zones and Zone marked equipment in Divisions. The markings must be suitable for the area classification, gas, and temperature class. This information is clearly defined in the respective codes.

USA

E5 Explosionproof (XP), Dust-Ignitionproof (DIP)

Certificate	FM-US FM16US0010X
Standards	FM Class 3600 – 2018; FM Class 3615 – 2018; FM Class 3810 – 2005; ANSI/ISA 60079-0 – 2013; ANSI/UL 60079-1 – 2015; ANSI/UL 60079-26 – 2017; ANSI/ISA 60079-31 – 2015; ANSI/NEMA® 250 – 1991; ANSI/IEC 60529 – 2014, ANSI/ISA 12.27.01:2011
Markings	XP CL I, DIV 1, GRPS A, B, C, D T6...T2 DIP CLII/III, DIV 1, GRPS E, F, G; T6...T3 CL I Zone 0/1 AEx db IIC T6...T2 Ga/Gb Zone 21 AEx tb IIIC T85 °C...T250 °C Db (-40 °C ≤ Ta ≤ +70 °C) (14); Type 4X/IP6X SINGLE SEAL

Specific Conditions of Use (X):

1. Flamepath joints are not for repair. Contact the manufacturer.
2. Plastic wire-on tag, Plastic part of Process Seal Antenna and Non-standard paint options (paint options other than Rosemount Blue) may cause risk from Electrostatic discharge. Avoid installation that could cause electrostatic build-up, and only clean with a damp cloth.
3. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5 °C greater than the maximum specified ambient temperature for location where installed.
4. The Transmitter can be installed in the boundary wall between a Zone 0 and Zone 1 area. In this configuration, the process connection is installed in Zone 0, while the transmitter housing is installed in Zone 1. Refer to Control Drawing D7000002-885.

(14) Other temperature ranges may apply, see Specific Conditions of Use (X).

5. Cable entries must be used which maintain the ingress protection of the enclosure to at least IP6X and/or Type 4X rating. To maintain the ingress protection ratings, Covers and Sensor Module to be fully tightened and PTFE tape or pipe dope is required for cable entries and blanking plugs. See Instruction Manual on application requirements.
6. Install per Control drawing D7000002-885.
7. Using the box provided on the nameplate, the User shall permanently mark the type of protection chosen for the specific installation. Once the type of protection has been marked it shall not be changed.
8. Display glass shall be positioned in such a way as to minimize the risk of mechanical impact.
9. The applicable temperature class, ambient temperature range and process temperature range of the equipment is as follows:

Table 23: For Divisions:

Temperature class / Maximum surface temperature	Ambient temperature range	Process temperature range
Division Gas groups:		
T2	-40 °C ≤ Ta ≤ 70 °C	-40 °C to 250 °C
T3	-40 °C ≤ Ta ≤ 70 °C	-40 °C to 195 °C
T4	-40 °C ≤ Ta ≤ 70° C	-40 °C to 130 °C
T5	-40 °C ≤ Ta ≤ 70 °C	-40 °C to 95 °C
T6	-40 °C ≤ Ta ≤ 70 °C	-40 °C to 80 °C
Division Dust groups:		
T3	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 160 °C
T4	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 130 °C
T5	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 95 °C
T6	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 80 °C

Table 24: For Zones:

Temperature class / Maximum surface temperature	Ambient temperature range	Process temperature range
Zone Gas groups:		
T2	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 250 °C
T3	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 195 °C
T4	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 130 °C
T5	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 95 °C
T6	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 80 °C
Zone Dust groups:		
T250°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 250 °C
T200°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 195 °C
T135°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 130 °C
T100°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 95 °C
T85°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 80 °C

I5 Intrinsic Safety (IS), Non-Incendive (NI)

Certificate FM-US FM16US0010X

Standards FM Class 3600 – 2018; FM Class 3610 – 2018; FM Class 3611 – 2018; FM Class 3810 – 2005; ANSI/ISA 60079-0 – 2013; ANSI/UL 60079-11 – 2014; ANSI/UL 60079-26 – 2017; ANSI/NEMA® 250 – 1991; ANSI/IEC 60529 – 2014; ANSI/ISA 12.27.01:2011

Markings IS CL I, II, III DIV 1, GRPS A-G T4...T2
NI CL I, DIV 2, GRPS A-D T4...T2
S CL II, III DIV 2, GRPS E-G T4...T3
CL I Zone 0 AEx ia IIC T4...T2 Ga
CL I Zone 0/1 AEx ib IIC T4...T2 Ga/Gb
Zone 20 AEx ia IIIC T85°C...T250°C Da
-60 (-55) °C ≤ Ta ≤ +70 °C
When installed per Control Drawing D7000002-885
SINGLE SEAL

Safety parameter	HART®	Fieldbus
Voltage U_i	30 V	30 V
Current I_i	133 mA	300 mA
Power P_i	1.0 W	1.5 W
Capacitance C_i	7.3 nF	1.1 nF
Inductance L_i	0	0

Specific Conditions of Use (X):

1. The Model 5408 Level Transmitter will not pass the 500Vrms dielectric strength test between the circuits and the earth ground. This must be taken into account during installation.
2. Plastic wire-on tag, Plastic part of Process Seal Antenna and Non-standard paint options (paint options other than Rosemount Blue) may cause risk from Electrostatic discharge. Avoid installation that could cause electrostatic build-up, and only clean with a damp cloth.
3. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5 °C greater than the maximum specified ambient temperature for location where installed.
4. The Transmitter can be installed in the boundary wall between a Zone 0 and Zone 1 area. In this configuration, the process connection is installed in Zone 0, while the transmitter housing is installed in Zone 1. Refer to Control Drawing D7000002-885.
5. Using the box provided on the nameplate, the User shall permanently mark the type of protection chosen for the specific installation. Once the type of protection has been marked it shall not be changed.
6. The applicable temperature class, ambient temperature range and process temperature range if the equipment is as follows:

Table 25: For Divisions:

Temperature class / Maximum surface temperature	Ambient temperature range(1)	Process temperature range(1)
Division Gas groups:		
T2	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 250 °C
T3	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 195 °C
T4	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 130 °C
Division Dust groups:		
T3	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 160 °C
T4	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 130 °C
T5	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 95 °C
T6	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 80 °C

(1) *-55 °C for Fieldbus; -60 °C for HART*

Table 26: For Zones:

Temperature class / Maximum surface temperature	Ambient temperature range(1)	Process temperature range(1)
Zone Gas groups:		
T2	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 250 °C
T3	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 195 °C
T4	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 130 °C
Zone Dust groups:		
T250°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 250 °C
T200°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 195 °C
T135°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 130 °C
T100°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 95 °C
T85°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 80 °C

(1) *-55 °C for Fieldbus; -60 °C for HART*

IE FISCO

Certificate FM-US FM16US0010X

Standards FM Class 3600 – 2018; FM Class 3610 – 2018; FM Class 3611 – 2018; FM Class 3810 – 2005; ANSI/ISA 60079-0 – 2013; ANSI/UL 60079-11 – 2014; ANSI/UL 60079-26 – 2017; ANSI/NEMA® 250 – 1991; ANSI/IEC 60529 – 2014; ANSI/ISA 12.27.01:2011

Markings
IS CL I, II, III DIV 1, GRPS A-G T4...T2
NI CL I, DIV 2, GRPS A-D T4...T2
S CL II, III DIV 2, GRPS E-G T4...T3
CL I Zone 0 AEx ia IIC T4...T2 Ga
CL I Zone 0/1 AEx ib IIC T4...T2 Ga/Gb
Zone 20 AEx ia IIIC T85°C...T250°C Da
-55 °C ≤ Ta ≤ +70°C

When installed per Control Drawing D7000002-885
SINGLE SEAL

Safety parameter	FISCO
Voltage U_i	17.5 V
Current I_i	380 mA
Power P_i	5.32 W
Capacitance C_i	1.1 nF
Inductance L_i	0

Specific Conditions of Use (X):

1. The Model 5408 Level Transmitter will not pass the 500Vrms dielectric strength test between the circuits and the earth ground. This must be taken into account during installation.
2. Plastic wire-on tag, Plastic part of Process Seal Antenna and Non-standard paint options (paint options other than Rosemount Blue) may cause risk from Electrostatic discharge. Avoid installation that could cause electrostatic build-up, and only clean with a damp cloth.
3. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5°C greater than the maximum specified ambient temperature for location where installed.
4. The Transmitter can be installed in the boundary wall between a Zone 0 and Zone 1 area. In this configuration, the process connection is installed in Zone 0, while the transmitter housing is installed in Zone 1. Refer to Control Drawing D7000002-885.
5. Using the box provided on the nameplate, the User shall permanently mark the type of protection chosen for the specific installation. Once the type of protection has been marked it shall not be changed.
6. The applicable temperature class, ambient temperature range and process temperature range if the equipment is as follows:

Table 27: For Divisions:

Temperature class / Maximum surface temperature	Ambient temperature range	Process temperature range
Division Gas groups:		
T2	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 250 °C
T3	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 195 °C
T4	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 130 °C
Division Dust groups:		
T3	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 160 °C
T4	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 130 °C
T5	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 95 °C
T6	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 80 °C

Table 28: For Zones:

Temperature class / Maximum surface temperature	Ambient temperature range	Process temperature range
Zone Gas groups:		
T2	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 250 °C
T3	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 195 °C
T4	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 130 °C
Zone Dust groups:		
T250°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 250 °C
T200°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 195 °C
T135°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 130 °C
T100°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 95 °C
T85°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 80 °C

Canada

E6 Explosionproof, Dust-Ignitionproof

Certificate FM-C FM16CA0011X

Standards C22.2 NO. 0.4-17:2017, C22.2 NO. 0.5-16:2016, C22.2 No. 25-17:2017, C22.2 No.30-M1986:1986 (R:2016), C22.2 No.94-M91:1991 (R:2011), C22.2 No. 61010-1:2004, CAN/CSA C22.2 No. 60079-0:2015 Ed. 3, C22.2 No. 60079-1:2016 Ed. 3, C22.2 No. 60079-26:2016; CAN/CSA-C22.2 No. 60079-31:2015, C22.2. 60529:2016, ANSI/ISA 12.27.01:2011

Markings XP CL I, DIV 1, GRPS A-D T6...T2
DIP CLII/III, DIV 1, GRPS E-G; T6...T3
Ex db IIC T6...T3 Gb
Ex tb IIIC T85°C...T250°C Db
(-40 °C ≤ Ta ≤ +70 °C) (15); Type 4X/IP6X
SINGLE SEAL

Specific Conditions of Use (X):

1. Flamepath joints are not for repair. Contact the manufacturer.
2. Plastic wire-on tag, Plastic part of Process Seal Antenna and Non-standard paint options (paint options other than Rosemount Blue) may cause risk from Electrostatic discharge. Avoid installation that could cause electrostatic build-up, and only clean with a damp cloth.
3. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5 °C greater than the maximum specified ambient temperature for location where installed.
4. Metric Field Wiring Entries are not allowed for Divisions.
5. The Transmitter can be installed in the boundary wall between a Zone 0 and Zone 1 area. In this configuration, the process connection is installed in Zone 0, while the transmitter housing is installed in Zone 1. Refer to Control Drawing D7000002-885.

(15) Other temperature ranges may apply, see Specific Conditions of Use (X).

6. Cable entries must be used which maintain the ingress protection of the enclosure to at least IP6X and/or Type 4X rating. To maintain the ingress protection ratings, Covers and Sensor Module to be fully tightened and PTFE tape or pipe dope is required for cable entries and blanking plugs. See Instruction Manual on application requirements.
7. Install per Control Drawing D7000002-885.
8. Using the box provided on the nameplate, the User shall permanently mark the type of protection chosen for the specific installation. Once the type of protection has been marked it shall not be changed.
9. Display glass shall be positioned in such a way as to minimize the risk of mechanical impact.
10. The applicable temperature class, ambient temperature range and process temperature range of the equipment is as follows:

Table 29: For Divisions:

Temperature class / Maximum surface temperature	Ambient temperature range	Process temperature range
Division Gas groups:		
T2	-40 °C ≤ Ta ≤ 70 °C	-40 °C to 250 °C
T3	-40 °C ≤ Ta ≤ 70 °C	-40 °C to 195 °C
T4	-40 °C ≤ Ta ≤ 70 °C	-40 °C to 130 °C
T5	-40 °C ≤ Ta ≤ 70 °C	-40 °C to 95 °C
T6	-40 °C ≤ Ta ≤ 70 °C	-40 °C to 80 °C
Division Dust groups:		
T3	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 160 °C
T4	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 130 °C
T5	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 95 °C
T6	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 80 °C

Table 30: For Zones:

Temperature class / Maximum surface temperature	Ambient temperature range	Process temperature range
Zone Gas groups:		
T2	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 250 °C
T3	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 195 °C
T4	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 130 °C
T5	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 95 °C
T6	-50 °C ≤ Ta ≤ 70 °C	-50 °C to 80 °C
Zone Dust groups:		
T250°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 250 °C
T200°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 195 °C
T135°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 130 °C
T100°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 95 °C
T85°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 80 °C

I6 Intrinsically Safe and Non-Incendive Systems

Certificate FM-C FM16CA0011X

Standards C22.2 NO. 0.4-17:2017, C22.2 NO. 0.5-16:2016, C22.2 No. 25-17:2017, C22.2 No.94-M91:1991 (R:2011), C22.2 No. 213-16:2016, C22.2 No. 61010-1:2004, CAN/CSA C22.2 No. 60079-0:2015 Ed. 3, CAN/CSAC22.2 No. 60079-11:2014 Ed. 2, CAN/CSAC22.2 No. 60079-15:2016 Ed.2, C22.2 No. 60079-26:2016, C22.2. 60529:2016, ANSI/ISA 12.27.01:2011

Markings IS CL I, II, III DIV 1, GRPS A-G T4...T2
NI CL I, DIV 2, GRPS A-D T4...T2
S CL II, III DIV 2, GRPS E-G T4...T3
Ex ia IIC T4...T2 Ga
Ex ib IIC T4...T2 Ga/Gb
Ex ia IIIC T85°C...T250°C Da
-60 (-55) °C ≤ Ta ≤ +70 °C
When installed per Control Drawing D7000002-885
SINGLE SEAL

Safety parameter	HART®	Fieldbus
Voltage U_i	30 V	30 V
Current I_i	133 mA	300 mA
Power P_i	1.0 W	1.5 W
Capacitance C_i	7.3 nF	1.1 nF
Inductance L_i	0	0

Specific Conditions of Use (X):

1. The Model 5408 Level Transmitter will not pass the 500Vrms dielectric strength test between the circuits and the earth ground. This must be taken into account during installation.
2. Plastic wire-on tag, Plastic part of Process Seal Antenna and Non-standard paint options (paint options other than Rosemount Blue) may cause risk from Electrostatic discharge. Avoid installation that could cause electrostatic build-up, and only clean with a damp cloth.
3. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5 °C greater than the maximum specified ambient temperature for location where installed.
4. The Transmitter can be installed in the boundary wall between a Zone 0 and Zone 1 area. In this configuration, the process connection is installed in Zone 0, while the transmitter housing is installed in Zone 1. Refer to Control Drawing D7000002-885.
5. Using the box provided on the nameplate, the User shall permanently mark the type of protection chosen for the specific installation. Once the type of protection has been marked it shall not be changed.
6. The applicable temperature class, ambient temperature range and process temperature range of the equipment is as follows:

Table 31: For Divisions:

Temperature class / Maximum surface temperature	Ambient temperature range(1)	Process temperature range(1)
Division Gas groups:		
T2	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 250 °C
T3	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 195 °C
T4	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 130 °C
Division Dust groups:		
T3	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 160 °C
T4	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 130 °C
T5	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 95 °C
T6	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 80 °C

(1) *-55 °C for Fieldbus; -60 °C for HART*

Table 32: For Zones:

Temperature class / Maximum surface temperature	Ambient temperature range(1)	Process temperature range(1)
Zone Gas groups:		
T2	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 250 °C
T3	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 195 °C
T4	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 130 °C
Zone Dust groups:		
T250°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 250 °C
T200°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 195 °C
T135°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 130 °C
T100°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 95 °C
T85°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 80 °C

(1) *-55 °C for Fieldbus; -60 °C for HART*

IF FISCO

Certificate FM-C FM16CA0011X

Standards C22.2 NO. 0.4-17:2017, C22.2 NO. 0.5-16:2016, C22.2 No. 25-17:2017, C22.2 No.94-M91:1991 (R:2011), C22.2 No. 213-16:2016, C22.2 No. 61010-11:2004, CAN/CSA C22.2 No. 60079-0:2015 Ed. 3, CAN/CSAC22.2 No. 60079-11:2014 Ed. 2, CAN/CSAC22.2 No. 60079-15:2016 Ed.2, C22.2 No. 60079-26:2016, C22.2. 60529:2016; ANSI/ISA 12.27.01:2011

Markings IS CL I, II, III DIV 1, GRPS A-G T4...T2
NI CL I, DIV 2, GRPS A-D T4...T2
S CL II, III DIV 2, GRPS E-G T4...T3
Ex ia IIC T4...T2 Ga
Ex ib IIC T4...T2 Ga/Gb
Ex ia IIIC T85°C...T250°C Da

-55 °C ≤ Ta ≤ +70°C
When installed per Control Drawing D7000002-885
SINGLE SEAL

Safety parameter	FISCO
Voltage U_i	17.5 V
Current I_i	380 mA
Power P_i	5.32 W
Capacitance C_i	1.1 nF
Inductance L_i	0

Specific Conditions of Use (X):

1. The Model 5408 Level Transmitter will not pass the 500Vrms dielectric strength test between the circuits and the earth ground. This must be taken into account during installation.
2. Plastic wire-on tag, Plastic part of Process Seal Antenna and Non-standard paint options (paint options other than Rosemount Blue) may cause risk from Electrostatic discharge. Avoid installation that could cause electrostatic build-up, and only clean with a damp cloth.
3. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5°C greater than the maximum specified ambient temperature for location where installed.
4. The Transmitter can be installed in the boundary wall between a Zone 0 and Zone 1 area. In this configuration, the process connection is installed in Zone 0, while the transmitter housing is installed in Zone 1. Refer to Control Drawing D7000002-885.
5. Using the box provided on the nameplate, the User shall permanently mark the type of protection chosen for the specific installation. Once the type of protection has been marked it shall not be changed.
6. The applicable temperature class, ambient temperature range and process temperature range if the equipment is as follows:

Table 33: For Divisions:

Temperature class / Maximum surface temperature	Ambient temperature range	Process temperature range
Division Gas groups:		
T2	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 250 °C
T3	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 195 °C
T4	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 130 °C
Division Dust groups:		
T3	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 160 °C
T4	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 130 °C
T5	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 95 °C
T6	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 80 °C

Table 34: For Zones:

Temperature class / Maximum surface temperature	Ambient temperature range	Process temperature range
Zone Gas groups:		
T2	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 250 °C
T3	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 195 °C
T4	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 130 °C
Zone Dust groups:		
T250°C	-55 °C ≤ Ta ≤ 70°C	-55 °C to 250 °C
T200°C	-55 °C ≤ Ta ≤ 70°C	-55 °C to 195 °C
T135°C	-55 °C ≤ Ta ≤ 70°C	-55 °C to 130 °C
T100°C	-55 °C ≤ Ta ≤ 70°C	-55 °C to 95 °C
T85°C	-55 °C ≤ Ta ≤ 70°C	-55 °C to 80 °C

Europe

E1 ATEX Flameproof

Certificate FM15ATEX0055X

Standards EN IEC 60079-0:2018, EN 60079-1:2014, EN 60079-26:2015, EN 60079-31:2014, EN 60529+A1+A2:2013

Markings Ⓔx II 1/2G Ex db IIC T6...T2 Ga/Gb
II 2D Ex tb IIIC T85°C... T250°C Db, IP6X
-60 °C ≤ Ta ≤ +70 °C

Specific Conditions of Use (X):

1. Flamepath joints are not for repair. Contact the manufacturer.
2. Plastic wire-on tag, Plastic part of Process Seal Antenna and Non-standard paint options (paint options other than Rosemount Blue) may cause risk from Electrostatic discharge. Avoid installation that could cause electrostatic build-up, and only clean with a damp cloth.
3. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5 °C greater than the maximum specified ambient temperature for location where installed.
4. The Transmitter can be installed in the boundary wall between EPL Ga and EPL Gb location. In this configuration, the process connection is EPL Ga, while the transmitter housing is EPL Gb. Refer to Control Drawing D7000002-885.
5. Cable entries must be used which maintain the ingress protection of the enclosure to at least IP6X. To maintain the ingress protection ratings, Covers and Sensor Module to be fully tightened and PTFE tape or pipe dope is required for cable entries and blanking plugs. See Instruction Manual on application requirements.
6. Install per Control Drawing D7000002-885.
7. Using the box provided on the nameplate, the User shall permanently mark the type of protection chosen for the specific installation. Once the type of protection has been marked it shall not be changed.
8. Display glass shall be positioned in such a way as to minimize the risk of mechanical impact.
9. The applicable temperature class, ambient temperature range and process temperature range of the equipment is as follows:

Temperature class / Maximum surface temperature	Ambient temperature range	Process temperature range
Gas & Dust groups:		
T2 / T250°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 250 °C
T3 / T200°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 195 °C
T4 / T135°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 130 °C
T5 / T100°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 95 °C
T6 / T85°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 80 °C

I1 ATEX Intrinsic Safety

Certificate FM15ATEX0055X

Standards EN IEC 60079-0:2018, EN 60079-11:2012, EN 60079-26:2015, EN 60529:1991+A1:2000 +A2:2013

Markings Ⓔx II 1G Ex ia IIC T4...T2 Ga
II 1/2G Ex ib IIC T4...T2 Ga/Gb
II 1D Ex ia IIIC T85°C...T250°C Da
-60 (-55) °C ≤ Ta ≤ +70 °C

Safety parameter	HART®	Fieldbus
Voltage U_i	30 V	30 V
Current I_i	133 mA	300 mA
Power P_i	1.0 W	1.5 W
Capacitance C_i	7.3 nF	1.1 nF
Inductance L_i	0	0

Specific Conditions of Use (X):

1. The Model 5408 Level Transmitter will not pass the 500Vrms dielectric strength test between the circuits and the earth ground. This must be taken into account during installation.
2. Plastic wire-on tag, Plastic part of Process Seal Antenna and Non-standard paint options (paint options other than Rosemount Blue) may cause risk from Electrostatic discharge. Avoid installation that could cause electrostatic build-up, and only clean with a damp cloth.
3. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5 °C greater than the maximum specified ambient temperature for location where installed.
4. The Transmitter can be installed in the boundary wall between EPL Ga and EPL Gb location. In this configuration, the process connection is EPL Ga, while the transmitter housing is EPL Gb. Refer to Control Drawing D7000002-885.
5. Using the box provided on the nameplate, the User shall permanently mark the type of protection chosen for the specific installation. Once the type of protection has been marked it shall not be changed.
6. The applicable temperature class, ambient temperature range and process temperature range of the equipment is as follows:

Temperature class / Maximum surface temperature	Ambient temperature range(1)	Process temperature range(1)
Gas groups:		
T2	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 250 °C
T3	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 195 °C
T4	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 130 °C
Dust groups:		
T250°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 250 °C
T200°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 195 °C
T135°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 130 °C
T100°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 95 °C
T85°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 80 °C

(1) *-55 °C for Fieldbus; -60 °C for HART*

IA ATEX FISCO

Certificate FM15ATEX0055X

Standards EN IEC 60079-0:2018, EN 60079-11:2012, EN 60079-26:2015

Markings ⟨Ex⟩ II 1G Ex ia IIC T4...T2 Ga
II 1/2G Ex ib IIC T4...T2 Ga/Gb
II 1D Ex ia IIIC T85°C...T250°C Da
-55°C ≤ Ta ≤ +70°C

Safety parameter	FISCO
Voltage U_i	17.5 V
Current I_i	380 mA
Power P_i	5.32 W
Capacitance C_i	1.1 nF
Inductance L_i	0

Specific Conditions of Use (X):

1. The Model 5408 Level Transmitter will not pass the 500Vrms dielectric strength test between the circuits and the earth ground. This must be taken into account during installation.
2. Plastic wire-on tag, Plastic part of Process Seal Antenna and Non-standard paint options (paint options other than Rosemount Blue) may cause risk from Electrostatic discharge. Avoid installation that could cause electrostatic build-up, and only clean with a damp cloth.
3. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5°C greater than the maximum specified ambient temperature for location where installed.
4. The Transmitter can be installed in the boundary wall between EPL Ga and EPL Gb location. In this configuration, the process connection is EPL Ga, while the transmitter housing is EPL Gb. Refer to Control Drawing D7000002-885.
5. Using the box provided on the nameplate, the User shall permanently mark the type of protection chosen for the specific installation. Once the type of protection has been marked it shall not be changed.

6. The applicable temperature class, ambient temperature range and process temperature range of the equipment is as follows:

Temperature class / Maximum surface temperature	Ambient temperature range	Process temperature range
Gas groups:		
T2	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 250 °C
T3	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 195 °C
T4	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 130 °C
Dust groups:		
T250°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 250 °C
T200°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 195 °C
T135°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 130 °C
T100°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 95 °C
T85°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 80 °C

N1 ATEX Type N: Non-Sparking

Certificate FM15ATEX0056X

Standards EN IEC 60079-0:2018, EN 60079-15:2010, EN 60529:1991+A1:2000 +A2:2013

Markings Ex II 3G Ex nA IIC T4...T2 Gc, IP65
(-34 °C ≤ Ta ≤ +70 °C)
V ≤ 42.4V, I ≤ 23 mA (HART®)
V ≤ 32V, I ≤ 22 mA (Fieldbus)

Specific Conditions of Use (X):

1. The Model 5408 Level Transmitter will not pass the 500Vrms dielectric strength test between the circuits and the earth ground. This must be taken into account during installation.
2. Plastic wire-on tag, Plastic part of Process Seal Antenna and Non-standard paint options (paint options other than Rosemount Blue) may cause risk from Electrostatic discharge. Avoid installation that could cause electrostatic build-up, and only clean with a damp cloth.
3. Cable entries must be used which maintain the ingress protection of the enclosure to at least IP65. To maintain the ingress protection ratings, Covers and Sensor Module to be fully tightened and PTFE tape or pipe dope is required for cable entries and blanking plugs. See Instruction Manual on application requirements.
4. The applicable temperature class, ambient temperature range and process temperature range of the equipment is as follows:

Temperature class	Ambient temperature range	Process temperature range
T2	-34 °C ≤ Ta ≤ 70 °C	-34 °C to 250 °C
T3	-34 °C ≤ Ta ≤ 70 °C	-34 °C to 195 °C
T4	-34 °C ≤ Ta ≤ 70 °C	-34 °C to 130 °C

International

E7 IECEx Flameproof

Certificate	IECEx FMG15.0033X
Standards	IEC 60079-0:2017, IEC 60079-1:2014; IEC 60079-26:2014, IEC 60079-31:2013
Markings	Ex db IIC T6...T2 Ga/Gb Ex tb IIIC T85°C...T250°C Db IP6X -60 °C ≤ Ta ≤ +70 °C

Specific Conditions of Use (X):

1. Flamepath joints are not for repair. Contact the manufacturer.
2. Plastic wire-on tag, Plastic part of Process Seal Antenna and Non-standard paint options (paint options other than Rosemount Blue) may cause risk from Electrostatic discharge. Avoid installation that could cause electrostatic build-up, and only clean with a damp cloth.
3. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5 °C greater than the maximum specified ambient temperature for location where installed.
4. The Transmitter can be installed in the boundary wall between EPL Ga and EPL Gb. In this configuration, the process connection is EPL Ga, while the transmitter housing is EPL Gb. Refer to Control Drawing D7000002-885.
5. Cable entries must be used which maintain the ingress protection of the enclosure to at least IP6X. To maintain the ingress protection ratings, Covers and Sensor Module to be fully tightened and PTFE tape or pipe dope is required for cable entries and blanking plugs. See Instruction Manual on application requirements.
6. Install per Control Drawing D7000002-885.
7. Using the box provided on the nameplate, the User shall permanently mark the type of protection chosen for the specific installation. Once the type of protection has been marked it shall not be changed.
8. Display glass shall be positioned in such a way as to minimize the risk of mechanical impact.
9. The applicable temperature class, ambient temperature range and process temperature range of the equipment is as follows:

Temperature class / Maximum surface temperature	Ambient temperature range	Process temperature range
Gas & Dust groups:		
T2 / T250°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 250 °C
T3 / T200°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 195 °C
T4 / T135°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 130 °C
T5 / T100°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 95 °C
T6 / T85°C	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 80 °C

I7 IECEx Intrinsic Safety

Certificate	IECEx FMG15.0033X
Standards	IEC 60079-0:2017, IEC 60079-11:2011, IEC 60079-26:2014, IEC 60529:2013
Markings	Ex ia IIC T4...T2 Ga Ex ib IIC T4...T2 Ga/Gb Ex ia IIIC T85°C...T250°C Da

-60 (-55) °C ≤ Ta ≤ +70 °C

Safety parameter	HART®	Fieldbus
Voltage U_i	30 V	30 V
Current I_i	133 mA	300 mA
Power P_i	1.0 W	1.5 W
Capacitance C_i	7.3 nF	1.1 nF
Inductance L_i	0	0

Specific Conditions of Use (X):

1. The Model 5408 Level Transmitter will not pass the 500Vrms dielectric strength test between the circuits and the earth ground. This must be taken into account during installation.
2. Plastic wire-on tag, Plastic part of Process Seal Antenna and Non-standard paint options (paint options other than Rosemount Blue) may cause risk from Electrostatic discharge. Avoid installation that could cause electrostatic build-up, and only clean with a damp cloth.
3. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5 °C greater than the maximum specified ambient temperature for location where installed.
4. The Transmitter can be installed in the boundary wall between EPL Ga and EPL Gb. In this configuration, the process connection is EPL Ga, while the transmitter housing is EPL Gb. Refer to Control Drawing D7000002-885.
5. Using the box provided on the nameplate, the User shall permanently mark the type of protection chosen for the specific installation. Once the type of protection has been marked it shall not be changed.
6. The applicable temperature class, ambient temperature range and process temperature range of the equipment is as follows:

Temperature class / Maximum surface temperature	Ambient temperature range(1)	Process temperature range(1)
Gas groups:		
T2	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 250 °C
T3	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 195 °C
T4	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 130 °C
Dust groups:		
T250°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 250 °C
T200°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 195 °C
T135°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 130 °C
T100°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 95 °C
T85°C	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 80 °C

(1) *-55 °C for Fieldbus; -60 °C for HART*

IG IECEx FISCO

Certificate	IECEx FMG15.0033X
Standards	IEC 60079-0:2017, IEC 60079-11:2011, IEC 60079-26:2014
Markings	Ex ia IIC T4...T2 Ga

Ex ib IIC T4...T2 Ga/Gb
Ex ia IIIC T85°C...T250°C Da
-55°C ≤ Ta ≤ +70°C

Safety parameter	FISCO
Voltage U_i	17.5 V
Current I_i	380 mA
Power P_i	5.32 W
Capacitance C_i	1.1 nF
Inductance L_i	0

Specific Conditions of Use (X):

1. The Model 5408 Level Transmitter will not pass the 500Vrms dielectric strength test between the circuits and the earth ground. This must be taken into account during installation.
2. Plastic wire-on tag, Plastic part of Process Seal Antenna and Non-standard paint options (paint options other than Rosemount Blue) may cause risk from Electrostatic discharge. Avoid installation that could cause electrostatic build-up, and only clean with a damp cloth.
3. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5°C greater than the maximum specified ambient temperature for location where installed.
4. The Transmitter can be installed in the boundary wall between EPL Ga and EPL Gb location. In this configuration, the process connection is EPL Ga, while the transmitter housing is EPL Gb. Refer to Control Drawing D7000002-885.
5. Using the box provided on the nameplate, the User shall permanently mark the type of protection chosen for the specific installation. Once the type of protection has been marked it shall not be changed.
6. The applicable temperature class, ambient temperature range and process temperature range of the equipment is as follows:

Temperature class / Maximum surface temperature	Ambient temperature range	Process temperature range
Gas groups:		
T2	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 250 °C
T3	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 195 °C
T4	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 130 °C
Dust groups:		
T250°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 250 °C
T200°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 195 °C
T135°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 130 °C
T100°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 95 °C
T85°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 80 °C

N7 IECEx Type N: Non-Sparking

Certificate IECEx FMG15.0033X

Standards IEC 60079-0:2017, IEC 60079-15:2010, IEC 60529:2013

Markings Ex nA IIC T4...T2 Gc
(-34 °C ≤ Ta ≤ +70 °C), IP65
V ≤ 42.4V, I ≤ 23 mA (HART®)
V ≤ 32V, I ≤ 22 mA (Fieldbus)

Specific Conditions of Use (X):

1. The Model 5408 Level Transmitter will not pass the 500Vrms dielectric strength test between the circuits and the earth ground. This must be taken into account during installation.
2. Plastic wire-on tag, Plastic part of Process Seal Antenna and Non-standard paint options (paint options other than Rosemount Blue) may cause risk from Electrostatic discharge. Avoid installation that could cause electrostatic build-up, and only clean with a damp cloth.
3. Cable entries must be used which maintain the ingress protection of the enclosure to at least IP65. To maintain the ingress protection ratings, Covers and Sensor Module to be fully tightened and PTFE tape or pipe dope is required for cable entries and blanking plugs. See Instruction Manual on application requirements.
4. The applicable temperature class, ambient temperature range and process temperature range of the equipment is as follows:

Temperature class / Maximum surface temperature	Ambient temperature range	Process temperature range
T2	-34 °C ≤ Ta ≤ 70 °C	-34 °C to 250 °C
T3	-34 °C ≤ Ta ≤ 70 °C	-34 °C to 195 °C
T4	-34 °C ≤ Ta ≤ 70 °C	-34 °C to 130 °C

Brazil

E2 INMETRO Flameproof

Certificate UL-BR 17.0344X

Standards ABNT NBR IEC 60079-0:2013, ABNT NBR IEC 60079-1:2016, ABNT NBR IEC 60079-26:2016, ABNT NBR IEC 60079-31:2014

Markings Ex db IIC T6...T2 Ga/Gb
Ex tb III C T85°C...T250°C Db
Tamb = -60 °C to +70 °C; IP6X

Specific Conditions of Use (X):

1. See certificate.

I2 INMETRO Intrinsic Safety

Certificate UL-BR 17.0344X

Standards ABNT NBR IEC 60079-0:2013, ABNT NBR IEC 60079-11:2013, ABNT NBR IEC 60079-26:2016, ABNT NBR IEC 60079-31:2014

Markings Ex ia IIC T4...T2 Ga
Ex ib IIC T4...T2 Ga/Gb
Ex ia IIIC T85°C...T250°C Da
Tamb = -60 (-55) °C to +70 °C

Safety parameter	HART®	Fieldbus
Voltage U_i	30 V	30 V
Current I_i	133 mA	300 mA
Power P_i	1.0 W	1.5 W
Capacitance C_i	7.3 nF	1.1 nF
Inductance L_i	0	0

Specific Conditions of Use (X):

1. See certificate.

IB INMETRO FISCO

Certificate UL-BR 17.0344X

Standards ABNT NBR IEC 60079-0:2013, ABNT NBR IEC 60079-11:2013, ABNT NBR IEC 60079-26:2016

Markings Ex ia IIC T4...T2 Ga
Ex ib IIC T4...T2 Ga/Gb
Ex ia IIIC T85°C...T250°C Da
-55 °C ≤ Ta ≤ +70 °C

Safety parameter	FISCO
Voltage U_i	17.5 V
Current I_i	380 mA
Power P_i	5.32 W
Capacitance C_i	1.1 nF
Inductance L_i	0

Specific Conditions of Use (X):

1. See certificate.

N2 INMETRO Type N: Non-Sparking

Certificate UL-BR 17.0344X

Standards ABNT NBR IEC 60079-0:2013, ABNT NBR IEC 60079-15:2012

Markings Ex nA IIC T4...T2 Gc
Tamb = -34 °C to +70 °C; IP65
V ≤ 42.4V, I ≤ 23 mA (HART®)
V ≤ 32V, I ≤ 22 mA (Fieldbus)

Specific Conditions of Use (X):

1. See certificate.

China

E3 Flameproof

Certificate NEPSI GYJ17.1226X

Standards GB3836.1/2/20-2010, GB12476.1/5-2013

Markings Ex d IIC T6~T2 Ga/Gb
Ex tD A21 IP6X T85°C~250°C
Tamb = -60 °C to +70 °C; IP6X

Specific Conditions of Use (X):

1. See certificate.

I3 Intrinsic Safety

Certificate NEPSI GYJ17.1226X

Standards GB3836.1/4/20-2010, GB12476.4-2010

Markings Ex ia IIC T4~T2 Ga
Ex ib IIC T4~T2 Ga/Gb
Ex iaD 20 T85~250 Da
Tamb = -60 (-55) °C to +70 °C

Safety parameter	HART®	Fieldbus
Voltage U_i	30 V	30 V
Current I_i	133 mA	300 mA
Power P_i	1.0 W	1.5 W
Capacitance C_i	7.3 nF	1.1 nF
Inductance L_i	0	0

Specific Conditions of Use (X):

1. See certificate.

IC FISCO

Certificate NEPSI GYJ17.1226X

Standards GB3836.1/4/20-2010, GB12476.4-2010

Markings Ex ia IIC T4...T2 Ga
Ex ib IIC T4...T2 Ga/Gb
Ex iaD 20 T85°C...T250°C Da
-55 °C ≤ Ta ≤ +70 °C

Safety parameter	FISCO
Voltage U_i	17.5 V
Current I_i	380 mA
Power P_i	5.32 W
Capacitance C_i	1.1 nF
Inductance L_i	0

Specific Conditions of Use (X):

1. See certificate.

N3 Type N: Non-Sparking

Certificate NEPSI GYJ17.1226X

Standards GB3836.1-2010, GB3836.8-2014

Markings Ex nA IIC T4~T2 Gc
Tamb = -34 °C to +70 °C; IP65
V ≤ 42.4V, I ≤ 23 mA (HART®)
V ≤ 32V, I ≤ 22 mA (Fieldbus)

Specific Conditions of Use (X):

1. See certificate.

Technical Regulations Customs Union (EAC)

TR CU 020/2011 “Electromagnetic Compatibility of Technical Products”

TR CU 032/2013 “On safety of equipment and vessels under pressure”

Certificate RU C-US.АД07.В.00770-19

TR CU 012/2011 “On safety of equipment intended for use in explosive atmospheres”

EM Technical Regulations Customs Union (EAC) Flameproof

Certificate ЕАЭС RU C-SE.АД07.В.01297/20

Standards GOST 31610.0-2014 (IEC 60079-0:2011), GOST IEC 60079-1-2011, GOST 31610.26-2012 (IEC 60079-26:2006), GOST R IEC 60079-31-2010

Markings Ga/Gb Ex d IIC T6....T2 X
Ex tb IIIC T85°C...T250°C Db X
Tamb = -60 °C to +70 °C

Specific Conditions of Use (X):

1. Flamepath joints are not for repair. Contact the manufacturer.

2. The Model 5408 Level Transmitter can accumulate electrostatic charge on the surface of the casing. It is necessary to clean the painted surfaces with a damp cloth.
3. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5 °C greater than the maximum specified ambient temperature for location where installed.
4. Cable entries must be used which maintain the ingress protection of the enclosure to at least IP65.
5. It is necessary for display to avoid physical impact.
6. The applicable temperature class, ambient temperature range and process temperature range of the equipment is as follows;

Temperature class / Maximum surface temperature	Ambient temperature range	Process temperature range
IIC/ IIIC		
T2/T250	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 250 °C
T3/T200	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 195 °C
T4/T135	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 130 °C
T5/T100	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 100 °C
T6/T85	-60 °C ≤ Ta ≤ 70 °C	-60 °C to 85 °C

IM Technical Regulations Customs Union (EAC) Intrinsic Safety

Certificate ЕАЭС RU C-SE.АД07.В.01297/20

Standards GOST 31610.0-2014 (IEC 60079-0:2011), GOST 31610.11-2014 (IEC 60079-11:2011), GOST 31610.26-2012 (IEC 60079-26:2006)

Markings 0Ex ia IIC T4...T2 Ga X
Ga/Gb Ex ib IIC T4...T2 X
Ex ia IIIC T85°C ...T250°C Da X
Tamb = -60 (-55) °C to +70 °C

Safety parameter	HART®	Fieldbus
Voltage U_i	30 V	30 V
Current I_i	133 mA	300 mA
Power P_i	1.0 W	1.5 W
Capacitance C_i	7.3 nF	1.1 nF
Inductance L_i	0	0

Specific Conditions of Use (X):

1. The Model 5408 Level Transmitter will not pass the 500Vrms dielectric strength test. This must be taken into account during installation.
2. The Model 5408 Level Transmitter can accumulate electrostatic charge on the surface of the casing. It is necessary to clean the painted surfaces with a damp cloth.
3. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5 °C greater than the maximum specified ambient temperature for location where installed.
4. Cable entries must be used which maintain the ingress protection of the enclosure to at least IP6X.

5. The applicable temperature class, ambient temperature range and process temperature range of the equipment is as follows;

Temperature class / Maximum surface temperature	Ambient temperature range(1)	Process temperature range(1)
IIC/ IIIC		
T2/T250	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 250 °C
T3/T200	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 195 °C
T4/T135	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 130 °C
T100	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 100 °C
T85	-60 (-55) °C ≤ Ta ≤ 70 °C	-60 (-55) °C to 85 °C

(1) *-55 °C for Fieldbus; -60 °C for HART*

IN Technical Regulations Customs Union (EAC), FISCO

Certificate ЕАЭС RU C-SE.АД07.В.01297/20

Standards GOST 31610.0-2014 (IEC 60079-0:2011), GOST 31610.11-2014 (IEC 60079-11:2011), GOST 31610.26-2012 (IEC 60079-26:2006)

Markings Ex ia IIC T4...T2 Ga
Ex ib IIC T4...T2 Ga/Gb
Ex ia IIIC T85°C...T250°C Da
-55 °C ≤ Ta ≤ +70 °C

Safety parameter	FISCO
Voltage U_i	17.5 V
Current I_i	380 mA
Power P_i	5.32 W
Capacitance C_i	1.1 nF
Inductance L_i	0

Specific Conditions of Use (X):

1. The Model 5408 Level Transmitter will not pass the 500Vrms dielectric strength test. This must be taken into account during installation.
2. The Model 5408 Level Transmitter can accumulate electrostatic charge on the surface of the casing. It is necessary to clean the painted surfaces with a damp cloth.
3. Appropriate cable, glands, and plugs need to be suitable for a temperature of 5°C greater than the maximum specified ambient temperature for location where installed.
4. Cable entries must be used which maintain the ingress protection of the enclosure to at least IP6X.
5. The applicable temperature class, ambient temperature range and process temperature range of the equipment is as follows;

Temperature class / Maximum surface temperature	Ambient temperature range	Process temperature range
Gas groups:		
T2	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 250 °C
T3	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 195 °C
T4	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 130 °C
Dust groups:		
T250°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 250 °C
T200°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 195 °C
T135°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 130 °C
T100°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 95 °C
T85°C	-55 °C ≤ Ta ≤ 70 °C	-55 °C to 80 °C

NM Technical Regulations Customs Union (EAC) Non-Sparking

Certificate ЕАЭС RU C-SE.АД07.B.01297/20

Standards GOST 31610.0-2014 (IEC 60079-0:2011), GOST 31610.15-2014/IEC 60079-15:2010

Markings 2Ex nA IIC T4...T2 Gc X
Tamb = -34 °C to +70 °C
V ≤ 42.4V, I ≤ 23 mA (HART®)
V ≤ 32V, I ≤ 22 mA (Fieldbus)

Specific Conditions of Use (X):

1. The Model 5408 Level Transmitter will not pass the 500Vrms dielectric strength test. This must be taken into account during installation.
2. Cable entries must be used which maintain the ingress protection of the enclosure to at least IP65.
3. The applicable temperature class, ambient temperature range and process temperature range of the equipment is as follows;

Temperature class / Maximum surface temperature	Ambient temperature range	Process temperature range
T2	-34 °C ≤ Ta ≤ 70 °C	-34 °C to 250 °C
T3	-34 °C ≤ Ta ≤ 70 °C	-34 °C to 195 °C
T4	-34 °C ≤ Ta ≤ 70 °C	-34 °C to 130 °C

Japan

E4 Flameproof

Certificate CML 17JPN1206X

Markings Ex d IIC T6...T2 Ga/Gb
Tamb = -40 °C to +70 °C

Specific Conditions of Use (X):

1. See certificate.

ID FISCO

Certificate CML 17JPN1206X

Markings Ex ia IIC T4...T2 Ga
Ex ib IIC T4...T2 Ga/Gb
Ex ia IIIC T85°C...T250°C Da
-55 °C ≤ Ta ≤ +70 °C

Safety parameter	FISCO
Voltage U_i	17.5 V
Current I_i	380 mA
Power P_i	5.32 W
Capacitance C_i	1.1 nF
Inductance L_i	0

Specific Conditions of Use (X):

See certificate.

India

Intrinsic Safety

Certificate PESO P403812

Markings Ex ia IIC T4...T2 Ga

Flameproof Safety

Certificate PESO P403810

Markings Ex db IIC T6...T2 Ga/Gb

Intrinsic Safety and Flameproof

Certificate PESO P402545, PESO P452909/2, PESO P452909/3

Markings Ex ia IIC T4...T2 Ga
Ex ib IIC T4...T2 Ga/Gb
Ex db IIC T6...T2 Ga/Gb

Intrinsic Safety

Certificate PESO P428401

Markings Ex ia IIC T4...T2 Ga

Ex ib IIC T4...T2 Ga/Gb

Non-Sparking

Certificate PESO P452909/1

Markings Ex nA IIC T4...T2 Gc

Republic of Korea

EP Flameproof

Certificate KTL 17- KAB4O-0652X, 18-KA4BO-0346X, 19-KA4BO-0169X, 19-KA4BO-0170X, 19-KA4BO-0726, 19-KA4BO-0727, 19-KA4BO-0728, 19-KA4BO-0732, 19-KA4BO-0733, 19-KA4BO-0734

Markings Ex d IIC T6...T2 Ga/Gb
Ex tb IIIC T85°C...T250°C
Tamb = -60 °C to +70 °C

IP Intrinsic Safety

Certificate KTL 17-KA4BO-0448X, 17-KA4BO-0654X, 18-KA4BO-0347X, 18-KA4BO-0345X, 19-KA4BO-0729, 19-KA4BO-0730, 19-KA4BO-0731, 19-KA4BO-0752, 19-KA4BO-0736, 19-KA4BO-0737

Markings Ex ia IIC T4...T2 Ga
Ex ib IIC T4...T2 Ga/Gb
Tamb = -60 (-55) °C to +70 °C

Safety parameter	HART®	Fieldbus
Voltage U_i	30 V	30 V
Current I_i	133 mA	300 mA
Power P_i	1.0 W	1.5 W
Capacitance C_i	7.3 nF	1.1 nF
Inductance L_i	0	0

Specific Conditions of Use (X):

1. See certificate.

United Arab Emirates

Flame-proof

Certificate 20-11-28736/Q20-11-001012

Markings Same as IECEx (E7)

Intrinsic Safety

Certificate 20-11-28736/Q20-11-001012

Markings Same as IECEx (I7)

FISCO

Certificate 20-11-28736/Q20-11-001012

Markings Same as IECEx (IG)

Type-N Non Sparking

Certificate 20-11-28736/Q20-11-001012

Markings Same as IECEx (N7)

Additional certifications

SBS American Bureau of Shipping (ABS) Type Approval

Certificate 20-1981069-PDA

Intended Use For use on ABS Classed Vessels and Offshore installations in accordance with ABS rules and International Standards.

Note
Housing material A, Aluminum, is not to be used on open decks.

SBV Bureau Veritas (BV) Type Approval

Certificate 52129/A1 BV

Requirements Bureau Veritas Rules for the Classification of Steel Ships/Offshore Units. EC Code: 31/41SB for 5408 SST housing 31/41B for 5408 Aluminum housing

Application Class Notations: AUT-UMS, AUT-CCS, AUT-PORT and AUT-IMS.

SDN Det Norske Veritas Germanischer Lloyd (DNV GL) Type Approval

Certificate TAA0000230

Intended Use DNV GL rules for classification – Ships, offshore units, and high speed and light craft.

Table 35: Application

Location classes	
Temperature	D
Humidity	B
Vibration	A
EMC	B
Enclosure	C(1)

(1) *Enclosure Class B for aluminum housing*

SLL Lloyd's Register (LR) Type Approval

Certificate LR2002529TA

Application Marine applications for use in environmental categories ENV1, ENV 2, ENV 3 and ENV 5(16) as defined in Lloyd's Register's Type Approval System, Test Specification Number 1, May 2018

QT Safety-certified to IEC 61508:2010 with certificate of FMEDA data

Certificate exida ROS 15-01-149 C001

Suitable for intended use

Compliant with NAMUR NE 95:2013, "Basic Principles of Homologation".

U1 Overfill prevention

Certificate Z-65.16-575

Application TÜV tested and approved by DIBt for overfill prevention according to the German WHG regulations.

QA 3-A®

Certificate Authorization Number 3626

The following options are conforming to the 3-A Sanitary Standards, Number 74-07 (Sensors and Sensor Fittings and Connections):

Process connection type C (Tri Clamp)

Process connection size 2, 3, 4

Antenna type SAA (Process Seal antenna)

Antenna size 2, 3, 4

The certification of the transmitter relies upon the following materials used in its construction:

Table 36: Product Contact Surfaces

Item	Material
Microwave launcher	PTFE fluoropolymer

(16) Only housing material "S" (stainless steel) is to be used on open decks.

Table 37: Nonproduct Contact Surfaces

Item	Material
Metal housing	Stainless steel 300 series or aluminium 360, painted with epoxy-polyester or polyurethane
Fasteners and plugs	Stainless steel 300 series
Seals	Nitrile rubber NBR, Ethylene propylene peroxide and FKM fluoroelastomer
Labels	Stainless steel 300 series, metallized polyester, polyester/polycarbonate

It is the responsibility of the user to ensure:

1. The materials listed in Table 36 and Table 37 are suitable for the media and cleaning/sanitizing processes.
2. The installation of the transmitter is drainable and cleanable.
3. That the joint/clamping between the transmitter and the nozzle is compatible with the tank pressure and media.
4. That for the application suitable cable entry devices are used and with appropriate ingress protection.
5. That any unused cable entries are sealed with suitable plugs to maintain the ingress protection ratings.

Pattern approval

Belarus Pattern Approval

Certificate No. 12954

Kazakhstan Pattern Approval

Certificate KazInMetr No. 15466

Russia Pattern Approval

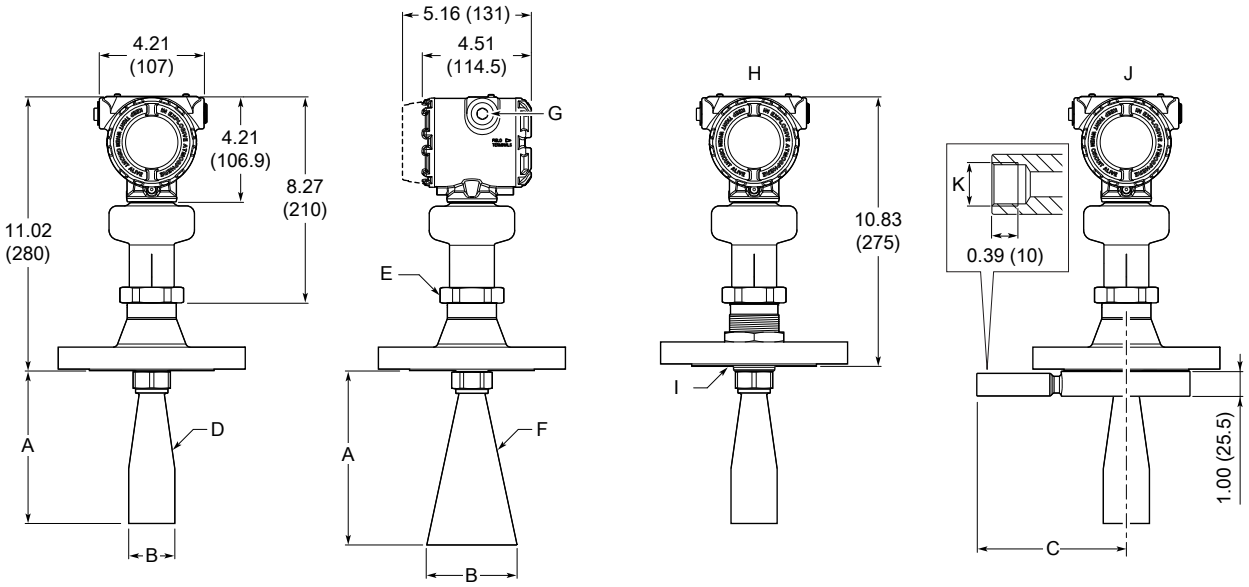
Certificate VNIIMS No. SE.C.29.004.A No 70968

Uzbekistan Pattern Approval

Certificate No. 02.7102

Dimensional drawings

Figure 25: Cone Antenna with Flanged Process Connection



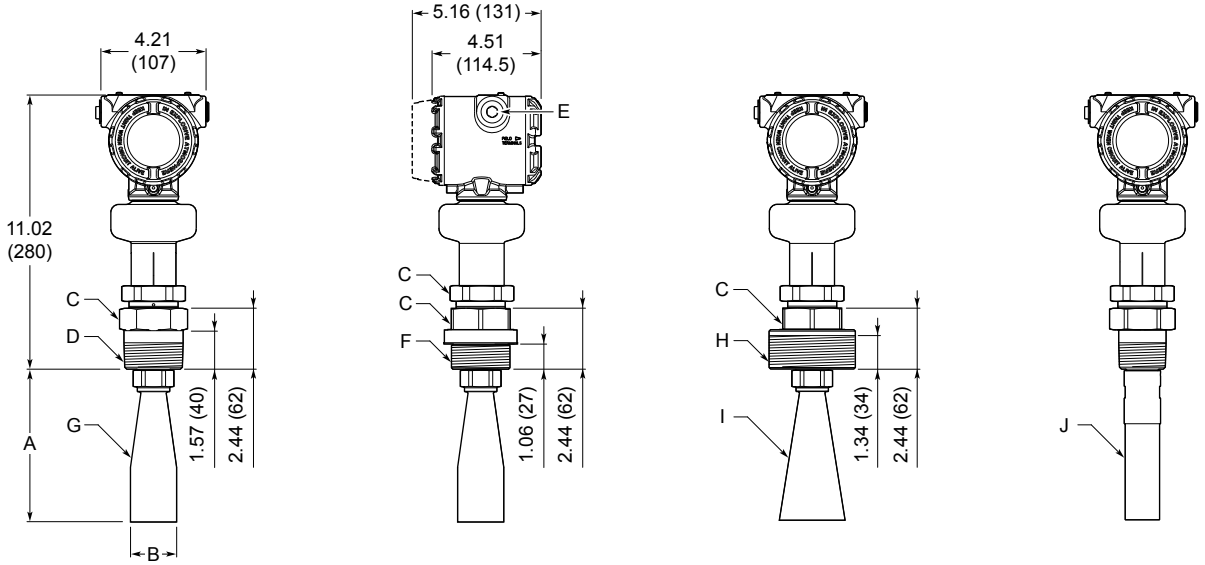
A. See Table 38 for dimensions.
B. See Table 38 for dimensions.
C. See Table 38 for dimensions.
D. 2-in. (DN50) cone style
E. s60
F. 3-in. (DN80) and 4-in. (DN100) cone style
G. ½-14 NPT, M20 x 1.5, or G½; optional adapters: eurofast® and minifast®
H. Protective plate design
I. Protective plate
J. Purging connector (option code PC1)
K. G⅜-in.

Dimensions are in inches (millimeters).

Table 38: Cone Antenna Dimensions

Cone size	A	B	C
1½-in. (DN40)	5.98 in. (152 mm)	1.38 in. (35 mm)	N/A
2-in. (DN50)	6.10 in. (155 mm)	1.85 in. (47 mm)	5.39 in. (137 mm)
3-in. (DN80)	6.02 in. (153 mm)	2.64 in. (67 mm)	6.77 in. (172 mm)
4-in. (DN100)	6.93 in. (176 mm)	3.62 in. (92 mm)	7.80 in. (198 mm)

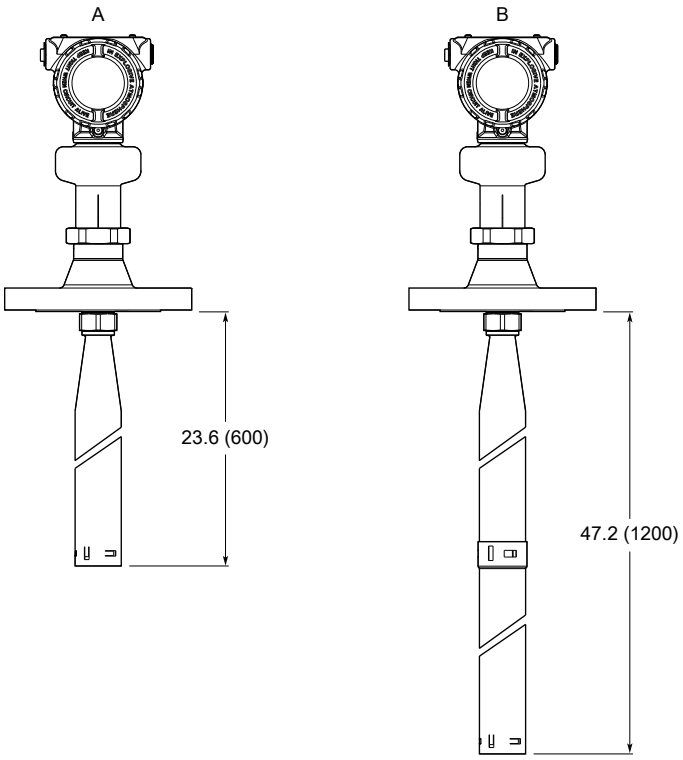
Figure 26: Cone Antenna with Threaded Process Connection



A. *See Table 38 for dimensions.*
B. *See Table 38 for dimensions.*
C. *s60*
D. *NPT 1½-, 2-, 3-, 4-in.*
E. *½-14 NPT, M20 x 1.5, or G½; optional adapters: eurofast and minifast*
F. *BSPP (G) 1½-, 2-in.*
G. *2-in. (DN50) cone style*
H. *BSPP (G) 3-, 4-in.*
I. *3-in. (DN80) and 4-in. (DN100) cone style*
J. *1½-in. (DN40) cone style*

Dimensions are in inches (millimeters).

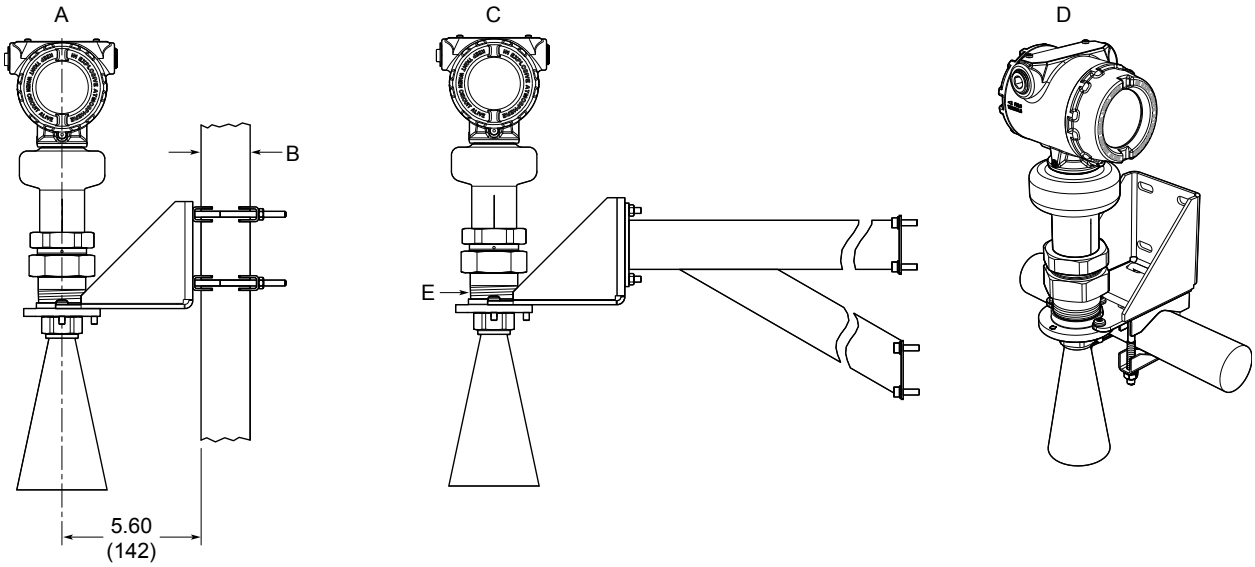
Figure 27: Extended Cone Antenna



A. Option code S1
B. Option code S2

Dimensions are in inches (millimeters).

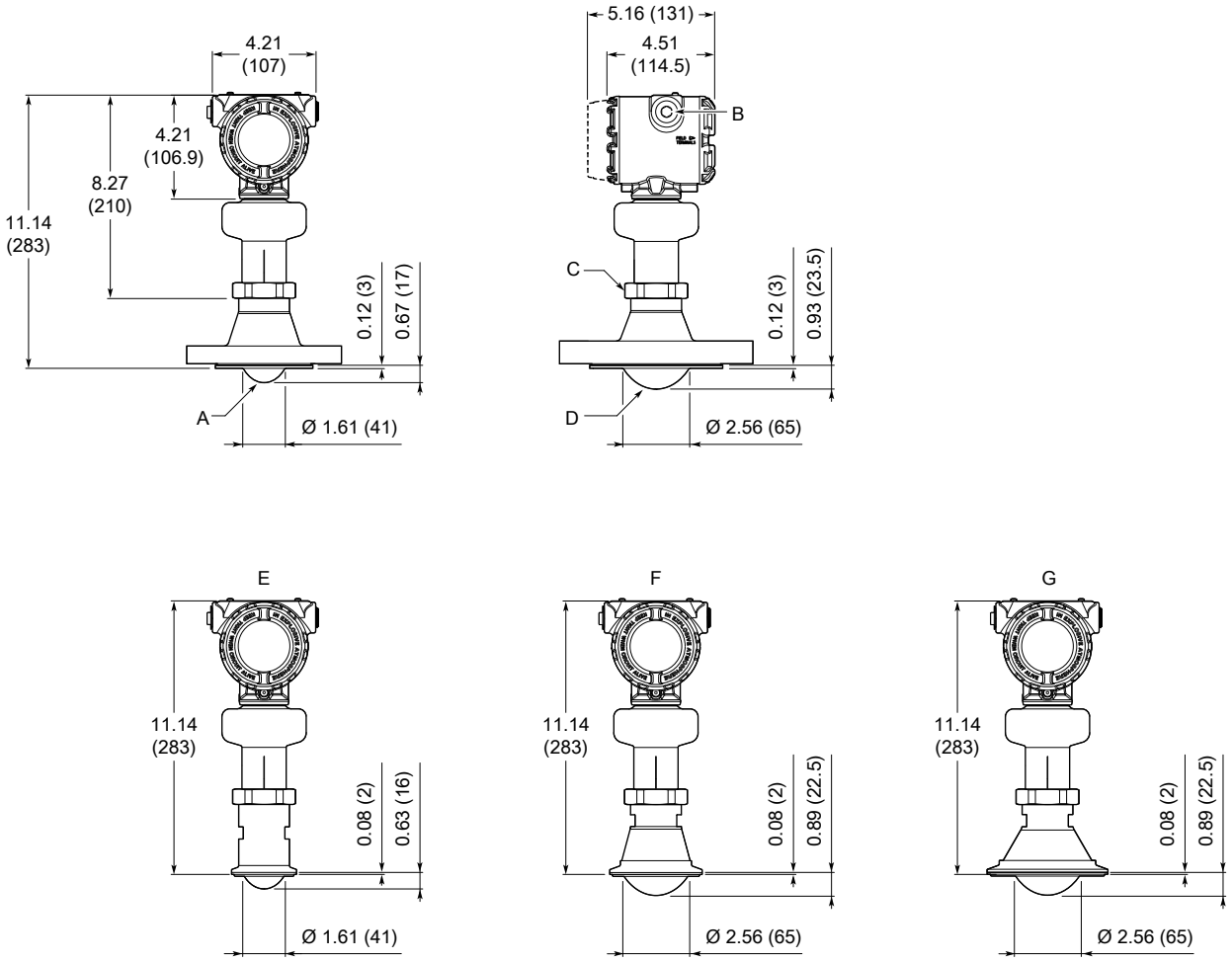
Figure 28: Cone Antenna with Bracket Mounting



A. Pipe mounting (vertical pipe)
B. Pipe diameter, max 2.52 in. (64 mm)
C. Wall mounting (see Figure 33 for hole pattern)
D. Pipe mounting (horizontal pipe)
E. NPT 1½-in.

Dimensions are in inches (millimeters).

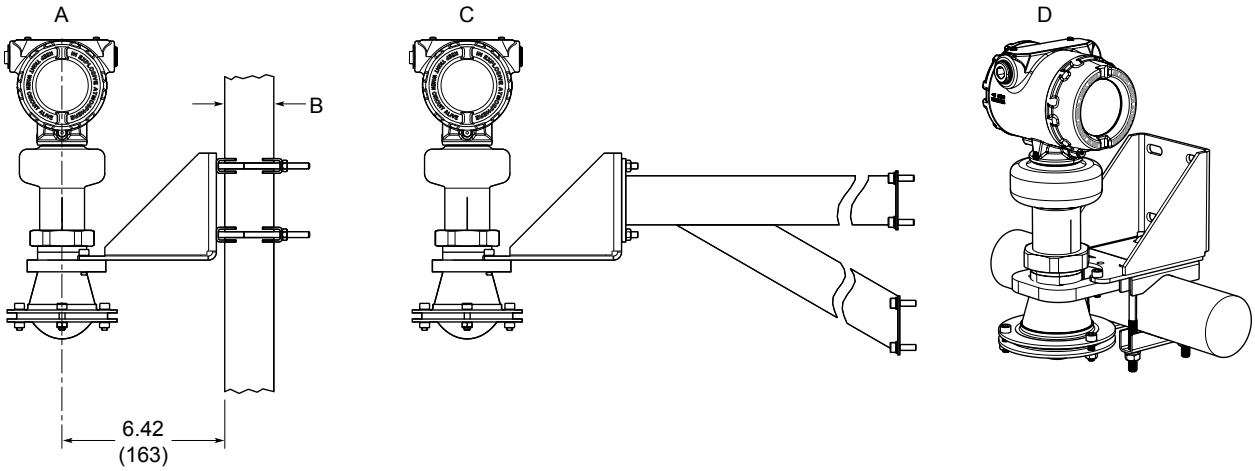
Figure 29: Process Seal Antenna



A. 2-in. (DN50) process seal style
B. ½-14 NPT, M20 x 1.5, or G½; optional adapters: eurofast and minifast
C. s60
D. 3-in. (DN80) and 4-in. (DN100) process seal style
E. 2-in. Tri Clamp
F. 3-in. Tri Clamp
G. 4-in. Tri Clamp

Dimensions are in inches (millimeters).

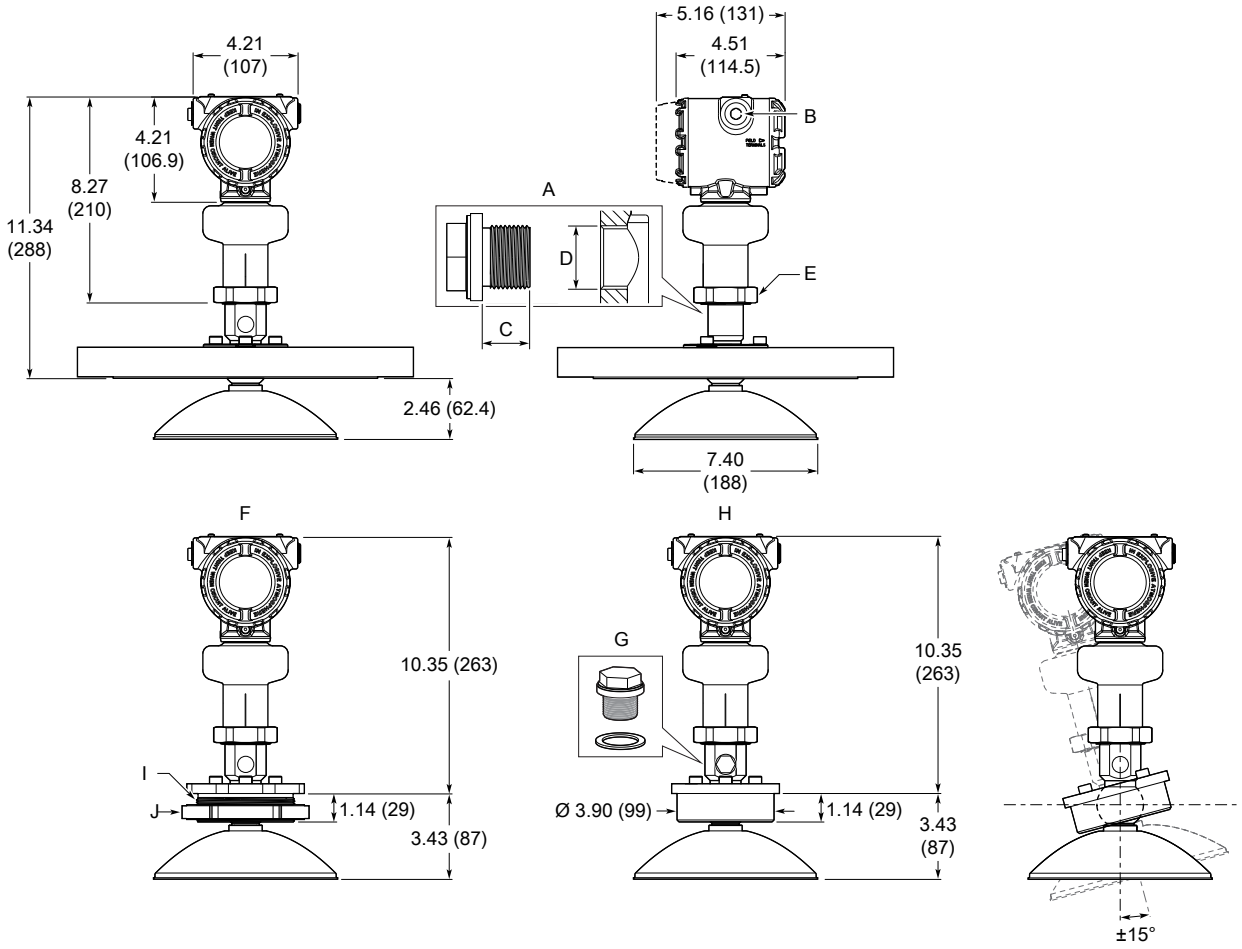
Figure 30: Process Seal Antenna with Bracket Mounting



A. Pipe mounting (vertical pipe)
B. Pipe diameter, max 2.52 in. (64 mm)
C. Wall mounting (see Figure 33 for hole pattern)
D. Pipe mounting (horizontal pipe)

Dimensions are in inches (millimeters).

Figure 31: Parabolic Antenna

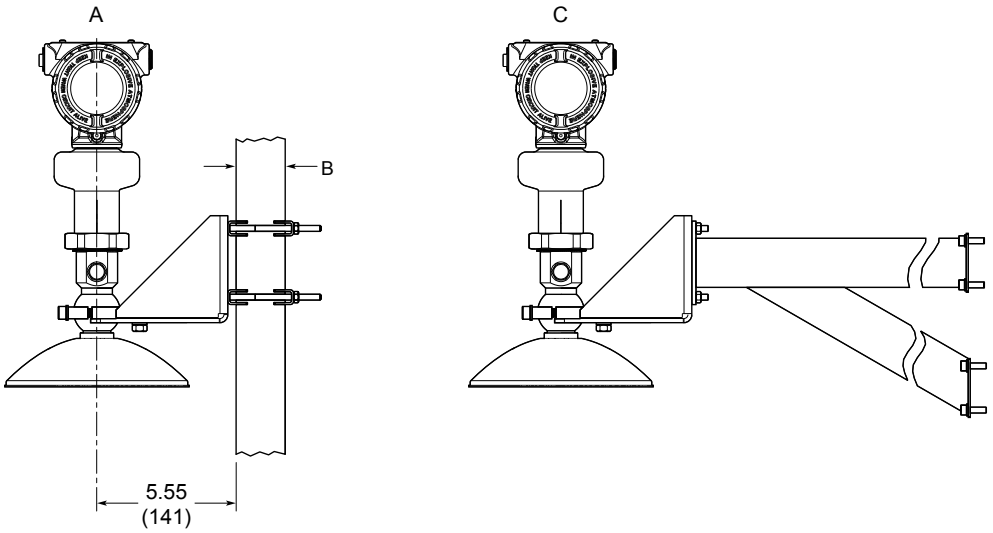


A. Purging connector
B. ½-14 NPT, M20 x 1.5, or G½; optional adapters: eurofast and minifast
C. 0.3-0.4 (8-10) (gasket excluded)
D. G⅜-in.
E. s60
F. Threaded connection
G. Purge plug kit (supplied)
H. Welded connection
I. BSPP (G) 3½-in.
J. Lock nut (supplied)(1)

1. Maximum flange thickness (with lock nut): 0.59 in. (15 mm)

Dimensions are in inches (millimeters).

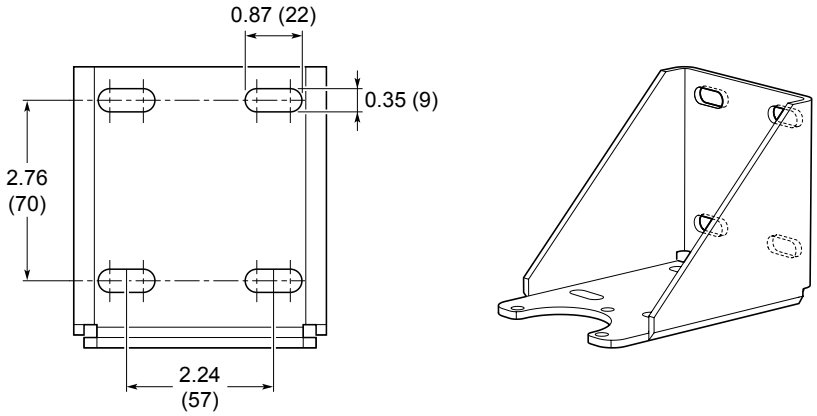
Figure 32: Parabolic Antenna with Bracket Mounting



A. Pipe mounting (vertical pipe)
B. Pipe diameter, max 2.52 in. (64 mm)
C. Wall mounting (see Figure 33 for hole pattern)

Dimensions are in inches (millimeters).

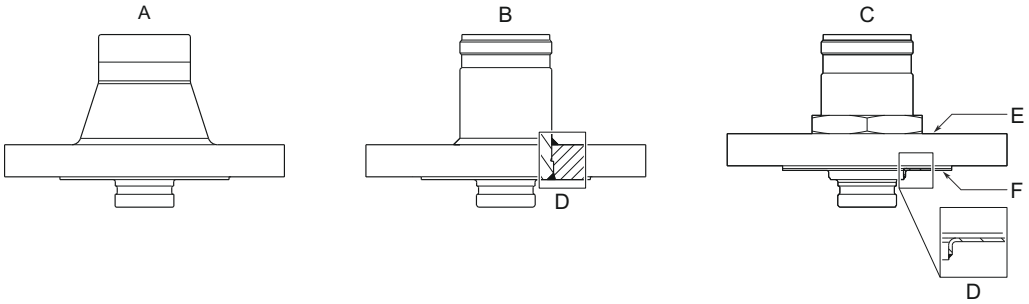
Figure 33: Hole Pattern for Wall Mounting



Dimensions are in inches (millimeters).

Standard flanges

Figure 34: Cone Antenna Flange Connection



A. Forged one-piece
B. Welded construction
C. Protective plate design
D. Weld
E. Backing flange
F. Protective plate

Table 39: Standard Flanges for Cone Antenna

Standard	Face type (1)	Face surface finish, R_a
ASME B16.5	Raised face	125-250 µin
	Ring type joint	< 63 µin
EN 1092-1	Type B1 raised face	3.2-12.5 µm
	Type A flat face	3.2-12.5 µm
JIS B2220	Raised face	3.2-6.3 µm

(1) *Face gasket surface is serrated per mating standard.*

Table 40: Cone Antennas with Protective Plate

Standard	Face type including protective plate	Plate surface finish, R_a
ASME B16.5	Raised face	3.2-6.3 µm
EN 1092-1	Raised face	3.2-6.3 µm
JIS B2220	Raised face	3.2-6.3 µm

Figure 35: Parabolic Antenna Flange Connection

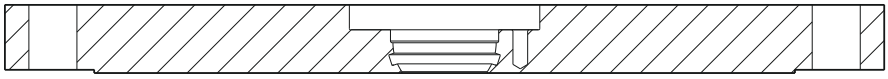


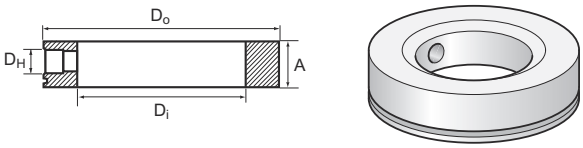
Table 41: Standard Flanges for Parabolic Antenna

Standard	Face type (1)	Face surface finish
ASME B16.5	Raised face	125-250 µin
EN 1092-1	Type A flat face	3.2-12.5 µm
JIS B2220	Raised face	3.2-12.5 µm

(1) *Face gasket surface is serrated per mating standard.*

Flushing connection rings

Figure 36: Flushing Connection Rings



A. Height: 0.97 in. (24.6 mm)

Table 42: Dimensions of Flushing Connection Rings

Flushing connection rings	D_i	D_o	D_H
2-in. ANSI	2.12 (53.8)	3.62 (91.9)	¼-in. NPT
3-in. ANSI	3.60 (91.4)	5.00 (127.0)	¼-in. NPT
4-in. ANSI/DN100	3.60 (91.4)	6.20 (157.5)	¼-in. NPT
DN50	2.40 (61.0)	4.00 (102.0)	¼-in. NPT
DN80	3.60 (91.4)	5.43 (138.0)	¼-in. NPT

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