

# Superior Performance Guided Wave Radar Level and Interface Transmitter

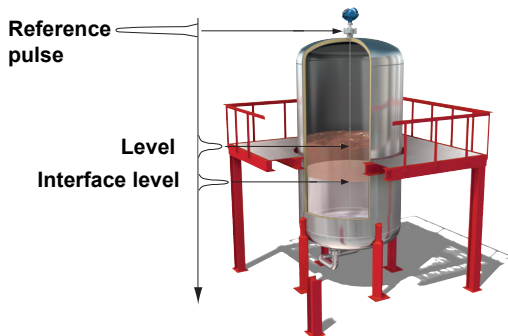
- Industry leading measurement capability and reliability provided by direct switch technology
- Increased plant availability with advanced diagnostics and PlantWeb® functionality
- Increased safety and proven FMEDA suitable for SIL2 with a SFF>90%
- Reduced cost and increased safety from the robust modular design
- Reduced instrument count and process penetrations with a MultiVariable™ transmitter
- Improved throughput and product quality due to superior performance and accuracy
- Reduced startup cost through powerful and easy-to-use configuration tools and seamless plant integration
- Improved EMC performance and higher safety with smart galvanic interface
- Reduced operating costs with predictive maintenance and easy troubleshooting



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## Taking Guided Wave Radar Benefits to the Next Level



### MEASUREMENT PRINCIPLE

Low power, nano-second microwave pulses are guided down a probe submerged in the process media. When a microwave pulse reaches a media with a different dielectric constant, part of the energy is reflected back to the transmitter.

The transmitter uses the residual wave of the first reflection for measuring the interface level. Part of the wave, which was not reflected at the upper product surface, continues until it is reflected at the lower product surface. The speed of this wave depends fully on the dielectric constant of the upper product.

The time difference between the transmitted and the reflected pulse is converted into a distance, and the total level or interface level is then calculated. The reflection intensity depends on the dielectric constant of the product. The higher the dielectric constant value, the stronger the reflection is.

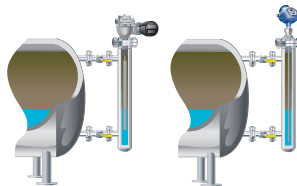
### High application flexibility



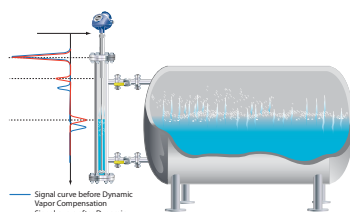
### GUIDED WAVE RADAR TECHNOLOGY BENEFITS

- Highly accurate and reliable direct level measurement with no compensation needed for changing process conditions (such as density, conductivity, viscosity, pH, temperature, and pressure)
- No moving parts and no re-calibration result in minimized maintenance
- Handles vapor, dust, turbulence, and foam well
- Suitable for small tanks, difficult tank geometry, internal obstacles, and unaffected by the mechanical design of chambers
- Top down installation minimizes risk for leakages

### Displacer      Guided wave radar



From this... → to this... in minutes



**Accuracy in saturated steam**

### SPECIAL 5300 FEATURES

#### Optimized to Suit More Applications

- Suitable for most liquid and solids level applications and liquid interface applications
- Innovations to handle even the most challenging applications reliably, including process vessels, control, and safety
- A wide selection of materials, process connections, probe styles, and accessories
- A wide range of options to find the best fit in existing chambers, or a complete assembly with Rosemount 9901 high quality chambers
- The Dynamic Vapor Compensation (DVC) option automatically compensates for changes in the vapor space dielectric

## Product Data Sheet

00813-0100-4530, Rev DA

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# Rosemount 5300 Series

## Best Performance and Uptime

- Unique Direct Switch Technology (DST) and Probe End Projection (PEP) improve measurement capability and reliability
- Ability to use single lead probe for long measuring ranges, obstructions and low dielectrics ensures reliability in more applications, such as viscous media
- PEP provides a backup function for challenging applications such as plastic pellets and boiling hydrocarbons
- Smart Galvanic Interface results in a more stable microwave and EMI performance with minimized effects from outside disturbances

## Robust Design Reduces Costs and Increases Safety

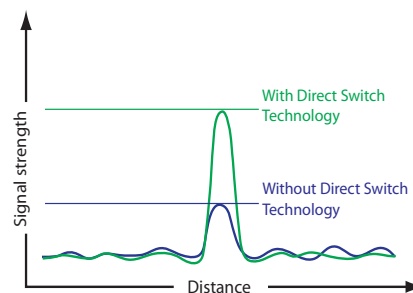
- Heavy-duty unique probe solution for extreme temperature and pressures with a multiple layer of protection
- EchoLogics and smart software functions provide enhanced ability to keep track of the surface and detect a full vessel situation
- Third party approved for overflow protection and Safety Integrated System SIL2 suitability
- Electronics and cable connections in separate compartments provides safer handling and improved moisture protection

## Easy Installation and Plant Integration

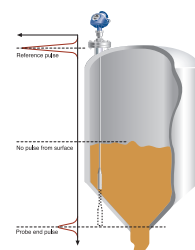
- Easy upgrade by matching existing tank connections and cut-to-fit probes
- MultiVariable™ device reduces the number of process penetrations
- Seamless system integration with HART®, FOUNDATION™ fieldbus, Modbus, or IEC 62591 (*WirelessHART*) with the Smart Wireless THUM™ adapter
- Pre-configured or easy configuration in Rosemount Radar Master with a five-step wizard, auto connect, and online help
- Enhanced DD with step-by-step configuration and echo curve capability (HART) in tools such as AMS Device Manager, and Field Communicator
- DTM with echo curve capability for use in FDT/DTM compatible configuration tools such as PACTWare™, Yokogawa® FieldMate/PRM

## Minimized Maintenance Reduces Cost

- Easy online troubleshooting with user friendly software, utilizing powerful echo curve and logging tools
- Signal Quality Metrics (SQM) diagnostics to detect product build-up on probe or to monitor turbulence, boiling, foam, and emulsions
- Predictive maintenance with advanced diagnostics and PlantWeb alerts
- Modular design for reduced spare parts and easy replacement of the head without opening the tank

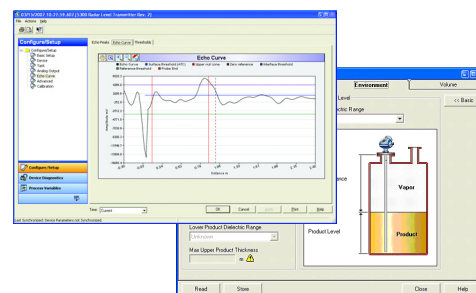
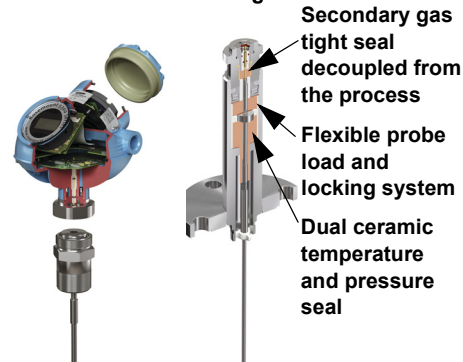


**DST provides a signal that is two to five times stronger than other GWR transmitters'**



**With PEP, the surface position is calculated if the surface echo becomes unavailable**

### Robust modular design



**Rosemount Radar Master enables easy configuration and service with wizard, online help, echo curve and logging tools, and much more**

## Rosemount 5301 and 5302 Level and/or Interface in Liquids



Rosemount 5301 and 5302 Guided Wave Radar Level transmitters provide industry leading measurement capabilities and reliability in liquids. Characteristics include:

- Direct Switch Technology and Probe End Projection to handle low reflective media and long measuring ranges
- Wide range of probe styles, materials, and temperatures and pressures for application flexibility
- HART 4-20 mA, FOUNDATION fieldbus, Modbus, or IEC 62591 (*WirelessHART*) with the Smart Wireless THUM adapter
- Prior use SIL 2 suitable (QS Option)
- Advanced Diagnostics (D01 & DA1 Options)

### Additional Information

Specifications: page 16

Certifications: page 36

Dimensional drawings: page 39

**TABLE 1. 5301 and 5302 Level and/or Interface in Liquids Ordering Information**

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

Model	Product Description	
5301	Guided Wave Radar Liquid Level or Interface Transmitter (interface available for fully submerged probe)	
5302	Guided Wave Radar Liquid Level and Interface Transmitter	
<b>Signal Output</b>		
<b>Standard</b>		<b>Standard</b>
H	4-20 mA with HART communication	★
F	FOUNDATION fieldbus	★
M	RS-485 with Modbus communication	★
<b>Housing Material</b>		
<b>Standard</b>		<b>Standard</b>
A	Polyurethane-covered Aluminum	★
<b>Expanded</b>		
S	Stainless Steel, Grade CF8M (ASTM A743)	
<b>Conduit / Cable Threads</b>		
<b>Standard</b>		<b>Standard</b>
1	½ - 14 NPT	★
2	M20 x 1.5 adapter	★
E	M12, 4-pin, Male connector (eurofast®)(1)	★
M	A size Mini, 4-pin, Male connector (minifast®)(1)	★
<b>Operating Temperature and Pressure</b> (2)		<b>Probe Type</b>
<b>Standard</b>		<b>Standard</b>
S	- 15 psig (-1bar) to 580 psig (40 bar) @ 302 °F (150 °C)	All
H	High Temperature / High Pressure(3): 2940 psi @ 752 °F and 5000 psi @ 100 °F (203 bar @ 400 °C and 345 bar @ 38 °C)	3A, 3B, 4A, 4U, 4V, 5A and 5B

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**TABLE 1. 5301 and 5302 Level and/or Interface in Liquids Ordering Information**

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

P	High Pressure <sup>(3)</sup> : Max 392 °F (200 °C): 3500 psi @ 392 °F and 5000 psi @ 100 °F (243 bar @ 200 °C and 345 bar @ 38 °C)		3B, 4A, 5A, and 5B	★
<b>Expanded</b>				
C	Cryogenic Temperature <sup>(3) (4)</sup> -321 °F (-196 °C) Max 392 °F (200 °C): 3500 psi @ 392 °F and 5000 psi @ 100 °F (243 bar @ 200 °C and 345 bar @ 38 °C)		3A, 3B, 4A, 5A, 5B (Only SST)	
<b>Material of Construction<sup>(5)</sup>: Process Connection / Probe</b>		<b>Probe Type</b>	<b>Valid Operation Temperature and Pressure</b>	
<b>Standard</b>				
1	316L SST (EN 1.4404)	All	S, H, P, C	★
<b>Expanded</b>				
2	Alloy C-276 (UNS N10276). With plate design if flanged version. Up to class 600, PN 63 for HTHP/HP probes.	3A, 3B, 4A	S, H, P	
3	Alloy 400 (UNS N04400). With plate design if flanged version.	3A, 3B, 4A, 5A, 5B	S	
7	PTFE covered probe and flange. With plate design.	4A and 5A	S	
8	PTFE covered probe	4A and 5A	S	
H	Alloy C-276 (UNS N10276) process connection, flange, and probe <sup>(6)</sup>	3A, 3B, 4A	H, P	
<b>Sealing, O-ring Material (Consult the factory for other o-ring materials)</b>				
<b>Standard</b>				
N	None <sup>(7)</sup>			★
V	Viton <sup>®</sup> fluoroelastomer			★
E	Ethylene Propylene			★
K	Kalrez <sup>®</sup> 6375 perfluoroelastomer			★
B	Buna-N			★
<b>Probe Type</b>		<b>Process Connection</b>	<b>Probe Lengths</b>	
<b>Standard</b>				
3B	Coaxial, perforated. For level and interface measurement, or easier cleaning.	Flange / 1 in. <sup>(12)</sup> , 1.5 in., 2 in. <sup>(12)</sup> Thread	Min: 1 ft 4 in. (0.4 m). Max: 19 ft 8 in. (6 m)	★
4A	Rigid Single Lead (8 mm)	Flange / 1 in. <sup>(12)</sup> , 1.5 in., 2 in. <sup>(12)</sup> Thread / Tri-Clamp	Min: 1 ft 4 in. (0.4 m). Max: 9 ft 10 in. (3 m)	★
4B	Rigid Single Lead (13 mm) <sup>(8)</sup>	Flange / 1 in., 1.5 in., 2 in. Thread / Tri-Clamp	Min: 1 ft 4 in. (0.4 m). Max: 14 ft 9 in. (4.5 m)	★
5A	Flexible Single Lead with weight <sup>(9)</sup>	Flange / 1 in. <sup>(12)</sup> , 1.5 in., 2 in. <sup>(12)</sup> Thread / Tri-Clamp	Min: 3 ft 4 in. (1 m). Max: 164 ft (50 m)	★
5B	Flexible Single Lead with chuck <sup>(10)</sup>	Flange / 1 in. <sup>(12)</sup> , 1.5 in., 2 in. <sup>(12)</sup> Thread / Tri-Clamp	Min: 3 ft 4 in. (1 m). Max: 164 ft (50 m)	★
<b>Expanded</b>				
1A	Rigid Twin Lead <sup>(12)</sup>	Flange / 1.5 in., 2 in. <sup>(12)</sup> Thread	Min: 1 ft 4 in. (0.4 m). Max: 9 ft 10 in. (3 m)	
2A	Flexible Twin Lead with weight <sup>(12)</sup>	Flange / 1.5 in., 2 in. <sup>(12)</sup> Thread	Min: 3 ft 4 in. (1 m). Max: 164 ft (50 m)	
3A	Coaxial (for level measurement) <sup>(11)</sup>	Flange / 1 in. <sup>(12)</sup> , 1.5 in., 2 in. <sup>(12)</sup> Thread	Min: 1 ft 4 in. (0.4 m). Max: 19 ft 8 in. (6 m)	
4U	Dynamic Vapor Compensation Single Rigid Probe for 2 in. pipes <sup>(13)</sup>	Flange / 1.5 in. Thread	Min: 2 ft 5 in. (0.76 m). Max: 13 ft (4 m)	

# Rosemount 5300 Series

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4V	Dynamic Vapor Compensation Single Rigid Probe for 3-4 in. pipes <sup>(13)</sup>	Flange / 1.5 in. Thread	Min: 2 ft 5 in. (0.76 m). Max: 13 ft (4 m)	
<b>Probe Length Units</b>				
<b>Standard</b>				<b>Standard</b>
E	English (feet, in.)			★
M	Metric (meters, centimeters)			★
<b>Total Probe Length<sup>(14)</sup> (feet/m)</b>				
<b>Standard</b>				<b>Standard</b>
xxx	0-164 ft or 0-50 m			★
<b>Total Probe Length<sup>(14)</sup> (in./cm)</b>				
<b>Standard</b>				<b>Standard</b>
xx	0-11 in. or 0-99 cm			★
<b>Process Connection - Size / Type (consult the factory for other process connections)</b>				
<b>ASME / ANSI Flanges<sup>(15)</sup> (16)</b>				
<b>Standard</b>				<b>Standard</b>
AA	2 in., 150 lb			★
AB	2 in., 300 lb			★
AC	2 in., 600 lb. HTHP / HP units			★
AD	2 in., 900 lb. HTHP / HP units			★
BA	3 in., 150 lb			★
BB	3 in., 300 lb			★
BC	3 in., 600 lb. HTHP / HP units			★
BD	3 in., 900 lb. HTHP / HP units			★
CA	4 in., 150 lb			★
CB	4 in., 300 lb			★
CC	4 in., 600 lb. HTHP / HP units			★
CD	4 in., 900 lb. HTHP / HP units			★
<b>Expanded</b>				
AE	2 in., 1500 lb. HTHP / HP units			
AI	2 in., 600 lb, RTJ (Ring Type Joint). HTHP / HP units			
AJ	2 in., 900 lb, RTJ (Ring Type Joint). HTHP / HP units			
AK	2 in., 1500 lb, RTJ (Ring Type Joint). HTHP / HP units			
BE	3 in., 1500 lb. HTHP / HP units			
BI	3 in., 600 lb, RTJ (Ring Type Joint). HTHP / HP units			
BJ	3 in., 900 lb, RTJ (Ring Type Joint). HTHP / HP units			
BK	3 in., 1500 lb, RTJ (Ring Type Joint). HTHP / HP units			
CE	4 in., 1500 lb. HTHP / HP units			
CI	4 in., 600 lb, RTJ (Ring Type Joint). HTHP / HP units			
CJ	4 in., 900 lb, RTJ (Ring Type Joint). HTHP / HP units			
CK	4 in., 1500 lb, RTJ (Ring Type Joint). HTHP / HP units			
DA	6 in., 150 lb			
<b>EN (DIN) Flanges<sup>(17)</sup> (18)</b>				
<b>Standard</b>				
HB	DN50, PN40			★
HC	DN50, PN63. HTHP / HP units			★
HD	DN50, PN100. HTHP / HP units			★
IA	DN80, PN16			★

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IB	DN80, PN40		★
IC	DN80, PN63. HTHP / HP units		★
ID	DN80, PN100. HTHP / HP units		★
JA	DN100, PN16		★
JB	DN100, PN40		★
JC	DN100, PN63. HTHP / HP units		★
JD	DN100, PN100. HTHP / HP units		★
<b>Expanded</b>			
HE	DN50, PN160. HTHP / HP units		
HF	DN50, PN250. HTHP / HP units		
IE	DN80, PN160. HTHP / HP units		
IF	DN80, PN250. HTHP / HP units		
JE	DN100, PN160. HTHP / HP units		
JF	DN100, PN250. HTHP / HP units		
KA	DN150, PN16		
<b>JIS Flanges<sup>(17) (19)</sup></b>			
<b>Standard</b>			<b>Standard</b>
UA	50A, 10K		★
VA	80A, 10K		★
XA	100A, 10K		★
<b>Expanded</b>			
UB	50A, 20K		
VB	80A, 20K		
XB	100A, 20K		
YA	150A, 10K		
YB	150A, 20K		
ZA	200A, 10K		
ZB	200A, 20K		
<b>Threaded Connections<sup>(15)</sup></b>		<b>Probe Type</b>	
<b>Standard</b>			<b>Standard</b>
RA	1 ½ in. NPT thread	All	★
RC	2 in. NPT thread	All, standard temperature and pressure	★
<b>Expanded</b>			
RB	1 in. NPT thread	3A, 3B, 4A, 4B, 5A, 5B, standard temperature and pressure	
SA	1 ½ in. BSP (G 1 ½ in.) thread	All	
SB	1 in. BSP (G 1 in.) thread	3A, 3B, 4A, 4B, 5A, 5B, standard temperature and pressure	
<b>Tri-Clamp Fittings<sup>(15)</sup></b>		<b>Probe Type</b>	
<b>Expanded</b>			
FT	1 ½ in. Tri-Clamp	4A, 5A, 5B standard temperature and pressure	
AT	2 in. Tri-Clamp	4A, 4B, 5A, 5B standard temperature and pressure	
BT	3 in. Tri-Clamp	4A, 4B, 5A, 5B standard temperature and pressure	

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CT	4 in. Tri-Clamp	4A, 4B, 5A, 5B standard temperature and pressure	
<b>Proprietary Flanges</b>			
<b>Standard</b>			<b>Standard</b>
TF	Fisher - proprietary 316L SST (for 249B chambers) Torque Tube Flange		★
TT	Fisher - proprietary 316L SST (for 249C chambers) Torque Tube Flange		★
TM	Masonellan - proprietary 316L SST Torque Tube Flange		★
<b>Hazardous Locations Certifications</b>			
<b>Standard</b>			<b>Standard</b>
NA	No Hazardous Locations Certifications		★
E1	ATEX Flameproof <sup>(20)</sup>		★
E3	NEPSI Flameproof <sup>(20)</sup>		★
E5	FM Explosion-proof <sup>(20)</sup>		★
E6	CSA Explosion-proof <sup>(20)</sup>		★
E7	IECEX Flameproof <sup>(20)</sup>		★
I1	ATEX Intrinsic Safety		★
IA	ATEX FISCO Intrinsic Safety <sup>(21)</sup>		★
I3	NEPSI Intrinsic Safety		★
IC	NEPSI FISCO Intrinsic Safety <sup>(21)</sup>		★
I5	FM Intrinsic Safety and Non-Incendive		★
IE	FM FISCO Intrinsic Safety <sup>(21)</sup>		★
I6	CSA Intrinsic Safety		★
IF	CSA FISCO Intrinsic Safety <sup>(21)</sup>		★
I7	IECEX Intrinsic Safety		★
IG	IECEX FISCO Intrinsic Safety <sup>(21)</sup>		★
<b>Expanded</b>			
E2	INMETRO Flameproof		
I2	INMETRO Intrinsic Safety		
IB	INMETRO FISCO Intrinsic Safety		
E4	TIIS Flameproof		
KA	ATEX, FM, CSA Flameproof/Explosion-proof <sup>(20)</sup>		
KB	ATEX, FM, IECEX Flameproof/Explosion-proof <sup>(20)</sup>		
KC	ATEX, CSA, IECEX Flameproof/Explosion-proof <sup>(20)</sup>		
KD	FM, CSA, IECEX Flameproof/Explosion-proof <sup>(20)</sup>		
KE	ATEX, FM, CSA Intrinsic Safety		
KF	ATEX, FM, IECEX Intrinsic Safety		
KG	ATEX, CSA, IECEX Intrinsic Safety		
KH	FM, CSA, IECEX Intrinsic Safety		
KI	FISCO - ATEX, FM, CSA Intrinsic Safety <sup>(21)</sup>		
KJ	FISCO - ATEX, FM, IECEX Intrinsic Safety <sup>(21)</sup>		
KK	FISCO - ATEX, CSA, IECEX Intrinsic Safety <sup>(21)</sup>		
KL	FISCO - FM, CSA, IECEX Intrinsic Safety <sup>(21)</sup>		
<b>Options</b>			
<b>Standard</b>			<b>Standard</b>
M1	Integral digital display		★
P1	Hydrostatic testing <sup>(22)</sup>		★
N2	NACE material recommendation per MR-0175 and MR-0103 <sup>(23)</sup>		★



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LS	Long stud <sup>(24)</sup> 9.8 in (250 mm) for flexible single lead probe to prevent contact with wall/nozzle. Standard height is 3.9 in (100 mm) for probes 5A and 5B.		★
T1	Transient Protection Terminal Block (standard with FISCO options)		★
W3	2.2 lb (1 kg) weight for flexible single lead probe (5A). L=5.5 in. (140 mm)		★
<b>Expanded</b>			
BR	Mounting Bracket for 1.5 in. NPT Process Connection (RA)		
W2	0.79 lb (0.36 kg) short weight for flexible single lead probe <sup>(25)</sup> . L=2 in. (50 mm)		
<b>Special Configuration (Software)</b>			
<b>Standard</b>			<b>Standard</b>
C1	Factory configuration (CDS required with order)		★
C4	Namur alarm and saturation levels, high alarm		★
C5	Namur alarm and saturation levels, low alarm		★
C8	Low alarm <sup>(26)</sup> (standard Rosemount alarm and saturation levels)		★
<b>Special Certifications</b>			
<b>Standard</b>			<b>Standard</b>
Q4	Calibration Data Certification		★
Q8	Material Traceability Certification per EN 10204 3.1 <sup>(27)</sup>		★
QS	Prior-use certificate of FMEDA Data. Only available with HART 4-20 mA output (output code H).		★
U1	WHG Overfill Approval. Only available with HART 4-20 mA output (output code H)		★
<b>Expanded</b>			
QG	GOST Primary Verification Certificate		
<b>PlantWeb Diagnostic Functionality</b>			
<b>Standard</b>			<b>Standard</b>
D01	FOUNDATION fieldbus Diagnostics Suite		★
DA1	HART Diagnostics Suite		★
<b>Centering Discs</b>		<b>Outer Diameter</b>	
<b>Standard</b>			<b>Standard</b>
S2	2 in. Centering disc <sup>(28)</sup>	1.8 in. (45 mm)	★
S3	3 in. Centering disc <sup>(28)</sup>	2.7 in. (68 mm)	★
S4	4 in. Centering disc <sup>(28)</sup>	3.6 in. (92 mm)	★
P2	2 in. Centering disc PTFE <sup>(29)</sup>	1.8 in. (45 mm)	★
P3	3 in. Centering disc PTFE <sup>(29)</sup>	2.7 in. (68 mm)	★
P4	4 in. Centering disc PTFE <sup>(29)</sup>	3.6 in. (92 mm)	★
<b>Expanded</b>			
S6	6 in. Centering disc <sup>(28)</sup>	5.55 in. (141 mm)	
S8	8 in. Centering disc <sup>(28)</sup>	7.40 in. (188 mm)	
P6	6 in. Centering disc PTFE <sup>(29)</sup>	5.55 in. (141 mm)	
P8	8 in. Centering disc PTFE <sup>(29)</sup>	7.40 in. (188 mm)	
<b>Remote Housing Mounting</b>			
<b>Expanded</b>			
B1	1m / 3.2 ft. Remote Housing Mounting Cable and Bracket		
B2	2m / 6.5 ft. Remote Housing Mounting Cable and Bracket		
B3	3m / 9.8 ft. Remote Housing Mounting Cable and Bracket		
<b>Consolidate to Chamber</b>			
<b>Expanded</b>			
XC	Consolidate to Chamber <sup>(30)</sup>		

(1) Not available with Flame/Explosion-proof approvals (E1, E3, E5, E6, E7, KA, KB, KC, and KD)

(2) Process seal rating. Final rating depends on flange and O-ring selection. See "Temperature and Pressure Limits" on page 22.

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- (3) Requires option None for sealing (no O-ring).
- (4) Welding Procedure Qualification Record Documentation will be supplied.
- (5) For other materials, consult the factory.
- (6) Consult the factory for this option.
- (7) Requires High Temperature High Pressure (code H), High Pressure (code P), or Cryogenic (code C) probe.
- (8) Available in SST. Consult the factory for other materials.
- (9) 0.79 lb (0.36 kg) standard weight for flexible single lead probe. L=5.5 in. (140 mm).  
For PTFE covered probes: 2.2 lb (1 kg) standard weight for flexible single lead probe. L=17.1 in. (434 mm).
- (10) Extra length for fastening is added in factory.
- (11) Requires model 5301. 1.3 lb (0.6 kg) standard weight for twin flex lead probe. L=3.5 in. (90 mm).
- (12) Only available with standard temperature and pressure (code S).
- (13) This is an HTHP probe.
- (14) Probe weight included if applicable. Give the total probe length in feet and inches or meters and centimeters, depending on selected probe length unit.  
If tank height is unknown, please round up to an even length when ordering. Probes can be cut to exact length in field. Maximum allowable length is determined by process conditions. See "Tank Connection and Probe" on page 31 for more probe length guidance.
- (15) Available in 316L SST. For other materials consult the factory.
- (16) Raised face type for SST flanges up to class 1500.
- (17) Available in 316L and EN 1.4404. For other materials consult the factory.
- (18) Type A flat face for SST flanges up to PN100 and type B2 raised face for SST flanges PN160 and PN250.
- (19) Raised face type for SST flanges.
- (20) Probes are intrinsically safe.
- (21) Requires FOUNDATION fieldbus signal output (U, parameter listed in "Product Certifications" on page 36).
- (22) For standard tank connection, only available with flange.
- (23) For Material SST, Alloy C-276 and Alloy 400; Probe Type 3A, 3B, 4A, 4B, 4U, and 4V.
- (24) Not available with PTFE covered probes.
- (25) Only for Material of Construction code 1 and 3. For other materials, consult the factory.
- (26) The standard alarm setting is high.
- (27) Certificate includes all pressure retaining wetted parts.
- (28) Available for SST and Alloy C-276 probes, type 2A, 4A, 4B, and 5A. Same disc material as probe material. For more information, see "Centering Discs" on page 35.
- (29) Available for probe types 2A, 4A, 4B and 5A, except for HTHP.
- (30) Not available for Cryogenic probe.

**Example Model String:** 5301-H-A-1-S-1-V-1A-M-002-05-AA-I1-M1C1. E-002-05, means 2 ft and 5 in. probe length. M-002-05, means 2.05 m.

## Rosemount 5303 Level for Solids



Rosemount 5303 Guided Wave Radar Level transmitter provides industry leading measurement capabilities and reliability on solids. Characteristics include:

- Direct Switch Technology and Probe End Projection to handle low reflective media and long measuring ranges
- Measurement independent of dust, moisture and material fluctuations
- HART 4-20 mA, FOUNDATION fieldbus, Modbus, or IEC 62591 (*WirelessHART*) with the Smart Wireless THUM adapter
- Probes for high physical weight loads (probe type 6A and 6B)
- Long stud available to prevent contact with nozzle (LS option)

### Additional Information

Specifications: page 16

Certifications: page 36

Dimensional drawings: page 39

TABLE 2. 5303 Level for Solids Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

Model	Product Description		
5303	Guided Wave Solids Level Transmitter		
<b>Signal Output</b>			
<b>Standard</b>			<b>Standard</b>
H	4-20 mA with HART communication		★
F	FOUNDATION fieldbus		★
M	RS-485 with Modbus communication		★
<b>Housing Material</b>			
<b>Standard</b>			<b>Standard</b>
A	Polyurethane-covered Aluminum		★
<b>Expanded</b>			
S	Stainless Steel, Grade CF8M (ASTM A743)		
<b>Conduit / Cable Threads</b>			
<b>Standard</b>			<b>Standard</b>
1	½ - 14 NPT		★
2	M20 x 1.5 adapter		★
E	M12, 4-pin, Male connector (eurofast <sup>®</sup> ) <sup>(1)</sup>		★
M	A size Mini, 4-pin, Male connector (minifast <sup>®</sup> ) <sup>(1)</sup>		★
<b>Operating Temperature and Pressure</b>			<b>Probe Type</b>
<b>Standard</b>			<b>Standard</b>
S	- 15 psig (-1bar) to 580 psig (40 bar) @ 302 °F (150 °C) <sup>(2)</sup>		Single Lead Probes only ★
<b>Material of Construction<sup>(3)</sup>: Process Connection / Probe</b>			<b>Probe Type</b>
<b>Standard</b>			<b>Standard</b>
1	316L SST (EN 1.4404)		Single Lead Probes only ★
<b>Sealing, O-ring Material (Consult factory for other o-ring materials)</b>			
<b>Standard</b>			<b>Standard</b>
V	Viton <sup>®</sup> fluoroelastomer		★
E	Ethylene Propylene		★

# Rosemount 5300 Series

**TABLE 2. 5303 Level for Solids Ordering Information**

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.  
The Expanded offering is subject to additional delivery lead time.

K	Kalrez® 6375 perfluoroelastomer		★
B	Buna-N		★
<b>Probe Type</b>		<b>Process Connection</b>	<b>Probe Lengths</b>
<b>Standard</b>			<b>Standard</b>
5A	Flexible Single Lead with weight, 4 mm <sup>(4)</sup>	Flange / 1 in., 1.5 in., 2 in. Thread	Min: 3 ft 4 in. (1 m). Max: 115 ft. (35 m) ★
5B	Flexible Single Lead with chuck, 4 mm <sup>(5)</sup>	Flange / 1 in., 1.5 in., 2 in. Thread	Min: 3 ft 4 in. (1 m). Max: 115 ft. (35 m) ★
6A	Flexible Single Lead with weight, 6 mm <sup>(6)</sup>	Flange / 1 in., 1.5 in., 2 in. Thread	Min: 3 ft 4 in. (1 m). Max: 164 ft. (50 m) ★
6B	Flexible Single Lead with chuck, 6 mm <sup>(5)</sup>	Flange / 1 in., 1.5 in., 2 in. Thread	Min: 3 ft 4 in. (1 m). Max: 164 ft. (50 m) ★
<b>Probe Length Units</b>			
<b>Standard</b>			<b>Standard</b>
E	English (feet, in.)		★
M	Metric (meters, centimeters)		★
<b>Total Probe Length <sup>(7)</sup> (feet/m)</b>			
<b>Standard</b>			<b>Standard</b>
xxx	0-164 ft or 0-50 m		★
<b>Total Probe Length <sup>(7)</sup> (in./cm)</b>			
<b>Standard</b>			<b>Standard</b>
xx	0-11 in. or 0-99 cm		★
<b>Process Connection - Size / Type (consult the factory for other process connections)</b>			
<b>ASME / ANSI Flanges<sup>(8)</sup></b>			
<b>Standard</b>			<b>Standard</b>
AA	2 in., 150 lb		★
AB	2 in., 300 lb		★
BA	3 in., 150 lb		★
BB	3 in., 300 lb		★
CA	4 in., 150 lb		★
CB	4 in., 300 lb		★
<b>Expanded</b>			
DA	6 in., 150 lb		
<b>EN (DIN) Flanges<sup>(9)</sup></b>			
<b>Standard</b>			<b>Standard</b>
HB	DN50, PN40		★
IA	DN80, PN16		★
IB	DN80, PN40		★
JA	DN100, PN16		★
JB	DN100, PN40		★
<b>Expanded</b>			
KA	DN150, PN16		
<b>JIS Flanges<sup>(9)</sup></b>			
<b>Standard</b>			<b>Standard</b>
UA	50A, 10K		★
VA	80A, 10K		★
XA	100A, 10K		★

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# Rosemount 5300 Series

**TABLE 2. 5303 Level for Solids Ordering Information**

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.  
The Expanded offering is subject to additional delivery lead time.

<b>Expanded</b>			
UB	50A, 20K		
VB	80A, 20K		
XB	100A, 20K		
YA	150A, 10K		
YB	150A, 20K		
ZA	200A, 10K		
ZB	200A, 20K		
<b>Threaded Connections<sup>(8)</sup></b>		<b>Probe Type</b>	
<b>Standard</b>			<b>Standard</b>
RA	1 ½ in. NPT thread	5A, 5B, 6A, 6B, std. temp. and pressure	★
RC	2 in. NPT thread	5A, 5B, 6A, 6B, std. temp. and pressure	★
<b>Expanded</b>			
RB	1 in. NPT thread	5A, 5B, 6A, 6B, std. temp. and pressure	
SA	1 ½ in. BSP (G 1 ½ in.) thread	5A, 5B, 6A, 6B, std. temp. and pressure	
SB	1 in. BSP (G 1 in.) thread	5A, 5B, 6A, 6B, std. temp. and pressure	
<b>Hazardous Locations Certifications</b>			
<b>Standard</b>			<b>Standard</b>
NA	No Hazardous Locations Certifications		★
E1	ATEX Flameproof		★
E3	NEPSI Flameproof		★
E5	FM Explosion-proof		★
E6	CSA Explosion-proof		★
E7	IECEX Flameproof		★
I1	ATEX Intrinsic Safety		★
IA	ATEX FISCO Intrinsic Safety <sup>(10)</sup>		★
I3	NEPSI Intrinsic Safety		★
IC	NEPSI FISCO Intrinsic Safety <sup>(10)</sup>		★
I5	FM Intrinsic Safety and Non-Incendive		★
IE	FM FISCO Intrinsic Safety <sup>(10)</sup>		★
I6	CSA Intrinsic Safety		★
IF	CSA FISCO Intrinsic Safety <sup>(10)</sup>		★
I7	IECEX Intrinsic Safety		★
IG	IECEX FISCO Intrinsic Safety <sup>(10)</sup>		★
<b>Expanded</b>			
E2	INMETRO Flameproof		
I2	INMETRO Intrinsic Safety		
IB	INMETRO FISCO Intrinsic Safety		
E4	TIIS Flameproof		
KA	ATEX, FM, CSA Flameproof/Explosion-proof		
KB	ATEX, FM, IECEX Flameproof/Explosion-proof		
KC	ATEX, CSA, IECEX Flameproof/Explosion-proof		
KD	FM, CSA, IECEX Flameproof/Explosion-proof		
KE	ATEX, FM, CSA Intrinsic Safety		
KF	ATEX, FM, IECEX Intrinsic Safety		
KG	ATEX, CSA, IECEX Intrinsic Safety		
KH	FM, CSA, IECEX Intrinsic Safety		
KI	FISCO - ATEX, FM, CSA Intrinsic Safety <sup>(10)</sup>		

# Rosemount 5300 Series

TABLE 2. 5303 Level for Solids Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

KJ	FISCO - ATEX, FM, IECEX Intrinsic Safety <sup>(10)</sup>	
KK	FISCO - ATEX, CSA, IECEX Intrinsic Safety <sup>(10)</sup>	
KL	FISCO - FM, CSA, IECEX Intrinsic Safety <sup>(10)</sup>	
<b>Options</b>		
<b>Standard</b>		<b>Standard</b>
M1	Integral digital display	★
P1	Hydrostatic testing <sup>(11)</sup>	★
LS	Long stud 9.8 in (250 mm) for flexible single lead probe to prevent contact with wall/nozzle. Standard height is 3.9 in (100 mm) for probes 5A and 5B; 5.9 in. (150 mm) for probes 6A and 6B	★
T1	Transient Protection Terminal Block (standard with FISCO options)	★
W3	2.2 lb (1 kg) weight for flexible single lead probe (5A). L=5.5 in. (140 mm)	★
<b>Expanded</b>		
BR	Mounting Bracket for 1.5 in. NPT Process Connection (RA) <sup>(12)</sup>	
<b>Special Configuration (Software)</b>		
<b>Standard</b>		<b>Standard</b>
C1	Factory configuration (CDS required with order)	★
C4	Namur alarm and saturation levels, high alarm	★
C5	Namur alarm and saturation levels, low alarm	★
C8	Low alarm <sup>(13)</sup> (standard Rosemount alarm and saturation levels)	★
<b>Special Certifications</b>		
<b>Standard</b>		<b>Standard</b>
Q4	Calibration Data Certification	★
Q8	Material Traceability Certification per EN 10204 3.1 <sup>(14)</sup>	★
QS	Prior-use certificate of FMEDA Data. Only available with HART 4-20 mA output (output code H).	★
U1	WHG Overfill Approval. Only available with HART 4-20 mA output (output code H)	★
<b>Expanded</b>		
QG	GOST Primary Verification Certificate	
<b>PlantWeb Diagnostic Functionality</b>		
<b>Standard</b>		<b>Standard</b>
D01	FOUNDATION fieldbus Diagnostics Suite	★
DA1	HART Diagnostics Suite	★
<b>Remote Housing Mounting</b>		
<b>Expanded</b>		
B1	1m / 3.2 ft. Remote Housing Mounting Cable and Bracket	
B2	2m / 6.5 ft. Remote Housing Mounting Cable and Bracket	
B3	3m / 9.8 ft. Remote Housing Mounting Cable and Bracket	

(1) Not available with Flame/Explosion-proof approvals (E1, E3, E5, E6, E7, KA, KB, KC, and KD)

(2) Process seal rating. Final rating depends on flange and O-ring selection. See "Tank Connection and Probe" on page 31.

(3) For other materials, consult the factory.

(4) 0.79 lb (0.36 kg) standard weight for flexible single lead probe. L=5.5 in. (140 mm).

(5) Extra length for fastening is added in the factory.

(6) 1.2 lb (0.56 kg) standard weight for flexible single lead probe. L=5.5 in. (140 mm).

(7) Probe weight included if applicable. Give the total probe length in feet and inches or meters and centimeters, depending on selected probe length unit. If tank height is unknown, please round up to an even length when ordering. Probes can be cut to exact length in field. Maximum allowable length is determined by process conditions. See "Tank Connection and Probe" on page 31 for more probe length guidance.

(8) Available in 316L SST. For other materials, consult the factory.

(9) Available in 316L and EN 1.4404. For other materials consult the factory.

(10) Requires FOUNDATION fieldbus signal output (U<sub>i</sub> parameter listed in "Product Certifications" on page 36).

(11) Available for flanged connection.

(12) Only for Standard Temperature and Pressure.

(13) The standard alarm setting is high.

(14) Certificate includes all pressure retaining wetted parts.

**Example Model String: 5303-H-A-1-S-1-V-6A-M-025-50-AA-11-M1C1. E-025-05, means 25 ft and 5 in. probe length. M-025-50, means 25.5 m.**

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# Rosemount 5300 Series

## ACCESSORIES

TABLE 3. Accessories Ordering Information



Process Connection - Size/Type (consult the factory for other process connections)			
Centering discs <sup>(1) (2)</sup>		Outer Diameter	
Standard			Standard
03300-1655-0001	Kit, 2-in. Centering Disk, SST, Rigid Single	1.8 in. (45 mm)	★
03300-1655-0002	Kit, 3-in. Centering Disk, SST, Rigid Single	2.7 in. (68 mm)	★
03300-1655-0003	Kit, 4-in. Centering Disk, SST, Rigid Single	3.6 in. (92 mm)	★
03300-1655-0006	Kit, 2-in. Centering Disk, PTFE, Rigid Single	1.8 in. (45 mm)	★
03300-1655-0007	Kit, 3-in. Centering Disk, PTFE, Rigid Single	2.7 in. (68 mm)	★
03300-1655-0008	Kit, 4-in. Centering Disk, PTFE, Rigid Single	3.6 in. (92 mm)	★
03300-1655-1001	Kit, 2-in. Centering Disk, SST, Single / Twin Flex Lead	1.8 in. (45 mm)	★
03300-1655-1002	Kit, 3-in. Centering Disk, SST, Single / Twin Flex Lead	2.7 in. (68 mm)	★
03300-1655-1003	Kit, 4-in. Centering Disk, SST, Single / Twin Flex Lead	3.6 in. (92 mm)	★
03300-1655-1006	Kit, 2-in. Centering Disk, PTFE, Single / Twin Flex Lead	1.8 in. (45 mm)	★
03300-1655-1007	Kit, 3-in. Centering Disk, PTFE, Single / Twin Flex Lead	2.7 in. (68 mm)	★
03300-1655-1008	Kit, 4-in. Centering Disk, PTFE, Single / Twin Flex Lead	3.6 in. (92 mm)	★
Expanded			
03300-1655-0004	Kit, 6-in. Centering Disk, SST, Rigid Single	5.55 in. (141 mm)	
03300-1655-0005	Kit, 8-in. Centering Disk, SST, Rigid Single	7.40 in. (188 mm)	
03300-1655-0009	Kit, 6-in. Centering Disk, PTFE, Rigid Single	5.55 in. (141 mm)	
03300-1655-0010	Kit, 8-in. Centering Disk, PTFE, Rigid Single	7.40 in. (188 mm)	
03300-1655-1004	Kit, 6-in. Centering Disk, SST, Single / Twin Flex Lead	5.55 in. (141 mm)	
03300-1655-1005	Kit, 8-in. Centering Disk, SST, Single / Twin Flex Lead	7.40 in. (188 mm)	
03300-1655-1009	Kit, 6-in. Centering Disk, PTFE, Single / Twin Flex Lead	5.55 in. (141 mm)	
03300-1655-1010	Kit, 8-in. Centering Disk, PTFE, Single / Twin Flex Lead	7.40 in. (188 mm)	
Vented Flanges <sup>(3)</sup>			
Expanded			
03300-1812-9001	Fisher 249B		
03300-1812-9002	Fisher 249C		
03300-1812-9003	Masoneilan		
Flushing Connection Rings			
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, ¼ in. NPT connection		
DP0002-5111-S6	DN50, ¼ in. NPT connection		
DP0002-8111-S6	DN80, ¼ in. NPT connection		
Other			
Standard			Standard
03300-7004-0001	Viator HART Modem and cables (RS232 connection)		★
03300-7004-0002	Viator HART Modem and cables (USB connection)		★

(1) If a centering disc is required for a flanged probe, the centering disc can be ordered with options Sx or Px on page 9 in the model code. If a centering disc is required for a threaded connection, or as a spare part, it should be ordered using the item numbers listed below.

(2) To order a centering disc in a different material consult the factory.

(3) 1½ in. NPT threaded connection (RA) is required.

### Functional Specification

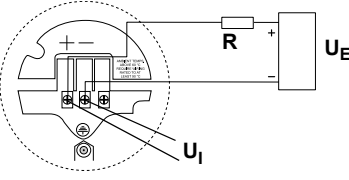
General	
<b>Field of Application</b>	Liquids and semi-liquids level and/or liquid/liquid interfaces or solids level <ul style="list-style-type: none"> <li>• Model 5301, for liquid level or submerged interface measurements</li> <li>• Model 5302, for liquid level and interface measurements</li> <li>• Model 5303, for solid level measurements</li> </ul>
<b>Measurement Principle</b>	Time Domain Reflectometry (TDR) (See "Measurement Principle" on page 2 for a description of how it works)
<b>Microwave Output Power</b>	Nominal 300 $\mu$ W, Max. 45 mW
<b>Telecommunication (FCC and R&amp;TTE)</b>	FCC part 15 (1998) subpart B and R&TTE (EU directive 99/5/EC). Considered to be an unintentional radiator under the Part 15 rules
<b>Humidity</b>	0 - 100% Relative Humidity
<b>Start-up Time</b>	< 40 s
<b>Internal Power Consumption</b>	< 50 mW in normal operation
4-20 mA HART (Output Option Code H) - (See Ordering Information in Table 1 on page 4 and Table 2 on page 11)	
<b>Output</b>	<p>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 HART signal can be used in a multidrop mode.</p> <p>The diagram illustrates a multidrop HART communication system. A Rosemount 5300 Series Transmitter is connected to a Rosemount 751 Field Signal Indicator. The transmitter also outputs a 4-20 mA / HART signal to a Field Communicator. Additionally, the transmitter is connected to a Rosemount 333 HART Tri-loop, which provides 3 x 4-20 mA signals to a Control System. A HART Modem is connected to the Field Communicator and a PC with Rosemount Radar Master.</p>
<b>Signal Wiring</b>	Recommended output cabling is twisted shielded pairs, 18-12 AWG
<b>HART Tri-loop</b>	 <p>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 (Document No. 00813-0100-4754) for additional information</p>
<b>Smart Wireless THUM Adapter</b>	 <p>The optional Smart Wireless THUM adapter can be mounted directly on the transmitter or by using a remote mounting kit. IEC 62591 (<i>WirelessHART</i>) enables access to multi-variable data and diagnostics, and adds wireless to almost any measurement point. See the Rosemount Smart Wireless THUM adapter Product Data Sheet (Document No. 00813-0100-4075) and Smart Wireless THUM Adapter for Rosemount Process Level Transmitter Applications (Document No. 00840-0100-4026)</p>



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# Rosemount 5300 Series

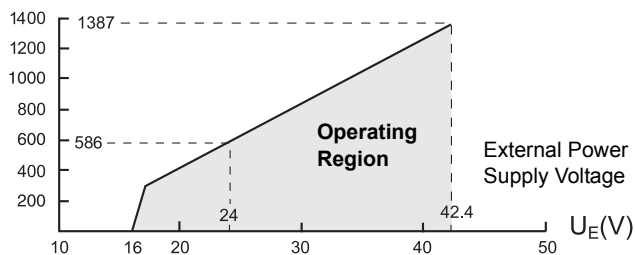
<p><b>External Power Supply<sup>(1)</sup></b></p>	<p>The input voltage (<math>U_I</math>) for HART is 16-42.4 Vdc (16-30 Vdc in IS applications, and 20-42.4 Vdc in Explosion-proof / Flameproof applications).</p> <p>For Flameproof/Explosion-proof installations the Rosemount 5300 Series transmitters have a built-in barrier; no external barrier needed.</p> <p>When a Smart Wireless THUM adapter is fitted, it adds a maximum drop of 2.5 Vdc in the connected loop</p> <p>R = Load Resistance (<math>\Omega</math>); <math>U_E</math> = External Power Supply Voltage (Vdc); <math>U_I</math> = Input Voltage (Vdc)</p>	
<p><b>Minimum Input Voltage (<math>U_I</math>) at Different Currents</b></p>	<p>Current: 3.75 mA Non-Hazardous Installations and Intrinsically Safe Installations: 16 Vdc Explosion-proof / Flameproof Installations: 20 Vdc</p> <p>Current: 21.75 mA Non-Hazardous Installations and Intrinsically Safe Installations: 11 Vdc Explosion-proof / Flameproof Installations: 15.5 Vdc</p>	
<p><b>IS Parameters</b></p>	<p>See "Product Certifications" on page 36</p>	
<p><b>Signal on Alarm</b></p>	<p>Standard: Low = 3.75 mA, High = 21.75 mA Namur NE43: Low = 3.60 mA, High = 22.50 mA</p>	
<p><b>Saturation Levels</b></p>	<p>Standard: Low = 3.9 mA, High = 20.8 mA Namur NE43: Low = 3.8 mA, High = 20.5 mA</p>	

## Load Limitations

Maximum load resistance is determined by the voltage level of the external power supply, as described by:

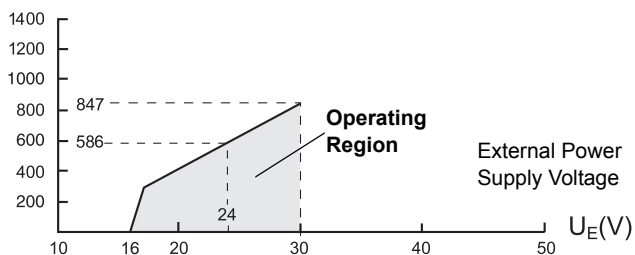
### Non-Hazardous Installations

$R(\Omega)$  Maximum Load Resistance



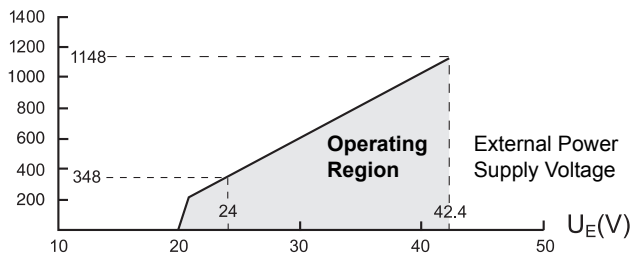
### Intrinsically Safe Installations

$R(\Omega)$  Maximum Load Resistance




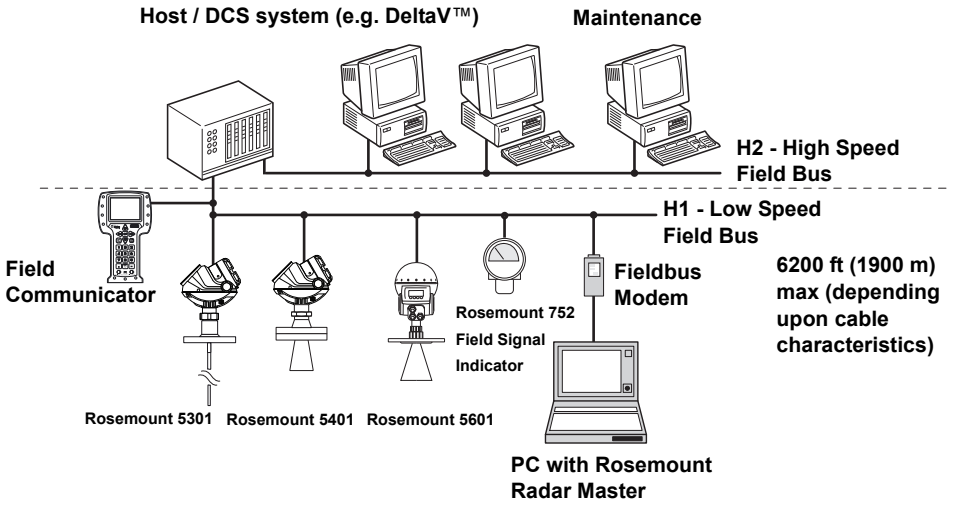
### Explosion-proof / Flameproof (EEx d) Installations

$R(\Omega)$  Maximum Load Resistance



### NOTE

For the EEx d case, the diagram is only valid if the HART<sup>®</sup> load resistance is at the + side and if the - side is grounded, otherwise the load resistance value is limited to 435  $\Omega$ .

FOUNDATION™ fieldbus (Output Option Code F) - (See Ordering Information in Table 1 on page 4 and Table 2 on page 11)	
Output	<p>FOUNDATION™ fieldbus </p>  <p>Host / DCS system (e.g. DeltaV™) Maintenance</p> <p>H2 - High Speed Field Bus</p> <p>H1 - Low Speed Field Bus</p> <p>Field Communicator</p> <p>Rosemount 5301 Rosemount 5401 Rosemount 5601</p> <p>Rosemount 752 Field Signal Indicator</p> <p>Fieldbus Modem</p> <p>6200 ft (1900 m) max (depending upon cable characteristics)</p> <p>PC with Rosemount Radar Master</p>
External Power Supply <sup>(1)</sup>	<p>The input voltage for FOUNDATION™ fieldbus is 9-32 Vdc (9-30 Vdc in IS applications, and 16-32 Vdc in Explosion-proof/Flameproof applications)                  The input voltage for FISCO, IS applications is 9-17.5 Vdc                  For Flameproof/Explosion-proof installations the Rosemount 5300 Series transmitters have a built-in barrier; no external barrier needed.</p>
Quiescent Current Draw	21 mA
FOUNDATION fieldbus Blocks	Resource block, 3 Transducer blocks, 6 AI blocks, PID block, ISEL block, SGCR block, ARTH block, and OS block
FOUNDATION fieldbus Class (Basic or Link Master)	Link Master (LAS)
FOUNDATION fieldbus Block Execution Time	AI-block: 30 ms. PID-block: 40 ms ARTH-, ISEL-, OSPL-block: 65 ms. CHAR-block: 75 ms
FOUNDATION fieldbus Instantiation	No
Conforming FOUNDATION fieldbus	ITK 5.0
FOUNDATION fieldbus PlantWeb Alert Support	Yes

## Modbus (Output Option Code M) - (See Ordering Information in Table 1 on page 4 and Table 2 on page 11)

**Output**

The RS-485 Modbus version communicates by Modbus RTU, Modbus ASCII, and Levelmaster protocols.

8 data bits, 1 start bit, 1 stop bit, and software selectable parity.  
Baud Rate: 1200, 2400, 4800, 9600 (default), and 19200 bits/s.  
Address Range: 1 to 255 (default device address is 246).

HART communication is used for configuration via the HART terminals or tunneling via the RS-485.

**Rosemount 5300 Series Transmitter**      **Power**

**Modbus, Levelmaster Emulation / RS-485**

**HART Modem**

**Control System**

**RS-232 / RS-485 Converter**

**Field Communicator**

**PC 5300 Setup in Rosemount Radar Master**

**PC 5300 Setup in Rosemount Radar Master via Tunneling**

**External Power Supply<sup>(1)</sup>**

The input voltage  $U_i$  for Modbus is 8-30 Vdc (max. rating)  
Power Consumption:  
< 0.5 W (with HART address=1)  
< 1.2 W (incl. four HART slaves)

**Modbus**

**ROSEMOUNT**

HART to Modbus Converter

MODBUS (RS-485)

POWER

HART

120Ω

120Ω

RS-485 Bus

A

B

Power Supply

If it is the last transmitter on the bus, connect the 120Ω termination resistor.

VT Termination

MB

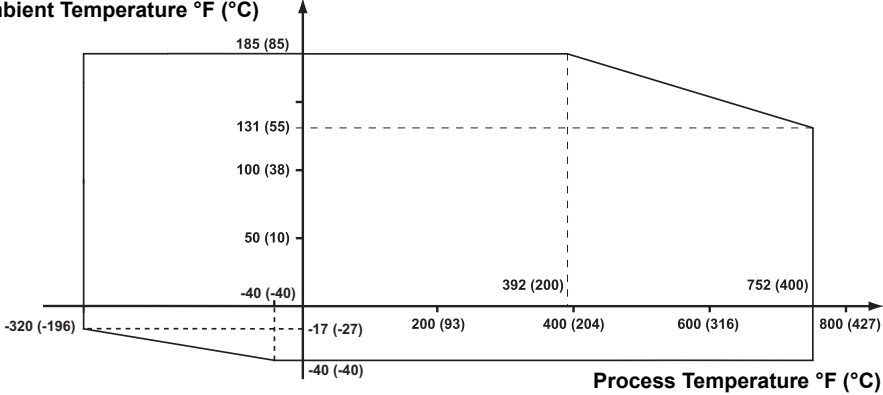
MA

MODBUS (RS-485)

For Flameproof/Explosion-proof installations the Rosemount 5300 Series transmitters have a built-in barrier; no external barrier needed.

<b>Display and Configuration</b>																																																																																																
<b>Integral Display</b> (Options Code M1)	The integral digital display can toggle between: level, distance, volume, internal temperature, interface distance, interface level, peak amplitudes, interface thickness, percentage of range, analog current out <b>Note:</b> The display cannot be used for configuration purposes																																																																																															
<b>Remote Display</b>	Data can be read from the optional integral display or remotely using the Rosemount 751 Field Signal Indicator for 4-20 mA / HART (see Product Data Sheet, Document No. 00813-0100-4378), or the Rosemount 752 Remote Indicator for FOUNDATION™ fieldbus (see Product Data Sheet, Document No. 00813-0100-4377)																																																																																															
<b>Configuration Tools</b>	HART: Rosemount Radar Master, Emerson Field Communicator, AMS Device Manager, or any other DD (Device Description) compatible host system FOUNDATION™ fieldbus: Rosemount Radar Master, Emerson Field Communicator, DeltaV, or any other DD (Device Description) compatible host system DTM (compliant with version 1.2 of the FDT/DTM specification) supporting configuration in for instance Yokogawa Fieldmate/PRM, E+H™ FieldCare, and PactWare™																																																																																															
<b>Output Units</b>	Level, Interface and Distance: ft, inches, m, cm, or mm Level Rate: ft/s, m/s, in./min, m/h Volume: ft <sup>3</sup> , inch <sup>3</sup> , US gals, Imp gals, barrels, yd <sup>3</sup> , m <sup>3</sup> , or liters Temperature: °F and °C																																																																																															
<b>Output Variables</b>	<table border="1"> <thead> <tr> <th></th> <th>5301</th> <th>5302</th> <th>5303</th> <th>PV, SV, TV, QV</th> </tr> </thead> <tbody> <tr><td>Level</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Distance to Level (Ullage)</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Level Rate</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Signal Strength</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Volume</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Internal Temperature</td><td>X</td><td>X</td><td>X</td><td>X</td></tr> <tr><td>Interface Level</td><td>(X)<sup>(1)</sup></td><td>X</td><td></td><td>X</td></tr> <tr><td>Interface Distance</td><td>(X)<sup>(1)</sup></td><td>X</td><td></td><td>X</td></tr> <tr><td>Interface Level Rate</td><td>(X)<sup>(1)</sup></td><td>X</td><td></td><td>X</td></tr> <tr><td>Interface Signal Strength</td><td>(X)<sup>(1)</sup></td><td>X</td><td></td><td>X</td></tr> <tr><td>Upper Layer Thickness</td><td>X</td><td>X</td><td></td><td>X</td></tr> <tr><td>Lower Volume</td><td>(X)<sup>(1)</sup></td><td>X</td><td></td><td>X</td></tr> <tr><td>Upper Volume</td><td>(X)<sup>(1)</sup></td><td>X</td><td></td><td>X</td></tr> <tr><td>Signal Quality</td><td>X</td><td>X</td><td>X</td><td>(X)<sup>(2)</sup></td></tr> <tr><td>Surface/Noise Margin</td><td>X</td><td>X</td><td>X</td><td>(X)<sup>(2)</sup></td></tr> <tr><td>Vapor DC</td><td>X</td><td></td><td></td><td>(X)<sup>(2)</sup></td></tr> <tr><td>Analog Output Current<sup>(3)</sup></td><td>X</td><td>X</td><td>X</td><td></td></tr> <tr><td>% of Range<sup>(4)</sup></td><td>X</td><td>X</td><td>X</td><td></td></tr> </tbody> </table> <p>(1) Interface measurement only for fully submerged probe, see page 25 (2) Not available as primary variable (3) LCD variable only. Not available for FOUNDATION fieldbus, Modbus Signal Output, or for HART units in fixed current mode (4) LCD variable only. Not available for FOUNDATION fieldbus Signal Output</p>		5301	5302	5303	PV, SV, TV, QV	Level	X	X	X	X	Distance to Level (Ullage)	X	X	X	X	Level Rate	X	X	X	X	Signal Strength	X	X	X	X	Volume	X	X	X	X	Internal Temperature	X	X	X	X	Interface Level	(X) <sup>(1)</sup>	X		X	Interface Distance	(X) <sup>(1)</sup>	X		X	Interface Level Rate	(X) <sup>(1)</sup>	X		X	Interface Signal Strength	(X) <sup>(1)</sup>	X		X	Upper Layer Thickness	X	X		X	Lower Volume	(X) <sup>(1)</sup>	X		X	Upper Volume	(X) <sup>(1)</sup>	X		X	Signal Quality	X	X	X	(X) <sup>(2)</sup>	Surface/Noise Margin	X	X	X	(X) <sup>(2)</sup>	Vapor DC	X			(X) <sup>(2)</sup>	Analog Output Current <sup>(3)</sup>	X	X	X		% of Range <sup>(4)</sup>	X	X	X	
	5301	5302	5303	PV, SV, TV, QV																																																																																												
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Analog Output Current <sup>(3)</sup>	X	X	X																																																																																													
% of Range <sup>(4)</sup>	X	X	X																																																																																													
<b>Diagnostics</b>	Transmitter diagnostics with alerts include hardware and software errors, electronics temperature, probe missing, and invalid measurement and configuration error diagnostics. In addition to this, echo curve and variable logging including signal strength facilitate easy on-line troubleshooting																																																																																															
<b>Advanced Diagnostics</b>	Signal Quality Metrics monitors the degradation of level signal relative to excess noise. This can schedule the cleaning of the probe or to detect and monitor turbulence, boiling, foam, and emulsions. It can be ordered by choosing the D01 or DA1 option																																																																																															
<b>Damping</b>	0-60 s (2 s, default value)																																																																																															

# Rosemount 5300 Series

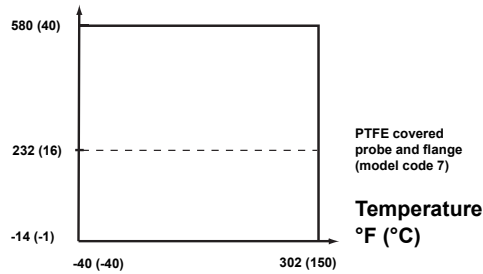
<b>Temperature and Pressure Limits</b>	
<b>Ambient Temperature</b>	<p>The maximum and minimum ambient temperature for the electronics depends on the process temperature (as described by the graph below) <i>and</i> on the approval (see "Product Certifications" on page 36).</p> <p><b>Ambient Temperature °F (°C)</b></p>  <p><b>Process Temperature °F (°C)</b></p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Nozzle insulation for the HTHP version (Operating Temperature and Pressure code H) should not exceed 4 in. (10 cm)</li> <li>• The temperature range for the optional Integral Display is -4 °F to 158 °F (-20 °C to 70 °C)</li> <li>• In applications where the ambient temperature exceeds the limits of the electronics, a Remote Mounting connection can be used. The maximum temperature for the Remote Mounting connection at the vessel connection point is 302 °F (150 °C)</li> </ul>
<b>Storage Temperature</b>	<p>-58 °F to 194 °F (-50 °C to 90 °C)                      With Integral Display: -40 °F to 185 °F (-40 °C to 85 °C)</p>

**Process Temperature<sup>(2)</sup>**

Standard (Std) tank connection (Operating Temperature and Pressure code S):

**Max. Rating, Standard Connections**

**Pressure  
psig (bar)**

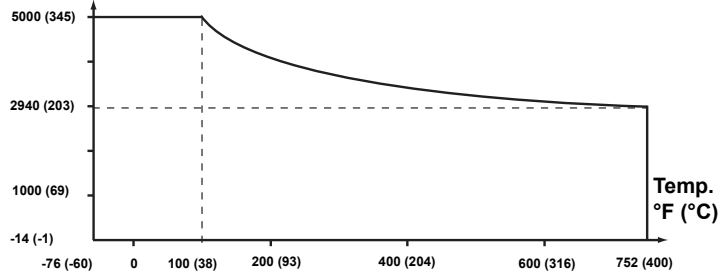


Final rating depends on flange and O-ring selection. The table on page 26 gives the temperature ranges for standard tank seals with different O-ring materials.

High Temperature and High Pressure (HTHP) tank connection (Operating Temperature and Pressure code H):

**Max. Rating, HTHP Connections**

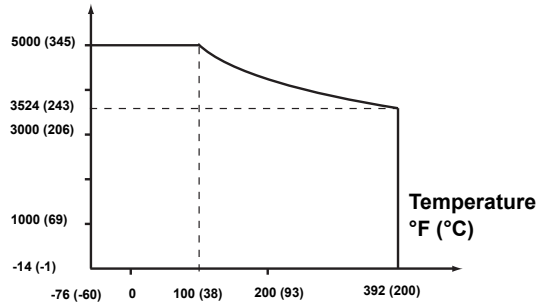
**Pressure  
psig (bar)**



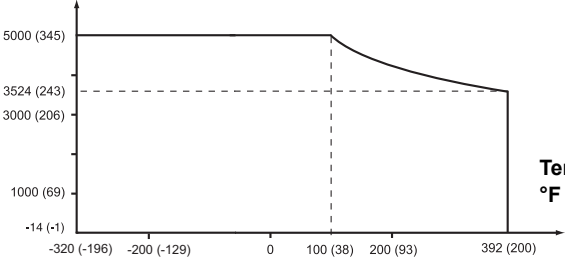
High Pressure (HP) tank connection (Operating Temperature and Pressure code P):

**Max. Rating, HP Connections**

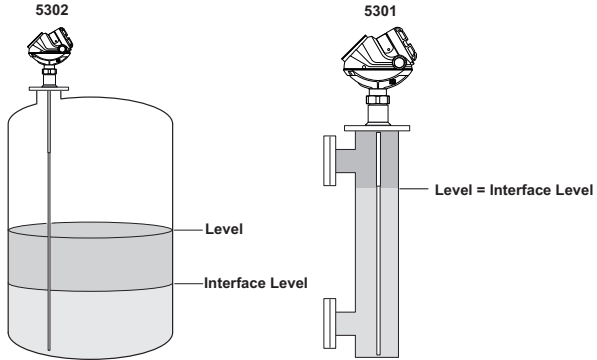
**Pressure  
psig (bar)**



# Rosemount 5300 Series

	<p>Cryogenic Temperature tank connection (Operating Temperature and Pressure code C):</p> <p><b>Max. Rating, C Connections</b></p> <p><b>Pressure psig (bar)</b></p>  <p><b>Temp. °F (°C)</b></p>
<p><b>ASME / ANSI Flange Rating</b></p>	<p>316L SST flanges according to ASME B16.5 Table 2-2.3:</p> <ul style="list-style-type: none"> <li>• Standard: Max. 302 °F/580 psig (150 °C/40 Bar)</li> <li>• HP/C: Class 2500 up to max 200 °C</li> <li>• HTHP: Class 2500 up to max 400 °C</li> </ul>
	<p>Alloy C-276 (UNS N10276) flanges according to ASME B16.5 Table 2-3.8:</p> <ul style="list-style-type: none"> <li>• HP/C: Class 1500 up to max 200 °C</li> <li>• HTHP: Class 1500 up to max 400 °C</li> </ul>
<p><b>EN Flange Rating</b></p>	<p>1.4404 according to EN 1092-1 material group 13E0:</p> <ul style="list-style-type: none"> <li>• Standard: Max. 302 °F/580 psig (150 °C/40 Bar)</li> <li>• HP/C: PN 320 up to max 200 °C</li> <li>• HTHP: PN 320 up to max 400 °C</li> </ul>
	<p>Alloy C-276 (UNS N10276) flanges according to EN 1092-1 material group 12E0</p>
<p><b>Fisher &amp; Masoneilan Flange Rating</b></p>	<p>316L SST according to ASME B16.5 Table 2-2.3:</p> <ul style="list-style-type: none"> <li>• Standard: Max. 302 °F/580 psig (150 °C/40 Bar)</li> <li>• HP/C: Class 600 up to max 200 °C</li> <li>• HTHP: Class 600 up to max 400 °C</li> </ul>
<p><b>JIS Flange Rating</b></p>	<p>316L SST according to JIS B2220 material group 2.3:</p> <ul style="list-style-type: none"> <li>• Standard: Max. 302 °F/580 psig (150 °C/40 Bar)</li> <li>• HP/C: Max temp. 200 °C. Final rating depends on flange.</li> <li>• HTHP: Max temp. 400 °C. Final rating depends on flange.</li> </ul>
<p><b>Tri-Clamp Rating</b></p>	<p>Maximum pressure is 16 bar for 1.5 in. (37.5 mm) and 2 in. (50 mm) housing; and 10 bar for 3 in. (75 mm) and 4 in. (100 mm) housing. The final rating depends on the clamp and gasket. Tri-Clamp is available for the Standard Temperature and Pressure seal.</p>
<p><b>Plate Design</b></p>	<p>Certain models of flanged Alloy and PTFE covered probes have a tank connection design with a protective flange plate of the same material as the probe and with a backing flange in 316L / EN 1.4404. The protective flange plate prevents the backing flange from being exposed to the tank atmosphere.</p> <p>Flange rating according to SST backing flange ASME B16.5 Table 2-2.3, EN 1092-1 material group 13E0, and JIS B2220 material group 2.3.</p> <p>Alloy C-276 protective plate:</p> <ul style="list-style-type: none"> <li>• Standard: Max. 302 °F/580 psig (150 °C/40 Bar). Flange plate design is available up to Class 300/PN 40</li> <li>• HP: Max temp. 200 °C. Flange plate design is available up to Class 600/PN 63</li> <li>• HTHP: Max temp. 400 °C. Flange plate design is available up to Class 600/PN 63</li> </ul> <p>Alloy 400 protective plate:</p> <ul style="list-style-type: none"> <li>• Standard: Max. 302 °F/580 psig (150 °C/40 Bar). Flange plate design is available up to Class 300/PN 40</li> </ul> <p>PTFE protective plate:</p> <ul style="list-style-type: none"> <li>• Standard: Max. 302 °F/580 psig (150 °C/40 Bar)</li> </ul>
<p><b>Flange Connection Rating</b></p>	<p>See Table 5 and Table 6 for the conditions used for flange strength calculations</p>



<b>Interface Measurements</b>	
<b>Considerations</b>	<p>The Rosemount 5302 is a good choice for measuring the interface of oil and water, or other liquids with significant dielectric differences. It is also possible to measure interfaces with a Rosemount 5301 in applications where the probe is fully submerged in the liquid. If interface is to be measured, follow these criteria:</p> <ul style="list-style-type: none"> <li>• The dielectric constant of the upper product must be known and should not vary. The Radar Master software has a built-in dielectric constant calculator to help the user estimate the upper product dielectric constant</li> <li>• The dielectric constant of the upper product must have a smaller dielectric constant than the lower product</li> <li>• The difference between the dielectric constants for the two products must be larger than 6</li> <li>• The maximum dielectric constant for the upper product is 8 for the single lead probes, 10 for the coaxial, and 7 for the twin lead probes</li> <li>• The upper product thickness must be larger than 5.1 in. (0.13 m) for all probes, except the HTHP coaxial probe, which requires 8 in. (0.2 m) to distinguish echoes from the two liquids</li> <li>• Sometimes there is an emulsion layer (mix of the products) between the two products which can affect interface measurements. For guidelines on emulsion situations, consult your local Emerson Process Management representative</li> </ul> <p>For information on the maximum allowable product thickness and measuring range, see "Interface Measuring Range" on page 29.</p>
	 <p><b>Interface Measurement with a Rosemount 5302 and a Rosemount 5301 (fully submerged probe)</b></p>
<b>Solids Measurements</b>	
<b>Considerations</b>	<p>Rosemount 5303 with a flexible single lead probe is a good choice for measuring solids, such as powders, granulates, or pellets with a grain size of up to 0.8 in. (20 mm). The measurement is made where the probe comes in contact with the material, which means that the shape of the material surface is not critical for the measurement. Measurements are also independent of moisture and material fluctuations such as density and temperature.</p> <p>The following should be kept in mind:</p> <ul style="list-style-type: none"> <li>• In solid applications, media may cause down-pull forces on silo roofs. The silo roof must be able to withstand the probe collapse load, or at least the maximum probe tensile load</li> <li>• The tensile load depends on the silo size, material density, and the friction coefficient. Forces increase with the buried length, the silo, and probe diameter. In critical cases, such as products with a risk of build-up, probe for high physical weight loads are available</li> <li>• Forces on probes, depending on their position, are generally two to ten times greater on probes with a tie-down than on probes with ballast weights</li> <li>• For environments where electrostatic discharges (plastics) are likely to occur, grounding of the probe and vessel may be required</li> </ul> <p><b>Note:</b>          Abrasive media can wear out the probe, so consider using non-contacting radar.</p> <p>For more information, refer to the Guided Wave Radar in Solid Level Applications Technical Note (Document No. 00840-2300-4811).</p>

# Rosemount 5300 Series

## High Pressure Steam Applications

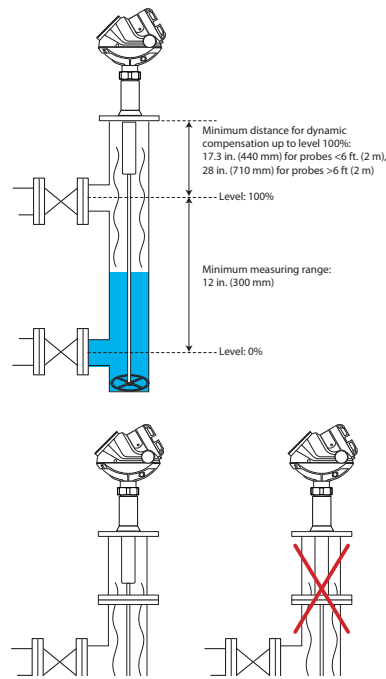
### Considerations

Saturated steam under high pressure can influence radar level transmitter measurements. Rosemount 5301 with Dynamic Vapor Compensation (DVC) will automatically compensate for this and maintain the level accuracy.

Considerations for DVC:

- A Single lead rigid HTHP probe with a reference reflector for vapor compensation must be used (probe type 4U, 4V)
- Mount in a 2, 3, or 4-in bypass chamber with flanges appropriately sized for the pressure and temperature of the application
- Use a centering disk to keep the probe centered in the chamber see "Chamber / Pipe Installations" on page 34
- Probes up to 13.1 ft (4 m) in length are supported
- Minimum measuring range is 12 in. (300 mm)
- DVC requires a minimum distance from the flange to the surface level in order to measure the change in the vapor dielectric constant. If the level rises within this area, the unit switches over to static compensation, using the last known vapor dielectric constant

For more information, refer to the High Pressure Steam Applications Technical Note (Document No. 00840-0100-4530)



(1) Reverse polarity protection.

(2) Final rating may be lower depending on flange and O-ring selection, See "Tank Connection and Probe" on page 31.

TABLE 4. Temperature ranges for standard tank seals with different O-ring materials

Tank seal with different O-ring material	Min. Temperature °F (°C) in air	Max. Temperature °F (°C) in air
Viton®	5 (-15)	302 (150)
Ethylene Propylene (EPDM)	-40 (-40)	266 (130)
Kalrez® 6375	14 (-10)	302 (150)
Buna-N	-31 (-35)	230 (110)

**NOTE!**

Always check the chemical compatibility of the o-ring material with your application

TABLE 5. 316L SST: conditions used for flange strength calculations

	Bolting material	Gasket		Flange material	Hub material
		Standard/HTHP	HP/HTHP/C		
<b>ASME/ANSI</b>	Stainless steel SA193 B8M C1.2	Soft (1a) with min. thickness 1.6 mm.	Spiral wound gasket with nonmetallic filler (1b)	Stainless steel A182 Gr. F316L and EN 10222-5-1.4404.	Stainless steel A479M 316L, and EN 10272-1.4404.
<b>EN, JIS</b>	EN 1515-1/-2 group 13E0, A4-70.	Soft (EN 1514-1) with min. thickness 1.6 mm.	Spiral wound gasket with nonmetallic filler (EN 1514-2)		

# Product Data Sheet

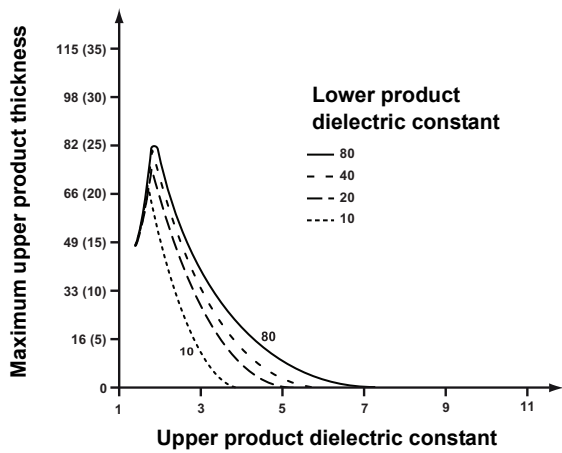
00813-0100-4530, Rev DA  
December 2010

# Rosemount 5300 Series

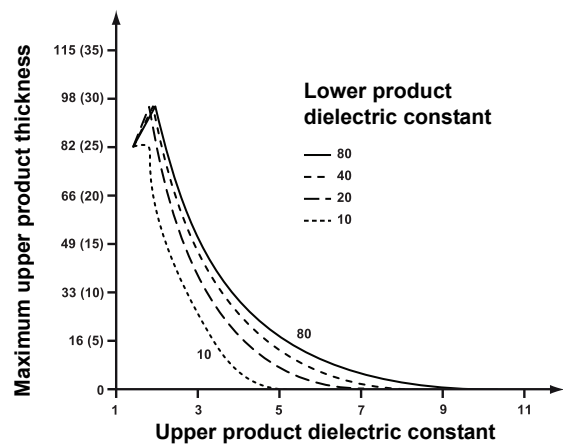
TABLE 6. Alloy C-276: conditions used for flange strength calculations

	Bolting material	Gasket		Flange material	Hub material
		HP/HTHP/C			
<b>ASME/ ANSI</b>	UNS N10276	Soft (1a) with min. Thickness 1.6 mm	Spiral wound gasket with nonmetallic filler (1b)	SB462 Gr. N10276 (solution annealed condition) or SB575 Gr. N10276 (solution annealed condition)	SB574 Gr. N10276
<b>EN, JIS</b>		Soft (EN 1514-1) with min. Thickness 1.6 mm	Spiral wound gasket with nonmetallic filler (EN 1514-2)		

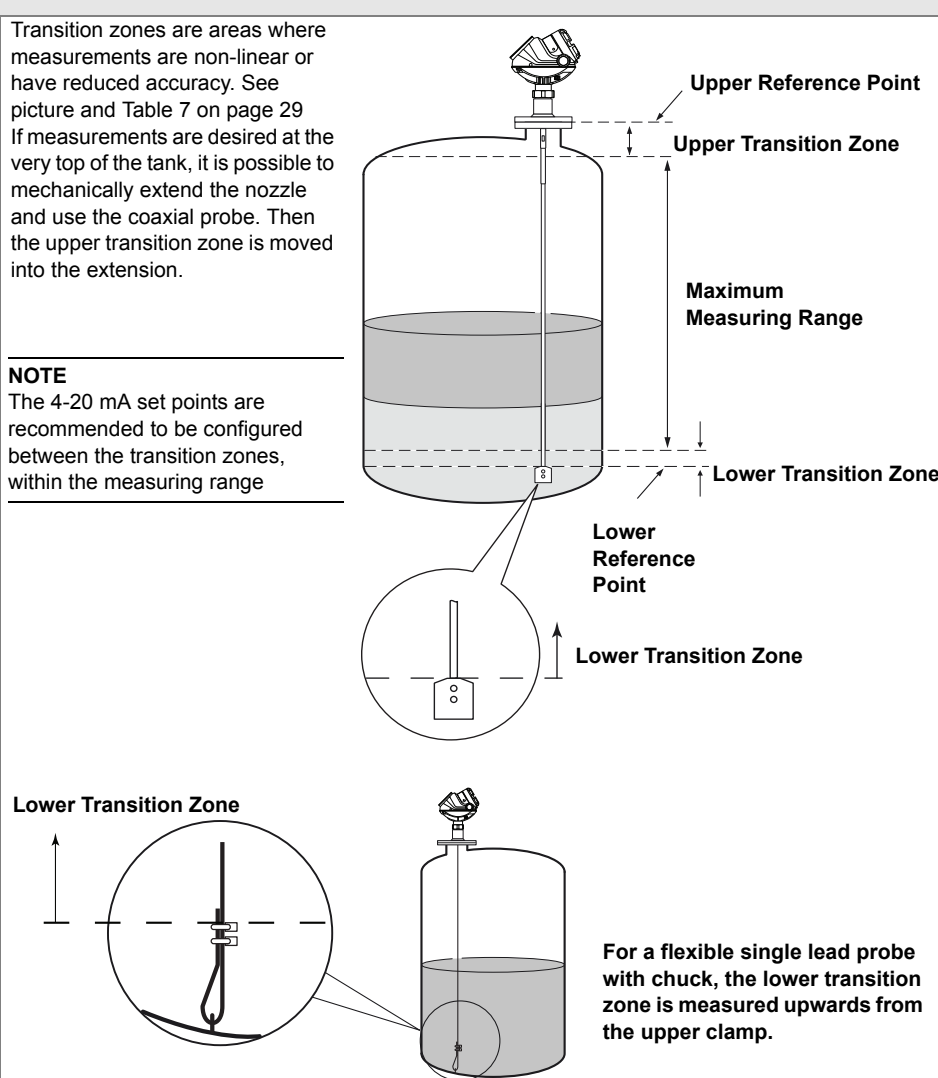
Maximum Upper Product Thickness for the Flexible Single Lead Probe in ft (m)



Maximum Upper Product Thickness for the Flexible Twin Lead Probe in ft (m)



## Performance Specification

General	
Reference Conditions	Single standard probe, 77 °F (25 °C) in water and ambient pressure
Reference Accuracy	± 0.12 in. (3 mm) or 0.03% of measured distance, whichever is greatest <sup>(1)</sup>
Repeatability	± 0.04 in. (1 mm)
Ambient Temperature Effect	± 0.008 in. (0.2 mm) /°K or ± 30 ppm/°K of measured value, whichever is greatest
Update Interval	< 1 per second
Measuring Range	
Transition Zones	<p>Transition zones are areas where measurements are non-linear or have reduced accuracy. See picture and Table 7 on page 29. If measurements are desired at the very top of the tank, it is possible to mechanically extend the nozzle and use the coaxial probe. Then the upper transition zone is moved into the extension.</p> <p><b>NOTE</b> The 4-20 mA set points are recommended to be configured between the transition zones, within the measuring range</p> 

<b>Measuring Range and Minimum Dielectric Constant</b>	16 in. (0.4 m) to 164 ft (50 m)
	See Table 8 on page 30 for each probe's measuring range and minimum dielectric constant. Due to the measuring range depending on the application and factors described below, the values are a guideline for clean liquids. For more information, ask your local Emerson Process Management representative
	Different parameters (factors) affect the echo and therefore the maximum measuring range differs depending on application according to: <ul style="list-style-type: none"> <li>• Disturbing objects close to the probe</li> <li>• Media with higher dielectric constant (<math>\epsilon_r</math>) gives better reflection and allows a longer measuring range</li> <li>• Surface foam and particles in the tank atmosphere may affect measuring performance</li> <li>• Heavy coating or contamination on the probe should be avoided since it can reduce measuring range and might cause erroneous level readings</li> </ul>
	<b>Note:</b> For Remote Housing, see Table 9 on page 30 for the maximum recommended measuring range for different Remote Housing lengths, installation types, Dielectric Constants, and probe types
<b>Interface Measuring Range</b>	Target applications include interfaces between oil / oil-like and water / water-like liquids with low (<3) upper product dielectric constant and high (>20) lower product dielectric constant. For such applications, the maximum measuring range is only limited by the length of the rigid single lead, coaxial, and rigid twin probes.
	For the flexible probes, the maximum measuring range will be reduced based on the maximum upper product thickness according to the diagram below. The maximum interface distance is 164 ft (50 m) minus the maximum product thickness.
	For information on the maximum allowable product thickness and measuring range, see graphs on page 27
<b>Environment</b>	
<b>Vibration Resistance</b>	Aluminum housing: IEC 60770-1 Level 1. Stainless Steel housing: IACS E10
<b>Electromagnetic Compatibility</b>	Emission and Immunity: EMC directive 89/336/EEC. EN61326-1:1997 incl. A1:1998 and A2:2001. NAMUR recommendations NE21
<b>Built-in Lightning Protection</b>	EN61326, IEC 801-5, level 1 kV. T1 option: the transmitter complies with IEEE 587 Category B transient protection and IEEE 472 surge protection
<b>Coating</b> (See Table 10 on page 30)	<ul style="list-style-type: none"> <li>• Single lead probes are preferred when there is a risk of contamination (because coating can result in the product bridging across the two leads for twin versions; between the inner lead and outer pipe for the coaxial probe)</li> <li>• For viscous or sticky applications, PTFE probes are recommended. Periodic cleaning may also be required</li> <li>• Signal Quality Metrics (option code D01, or DA1) can be used in determining when to clean the probe. Transmitters equipped with the Diagnostics Suite option can calculate Signal Quality Metrics</li> <li>• Maximum error due to coating is 1-10% depending on probe type, dielectric constant, coating thickness and coating height above product surface</li> </ul>
<b>CE-mark</b>	Complies with applicable directives (EMC, ATEX)

(1) For probes with spacers, the accuracy may deviate close to the spacers. Accuracy may be affected by remote housing.

**TABLE 7. Transition Zones**

	Dielectric Constant	Rigid Single Lead	Flexible Single Lead	Coaxial	Rigid Twin Lead	Flexible Twin Lead
<b>Upper<sup>(1)</sup> Transition Zone</b>	80	4.3 in. (11 cm)	4.3 in. (11 cm)	4.3 in. (11 cm)	4.3 in. (11 cm)	4.7 in. (12 cm)
	2	6.3 in. (16 cm)	7.1 in. (18 cm)	4.3 in. (11 cm)	5.5 in. (14 cm)	5.5 in. (14 cm)
<b>Lower<sup>(2)</sup> Transition Zone</b>	80	2 in. (5 cm)	0 in. (0 cm) <sup>(4)</sup> <sup>(3)</sup>	0.4 in. (1 cm)	1.2 in. (3 cm)	2 in. (5 cm) <sup>(4)</sup>
	2	2.8 in. (7 cm) <sup>(5)</sup>	2 in. (5 cm) - long weight <sup>(4)</sup> 3.2 in. (8 cm) - short weight <sup>(4)</sup>	2 in. (5 cm)	4 in. (10 cm)	5.5 in. (14 cm) <sup>(4)</sup>
<b>Note:</b> The 4–20 mA set points are recommended to be configured between the transition zones, within the measuring range.						

- (1) The distance from the upper reference point where measurements have reduced accuracy.
- (2) The distance from the lower reference point where measurements have reduced accuracy.
- (3) The measuring range for the PTFE covered Flexible Single Lead probe includes the weight. For low dielectric media, special configuration may be required.
- (4) Note that the weight length or chuck fastening length adds to non-measurable area and is not included in the diagram. See "Dimensional Drawings" on page 39.
- (5) When using a metallic centering disc, the lower transition zone is 8 in. (20 cm), including weight if applicable. When using a PTFE centering disc, the lower transition zone is not affected.

# Rosemount 5300 Series

TABLE 8. Measuring Range and Minimum Dielectric Constant

Rigid Single Lead	Flexible Single Lead <sup>(1)</sup>	Coaxial	Rigid Twin Lead	Flexible Twin Lead
<b>Maximum Measuring Range</b>				
9 ft. 10 in. (3 m) for 8 mm probes. 14 ft. 9 in. (4.5 m) for 13 mm probes	164 ft (50 m)	19 ft 8 in. (6 m)	9 ft 10 in. (3 m)	164 ft (50 m)
<b>Minimum Dielectric Constant</b>				
1.4 (Std) (1.25 if installed in a metallic bypass or stilling well) <sup>(1) (2)</sup>  1.6 (HP/HTHP/C) (1.4 if installed in a metallic bypass or stilling well) <sup>(1) (2)</sup>	1.4 (Std), up to 49 ft (15 m) <sup>(1)</sup> 1.6 (HP/HTHP/C), up to 49 ft (15 m) <sup>(1)</sup>  (Std/HP/HTHP/C) 1.8, up to 82 ft (25 m) <sup>(1)</sup> 2.0, up to 115 ft (35 m) <sup>(1)</sup> 3, up to 138 ft (42 m) 4, up to 151 ft (46 m) 6, up to 164 ft (50 m)	1.2 (Std) 1.4 (HP/C) 2.0 (HTHP)	1.4 (Std)	(Std) 1.4, up to 82 ft (25 m) <sup>(1)</sup> 2.0, up to 115 ft (35 m) <sup>(1)</sup> 2.5, up to 131 ft (40 m) <sup>(1)</sup> 3.5, up to 148 ft (45 m) 6, up to 164 ft (50 m)

(1) Probe end projection software function will improve the minimum measurable dielectric constant. Consult the factory for details.

(2) May be lower depending on installation.

TABLE 9. Remote Housing Measuring Range

		Dielectric Constant	Rigid Single 8 mm	Rigid Single 13 mm	Flexible Single	Coaxial	Rigid Twin	Flexible Twin
<b>1 m Remote Housing</b>	Chamber / pipe installations ≤ 4 in. (100 mm)	1.4	4 ft (1.25 m)	15 ft (4.5 m) <sup>(1)</sup>	33 ft (10 m) <sup>(1) (2)</sup>	19 ft (6 m)	10 ft (3 m) <sup>(1)</sup>	33 ft (10 m) <sup>(1) (2)</sup>
		2	10 ft (3 m) <sup>(1)</sup>	15 ft (4.5 m) <sup>(1)</sup>	33 ft (10 m) <sup>(1) (2)</sup>		10 ft (3 m) <sup>(1)</sup>	33 ft (10 m) <sup>(1) (2)</sup>
	80	10 ft (3 m)	15 ft (4.5 m) <sup>(1)</sup>	33 ft (10 m) <sup>(1) (2)</sup>	10 ft (3 m) <sup>(1)</sup>		33 ft (10 m) <sup>(1) (2)</sup>	
	Tank installations	1.4	4 ft (1.25 m)	4 ft (1.25 m)	4 ft (1.25 m)		4 ft (1.25 m)	4 ft (1.25 m)
2		4 ft (1.25 m)	4 ft (1.25 m)	4 ft (1.25 m)	4 ft (1.25 m)	4 ft (1.25 m)	98 ft (30 m) <sup>(1)</sup>	
		80	10 ft (3 m) <sup>(1)</sup>	10 ft (3 m) <sup>(1)</sup>	159 ft (48.5 m) <sup>(1)</sup>	10 ft (3 m) <sup>(1)</sup>	159 ft (48.5 m) <sup>(1)</sup>	
<b>2 m Remote Housing</b>	Chamber / pipe installations ≤ 4 in. (100 mm)	1.4	9 ft (2.75 m)	15 ft (4.5 m) <sup>(1)</sup>	33 ft (10 m) <sup>(1) (2)</sup>	19 ft (6 m)	10 ft (3 m) <sup>(1)</sup>	33 ft (10 m) <sup>(1) (2)</sup>
		2	10 ft (3 m) <sup>(1)</sup>	15 ft (4.5 m) <sup>(1)</sup>	33 ft (10 m) <sup>(1) (2)</sup>		10 ft (3 m) <sup>(1)</sup>	33 ft (10 m) <sup>(1) (2)</sup>
	80	10 ft (3 m)	15 ft (4.5 m)	33 ft (10 m) <sup>(1) (2)</sup>	10 ft (3 m) <sup>(1)</sup>		33 ft (10 m) <sup>(1) (2)</sup>	
	Tank installations	1.4	9 ft (2.75 m)	9 ft (2.75 m)	9 ft (2.75 m)		9 ft (2.75 m)	9 ft (2.75 m)
2		9 ft (2.75 m)	9 ft (2.75 m)	9 ft (2.75 m)	9 ft (2.75 m)	9 ft (2.75 m)	98 ft (30 m) <sup>(1)</sup>	
		80	10 ft (3 m) <sup>(1)</sup>	10 ft (3 m) <sup>(1)</sup>	154 ft (47 m) <sup>(1)</sup>	10 ft (3 m) <sup>(1)</sup>	154 ft (47 m) <sup>(1)</sup>	
<b>3 m Remote Housing</b>	Chamber / pipe installations ≤ 4 in. (100 mm)	1.4	10 ft (3 m)	15 ft (4.5 m)	33 ft (10 m) <sup>(1) (2)</sup>	19 ft (6 m)	10 ft (3 m) <sup>(1)</sup>	33 ft (10 m) <sup>(1) (2)</sup>
		2		15 ft (4.5 m)	33 ft (10 m) <sup>(1) (2)</sup>			33 ft (10 m) <sup>(1) (2)</sup>
	80	15 ft (4.5 m)		33 ft (10 m) <sup>(1) (2)</sup>	33 ft (10 m) <sup>(1) (2)</sup>			
	Tank installations	1.4		14 ft (4.25 m)	14 ft (4.25 m)			14 ft (4.25 m)
2		14 ft (4.25 m)	14 ft (4.25 m)	14 ft (4.25 m)	14 ft (4.25 m)	98 ft (30 m) <sup>(1)</sup>		
		80	15 ft (4.5 m) <sup>(1)</sup>	149 ft (45.5 m) <sup>(1)</sup>	149 ft (45.5 m) <sup>(1)</sup>	10 ft (3 m) <sup>(1)</sup>	149 ft (45.5 m) <sup>(1)</sup>	

(1) Accuracy may be affected up to ± 1.2 in. (30 mm).

(2) Required chamber/pipe size is 3 or 4 in. (75 - 100 mm).

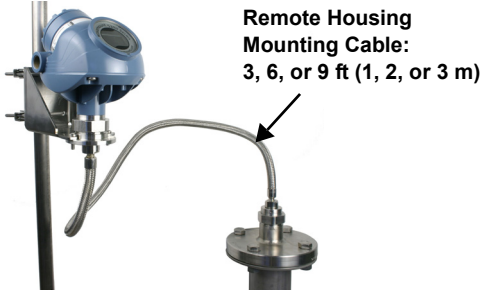
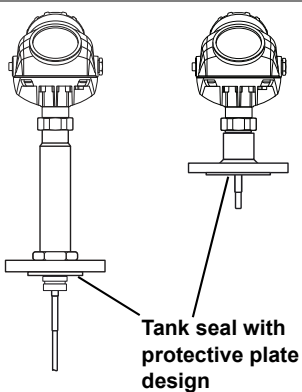
TABLE 10. Maximum recommended Viscosity and Coating / Build-up

Coaxial	Twin Lead	Single Lead
<b>Maximum Viscosity</b>		
500 cP	1500 cP	8000 cP <sup>(1) (2)</sup>
<b>Coating / Build-up</b>		
Coating not recommended	Thin coating allowed, but no bridging	Coating allowed

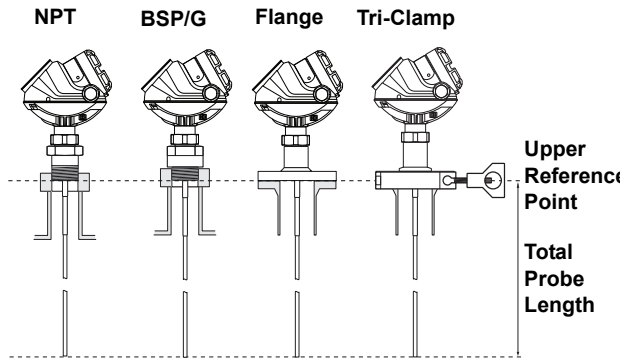
(1) Consult your local Emerson Process Management representative in the case of agitation/turbulence and high viscous products.

(2) Be cautious in HTHP viscous or crystallizing media applications where temperature at instrument connection is significantly lower than process temperature with risk of coating in the upper part of probe that may reduce the measurement signal. Consider using HP or STD probes in such applications.

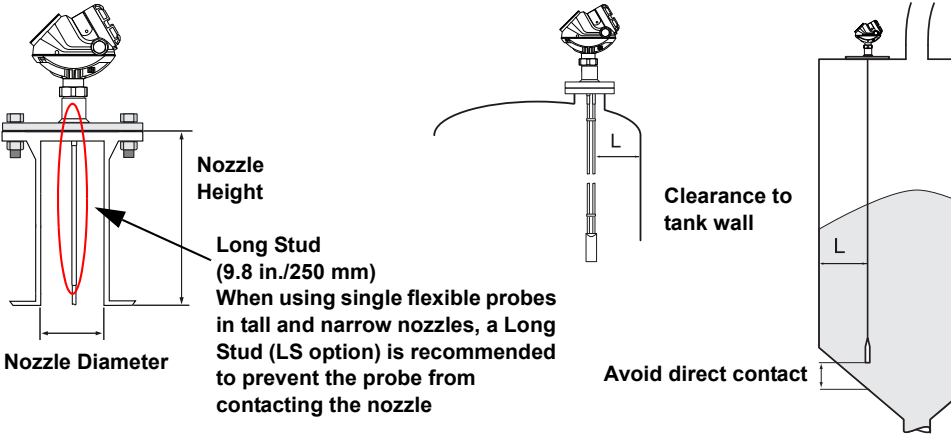
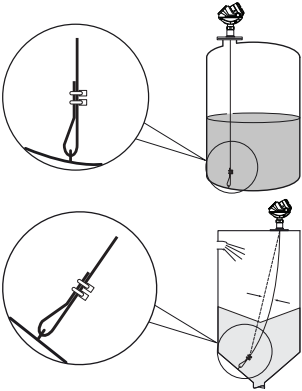
## Physical Specification

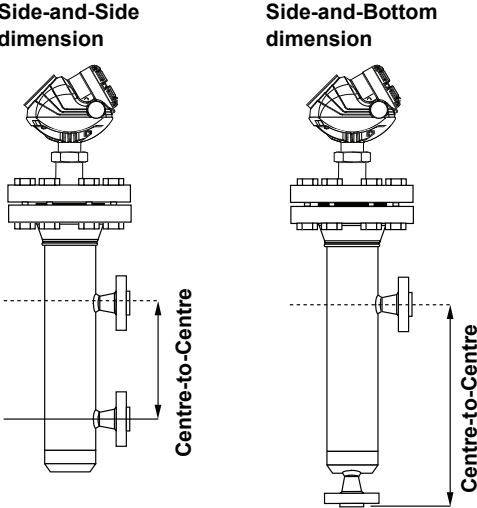
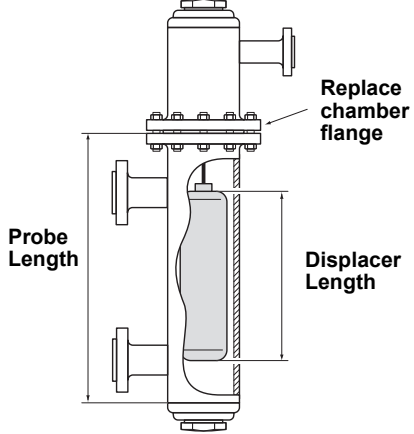
<b>Housing and Enclosure</b>	
<b>Type</b>	Dual compartment (terminal compartment and the electronics are completely separated). Two entries for conduit or cable connections. The transmitter housing can be rotated in any direction
<b>Electrical Connection</b>	½ - 14 NPT for cable glands or conduit entries. Optional: M20 x 1.5 conduit / cable adapter, M12 4-pin male eurofast® connector or A size Mini 4-pin male minifast® connector. Recommended output cabling is twisted shielded pairs, 18-12 AWG
<b>Housing Material</b>	Polyurethane-covered Aluminum, or Stainless Steel Grade CF8M (ASTM A743)
<b>Ingress Protection</b>	NEMA 4X, IP 66, IP67
<b>Factory Sealed</b>	Yes
<b>Weight</b>	Transmitter Head (TH): Aluminium 4.4 lb (2 kg), SST 10.8 lb (4.9 kg).
<b>Remote Housing Mounting</b>	<p>Kit that includes a flexible armored extension cable and a bracket for wall or pipe mounting. See "Remote Housing" on page 50 for the dimensions.</p> 
<b>Tank Connection and Probe</b>	
<b>Tank Connection</b>	<p>The tank connection consists of a tank seal, a flange, Tri-Clamp, or NPT or BSP/G threads.</p> <p>Certain models of flanged Alloy and PTFE covered probes have a tank connection design with a protective plate of the same material as the probe. This is to prevent the 316L / EN 1.4404 SST flange from being exposed to the tank atmosphere.</p> <p>See "Dimensional Drawings" on page 39.</p> 
<b>Flange Dimensions</b>	Follows ASME B 16.5, JIS B2220, and EN 1092-1 standards for blind flanges. For Proprietary Fisher® and Masoneilan® flanges, see "Special Flanges and Flushing Connection Rings" on page 51
<b>Vented Flanges</b>	Available with Masoneilan and Fisher vented flanges. Vented flanges must be ordered as accessories with a 1½-in. NPT threaded process connection (code RA); see "Special Flanges and Flushing Connection Rings" on page 51. As an alternative to a vented flange, it is possible to use a flushing connection ring on top of the standard nozzle.
<b>Probe Versions</b>	<p>Coaxial, Rigid Twin and Rigid Single Lead, Flexible Twin and Flexible Single Lead. Probes can be ordered in different materials and options for extreme temperatures and pressure</p> <p>For guidelines on which probe to select depending on application, see the Technical Note Guided Wave Radar Application Guidelines (Document No. 00840-2600-4811)</p>

# Rosemount 5300 Series

<p><b>Material Exposed To Tank Atmosphere</b></p>	<p>Standard Probe (Operating Temperature and Pressure code S):</p> <ul style="list-style-type: none"> <li>Material model code 1: 316L SST (EN 1.4404), PTFE, PFA, and O-ring materials</li> <li>Material model code 2: Alloy C-276 (UNS N10276), PTFE, PFA, and O-ring materials</li> <li>Material model code 3: Alloy 400 (UNS N04400), PTFE, PFA, and O-ring materials</li> <li>Material model code 7: PTFE</li> <li>Material model code 8: PTFE, 316 L SST (EN 1.4404), and O-ring materials</li> </ul> <p>HTHP Probe (Operating Temperature and Pressure code H):</p> <ul style="list-style-type: none"> <li>Material model code 1: 316L SST (EN 1.4404), Ceramic (Al<sub>2</sub>O<sub>3</sub>), Graphite, and Inconel</li> <li>Material model code 2 and H: Alloy C-276 (UNS N10276), Ceramic (Al<sub>2</sub>O<sub>3</sub>), Graphite, Inconel</li> </ul> <p>HP Probe (Operating Temperature and Pressure code P):</p> <ul style="list-style-type: none"> <li>Material model code 1: 316L SST (EN 1.4404), Ceramic (Al<sub>2</sub>O<sub>3</sub>), Graphite, PFA, PTFE, Inconel</li> <li>Material model codes 2, H: Alloy C-276 (UNS N10276), Ceramic (Al<sub>2</sub>O<sub>3</sub>), Graphite, PFA, PTFE, Inconel</li> </ul> <p>Cryogenic Probe (Operating Temperature and Pressure code C):</p> <ul style="list-style-type: none"> <li>Material model code 1: 316L SST (EN 1.4404), Ceramic (Al<sub>2</sub>O<sub>3</sub>), Graphite, PFA, PTFE, Inconel</li> </ul>
<p><b>Pressure Equipment Directive (PED)</b></p>	<p>Complies with 97/23/EC article 3.3</p>
<p><b>Total Probe Length</b></p>	<p>This is defined from the upper reference point to the end of the probe (weight included, if applicable).</p>  <p>Select the probe length according to the required measuring range (the probe must be hung and fully extended through the entire distance where level readings are desired). Most of the probes can be cut in field. However, there are some restrictions for the standard and HP/C coaxial probes: these can be cut up to 2 ft. (0.6 m). Probes shorter than 4.1 ft. (1.25 m) can be cut to the minimum length of 1.3 ft. (0.4 m). The HTHP coaxial probe and the PTFE covered probes cannot be cut in the field.</p>
<p><b>Minimum and Maximum Probe Length</b></p>	<p>Coaxial: 1.3 ft (0.4 m) to 19.7 ft (6 m).  Rigid Twin Lead: 1.3 ft (0.4 m) to 9.8 ft (3 m).  Flexible Twin Lead: 3.3 ft (1 m) to 164 ft (50 m).  Rigid Single Lead (0.3 in./8 mm): 1.3 ft (0.4 m) to 9.8 ft (3 m)  Rigid Single Lead (0.5 in./13 mm): 1.3 ft (0.4 m) to 14.8 ft (4.5 m)  Flexible Single Lead: 3.3 ft (1 m) to 164 ft (50 m)</p>
<p><b>Probe Angle</b></p>	<p>0 to 90 degrees from vertical axis</p>
<p><b>Tensile Strength</b></p>	<p>0.16 in. (4 mm) Flexible Single Lead probe: 2698 lb (12 kN)  0.24 in. (6 mm) Flexible Single Lead probe: 6519 lb (29 kN)  Flexible Twin Lead probe: 2023 lb (9 kN)</p>
<p><b>Collapse Load</b></p>	<p>0.16 in. (4 mm) Flexible Single Lead probe: 3597 lb (16 kN)  0.24 in. (6 mm) Flexible Single Lead probe: 7868 lb (35 kN)</p>
<p><b>Sideway Capacity</b></p>	<p>Coaxial probe: 73.7 ft. lbf, 3.7 lb at 19.7 ft. (100 Nm, 1.67 kg at 6 m)  Rigid Twin Lead: 2.2 ft. lbf, 0.22 lb at 9.8 ft. (3 Nm, 0.1 kg at 3 m)  Rigid Single Lead: 4.4 ft. lbf, 0.44 lb at 9.8 ft. (6 Nm, 0.2 kg at 3 m)</p>
<p><b>Maximum Recommended Nozzle Height</b></p>	<p>4 in. (10 cm) + nozzle diameter  For coaxial probes, there are no restrictions</p>



<p><b>Minimum Clearance</b>          (See Table 11 on page 35)</p>	 <p><b>Nozzle Height</b></p> <p><b>Long Stud (9.8 in./250 mm)</b>          When using single flexible probes in tall and narrow nozzles, a Long Stud (LS option) is recommended to prevent the probe from contacting the nozzle</p> <p><b>Nozzle Diameter</b></p> <p><b>Clearance to tank wall</b></p> <p><b>Avoid direct contact</b></p>
<p><b>Other Mechanical Considerations</b></p>	<p>To get best possible performance, the following must be considered before installing the transmitter:</p> <ul style="list-style-type: none"> <li>• Inlets should be kept at a distance in order to avoid product filling on the probe</li> <li>• Avoid physical contact between probes and agitators, as well as applications with strong fluid movement unless the probe is anchored</li> <li>• Probe tie-down is recommended if the probe can move to within 1 ft. (30 cm) of any object during operations</li> <li>• In order to stabilize the probe for side forces, it is possible to fix or guide the probe to the tank bottom</li> <li>• For optimal single lead probe performance in non-metallic vessels, the probe must either be mounted with a 2-in. / DN 50 or larger metallic flange, or a metal sheet with an 8-in. diameter (200 mm) or larger must be used (see the Reference Manual for placement)</li> </ul>  <p><b>Flexible single lead probe with chuck installed in liquids and in solids. For solids, it is recommended that the probe should be slack to prevent high tensile loads.</b></p> <p>See the Reference Manual (Document No. 00809-0100-4530) for more mechanical installation information</p>
<p><b>Weight</b></p>	<p>Flange: depends on flange size          Coaxial probe: 0.67 lb/ft (1 kg/m)          Rigid Single Lead probe (0.3 in./8 mm): 0.27 lb/ft (0.4 kg/m)          Rigid Single Lead probe (0.5 in./13 mm): 0.71 lb/ft (1.06 kg/m)          Rigid Twin Lead probe: 0.40 lb/ft (0.6 kg/m)          Flexible Single Lead probe: 0.05 lb/ft (0.08 kg/m)          Flexible Twin Lead probe: 0.09 lb/ft (0.14 kg/m)          End weight: 0.88 lb (0.40 kg) for the 4 mm single lead probe, 1.2 lb (0.55 kg) for the 6 mm single lead probe and 1.3 lb (0.60 kg) for twin lead probes</p>

Chamber / Pipe Installations	
<p><b>Rosemount 9901 Chamber</b></p>	<p>Rosemount 9901 allows external mounting of process level instrumentation. It supports a variety of process connections, and optional drain and vent connections. The Rosemount 9901 chamber is designed to the ASME B31.3 standard, and is Pressure Equipment Directive (PED) compliant. Use option code XC to order together with the 5300 Series transmitters.</p> <p>The probe length to use for a Rosemount 9901 chamber can be calculated with this formula (only valid for standard 9901 chambers):</p> <p><b>Side-and-Side dimension:</b>  <math>\text{Probe length} = \text{Centre-to-Centre dimension} + 19 \text{ in. (48 cm)}</math></p> <p><b>Side-and-Bottom dimension:</b>  <math>\text{Probe length} = \text{Centre-to-Centre dimension} + 4 \text{ in. (10 cm)}</math></p>  <p>Use a centering disc the same diameter as the chamber if the probe length &gt; 3.3 ft (1 m). See "Probe Type in Chamber Considerations" on page 34 and "Centering Discs" on page 35 for which probe and disc to use</p> <p>For additional information, see the Rosemount 9901 Chamber for Process Level Instrumentation Product Data Sheet (Document Number 00813-0100-4601)</p>
<p><b>Existing Chamber</b></p>	<p>A Rosemount 5300 Series transmitter is the perfect replacement in an existing displacer chamber. Proprietary flanges are offered, enabling use of existing chambers to make installation easy.</p> <p><b>Considerations when changing to 5300:</b>          The 5300 series flange choice and probe length must be correctly matched to the chamber. Both standard ANSI and EN (DIN), as well as proprietary chamber flanges, are available. See "Special Flanges and Flushing Connection Rings" on page 51 to identify the proprietary flanges.</p> <p>See "Probe Type in Chamber Considerations" on page 34 and "Centering Discs" on page 35 for which probe and disc to use. See Table 12 on page 35 for guidelines on the required probe length</p>  <p>For additional information, see the Replacing Displacers with Guided Wave Radar Technical Note (Document Number 00840-2200-4811)</p>
<p><b>Probe Type in Chamber Considerations</b></p>	<p>When installing a Rosemount 5300 in a chamber, the single lead probe is recommended. An exception is with liquefied gas &gt; 40 bar where the coaxial probe is recommended.</p> <p>The recommended minimum chamber diameter is 4 in. (100 mm) for Single Flexible probe and 3 in. (75 mm) for the Single Rigid probe. The probe should be centered to prevent it touching the sides of the well.</p> <p>The probe length determines if a Single Rigid or Single Flexible probe should be used:</p> <ul style="list-style-type: none"> <li>• Less than 20 ft (6 m):              Rigid Single Probe is recommended. Use a centering disc for probe &gt; 3.3 ft (1 m). If installation requires less head-space, use a Flexible Single Probe with a weight and centering disc.</li> <li>• More than 20 ft (6 m):              Use Flexible Single Probe with a weight and centering disc.</li> </ul> <p>A short weight is available for the single flexible SST probe. It is used for measuring close to the probe end and shall be used where the measuring range must be maximized. The height is 2 in. (50 mm) and the diameter is 1.5 in. (37.5 mm). The option code is W2.</p>

# Product Data Sheet

00813-0100-4530, Rev DA

December 2010

# Rosemount 5300 Series

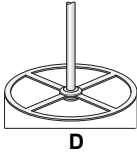
<b>Centering Discs</b>	<p>To prevent the probe from contacting the chamber or pipe wall, centering discs are available for rigid single, flexible single, and flexible twin lead probes. The disc is attached to the end of the probe. Discs are made of stainless steel, Alloy C-276, Alloy 400, or PTFE. The centering disc in PTFE is not available for HTHP probes. See Table 13 for Dimension D. Table 14 shows which centering disc diameter to choose for a particular pipe.</p>	
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TABLE 11. Minimum Clearance

	Rigid Single Lead	Flexible Single Lead	Coaxial	Rigid Twin Lead	Flexible Twin Lead
<b>Recommended nozzle diameter</b>	6 in. (15 cm) or more	6 in. (15 cm) or more	Enough space to fit the probe	4 in. (10 cm) or more	4 in. (10 cm) or more
<b>Min. nozzle diameter<sup>(1)</sup></b>	2 in. (5 cm)	2 in. (5 cm)	Enough space to fit the probe	2 in. (5 cm)	2 in. (5 cm)
<b>Min. clearance to tank wall (L) or obstruction<sup>(2)</sup></b>	4 in. (10 cm) if smooth metallic wall. 20 in. (50 cm) if disturbing objects, rugged metallic or concrete/plastic wall.	4 in. (10 cm) if smooth metallic wall. 20 in. (50 cm) if disturbing objects, rugged metallic or concrete/plastic wall.	0 in. (0 cm)	4 in. (10 cm)	4 in. (10 cm)
<b>Min. chamber/still pipe diameter</b>	2 in. (5 cm) <sup>(3)</sup>	Consult the factory	1.5 in. (3.8 cm)	2 in. (5 cm) <sup>(4)</sup>	Consult the factory

- (1) Requires special configuration and setting of Upper Null Zone and may affect the maximum measuring range.
- (2) Minimum clearance from tank bottom for the coaxial and rigid single probes is 0.2 in. (5 mm).
- (3) The probe must be centered in the pipe/bypass. A centering disc (see "Centering Discs" on page 35 and "Ordering Information" on page 4) can be used to prevent the probe from contacting the chamber wall.
- (4) The centermost lead must be at least 0.6 in. (15 mm) away from the pipe/bypass wall.

TABLE 12. Required probe length in chambers

Chamber Manufacturer	Probe Length <sup>(1)</sup>
Major torque-tube manufacture (249B, 249C, 2449K, 249N, 259B)	Displacer+9 in. (229 mm)
Masoneilan (Torque tube operated), proprietary flange	Displacer+8 in. (203 mm)
Other - torque tube <sup>(2)</sup>	Displacer+8 in. (203 mm)
Magnetrol (spring operated) <sup>(3)</sup>	Displacer+between 7.8 in. (195 mm) to 15 in. (383 mm)
Others - spring operated <sup>(2)</sup>	Displacer+19.7 in. (500 mm)

- (1) If flushing ring is used, add 1 in. (25 mm).
- (2) For other manufacturers, there are small variations. This is an approximate value, actual length should be verified.
- (3) Lengths vary depending on model, SG and rating, and should be verified.

TABLE 14. Centering disc size recommendation for different pipe schedules

Pipe Size	Pipe Schedule					
	5s,5	10s,10	40s,40	80s,80	120	160
<b>2 in.</b>	2 in.	2 in.	2 in.	2 in.	NA <sup>(1)</sup>	NA <sup>(2)</sup>
<b>3 in.</b>	3 in.	3 in.	3 in.	3 in.	NA <sup>(1)</sup>	2 in.
<b>4 in.</b>	4 in.	4 in.	4 in.	4 in.	4 in.	3 in.
<b>5 in.</b>	4 in.	4 in.	4 in.	4 in.	4 in.	4 in.
<b>6 in.</b>	6 in.	6 in.	6 in.	6 in.	4 in.	4 in.
<b>7 in.</b>	NA <sup>(1)</sup>	NA <sup>(1)</sup>	5 in.	6 in.	NA <sup>(1)</sup>	NA <sup>(1)</sup>
<b>8 in.</b>	8 in.	8 in.	8 in.	8 in.	6 in.	6 in.

- (1) Schedule is not available for pipe size.
- (2) No centering disc is available.

TABLE 13. Centering Disc Dimensions

Disc Size	Actual Disc Diameter
2 in.	1.8 in. (45 mm)
3 in.	2.7 in. (68 mm)
4 in.	3.6 in. (92 mm)
6 in.	5.55 in. (141 mm)
8 in.	7.40 in. (188 mm)

## Product Certifications

### SAFETY NOTE

A safety isolator such as a zener barrier is always needed for intrinsic safety.

Probes covered with plastic and/or with plastic discs may generate an ignition-capable level of electrostatic charge under certain extreme conditions. Therefore, when the probe is used in a potentially explosive atmosphere, appropriate measures must be taken to prevent electrostatic discharge.

### Factory Mutual (FM) Approval



Project ID: 3020497

E5 Explosion-proof for Class I, Div. 1, Groups B, C, and D;  
Dust Ignition Proof for Class II/III, Div. 1, Groups E, F, and G;  
With Intrinsically Safe connections to Class I, II, III, Div. 1, Groups B, C, D, E, F, and G.  
Temp. Code T4  
Ambient temperature limits:  $-50\text{ }^{\circ}\text{C}$  to  $+70\text{ }^{\circ}\text{C}$ <sup>(3)</sup>.  
Seal not required.  
Approval valid for HART, FOUNDATION fieldbus, and Modbus options.

I5, IE Intrinsically Safe for Class I, II, III, Div. 1, Groups A, B, C, D, E, F, and G,  
Class I, Zone 0, AEx ia IIC T4 when installed per Control Drawing: 9240 030-936.  
Non-Incendive Class I, II, Div. 2, Groups A, B, C, D, F, and G;  
Suitable for Class III, Div. 2.  
4-20 mA / HART model:  $U_i=30\text{ Vdc}$ ,  $I_i=130\text{ mA}$ ,  $P_i=1.0\text{ W}$ ,  $C_i=7.26\text{ nF}$ ,  $L_i=0\text{ H}$ .  
FOUNDATION fieldbus model:  $U_i=30\text{ Vdc}$ ,  $I_i=300\text{ mA}$ ,  $P_i=1.3\text{ W}$ ,  $C_i=0\text{ nF}$ ,  $L_i=0\text{ H}$ .  
FISCO model:  $U_i=17.5\text{ Vdc}$ ,  $I_i=380\text{ mA}$ ,  $P_i=5.32\text{ W}$ ,  $L_i=C_i=0$ .  
Temp. Code T4  
Ambient temperature limits:  $-50\text{ }^{\circ}\text{C}$  to  $+70\text{ }^{\circ}\text{C}$ <sup>(3)</sup>  
Approval valid for HART, FOUNDATION fieldbus, and FISCO options.

### EU Conformity

The most recent revision of the EC declaration of conformity can be found at [www.rosemount.com](http://www.rosemount.com).

### Safety Instrumented Systems (SIS)

The Rosemount 5300 Series has been evaluated by a third party, Exida, against hardware requirements according to IEC 61508. With a FMEDA (Failure Modes, Effects and Diagnostics Analysis) report with a Safe Failure Fraction (SFF) above 90%, 5300 is suitable in SIS according to the Prior Use methodology. For more information, go to: <http://www.emersonprocess.com/rosemount/safety/>. To order the certificate of FMEDA data use option code QS.

### ATEX Approval

Nemko 04ATEX1073X


### SPECIAL CONDITIONS FOR SAFE USE (X)

The intrinsically safe circuits do not withstand the 500 Vac test as specified in IEC 60079-11 clause 6.4.12.

Impact and friction hazards need to be considered according to EN 60079-0 clause 8.1.2 when the transmitter and part of antennas exposed to the exterior atmosphere of the tank is made with light metal alloys and of category II 1G EPL Ga.


The Ex ia version of model 5300 FISCO field device may be supplied by an [Ex ib] FISCO power supply when the power supply is certified with three separate safety current limiting devices and voltage limitation which meets the requirements for type Ex ia.

E1<sup>(1)</sup> Flameproof:

 II 1/2 G T4  
II 1D T79°C<sup>(2)</sup>.  
Ex ia/db ia IIC T4 Ga/Gb ( $-40\text{ }^{\circ}\text{C} \leq T_a \leq +70\text{ }^{\circ}\text{C}$ <sup>(3)</sup>)  
Ex ta IIIC T79°C<sup>(2)</sup> ( $-40\text{ }^{\circ}\text{C} \leq T_a \leq +70\text{ }^{\circ}\text{C}$ <sup>(3)</sup>)  
 $U_m = 250\text{ V}$ .

Approval valid for HART, FOUNDATION fieldbus, and Modbus options.

I1<sup>(1)</sup>, IA<sup>(1)</sup> Intrinsically Safe:

 II 1 G T4.  
II 1/2 G T4  
II 1 D T79°C<sup>(2)</sup>  
Ex ia IIC T4 ( $-50\text{ }^{\circ}\text{C} \leq T_a \leq +70\text{ }^{\circ}\text{C}$ <sup>(3)</sup>).  
Ex ia/ib IIC T4 Ga/Gb ( $-50\text{ }^{\circ}\text{C} \leq T_a \leq +70\text{ }^{\circ}\text{C}$ <sup>(3)</sup>).  
Ex ta IIIC T79°C<sup>(2)</sup> ( $-50\text{ }^{\circ}\text{C} \leq T_a \leq +70\text{ }^{\circ}\text{C}$ <sup>(3)</sup>).  
4-20 mA / HART model:  $U_i=30\text{ Vdc}$ ,  $I_i=130\text{ mA}$ ,  $P_i=1.0\text{ W}$ ,  $C_i=7.26\text{ nF}$ ,  $L_i=0\text{ H}$ .  
FOUNDATION fieldbus model:  $U_i=30\text{ Vdc}$ ,  $I_i=300\text{ mA}$ ,  $P_i=1.5\text{ W}$ ,  $C_i=0\text{ nF}$ ,  $L_i=0\text{ H}$ .  
FISCO model:  $U_i=17.5\text{ Vdc}$ ,  $I_i=380\text{ mA}$ ,  $P_i=5.32\text{ W}$ ,  $C_i=0\text{ nF}$ ,  $L_i < 1\text{ }\mu\text{H}$ .  
Installation Drawing: 9240 030-938  
Approval valid for HART, FOUNDATION fieldbus, and FISCO options.

(1) Ordering Information Code for Product Certificates, see page 8 and page 13.  
(2) +69 °C with FOUNDATION fieldbus or FISCO option.  
(3) +60 °C with FOUNDATION fieldbus or FISCO option.

## Product Data Sheet

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December 2010

# Rosemount 5300 Series

### Canadian Standards Association (CSA) Approval

This product meets the Dual Seal Requirements of ANSI/ISA 12.27.01-2003.

Cert. no. 1514653

E6<sup>(1)</sup> Explosion-proof with internal Intrinsically Safe Circuits [Exia]  
Class I, Div. 1, Groups B, C and D;  
Temp Code T4.  
Class II, Div. 1 and 2, Groups E, F and G;  
Class III, Div. 1  
Ambient temperature limits -50 °C to +70 °C<sup>(3)</sup>  
Approval valid for HART, FOUNDATION fieldbus, and Modbus options.

I6, IF<sup>(1)</sup> Intrinsically Safe Exia:  
Class I, Div. 1, Groups A, B, C, and D.  
Temp Code T4.  
4-20 mA / HART model:  $U_i=30$  Vdc,  $I_i=130$  mA,  $P_i=1.0$  W,  $C_i=7.26$  nF,  $L_i=0$  H.  
FOUNDATION fieldbus model:  $U_i=30$  Vdc,  $I_i=300$  mA,  $P_i=1.3$  W,  $C_i=0$  nF,  $L_i=0$  H.  
FISCO model:  $U_i=17.5$  Vdc,  $I_i=380$  mA,  $P_i=5.32$  W,  $L_i=C_i=0$ .  
Approval valid for HART, FOUNDATION fieldbus, and FISCO options.  
Installation Drawing: 9240 030-937  
Ambient temperature limits -50 °C to +70 °C<sup>(3)</sup>

### IECEX Approval

IECEX NEM 06.0001X

#### SPECIAL CONDITIONS FOR SAFE USE (X)

The intrinsically safe circuits do not withstand the 500 Vac test as specified in IEC 60079-11 clause 6.4.12.

Impact and friction hazards need to be considered according to EN 60079-0 clause 8.1.2 when the transmitter and part of antennas exposed to the exterior atmosphere of the tank is made with light metal alloys and of category II 1G EPL Ga.

The Ex ia version of model 5300 FISCO field device may be supplied by an [Ex ib] FISCO power supply when the power supply is certified with three separate safety current limiting devices and voltage limitation which meets the requirements for type Ex ia.

E7<sup>(1)</sup> Flameproof:  
Ex ia/db ia IIC T4 Ga/Gb (-40 °C ≤  $T_a$  ≤ +70 °C<sup>(3)</sup>)  
Ex ta IIIC T79°C<sup>(2)</sup> (-40 °C ≤  $T_a$  ≤ +70 °C<sup>(3)</sup>)  
 $U_m = 250$  V.  
Approval valid for HART, FOUNDATION fieldbus, and Modbus options.

I7<sup>(1)</sup>, IG<sup>(1)</sup> Intrinsically Safe:  
Ex ia IIC T4 (-50 °C ≤  $T_a$  ≤ +70 °C<sup>(3)</sup>).  
Ex ia/ib IIC T4 Ga/Gb (-50 °C ≤  $T_a$  ≤ +70 °C<sup>(3)</sup>).  
Ex ta IIIC T79°C<sup>(2)</sup> (-50 °C ≤  $T_a$  ≤ +70 °C<sup>(3)</sup>).  
4-20 mA / HART model:  $U_i=30$  Vdc,  $I_i=130$  mA,  $P_i=1.0$  W,  $C_i=7.26$  nF,  $L_i=0$  H.  
FOUNDATION fieldbus model:  $U_i=30$  Vdc,  $I_i=300$  mA,  $P_i=1.5$  W,  $C_i=0$  nF,  $L_i=0$  H.  
FISCO model:  $U_i=17.5$  Vdc,  $I_i=380$  mA,  $P_i=5.32$  W,  $C_i=0$  nF,  $L_i < 1$  μH.  
Installation Drawing: 9240 030-938  
Approval valid for HART, FOUNDATION fieldbus, and FISCO options.

(1) Ordering Information Code for Product Certificates, see page 8 and page 13.

(2) +69 °C with FOUNDATION fieldbus or FISCO option.

(3) +60 °C with FOUNDATION fieldbus or FISCO option.

National Supervision and Inspection Center  
for Explosion Protection and Safety of  
Instrumentation (NEPSI) Approvals



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### SPECIAL CONDITIONS FOR SAFE USE (X)

Refer to Certificates:

GYJ081080X for Ex ia IIC T4 and GYJ081130X for Ex iad IIC T4.

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E3<sup>(1)</sup> Flameproof:

HART model:

Ex iad IIC T4 (-40 °C < T<sub>a</sub> < +70 °C)

FOUNDATION fieldbus model:

Ex iad IIC T4 (-40 °C < T<sub>a</sub> < +60 °C)

I3<sup>(1)</sup> Intrinsically Safe:

HART model:

Ex ia IIC T4 (-50 °C < T<sub>a</sub> < +70 °C)

4-20 mA / HART model: U<sub>i</sub>=30 V, I<sub>i</sub>=130 mA, P<sub>i</sub>=1.0 W,

C<sub>i</sub>=7.25 nF, L<sub>i</sub>=108 μH

FOUNDATION fieldbus model:

Ex ia IIC T4 (-50 °C < T<sub>a</sub> < +60 °C)

U<sub>i</sub>=30 V, I<sub>i</sub>=300 mA, P<sub>i</sub>=1.5 W, C<sub>i</sub>~0 nF, L<sub>i</sub>~0 μH

IC<sup>(1)</sup> FOUNDATION fieldbus FISCO model:

Ex ia IIC T4 (-50 °C < T<sub>a</sub> < +60 °C)

U<sub>i</sub>=17.5 V, I<sub>i</sub>=380 mA, P<sub>i</sub>=5.32 W, C<sub>i</sub>~0 nF, L<sub>i</sub>~0 μH

NCC/INMETRO Approvals



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### SPECIAL CONDITIONS FOR SAFE USE (X)

Refer to Certificate:

4205/07X

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E2 Flameproof:

BR-Ex d/ia IIC T4 -40 °C ≤ T<sub>a</sub> ≤ +70 °C<sup>(2)</sup> Gb/Ga

Approval valid for HART and FOUNDATION fieldbus options.

I2, IB Intrinsically Safe:

BR-Ex ia IIC T4 -40 °C ≤ T<sub>a</sub> ≤ +70 °C<sup>(2)</sup> Ga

Approval valid for HART and FOUNDATION fieldbus options.

### Overfill Protection

Cert no: Z-65.16-476

U1 TÜV-tested and approved for overfill protection according to  
the German WHG regulations

Approval valid for HART option.

Technology Institution of Industrial Safety  
(TIIS) Approval



E4<sup>(1)</sup> Flameproof:

Transmitter: Ex d [ia] IIC T4

Probe: Ex ia IIC T4

Installation Drawing: 05300-00548.

Approval valid for HART and FOUNDATION fieldbus options.

For detailed information, refer to the Rosemount 5300 Series  
Reference Manual (Document No. 00809-0100-4530).

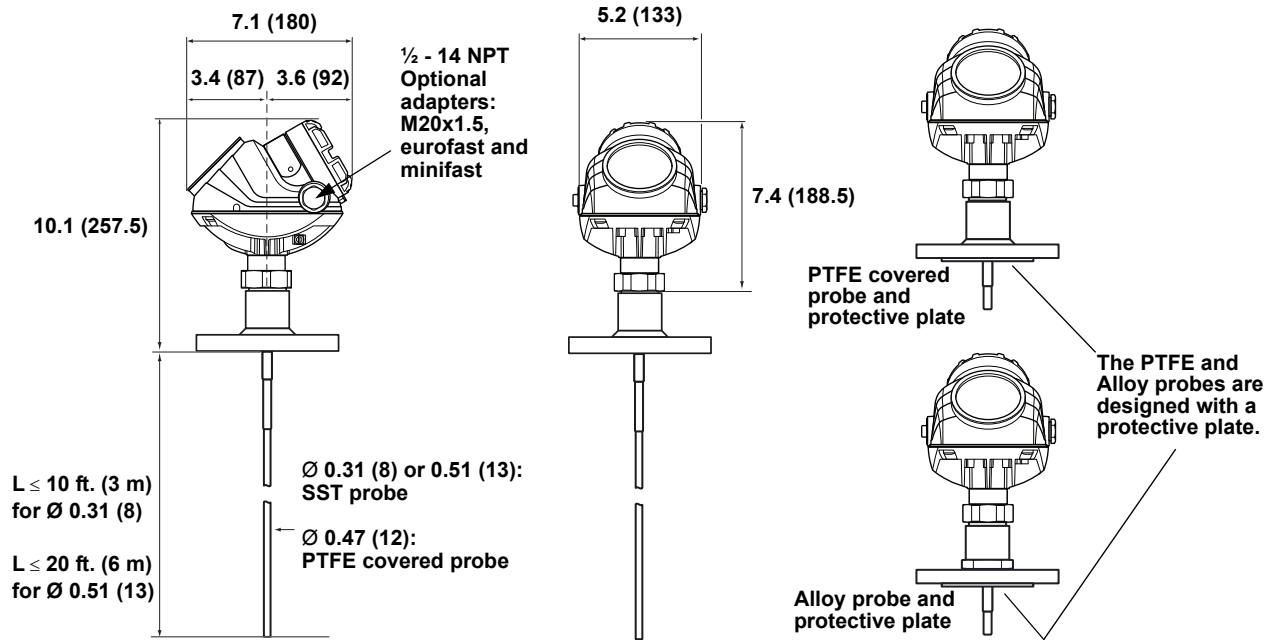
(1) Ordering Information Code for Product Certificates, see page 8 and page 13.

(2) +60 °C with FOUNDATION fieldbus.

**Dimensional Drawings**

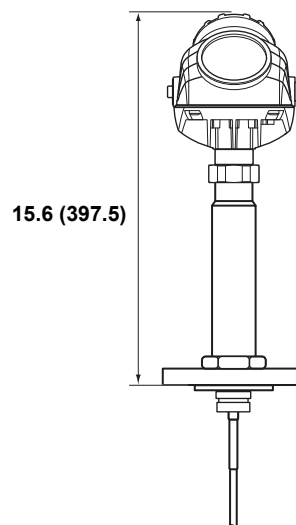
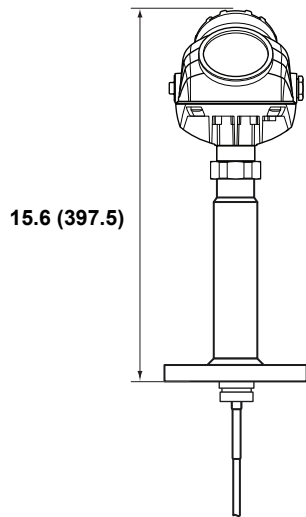
Dimensions are in inches  
 (millimeters)

**RIGID SINGLE LEAD PROBE WITH FLANGE CONNECTION**



**HTHP/HP/C version**

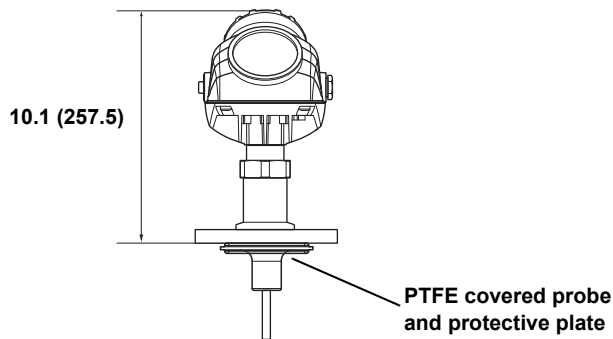
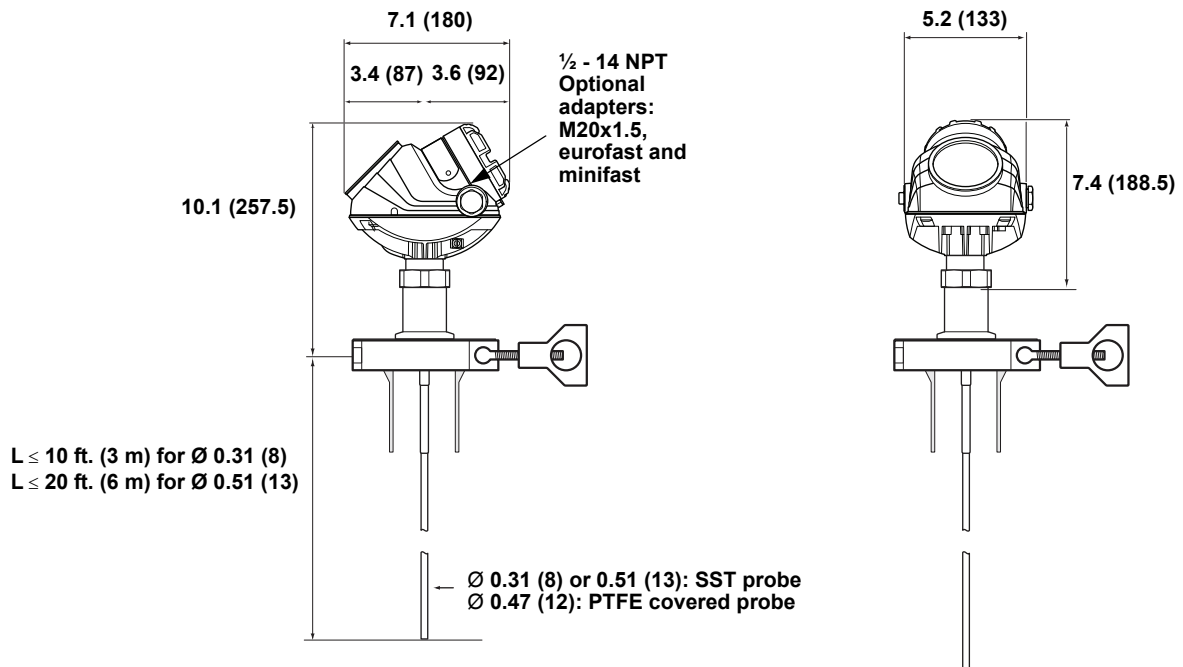
**HTHP/HP Plate Design  
 (Option for Alloy versions)**



# Rosemount 5300 Series

## RIGID SINGLE LEAD PROBE WITH TRI-CLAMP CONNECTION

Dimensions are in inches  
(millimeters)





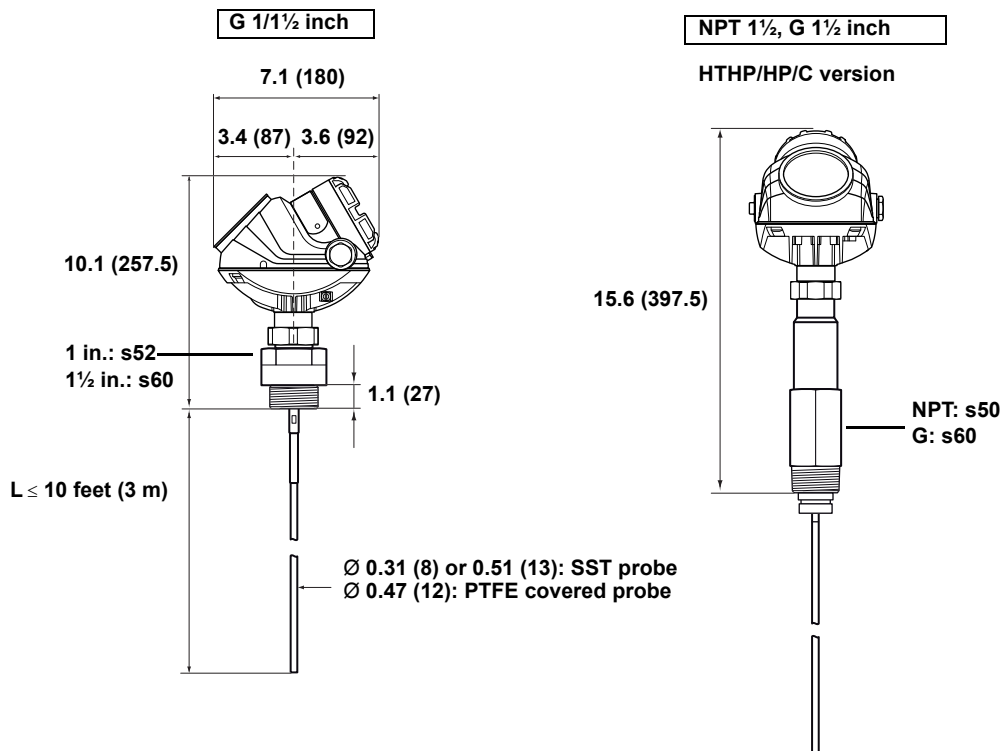
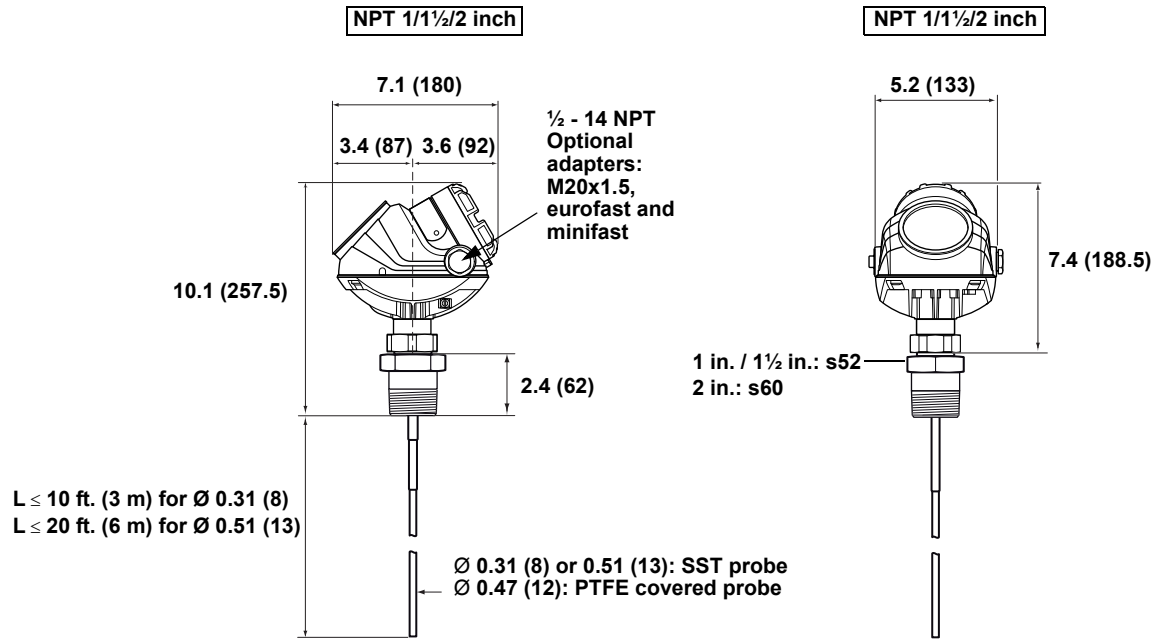
# Product Data Sheet

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December 2010

# Rosemount 5300 Series

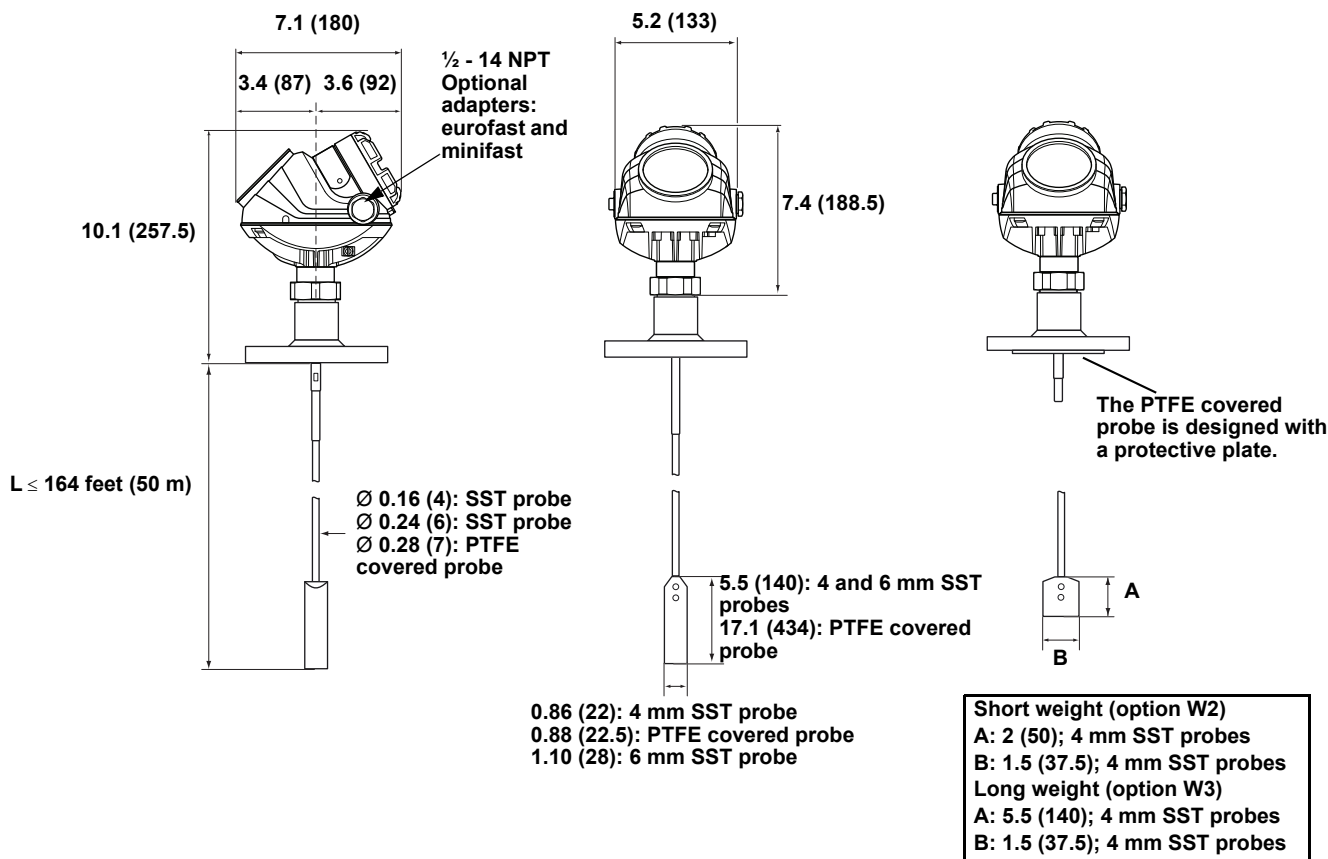
## RIGID SINGLE LEAD PROBE WITH THREADED CONNECTION

Dimensions are in inches  
(millimeters)

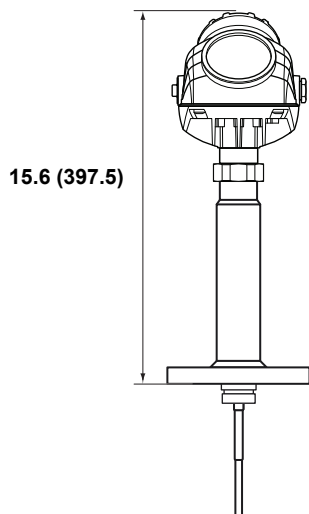


## FLEXIBLE SINGLE LEAD PROBE WITH FLANGE CONNECTION

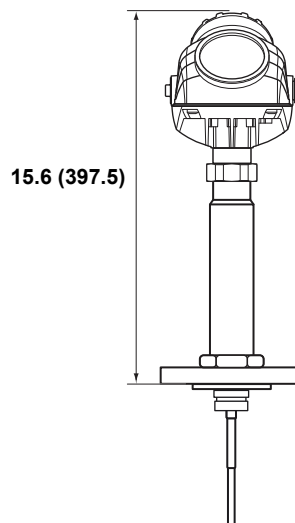
Dimensions are in inches (millimeters)



**HHP/HP/C version**



**HHP/HP/C Plate Design  
(Option for Alloy versions)**



# Product Data Sheet

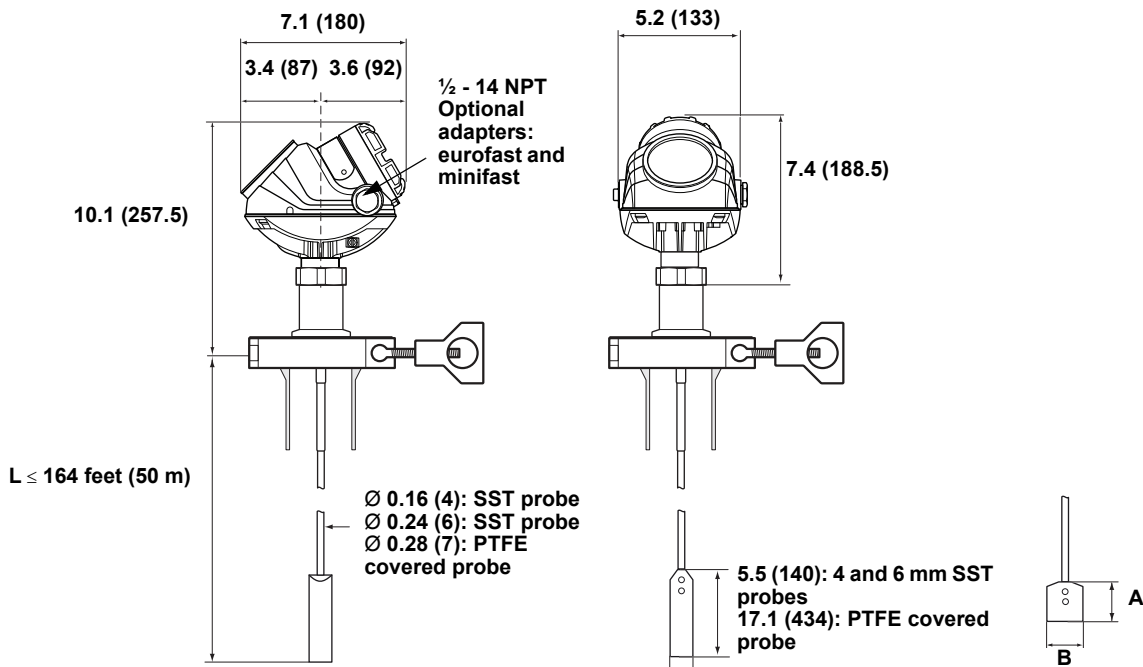
00813-0100-4530, Rev DA

December 2010

# Rosemount 5300 Series

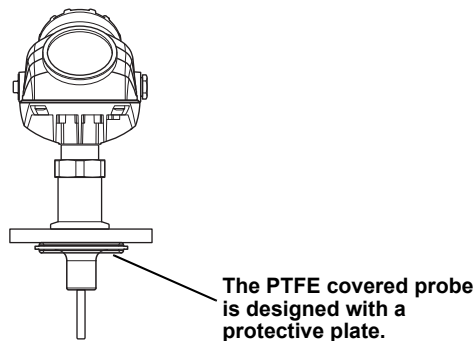
## FLEXIBLE SINGLE LEAD PROBE WITH TRI-CLAMP CONNECTION

Dimensions are in inches (millimeters)



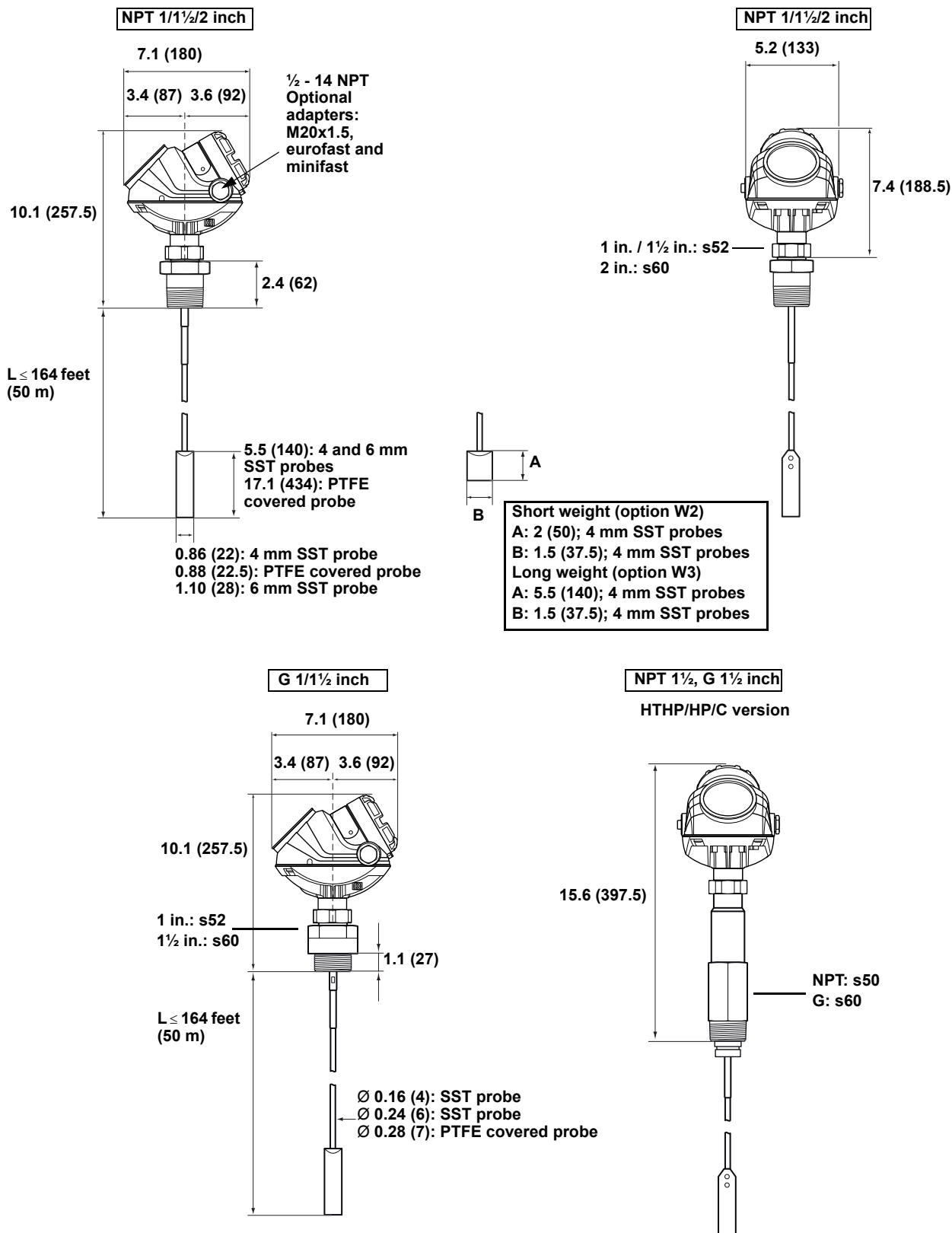
- 0.86 (22): 4 mm SST probe
- 0.88 (22.5): PTFE covered probe
- 1.10 (28): 6 mm SST probe

<p><b>Short weight (option W2)</b>                  A: 2 (50); 4 mm SST probes                  B: 1.5 (37.5); 4 mm SST probes  <b>Long weight (option W3)</b>                  A: 5.5 (140); 4 mm SST probes                  B: 1.5 (37.5); 4 mm SST probes</p>
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# Rosemount 5300 Series

## FLEXIBLE SINGLE LEAD PROBE WITH THREADED CONNECTION Dimensions are in inches (millimeters)



# Product Data Sheet

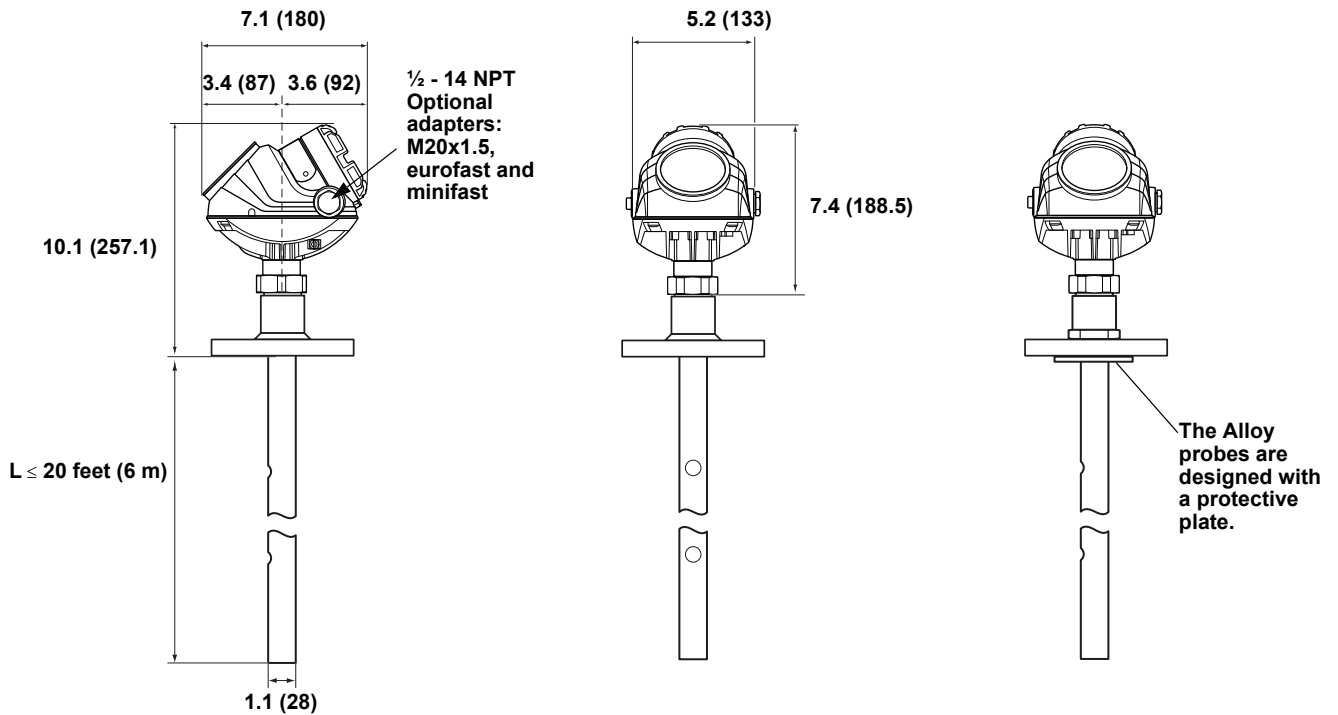
00813-0100-4530, Rev DA

December 2010

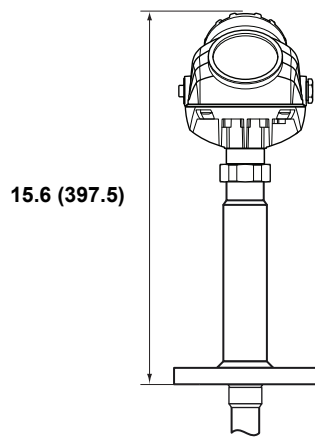
# Rosemount 5300 Series

## COAXIAL PROBE WITH FLANGE CONNECTION

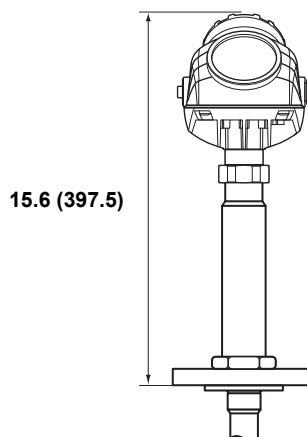
Dimensions are in inches  
(millimeters)



HTHP/HP/C version

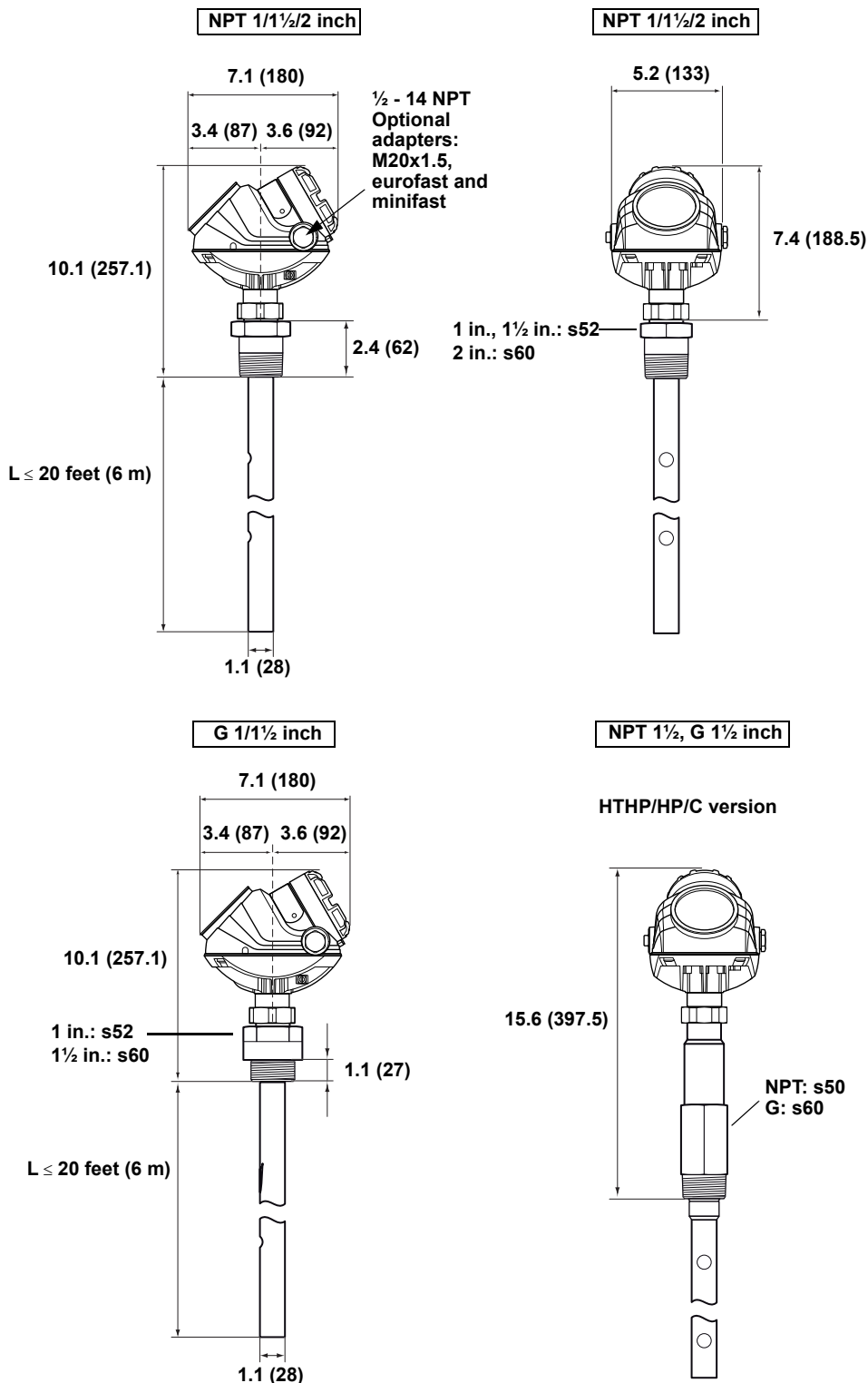


HTHP/HP Plate Design  
(Option for Alloy versions)



## COAXIAL PROBE WITH THREADED CONNECTION

Dimensions are in inches  
(millimeters)



# Product Data Sheet

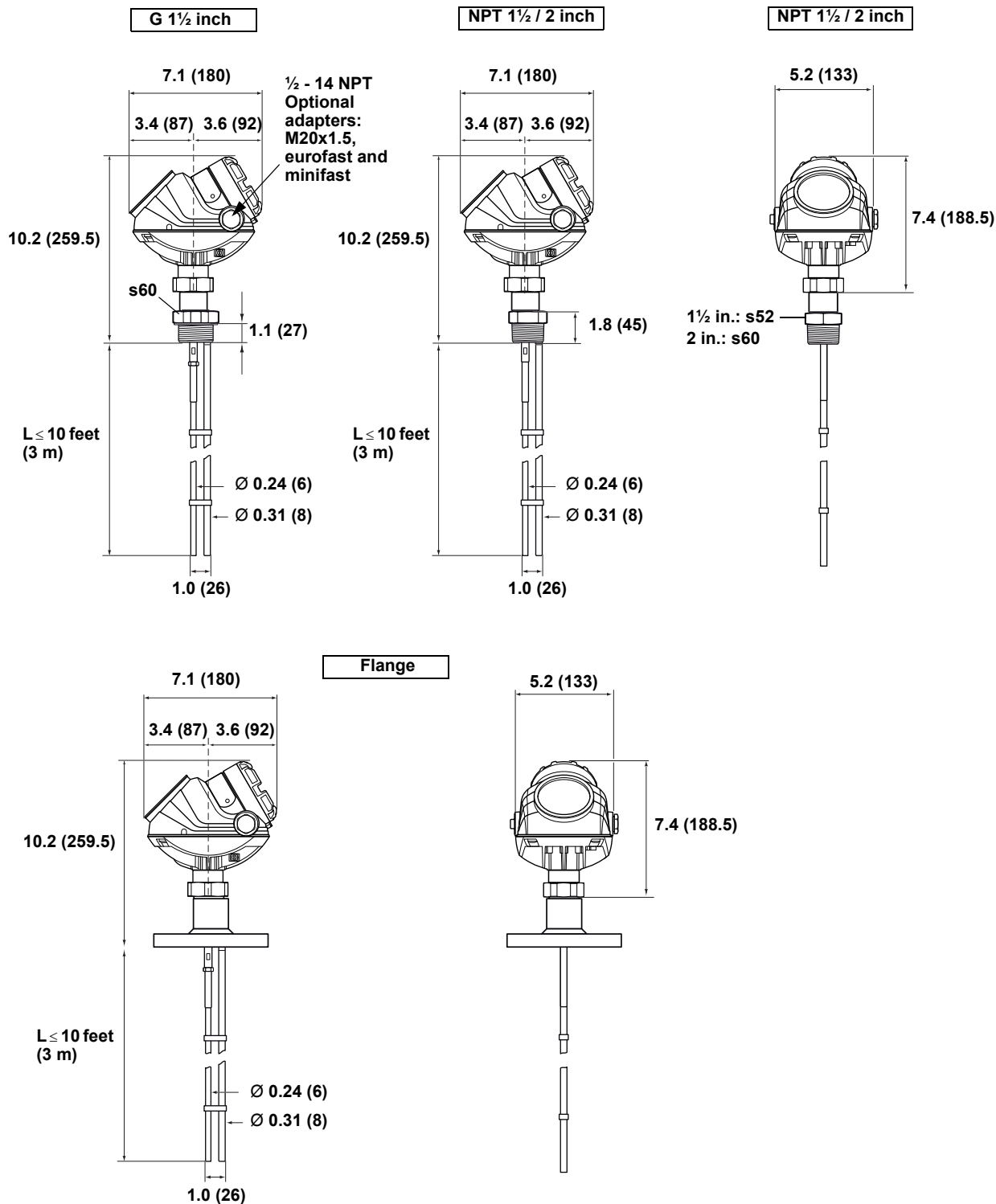
00813-0100-4530, Rev DA

December 2010

# Rosemount 5300 Series

## RIGID TWIN LEAD PROBE

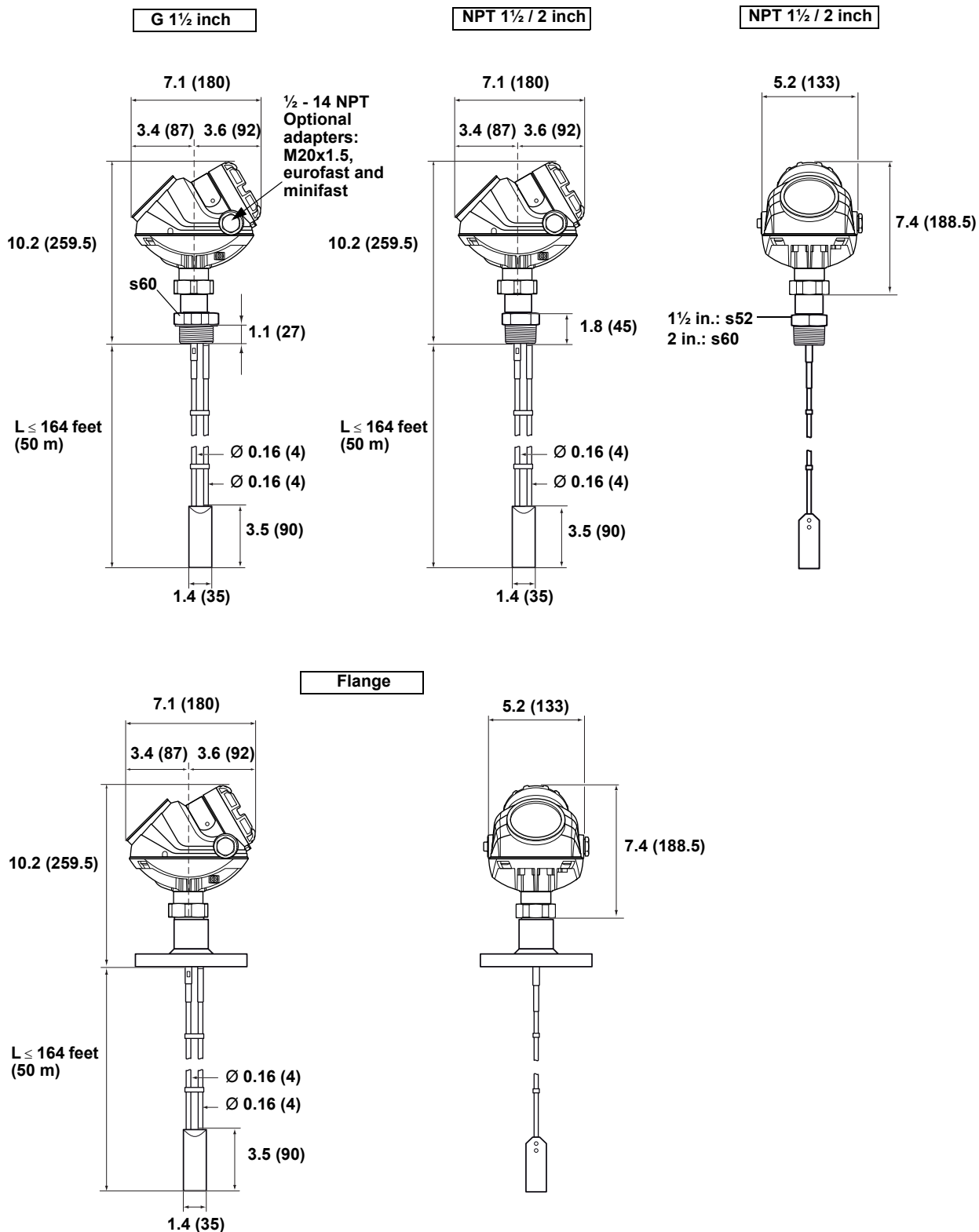
Dimensions are in inches  
(millimeters)



# Rosemount 5300 Series

## FLEXIBLE TWIN LEAD PROBE

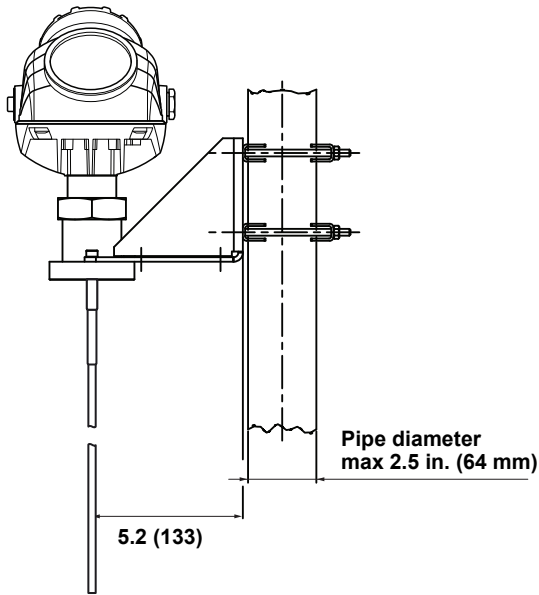
Dimensions are in inches  
(millimeters)



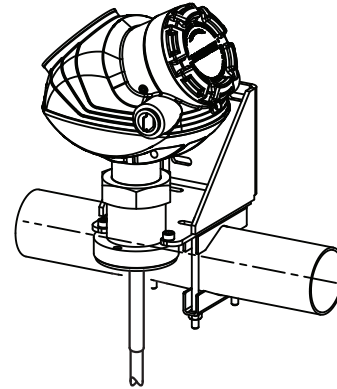


## BRACKET MOUNTING

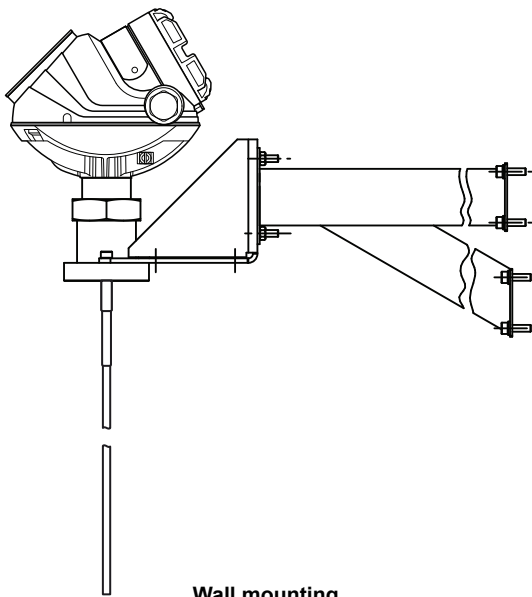
Dimensions are in inches  
(millimeters)



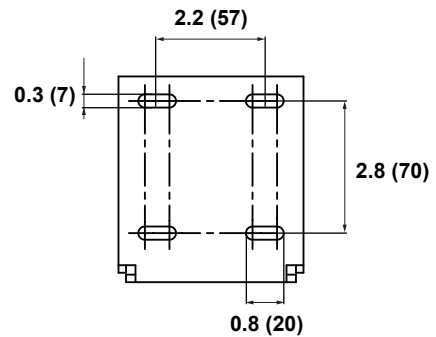
**Pipe mounting  
(vertical pipe)**



**Pipe mounting  
(horizontal pipe)**



**Wall mounting**

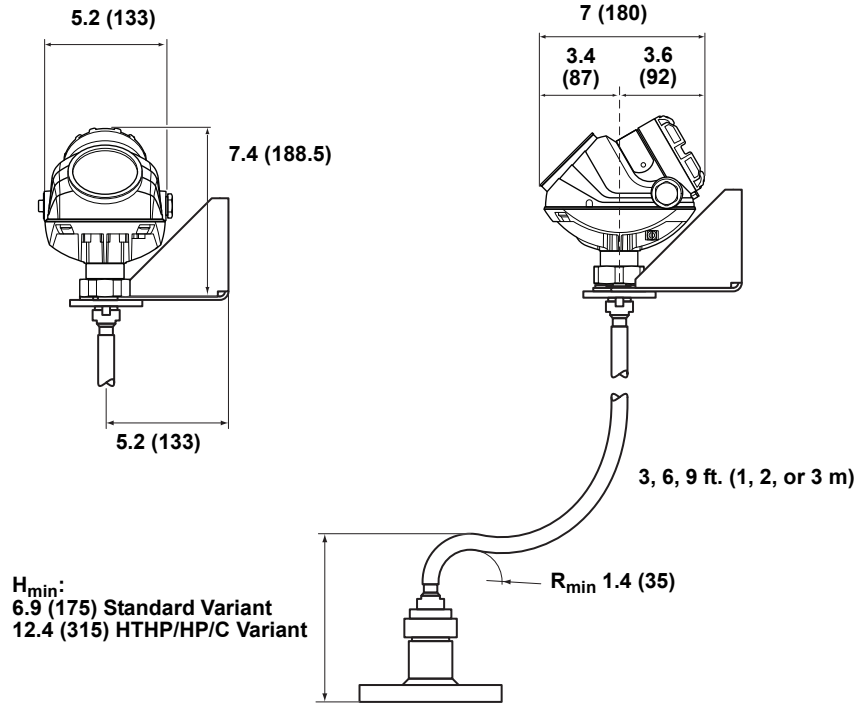


**Hole pattern  
wall mounting**

# Rosemount 5300 Series

## REMOTE HOUSING

Dimensions are in inches  
(millimeters)



# Product Data Sheet

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December 2010

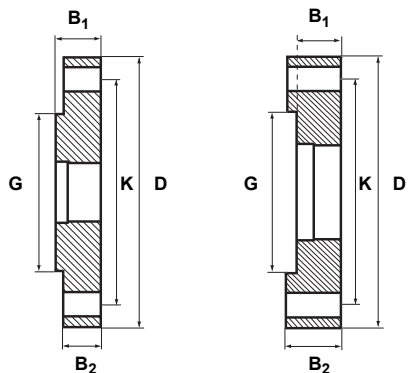
# Rosemount 5300 Series

## SPECIAL FLANGES AND FLUSHING CONNECTION RINGS

Dimensions are in inches  
(millimeters)

**Raised Face**

**Recessed Face**



**D:** Outside diameter  
**B1:** Flange thickness with gasket surface  
**B2:** Flange thickness without gasket surface  
**F=B<sub>1</sub>-B<sub>2</sub>:** Gasket surface thickness  
**G:** Gasket surface diameter  
**# Bolts:** Number of Bolts  
**K:** Bolt hole circle diameter

### NOTE

Dimensions may be used to aid in the identification of installed flanges. It is not intended for manufacturing use.

Special Flanges <sup>(1)</sup>	D	B <sub>1</sub>	B <sub>2</sub>	F	G	# Bolts	K
Fisher 249B/259B <sup>(2)</sup>	9.00 (228.6)	1.50 (38.2)	1.25 (31.8)	0.25 (6.4)	5.23 (132.8)	8	7.25 (184.2)
Fisher 249C <sup>(3)</sup>	5.69 (144.5)	0.94 (23.8)	1.13 (28.6)	-0.19 (-4.8)	3.37 (85.7)	8	4.75 (120.65)
Masonellan <sup>(2)</sup>	7.51 (191.0)	1.54 (39.0)	1.30 (33.0)	0.24 (6.0)	4.02 (102.0)	8	5.87 (149.0)

(1) These flanges are also available in a vented version.

(2) Flange with raised face.

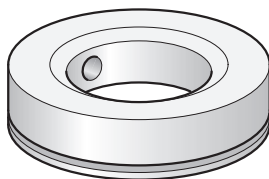
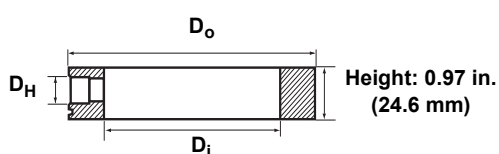
(3) Flange with recessed face.

Masonellan and Fisher flanges are also available in vented versions (see "Vented Flanges" on page 15), with the same dimensions as shown in the table above.

Vented flanges must be ordered with a 1 ½ in. NPT threaded process connection (code RA).

For information about flange temperature and pressure ratings, see page 22.

### Flushing Connection Ring



Flushing Connection Rings	D <sub>i</sub>	D <sub>o</sub>	D <sub>H</sub>
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	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

Pressure and temperature rating for flushing ring up to Class 2500.

## Rosemount Level Solutions

Emerson provides a complete range of Rosemount products for level measurement applications.

### Vibrating Fork Switches – Point Level Detection

For high and low alarms, overflow protection, pump control, including wide pressure and temperature requirements, and hygienic applications. Flexible mounting. Immune to changing process conditions and suitable for most liquids.

The product line consists of:

- Rosemount 2160 Wireless
- Rosemount 2130 Enhanced
- Rosemount 2120 Full-featured
- Rosemount 2110 Compact

### Differential Pressure – Level or Interface Measurement

Flexible mounting for liquid tank levels, including those with wide temperature and pressure requirements. Can be isolated by valves. Unaffected by: vapor space changes, surface conditions, foam, corrosive fluids, internal tank equipment. Optimize performance with direct mount, Tuned-System Assemblies:

- Rosemount DP Level Transmitters and Remote Seals
- Rosemount 3051S\_L, 3051L, and 2051L Liquid Level Transmitters

### Ultrasonic – Level Measurement

Top mounted, non-contacting for simple tank and open air level measurements. Unaffected by fluid properties such as: density, viscosity, dirty coating, and corrosiveness. Appropriate for routine applications outside of explosion proof areas. The product line consists of:

- Rosemount 3100 Series Ultrasonic Process Level Transmitters

### Guided Wave Radar – Level and Interface Measurement

Top mounted, direct level and interface measurement of liquids or solids, including those with wide temperature and pressure requirements. Unaffected by changing process conditions. Good fit for small spaces and easy swap for older technologies.

The product line consists of:

- Rosemount 5300 Series – Accurate, superior performance transmitter in most applications including process vessels and control
- Rosemount 3300 Series – Versatile and easy-to-use transmitter in most liquid storage and monitoring applications

### Non-contacting Radar – Level Measurement

Top mounted, direct level measurement for liquids or solids, including those with wide temperature and pressure requirements. Can be isolated by valves. Unaffected by changing process conditions. Good for dirty, coating, and corrosive applications. The product line consists of:

- Rosemount 5400 Series – Accurate, superior performance 2-wire transmitters for most liquid level applications and process conditions
- Rosemount 5600 Series – 4-wire transmitters with maximum sensitivity and performance for solids, challenging reactors, rapid level changes and excessive process conditions

### Chambers for Process Level Instrumentation

- Rosemount 9901 – High quality chambers for external mounting of level measurement and control instrumentation on process vessels

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