

Rosemount™ 2535 Solids Level Switch

Vibrating Rod



- Compact level switch with threaded process connections from 1-in.
- Sensitivity is adjustable with four settings
- High surface quality for excellent resistance
- Robust design, suitable for process pressures up to 232 psi (16 bar)
- Temperature range from -40 to 302 °F (-40 to 150 °C)

Introduction

Measurement principles

The Rosemount™ 2535 Solids Level Switch uses the principle of a tuning fork and a piezo-electric crystal to oscillate the rod at its natural frequency. Changes to the oscillation frequency are continuously monitored by electronics as it varies depending on the rod being covered or uncovered.

When the solids medium in the vessel (silo) falls away from the rod, it causes a change of oscillation frequency that is detected by the electronics and the output switches to indicate an 'uncovered' state.

When the solids medium in the vessel (silo) rises and covers the rod, it causes a change of oscillation frequency that is detected by the electronics and the output switches to indicate a 'covered' state.

The electrical output will vary depending on the electronics selected.

Key features and benefits

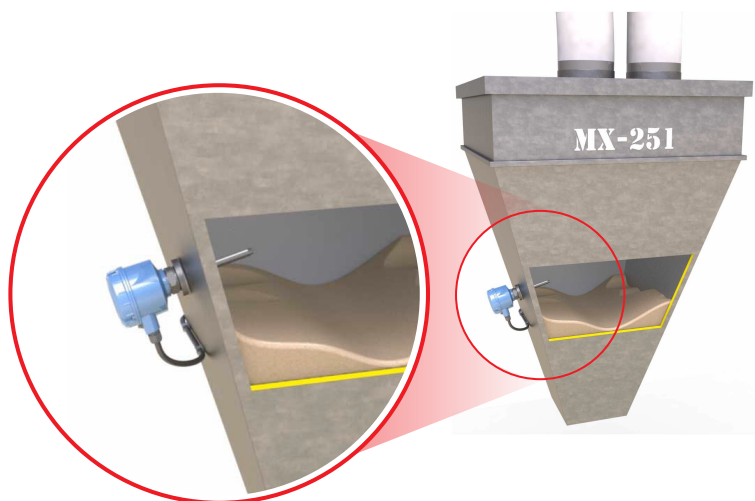
- Reliable level detection for all bulk materials
- Particularly suitable for use in fine-grained and powdery materials, and materials with strong "caking" properties and coarse-grained granulate
- Ideal for use for full-silo, on-demand, or empty-silo detection
- Very compact design for installation in vessels with very limited space
- Standard shaft lengths are available from 160 mm
- Tube-extension versions available with shaft lengths up to 4000 mm
- Robust aluminum die-cast housing with IP67 protection
- Easy installation and commissioning, and maintenance-free
- Approvals for application within hazardous areas (dust)
- RoHS compliance
- Adjustable sensitivity levels for light bulk solids from 20 g/l

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Applications

- Materials with very light product density
- Overfill detection in pipes and shafts
- Low level detection
- Silos/vessels with limited space
- Vibration within the vessel



Ordering information

The specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See [Materials selection](#) for more information.

Table 1: Rosemount 2535 Ordering Information

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

Model	Product description		
2535	Rosemount Solids Switch - Vibrating Rod		★
Thermal profile ⁽¹⁾			
M	Without extension tube (up to T _{process} = 302 °F (150 °C) at T _{amb} ≤ 104 °F (40 °C))		★
E	With extension tube (up to T _{process} = 302 °F (150 °C) at T _{amb} > 104 °F (40 °C))		★
Materials of construction: process connection/thermal extension tube			
D	304/321 Stainless steel (1.4301/1.4541)		★
S	316L Stainless steel (1.4404)		★
Conduit entry/cable threads			
1	M20 x 1.5, 1 off screwed cable gland + 1 off blind plug for CE, ATEX, and IECEx		★
2	M20 x 1.5, 2 off screwed cable glands		★
4	½-in. NPT tapered ANSI B1.20.1 (1 off conduit + 1 off Ex-d blind plug)		★
5	¾-in. NPT tapered ANSI B1.20.1 (1 off conduit + 1 off Ex-d blind plug)		★
Process connection size			
1	1 in./25 mm (DN25)/25A		★
A	1.25 in./32 mm		★
5	1.5 in./40 mm (DN40)/40A		★
2	2 in./50 mm (DN50)/50A		★
3	3 in./80 mm (DN80)/80A		★
4	4 in./100 mm (DN100)/100A		★
Process connection rating			Sizes
AA	ASME B16.5 Class 150 flange	2, 3, and 4	★
DZ	EN 1092-1 PN6 flange	4	★
DA	EN 1092-1 PN16 flange	4	★
NN	For use with non-flange process connection type	1, A, 5, and 2	★
Process connection type			Ratings
F	Flat-face flange	DZ and DA	★
R	Raised-face flange	AA	★
G	BSPP (G) thread	NN	★
N	NPT thread	NN	★
C	Tri Clamp	NN	★

Table 1: Rosemount 2535 Ordering Information (continued)

Electronic type			
G	PNP, 20 to 40 Vdc		
V	Relay DPDT, 21 to 230 Vac, 22 to 45 Vdc		★
Rod length			
A	Standard length 6.3 in. (160 mm)		★
E	Extended, customer-specified length in tenths of inches		★
M	Extended, customer-specified length in millimeters		★
Specific extended rod length			
0000	Factory default length (only if rod length A is selected)		★
XXXX	Specific customer-specified length in tenths of inches or millimeters (XXX.X inches or XXXX mm)		★
Product certifications		Conduit entries	
NA	No hazardous locations certifications	All	★
ND	ATEX, dust certification	All	★
NK	IECEX, dust certification	All	★
EM ⁽²⁾	Technical Regulations Customs Union (EAC), dust certification	All	
KZ	American and Canadian Ordinary Location (unclassified, safe area)	4	★
KB	American and Canadian, DIP	4	★
Options (include with selected model number)			
Calibration data certification			
Q4	Certificate of functional test		★
Weather protection			
P2	Weather protection cover		★
Sliding sleeve ⁽³⁾		Certifications	
S1	Sliding sleeve, without overpressure, maximum 302 °F (150 °C)	NA and KZ	★
S2	Sliding sleeve, with overpressure, maximum 232 psi (16 bar), maximum 302 °F (150 °C)	All	★
Extended product warranty			
WR5	5-year limited warranty		★
Typical model number: 2535 M S 1 5 NN G V A 0000 NA			

- (1) A thermal extension tube (temperature-extended shaft) moves the electronics further away from high process temperatures. Select this extension when ambient temperatures are greater than 104 °F (40 °C). See [Operating conditions](#) and [Dimensional drawings](#) for further information.
- (2) Please contact your local Emerson representative for the availability of this option code.
- (3) Sliding sleeves require an extended length fork from 11.8 to 157-in. (300 to 4000 mm) with a threaded or flanged process connection. Tri Clamp, 1-in and 1¼-in. threaded process connections are not available.

Spare and accessories

The specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See [Materials selection](#) for more information.

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

Table 2: Spares

Part number	Description	
02500-1000-0127	Electronics board: Relay DPDT 21 to 230 Vac, 22 to 45 Vdc	★
02500-1000-0128	Electronics board: Relay PNP, 20 to 40 Vdc	★

Table 3: Accessories

Part number	Description	
02500-7500-0001	Mounting kit 1 for DN100 PN6 and EN1092-1 flange with ø18 mm holes, containing: 4 off M16 x 60 mm screws (A2-grade stainless steel) 4 off M16 nuts 4 off washers 1 off seal (non-food grade) for up to 256 °F (125 °C)	★
02500-7500-0004	Mounting kit 2 for DN100 PN6 and EN1092-1 flange with M16 threaded holes, containing: 4 off M16 x 40 mm screws (A2-grade stainless steel) 4 off washers 1 off seal (non-food grade) for up to 256 °F (125 °C)	★
02500-7500-0007	Mounting kit 3 for DN100 PN16 and EN1092-1 flange with ø18 mm holes, containing: 8 off M16 x 60 mm screws (A2-grade stainless steel) 8 off M16 nuts 8 off washers 1 off seal (non-food grade) for up to 256 °F (125 °C)	★
02500-7500-0010	Mounting kit 4 for DN100 PN16 and EN1092-1 flange with M16 threaded holes, containing: 8 off M16 x 40 mm screws (A2-grade stainless steel) 8 off washers 1 off seal (non-food grade) for up to 256 °F (125 °C)	★

Specifications

Material selection

Emerson provides a variety of Rosemount products with various product options and configurations including materials of construction that can be expected to perform well in a wide range of applications. The Rosemount product information presented is intended as a guide for the purchaser to make an appropriate selection for the application. It is the purchaser's sole responsibility to make a careful analysis of all process parameters (such as all chemical components, temperature, pressure, flow rate, abrasives, contaminants, etc.), when specifying product, materials, options, and components for the particular application. Emerson is not in a position to evaluate or guarantee the compatibility of the process fluid or other process parameters with the product, options, configuration or materials of construction selected.

Electrical data

Connection terminals	0.14 - 2.5 mm ² (AWG 26-14)
Cable entry	M20 × 1.5 screwed cable gland ½-in. NPT conduit connection ¾-in. NPT conduit connection Clamping range (diameter) of the factory provided cable glands: 0.24 to 0.47 in. (6 to 12 mm) for M20 × 1.5
Signal output delay	1 second for uncovered-to-covered status switchover. 1 to 2 seconds for covered-to-uncovered status switchover.
Safety operation (FSL or FSH)	Configurable switches for each signal output. Select Fail Safe High (FSH) or Fail Safe Low (FSL) depending on application.
Vibration frequency	330 Hz
Overvoltage category	II
Pollution degree	2 (inside housing)

Electronics

	Universal voltage Relay DPDT	3-wire PNP
Power supply	21 to 230 Vac 50/60 Hz ±10%* 22 to 45 Vdc ±10%* *including ±10% from EN 61010	20 to 40 Vdc ±10%* *including ±10% from EN 61010
Maximum ripple of power supply	7 V _{SS} at dc	7 V _{SS}
Maximum installed load, input current	22 VA, 2 W	0.5 A
Signal output	Floating relay DPDT Maximum 250 Vac, 8 A (non-inductive) Maximum 30 Vdc, 5 A (non-inductive)	Open Collector: Maximum permanent load is 0.4 A Short-circuit, overload, and reverse polarity protections

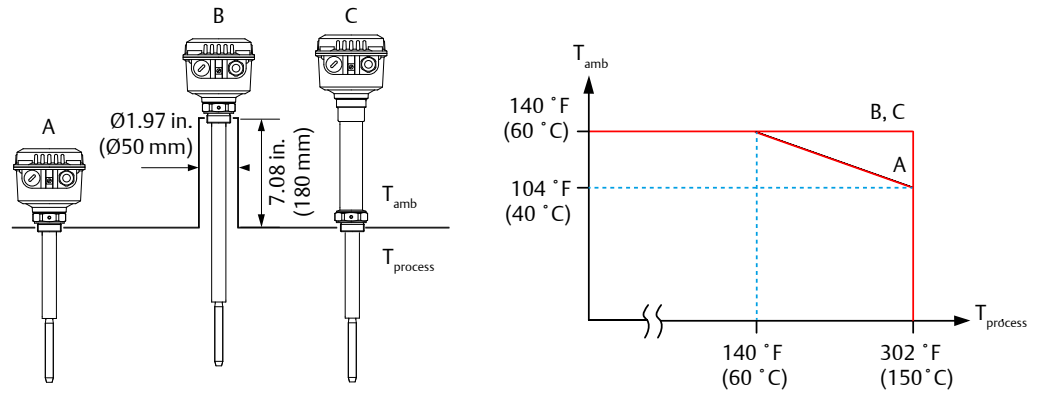
		$V_{OUT} = V_{IN}$, drop < 2.5 V
Status of signal output	Indicated by a built-in LED	Indicated by a built-in LED
Isolation	Power supply to signal output: 2225 Vrms Signal output to signal output: 2225 Vrms	N/A
Protection class	I	III

Mechanical data

Housing	Aluminum housing, powder coated Seal between housing and lid: NBR Seal between housing and process connection: NBR Nameplate: polyester film
Ingress protection	IP67 (EN 60529), NEMA® Type 4X
Process connection	Materials: Standard length: Stainless steel 304/321 (1.4301/1.4541) or 316L (1.4404) Extended length: Stainless steel 304/321 (1.4301/1.4541) or 316L (1.4404) Thread: G 1-in., G 1¼-in., G 1½-in. DIN 228; NPT 1-in., NPT 1¼-in., NPT 1½-in. ANSI B 1.20.1 Flanges: 321 (1.4541) or 316L (1.4404) according to selection Tri Clamp: Stainless steel 304 (1.4301) or 316L (1.4404), 2-in. (DN50) ISO 2852 All materials are food grade.
Rod	Material: Stainless steel 316L (1.4404) (food grade)
Maximum noise level	50 dBA
Overall weight (approximated)	Standard length versions: 2.9 lbs (1.3 kg) Extended length versions: 2.9 lbs + 2.9 lbs per 39.3 in. (1.3 kg + 1.3 kg/m) extension

Operating conditions

Ambient temperature (housing)	-40 to +140 °F (-40 to +60 °C)
Process temperature	-40 to +302 °F (-40 to +150 °C)



For versions with hazardous area approvals, see [Product Certifications](#).

Ventilation

Ventilation is not required.

Minimum powder density requirements

Setting	Minimum powder density
I	1.25 lb/ft ³ (20 g/l)
II	5 lb/ft ³ (80 g/l)
III	9.4 lb/ft ³ (150 g/l)
IV	18.7 lb/ft ³ (300 g/l)

Bulk material restriction

No strong tendency to cake or deposit.

Maximum mechanical load

400 N laterally on vibrating rod (at 104 °F, 40 °C)

Fit a protective angled (reverse-V shaped) shield above the level switch when mechanical loads are high.

Maximum mechanical torque

180 Nm (at 104 °F, 40 °C) for extended lengths

Maximum process pressure

232 psi (16 bar)

Must be an unpressurized tank when a sliding sleeve without overpressure option is used.

The maximum process pressure may be reduced when flanges are used. Refer to the flange standards for pressure ratings and pressure de-ratings with higher temperatures.

The Ex-approved Rosemount 2535 supports process over-pressures up to 232 psi (16 bar) for test purposes. In hazardous areas (classified locations), the over-pressure is restricted to between -2.9 to +1.45 psi (-0.2 to +0.1 bar).

Vibration

1.5 (m/s²)²/Hz according to EN 60068-2-64

Relative humidity

0 to 100%, suitable for outdoor use

Maximum altitude

6562 ft. (2000 m)

Expected product lifetime

The following parameters have a negative influence on the expected product lifetime:

High ambient- and process temperatures, corrosive environments, high plant vibrations, and high flow rate of abrasive bulk material.

Transport and storage

Transport

Refer to the instructions as stated on the transport packaging, otherwise the products may get damaged.

Transport temperature: -40 to +176 °F (-40 to +80 °C)

Transport humidity: 20 to 85%

Always inspect the received goods for any damage occurred during shipment from the factory. Notify Emerson of damaged goods as soon as possible.

Storage

Products must be stored at a dry and clean place. They must be protected from influence of corrosive environments, vibrations, and exposure to direct sunlight.

Storage temperature: -40 to +176 °F (-40 to +80 °C)

Storage humidity: 20 to 85%

Product certifications

European Union directive information

A copy of the EU Declaration of Conformity can be found at the end of the Rosemount 2535 [Product Certifications document](#) . The most recent revision of the EU Declaration of Conformity can be found at Emerson.com/Rosemount.

Ordinary location certification

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

Installing equipment in North America

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

U.S.A.

U.S.A. Ordinary Location certification

KZ

Summary of product certification:

Protection	Ordinary location (unclassified, safe area)
Project ID	3059552
Standards	ANSI/ISA 61010-1:2012 ANSI/NEMA® 250:2003 ANSI/IEC 60529:2004
Markings	Type 4X and IP67

U.S.A. Dust certification

KB

Summary of product certification:

Protection	Dust ignition-proof
Project ID	3059552
Standards	FM Class 3600:2018 FM Class 3616:2011 ANSI/ISA 61010-1:2012 ANSI/NEMA® 250:2003 ANSI/IEC 60529:2004
Markings	Class II, Division 1, Groups E, F, G; Class III, Division 1 T4A Ta = -40 °C to +60 °C Type 4X, IP67

Canada

Canada Ordinary Location certification

KZ

Summary of product certification

Protection	Ordinary location (unclassified, safe area)
Project ID	3059552
Standards	CSA-C22.2 No. 0-10:R2015 CSA-C22.2 No. 0.4:R2013 CSA-C22.2 No. 0.5:R2012 CSA-C22.2 No. 94:R2011 CSA-C22.2 No. 60529:R2010 CAN/CSA-C22.2 No. 61010-1:2012
Markings	Type 4X and IP67

Canada Dust certification

KB

Summary of product certification

Protection	Dust-ignition proof
Project ID	3059552
Standards	CSA-C22.2 No. 0-10:R2015 CSA-C22.2 No. 0.4:R2013 CSA-C22.2 No. 0.5:R2012 CSA-C22.2 No. 25:R2014 CSA-C22.2 No. 94:R2011 CSA-C22.2 No. 60529:R2010 CAN/CSA-C22.2 No. 61010-1:2012
Markings	Class II, Division 1, Groups E, F, and G Class III, Division 1 T4A Ta = -40 °C to +60 °C Type 4X, IP67

Europe

ATEX Dust certification

ND

Summary of product certification

Protection	By enclosure
Certificate	BVS 19 ATEX E 075
Standards	EN60079-0:2012 + A11:2013 EN 60079-31:2014
Markings	Ⓔ II 1/2 D Ex ta/tb IIIC T* Da/Db
Temperature	See Table 4

Table 4: Thermal data

Permitted ambient temperature ⁽¹⁾	Maximum process temperature (Zone 20)	Maximum surface temperature
-40 °C...+60 °C	<= 120 °C	120 °C
	<= 130 °C	130 °C
	<= 140 °C	140 °C
	<= 150 °C	150 °C

(1) At the electronics enclosure (Zone 21).

The maximum surface temperature of the electronic enclosure with a thermal fuse is 120 °C.

Permitted temperature at sensor extension, process connection is -40 to 150 °C.

International

IECEX Dust certification

NK

Summary of product certification

Protection	By enclosure
Certificate	IECEX BVS 19.0071
Standards	IEC 60079-0:2011 IEC 60079-31:2013
Markings	Ex ta/tb IIIC T* Da/Db
Temperature	See Table 5

Table 5: Thermal data

Permitted ambient temperature ⁽¹⁾	Maximum process temperature (Zone 20)	Maximum surface temperature
-40 to 60 °C	<= 120 °C	120 °C
	<= 130 °C	130 °C
	<= 140 °C	140 °C
	<= 150 °C	150 °C

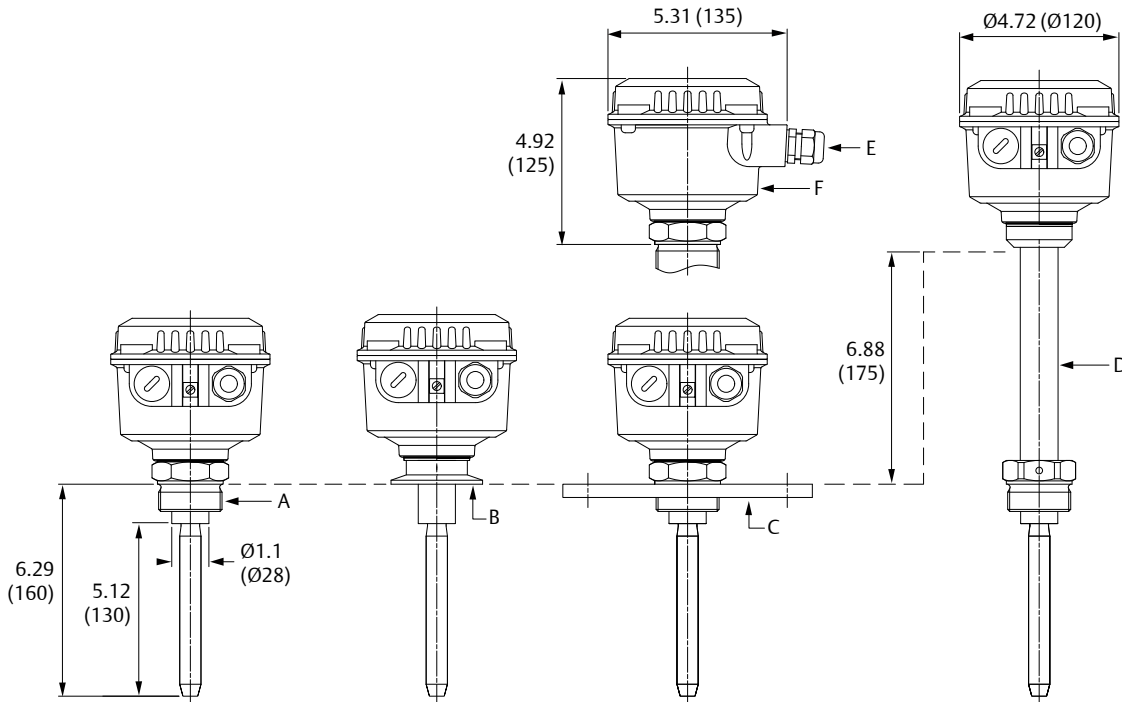
(1) *At the electronics enclosure (Zone 21).*

The maximum surface temperature of the electronic enclosure with a thermo fuse is limited to 120 °C.

Permitted temperature at sensor extension, process connection is -40 to 150 °C.

Dimensional drawings

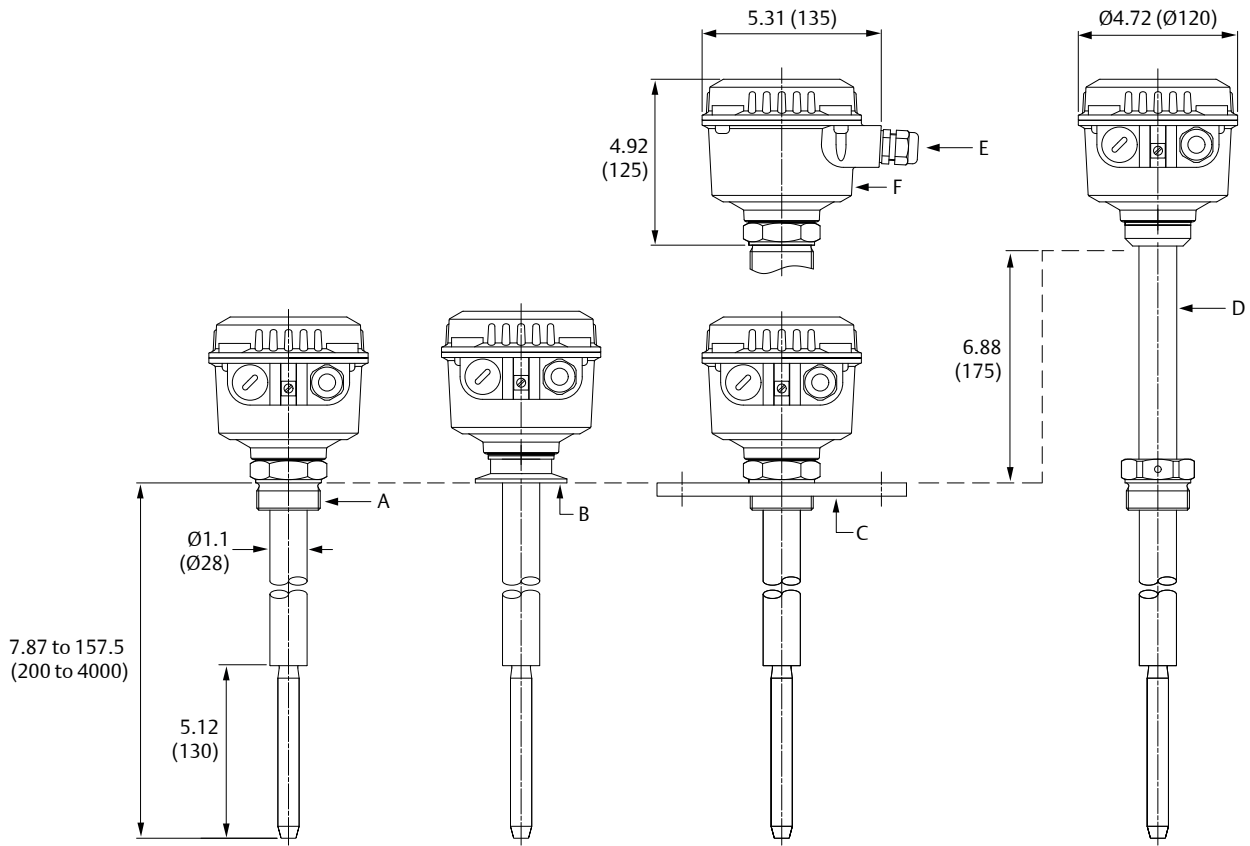
Figure 1: Rosemount 2535 Vibrating Rod Level Switch (Standard Length)



- A. Thread
- B. Tri Clamp
- C. Flange
- D. Thermal extension tube (temperature extension shaft)
- E. Conduit/cable entries
- F. Aluminum housing

Dimensions are in inches (millimeters).

Figure 2: Rosemount 2535 Vibrating Rod Level Switch (Extended Length)



- A. Thread
- B. Tri Clamp
- C. Flange
- D. Thermal extension tube (temperature extension shaft)
- E. Conduit/cable entries
- F. Aluminum housing

Dimensions are in inches (millimeters).

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