

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 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

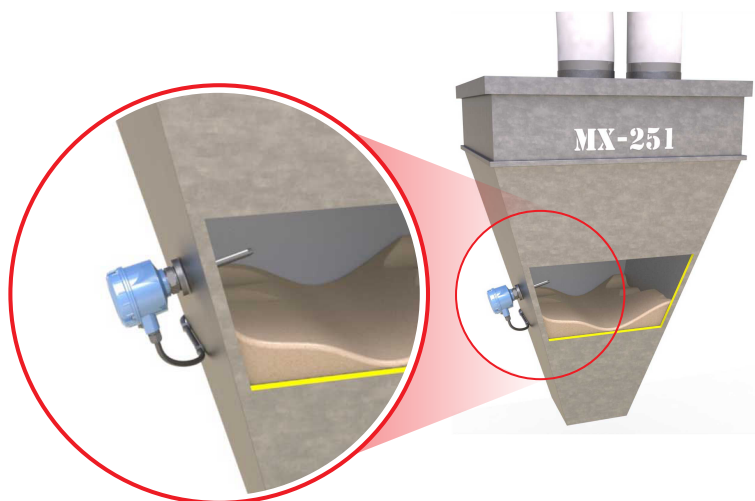
- Reliable level detection for all bulk materials
- Particularly suitable for use in fine-grained and powdery materials, and materials with strong "caking" properties and coarse-grained granulate
- Ideal for use for full-silo, on-demand, or empty-silo detection
- Very compact design for installation in vessels with very limited space
- Standard shaft lengths are available from 6.3 in. (160 mm)
- Tube-extension versions available with shaft lengths up to 157 in. (4000 mm)
- Robust aluminum die-cast housing with IP67 protection
- Easy installation and commissioning, and maintenance-free
- Approvals for hazardous locations (gas and dust)
- RoHS compliance
- Adjustable sensitivity levels for light bulk solids from 1.2 lb/ft³ (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

Online product configurator

Many products are configurable online using our product configurator.

Select the **Configure** button or visit [Emerson.com/global](https://www.emerson.com/global) to start. With this tool's built-in logic and continuous validation, you can configure your products more quickly and accurately.

Specifications and options

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

Model codes

Model codes contain the details related to each product. Exact model codes will vary; an example of a typical model code is shown in [Figure 1](#).

Figure 1: Model Code Example

2535 M S 1 5 NN G V A 0000 NA	Q4
1	2

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

Optimizing lead time

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

Rosemount 2535 Solids Level Switch ordering information



The Rosemount 2535 is particularly suited for full, demand and empty detection of fine grains and powders in storage and process vessels. It handles light solids and powders with ease and is suitable for use in hazardous and dusty environments. Its simple design makes it reliable, maintenance-free and less prone to clogging compared with other point level measurement technologies.

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Required model components

Model

Code	Description	
2535	Rosemount Solids Switch - Vibrating Rod	★

Thermal profile

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).

Code	Description	
M	Without extension tube (up to $T_{process} = 302\text{ °F (150 °C)}$ at $T_{amb} < 104\text{ °F (40 °C)}$)	★
E	With extension tube (up to $T_{process} = 302\text{ °F (150 °C)}$ at $T_{amb} > 104\text{ °F (40 °C)}$)	★

Related information

[Operating conditions](#)
[Dimensional drawings](#)

Materials of construction: process connection/thermal extension tube

Code	Description	
D	304/321 Stainless steel (1.4301/1.4541)	★
S	316L Stainless steel (1.4404)	★

Conduit entry/cable threads

Code	Description	
1 ⁽¹⁾	M20 x 1.5, 1 off screwed cable gland + 1 off blind plug for CE, ATEX, and IECEx	★
2 ⁽²⁾	M20 x 1.5, 2 off screwed cable glands	★
4 ⁽³⁾	NPT ½-in. tapered ANSI B1.20.1 (1 off conduit + 1 off Ex-d blind plug)	★
5 ⁽⁴⁾	NPT ¾-in. tapered ANSI B1.20.1 (1 off conduit + 1 off Ex-d blind plug)	

- (1) Code 1 is for selecting a solid switch with M20 x 1.5-in threaded conduit/cable entries. The switch will be provided with 1 screwed cable gland and 1 blind plug. This option is valid with the following product certifications: CE, ATEX and IECEx, except flameproof versions.
- (2) Code 2 is for selecting a solid switch with two screwed M20 x 1.5-in cable glands. Available for all product certification options, except flameproof versions.
- (3) Code 4 is for selecting a solid switch with NPT 1/5-in threaded conduit/cable entries. The switch will be provided with 1 conduit entry adaptor and one Ex-d rated blind plug. It is available for ordering with all product certifications.

(4) Code 5 is for selecting a solid switch with NPT 3/4-in threaded conduit/cable entries. The switch will be provided with 1 conduit entry adaptor and one Ex-d rated blank plug. It is available for ordering with all product certifications.

Process connection size

Code	Description	
1	1 in./25 mm (DN25)/25A	★
A	1¼ in./32 mm	★
5	1½ in./40 mm (DN40)/40A	★
2 ⁽¹⁾	2 in./50 mm (DN50)/50A	★
3	3 in./80 mm (DN80)/80A	★
4	4 in./100 mm (DN100)/100A	★

(1) Available when Process connection type code R or C is selected.

Process connection rating

Code	Description	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

Code	Description	Ratings	
F	Flat-face flange	DZ and DA	★
R	Raised-face flange	AA	★
G ⁽¹⁾	BSPP (G) thread	NN	★
N	NPT thread	NN	★
C	Tri Clamp	NN	★

(1) Available when Process connection size 1, A, or 5 is selected.

Electronic type

Code	Description	
G	PNP 20 to 40 Vdc	
V	Relay DPDT, 21 to 230 Vac, 22 to 45 Vdc	★

Rod length

Code	Description	
A	Standard length 6.3 in. (160 mm)	★
E ⁽¹⁾	Extended, customer-specified length in tenths of inches	★
M ⁽¹⁾	Extended, customer-specified length in millimeters	★

(1) Please refer to [Dimensional drawings](#) for minimum and maximum length.

Specific extended rod length

Code	Description	
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

Code	Description	Conduit entry	
NA	No hazardous locations certifications	All	★
ND	ATEX, Dust Certification (DIP)	All	★
NK	IECEX, Dust Certification (DIP)	All	★
NR	INMETRO, Dust Certification (DIP)	All	★
NS	China, Dust Certification (DIP)	All	★
KZ	American and Canadian Ordinary Location (unclassified, safe area)	4 and 5	★
KB	American and Canadian, DIP	4 and 5	★

Additional options

Calibration data certification

Code	Description	
Q4	Certificate of functional test	★

Weather protection

Code	Description	
P2	Weather protection cover	★

Sliding sleeve

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.

Code	Description	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

Code	Description	
WR5	5-year limited warranty	★

Spare and accessories

The specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See [Material 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 1: 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 2: 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 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	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

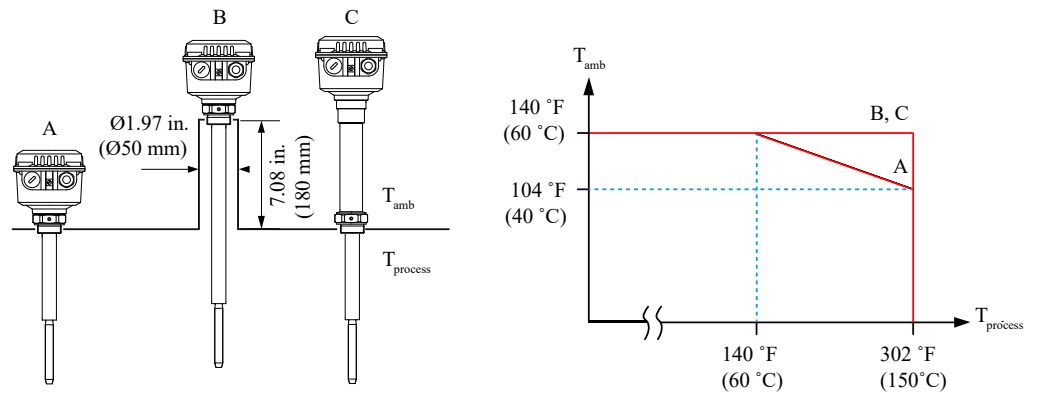
Status of signal output	Indicated by a built-in LED	Indicated by a built-in LED
Isolation	Power supply to signal output: 2225 Vrms Signal output to signal output: 2225 Vrms	N/A
Protection class	I	III

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.
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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	-14.5 to 232 psi (-1 to +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/s ²) 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

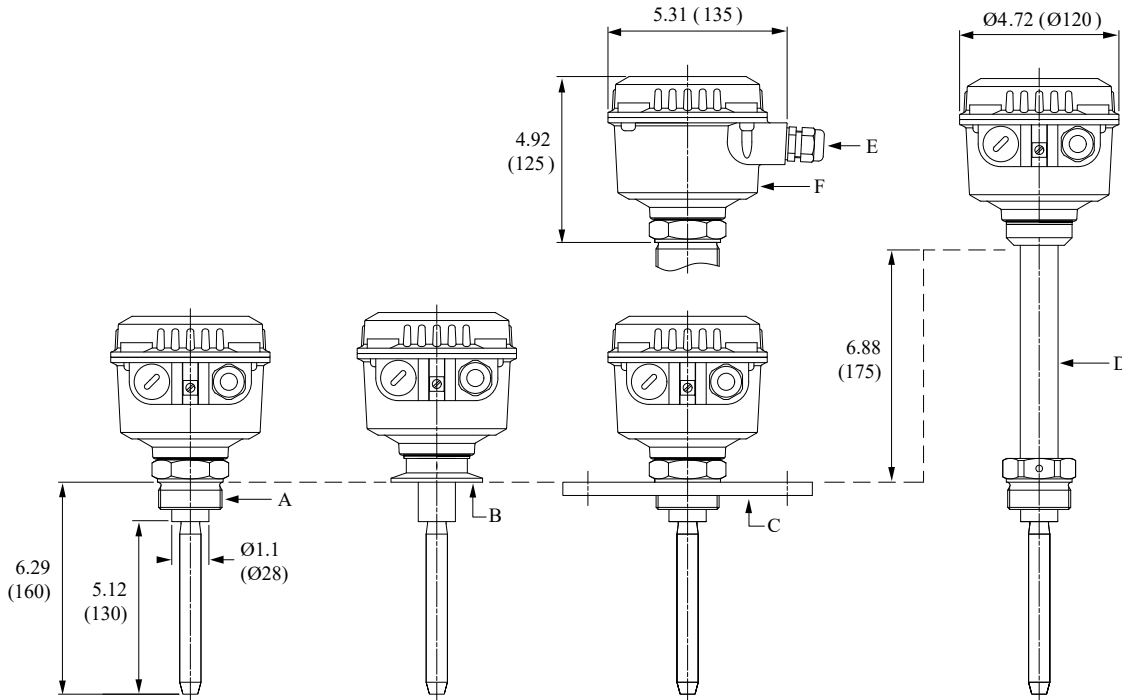
Transport	Refer to the instructions as stated on the transport packaging, otherwise the products may get damaged.
	Transport temperature: -40 to +176 °F (-40 to +80 °C)
	Transport humidity: 20 to 85%
	Always inspect the received goods for any damage occurred during shipment from the factory. Notify Emerson 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

See the Rosemount 2535 [Product Certifications](#) document for detailed information on the existing approvals and certifications.

Dimensional drawings

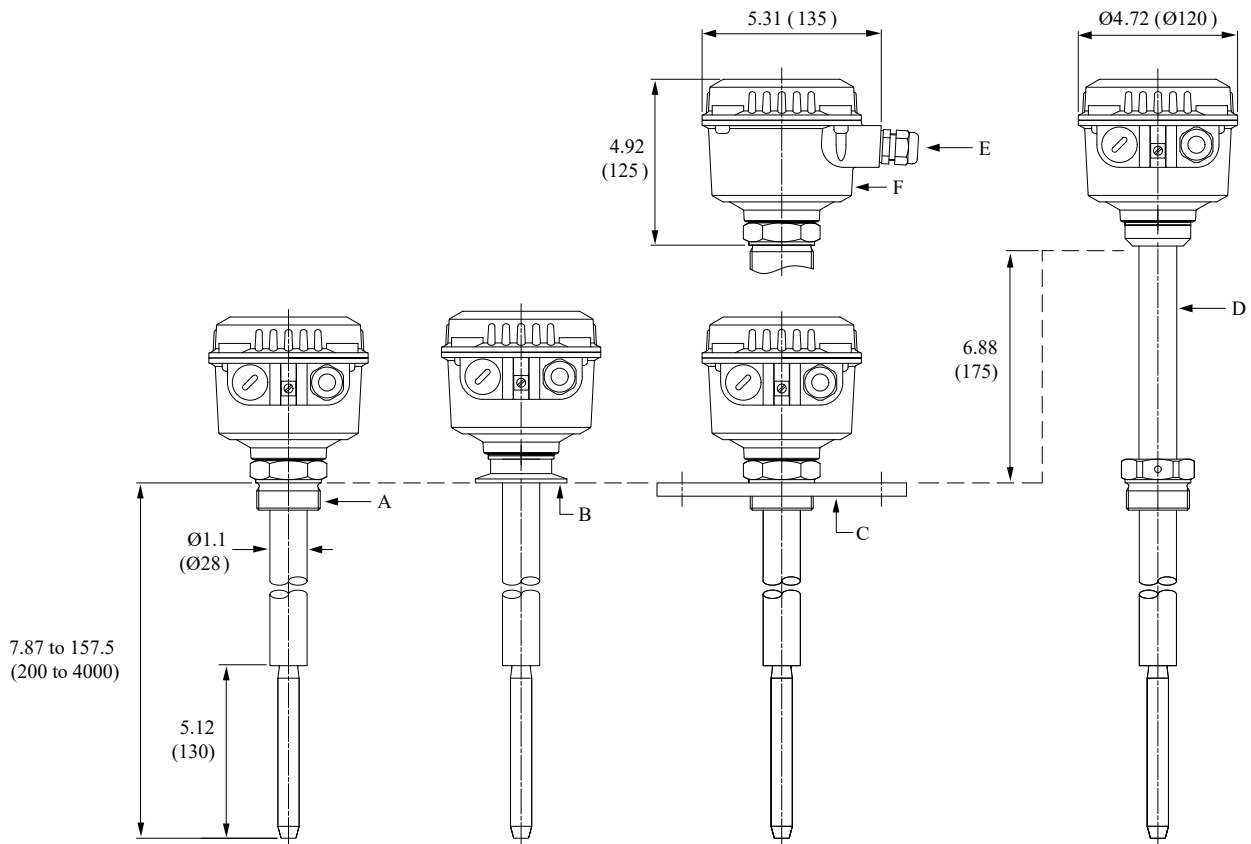
Figure 2: Rosemount 2535 Vibrating Rod Level Switch (Standard Length)



- 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 3: Rosemount 2535 Vibrating Rod Level Switch (Extended Length)



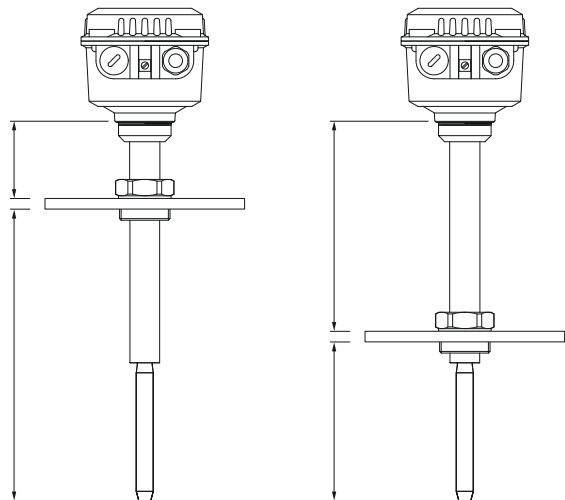
- A. Thread
- B. Tri Clamp
- C. Flange
- D. Thermal extension tube (temperature extension shaft)
- E. Conduit/cable entries
- F. Aluminum housing

Dimensions are in inches (millimeters).

Sliding sleeve

Sliding sleeve can be used to adjust the position of the paddle. When using the sliding sleeve the total length of the level switch remains unchanged, make sure that there is sufficient space to allow for these adjustments.

Figure 4: Sliding Sleeve



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

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