

# Rosemount™ 2521 Solids Level Switch

## Vibrating Fork



- Very high sensitivity (<5 g/l)
- Reliable, simple and maintenance free measurement principle
- Suitable for process pressures up to 232 psi (16 bar)
- Temperature range from -40 to 302 °F (-40 to 150 °C)
- Extremely robust short-fork versions

# Introduction

## Measurement principles

The Rosemount 2521 uses the principle of a tuning fork and a piezo-electric crystal to oscillate the forks at their natural frequency. Changes to the oscillation frequency are continuously monitored by electronics which varies depending on whether the fork is covered or uncovered by a solids medium.

When the solids medium in the vessel (silo) falls away from the fork, 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 fork, 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

- Enhanced version of the vibrating fork with extra sensitivity options
- Available as a standard fork length and tube/cable extended fork lengths
- Ideal for use on bulk solids - particularly suitable for use in fine-grained and powdered materials
- Suitable for hygienic applications - polished forks and wetted parts made from stainless steel
- Short fork design allows mounting in small pipes or process vessels with very limited space
- Versatile installation, may be installed in vertical, horizontal, or angled positions
- Modular and simple design
- Available with separate electronic housing
- Reliable, simple, and maintenance-free measurement principle
- Robust aluminum die-cast housing with IP66 protection
- Adjustable signal output time delay
- Handles mechanical vibrations in process
- Approvals for hazardous locations (gas and dust)

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## Applications

- Materials with very light product density,  $< 0.3 \text{ lb/ft}^3$  (5 g/l)
- Applications requiring pneumatic filling
- Silos/vessels with limited space
- Vibration within the vessel
- High reliability requirements



# Ordering information

## Online product configurator

Many products are configurable online using our product configurator. Select the **Configure** button or visit [Emerson.com/global](https://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.

### Related information

[Specifications](#)

## 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**

|                                  |    |
|----------------------------------|----|
| 2521 S M D 1 5 NN B E A 00000 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. The non-starred offerings are subject to additional delivery lead time.

## Rosemount 2521 Solids Level Switch ordering information



The Rosemount 2521 is suitable for fine-grained and powdered media in storage and process vessels where high sensitivity is needed. It is a robust technology with high sensitivity and is easy to operate. It has flexible options via configurable specifications for different applications. With an adjustable switching delay, false switching can be prevented.

[CONFIGURE >](#)
[VIEW PRODUCT >](#)

## Required model components

### Model

| Code | Description                            |   |
|------|----------------------------------------|---|
| 2521 | Level Switch - Enhanced Vibrating Fork | ★ |

### Fork profile

There are two adjustable settings, A and B on the electronics board. See [Operating conditions](#) for how the minimum density requirements are affected by the Fork Profile option codes.

| Code | Description                                                                   |   |
|------|-------------------------------------------------------------------------------|---|
| S    | Standard sensitivity, 3 lb/ft <sup>3</sup> (50 g/l), dry and wet applications | ★ |
| H    | High sensitivity, 1.2 lb/ft <sup>3</sup> (20 g/l)                             | ★ |

### Thermal profile

| Code             | Description                                                                                                                 |   |
|------------------|-----------------------------------------------------------------------------------------------------------------------------|---|
| M                | Without extension tube (up to T <sub>process</sub> = 302 °F (150 °C) at T <sub>amb</sub> ≤ 104 °F (40 °C))                  | ★ |
| E <sup>(1)</sup> | With extension tube (up to T <sub>process</sub> = 302 °F (150 °C) at T <sub>amb</sub> > 104 °F (40 °C))                     | ★ |
| R <sup>(1)</sup> | With remote housing cable 59-in. (1500 mm) long (up to T <sub>process</sub> = 302 °F (150 °C))                              |   |
| S <sup>(1)</sup> | With remote housing cable 157-in. (4000 mm) long (up to T <sub>process</sub> = 302 °F (150 °C))                             |   |
| C                | With cable extension (T <sub>process</sub> : -13 to 176 °F (-25 to 80 °C), T <sub>amb</sub> : -13 to 140 °F (-25 to 60 °C)) |   |

(1) A thermal extension cable or 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.

### Materials of construction: process connection/process extension tube

| Code             | Description                             |   |
|------------------|-----------------------------------------|---|
| D                | 304/321 Stainless steel (1.4301/1.4541) | ★ |
| S <sup>(1)</sup> | 316L Stainless steel (1.4404)           | ★ |

(1) Not available when Thermal Profile code C is selected.

## Conduit entry/cable threads

| Code | Description                                                                     |   |
|------|---------------------------------------------------------------------------------|---|
| 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    | NPT ½-in. tapered ANSI B1.20.1 (1 off conduit + 1 off Ex-d blind plug)          | ★ |
| 6    | M20 x 1.5 (1 off conduit + 1 off Ex-d blind plug)                               |   |

## Process connection size

| Code             | Description               |   |
|------------------|---------------------------|---|
| 5                | 1½ in./40 mm (DN40)/40A   | ★ |
| 2 <sup>(1)</sup> | 2 in./50 mm (DN50)/50A    | ★ |
| 3                | 3 in./80 mm (DN80)/80A    | ★ |
| 4                | 4 in./100 mm (DN100)/100A | ★ |

(1) When selecting Process connection size code 2 together with Process connection rating code NN, and Process connection type code G or N, the Sliding sleeve code S2 is required.

## Process connection rating

| Code              | Description                                     | Sizes        |   |
|-------------------|-------------------------------------------------|--------------|---|
| AA                | ASME B16.5 Class 150 flange                     | All except 5 | ★ |
| DZ                | EN 1092-1 PN6 flange                            | 4            | ★ |
| DA                | EN 1092-1 PN16 flange                           | 4            | ★ |
| NN <sup>(1)</sup> | For use with non-flange process connection type | 2 and 5      | ★ |

(1) When selecting Process connection size code 2 together with Process connection rating code NN, and Process connection type code G or N, the Sliding sleeve code S2 is required.

## Process connection type

| Code             | Description        | Ratings   |   |
|------------------|--------------------|-----------|---|
| F                | Flat-face flange   | DZ and DA | ★ |
| R                | Raised-face flange | AA        | ★ |
| B                | BSPT (R) thread    | NN        | ★ |
| G <sup>(1)</sup> | BSPP (G) thread    | NN        | ★ |
| N <sup>(1)</sup> | NPT thread         | NN        | ★ |
| C <sup>(2)</sup> | Tri Clamp          | NN        | ★ |

(1) When selecting Process connection size code 2 together with Process connection rating code NN, and Process connection type code G or N, the Sliding sleeve code S2 is required.

(2) Not available when Thermal Profile code C is selected.

## Electronic type

| Code             | Description                                                                | Fork profile | Product certifications           |   |
|------------------|----------------------------------------------------------------------------|--------------|----------------------------------|---|
| T                | Direct load switching (mains 2-wire) 19 to 230 Vac, without contact, ac/dc | All          | All except I3, IJ, IL, and KE    | ★ |
| G                | PNP 18 to 50 Vdc                                                           | All          | All except I3, IJ, IL, and KE    | ★ |
| V                | Relay DPDT, 19 to 230 Vac                                                  | All          | All except I3, IJ, IL, and KE    | ★ |
| E                | Relay SPDT, 19 to 230 Vac                                                  | All          | All except I3, IJ, IL, and KE    | ★ |
| K <sup>(1)</sup> | NAMUR                                                                      | All except S | Available for I3, IJ, IL, and KE | ★ |

(1) Not available when Fork Profile code S is selected.

## Fork length

| Code                | Description                                                                        | Fork profiles |   |
|---------------------|------------------------------------------------------------------------------------|---------------|---|
| A <sup>(1)</sup>    | Standard length 6.47 in. (165 mm)                                                  | S             | ★ |
| B <sup>(1)</sup>    | Standard length 9.25 in. (235 mm), or 10.24-in (260 mm) for Fork Sensitivity V2/V3 | H             | ★ |
| E <sup>(1)(2)</sup> | Extended tube, customer-specified length in tenths of inches                       | All           | ★ |
| M <sup>(1)(2)</sup> | Extended tube, customer-specified length in millimeters                            | All           | ★ |
| F <sup>(2)(3)</sup> | Extended cable, customer-specified length in tenths of inches                      | All           |   |
| N <sup>(2)(3)</sup> | Extended cable, customer-specified length in millimeters                           | All           |   |

(1) Not available when Thermal Profile code C is selected.

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

(3) Available only when Thermal Profile code C is selected.

## Specific extended fork length

| Code  | Description                                                                                                 |   |
|-------|-------------------------------------------------------------------------------------------------------------|---|
| 0000  | Factory default length (only if fork length A or B is selected)                                             | ★ |
| XXXXX | Specific customer-specified tube/cable length in tenths of inches (XXXX.X inches) or millimeters (XXXXX mm) | ★ |

## Product certifications

| Code | Description                                                   | Conduit entry |   |
|------|---------------------------------------------------------------|---------------|---|
| NA   | No hazardous locations certifications                         | 1, 2, and 4   | ★ |
| ND   | ATEX, Dust Certification (DIP)                                | 1, 2, and 4   | ★ |
| NK   | IECEX, Dust Certification (DIP)                               | 1, 2, and 4   | ★ |
| NS   | China, Dust Certification                                     | 1, 2, and 4   | ★ |
| E3   | China, Flameproof / Dust Certification                        | 4 and 6       | ★ |
| E7   | IECEX, Flameproof / Dust Certification (DIP)                  | 4 and 6       | ★ |
| E8   | ATEX, Flameproof / Dust Certification (DIP)                   | 4 and 6       | ★ |
| I3   | China, Intrinsically Safe / Dust Certification                | 1, 2, and 4   | ★ |
| IJ   | ATEX, Intrinsically Safe, Dust Certification (DIP)            | 1, 2, and 4   | ★ |
| IL   | IECEX, Intrinsically Safe, Dust Certification (DIP)           | 1, 2, and 4   | ★ |
| K1   | ATEX, Increased Safety, Flameproof / Dust Certification (DIP) | 1, 2, and 4   | ★ |

| Code | Description                                                                    | Conduit entry |   |
|------|--------------------------------------------------------------------------------|---------------|---|
| K3   | China, Increased Safety / Flameproof / Dust Certification                      | 1, 2, and 4   | ★ |
| K7   | IECEX, Increased Safety, Flameproof / Dust Certification (DIP)                 | 1, 2, and 4   | ★ |
| KB   | American and Canadian, Dust Certification (DIP)                                | 4 only        | ★ |
| KE   | American and Canadian, Intrinsically Safe, Dust Certification (DIP)            | 4 only        | ★ |
| KT   | American and Canadian, Increased Safety, Flameproof / Dust Certification (DIP) | 4 only        | ★ |
| KY   | American and Canadian, Explosion-proof / Dust Certification (DIP)              | 4 only        | ★ |
| KZ   | American and Canadian Ordinary Location (unclassified, safe area)              | 4 only        | ★ |

## Additional options

### Calibration data certification

| Code | Description                    |   |
|------|--------------------------------|---|
| Q4   | Certificate of functional test | ★ |

### Weather protection

| Code | Description              |   |
|------|--------------------------|---|
| P2   | Weather protection cover | ★ |

### Fork sensitivity

| Code                 | Description                                                                             | Thermal profiles |   |
|----------------------|-----------------------------------------------------------------------------------------|------------------|---|
| V1 <sup>(1)</sup>    | Enhanced (> 0.3 lb/ft <sup>3</sup> (5 g/l))                                             | M, E, and C      | ★ |
| V2 <sup>(1)(2)</sup> | Enhanced (< 0.3 lb/ft <sup>3</sup> (5 g/l)) with increased vibrating surface (aluminum) | M, E, and C      |   |
| V3 <sup>(1)</sup>    | Enhanced (< 0.3 lb/ft <sup>3</sup> (5 g/l))                                             | M, E, and C      |   |
| V4 <sup>(3)</sup>    | Adjustable sensitivity for interface applications                                       | M, E, and C      |   |

(1) Available only when Fork Profile code H is selected (for high sensitivity).

(2) This option requires a 4-in. flanged process connection to be selected.

(3) Available only when Fork Profile code S is selected (for standard sensitivity in wet and dry applications) and Product Certification code NA is selected. The potentiometer on the electronics board may then be used to fine-tune the sensitivity.

### Sliding sleeve

The Sliding sleeve option requires an extended fork length.

When selecting Process connection size code 2 together with Process connection rating code NN, and Process connection type code G or N, the Sliding sleeve code S2 is required.

Not available when Process connection size code 5 is selected. Available only when Process connection type code F, R, G, or N is selected.

| Code | Description                                                       | Thermal profiles |   |
|------|-------------------------------------------------------------------|------------------|---|
| S2   | Sliding sleeve, maximum 232 psi (16 bar), maximum 302 °F (150 °C) | M, E, R, and S   | ★ |



**Extended product warranty**

| Code | Description             |   |
|------|-------------------------|---|
| WR5  | 5-year limited warranty | ★ |

**Tag plate**

| Code | Description     |   |
|------|-----------------|---|
| WT   | Wired tag plate | ★ |

## Spares 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                                                                                                |   |
|-----------------|------------------------------------------------------------------------------------------------------------|---|
| 02500-1000-0069 | Electronics board: Relay SPDT 19 to 230 Vac, 19 to 55 Vdc, Fork Profile code S                             | ★ |
| 02500-1000-0070 | Electronic module: Relay SPDT 19 to 230 Vac, 19 to 55 Vdc, intrinsic safe                                  | ★ |
| 02500-1000-0071 | Electronic module: Relay SPDT 19 to 230 Vac, 19 to 55 Vdc, intrinsic safe                                  | ★ |
| 02500-1000-0072 | Electronic module: Relay (DPDT) 19 to 230 Vac, 19 to 36 Vdc, intrinsic safe                                | ★ |
| 02500-1000-0073 | Electronic module: PNP 18 to 50 Vdc                                                                        | ★ |
| 02500-1000-0074 | Electronic module: PNP 18 to 50 Vdc, intrinsic safe                                                        | ★ |
| 02500-1000-0075 | Electronic module: 2-wire without contact 19 to 230 Vac/Vdc                                                | ★ |
| 02500-1000-0077 | Electronic module: 8/16 mA 2-wire, intrinsic safe                                                          | ★ |
| 02500-1000-0078 | Electronic module: 8/16 mA or 4-20 mA 2-wire, intrinsic safe                                               | ★ |
| 02500-1000-0079 | Electronic module: 8/16 mA or 4-20 mA 2-wire                                                               | ★ |
| 02500-1000-0080 | Electronics board: Relay SPDT 19 to 230 Vac, 19 to 55 Vdc, Fork Profile code H                             | ★ |
| 02500-1000-0081 | Electronics board: Relay SPDT 19 to 230 Vac, 19 to 55 Vdc, Fork Sensitivity code V1                        | ★ |
| 02500-1000-0082 | Electronics board: Relay SPDT 19 to 230 Vac, 19 to 55 Vdc, Fork Sensitivity code V3                        | ★ |
| 02500-1000-0083 | Electronics board: Relay SPDT 19 to 230 Vac, 19 to 55 Vdc, Fork Sensitivity code V2                        | ★ |
| 02500-1000-0084 | Electronic module: Relay SPDT 19 to 230 Vac, 19 to 55 Vdc, 0,3 lb/ft <sup>3</sup> (5 g/l), intrinsic safe  | ★ |
| 02500-1000-0085 | Electronic module: Relay SPDT 19 to 230 Vac, 19 to 55 Vdc, 0,3 lb/ft <sup>3</sup> (5 g/l), intrinsic safe  | ★ |
| 02500-1000-0086 | Electronic module: Relay DPDT 19 to 230 Vac, 19 to 55 Vdc                                                  | ★ |
| 02500-1000-0087 | Electronic module: Relay DPDT 19 to 230 Vac, 19 to 55 Vdc, 0,3 lb/ft <sup>3</sup> (5 g/l)                  | ★ |
| 02500-1000-0088 | Electronic module: Relay DPDT 19 to 230 Vac, 19 to 36 Vdc                                                  | ★ |
| 02500-1000-0089 | Electronic module: Relay (DPDT) 19 to 230 Vac, 19 to 36 Vdc, 0,3 lb/ft <sup>3</sup> (5 g/l)                | ★ |
| 02500-1000-0090 | Electronic module: VN2000 PNP 18 to 50 Vdc                                                                 | ★ |
| 02500-1000-0091 | Electronic module: PNP 18 to 50 Vdc, 0,3 lb/ft <sup>3</sup> (5 g/l)                                        | ★ |
| 02500-1000-0092 | Electronic module: PNP 18 to 50 Vdc, 1,2 lb/ft <sup>3</sup> (20 g/l), intrinsic safe                       | ★ |
| 02500-1000-0093 | Electronic module: PNP 18 to 50 Vdc, 0,3 lb/ft <sup>3</sup> (5 g/l), intrinsic safe                        | ★ |
| 02500-1000-0094 | Electronic module: 2-wire without contact 19 to 230 Vac/Vdc, 1,2 lb/ft <sup>3</sup> (20 g/l)               | ★ |
| 02500-1000-0095 | Electronic module: 2-wire without contact 19 to 230 Vac/Vdc, 0,3 lb/ft <sup>3</sup> (5 g/l)                | ★ |
| 02500-1000-0098 | Electronic module: NAMUR 2-wire intrinsic safe                                                             | ★ |
| 02500-1000-0099 | Electronic module: NAMUR 2-wire, 0,3 lb/ft <sup>3</sup> (5 g/l), intrinsic safe                            | ★ |
| 02500-1000-0100 | Electronic module: 8/16 mA 2-wire, 1,2 lb/ft <sup>3</sup> (20 g/l), intrinsic safe                         | ★ |
| 02500-1000-0102 | Electronic module: 8/16 mA or 4-20 mA, 1,2 lb/ft <sup>3</sup> (20 g/l)                                     | ★ |
| 02500-1000-0103 | Electronic module: 8/16 mA or 4-20 mA 0,3 lb/ft <sup>3</sup> (5 g/l)                                       | ★ |
| 02500-1000-0104 | Electronic module: VN2000/6000 8/16 mA or 4-20 mA, 2-wire, 1,2 lb/ft <sup>3</sup> (20 g/l), intrinsic safe | ★ |

**Table 1: Spares (continued)**

| Part number     | Description                                                                                               |   |
|-----------------|-----------------------------------------------------------------------------------------------------------|---|
| 02500-1000-0105 | Electronic module: VN2000/6000 8/16 mA or 4-20 mA, 2-wire, 0,3 lb/ft <sup>3</sup> (5 g/l), intrinsic safe | ★ |
| 02500-1000-0107 | Remote version: Remote cable (special Triaxial cable), price per 1000 mm (39.4")                          | ★ |

**Table 2: Accessories**

| Part number     | Description                                                                                                                                                                                                                         |   |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 02500-7500-0002 | Mounting kit 1 for DN100 PN6 and EN1092-1 flange with ø18 mm holes, containing:<br>4 off M16 x 60 mm screws (A2-grade stainless steel)<br>4 off M16 nuts<br>4 off washers<br>1 off seal (non-food grade) for up to 464 °F (240 °C)  | ★ |
| 02500-7500-0005 | Mounting kit 2 for DN100 PN6 and EN1092-1 flange with M16 threaded holes, containing:<br>4 off M16 x 40 mm screws (A2-grade stainless steel)<br>4 off washers<br>1 off seal (non-food grade) for up to 464 °F (240 °C)              | ★ |
| 02500-7500-0008 | Mounting kit 3 for DN100 PN16 and EN1092-1 flange with ø18 mm holes, containing:<br>8 off M16 x 60 mm screws (A2-grade stainless steel)<br>8 off M16 nuts<br>8 off washers<br>1 off seal (non-food grade) for up to 464 °F (240 °C) | ★ |
| 02500-7500-0011 | Mounting kit 4 for DN100 PN16 and EN1092-1 flange with M16 threaded holes, containing:<br>8 off M16 x 40 mm screws (A2-grade stainless steel)<br>8 off washers<br>1 off seal (non-food grade) for up to 464 °F (240 °C)             | ★ |
| 02500-7502-0001 | Angle bracket, Aluminium for remote housing cable                                                                                                                                                                                   | ★ |

# Specifications

## Electrical data

|                                   |                                                                                                                                                                       |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Connection terminals</b>       | 4 mm <sup>2</sup> (AWG 12), maximum                                                                                                                                   |
| <b>Cable entry options</b>        | M20 × 1.5 or ½-in. NPT threaded cable/conduit entry<br>Clamping range (diameter) of the factory provided cable glands:<br>0.24 to 0.47 in. (6 to 12 mm) for M20 × 1.5 |
| <b>Signal output delay</b>        | 1 second for uncovered-to-covered switchover<br>1 to 2 seconds for covered-to-uncovered switchover                                                                    |
| <b>Safety operation (FSL,FSH)</b> | Configurable switches for each signal output. Select Fail Safe High (FSH) or Fail Safe Low (FSL) depending on application.                                            |
| <b>Sensitivity</b>                | Adjustable, two settings (A or B)                                                                                                                                     |
| <b>Vibration frequency</b>        | Rosemount 2521S: 350 Hz<br>Rosemount 2521H: 125 Hz (standard) or 90 Hz (enhanced sensitive options V2 to V3)                                                          |
| <b>Installation category</b>      | II                                                                                                                                                                    |
| <b>Pollution degree</b>           | 2 (inside housing)                                                                                                                                                    |

## Electronics

**Table 3: Electronics (1/2)**

|                                 | SPDT relay<br>(universal voltage)                                           | Relay DPDT<br>(universal voltage)                                                                  | 3-wire PNP                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Power supply                    | 19 to 230 Vac 50/60 Hz ±10%                                                 | 19 to 230 Vac 50/60 Hz ±10%                                                                        |                                                                                                                                |
|                                 | 19 to 55 Vdc ±10%                                                           | 19 to 55 Vdc (36 Vdc <sup>(1)</sup> ) ±10%                                                         | 18 to 50 Vdc ±10%                                                                                                              |
| Maximum ripple of dc supply     | 7 V <sub>SS</sub>                                                           | 7 V <sub>SS</sub>                                                                                  | 7 V <sub>SS</sub>                                                                                                              |
| Maximum load                    | 8 VA, 1.5 W                                                                 | 18 VA, 2 W                                                                                         | 1.5 W                                                                                                                          |
| Signal output                   | SPDT relay                                                                  | SPDT relay                                                                                         | Open collector:                                                                                                                |
|                                 | Maximum 250 Vac, 8 A (non-inductive)<br>Maximum 30 Vdc, 5 A (non-inductive) | Maximum 250 Vac, 8 A (non-inductive)<br>Maximum 30 Vdc, 5 A (non-inductive)                        | Permanent load maximum is 0.4 A. Short-circuit and overload protected.<br>Maximum power-on voltage is 50 V (reverse protected) |
| Intrinsically Safe (IS) ratings | Not applicable                                                              |                                                                                                    |                                                                                                                                |
| Indicating LED                  | Status of signal output is indicated.                                       |                                                                                                    |                                                                                                                                |
| Isolation                       | Power supply to signal output:<br>2225 Vrms                                 | Power supply to signal output:<br>2225 Vrms<br>Signal output to signal output (DPDT):<br>2225 Vrms | Not applicable                                                                                                                 |
| Protection class                | I                                                                           | I                                                                                                  | III                                                                                                                            |

(1) Versions of the Rosemount 2521 with an Intrinsically Safe approval are restricted to a maximum supply of 36 Vdc.

**Table 4: Electronics (2/2)**

|                                 | 2-wire without contact                                                                                                                                                                                                                                                                                                 | NAMUR (IEC 60947-5-6)                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Power supply                    | 19 to 230 Vac 50/60 Hz $\pm 10\%$                                                                                                                                                                                                                                                                                      | 7 to 9 Vdc                                                                                                                               |
| Maximum ripple of dc supply     | 7 V <sub>SS</sub>                                                                                                                                                                                                                                                                                                      | Not applicable                                                                                                                           |
| Maximum load                    | 1.5 VA, 1 W                                                                                                                                                                                                                                                                                                            | 30 mA (for non intrinsically safe application)                                                                                           |
| Signal output                   | Load current:<br>Minimum 10 mA<br>Maximum 500 mA permanent<br>Maximum 2 A <200 ms<br>Maximum 5 A <50 ms<br>Voltage drop on the electronic module:<br>Maximum 7 V with closed electric circuit.<br>Cut-off current with open electric circuit:<br>Maximum 5 mA <sup>(1)</sup><br>Short-circuit- and overload-protected. | <1 mA or >2.2 mA (spec. IEC 60947-5-6)                                                                                                   |
| Intrinsically Safe (IS) ratings | Not applicable                                                                                                                                                                                                                                                                                                         | U <sub>i</sub> = 20 V<br>I <sub>i</sub> = 67 mA<br>P <sub>i</sub> = 0.17 W<br>C <sub>i</sub> = negligible<br>L <sub>i</sub> = negligible |
| Indicating LED                  | Status of signal output is indicated.                                                                                                                                                                                                                                                                                  | Status of signal output and diagnostics are indicated.                                                                                   |
| Protection class                | I                                                                                                                                                                                                                                                                                                                      | III                                                                                                                                      |

(1) For safety, the cut-off current will be set for some milliseconds to 0 when the electric circuit is open.

## Mechanical data

|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Housing</b>                          | Aluminum housing, powder coated<br>Seal between housing and lid: NBR<br>Seal between housing and process connection: NBR<br>Nameplate: polyester film                                                                                                                                                                                                                                                                |
| <b>Cable of separate housing</b>        | Silicone elastomer, $\varnothing 10$ mm ( $\varnothing 0.39$ in.), surface resistance < 10 <sup>9</sup> Ohm, UV-resistant, minimum bend radius of 1.97 in. (50 mm)                                                                                                                                                                                                                                                   |
| <b>Ingress Protection (IP)</b>          | NEMA® Type 4X, IP66 (IEC/EN 60529)                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Process connection and extension</b> | Materials:<br>1.4301/1.4404 stainless steel (304/316L)<br>Flanges: 1.4541 stainless steel (321). Other higher quality or corrosion-resistant materials may be used as alternatives.<br>Cable-extended fork length: PUR with black carbon (not food grade)<br>Thread: R 1½-in. tapered (EN 10226) or 1½-in. NPT tapered (ANSI B 1.20.1)<br>Tri Clamp: 1.4301/1.4404 stainless steel (304/316L), 2-in. (DN50) ISO 2852 |
| <b>Fork</b>                             | 1.4404 (316L) stainless steel, food grade<br>Surface finish: polished, Ra < 0.75 µm; PTFE (on request)                                                                                                                                                                                                                                                                                                               |
| <b>Maximum noise level</b>              | 50 dBA                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Overall weight (approximated)</b>    | See <a href="#">Table 5</a>                                                                                                                                                                                                                                                                                                                                                                                          |

Table 5: Overall Weights

|                                     | Standard housing | Type DE-housing   | Type D-housing    | Extension                              |
|-------------------------------------|------------------|-------------------|-------------------|----------------------------------------|
| Standard length version:            | 4.6 lbs (2.1 kg) | 7 lbs (3.2 kg)    | 6.2 lbs (2.8 kg)  | -                                      |
| Tube/shaft extended length version: | 4.6 lbs (2.1 kg) | 7 lbs (3.2 kg)    | 6.2 lbs (2.8 kg)  | + 5.5 lbs per 39.3 in. (+2.5 kg per m) |
| Cable extended length version:      | 9.9 lbs (4.5 kg) | 12.3 lbs (5.6 kg) | 11.4 lbs (5.2 kg) | + 1.1 lbs per 39.3 in. (+0.5 kg per m) |

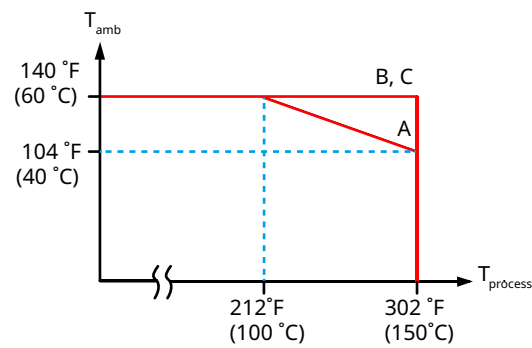
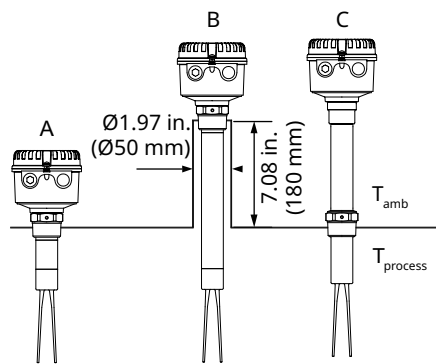
Material selection

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.

Operating conditions

|                               |                                 |                                                                                                                      |
|-------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Ambient temperature (housing) | -40 to +140 °F (-40 to +60 °C)  | All except cable-extended versions                                                                                   |
|                               | -13 to +140 °F (-25 to +60 °C)  | Cable-extended versions                                                                                              |
| Process temperature           | -40 to +302 °F (-40 to +150 °C) | All except cable-extended versions                                                                                   |
|                               |                                 | Mounting for process temperature up to 150 °C (302 °F): see graph                                                    |
|                               | -40 to +230 °F (-40 to +110 °C) | Rosemount 2521 with the standard fork length and the tube-extended fork length with Ex approval and separate housing |
|                               | -13 to +176 °F (-25 to +80 °C)  | Cable-extended versions                                                                                              |



|                                     |                              |                                             |                                              |
|-------------------------------------|------------------------------|---------------------------------------------|----------------------------------------------|
| Ventilation                         | Ventilation is not required. |                                             |                                              |
| Minimum powder density requirements | Rosemount 2521S              | Setting B:<br>3 lb/ft <sup>3</sup> (50 g/l) | Setting A:<br>9 lb/ft <sup>3</sup> (150 g/l) |

|                            |                                                                                                                                                                                                                               |                                                                                                                                 |                                                                                                                                   |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
|                            | Rosemount 2521H                                                                                                                                                                                                               | 1.2 lb/ft <sup>3</sup> (20 g/l)<br>0.3 lb/ft <sup>3</sup> (5 g/l), V1<br>< 0.3 lb/ft <sup>3</sup> (5 g/l), V2/V3 <sup>(1)</sup> | 4.5 lb/ft <sup>3</sup> (75 g/l)<br>1.2 lb/ft <sup>3</sup> (20 g/l), V1<br>< 1.2 lb/ft <sup>3</sup> (20 g/l), V2/V3 <sup>(1)</sup> |
| Bulk material requirements | No strong tendency to cake or deposit.<br>Maximum 0.39 in. (10 mm) grain size.                                                                                                                                                |                                                                                                                                 |                                                                                                                                   |
| Maximum mechanical load    | 600 N laterally (on the forks)<br><br>Fit a protective angled (reverse-V shaped) shield to the vessel, directly above the level switch, when mechanical loads are high.                                                       |                                                                                                                                 |                                                                                                                                   |
| Maximum mechanical torque  | 300 Nm                                                                                                                                                                                                                        | Tube/shaft-extended versions                                                                                                    |                                                                                                                                   |
| Maximum tractive force     | 2 kN                                                                                                                                                                                                                          | Cable-extended versions                                                                                                         |                                                                                                                                   |
| Maximum process pressure   | -14.5 to 232 psi (-1 to +16 bar)<br>-14.5 to 87 psi (-1 to +6 bar)                                                                                                                                                            | Standard length and tube/shaft extended versions<br>Cable-extended versions                                                     |                                                                                                                                   |
|                            | The maximum overall process pressure may be reduced, depending on the selected flange. Refer to the flange standards for pressure ratings and pressure de-ratings at higher temperatures.                                     |                                                                                                                                 |                                                                                                                                   |
| Vibration                  | 1.5 (m/s <sup>2</sup> ) <sup>2</sup> /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:<br>High ambient- and process temperatures, corrosive environments, high plant vibration, and a high flow rate of abrasive bulk material. |                                                                                                                                 |                                                                                                                                   |

(1) The V2 sensitivity option has an increased surface area on the fork and is more sensitive than the V3 option.

## Transport and storage

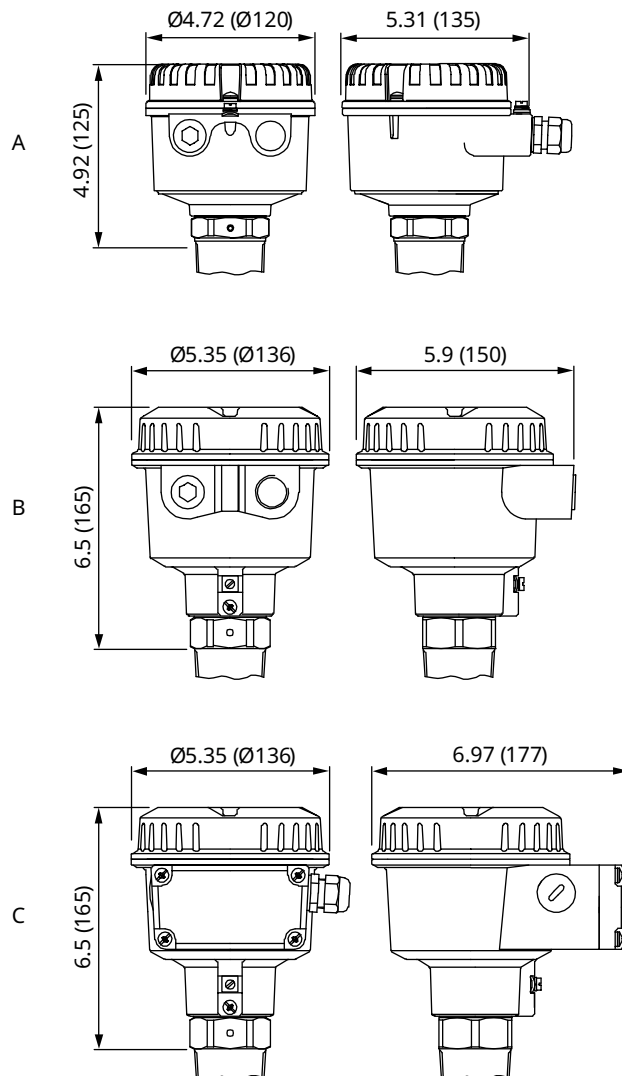
|                  |                                                                                                                                                                                                                                                                                        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

## Product certifications

See the Rosemount 2521 [Product Certifications](#) document for detailed information on the existing approvals and certifications.

## Dimensional drawings

Figure 2: Rosemount 2521 Housing Options



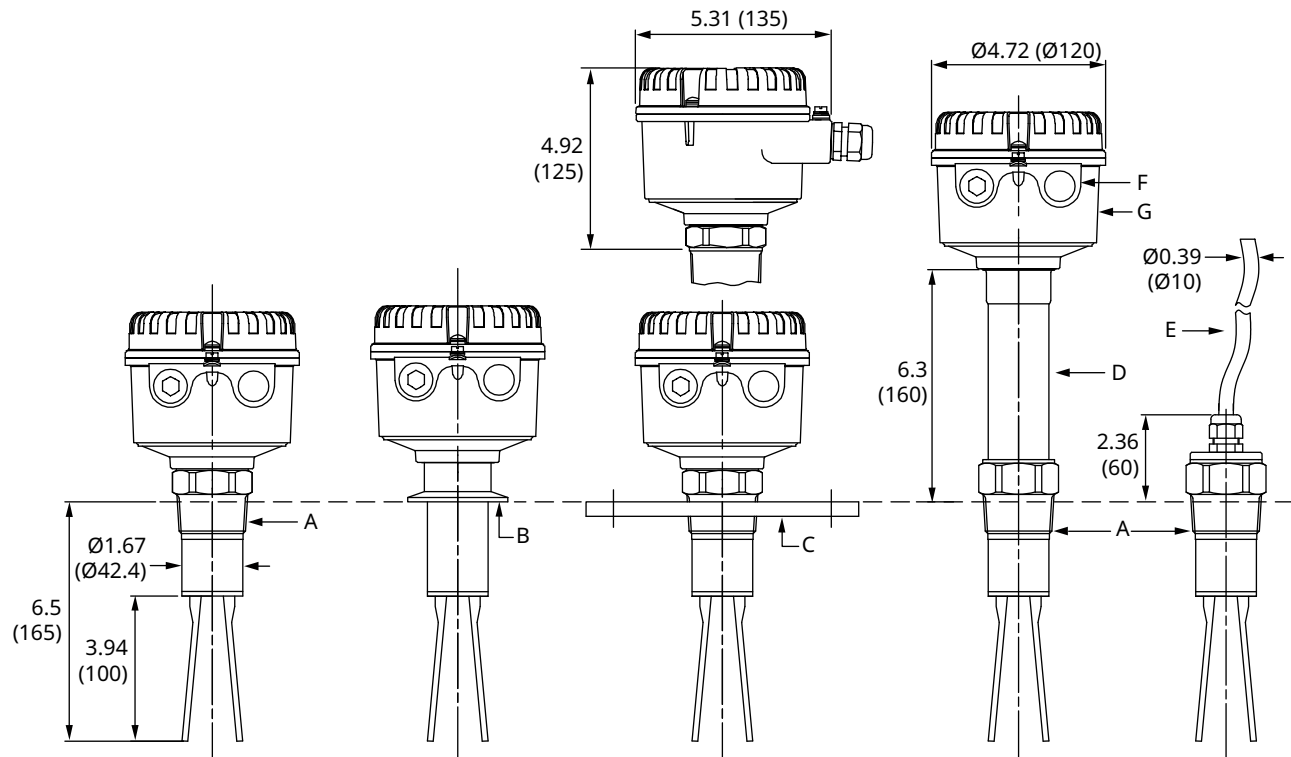
A. Standard housing

B. Type D flameproof/explosion-proof housing

C. Type DE explosion-proof housing with increased safety terminal box

Dimensions are in inches (millimeters).

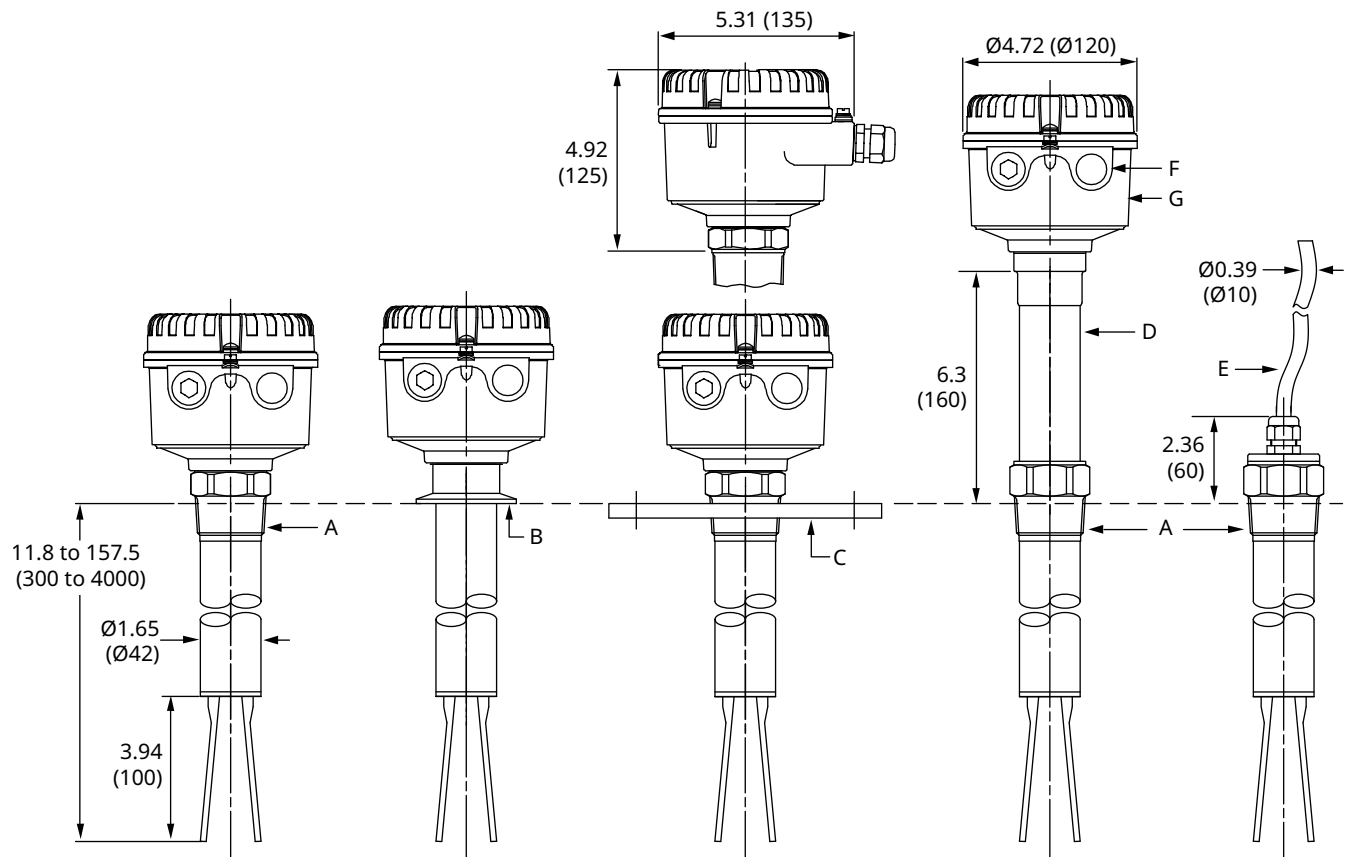


**Figure 3: Rosemount 2521S Vibrating Fork Level Switch (Standard Length, Standard Fork Sensitivity)**

- A. Thread
- B. Tri Clamp
- C. Flange
- D. Thermal extension tube (temperature-extended shaft)
- E. Separate housing option
- F. Conduit/cable entries
- G. Aluminum standard housing. See [Figure 2](#) for dimensions of housing types D and DE.

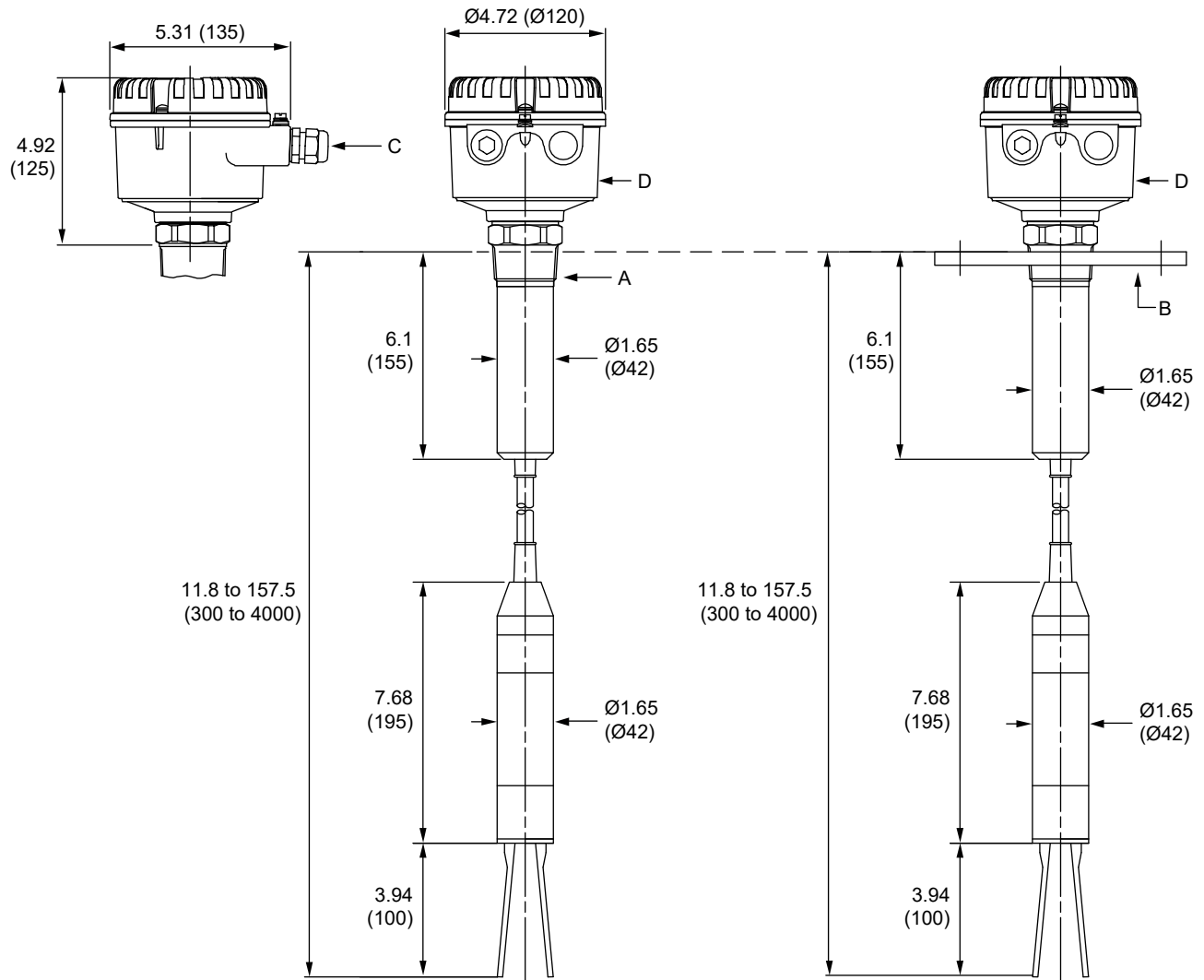
Dimensions are in inches (millimeters).

**Figure 4: Rosemount 2521S Vibrating Fork Level Switch (Tube-extended Length, Standard Fork Sensitivity)**



- A. Thread
- B. Flange
- C. Tri Clamp
- D. Thermal extension tube (temperature-extended shaft)
- E. Separate housing option
- F. Conduit/cable entries
- G. Aluminum standard housing. See [Figure 2](#) for dimensions of housing types D and DE.

Dimensions are in inches (millimeters).

**Figure 5: Rosemount 2521S Vibrating Fork Level Switch (Cable Extension, Standard Fork Sensitivity)**

A. Thread

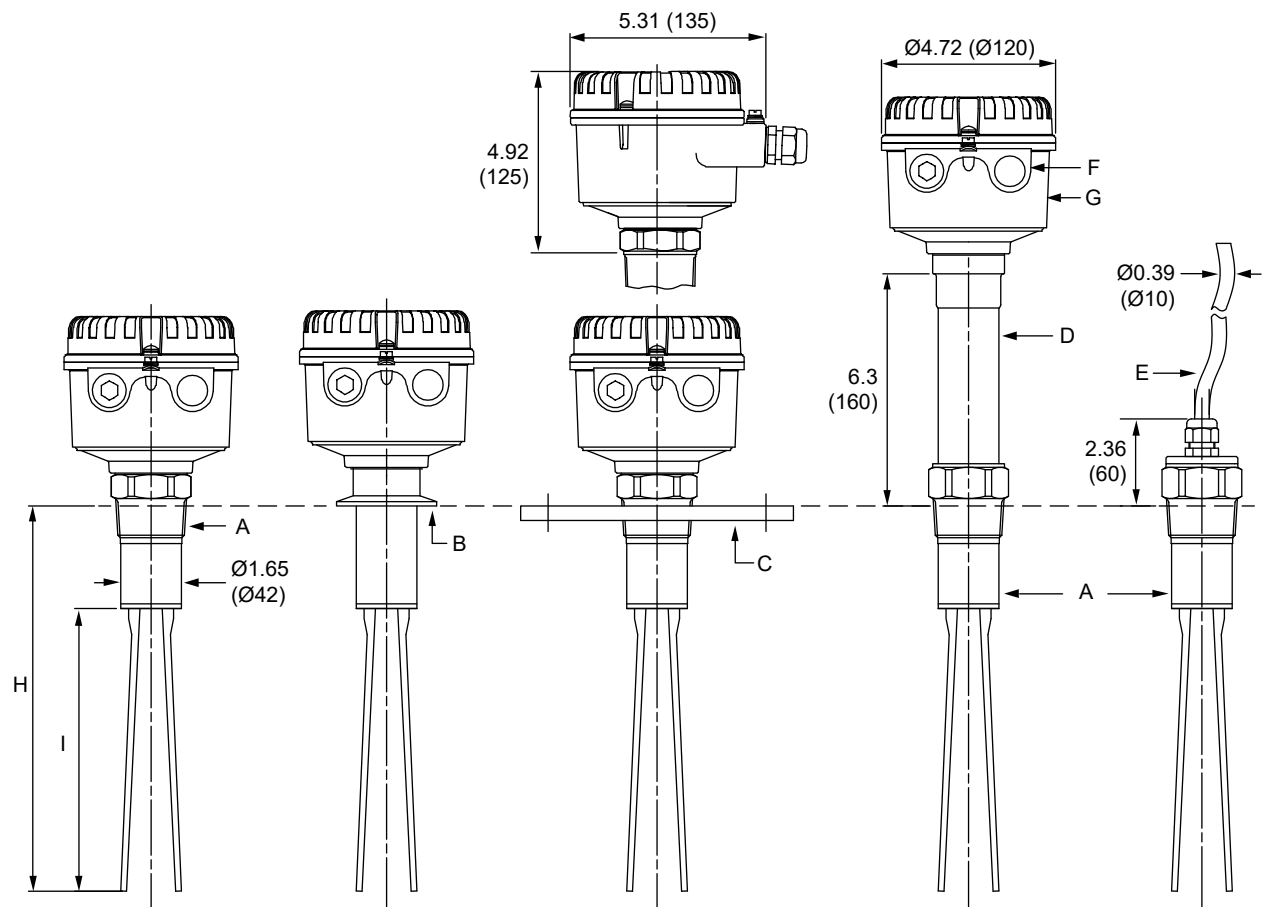
B. Flange

C. Conduit/cable entries

D. Aluminum standard housing. See [Figure 2](#) for dimensions of housing types D and DE.

Dimensions are in inches (millimeters).

Figure 6: Rosemount 2521H Vibrating Fork Level Switch (Standard Length, Enhanced Fork Sensitivity)



- A. Thread
- B. Flange
- C. Tri Clamp
- D. Thermal extension tube (temperature-extended shaft)
- E. Separate housing option
- F. Conduit/cable entries
- G. Aluminum standard housing. See [Figure 2](#) for dimensions of housing types D and DE.
- H. Dimension L (see [Table 6](#))
- I. Dimension X (see [Table 6](#))

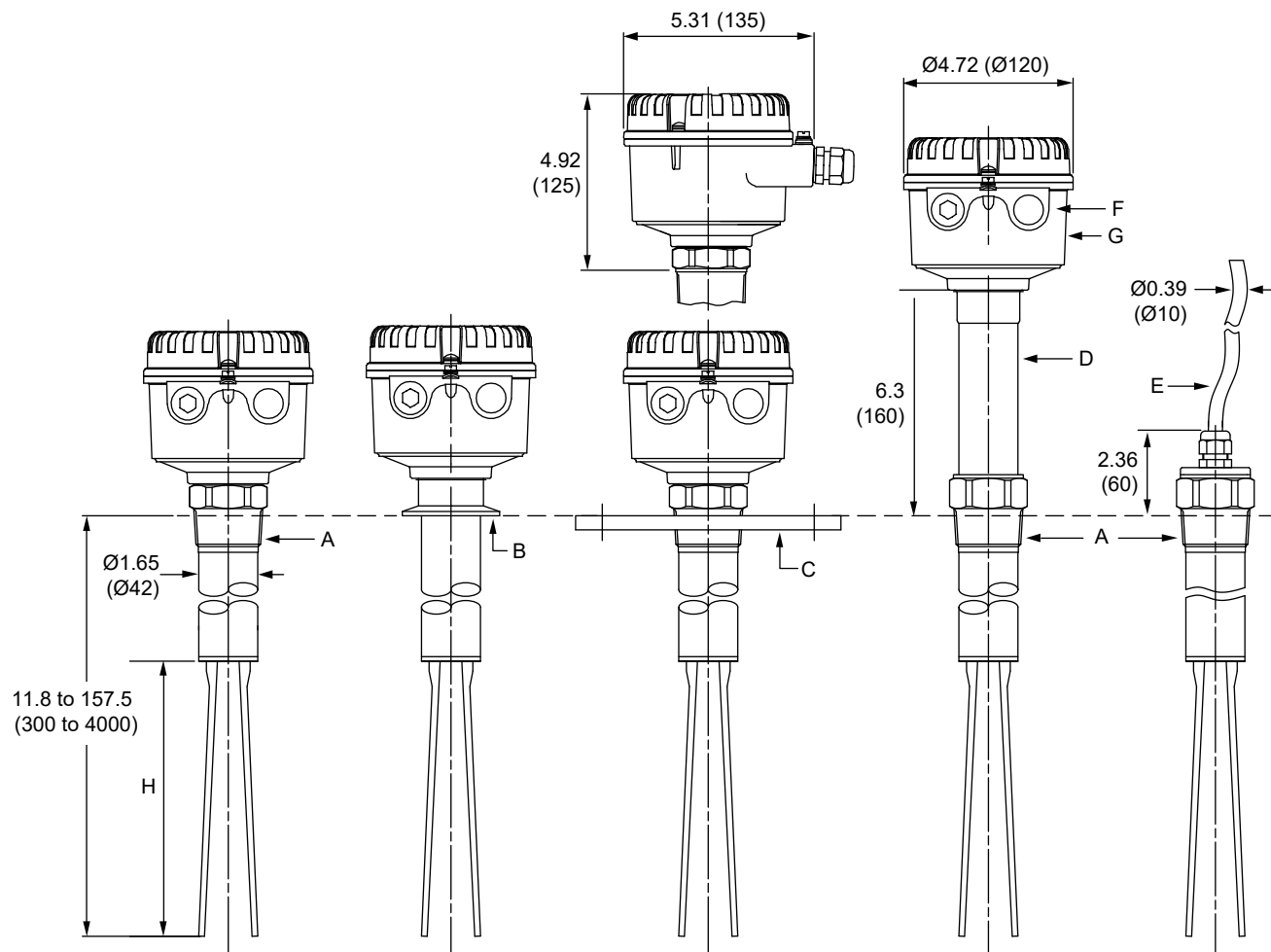
Dimensions are in inches (millimeters).

Table 6: Dimensions L and X

| Dimension | Fork sensitivity options |                                        |
|-----------|--------------------------|----------------------------------------|
|           | Without option           | Options (V1, V2 <sup>(1)</sup> and V3) |
| L         | 9.25 in. (235 mm)        | 10.24 in. (260 mm)                     |
| X         | 6.69 in. (170 mm)        | 7.68 in. (195 mm)                      |

(1) Option V2 is only available on a Rosemount 2521 with a 4-in. DN100 flanged process connection.

Figure 7: Rosemount 2521H Vibrating Fork Level Switch (Tube-extended Length, Enhanced Fork Sensitivity)



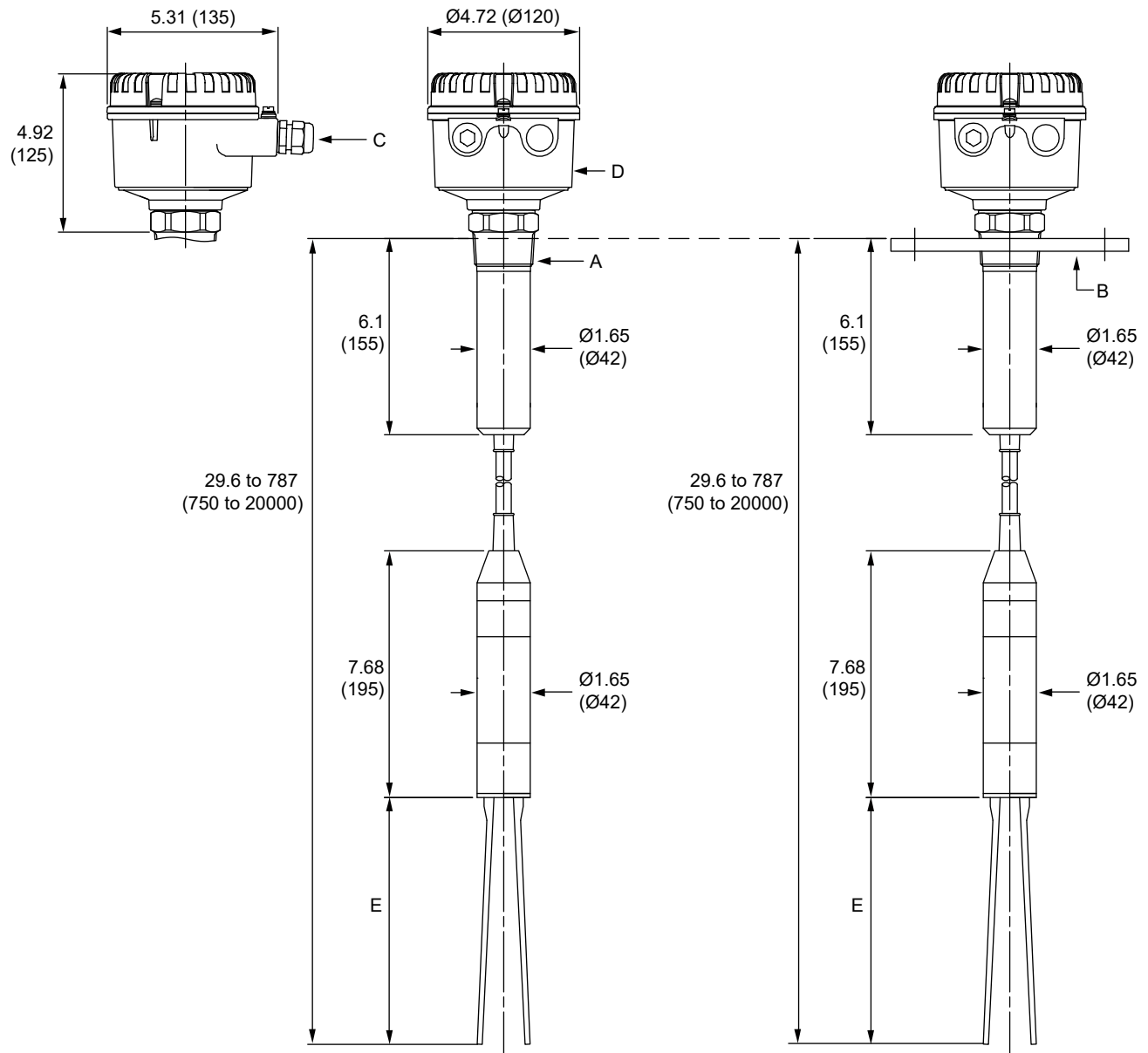
- A. Thread
- B. Flange
- C. Tri Clamp
- D. Thermal extension tube (temperature-extended shaft)
- E. Separate housing option
- F. Conduit/cable entries
- G. Aluminum standard housing. See [Figure 2](#) for dimensions of housing types D and DE.
- H. Dimension X (see [Table 7](#))

Dimensions are in inches (millimeters).

Table 7: Dimension X

| Dimension | Fork sensitivity options |                                      |
|-----------|--------------------------|--------------------------------------|
|           | Without option           | Options V1, V2 <sup>(1)</sup> and V3 |
| X         | 6.69 in. (170 mm)        | 7.68 in. (195 mm)                    |

(1) Option V2 is only available on a Rosemount 2521 with a 4-in. DN100 flanged process connection.

**Figure 8: Rosemount 2521H Vibrating Fork Level Switch (Cable Extension, Enhanced Fork Sensitivity)**

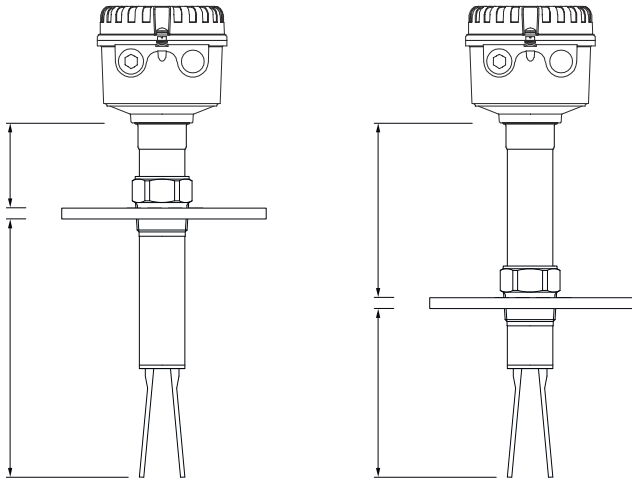
- A. Thread
- B. Flange
- C. Conduit/cable entries
- D. Aluminum standard housing. See [Figure 2](#) for dimensions of housing types D and DE.
- E. Dimension X (see [Table 7](#))

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 9: Sliding Sleeve**



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