

# Small Limit Switch D4V

## Compact Vertical Models Sized for Asian Standards

- Compact new design approximately 1/3 the size of OMRON vertical Limit Switches.
- Structure enables the terminal section to be fully opened for easy wiring.
- RoHS compliant.
- Degree of protection: IP65



## Model Number Structure

### Model Number Legend

D4V-81□□Z  
1

#### 1. Actuator type

- |                             |                         |
|-----------------------------|-------------------------|
| 04: Roller lever            | 12: Roller plunger      |
| 07: Rod lever               | 22: Crossroller plunger |
| 08: Adjustable roller lever | 66: Coil spring         |
| 11: Push plunger            | 69: Wire spring         |

## Ordering Information

### List of Models

| Actuator type                                                                                               | Model     |
|-------------------------------------------------------------------------------------------------------------|-----------|
| Roller lever             | D4V-8104Z |
| Rod lever                | D4V-8107Z |
| Adjustable roller lever  | D4V-8108Z |
| Push plunger             | D4V-8111Z |
| Roller plunger           | D4V-8112Z |
| Crossroller plunger      | D4V-8122Z |
| Coil spring              | D4V-8166Z |
| Wire spring              | D4V-8169Z |

**Note:** Metallic roller levers and metallic variable roller levers can also be manufactured.

# Specifications

## ■ Certified Standards

| Certification body | Standard                | File No.                                       |
|--------------------|-------------------------|------------------------------------------------|
| CCC                | GB14048.5               | Consult your OMRON representative for details. |
| UL (See note.)     | UL508, CSA C22.2 No. 14 |                                                |
| TÜV                | IEC60947-5-1            |                                                |

**Note:** Certification equivalent to CSA C22.2 No. 14 has been obtained from UL.

## ■ Ratings

| Rated voltage (V) | Non-inductive load (A) |     |           |     | Inductive load (A) |     |            |     |
|-------------------|------------------------|-----|-----------|-----|--------------------|-----|------------|-----|
|                   | Resistive load         |     | Lamp load |     | Inductive load     |     | Motor load |     |
|                   | NC                     | NO  | NC        | NO  | NC                 | NO  | NC         | NO  |
| 125 VAC           | 5                      |     | 1.5       | 0.7 | 3                  |     | 2          | 1   |
| 250 VAC           | 5                      |     | 1         | 0.5 | 3                  |     | 1.5        | 0.8 |
| 12 VDC            | 5                      |     | 3         |     | 4                  |     | 3          |     |
| 24 VDC            | 5                      |     | 3         |     | 4                  |     | 3          |     |
| 125 VDC           | 0.4                    | 0.2 | ---       | --- | ---                | --- | ---        | --- |
| 250 VDC           | 0.4                    | 0.2 | ---       | --- | ---                | --- | ---        | --- |

- Note:**
- The above current ratings are for steady-state current.
  - Inductive load has a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).
  - Lamp load has an inrush current of 10 times the steady-state current.
  - Motor load has an inrush current of 6 times the steady-state current.

|                |    |           |
|----------------|----|-----------|
| Inrush current | NC | 24 A max. |
|                | NO | 12 A max. |

## ■ Ratings for Safety Standard Certification

### CCC (GB14048.5), TÜV (EN60947-5-1)

| Category and rating                     |
|-----------------------------------------|
| AC-12: 250 VAC at 5 A, resistive load   |
| DC-12: 125 VDC at 0.4 A, resistive load |

### UL (UL508, CSA C22.2 No. 14)

| Ratings        |
|----------------|
| 5 A, 250 VAC   |
| 0.4 A, 125 VDC |

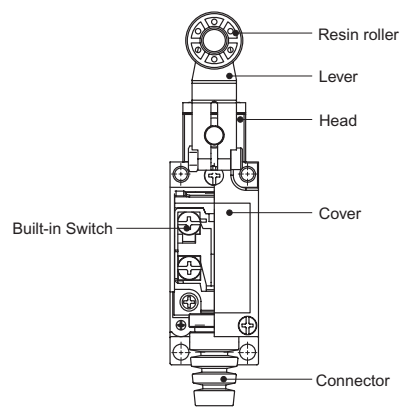
## ■ Characteristics

|                                            |                                                 |                                                                    |
|--------------------------------------------|-------------------------------------------------|--------------------------------------------------------------------|
| Degree of protection                       |                                                 | IP65                                                               |
| Durability (See note 3.)                   | Mechanical                                      | 10,000,000 operations min.                                         |
|                                            | Electrical                                      | 300,000 operations min.<br>(5 A at 250 VAC, resistive load)        |
| Operating speed                            |                                                 | 5 mm to 0.5 m/s                                                    |
| Operating frequency                        | Mechanical                                      | 120 operations/min                                                 |
|                                            | Electrical                                      | 30 operations/min                                                  |
| Insulation resistance                      |                                                 | 100 MΩ min. (at 500 VDC)                                           |
| Contact resistance                         |                                                 | 25 mΩ max. (initial value)                                         |
| Dielectric strength                        | Between terminals of the same polarity          | 1,000 VAC, 50/60 Hz for 1 min                                      |
|                                            | Between current-carrying metal parts and ground | 1,500 VAC, 50/60 Hz for 1 min                                      |
| Rated insulation voltage (Ui)              |                                                 | 250 V                                                              |
| Pollution degree (application environment) |                                                 | 3 (EN 60947-5-1)                                                   |
| Short-circuit protection device            |                                                 | 10-A fuse, gG or gI (IEC 269)                                      |
| Conditional short-circuit current          |                                                 | 100 A (EN 60947-5-1)                                               |
| Rated open thermal current (Ith)           |                                                 | 5 A (EN 60947-5-1)                                                 |
| Electric shock protection class            |                                                 | Class I                                                            |
| Rated frequency                            |                                                 | 50/60 Hz                                                           |
| Vibration resistance                       | Malfunction                                     | 10 to 55 Hz, 1.5-mm double amplitude (See note 4.)                 |
| Shock resistance                           | Destruction                                     | 1,000 m/s <sup>2</sup> (free position) min.                        |
|                                            | Malfunction                                     | 300 m/s <sup>2</sup> (operation limit position) min. (See note 4.) |
| Ambient operating temperature range        |                                                 | -20°C to 60°C (with no icing)                                      |
| Ambient operating humidity range           |                                                 | 90% max.                                                           |
| Weight                                     |                                                 | Approx. 130 to 190 g                                               |

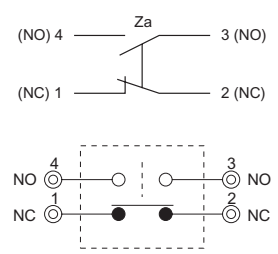
- Note:**
- The above values are initial values.
  - The above characteristics may vary depending on the model. Contact your OMRON representative for further details.
  - Durability values are calculated at an operating temperature of 5°C to 35°C, and an operating humidity of 40% to 70%.
  - Except for the coil spring model and wire spring model

# Nomenclature

## ■ Structure



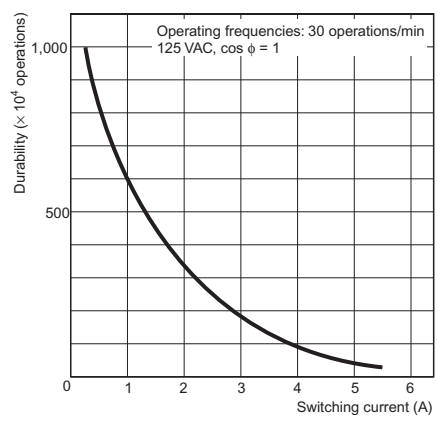
## ■ Contact Form



# Engineering Data

## Electrical Durability: $\cos \phi = 1$

(Ambient temperature: 5°C to 35°C; ambient humidity: 40% to 70%)

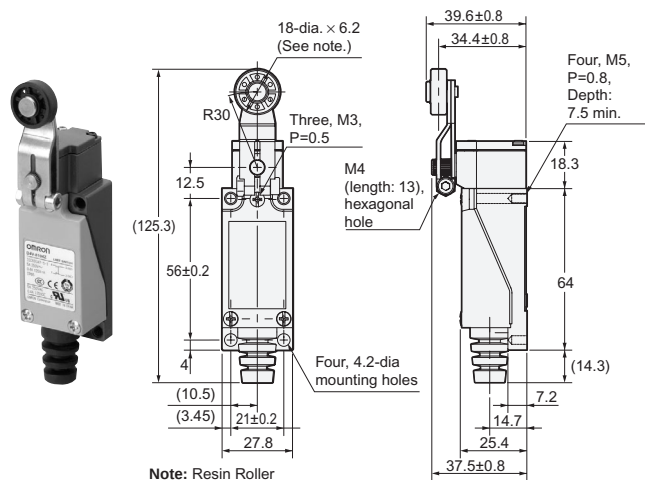


# Dimensions

Note: All units are in millimeters unless otherwise indicated.

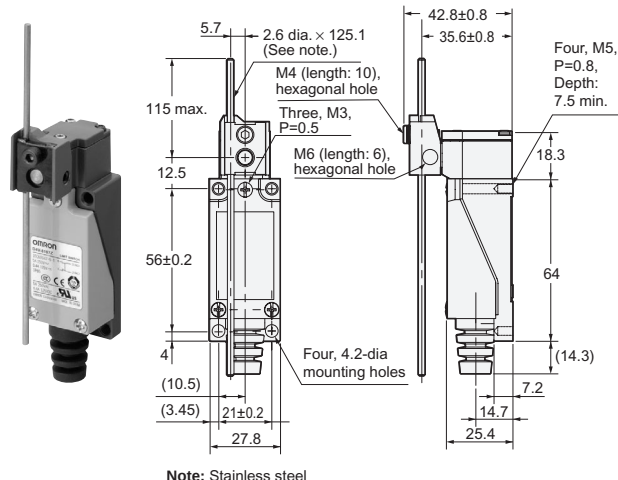
## Roller Lever

D4V-8104Z



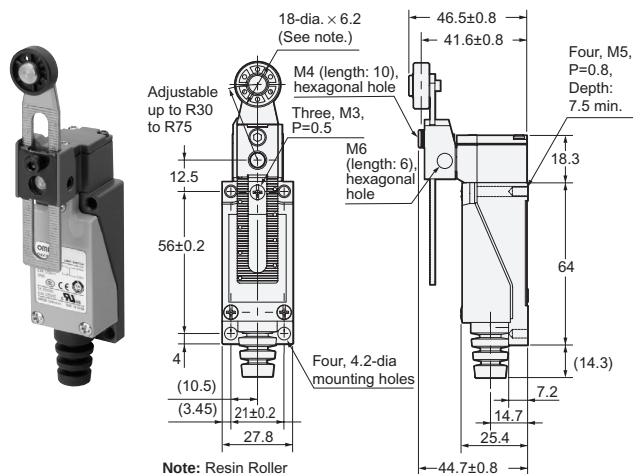
## Rod Lever

D4V-8107Z



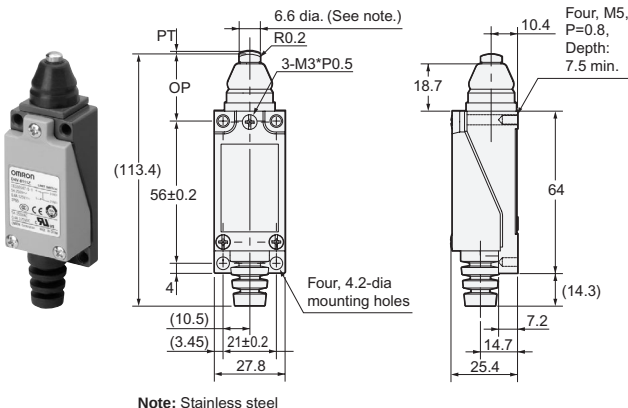
## Adjustable Roller Lever

D4V-8108Z



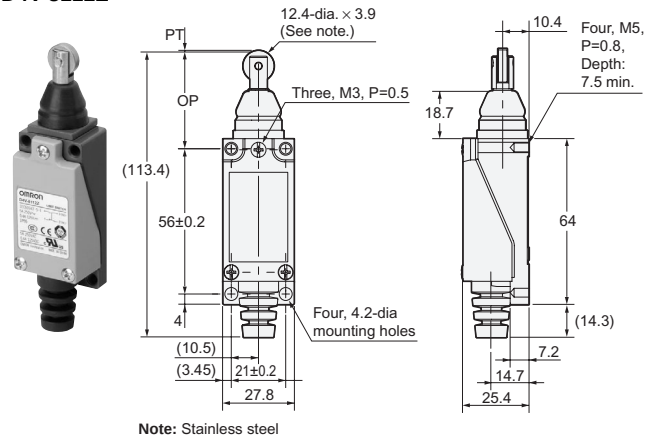
## Push Plunger

D4V-8111Z



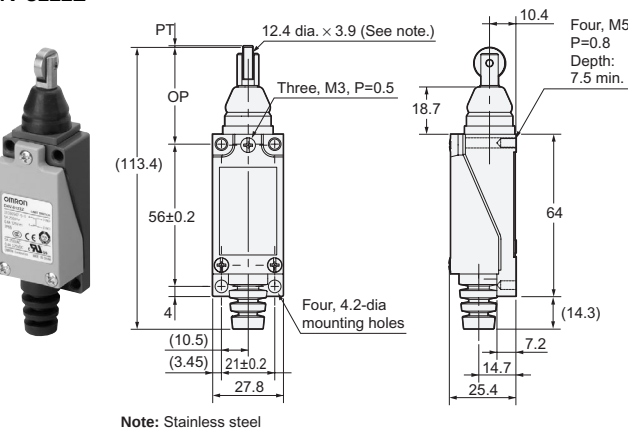
## Roller Plunger

D4V-8112Z



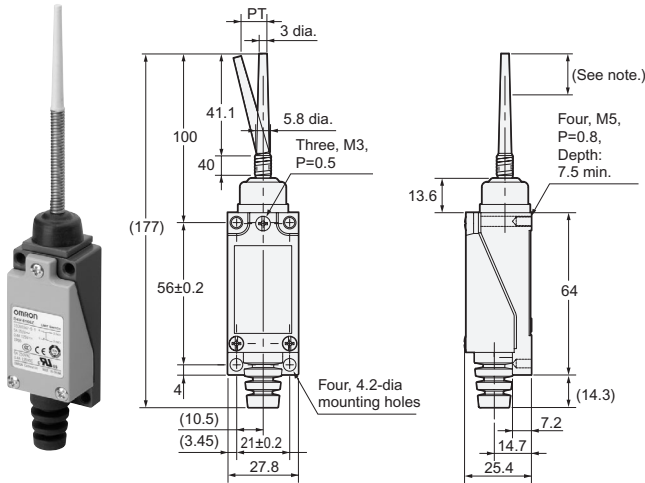
## Crossroller Plunger

D4V-8122Z



# Coil Spring

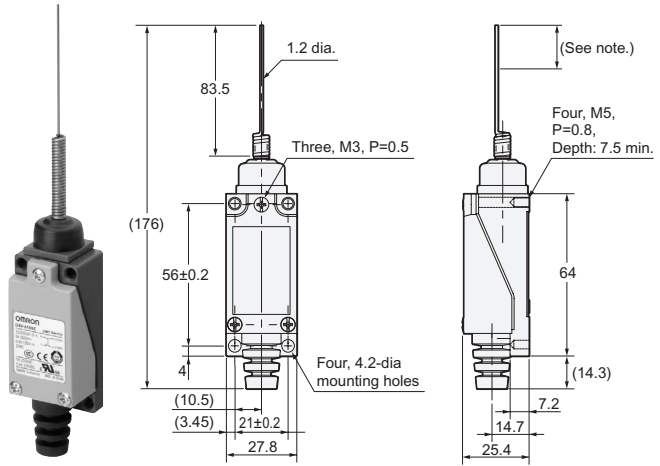
## D4V-8166Z



**Note:** The range for operation is between the tip of the rod and 1/3 of the length of the actuator.

# Wire Spring

## D4V-8169Z



**Note:** The range for operation is between the tip of the rod and 1/3 of the length of the actuator.

**Note:** Unless otherwise specified, the tolerances are  $\pm 0.4$  mm for the above dimensions for each model.

# Operating Characteristics

| Model                     |         | D4V-8104Z | D4V-8107Z | D4V-8108Z | D4V-8111Z | D4V-8112Z | D4V-8122Z | D4V-8166Z | D4V-8169Z |
|---------------------------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Operating characteristics |         |           |           |           |           |           |           |           |           |
| Operating force           | OF max. | 5.88 N    | 5.88 N    | 7.84 N    | 9.8 N     | 9.8 N     | 9.8 N     | 0.88 N    | 0.88 N    |
| Release force             | RF min. | 0.49 N    | 0.69 N    | 0.49 N    | 2.94 N    | 2.94 N    | 2.94 N    | ---       | ---       |
| Pretravel                 | PT max. | 20°       | 20°       | 20°       | 1.5 mm    | 1.5 mm    | 1.5 mm    | 30 mm     | 30 mm     |
| Overtravel                | OT min. | 75°       | 75°       | 75°       | 4 mm      | 4 mm      | 4 mm      | ---       | ---       |
| Movement differential     | MD max. | 10°       | 10°       | 10°       | 1.2 mm    | 1.2 mm    | 1.2 mm    | ---       | ---       |
| Total travel              | TT min. | 95°       | 95°       | 95°       | 5.5 mm    | 5.5 mm    | 5.5 mm    | ---       | ---       |
| Operating position        | OP      | ---       | ---       | ---       | 26±0.8 mm | 37±0.8 mm | 37±0.8 mm | ---       | ---       |

**Note:** The operating characteristics of the D4V-8107 are measured with a lever length of 30 mm. The operating characteristics of the D4V-8108 are measured with a lever length of R30.

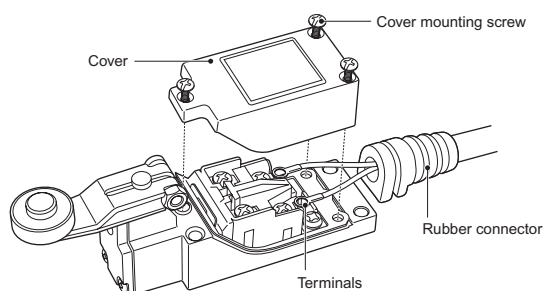
# Precautions

## ■ Precautions for Correct Use

### Wiring

#### Wiring Procedure

1. Loosen the cover mounting screws and remove the cover.
2. Run the wiring through the rubber connector on the cover and then press-fit the solderless terminals. (The following solderless terminals are available.)
3. After inserting the solderless terminal into the Switch, tighten the terminal screws securely.
4. Mount the cover. (Make sure that the rubber connector is securely pressed into the cover slot.)
5. Tighten the three screws evenly. (The optimum tightening torque for each screw is 0.49 to 0.59 N·m.)



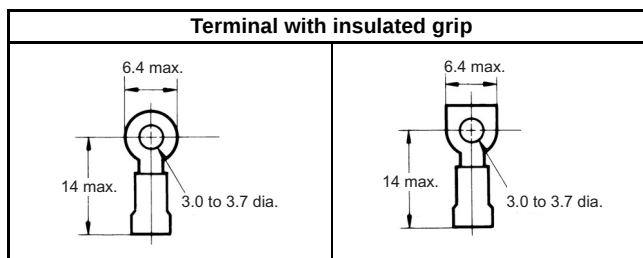
### Applicable Lead Wires

| Wire name                                | Applicable wire                              |                                  |                           |
|------------------------------------------|----------------------------------------------|----------------------------------|---------------------------|
|                                          | Number of conductors                         | Conductor size                   | Finished outside diameter |
| Vinyl cabtire cord (VCTF)                | 2 conductors<br>3 conductors<br>4 conductors | 0.75 mm <sup>2</sup>             | Round,<br>6 to 9 dia.     |
| Vinyl cabtire cable (VCT)                | 2 conductors                                 | 0.75 mm <sup>2</sup>             |                           |
| 600-V vinyl-insulated sheath cable (VVF) | 2 conductors                                 | 1 dia.,<br>1.2 dia.,<br>1.6 dia. |                           |

**Note:** Do not use wires containing silicone, otherwise a contact failure may result.

## Applicable Terminals

The following solderless terminals can be used.  
(Do not use fork or any other type of terminals, otherwise an accidental disconnection resulting in a ground fault may result.)

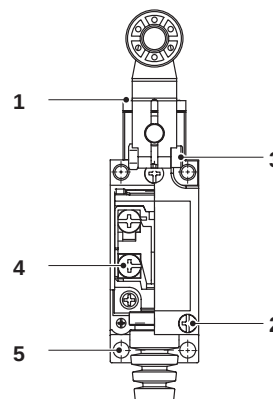


## Appropriate Tightening Torque

If screws are too loose, they can lead to an early malfunction of the Switch, so ensure that all screws are tightened using the correct torque.

| No. | Type                                       | Appropriate tightening torque |
|-----|--------------------------------------------|-------------------------------|
| 1   | Head mounting screw                        | 0.49 to 0.59 N·m              |
| 2   | Cover mounting screw                       | 0.49 to 0.59 N·m              |
| 3   | Lever mounting screw                       | 2.45 to 2.94 N·m              |
| 4   | Terminal screw (M3)                        | 0.49 to 0.59 N·m              |
| 5   | Switch mounting screw (M4 Allen-head bolt) | 2.45 to 2.94 N·m              |

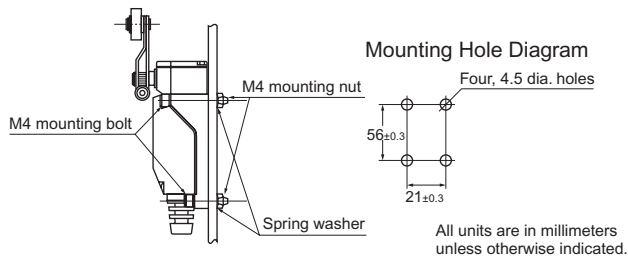
**Note:** In particular, when changing the direction of the Head, make sure that all screws are tightened again to the correct torque. Be careful not to allow any foreign substance to enter the Switch.



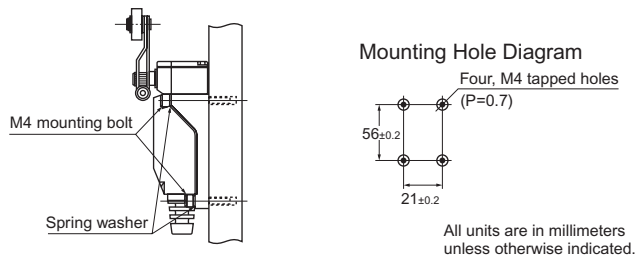
## Mounting

### 1. Front Surface Mounting

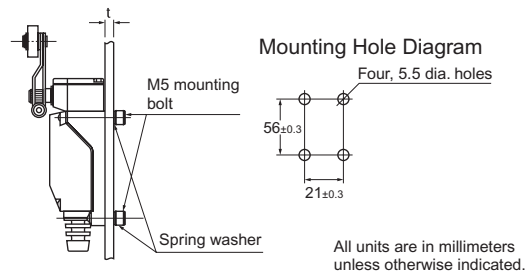
#### 1. Through-hole Panel Mounting



#### 2. Tap Panel Mounting



### 2. Rear Surface Mounting



**Note:** The tap screws for the body are M5, P=0.8, with a minimum depth of 7.5 mm. Use bolts with a length of the panel thickness  $t + 7$  mm or less.

### Others

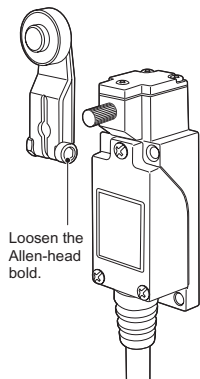
- Do not use the Limit Switch outdoors, otherwise the Limit Switch will be damaged by rust or ozone.
- The Limit Switch is not suitable in places exposed to the spray of rainwater, seawater, or oily water. Contact your OMRON representative if such specifications are required.
- If high-sealing performance is required along with shielded wiring or conduit wiring, use the D4C or WL.

## Using the Switch

### Changing the Actuator Mounting Position

#### (D4V-8104Z, D4V-8108Z, D4V-8107Z)

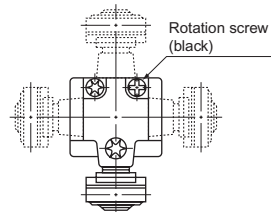
By loosening the Allen-head bolt on the actuator lever, the position of the actuator can be set anywhere within the 360°.



### Changing the Head Direction

#### (D4V-8104Z, D4V-8107Z, D4V-8108Z)

By loosening one screw (black) at a time, the head can be changed at 90° increments in any of the four directions.



### Operation

- Operate the coil spring and wire spring models between the tip of the actuator and 1/3 the length of the actuator and parallel to the direction of operation.
- Handling the bottom of the actuator or excessively pushing in the tip may lead to bending damage, deformation, malfunction, and deterioration of service life.
- Contact bouncing, chattering, or telegraphing may occur. Take steps so that incorrect signals are not detected on the circuit side if doing so will cause problems with the application.

**Note:** Telegraphing refers to the phenomenon of the actuator being used and bouncing back after the operating body has passed, and moving to the operation point on the opposite side, which causes the contact to operate.

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**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.



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