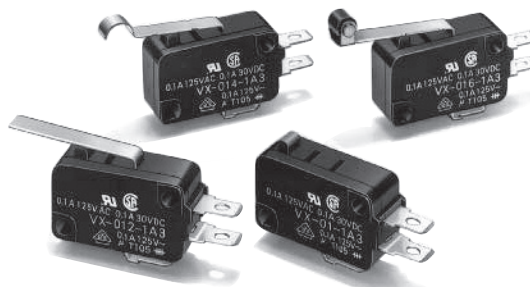


# Snap Action Switch VX

## Miniature Snap Action Switch

- Compact snap action switch with low force operation
- Wide variation extends from microload to 5 A switching current, with shapes identical to those of the V-series Miniature Basic Snap Action Switch.
- Internal hinge lever mechanism assures outstanding contact reliability
- RoHS Compliant



## Ordering Information

| Actuator                                                                                                        | Terminal Style | OF max. | Rated current |             |
|-----------------------------------------------------------------------------------------------------------------|----------------|---------|---------------|-------------|
|                                                                                                                 |                |         | 5 A           | 0.1 A       |
| Pin plunger<br>                | A              | 25 gf   | VX-5-1A2      | VX-01-1A2   |
|                                                                                                                 |                | 50 gf   | VX-5-1A3      | VX-01-1A3   |
|                                                                                                                 | C2             | 25 gf   | VX-5-1C22     | VX-01-1C22  |
|                                                                                                                 |                | 50 gf   | VX-5-1C23     | VX-01-1C23  |
| Short hinge lever<br>        | A              | 50 gf   | VX-51-1A3     | VX-011-1A3  |
|                                                                                                                 | C2             |         | VX-51-1C23    | VX-011-1C23 |
| Hinge lever<br>              | A              | 30 gf   | VX-52-1A3     | VX-012-1A3  |
|                                                                                                                 | C2             |         | VX-52-1C23    | VX-012-1C23 |
| Long hinge lever<br>         | A              | 20 gf   | VX-53-1A3     | VX-013-1A3  |
|                                                                                                                 | C2             |         | VX-53-1C23    | VX-013-1C23 |
| Simulated roller lever<br>   | A              | 30 gf   | VX-54-1A3     | VX-014-1A3  |
|                                                                                                                 | C2             |         | VX-54-1C23    | VX-014-1C23 |
| Short hinge roller lever<br> | A              | 60 gf   | VX-55-1A3     | VX-015-1A3  |
|                                                                                                                 | C2             |         | VX-55-1C23    | VX-015-1C23 |
| Hinge roller lever<br>       | A              | 30 gf   | VX-56-1A3     | VX-016-1A3  |
|                                                                                                                 | C2             |         | VX-56-1C23    | VX-016-1C23 |

## Model Number Legend

VX -     -      

1 2 3 4 5

### 1. Ratings

5: 5 A at 250 VAC  
01: 0.1 A at 30 VDC

### 2. Actuator

None: Pin plunger  
1: Short hinge lever  
2: Hinge lever  
3: Long hinge lever  
4: Simulated roller lever  
5: Short hinge roller lever  
6: Hinge roller lever

### 3. Contact Form

1: SPDT  
2: SPST-NC  
3: SPST-NO

### 4. Terminals

A: Solder terminals  
C2: Quick-connect terminals (#187)

### 5. Maximum Operating Force

2: 25 gf  
3: 50 gf

**Note:** These OF values are for the pin plunger models.

# Specifications

## ■ Characteristics

| Item                                        | VX-5                                                                                                                                                                                                                   | VX-01                                      |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| Operating speed                             | 0.1 mm to 1 m/s (pin plunger models)                                                                                                                                                                                   |                                            |
| Operating frequency                         | Mechanical: 600 operations per minute<br>Electrical: 30 operations per minute                                                                                                                                          |                                            |
| Contact resistance                          | 30 mΩ max.                                                                                                                                                                                                             | 50 mΩ max.                                 |
| Insulation resistance                       | 100 MΩ min. at 500 VDC                                                                                                                                                                                                 |                                            |
| Dielectric strength (see note 2)            | 1,000 VAC, 50/60 Hz for 1 minute between terminals of same polarity<br>1,500 VAC, 50/60 Hz for 1 minute between current-carrying metal parts and ground and between each terminal and non-current-carrying metal parts |                                            |
| Vibration resistance (see note 3)           | Malfunction: 10 to 55 Hz, 1.5 mm double amplitude                                                                                                                                                                      |                                            |
| Shock resistance (see note 3)               | Destruction: 400 m/s <sup>2</sup> (approx. 40G) max.<br>Malfunction: 100 m/s <sup>2</sup> (approx. 10G) max                                                                                                            |                                            |
| Degree of protection                        | IEC IP40                                                                                                                                                                                                               |                                            |
| Degree of protection against electric shock | Class I                                                                                                                                                                                                                |                                            |
| Proof tracking index                        | 175                                                                                                                                                                                                                    |                                            |
| Ambient operating temperature               | -25°C to 80°C (at 60% RH max.) with no icing                                                                                                                                                                           |                                            |
| Ambient operating humidity                  | 85% max (for 5°C to 35°C)                                                                                                                                                                                              |                                            |
| Service life                                | Mechanical                                                                                                                                                                                                             | 50,000,000 operations min. (60 ops/minute) |
|                                             | Electrical                                                                                                                                                                                                             | 10,000,000 operations min. (60 ops/minute) |
| Weight                                      | Mechanical                                                                                                                                                                                                             | 500,000 operations min. (30 ops/minute)    |
|                                             | Electrical                                                                                                                                                                                                             | 1,000,000 operations min. (30 ops/minute)  |
| Weight                                      | Approx. 6.2 g (pin plunger models)                                                                                                                                                                                     |                                            |

**Note:** 1. Data shown are of initial value.

2. The dielectric strength shown is measured using a separator between the switch and metal mounting plate.

3. For the pin plunger models, the above values apply for use at the free position and total travel position. For lever models, they apply at the total travel position. Contact separation time is within 1 ms.

## ■ Ratings (reference values)

| Type  | Rated voltage | Resistive load |    | Lamp load |    | Inductive load |    |
|-------|---------------|----------------|----|-----------|----|----------------|----|
|       |               | NC             | NO | NC        | NO | NC             | NO |
| 5 A   | 250 VAC       | 5              |    | ---       |    | ---            |    |
|       | 125 VAC       | 5              |    | 0.5       |    | 4              |    |
|       | 8 VDC         | 5              |    | 3         |    | 4              |    |
|       | 30 VDC        | 5              |    | 3         |    | 4              |    |
|       | 125 VDC       | 0.4            |    | 0.1       |    | 0.4            |    |
|       | 250 VDC       | 0.3            |    | 0.05      |    | 0.2            |    |
| 0.1 A | 125 VAC       | 0.1            |    | ---       |    | ---            |    |
|       | 8 VDC         | 0.1            |    | ---       |    | ---            |    |
|       | 30 VDC        | 0.1            |    | ---       |    | ---            |    |

**Note:** 1. Inductive load has a power factor of 0.4 min. (AC) and a time constant of 7 milliseconds max. (DC).

2. Lamp load has an inrush current of 10 times the steady-state current

3. The electrical rating applies under the following test conditions:

Ambient Temperature = 20±2°C, Ambient Humidity = 65±5%, Operating frequency = 30 operations/minute

## ■ Approved Standards

UL Recognized (File No. E41515)

CSA Certified (File No. LR21642)

| Rated Voltage | VX-5 | VX-01 |
|---------------|------|-------|
| 125 VAC       | 5 A  | 0.1 A |
| 250 VAC       | 5 A  | ---   |
| 30 VDC        | ---  | 0.1 A |

EN61058-1 - - VDE approval (File No. 124761)

| Rated Voltage | VX-5 | VX-01 |
|---------------|------|-------|
| 125 VAC       | 5 A  | 0.1 A |
| 250 VAC       | 5 A  | ---   |

Testing conditions: 5E4 (50,000 operations), T105 (0°C to 105°C)

## ■ Contact Specifications

| Item                               | VX-5                    | VX-01         |
|------------------------------------|-------------------------|---------------|
| Specification                      | Rivet                   | Crossbar      |
| Material                           | Silver alloy            | Gold alloy    |
| Gap (standard value)               | 0.5 mm                  |               |
| Inrush current                     | NC: 15A max.<br>NO: --- | ---           |
| Minimum applicable load (see note) | 160 mA at 5 VDC         | 1 mA at 5 VDC |

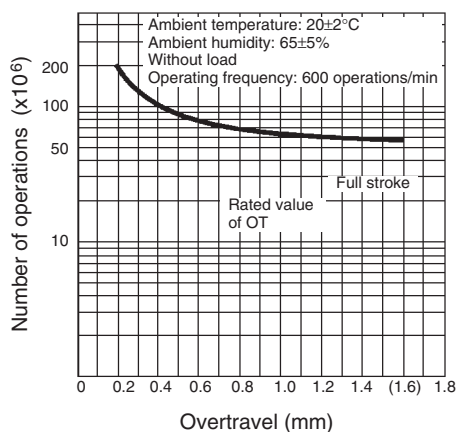
**Note:** Minimum applicable loads are indicated by N standard reference values. This value represents the failure rate at a 60% ( $\lambda_{60}$ ) reliability level (JIS C5003).

The equation  $\lambda_{60}=0.5 \times 10^{-6} / \text{operations}$  indicates that a failure rate of 1/2,000,000 operations can be expected at a reliability level of 60%

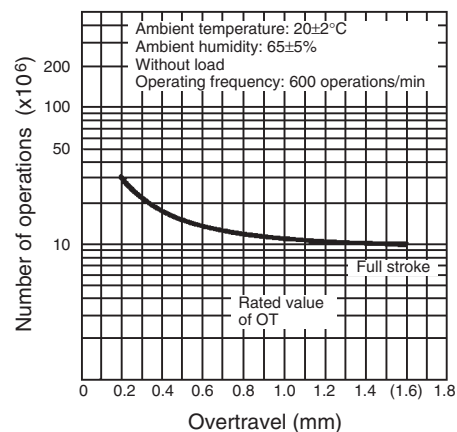
# Engineering Data

## Mechanical service life

VX-5

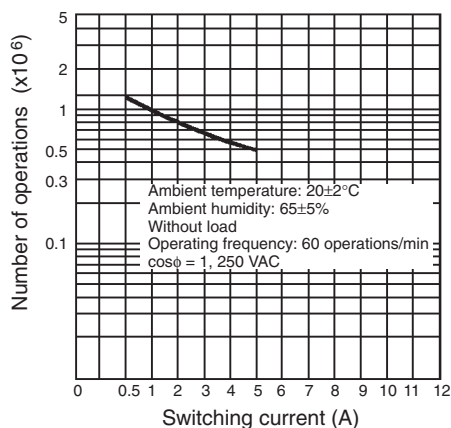


VX-01

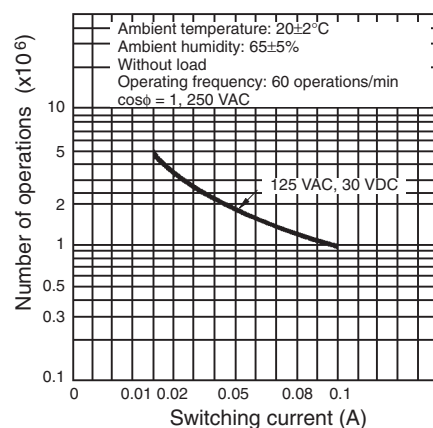


## Electrical service life

VX-5



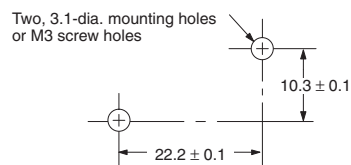
VX-01



## Mounting

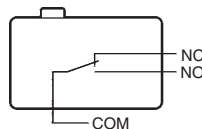
### Panel Mounting

All switches may be panel mounted using M3 mounting screws with plane washers or spring washers to securely mount the switch. Tighten the screws to a torque of 0.39 to 0.59 N·m.

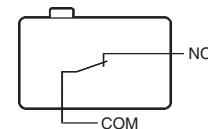


## Contact Form

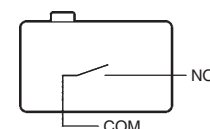
SPDT



SPST-NC



SPST-NO



# Dimensions

## Terminals

- Note:** 1. Unless otherwise specified, all units are in millimeters and a tolerance of  $\pm 0.4$  mm applies to all dimensions  
2. The following illustrates the SPDT contact form

| Solder terminals (A)           | #187 Quick-connect terminals (C2)            |
|--------------------------------|----------------------------------------------|
| <p>Three, solder terminals</p> | <p>Three, quick-connect terminals (#187)</p> |
| <p>2.4 dia. 1.6 dia.</p>       | <p>1.6-dia. terminal hole</p>                |

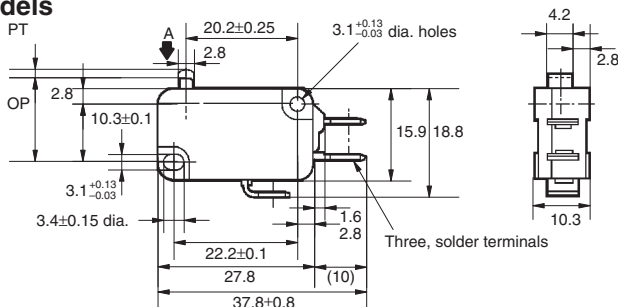
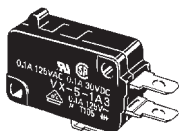
**Note:** The length to the center of the 1.6-dia. holes.

## Dimensions and Operating Characteristics

- Note:** 1. Unless otherwise specified, all units are in millimeters and a tolerance of  $\pm 0.4$  mm applies to all dimensions  
2. The following illustrations and dimensions are for solder terminal models. Refer to "Terminals" for models with quick-connect terminals (#187).  
3. The □ in the model number is for the terminal code. (A = Solder Terminal, C2 = #187 quick-connect terminal)  
4. The operating characteristics are for operation in the A direction(▼)

### Pin Plunger Models

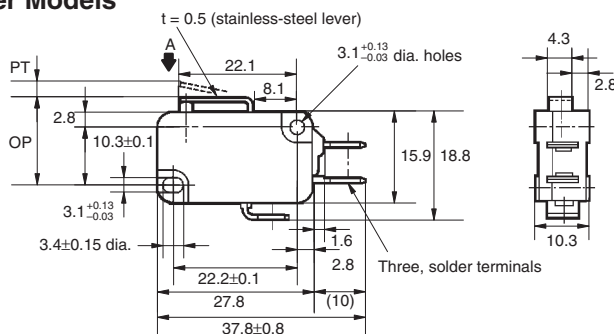
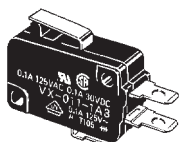
VX-5-1□2  
VX-5-1□3  
VX-01-1□2  
VX-01-1□3



| Characteristics | VX-5-1□2<br>VX-01-1□2 | VX-5-1□3<br>VX-01-1□3 |
|-----------------|-----------------------|-----------------------|
| OF max.         | 25 gf                 | 50 gf                 |
| RF min.         | 3 gf                  | 5 gf                  |
| PT max.         | 1.2 mm                |                       |
| OT min.         | 1.0 mm                |                       |
| MD max.         | 0.3 mm                |                       |
| OP              | 14.7 ± 0.4 mm         |                       |

### Short Hinge Lever Models

VX-51-1□3  
VX-011-1□3

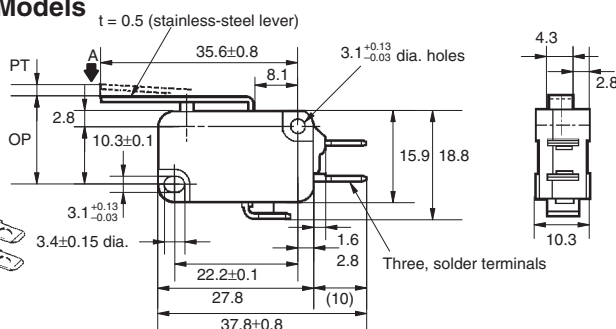
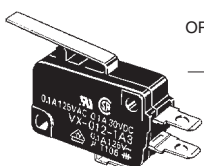


| Characteristics | VX-51-1□3               | VX-011-1□3 |
|-----------------|-------------------------|------------|
| OF max.         | 50 gf (reference value) |            |
| RF min.         | 4 gf (reference value)  |            |
| PT max.         | 1.6 mm                  |            |
| OT min.         | 0.8 mm                  |            |
| MD max.         | 0.5 mm                  |            |
| OP              | 15.2 ± 0.5 mm           |            |

**Note:** The reference value applies for cases when the installation direction is such that the lever weight is not applied to the plunger

### Hinge Lever Models

VX-52-1□3  
VX-012-1□3

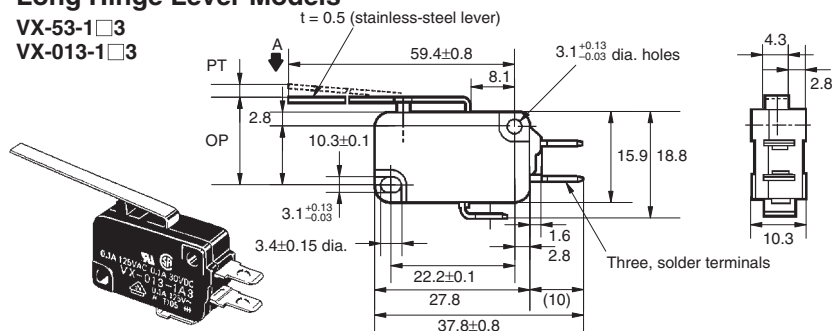


| Characteristics | VX-52-1□3     | VX-012-1□3 |
|-----------------|---------------|------------|
| OF max.         | 30 gf         |            |
| RF min.         | ---           |            |
| PT max.         | 4.0 mm        |            |
| OT min.         | 1.6 mm        |            |
| MD max.         | 0.8 mm        |            |
| OP              | 15.2 ± 1.2 mm |            |

- Note:** 1. Unless otherwise specified, all units are in millimeters and a tolerance of  $\pm 0.4$  mm applies to all dimensions  
 2. The following illustrations and dimensions are for solder terminal models. Refer to "Terminals" for models with quick-connect terminals (#187).  
 3. The  $\square$  in the model number is for the terminal code. (A = Solder Terminal, C2 = #187 quick-connect terminal)  
 4. The operating characteristics are for operation in the A direction(↕)

### Long Hinge Lever Models

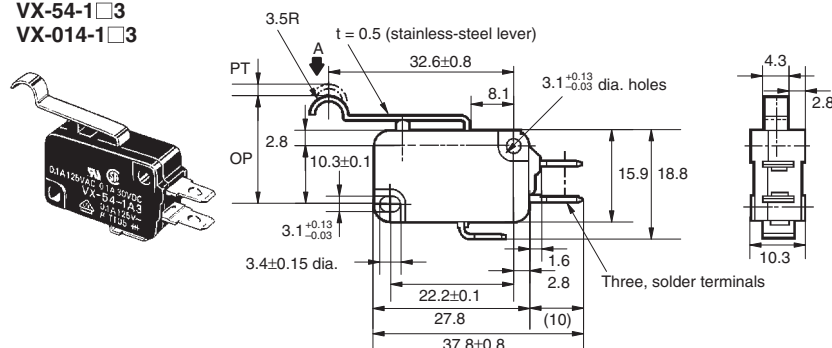
VX-53-1 $\square$ 3  
 VX-013-1 $\square$ 3



| Characteristics | VX-53-1 $\square$ 3 | VX-013-1 $\square$ 3 |
|-----------------|---------------------|----------------------|
| OF max.         | 20 gf               |                      |
| RF min.         | - - -               |                      |
| PT max.         | 9.0 mm              |                      |
| OT min.         | 3.2 mm              |                      |
| MD max.         | 2.0 mm              |                      |
| OP              | 15.2 ± 2.6 mm       |                      |

### Simulated Roller Lever Models

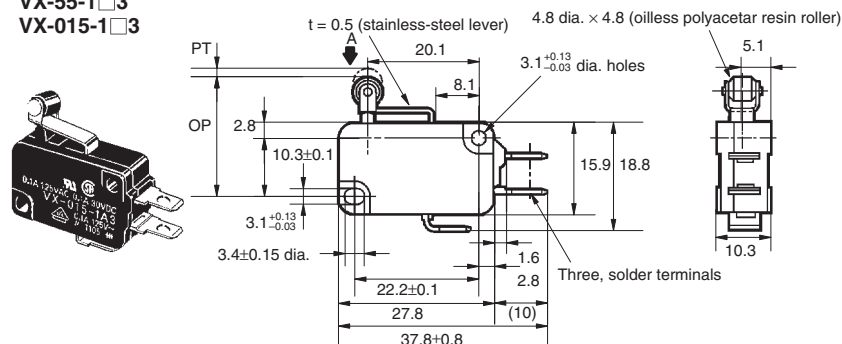
VX-54-1 $\square$ 3  
 VX-014-1 $\square$ 3



| Characteristics | VX-54-1 $\square$ 3 | VX-014-1 $\square$ 3 |
|-----------------|---------------------|----------------------|
| OF max.         | 30 gf               |                      |
| RF min.         | 2 gf                |                      |
| PT max.         | 4.0 mm              |                      |
| OT min.         | 1.6 mm              |                      |
| MD max.         | 0.8 mm              |                      |
| OP              | 18.7 ± 1.2 mm       |                      |

### Short Hinge Roller Lever Models

VX-55-1 $\square$ 3  
 VX-015-1 $\square$ 3

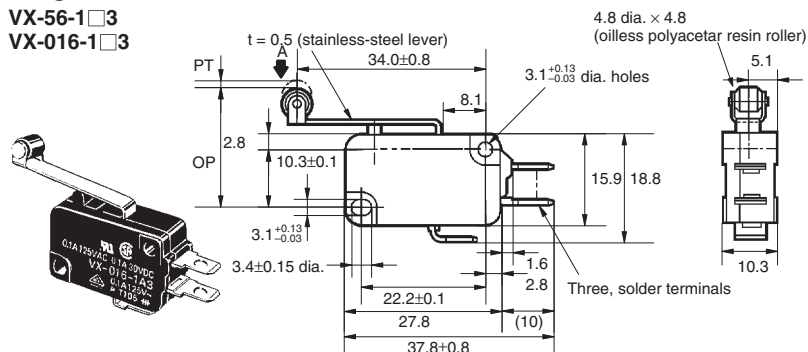


| Characteristics | VX-55-1 $\square$ 3     | VX-015-1 $\square$ 3 |
|-----------------|-------------------------|----------------------|
| OF max.         | 60 gf (reference value) |                      |
| RF min.         | 4 gf (reference value)  |                      |
| PT max.         | 1.6 mm                  |                      |
| OT min.         | 0.8 mm                  |                      |
| MD max.         | 0.5 mm                  |                      |
| OP              | 20.7 ± 0.6 mm           |                      |

**Note:** The reference value applies for cases when the installation direction is such that the lever weight is not applied to the plunger

### Hinge Roller Lever Models

VX-56-1 $\square$ 3  
 VX-016-1 $\square$ 3



| Characteristics | VX-56-1 $\square$ 3 | VX-016-1 $\square$ 3 |
|-----------------|---------------------|----------------------|
| OF max.         | 30 gf               |                      |
| RF min.         | - - -               |                      |
| PT max.         | 4.0 mm              |                      |
| OT min.         | 1.6 mm              |                      |
| MD max.         | 0.8 mm              |                      |
| OP              | 20.7 ± 1.2 mm       |                      |

# Precautions

## ■ Correct Use

### Mounting Direction

For a switch with an actuator, mount the switch in a direction where the actuator weight will not be applied to the switch.

Since the switch is designed for a small load, its resetting force is small. Therefore, resetting failure may occur if unnecessary load is applied to the switch.

### Operation

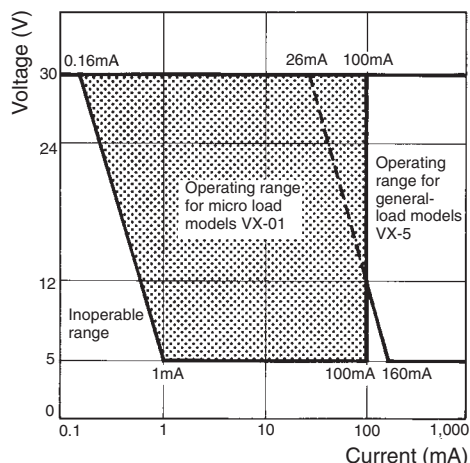
Keep the operation control completely separate from the actuator of the switch, and push it down fully when starting operation. Do not displace the operating position of the actuator when machining.

Consult OMRON in advance if the operating speed is to be extremely slow, or if the pushbutton is to be set somewhere between the free position and operating position.

Mount pin pushbutton switches so that stroke of the pushbutton and the stroke of the operating control overlap on a vertical line. The stroke of the switch, after operation, should be set to 60- 90% that of standard OT (MIN operation).

### Using Microloads

Using a model for ordinary loads to switch microloads may result in faulty operation. Instead, use the models that are designed for microloads and that operate in the following range;



However, even when using microload models within the operating range shown above, if inrush current or inductive voltage spikes occur when the contact is opened or closed, it may increase contact wear and so decrease the service life. Therefore, insert a contact protection circuit where necessary.

## ■ Cautions

### Handling

Be careful not to drop the switch. Doing so may cause damage to the switch's internal components because it is designed for a small load.

### Solder Terminal Connection

Quickly finish the soldering of the lead wire to its terminal. Use a soldering iron rated at 60W and preferably complete the soldering within 5 seconds.

Excess wattage or prolonged heating can deteriorate the characteristics of the switch.

### Insulation Distance

When mounting, make sure there is sufficient insulation distance between the switch and its mounting panel. If it is insufficient, install an insulation guard or separator. Always install an insulation guard or separator when mounting the microswitch on a metallic body. Contact your OMRON representative for information about insulation guards and separators.

### Application Environment

Do not use the Switch in locations that are subject to toxic gas, silicon, excessive dust, excessive dirt, high temperatures, high humidity, sudden temperature changes, water splashes, or oil splashes. Otherwise, damage resulting by faulty contact of the Switch contacts, corrosion, or other causes, or other functional faults may occur.

Depending on environmental conditions, the switch should be rechecked about 3 to 6 months after it has been assembled.



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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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