

# Subminiature Basic Switch

## SS-P

### SS Series Compatible Mounting with a Simple Construction and Easy-to-Use Design Concept

- Insert molded base and improved case-to-base seal provides enhanced resistance to flux.
- Switch rating of 3 A at 125 VAC possible with a single-leaf movable spring. Models for micro loads with gold crossbar contact are also available.
- Solder, quick-connect terminals (#110), and PCB terminals are available, including even-pitched PCB terminals.
- RoHS Compliant.



## Ordering Information

| Rating | Actuator               | Terminals | Solder terminals | Quick-connect terminals (#110) | PCB terminals |             |
|--------|------------------------|-----------|------------------|--------------------------------|---------------|-------------|
|        |                        |           |                  |                                | Uneven pitch  | Even pitch  |
| 3 A    | Pin plunger            |           | SS-3GP           | SS-3GPT                        | SS-3GPD       | SS-3GPB     |
|        | Hinge lever            |           | SS-3GLP          | SS-3GLPT                       | SS-3GLPD      | SS-3GLPB    |
|        | Simulated roller lever |           | SS-3GL13P        | SS-3GL13PT                     | SS-3GL13PD    | SS-3GL13PB  |
| 0.1 A  | Pin plunger            |           | SS-01GP          | SS-01GPT                       | SS-01GPD      | SS-01GPB    |
|        | Hinge lever            |           | SS-01GLP         | SS-01GLPT                      | SS-01GLPD     | SS-01GLPB   |
|        | Simulated roller lever |           | SS-01GL13P       | SS-01GL13PT                    | SS-01GL13PD   | SS-01GL13PB |

### Model Number Legend

SS-□ □ □ P □  
1 2 3 4

#### 1. Ratings

3: 3 A at 125 VAC  
01: 0.1 A at 30 VDC

#### 2. Contact Gap

G: 0.5 mm

#### 3. Actuator

None: Pin plunger  
L: Hinge lever  
L13: Simulated roller lever

#### 4. Terminals

None: Solder terminals  
T: Quick-connect terminals (#110)  
D: PCB terminals (Uneven pitch)  
B: PCB terminals (Even pitch)

# Specifications

## ■ Characteristics

|                                               |                                                                                                                                                                                                                                                   |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating speed                               | 0.1 mm to 1 m/s (for pin plunger models)                                                                                                                                                                                                          |
| Operating frequency                           | Mechanical: 300 operations/min<br>Electrical: 30 operations/min                                                                                                                                                                                   |
| Insulation resistance                         | 100 MΩ min. (at 500 VDC)                                                                                                                                                                                                                          |
| Contact resistance                            | SS-3P: 50 mΩ max.<br>SS-01P: 100 mΩ max.                                                                                                                                                                                                          |
| Dielectric strength (See note 2)              | 1,000 VAC, 50/60 Hz for 1 min between terminals of the same polarities<br>1,500 VAC, 50/60 Hz for 1 min 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: 1,000 m/s <sup>2</sup> (approx. 100 G) max.<br>Malfunction: 300 m/s <sup>2</sup> (approx. 30 G) max.                                                                                                                                 |
| Degree of protection                          | IEC IP40                                                                                                                                                                                                                                          |
| Degree of protection against electrical shock | Class I                                                                                                                                                                                                                                           |
| Proof tracking index (PTI)                    | 175                                                                                                                                                                                                                                               |
| Ambient operating temperature                 | -25°C to 85°C (at 60% RH max.) with no icing                                                                                                                                                                                                      |
| Ambient operating humidity                    | 85% max. (for 5°C to 35°C)                                                                                                                                                                                                                        |
| Life expectancy                               | Mechanical: 1,000,000 operations min. (60 operations/min)<br>Electrical: SS-3P: 70,000 operations min. (20 operations/min, 125 VAC)<br>100,000 operations min. (20 operations/min, 30 VDC)<br>SS-01P: 200,000 operations min. (20 operations/min) |
| Weight                                        | Approx. 1.6 g (for pin plunger models)                                                                                                                                                                                                            |

**Note:** 1. The data given above are initial values.

2. The dielectric strength shown in the table indicates a value for models with a Separator.

3. For the pin plunger models, the above values apply for both the free position and total travel position. For the lever models, the values apply at the total travel position. Contact opening or closing time is within 1 ms.

## ■ Ratings

| Rated voltage | Model<br>Item | SS-3P          | SS-01P |
|---------------|---------------|----------------|--------|
|               |               | Resistive load |        |
| 125 VAC       |               | 3 A            | 0.1 A  |
| 30 VDC        |               | 3 A            | 0.1 A  |

**Note:** 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 (UL approval)

| Rated Voltage | SS-3P | SS-01P |
|---------------|-------|--------|
| 125 VAC       | 3 A   | 0.1 A  |
| 30 VDC        | 3 A   | 0.1 A  |

EN61058-1 - VDE approval

(File No. 40008425)

| Rated Voltage | SS-3P | SS-01P |
|---------------|-------|--------|
| 125 VAC       | 3 A   | 0.1 A  |
| 30 VDC        | 3 A   | 0.1 A  |

Testing conditions: 5E4 (50,000 operations), T55 (0°C to 55°C)

**Note:** The rated values approved by each of the safety standards (e.g. UL, CSA) may be different from the performance characteristics individually defined in this catalog.

## ■ Contact Specifications

| Item                               | SS-3P           | SS-01P        |
|------------------------------------|-----------------|---------------|
| Specification                      | Rivet           | Crossbar      |
| Material                           | Silver alloy    | Gold alloy    |
| Gap (standard value)               | 0.5 mm          |               |
| Minimum applicable load (see note) | 160 mA at 5 VDC | 1 mA at 5 VDC |

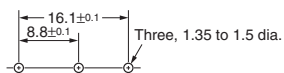
**Note:** Minimum applicable loads are indicated by N standard reference values. This value represents the failure rate at a 60% ( $\lambda_{60}$ ) reliability level (JIS C5003).

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%.

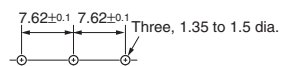
# Engineering Data

## ■ Mounting Holes

### PCB Mounting Dimensions (Reference - uneven spacing)

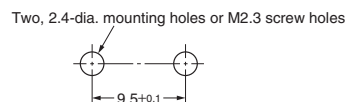


### PCB Mounting Dimensions (Reference - even spacing)



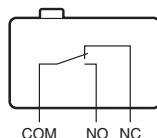
### Panel Mounting

All switches may be panel mounted using M2.3 mounting screws with plane washers or spring washers to securely mount the switch. Tighten the screws to a torque of 0.23 to 0.26 N·m



## ■ Contact Form

SPDT

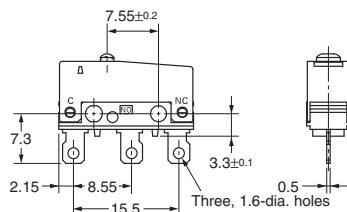


## Dimensions

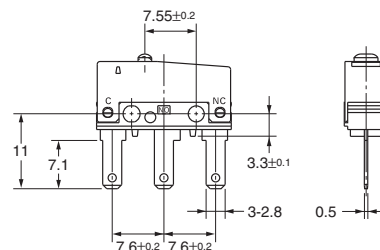
### ■ Terminals

- Note:** 1. Unless otherwise specified, all units are in millimeters and a tolerance of  $\pm 0.4$  mm applies to all dimensions  
2. Terminal plate thickness is 0.5 mm for all models.

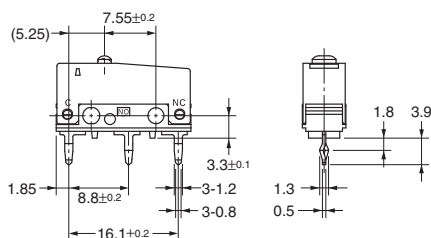
#### Solder Terminals



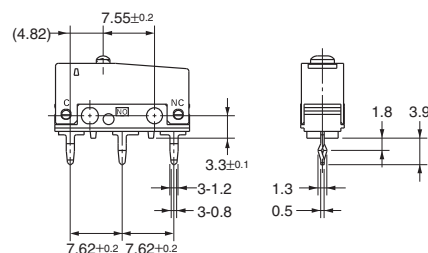
#### Quick-connect Terminals (#110)



#### PCB Terminals (Uneven pitch)



#### PCB Terminals (Even pitch)



# Dimensions and Operating Characteristics

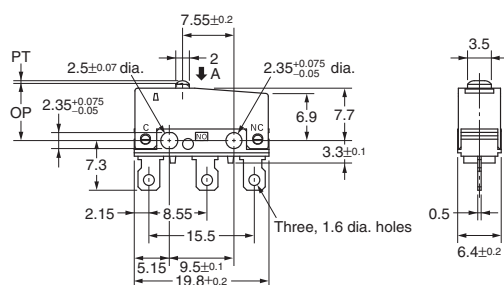
**Note:** 1. Unless otherwise specified, all units are in millimeters and a tolerance of  $\pm 0.4$  mm applies to all dimensions

2. The following illustrations are for solder terminal models. Refer to "Terminals" for models with quick-connect terminals (#110) and PCB terminals.

3. The operating characteristics are for operation in the A direction(▼)

## Pin Plunger Models

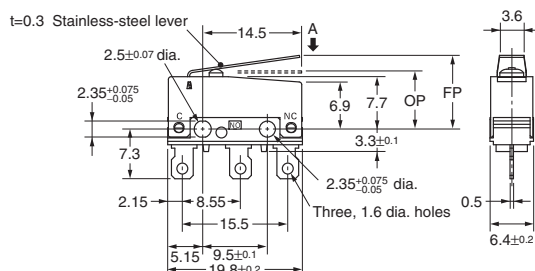
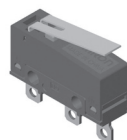
SS-3GP  
SS-01GP



| Characteristics | SS-3GP           | SS-01GP |
|-----------------|------------------|---------|
| OF max.         | 153 gf           |         |
| RF min.         | 20 gf            |         |
| PT max.         | 0.6 mm           |         |
| OT min.         | 0.4 mm           |         |
| MD max.         | 0.15 mm          |         |
| OP              | 8.4 $\pm$ 0.3 mm |         |

## Hinge Lever Models

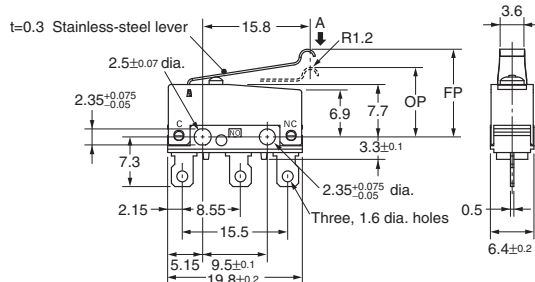
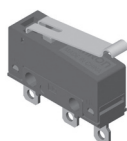
SS-3GLP  
SS-01GLP



| Characteristics | SS-3GLP          | SS-01GLP |
|-----------------|------------------|----------|
| OF max.         | 51 gf            |          |
| RF min.         | 5 gf             |          |
| OT min.         | 1.0 mm           |          |
| MD max.         | 0.8 mm           |          |
| FP max.         | 13.6 mm          |          |
| OP              | 8.8 $\pm$ 0.8 mm |          |

## Simulated Roller Lever Models

SS-3GL13P  
SS-01GL13P



| Characteristics | SS-3GL13P         | SS-01GL13P |
|-----------------|-------------------|------------|
| OF max.         | 51 gf             |            |
| RF min.         | 5 gf              |            |
| OT min.         | 1.0 mm            |            |
| MD max.         | 0.8 mm            |            |
| FP max.         | 15.5 mm           |            |
| OP              | 10.7 $\pm$ 0.8 mm |            |

# Precautions

## ■ Correct Use

### Mounting

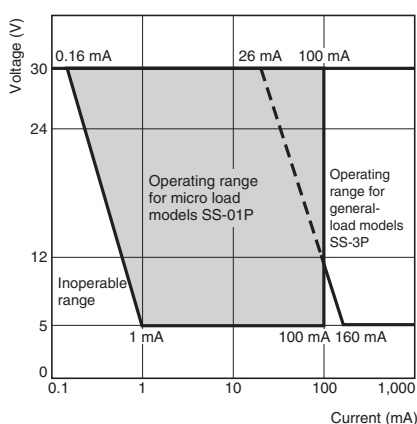
Mount the Switch onto a flat surface. Mounting on an uneven surface may cause deformation of the Switch, resulting in faulty operation or breakage in the housing.

### Operating Stroke Setting

Take particular care in setting the operating stroke for the pin plunger models. Make sure that the operating stroke is 60% to 90% of the rated OT distance. Do not operate the actuator exceeding the OT distance, otherwise the life expectancy of the Switch may be shortened.

### 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

Turn OFF the power supply before mounting or removing the Switch, wiring, or performing maintenance or inspection. Failure to do so may result in electric shock or burning.

### Solder Terminal Connection

When soldering lead wires to solder terminals, first insert the lead wire conductor through the terminal hole and then solder.

Make sure that the temperature at the tip of the soldering iron is 350 to 400°C. Do not take more than 3 seconds to solder the switch terminal, and do not impose external force on the terminal for 1 min after soldering. Improper soldering involving an excessively high temperature or excessive soldering time may deteriorate the characteristics of the Switch.

### Quick-Connect Terminals

Wire quick-connect terminals (#110) with receptacles. Insert the terminals straight into the receptacles. Do not impose excessive force on the terminal in the horizontal direction, otherwise the terminal may be deformed or the housing may be damaged.

Use appropriate #110 QC connectors, made by Nippon Tanshi or Tyco Electronics, to mate with the quick-connect versions of the switch. These connectors are not sold by OMRON. Contact Nippon Tanshi or Tyco Electronics to purchase these connectors.

### PCB Terminal Connection

When using automatic soldering baths, we recommend soldering at  $260 \pm 5^\circ\text{C}$  within 5 seconds. Make sure that the liquid surface of the solder does not flow over the edge of the board.

When soldering by hand, as a guideline, solder with a soldering iron with a tip temperature of 350 to 400°C within 3 seconds, and do not apply any external force for at least 1 minutes after soldering. When applying solder, keep the solder away from the case of the Switch and do not allow solder or flux to enter the case.

### Insulation Distance

Use a separator between the switch and metal mounting panels, to ensure proper dielectric characteristics are achieved.

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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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