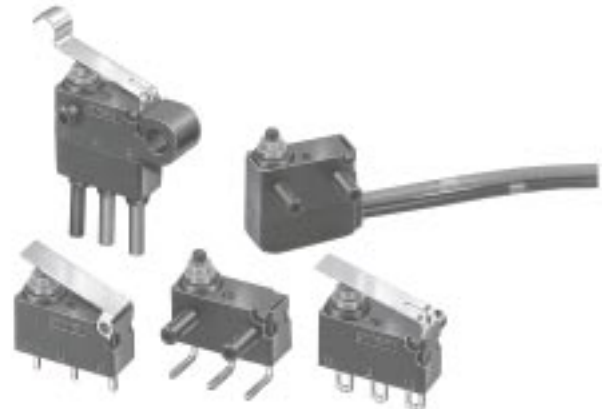


**Sealed Ultra Subminiature Basic Switch**

**D2HW**

**Smallest sealed snap-action switch in the industry with a very long stroke for reliable ON/OFF action.**

- The case dimensions are 78% of conventional models, contributing to down-sizing of mechanical modules.
- Extra-long stroke even without levers. (OT: 1.4 mm)
- Made of environment-friendly materials. All models are lead-free, including lead wire models.



**Ordering Information**

■ **Model Number Legend:**

**D2HW-**

--	--	--	--	--

  
1 2 3 4 5

**1. Mounting Structure**

- A: Without posts (base-mounting)
- BR: Posts on right
- BL: Posts on left
- C: M3-screw mounting

**2. Ratings**

- 2: 1 mA at 5 VDC to 2 A at 12 VDC

**3. Actuator**

- 0: Pin plunger
- 1: Hinge lever
- 2: Long hinge lever
- 3: Simulated hinge lever
- 6: Leaf lever
- 7: Simulated leaf lever
- 8: Long leaf lever

**4. Contacts**








- 1: SPDT
- 2: SPST-NC (Lead wire models only.)
- 3: SPST-NO (Lead wire models only.)

**5. Terminals**







- D: Straight PCB terminals
- DR: Right-angled PCB terminals
- DL: Left-angled PCB terminals
- H: Solder terminals
- M: Lead wires downwards
- MR: Lead wires on right-side
- ML: Lead wires on left-side








## ■ List of Models

### PCB-mounted Models

Actuator	Terminals		Contact form	Model		
				With posts on right 	With posts on left 	Without posts 
Pin plunger 	For PCB	Straight	SPDT	---	---	D2HW-A201D
		Angled		D2HW-BR201DR	D2HW-BL201DL	---
Hinge lever 		Straight		---	---	D2HW-A211D
		Angled		D2HW-BR211DR	D2HW-BL211DL	---
Long hinge lever 		Straight		---	---	D2HW-A221D
		Angled		D2HW-BR221DR	D2HW-BL221DL	---
Simulated hinge lever 		Straight		---	---	D2HW-A231D
		Angled		D2HW-BR231DR	D2HW-BL231DL	---

### Models with Solder Terminals or Lead Wire Terminals

Actuator	Terminals		Contact form	Model		
				With posts on right 	With posts on left 	M3-screw mounting 
Pin plunger 	Solder		SPDT	D2HW-BR201H	D2HW-BL201H	D2HW-C201H
	Lead wire	Downwards	SPDT	D2HW-BR201M	D2HW-BL201M	D2HW-C201M
			SPST-NC	D2HW-BR202M	D2HW-BL202M	D2HW-C202M
			SPST-NO	D2HW-BR203M	D2HW-BL203M	D2HW-C203M
		Right-side	SPST-NC	D2HW-BR202MR	D2HW-BL202MR	D2HW-C202MR
			SPST-NO	D2HW-BR203MR	D2HW-BL203MR	D2HW-C203MR
		Left-side	SPST-NC	D2HW-BR202ML	D2HW-BL202ML	---
	SPST-NO		D2HW-BR203ML	D2HW-BL203ML	---	
Hinge lever 	Solder		SPDT	D2HW-BR211H	D2HW-BL211H	D2HW-C211H
	Lead wire	Downwards	SPDT	D2HW-BR211M	D2HW-BL211M	D2HW-C211M
			SPST-NC	D2HW-BR212M	D2HW-BL212M	D2HW-C212M
			SPST-NO	D2HW-BR213M	D2HW-BL213M	D2HW-C213M
		Right-side	SPST-NC	D2HW-BR212MR	D2HW-BL212MR	D2HW-C212MR
			SPST-NO	D2HW-BR213MR	D2HW-BL213MR	D2HW-C213MR
		Left-side	SPST-NC	D2HW-BR212ML	D2HW-BL212ML	---
	SPST-NO		D2HW-BR213ML	D2HW-BL213ML	---	
Long hinge lever 	Solder		SPDT	D2HW-BR221H	D2HW-BL221H	D2HW-C221H
	Lead wire	Downwards	SPDT	D2HW-BR221M	D2HW-BL221M	D2HW-C221M
			SPST-NC	D2HW-BR222M	D2HW-BL222M	D2HW-C222M
			SPST-NO	D2HW-BR223M	D2HW-BL223M	D2HW-C223M
		Right-side	SPST-NC	D2HW-BR222MR	D2HW-BL222MR	D2HW-C222MR
			SPST-NO	D2HW-BR223MR	D2HW-BL223MR	D2HW-C223MR
		Left-side	SPST-NC	D2HW-BR222ML	D2HW-BL222ML	---
	SPST-NO		D2HW-BR223ML	D2HW-BL223ML	---	

Actuator	Terminals		Contact form	Model		
				With posts on right 	With posts on left 	M3-screw mounting 
<b>Simulated hinge lever</b> 	Solder		SPDT	D2HW-BR231H	D2HW-BL231H	D2HW-C231H
	Lead wire	Downwards	SPDT	D2HW-BR231M	D2HW-BL231M	D2HW-C231M
			SPST-NC	D2HW-BR232M	D2HW-BL232M	D2HW-C232M
			SPST-NO	D2HW-BR233M	D2HW-BL233M	D2HW-C233M
		Right-side	SPST-NC	D2HW-BR232MR	D2HW-BL232MR	D2HW-C232MR
			SPST-NO	D2HW-BR233MR	D2HW-BL233MR	D2HW-C233MR
		Left-side	SPST-NC	D2HW-BR232ML	D2HW-BL232ML	---
	SPST-NO		D2HW-BR233ML	D2HW-BL233ML	---	
<b>Leaf lever</b> 	Solder		SPDT	D2HW-BR261H	D2HW-BL261H	D2HW-C261H
	Lead wire	Downwards	SPDT	D2HW-BR261M	D2HW-BL261M	D2HW-C261M
			SPST-NC	D2HW-BR262M	D2HW-BL262M	D2HW-C262M
			SPST-NO	D2HW-BR263M	D2HW-BL263M	D2HW-C263M
		Right-side	SPST-NC	D2HW-BR262MR	D2HW-BL262MR	D2HW-C262MR
			SPST-NO	D2HW-BR263MR	D2HW-BL263MR	D2HW-C263MR
		Left-side	SPST-NC	D2HW-BR262ML	D2HW-BL262ML	---
	SPST-NO		D2HW-BR263ML	D2HW-BL263ML	---	
<b>Simulated leaf lever</b> 	Solder		SPDT	D2HW-BR271H	D2HW-BL271H	D2HW-C271H
	Lead wire	Downwards	SPDT	D2HW-BR271M	D2HW-BL271M	D2HW-C271M
			SPST-NC	D2HW-BR272M	D2HW-BL272M	D2HW-C272M
			SPST-NO	D2HW-BR273M	D2HW-BL273M	D2HW-C273M
		Right-side	SPST-NC	D2HW-BR272MR	D2HW-BL272MR	D2HW-C272MR
			SPST-NO	D2HW-BR273MR	D2HW-BL273MR	D2HW-C273MR
		Left-side	SPST-NC	D2HW-BR272ML	D2HW-BL272ML	---
	SPST-NO		D2HW-BR273ML	D2HW-BL273ML	---	
<b>Long leaf lever</b> 	Lead wire	Downwards	SPDT	D2HW-BR281M	D2HW-BL281M	D2HW-C281M
			SPST-NC	D2HW-BR282M	D2HW-BL282M	D2HW-C282M
			SPST-NO	D2HW-BR283M	D2HW-BL283M	D2HW-C283M
		Right-side	SPST-NC	---	---	D2HW-C282MR
	SPST-NO		---	---	D2HW-C283MR	

**Note** The length of standard lead wires (AVSS 0.5) for lead wire models is 30 cm.

## Specifications

### ■ Ratings

Rated voltage (V)	Resistive load
12 VDC	2 A
24 VDC	1 A
42 VDC	0.5 A

<b>Minimum applicable load (see note)</b>	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%.

## ■ Characteristics

Item	Specification
Operating speed	1 mm to 500 mm/s (for pin plunger models)
Operating frequency	30 operations/min
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance (initial value)	100 mΩ max. (lead wire models: 150 mΩ max.)
Dielectric strength	600 VAC, 50/60 Hz for 1 min between terminals of the same polarity 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	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	Malfunction: 300 m/s <sup>2</sup> max.
Life expectancy	Mechanical: 1,000,000 operations min. (30 operations/min) Electrical: 100,000 operations min. (20 operations/min)
Degree of protection	IP67 for lead wire models IP50 for terminal models
Degree of protection against electric shock	Class I
Proof tracking index (PTI)	175
Switch category	A (IEC 335)
Ambient operating temperature	-40 to 85°C (with no icing)
Ambient operating humidity	95% max. (in temperature range 5 to 35°C)
Weight	Approx. 0.7 g (for pin plunger models with terminals)

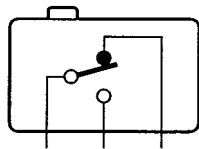
## ■ Contact Specifications

Item	Specification
Specification	Crossbar
Material	Gold alloy
Gap (standard value)	0.5 mm

## Operation

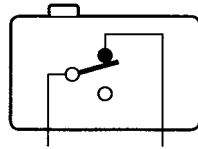
### ■ Contact Form

#### SPDT Contacts



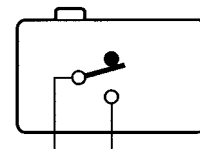
COM (Black) NO (Blue) NC (Red)

#### SPST-NC Contacts (Lead Wire Models Only)



COM (Black) NC (Red)

#### SPST-NO Contacts (Lead Wire Models Only)



COM (Black) NO (Blue)

**Note** Lead wire colors are indicated in parentheses.

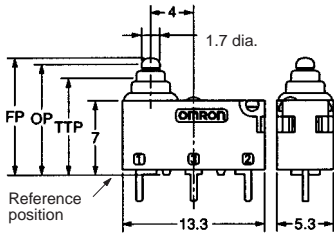
# Dimensions

**Note** All units are in millimeters unless otherwise indicated.

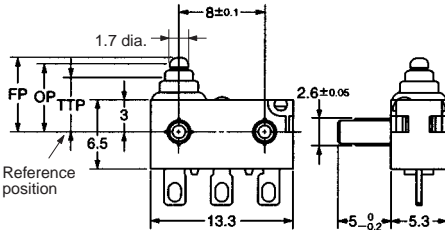
## ■ Mounting Structure and Reference Positions for Operating Characteristics

The reference positions used for FP, OP, and TTP values are as shown below for each type of mounting.

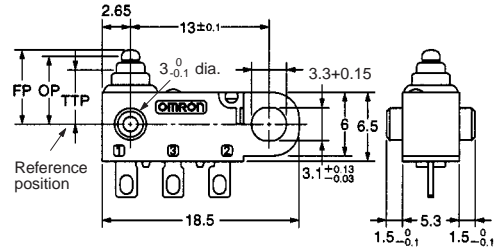
### D2HW-A □ Models without Posts



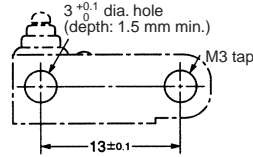
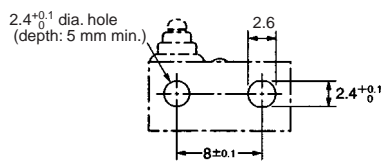
### D2HW-B □ Models with Posts



### D2HW-C □ M3-screw Mounting Models

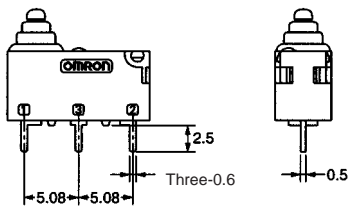


### Mounting Hole Dimensions (Reference)

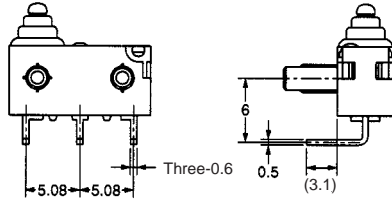


## ■ Terminals

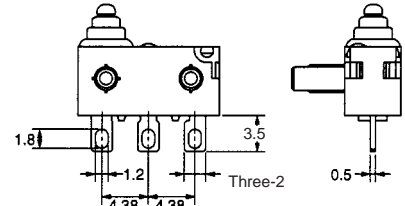
### Straight PCB Terminals



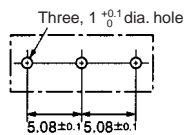
### Angled PCB Terminals



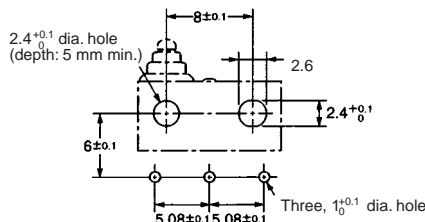
### Solder Terminals



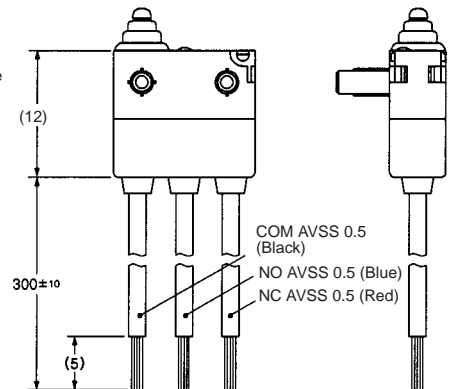
### PCB Cutout Dimensions (Reference)



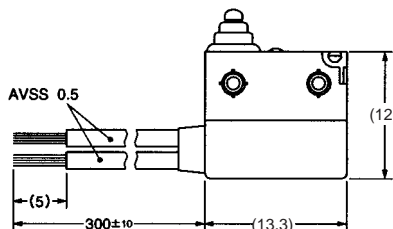
### PCB Cutout Dimensions (Reference)



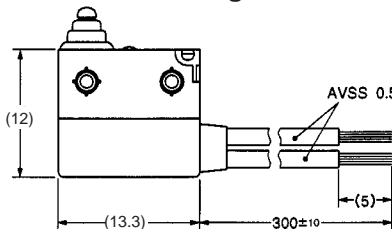
### Lead Wires Downwards



### Lead Wires on Left-side

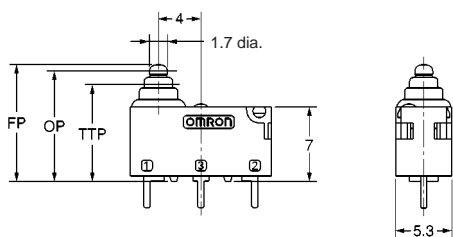


### Lead Wires on Right-side



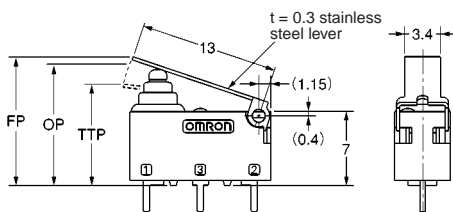
■ Dimensions and Operating Characteristics

Pin Plunger  
D2HW-□20□□



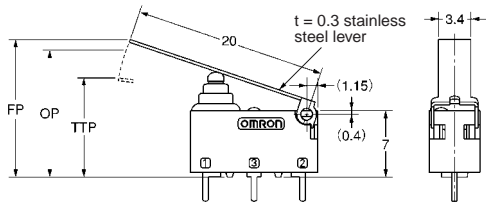
Characteristic	Models without posts	Models with posts and M3-mounting models
OF max.	0.75 N {76 gf}	
RF min.	0.10 N {10 gf}	
MD max.	0.25 mm	
OT ref.	(1.4 mm)	
FP max.	11.2 mm	7.2 mm
OP	10.4±0.2 mm	6.4±0.2 mm
TTP max.	9.1 mm	5.1 mm

Hinge Lever  
D2HW-□21□□



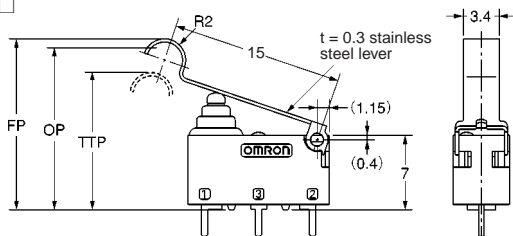
Characteristic	Models without posts	Models with posts and M3-mounting models
OF max.	0.6 N {61 gf}	
RF min.	0.07 N {7 gf}	
MD max.	0.5 mm	
OT ref.	(1.6 mm)	
FP max.	12.8 mm	8.8 mm
OP	11.5±0.5 mm	7.5±0.5 mm
TTP max.	10 mm	6 mm

Long Hinge Lever  
D2HW-□22□□



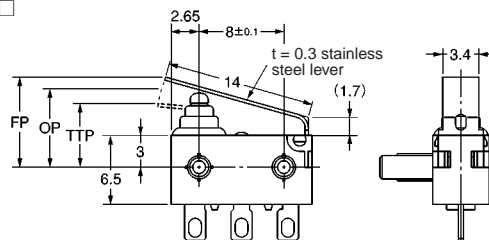
Characteristic	Models without posts	Models with posts and M3-mounting models
OF max.	0.4 N {41 gf}	
RF min.	0.03 N {3 gf}	
MD max.	0.8 mm	
OT ref.	(2.5 mm)	
FP max.	15.5 mm	11.5 mm
OP	13.3±0.8 mm	9.3±0.8 mm
TTP max.	11 mm	7 mm

Simulated Hinge Lever  
D2HW-□23□□



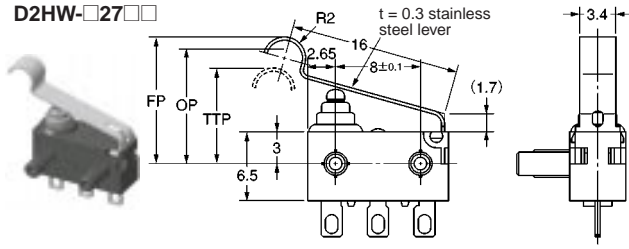
Characteristic	Models without posts	Models with posts and M3-mounting models
OF max.	0.6 N {61 gf}	
RF min.	0.05 N {5 gf}	
MD max.	0.5 mm	
OT ref.	(1.9 mm)	
FP max.	16.5 mm	12.5 mm
OP	15.2±0.5 mm	11.2±0.5 mm
TTP max.	13.5 mm	9.5 mm

Leaf Lever  
D2HW-□26□□



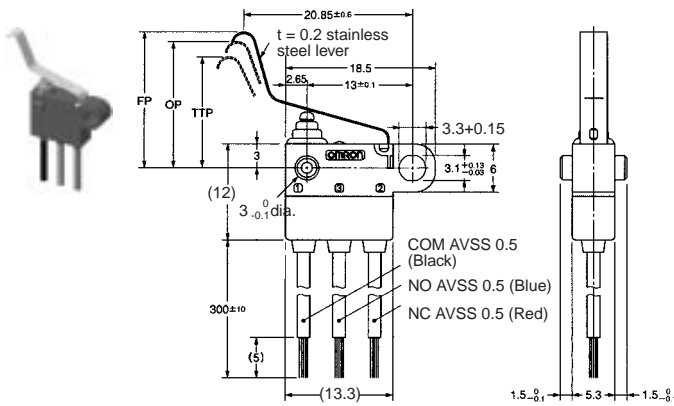
Characteristic	Models with posts and M3-mounting models
OF max.	1.8 N {183 gf}
RF min.	0.20 N {20 gf}
MD max.	0.5 mm
OT ref.	(1.8 mm)
FP max.	9.3 mm
OP	7.4±0.5 mm
TTP max.	5.8 mm

**Simulated Leaf Lever**  
D2HW-□27□□



Characteristic	Models with posts and M3-mounting models
OF max.	1.8 N {183 gf}
RF min.	0.20 N {20 gf}
MD max.	0.5 mm
OT ref.	(2.0 mm)
FP max.	12.5 mm
OP	10.8 ± 0.5 mm
TTP max.	8.9 mm

**Long Leaf Lever**  
D2HW-□28□□



Characteristic	Models with posts and M3-mounting models
OF max.	0.9 N {92 gf}
RF min.	0.15 N {15 gf}
MD max.	0.7 mm
OT ref.	(2.8 mm)
FP max.	19 mm
OP	15.4 ± 1.5 mm
TTP max.	12.8 mm

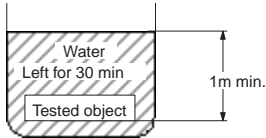
**Note** Dimensions not indicated in the above diagrams have a tolerance of ±0.2 mm.

# Precautions

## ■ Cautions

### Degree of Protection

Do not use this product in water. Although lead wire models satisfy the test conditions for the standard given below, this test is to check the ingress of water into the switch enclosure after submerging the Switch in water for a given time. Satisfying this test condition does not mean that the Switch can be used in water. Lead wire models satisfy IEC Publication 529, degree of protection IP67. Refer to the following illustration for the test method.



Sudden changes in temperature or switching in locations where the D2HW is constantly subject to drops of water or drops of water are in contact with the D2HW, may result in the ingress of water into the switch enclosure due to respiration. Test the D2HW completely for possible problems before using it under such conditions.

Prevent the Switch from coming into contact with oil and chemicals. Otherwise, damage to or deterioration of Switch materials may result.

Do not use the D2HW in locations where silicon-based adhesives, oil, or grease are present. Doing so may result in contact failure due to the formation of oxidized silicon.

### Terminal Connection

To solder the lead wire to the terminal, first entwine the conducting part around the terminal hole. Solder using a soldering iron rated at 30 W max. within 3 s.

Applying a soldering iron for too long a time or using one that is rated at more than 30 W may degrade the Switch characteristics.

When soldering PCB terminals to the PCB, ensure that the surface area of the flux or the solder does not exceed that of the PCB.

### Side-actuated (Cam/Dog) Operation

When using a cam or dog to operate the Switch, factors such as the operating speed, operating frequency, push-button indentation, and material and shape of the cam or dog will affect the durability of the Switch. Confirm performance specifications under actual operation conditions before using the Switch in applications.

## ■ Correct Use

### Mounting

Always turn OFF the power supply before mounting or dismantling, wiring, or performing maintenance inspections. Failure to do so may result in electric shock or burning.

Mount M3-screw mounted models securely, using M3 mounting screws with plain or spring washers. Tighten the screws to a torque of 0.29 N·m max. Tightening the screws to a torque exceeding this may result in deterioration of the sealing or damage to the product.

For models with posts, secure the posts by thermal caulking or by pressing into an attached device. When pressed into an attached device, provide guides on the opposite ends of the posts to ensure that they do not fall out or rattle.

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

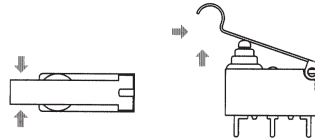
### Operating Body

Use an operating body with low frictional resistance and of a shape that will not interfere with the sealing rubber, otherwise the plunger may be damaged or the sealing may deteriorate.

### Handling

Do not handle the Switch in a way that may cause damage to the sealing rubber.

When handling the Switch, ensure that uneven pressure or, as shown in the following diagram, pressure in a direction other than the operating direction is not applied to the Actuator or Switch may be damaged, or the service life may be reduced.



### Wiring Lead Wire Models

When wiring lead wire models, ensure that there is no tension or that there are no sharp bends near the parts where the wire is drawn out. Otherwise, damage to the Switch or deterioration in the sealing may result.

### Using the Switch with Micro Loads

Even when the Switch is used within the appropriate operating range, power surges may shorten its service life. Insert a contact protection circuit as required.



**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**

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

Cat. No. B105-E1-3 **In the interest of product improvement, specifications are subject to change without notice.**

## **OMRON Corporation**

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Electronic & Mechanical Components Division H.Q.

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