

Sealed Subminiature Basic Switch

D2SW-P

Sealed Basic Switch with Simplified Construction, Mounting Compatible with SS and D2SW Series.

- Sealing by using rubber packing means the switch can be used in dust-proof or in temporary water-proof environments (IEC IP67).
- Switch rating of 2A at 250 VAC possible with a single-leaf movable spring. Models for micro loads are also available.
- Solder, quick-connect terminals (#110), PCB terminals and molded lead wires are available. Even-pitched PCB terminals are also standardized.

RoHS Compliant



Ordering Information

■ Model Number Legend

D2SW-P

1	2	3	4

1. Ratings

2: 2A at 250 VAC
01: 0.1A at 30 VDC

2. Actuator

None: Pin plunger
L1: Hinge lever
L2: Hinge roller lever
L3: Simulated roller lever









3. Contact Form

None: SPDT
-2: SPST-NC (Molded lead wire models only)
-3: SPST-NO (Molded lead wire models only)

4. Terminals

H: Solder terminals
D: PCB terminals (Uneven pitch)
T: Quick-connect terminals (#110)
M: Molded lead wires

■ List of Models

Rating	Actuator	Terminal	Solder terminals	PCB terminals	Quick-connect terminals (#110)	Molded lead wires
2A	Pin plunger		D2SW-P2H	D2SW-P2D	D2SW-P2T	D2SW-P2M
	Hinge lever		D2SW-P2L1H	D2SW-P2L1D	D2SW-P2L1T	D2SW-P2L1M
	Hinge roller lever		D2SW-P2L2H	D2SW-P2L2D	D2SW-P2L2T	D2SW-P2L2M
	Simulated roller lever		D2SW-P2L3H	D2SW-P2L3D	D2SW-P2L3T	D2SW-P2L3M
0.1A	Pin plunger		D2SW-P01H	D2SW-P01D	D2SW-P01T	D2SW-P01M
	Hinge lever		D2SW-P01L1H	D2SW-P01L1D	D2SW-P01L1T	D2SW-P01L1M
	Hinge roller lever		D2SW-P01L2H	D2SW-P01L2D	D2SW-P01L2T	D2SW-P01L2M
	Simulated roller lever		D2SW-P01L3H	D2SW-P01L3D	D2SW-P01L3T	D2SW-P01L3M

Note Consult your OMRON sales representative for details on SPST-NO and SPST-NC models.

Specifications

■ Ratings

Model	Rated voltage	Resistive load
D2SW-P2	30 VDC	2 A
	250 VAC	
D2SW-P01	30 VDC	0.1 A
	125 VAC	

Note The ratings values apply under the following test conditions.
 Ambient temperature: 20±2°C
 Ambient humidity: 65±5%
 Operating frequency: 20 operations/min

■ Characteristics

Item	Model	D2SW-P2	D2SW-P01
Operating speed		0.1 mm to 500 mm/s (pin plunger models)	
Operating frequency		Mechanical : 120 operations/min max. Electrical : 20 operations/min max.	
Insulation resistance		100 MΩ min. (at 500 VDC)	
Contact resistance (initial value)		Terminal models : 50 mΩ max. Molded lead wire models : 100 mΩ max.	Terminal models : 100 mΩ max. Molded lead wire models : 150 mΩ max.
Dielectric strength (see note 2)		1,000 VAC, 50/60 Hz for 1 min between terminals of the same polarities	600 VAC, 50/60 Hz for 1 min between terminals of the same polarities
		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 ² (approx. 100G) max. Malfunction: 300 m/s ² (approx. 30G) max.	
Durability (see note 4)		Mechanical: 1,000,000 operations min. (60 operations/min.) Electrical: 50,000 operations min. (20 operations/min.)	Mechanical: 1,000,000 operations min. (60 operations/min.) Electrical: 200,000 operations min. (20 operations/min.)
Degree of protection		IEC IP67 (see note 5) (excluding the terminals on terminal models)	
Degree of protection against electric shock		Class 1	
Proof tracking index (PTI)		175	
Ambient operating temperature		-20°C to 70°C (at ambient humidity of 60% max.) (with no icing or condensation)	
Ambient operating humidity		85% max. (for 5°C to 35°C)	
Weight		Approx. 2 g (pin plunger models with terminals)	

Note:

- The data given above are initial values.
- The dielectric strength shown in the table indicates a value for models with a Separator.
- 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 1ms.
- Consult your OMRON sales representative for testing conditions.
- The test to meet standards checks for water intrusion after immersion for 30 minutes. The test does not check for switching operation underwater. Refer to "Degree of Protection" of "Instructions for Correct Use".

■ Approved Standards

Consult your OMRON sales representative for specific models with standard approval.

UL1054 (File No. E41515)
/CSA C22.2 No. 55 (UL approval)

Rated voltage	D2SW-P2	D2SW-P01
125 VAC	---	0.1 A
250 VAC	2 A	---
30 VDC	2 A	0.1 A

EN61058-1 (File No.85002, VDE approval)

Rated voltage	D2SW-3	D2SW-01
125 VAC	---	0.1 A
250 VAC	2 A	---
30 VDC	2 A	0.1 A

Testing condition: 5E4 (50,000 operating), T55 (0°C to 55°C)

■ Contact Specifications

Item	Model	D2SW-P2	D2SW-P01
Contact	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

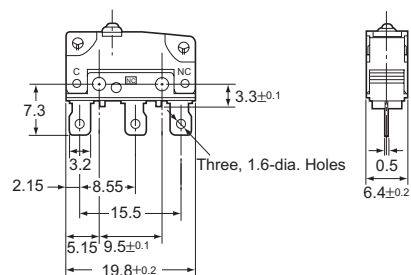
Note For more information on the minimum applicable load, refer to *Using Micro Loads* on page 6.

Dimensions

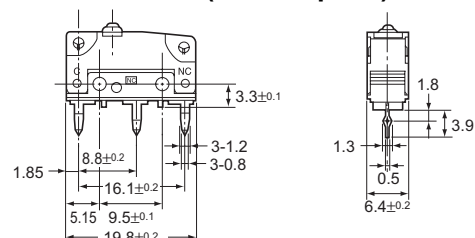
■ Terminals

Note: 1. All units are in millimeters unless otherwise indicated.
 2. Terminal plate thickness is 0.5 mm for all models.

Solder Terminals

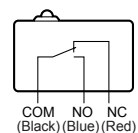


PCB Terminals (Uneven pitch)

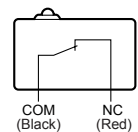


■ Contact Form

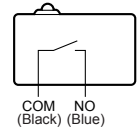
SPDT



SPST-NC (Molded lead wire models only)

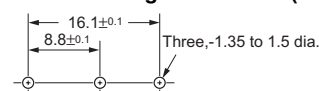


SPST-NO (Molded lead wire models only)

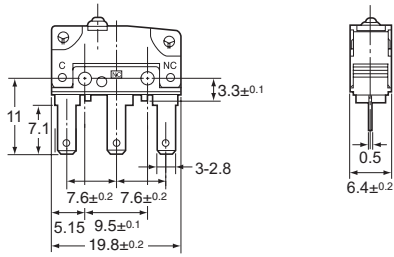


Note Lead wire colors are indicated in parentheses.

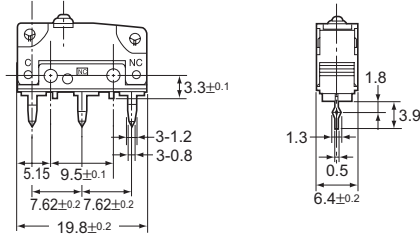
PCB Mounting Dimensions (Reference)



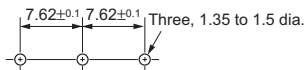
Quick-connect Terminals (#110)



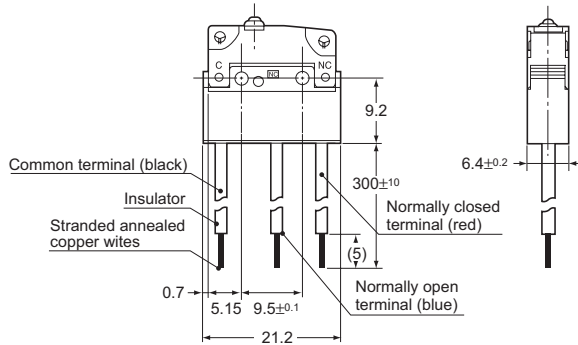
PCB Terminals (Even pitch)



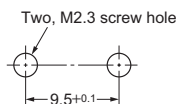
PCB Mounting Dimensions (Reference)



Molded Lead Wires



■ Mounting Holes



■ Dimensions and Operating Characteristics

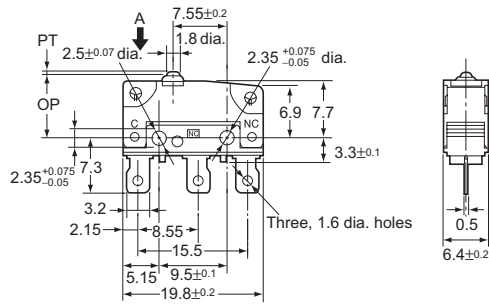
- Note:**
1. All units are in millimeters unless otherwise indicated.
 2. The following illustrations and drawings are for solder terminal models. Refer to page 3 for details on models with quick-connect terminals (#110) or PCB terminals or molded lead wires.
 3. The □ in the model number is for the contact form code or the terminal code.
 4. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

5. The operating characteristics are for operation in the A direction (↓).

Pin Plunger Models

D2SW-P2□□

D2SW-P01□□

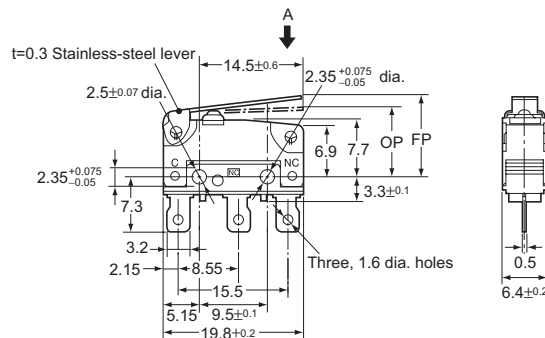


OF max.	1.8 N {183 gf}
RF min.	0.2 N {20 gf}
PT max.	0.6 mm
OT min.	0.4 mm
MD max.	0.15 mm
OP	8.4±0.3 mm

Hinge Lever Models

D2SW-P2L1□□

D2SW-P01L1□□

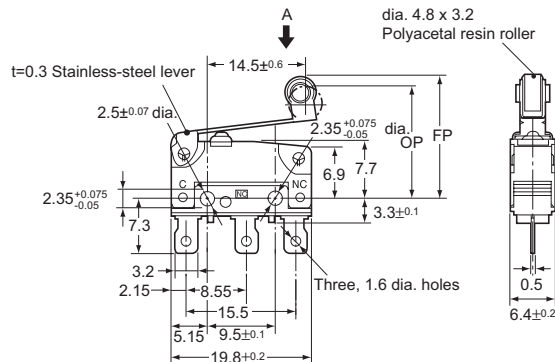


OF max.	0.6 N {61 gf}
RF min.	0.05 N {5 gf}
OT min.	0.8 mm
MD max.	0.8 mm
FP max.	13.6 mm
OP	8.8±0.8 mm

Hinge Roller Lever Models

D2SW-P2L2□□

D2SW-P01L2□□

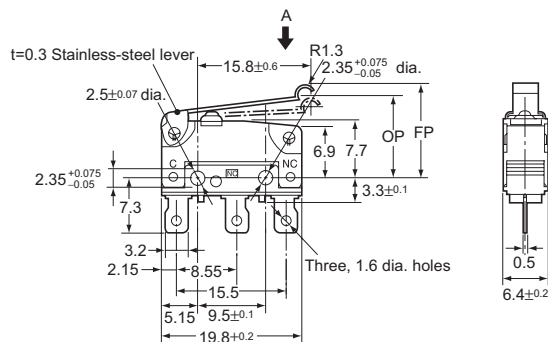


OF max.	0.6 N {61 gf}
RF min.	0.05 N {5 gf}
OT min.	0.8 mm
MD max.	0.8 mm
FP max.	19.3 mm
OP	14.5±0.8 mm

Simulated Roller Lever Models

D2SW-P2L3□□

D2SW-P01L3□□



OF max.	0.6 N {61 gf}
RF min.	0.05 N {5 gf}
OT min.	0.8 mm
MD max.	0.8 mm
FP max.	15.5 mm
OP	10.7±0.8 mm

Precautions

Refer to *General Information*.

■ Cautions

Degree of Protection

Do not use this product in water. Although this 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.

IEC 60529: 2001 Degrees of protection provided by enclosures (IP Code)

Code: IP67 (The test to meet the standard checks for water intrusion after immersion for 30 minutes.)

Do not operate the Switch when it is exposed to water spray, or when water drops adhere to the Switch surface, or during sudden temperature changes, otherwise water may intrude into the interior of the Switch due to a suction effect.

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 Switch in areas where it is exposed to silicon adhesives, oil, or grease, otherwise faulty contact may result due to the generation of silicon oxide.

The environment-resistant performance of the switch differs depending on operating loads, ambient atmospheres, and installation conditions, etc. Please perform an operating test of the switch in advance under actual usage conditions.

Connecting to Terminals

Connecting to Solder Terminals

When soldering the lead wire to the terminal, first insert the lead wire conductor through the terminal hole and the conduct soldering.

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.

Connecting to Quick-connect Terminals

Wire the 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.

Connecting to PCB Terminal Boards

When using automatic soldering baths, we recommend soldering at 260±5°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.

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

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.

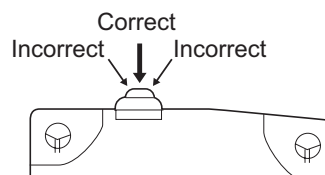
Use M2.3 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 0.23 to 0.26 N·m {2.3 to 2.7 kgf·cm}. Exceeding the specified torque may result in deterioration of the sealing or damage.

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.

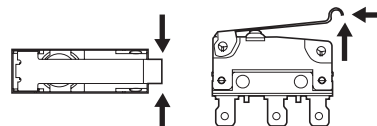
With the pin plunger models, set the Switch so that the plunger can be pushed in from directly above. Since the plunger is covered with a rubber cap, applying a force from lateral directions may cause damage to the plunger or reduction in the sealing capability.



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, otherwise the Actuator or Switch may be damaged, or durability may be decreased.



Wiring Molded Lead Wire Models

When wiring molded lead wire models, ensure that there is no weight on the wire 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.

Operating Stroke Setting

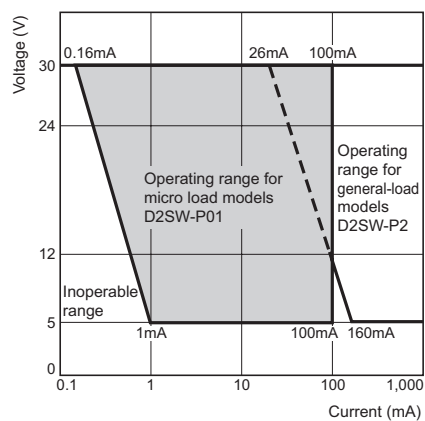
Set the operating stroke so that the actuator is completely disengaged when the switch is in the free position (FP), and is pushed to a point between 60% and 90% of the OT distance after the switch is operated.

Insufficient or excessive pushing of the actuator may result in decreased switch durability or damage to the switch.

Using Micro Loads

Using a model for ordinary loads to open or close the contact of a micro load circuit may result in a faulty contact. Use models that operate in the following range. However, even when using micro load models within the operating range shown below, if inrush current occurs when the contact is opened or closed, it may increase contact wear and so decrease durability. Therefore, insert a contact protection circuit where necessary. The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% (λ.60).

The equation, $\lambda_{60} = 0.5 \times 10^{-6}/\text{operations}$ indicates that the estimated malfunction rate is less than 1/2,000,000 operations with a reliability level of 60%.



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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