

Sub-Miniature Basic Switch (Non-Sealed) – SS

Economical, Subminiature Basic Switch Offers Long Life (30,000 Operations)

- ROHS Compliant.
- Incorporating simple and stable two split springs which ensures a long service life (30,000,000 operations).
- A variety of models with low operating force to high operating force are available.
- Solder, quick-connect terminals (#110) and PCB terminals are available.



Ordering Information

Model Number Legend

SS-□□□□□
1 2 3 4 5

1. Ratings

01: 0.1A at 30VDC
5: 5A at 125VAC
10: 10.1A at 250VAC

2. Actuator

None: Pin plunger
GL: Hinge lever
GL13: Simulated roller lever
GL2: Hinge roller lever

3. Operating Force (at Pin Plunger)

None: 1.47N (150gf)
-F: 0.49N (50gf) (0.1A, 5A)
-E: 0.25N (25gf) (0.1A)

Note 1: These values are for the pin plunger model.

Note 2: The PCB terminal has a right-angle terminal option.

D1: Left angle terminal
D2: Right angle terminal

Note 3: When suffix “-T” is placed after the model number, the model withstands high temperatures (-25°C to 120°C).

4. Contact Form













None: SPDT
-2: SPST-NC
-3: SPST-NO

5. Terminals

None: Solder
T: Quick-connect terminals (#110)
D: PCB (see Note 2)

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List of Models

Rating	Actuator	OF max.	Soldering terminal	Quick-connect terminal (#110)	PCB terminal	
0.1 A	Pin plunger 	0.25 N (25 gf)	SS-01-E	SS-01-ET	SS-01-ED	
		0.49 N (50 gf)	SS-01-F	SS-01-FT	SS-01-FD	
		1.47 N (150 gf)	SS-01	SS-01T	SS-01D	
	Hinge lever 	0.08 N (8 gf)	SS-01GL-E	SS-01GL-ET	SS-01GL-ED	
		0.16 N (16 gf)	SS-01GL-F	SS-01GL-FT	SS-01GL-FD	
		0.49 N (50 gf)	SS-01GL	SS-01GLT	SS-01GLD	
	Simulated roller lever 	0.08 N (8 gf)	SS-01GL13-E	SS-01GL13-ET	SS-01GL13-ED	
		0.16 N (16 gf)	SS-01GL13-F	SS-01GL13-FT	SS-01GL13-FD	
		0.49 N (50 gf)	SS-01GL13	SS-01GL13T	SS-01GL13D	
	Hinge roller lever 	0.08 N (8 gf)	SS-01GL2-E	SS-01GL2-ET	SS-01GL2-ED	
		0.16 N (16 gf)	SS-01GL2-F	SS-01GL2-FT	SS-01GL2-FD	
		0.49 N (50 gf)	SS-01GL2	SS-01GL2T	SS-01GL2D	
5 A	Pin plunger 	0.49 N (50 gf)	SS-5-F	SS-5-FT	SS-5-FD	
		1.47 N (150 gf)	SS-5	SS-5T	SS-5D	
	Hinge lever 	0.16 N (16 gf)	SS-5GL-F	SS-5GL-FT	SS-5GL-FD	
		0.49 N (50 gf)	SS-5GL	SS-5GLT	SS-5GLD	
	Simulated roller lever 	0.16 N (16 gf)	SS-5GL13-F	SS-5GL13-FT	SS-5GL13-FD	
		0.49 N (50 gf)	SS-5GL13	SS-5GL13T	SS-5GL13D	
	Hinge roller lever 	0.16 N (16 gf)	SS-5GL2-F	SS-5GL2-FT	SS-5GL2-FD	
		0.49 N (50 gf)	SS-5GL2	SS-5GL2T	SS-5GL2D	
	10.1 A	Pin plunger 	1.47 N (150 gf)	SS-10	SS-10T	SS-10D
		Hinge lever 	0.49 N (50 gf)	SS-10GL	SS-10GLT	SS-10GLD
		Simulated roller lever 	0.49 N (50 gf)	SS-10GL13	SS-10GL13T	SS-10GL13D
		Hinge roller lever 	0.49 N (50 gf)	SS-10GL2	SS-10GL2T	SS-10GL2D

Consult your Omron representative for details on SPST-NO and SPST-NC models.

Specifications

Ratings

Model	Rated voltage	Resistive load
SS-10	250VAC	10.1A
SS-5	125VAC	5A
	250VAC	3A
SS-01	125VAC	0.1A
	30VDC	0.1A

Note: 1. The ratings values apply under the following test conditions:
 Ambient temperature: 20±2°C
 Ambient humidity: 65±5%
 Operating frequency: 30 operations/min

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■ Switching capacity per load (reference values)

Type	Rated voltage	SS-10, SS-5								SS-01	
		Non-inductive load				Inductive load				Non-inductive load	
		Resistive load		Lamp load		Inductive load		Motor load		Resistive load	
		NC	NO	NC	NO	NC	NO	NC	NO	NC	NO
General-purpose	125 VAC	5 (10.1) A (see note 1)		1.5 A	0.7 A	3 A		2.5 A	1.3 A	0.1 A	
	250 VAC	3 (10.1) A (see note 1)		1 A	0.5 A	2 A		1.5 A	0.8 A	---	
	8 VDC	5 (10.1) A (see note 1)		2 A		5 A	4 A	3 A		0.1 A	
	14 VDC	5 (10.1) A (see note 1)		2 A		4 A	4 A	3 A		0.1 A	
	30 VDC	4 A		2 A		3 A	3 A	3 A		0.1 A	
	125 VDC	0.4 A		0.05 A		0.4 A	0.4 A	0.05 A		---	
	250 VDC	0.2 A		0.03 A		0.2 A	0.2 A	0.03 A		---	

- Note:**
1. Data in parentheses apply to the SS-10 models only.
 2. The above values are for the steady-state current.
 3. Inductive load has a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC). The inductive load rating of SS-10 is the same as that of SS-5.
 4. Lamp load has an inrush current of 10 times the steady-state current.
 5. Motor load has an inrush current of 6 times the steady-state current.
 6. If the Switch is used in a DC circuit and is subjected to a surge, connect a surge suppressor across the Switch.

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■ Characteristics

Operating speed	0.1 mm to 1 m/s (pin plunger models)
Operating frequency	Mechanical: 400 operations/min Electrical: 60 operations/min
Insulation resistance	100 M Ω min. (at 500 VDC)
Contact resistance (initial value)	OF 1.47 N (150 gf): SS-01 models: 50 m Ω max. SS-5, SS-10 models: 30 m Ω max. OF 0.49 N (50 gf): SS-01 models: 100 m Ω max. SS-5 models: 50 m Ω max. OF 0.25 N (25 gf): SS-01 models: 150 m Ω max.
Dielectric strength	1,000 VAC (600 VAC for SS-01 models), 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 part and ground, and between each terminal and non-current-carrying metal part (see note 1)
Vibration resistance (see note 2)	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	Destruction: OF 1.47 N (150 gf): 1,000 m/s ² (approx. 100G) max. OF 0.25 N (25gf)/0.49 N (50 gf): 500 m/s ² (approx. 50G) max. Malfunction: OF 1.47 N (150 gf): 300 m/s ² (approx. 30G) max. OF 0.25 N (25 gf)/0.49 N (50 gf): 200 m/s ² (approx. 20G) max. Note: Lever-type model: Total travel position (with a contact separation time of 1 ms max.)
Life expectancy	Mechanical: 30,000,000 operations min. (Refer to the following <i>Engineering Data</i> .) 10,000,000 operations min. for SS-10 models Electrical: 200,000 operations min. (Refer to the following <i>Engineering Data</i> .) 50,000 operations min. for SS-10 models
Degree of protection	IEC IP40
Degree of protection against electrical shock	Class 1
Proof Tracking Index (PTI)	175
Ambient temperature	Operating: -25°C to 85°C (at ambient humidity of 60% max.) (with no icing)
Ambient humidity	Operating: 85% max. (for 5°C to 35°C)
Weight	Approx. 1.6 g (pin plunger models)

- 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 useat both the free position and total travel position. For the lever models, they apply at the total travelposition.
 - Lever-type models. Total travel position (with a contact separation time of 1ms max)
 - For testing conditions, contact Omron.

■ Approved Standards

UL1054 (File No. E41515)

CSA C22.2 No. 55 (File No. LR21642)

Rated voltage	SS-10	SS-5	SS-01
125 VAC	---	5 A	0.1 A
250 VAC	10.1 A	3 A	---
30 VDC	---	---	0.1 A

EN61058-1 (File No. 129246 for SS-5, 125256 for SS-10, VDE approval)

Rated voltage	SS-10	SS-5
250 VAC	10 A	5 A

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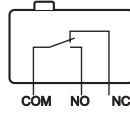
■ Contact Specifications

Item		SS-10	SS-5	SS-01
Contact	Specification	Rivet		Crossbar
	Material	Silver alloy	Silver	Gold alloy
	Gap (standard value)	0.5 mm		0.25 mm
Inrush current	NC	20 A max.		1 A max.
	NO	15 A max.	10 A max.	1 A max.
Min applicable load (see note)		160mA at 5VDC		1mA at 5VDC

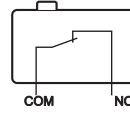
Note: For more information on minimum applicable load, refer to 'Using micro loads'

■ Contact Form

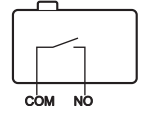
SPDT



SPST-NC



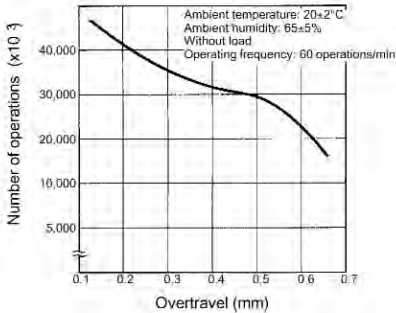
SPST-NO



Engineering Data

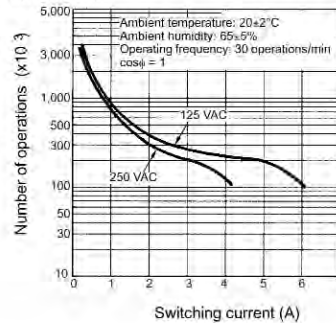
Mechanical Life Expectancy (Pin Plunger Model)

SS-5, SS-1, SS-01 Models



Electrical Life Expectancy (Pin Plunger Model)

SS-5 Models

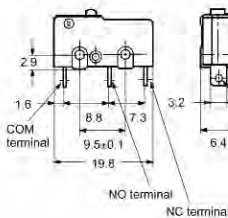


Dimensions

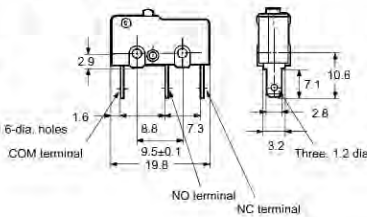
■ Terminals

Terminal plate thickness is 0.5 mm.

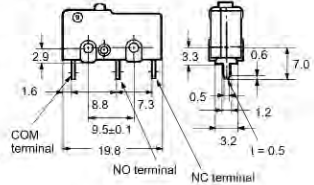
Solder Terminal



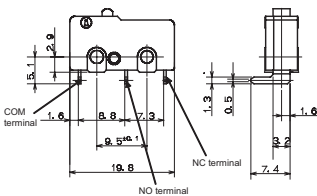
Quick-connect Terminal (#110)



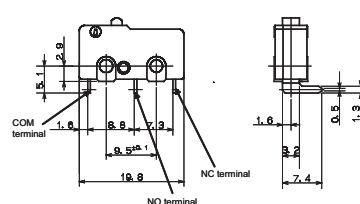
PCB Terminal



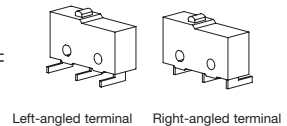
PCB, Left-angled terminal



PCB, Right-angled terminal



Note: Angled terminal directions are shown below.



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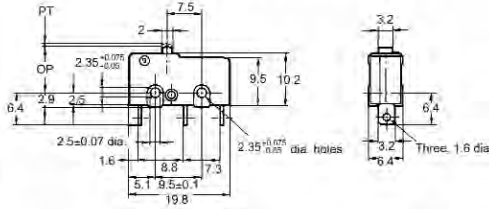
■ Dimensions and Operating Characteristics

Note: 1. All units are in millimeters unless otherwise indicated.

2. The following illustration and drawing are for solder terminal models. Refer to previous page for details on models with quick-connect terminals (#110) or PCB terminals.
3. Unless otherwise specified, a tolerance of ± 0.4 mm applies to all dimensions.

Pin Plunger

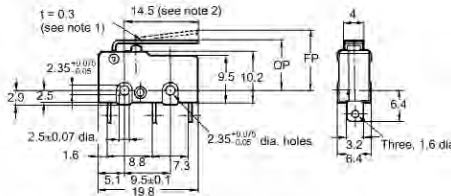
SS-01(-E, -F)
SS-5(-F)
SS-10



Model	SS-01-E	SS-01-F SS-5-F	SS-01 SS-5	SS-10
OF max.	0.25 N (25 gf)	0.49 N (50 gf)	1.47 N (150 gf)	1.47 N (150 gf)
RF min.	0.02 N (2 gf)	0.04 N (4 gf)	0.25 N (25 gf)	0.25 N (25 gf)
PT max.	0.5 mm	0.5 mm	0.5 mm	0.6 mm
OT min.	0.5 mm	0.5 mm	0.5 mm	0.4 mm
MD max.	0.1 mm	0.1 mm	0.1 mm	0.12 mm
OP	8.4±0.5 mm			

Hinge Lever

SS-01GL(-E, -F)
SS-5GL(-F)
SS-10GL



- Note:** 1 Stainless-steel lever
2 Besides the SS-□GL models with a hinge lever length of 14.5, the SS-□GL11 models with a hinge lever length of 18.5, the SS-□GL111 models with a hinge lever length of 22.6, and the SS-□GL1111 models with a hinge lever length of 37.8 are available. Contact your OMRON representative for these models.

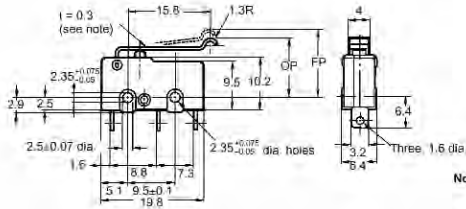
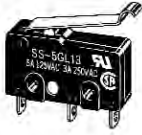
Model	SS-01GL-E	SS-01GL-F SS-5GL-F	SS-01GL SS-5GL	SS-10GL
OF max.	0.08 N (8 gf)	0.16 N (16 gf)	0.49 N (50 gf)	0.49 N (50 gf)
RF min.	0.01 N (1 gf) (See note)	0.02 N (2 gf)	0.06 N (6 gf)	0.06 N (6 gf)
OT min.	1.2 mm	1.2 mm	1.2 mm	1.0 mm
MD max.	0.8 mm	0.8 mm	0.8 mm	1.0 mm
FP max.	13.6 mm			
OP	8.8±0.8 mm			

Note: The values indicated in parenthesis are reference values for cases when the installation direction is such that the lever weight is not applied to the plunger.

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Simulated Roller Lever

SS-01GL13(-E, -F)
SS-5GL13(-F)
SS-10GL13

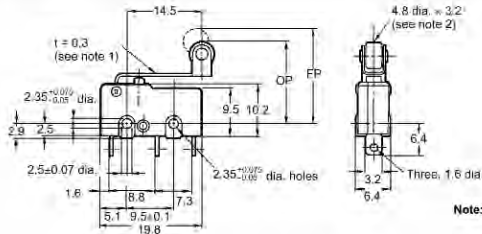


Note: Stainless-steel spring lever.

Model	SS-01GL13-E	SS-01GL13-F SS-5GL13-F	SS-01GL13 SS-5GL13	SS-10GL13
OF max.	0.08 N {8 gf}	0.16 N {16 gf}	0.49 N {50 gf}	0.49 N {50 gf}
RF min.	0.01 N {1 gf} (See note)	0.02 N {2 gf}	0.06 N {6 gf}	0.06 N {6 gf}
OT min.	1.2 mm	1.2 mm	1.2 mm	1.0 mm
MD max.	0.8 mm	0.8 mm	0.8 mm	1.0 mm
FP max.	15.5 mm			
OP	10.7±0.8 mm			

Hinge Roller Lever

SS-01GL2(-E, -F)
SS-5GL2(-F)
SS-10GL2



Note: 1. Stainless-steel spring lever
2. Polyacetal resin roller

Model	SS-01GL2-E	SS-01GL2-F SS-5GL2-F	SS-01GL2 SS-5GL2	SS-10GL2
OF max.	0.08 N {8 gf}	0.16 N {16 gf}	0.49 N {50 gf}	0.49 N {50 gf}
RF min.	0.01 N {1 gf} (See note)	0.02 N {2 gf}	0.06 N {6 gf}	0.06 N {6 gf}
OT min.	1.2 mm	1.2 mm	1.2 mm	1.0 mm
MD max.	0.8 mm	0.8 mm	0.8 mm	1.0 mm
FP max.	19.3 mm			
OP	14.5±0.8 mm			

Note: The values indicated in parentheses are reference values for cases when the installation direction is such that the lever weight is not applied to the plunger

Precautions

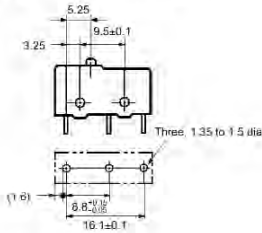
■ Mounting

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.

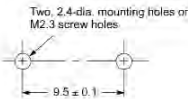
Use two M2.3 mounting screws with spring washers to mount the Switch. Tighten the screws to a torque of 0.23 to 0.26N . m (2.3 to 2,6 kgf . cm)

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.

PCB Mounting Dimensions (Reference)



Mounting Holes



Operating Stroke Setting

Take particular care in setting the operating stroke for the pin plunger models. Make sure that the operating stroke is 70% to 100% of the rated OT distance. Do not operate the actuator exceeding the OT distance, otherwise the durability of the switch may be shortened.

■ Separators (Insulation Sheet)

Applicable Switch	Thickness (mm)	Model (see note)
SS, D2S, D2SW	0.18	Separator for SS0.18
	0.4	Separator for SS0.4

Separator for SS□



Terminal Connection

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

Make sure that the capacity of the soldering iron is 60W maximum. Do not take more than 5s to solder the switch terminal. Improper soldering involving excessively high temperature or excessive soldering time may deteriorate the characteristics of the switch.

Be sure to apply only the minimum required amount of flux. The switch may have contact failures if flux intrudes into the interior of the switch.

Use the following lead wires to connect to the solder terminals

If the PCB terminal models are soldered in the solder bath, flux will permeate inside the Switch and cause contact failure. Therefore manually solder the PCB terminal.

Specifications Approved by TÜV Rheinland According to EN61058-1

Model	Conductor size
SS-5	0.5 to 0.75 mm ²
SS-10	0.75 mm ²

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.

Insulation Distance

According to EN61058-1, the minimum thickness of insulation according to IEC 61058-1 is 1.1mm, and the minimum clearance between live terminals and mounting plate is 1.6mm. If the proper insulation for the terminator cannot be obtained, add insulation such as a Separator or insulation guard on the switch.

■ Using Micro Loads

Using a model for ordinary loads to open or close the contact of a microload circuit may result in 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, $\lambda_{60} = 0.5 \times 10^{-6}$ /operations indicates that the estimated malfunction rate is less than 1/2,000,000 operations with a reliability level of 60%.

Use the Switch within the following operating range.

