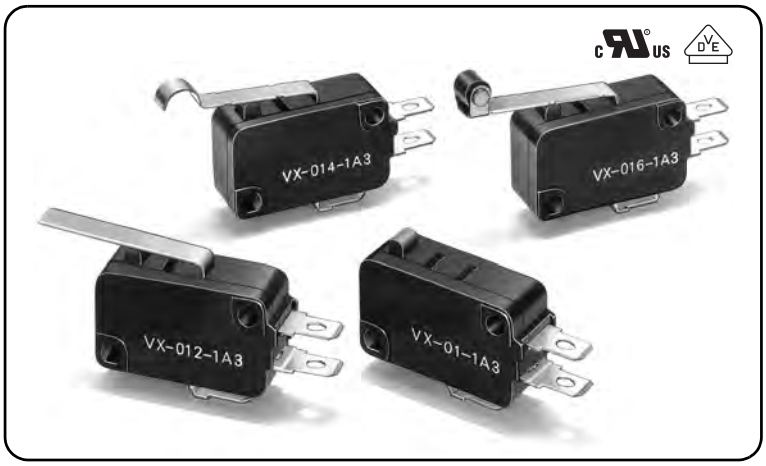
Miniature Basic Switch with Low Operating Force and High Contact Reliability



- **Wide variation extends from micro load to 5A switching current, with shapes identical to those of the V-series Miniature Basic Switch.**
- **Unique internal mechanism ensures the high contact reliability even in micro load operations. Applicable for detection of lightweight objects.**

RoHS Compliant

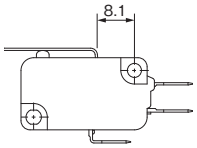
Model Number Legend

VX-[1][2][3]-[4][5][6]

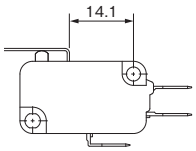
1. Ratings
- 5 : 250 VAC 5 A
- 01 : 30 VDC 0.1 A

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. Lever mounting position
- None : Lever set distant from plunger (Standard Position)



- K : Lever set close to plunger (Position K)



4. Contact form
- 1 : SPDT
- 2 : SPST-NC
- 3 : SPST-NO

5. Terminals
- A : Solder terminals
- C2 : Quick Connect Terminal (#187)

6. Maximum Operating Force (OF)
- 2 : 0.25N {25 gf} (for pin plungers only)
- 3 : 0.49N {50 gf}

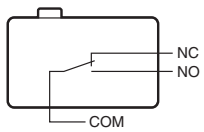
Note. These values are for the pin plunger models.

List of Models

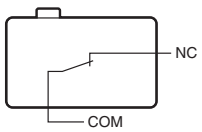
Actuator	Terminals	Contact Form	Ratings: Lever mounting position Maximum Operating Force (OF)	5 A: Standard Position	5 A: Position K	0.1 A: Standard Position	0.1 A: Position K
Pin plunger	Solder terminals	SPDT	0.25 N {25 gf}	**VX-5-1A2**	-	**VX-01-1A2**	-
		SPST-NC		**VX-5-2A2**	-	**VX-01-2A2**	-
		SPST-NO		**VX-5-3A2**	–	**VX-01-3A2**	–
		SPDT	0.49 N {50 gf}	**VX-5-1A3**	–	**VX-01-1A3**	–
		SPST-NC		**VX-5-2A3**	–	**VX-01-2A3**	–
		SPST-NO		**VX-5-3A3**	–	**VX-01-3A3**	–
	Quick Connect Terminal (#187)	SPDT	0.25 N {25 gf}	**VX-5-1C22**	–	**VX-01-1C22**	–
		SPST-NC		**VX-5-2C22**	–	**VX-01-2C22**	–
		SPST-NO		**VX-5-3C22**	–	**VX-01-3C22**	–
		SPDT	0.49 N {50 gf}	**VX-5-1C23**	–	**VX-01-1C23**	–
		SPST-NC		**VX-5-2C23**	–	**VX-01-2C23**	–
		SPST-NO		**VX-5-3C23**	–	**VX-01-3C23**	–
Short hinge lever	Solder terminals	SPDT	0.49 N {50 gf}	**VX-51-1A3**	–	**VX-011-1A3**	–
		SPST-NC		**VX-51-2A3**	–	**VX-011-2A3**	–
		SPST-NO		**VX-51-3A3**	–	**VX-011-3A3**	–
	Quick Connect Terminal (#187)	SPDT		**VX-51-1C23**	–	**VX-011-1C23**	–
		SPST-NC		**VX-51-2C23**	–	**VX-011-2C23**	–
		SPST-NO		**VX-51-3C23**	–	**VX-011-3C23**	–
Hinge lever	Solder terminals	SPDT	0.29 N {30 gf}	**VX-52-1A3**	–	**VX-012-1A3**	–
		SPST-NC		**VX-52-2A3**	–	**VX-012-2A3**	–
		SPST-NO		**VX-52-3A3**	–	**VX-012-3A3**	–
	Quick Connect Terminal (#187)	SPDT		**VX-52-1C23**	–	**VX-012-1C23**	–
		SPST-NC		**VX-52-2C23**	–	**VX-012-2C23**	–
		SPST-NO		**VX-52-3C23**	–	**VX-012-3C23**	–
Long hinge lever	Solder terminals	SPDT	0.20 N {20 gf}	**VX-53-1A3**	**VX-53K-1A3**	**VX-013-1A3**	**VX-013K-1A3**
		SPST-NC		**VX-53-2A3**	**VX-53K-2A3**	**VX-013-2A3**	**VX-013K-2A3**
		SPST-NO		**VX-53-3A3**	**VX-53K-3A3**	**VX-013-3A3**	**VX-013K-3A3**
	Quick Connect Terminal (#187)	SPDT		**VX-53-1C23**	**VX-53K-1C23**	**VX-013-1C23**	**VX-013K-1C23**
		SPST-NC		**VX-53-2C23**	**VX-53K-2C23**	**VX-013-2C23**	**VX-013K-2C23**
		SPST-NO		**VX-53-3C23**	**VX-53K-3C23**	**VX-013-3C23**	**VX-013K-3C23**
Simulated roller lever	Solder terminals	SPDT	0.29 N {30 gf}	**VX-54-1A3**	**VX-54K-1A3**	**VX-014-1A3**	**VX-014K-1A3**
		SPST-NC		**VX-54-2A3**	**VX-54K-2A3**	**VX-014-2A3**	**VX-014K-2A3**
		SPST-NO		**VX-54-3A3**	**VX-54K-3A3**	**VX-014-3A3**	**VX-014K-3A3**
	Quick Connect Terminal (#187)	SPDT		**VX-54-1C23**	**VX-54K-1C23**	**VX-014-1C23**	**VX-014K-1C23**
		SPST-NC		**VX-54-2C23**	**VX-54K-2C23**	**VX-014-2C23**	**VX-014K-2C23**
		SPST-NO		**VX-54-3C23**	**VX-54K-3C23**	**VX-014-3C23**	**VX-014K-3C23**
Short hinge roller lever	Solder terminals	SPDT	0.59 N {60 gf}	**VX-55-1A3**	–	**VX-015-1A3**	–
		SPST-NC		**VX-55-2A3**	–	**VX-015-2A3**	–
		SPST-NO		**VX-55-3A3**	–	**VX-015-3A3**	–
	Quick Connect Terminal (#187)	SPDT		**VX-55-1C23**	–	**VX-015-1C23**	–
		SPST-NC		**VX-55-2C23**	–	**VX-015-2C23**	–
		SPST-NO		**VX-55-3C23**	–	**VX-015-3C23**	–
Hinge roller lever	Solder terminals	SPDT	0.29 N {30 gf}	**VX-56-1A3**	**VX-56K-1A3**	**VX-016-1A3**	**VX-016K-1A3**
		SPST-NC		**VX-56-2A3**	**VX-56K-2A3**	**VX-016-2A3**	**VX-016K-2A3**
		SPST-NO		**VX-56-3A3**	**VX-56K-3A3**	**VX-016-3A3**	**VX-016K-3A3**
	Quick Connect Terminal (#187)	SPDT		**VX-56-1C23**	**VX-56K-1C23**	**VX-016-1C23**	**VX-016K-1C23**
		SPST-NC		**VX-56-2C23**	**VX-56K-2C23**	**VX-016-2C23**	**VX-016K-2C23**
		SPST-NO		**VX-56-3C23**	**VX-56K-3C23**	**VX-016-3C23**	**VX-016K-3C23**

Contact Form

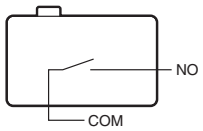
●SPDT



●SPST-NC



●SPST-NO



Separator (Sold Separately), Actuator (Sold Separately), Terminal Connector (Sold Separately) ➡ Refer to "**Basic Switch Common Accessories**"

Contact Specifications

Item	Model	VX-5 models	VX-01 models
Contact	Specification	Rivet	Crossbar
	Material	Silver alloy	Gold alloy
	Gap (standard value)	0.5 mm	
Inrush current	NC	15 A max.	-
	NO	15 A max.	-
Minimum applicable load (reference value) *		5 VDC 160 mA	5 VDC 1 mA

* Please refer to "**Using Micro Loads**" in "**●Precautions**" for more information on the minimum applicable load.

Ratings

Model	Item: Rated voltage	Resistive load
VX-5 models	250 VAC	5 A
VX-01 models	125 VAC	0.1 A
	30 VDC	0.1 A

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

Approved Safety Standards

UL (UL61058-1)/cUL (CSA C22.2 No.61058-1)

Rated voltage / Model	VX-5	VX-01
125 VAC	5 A	0.1 A
250 V	5 A	-
30 VDC	-	0.1 A

VDE (EN61058-1)

Rated voltage / Model	VX-5	VX-01
250VAC	5 A	-
125VAC	5 A	0.1 A

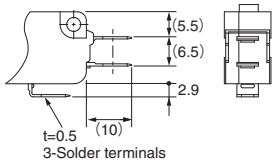
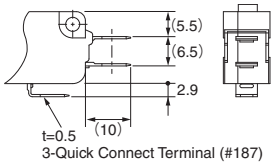
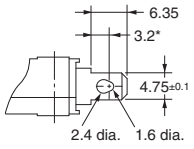
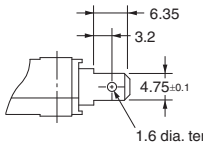
Testing conditions: 5E4 (50,000 operations) T105 (0 to 105°C)

Characteristics

Item	Model	VX-5 models	VX-01 models
Permissible operating speed		0.1 mm to 1 m/s (for pin plunger models)	
Permissible operating frequency	Mechanical	600 operations/min (for pin plunger models)	
	Electrical	60 operations/min	
Insulation resistance		100 MΩ min. (at 500 VDC with insulation tester)	
Contact resistance (initial value)		30 mΩ max.	50 mΩ max.
Dielectric strength *1	Between terminals of the same polarity	1,000 VAC 50/60 Hz for 1 min	
	Between current-carrying metal parts and ground	1,500 VAC 50/60 Hz for 1 min	
	Between terminals and non-current-carrying metal parts	1,500 VAC 50/60 Hz for 1 min	
Vibration resistance *2	Malfunction	10 to 55 Hz, 1.5 mm double amplitude	
Shock resistance	Durability	400 m/s² {approx. 40G} max.	
	Malfunction *2	100 m/s² {approx. 10G} max.	
Durability *3	Mechanical	50,000,000 operations min. (60 operations/min)	10,000,000 operations min. (60 operations/min)
	Electrical	500,000 operations min. (30 operations/min)	1,000,000 operations min. (30 operations/min)
Degree of protection		IEC IP40	
Degree of protection against electric shock		Class I	
Proof tracking index (PTI)		175	
Ambient operating temperature		-25 to 105°C (at ambient humidity of 60% max.) (with no icing or condensation)	
Ambient operating humidity		85% max. (for 5 to 35°C)	
Weight		Approx. 6.2 g (pin plunger models)	

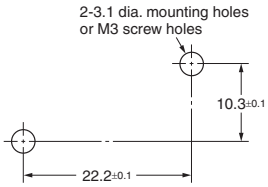
Note. The data given above are initial values.
*1. The values for dielectric strength shown are for models with a Separator (refer to "**Micro Switch Common Accessories**").
*2. For the pin plunger models, the above values apply for use at the free position and total travel position. For the lever models, they apply at the total travel position. Close or open circuit of the contact is 1 ms max.
*3. For testing conditions, consult your OMRON sales representative.

Terminals/Appearances (Unit: mm)

Solder terminals	Quick Connect Terminal (#187)
 3-Solder terminals	 3-Quick Connect Terminal (#187)
 * This indicates the length to the center of 1.6 dia. hole.	 1.6 dia. terminal holes

Note. The above is for the SPDT contact specifications.

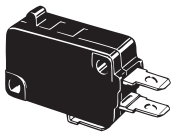
Mounting Holes (Unit: mm)

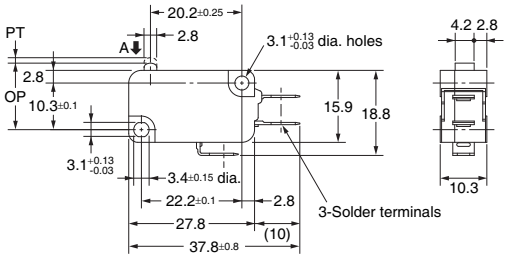


Dimensions (Unit: mm) and Operating Characteristics

The following illustrations and drawings are for solder terminals. Illustrations for Quick Connect Terminal (#187) are omitted. For details, refer to **"Terminals/Appearances"** on previous page.
The □ is replaced with the code for the terminals. See the "**List of Models**" for available combinations of shapes.

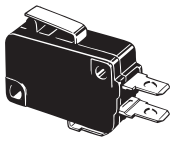
●Pin plunger
VX-5-1□2
VX-5-1□3
VX-01-1□2
VX-01-1□3

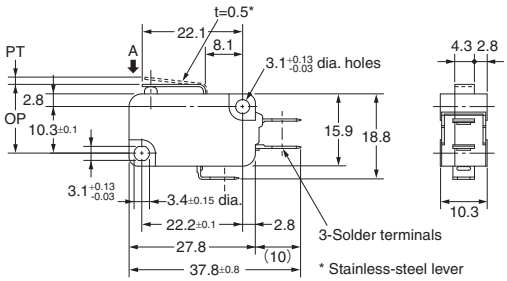




Operating Characteristics		Model	VX-5-1□2 VX-01-1□2	VX-5-1□3 VX-01-1□3
Operating Force Releasing Force	OF RF	Max. Min.	0.25 N {25 gf} 0.03 N {3 gf}	0.49 N {50 gf} 0.05 N {5 gf}
Pretravel Overtravel Movement Differential	PT OT MD	Max. Min. Max.	1.2 mm 1.0 mm 0.3 mm	
Operating Position	OP		14.7±0.4 mm	

●Short hinge lever (Standard Position)
VX-51-1□3
VX-011-1□3

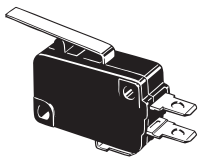


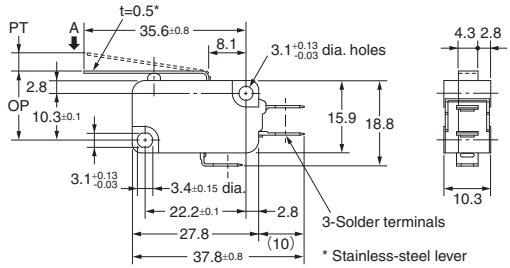


Operating Characteristics		Model	VX-51-1□3 VX-011-1□3
Operating Force Releasing Force	OF RF	Max. Min.	0.49 N {50 gf} 0.04 N {4 gf} (reference value)
Pretravel Overtravel Movement Differential	PT OT MD	Max. Min. Max.	1.6 mm 0.8 mm 0.5 mm
Operating Position	OP		15.2±0.5 mm

Note. The indicated reference values of RF are for cases where the lever weight is not applied to the plunger.

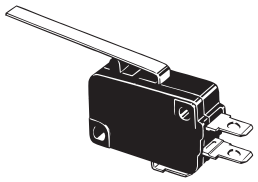
●Hinge lever (Standard Position)
VX-52-1□3
VX-012-1□3

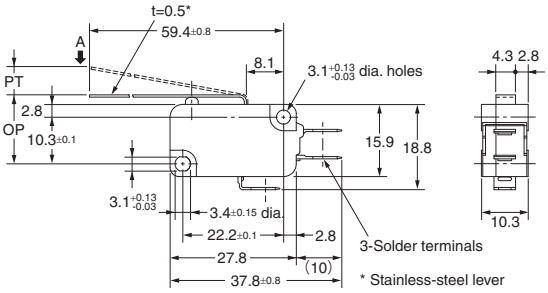




Operating Characteristics		Model	VX-52-1□3 VX-012-1□3
Operating Force Releasing Force	OF RF	Max. Min.	0.29 N {30 gf} -
Pretravel Overtravel Movement Differential	PT OT MD	Max. Min. Max.	4.0 mm 1.6 mm 0.8 mm
Operating Position	OP		15.2±1.2 mm

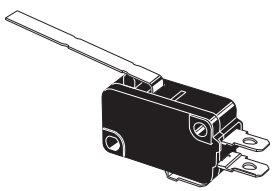
●Long hinge lever (Standard Position)
VX-53-1□3
VX-013-1□3

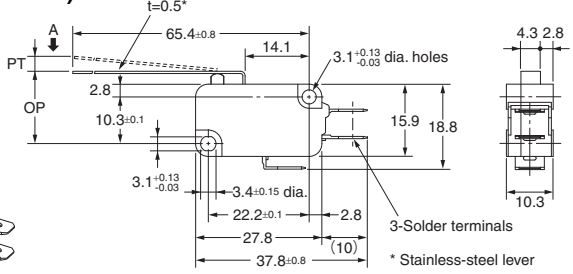




Operating Characteristics		Model	VX-53-1□3 VX-013-1□3
Operating Force Releasing Force	OF RF	Max. Min.	0.20 N {20 gf} -
Pretravel Overtravel Movement Differential	PT OT MD	Max. Min. Max.	9.0 mm 3.2 mm 2.0 mm
Operating Position	OP		15.2±2.6 mm

●Long hinge lever (Position K)
VX-53K-1□3
VX-013K-1□3



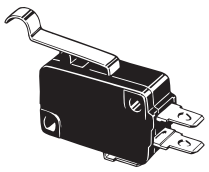


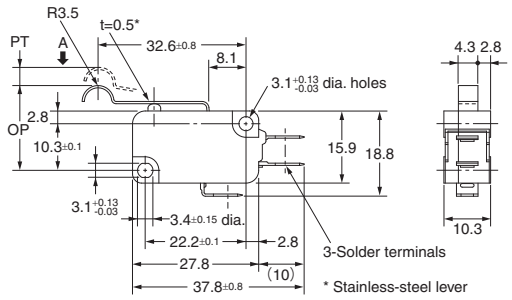
Operating Characteristics		Model	VX-53K-1□3 VX-013K-1□3
Operating Force Releasing Force	OF RF	Max. Min.	0.12 N {12 gf} -
Pretravel Overtravel Movement Differential	PT OT MD	Max. Min. Max.	15.0 mm 5.0 mm 4.2 mm
Operating Position	OP		15.2±4.4 mm

Note 1. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
Note 2. The operating characteristics are for operation in the A direction (⬇).

●Simulated roller lever (Standard Position)

VX-54-1□3
VX-014-1□3

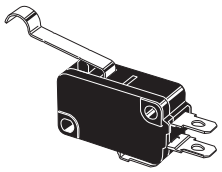


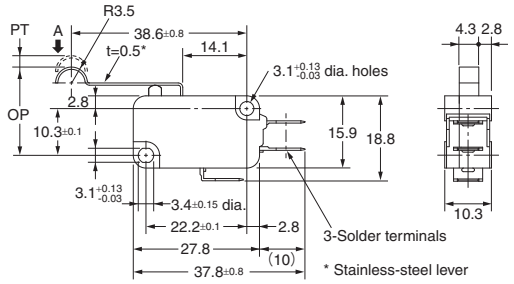


Operating Characteristics		Model	VX-54-1□3 VX-014-1□3
Operating Force Releasing Force	OF RF	Max. Min.	0.29 N {30 gf} 0.02 N {2 gf}
Pretravel Overtravel Movement Differential	PT OT MD	Max. Min. Max.	4.0 mm 1.6 mm 0.8 mm
Operating Position	OP		18.7±1.2 mm

●Simulated roller lever (Position K)

VX-54K-1□3
VX-014K-1□3

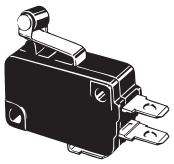


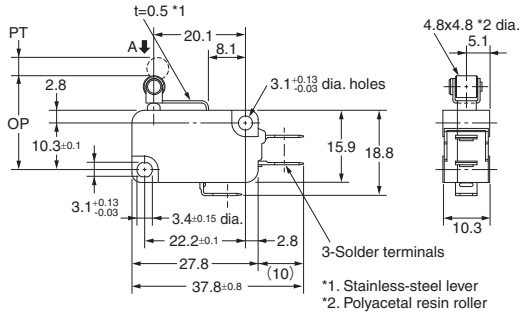


Operating Characteristics		Model	VX-54K-1□3 VX-014K-1□3
Operating Force Releasing Force	OF RF	Max. Min.	0.18 N {18 gf} (0.01 N {1 gf})
Pretravel Overtravel Movement Differential	PT OT MD	Max. Min. Max.	7.2 mm 2.5 mm 2.0 mm
Operating Position	OP		18.7±2.2 mm

●Short hinge roller lever (Standard Position)

VX-55-1□3
VX-015-1□3



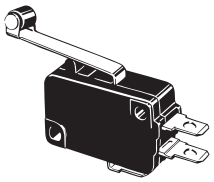


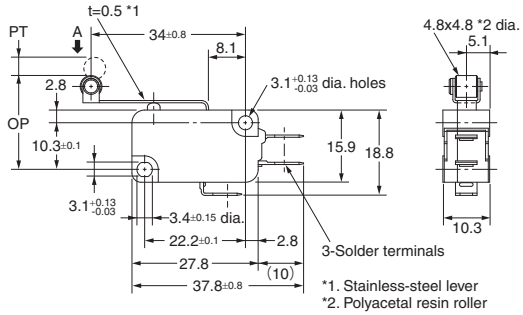
Operating Characteristics		Model	VX-55-1□3 VX-015-1□3
Operating Force Releasing Force	OF RF	Max. Min.	0.59 N {60 gf} 0.04 N {4 gf} (reference value)
Pretravel Overtravel Movement Differential	PT OT MD	Max. Min. Max.	1.6 mm 0.8 mm 0.5 mm
Operating Position	OP		20.7±0.6 mm

Note. The indicated reference values of RF are for cases where the lever weight is not applied to the plunger.

●Hinge roller lever (Standard Position)

VX-56-1□3
VX-016-1□3

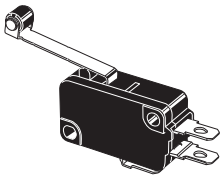


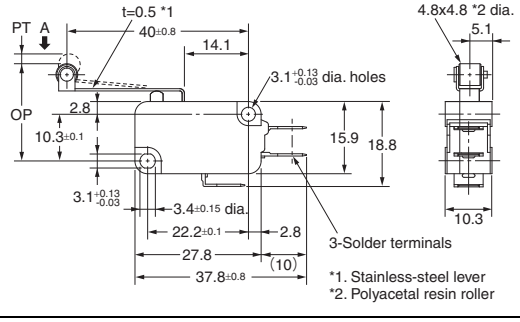


Operating Characteristics		Model	VX-56-1□3 VX-016-1□3
Operating Force Releasing Force	OF RF	Max. Min.	0.29 N {30 gf} -
Pretravel Overtravel Movement Differential	PT OT MD	Max. Min. Max.	4.0 mm 1.6 mm 0.8 mm
Operating Position	OP		20.7±1.2 mm

●Hinge roller lever (Position K)

VX-56K-1□3
VX-016K-1□3





Operating Characteristics		Model	VX-56K-1□3 VX-016K-1□3
Operating Force Releasing Force	OF RF	Max. Min.	0.18 N {18 gf} (0.01 N {1 gf})
Pretravel Overtravel Movement Differential	PT OT MD	Max. Min. Max.	7.2 mm 2.5 mm 2.0 mm
Operating Position	OP		20.7±2.2 mm

Note 1. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
Note 2. The operating characteristics are for operation in the A direction (⬇).

Precautions

★Please refer to "Common Precautions" for correct use.

Cautions

●Handling

Do not apply excessive shock. Doing so may cause damage to the Switch's internal components because it is designed for a small load.

●Soldering

- Terminal connections
  Complete the soldering at the iron tip temperature between 250 to 350°C (60W) within 5 seconds, and do not apply any external force for 1 minute after soldering.
  Apply minimum amount of flux required. It may result in contact failure once the flux penetrates into the internal part of the Switch.
- Connecting to Tab Terminals (#187)
  When connecting to the Tab terminal, insert the receptacle of tab #187 straight toward the terminal.
  Applying excessive external force laterally may cause deformation of terminals and may damage the housings.

Correct Use

●Mounting

Use M3 mounting screw 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 {4 to 6 kgf·cm}.

●Mounting Direction

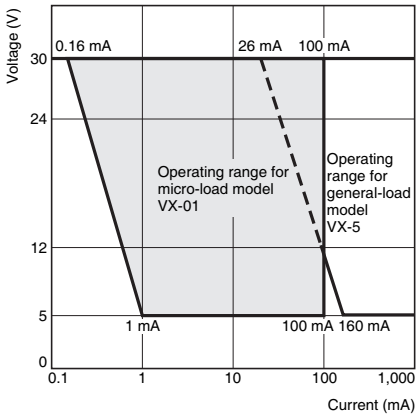
For a Switch with an actuator, mount the Switch in a direction where the actuator weight will not be applied to the Switch. Since the Switch is designed for a small load, its resetting force is small. Therefore, resetting failure may occur if unnecessary load is applied to the Switch.

●Using Micro Loads

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

(JIS C5003)

The equation, $\lambda_{60}=0.5\times10^{-6}$/operations operation, indicates that the estimated malfunction rate is less than $\frac{1}{2{,}000{,}000}$ operations with a reliability level of 60%.



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