OMRON

Miniature Basic Switch

VX

Miniature Basic Switch with Low Operating Force and High Contact Reliability

- Wide variation extends from micro load to 5-A switching current, with shapes identical to those of the V-series Miniature Basic Switch.
- A unique internal mechanism enables high contact strength with low operating force. Can be used for detecting lightweight objects.

Ordering Information

■ Model Number Legend

VX-□□-□□□

1 2 3 4 5

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

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

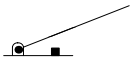
3. Contact Form
- 1: SPDT
- 2: SPST-NC
- 3: SPST-NO

4. Terminals
- A: Solder terminals
- C2: Quick-connect terminals (#187)

5. Maximum Operating Force
- 2: OF 0.25 N {25 gf}
- 3: OF 0.49 N {50 gf}

Note: These values are for the pin plunger models.

■ List of Models

Actuator	Terminals (see note)	OF max.	Model	
			5 A	0.1 A
Pin plunger	A	0.25 N {25 gf}	VX-5-1A2	VX-01-1A2
		0.49 N {50 gf}	VX-5-1A3	VX-01-1A3
	C2	0.25 N {25 gf}	VX-5-1C22	VX-01-1C22
		0.49 N {50 gf}	VX-5-1C23	VX-01-1C23
Short hinge lever 	A	0.49 N {50 gf}	VX-51-1A3	VX-011-1A3
	C2		VX-51-1C23	VX-011-1C23
Hinge Lever 	A	0.29 N {30 gf}	VX-52-1A3	VX-012-1A3
	C2		VX-52-1C23	VX-012-1C23
Long hinge lever 	A	0.20 N {20 gf}	VX-53-1A3	VX-013-1A3
	C2		VX-53-1C23	VX-013-1C23
Simulated roller lever 	A	0.29 N {30 gf}	VX-54-1A3	VX-014-1A3
	C2		VX-54-1C23	VX-014-1C23
Short hinge roller lever 	A	0.59 N {60 gf}	VX-55-1A3	VX-015-1A3
	C2		VX-55-1C23	VX-015-1C23
Hinge roller lever 	A	0.29 N {30 gf}	VX-56-1A3	VX-016-1A3
	C2		VX-56-1C23	VX-016-1C23

Note: 1. Contact your OMRON sales representative for details on SPST-NO and SPST-NC models.

2. Terminals A: Solder terminals
C2: Quick-connect terminals (#187)

Specifications

■ Ratings

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

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

■ Switching Capacity per Load (Reference Values)

Model	Voltage	Non-inductive load				Inductive load	
		Resistive load		Lamp load			
		NC	NO	NC	NO	NC	NO
VX-5	**125 VAC**	5 A		0.5 A		4 A	
	8 VDC	5 A		3 A		4 A	
	30 VDC	5 A		3 A		4 A	
	125 VDC	0.4 A		0.1 A		0.4 A	
	250 VDC	0.3 A		0.05 A		0.2 A	
VX-01	**125 VAC**	0.1 A		---		---	
	8 VDC	0.1 A		---		---	
	30 VDC	0.1 A					

Note: 1. Inductive load has a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).

2. Lamp load has an inrush current of 10 times the steady-state current.

■ Characteristics

Item	VX-5	VX-01
Operating speed	0.1 mm to 1 m/s (pin plunger models)	
Operating frequency	Mechanical: 600 operations/min max. Electrical: 30 operations/min max.	
Insulation resistance	100 MΩ min. (at 500 VDC)	
Contact resistance (initial value)	30 mΩ max.	50 mΩ max.
Dielectric strength (see note 2)	1,000 VAC, 50/60 Hz for 1 min between terminals of same polarity 1,500 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground 1,500 VAC, 50/60 Hz for 1 min 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: 400 m/s^2 {approx. 40G} max. Malfunction: 100 m/s^2 {approx. 10G} max.	
Durability (see note 4)	Mechanical: 50,000,000 operations min. (60 operations/min) (Refer to the following *Engineering Data*.) Electrical: 500,000 operations min. (30 operations/min) (Refer to the following *Engineering Data*.)	Mechanical: 10,000,000 operations min. (60 operations/min) (Refer to the following *Engineering Data*.) Electrical: 1,000,000 operations min. (30 operations/min) (Refer to the following *Engineering Data*.)
Degree of protection	IEC IP40	
Degree of protection against electric shock	Class I	
Proof tracking index (PTI)	175	
Ambient operating temperature	–25°C to 80°C (at ambient humidity of 60% max.) (with no icing)	
Ambient operating humidity	85% max. (for 5°C to 35°C)	
Weight	Approx. 6.2 g (pin plunger models)	

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

2. The value for dielectric strength shown is for models with a Separator.
3. For the pin plunger models, the above values apply for use at both the free position and total travel position. For the lever models, they apply at the total travel position. Contact opening or closing time is within 1 ms.
4. For testing conditions, contact your OMRON sales representative.

■ Approved Standards

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

UL1054 (File No. E41515)/CSA C22.2 No. 55 (File No. LR21642)

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

EN61058-1 (File No. 124761, VDE approval)

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

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

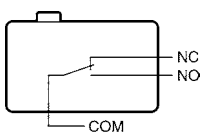
■ Contact Specifications

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

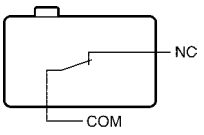
Note: For more information on the minimum applicable load, refer to *Using Micro Loads* on page 132.

■ Contact Form

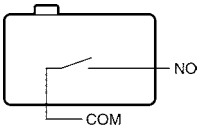
SPDT



SPST-NC



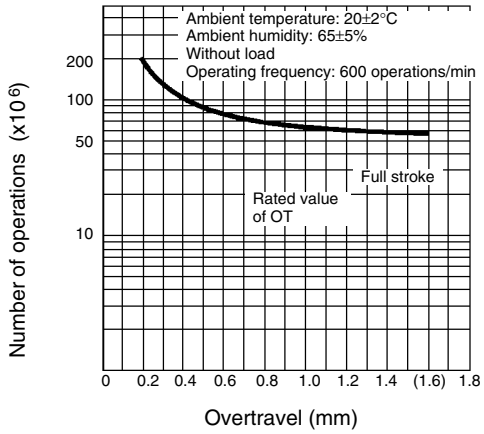
SPST-NO



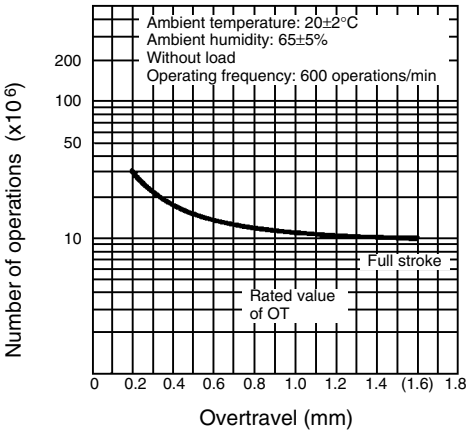
Engineering Data (Reference Values)

Mechanical Durability (Pin Plunger Models)

VX-5

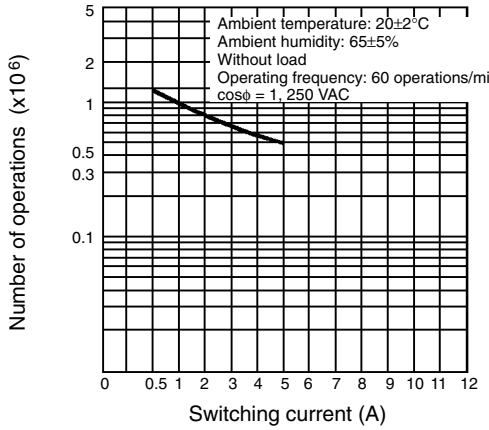


VX-01

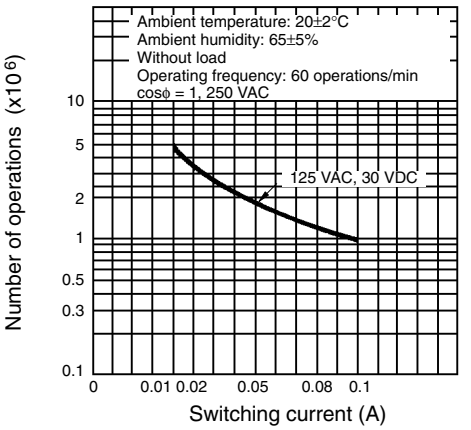


Electrical Durability (Pin Plunger Models)

VX-5



VX-01

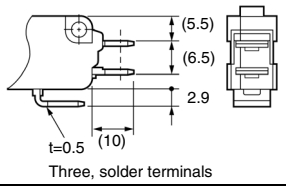
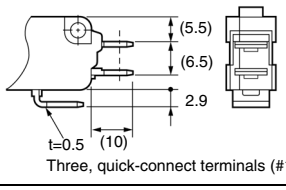
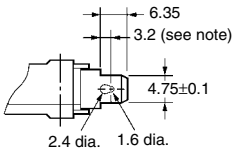
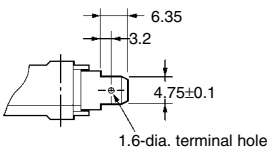


Dimensions

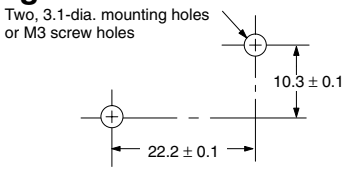
■ Terminals

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

2. The following is for the SPDT contact specifications.

Terminal type	Solder terminals (A)	Quick-connect terminals (#187) (C2)
COM bottom position	 Three, solder terminals	 Three, quick-connect terminals (#187)
Terminal dimensions	 **Note:** The length to the center of the 1.6-dia. holes.	

■ Mounting Holes



■ Dimensions and Operating Characteristics

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

2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

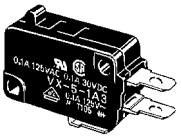
3. The following illustrations and drawings are for solder terminals (Terminal A). Illustrations for Terminal C2 are omitted. For details, refer to *Terminals*.

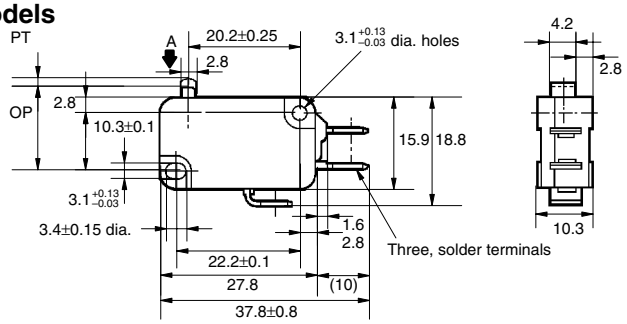
4. The □ in the model number is for the terminal code.
A: Solder terminals
C2: Quick-connect terminals (#187)

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

Pin Plunger Models

VX-5-1□2
VX-5-1□3
VX-01-1□2
VX-01-1□3

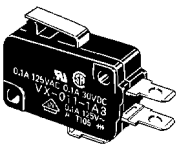


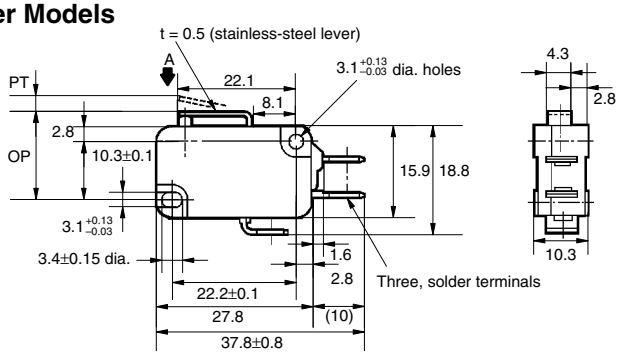


Model	VX-5-1□2 VX-01-1□2	VX-5-1□3 VX-01-1□3
OF max.	0.25 N {25 gf}	0.49 N {50 gf}
RF min.	0.03 N {3 gf}	0.05 N {5 gf}
PT max.	1.2 mm	
OT min.	1.0 mm	
MD max.	0.3 mm	
OP	14.7±0.4 mm	

Short Hinge Lever Models

VX-51-1□3
VX-011-1□3



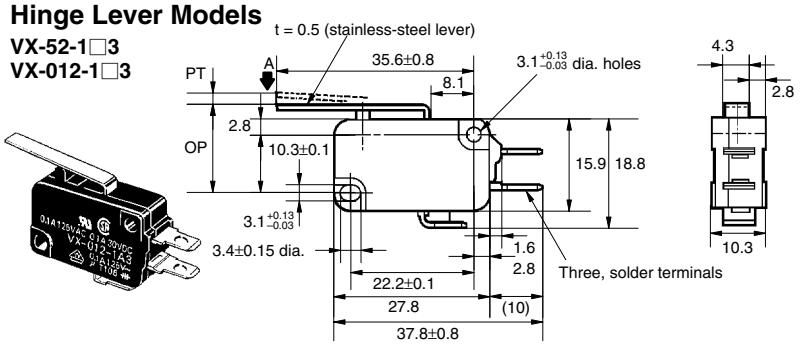


Model	VX-51-1□3	VX-011-1□3
OF max.	0.49 N {50 gf}	
RF min.	0.04 N {4 gf} (reference value)	
PT max.	1.6 mm	
OT min.	0.8 mm	
MD max.	0.5 mm	
OP	15.2±0.5 mm	

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.

Hinge Lever Models

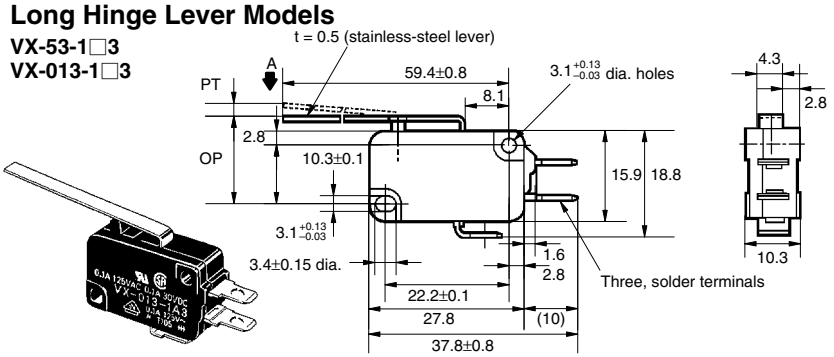
VX-52-1□3
VX-012-1□3



Model	VX-52-1□3	VX-012-1□3
OF max.	0.29 N {30 gf}	
RF min.	---	
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	0.8 mm	
OP	15.2±1.2 mm	

Long Hinge Lever Models

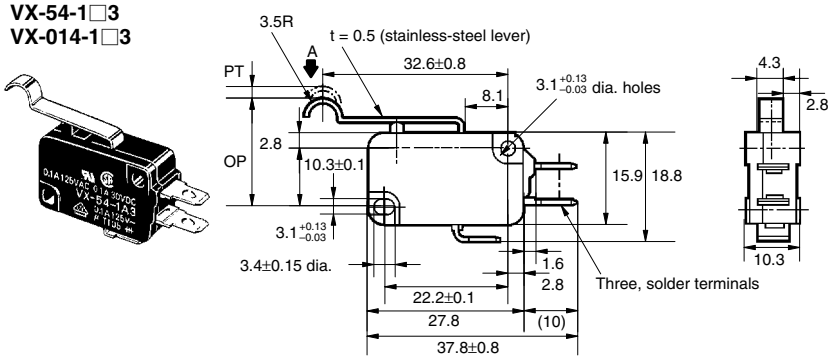
VX-53-1□3
VX-013-1□3



Model	VX-53-1□3	VX-013-1□3
OF max.	0.20 N {20 gf}	
RF min.	---	
PT max.	9.0 mm	
OT min.	3.2 mm	
MD max.	2.0 mm	
OP	15.2±2.6 mm	

Simulated Roller Lever Models

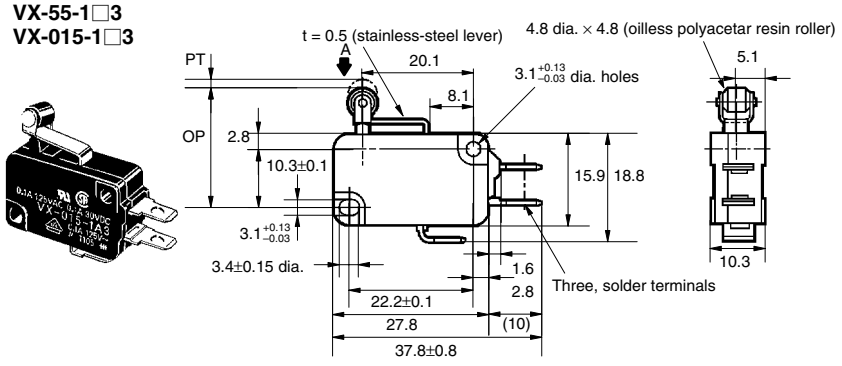
VX-54-1□3
VX-014-1□3



Model	VX-54-1□3	VX-014-1□3
OF max.	0.29 N {30 gf}	
RF min.	0.02 N {2 gf}	
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	0.8 mm	
OP	18.7±1.2 mm	

Short Hinge Roller Lever Models

VX-55-1□3
VX-015-1□3

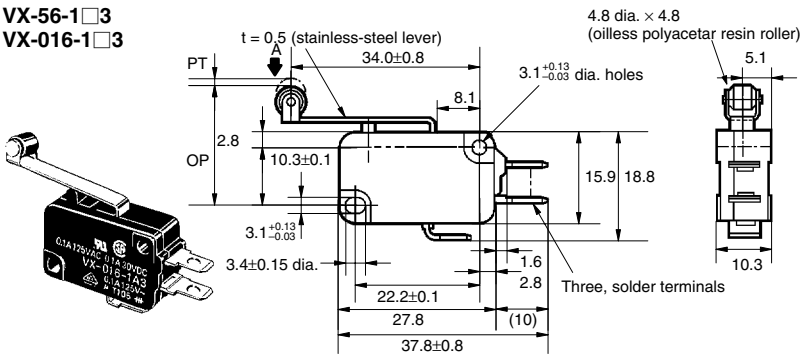


Model	VX-55-1□3	VX-015-1□3
OF max.	0.59 N {60 gf}	
RF min.	0.04 N {4 gf} (reference value)	
PT max.	1.6 mm	
OT min.	0.8 mm	
MD max.	0.5 mm	
OP	20.7±0.6 mm	

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.

Hinge Roller Lever Models

VX-56-1□3
VX-016-1□3



Model	VX-56-1□3	VX-016-1□3
OF max.	0.29 N {30 gf}	
RF min.	---	
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	0.8 mm	
OP	20.7±1.2 mm	

Precautions

Refer to pages 26 to 31 for common precautions.

■ Cautions

Handling

Be careful not to drop the Switch. Doing so may cause damage to the Switch's internal components because it is designed for a small load.

■ Correct Use

Mounting

Use M3 mounting screws 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}.

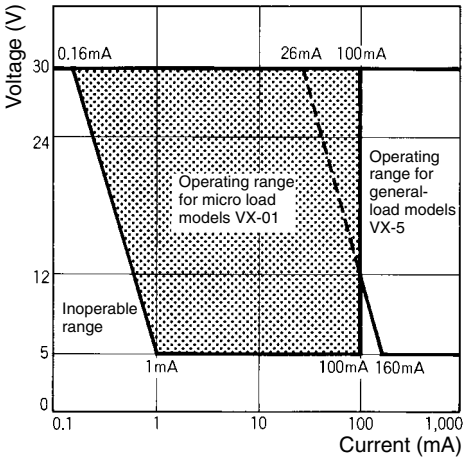
Mounting Direction

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 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%.



■ Actuator (Sold Separately)

Various Actuators are available as shown on pages 152 to 155.

■ Connector (Sold Separately)

Refer to Terminal Connectors on page 282.

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. B039-E1-02B