








# Snap Action Switch VX

## Miniature Snap Action Switch

- Compact snap action switch with low force operation
- Wide variation extends from microload to 5 A switching current, with shapes identical to those of the V-series Miniature Basic Snap Action Switch.
- Internal hinge lever mechanism assures outstanding contact reliability
- RoHS Compliant



## Ordering Information

Actuator	Terminal Style	OF max.	Rated current	
			5 A	0.1 A
Pin plunger 	A	25 gf	VX-5-1A2	VX-01-1A2
		50 gf	VX-5-1A3	VX-01-1A3
	C2	25 gf	VX-5-1C22	VX-01-1C22
		50 gf	VX-5-1C23	VX-01-1C23
Short hinge lever 	A	50 gf	VX-51-1A3	VX-011-1A3
	C2		VX-51-1C23	VX-011-1C23
Hinge lever 	A	30 gf	VX-52-1A3	VX-012-1A3
	C2		VX-52-1C23	VX-012-1C23
Long hinge lever 	A	20 gf	VX-53-1A3	VX-013-1A3
	C2		VX-53-1C23	VX-013-1C23
Simulated roller lever 	A	30 gf	VX-54-1A3	VX-014-1A3
	C2		VX-54-1C23	VX-014-1C23
Short hinge roller lever 	A	60 gf	VX-55-1A3	VX-015-1A3
	C2		VX-55-1C23	VX-015-1C23
Hinge roller lever 	A	30 gf	VX-56-1A3	VX-016-1A3
	C2		VX-56-1C23	VX-016-1C23

### 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: 25 gf  
3: 50 gf

**Note:** These OF values are for the pin plunger models.

# Specifications

## Characteristics

Item	VX-5	VX-01
Operating speed	0.1 mm to 1 m/s (pin plunger models)	
Operating frequency	Mechanical: 600 operations per minute Electrical: 30 operations per minute	
Contact resistance	30 mΩ max.	50 mΩ max.
Insulation resistance	100 MΩ min. at 500 VDC	
Dielectric strength (see note 2)	1,000 VAC, 50/60 Hz for 1 minute between terminals of same polarity 1,500 VAC, 50/60 Hz for 1 minute 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: 400 m/s <sup>2</sup> (approx. 40G) max. Malfunction: 100 m/s <sup>2</sup> (approx. 10G) max	
Degree of protection	IEC IP40	
Degree of protection against electric shock	Class I	
Proof tracking index	175	
Ambient operating temperature	-25°C to 80°C (at 60% RH max.) with no icing	
Ambient operating humidity	85% max (for 5°C to 35°C)	
Service life	Mechanical	50,000,000 operations min. (60 ops/minute)
	Electrical	10,000,000 operations min. (60 ops/minute)
Weight	Mechanical	500,000 operations min. (30 ops/minute)
	Electrical	1,000,000 operations min. (30 ops/minute)
Weight	Approx. 6.2 g (pin plunger models)	

- Note:**
1. Data shown are of initial value.
  2. The dielectric strength shown is measured using a separator between the switch and metal mounting plate.
  3. For the pin plunger models, the above values apply for use at the free position and total travel position. For lever models, they apply at the total travel position. Contact separation time is within 1 ms.

## Ratings (reference values)

Type	Rated voltage	Resistive load		Lamp load		Inductive load	
		NC	NO	NC	NO	NC	NO
5 A	250 VAC		5		---		---
	125 VAC		5		0.5		4
	8 VDC		5		3		4
	30 VDC		5		3		4
	125 VDC		0.4		0.1		0.4
	250 VDC		0.3		0.05		0.2
0.1 A	125 VAC		0.1		---		---
	8 VDC		0.1		---		---
	30 VDC		0.1		---		---

- Note:**
1. Inductive load has a power factor of 0.4 min. (AC) and a time constant of 7 milliseconds max. (DC).
  2. Lamp load has an inrush current of 10 times the steady-state current
  3. The electrical rating applies under the following test conditions:  
Ambient Temperature = 20±2°C, Ambient Humidity = 65±5%, Operating frequency = 30 operations/minute

## Approved Standards

UL Recognized (File No. E41515)  
CSA Certified (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 - - VDE approval (File No. 124761)

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

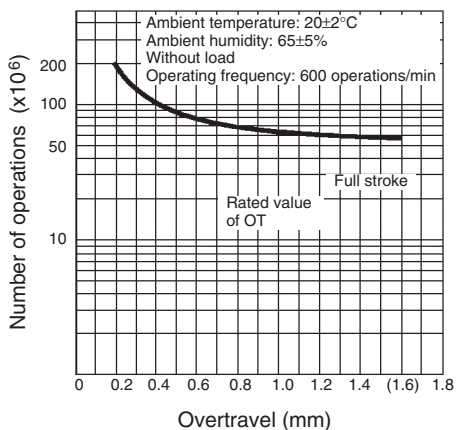
Item	VX-5	VX-01
Specification	Rivet	Crossbar
Material	Silver alloy	Gold alloy
Gap (standard value)	0.5 mm	
Inrush current	NC: 15A max.	
	NO: ---	---
Minimum applicable load (see note)	160 mA at 5 VDC	1 mA at 5 VDC

- 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  $\lambda_{60}=0.5 \times 10^{-6}$  / operations indicates that a failure rate of 1/2,000,000 operations can be expected at a reliability level of 60%

# Engineering Data

## Mechanical service life

VX-5

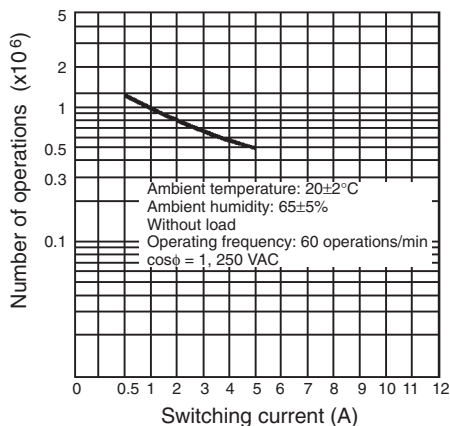


VX-01



## Electrical service life

VX-5



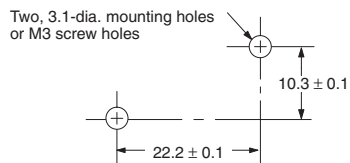
VX-01



## Mounting

### Panel Mounting

All switches may be panel mounted using 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.



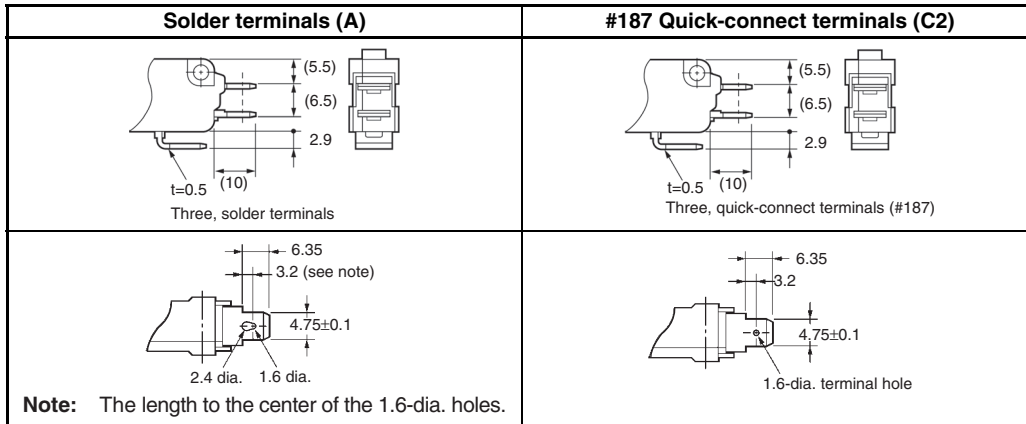
## Contact Form



# Dimensions

## ■ Terminals

- Note:** 1. Unless otherwise specified, all units are in millimeters and a tolerance of  $\pm 0.4$  mm applies to all dimensions  
 2. The following illustrates the SPDT contact form



## ■ Dimensions and Operating Characteristics

- Note:** 1. Unless otherwise specified, all units are in millimeters and a tolerance of  $\pm 0.4$  mm applies to all dimensions  
 2. The following illustrations and dimensions are for solder terminal models. Refer to "Terminals" for models with quick-connect terminals (#187).  
 3. The □ in the model number is for the terminal code. (A = Solder Terminal, C2 = #187 quick-connect terminal)  
 4. The operating characteristics are for operation in the A direction(↓)

### Pin Plunger Models

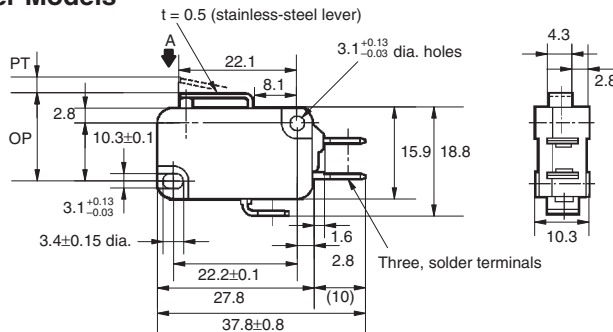
- VX-5-1□2  
 VX-5-1□3  
 VX-01-1□2  
 VX-01-1□3



Characteristics	VX-5-1□2 VX-01-1□2	VX-5-1□3 VX-01-1□3
OF max.	25 gf	50 gf
RF min.	3 gf	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

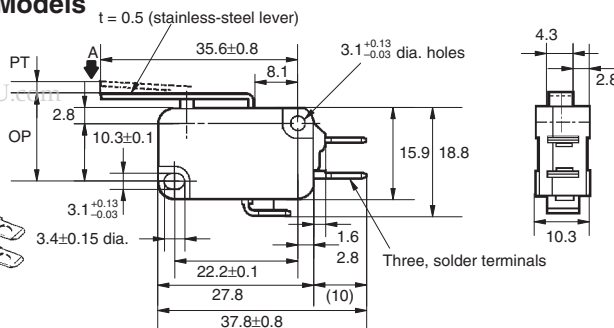


Characteristics	VX-51-1□3	VX-011-1□3
OF max.	50 gf (reference value)	
RF min.	4 gf (reference value)	
PT max.	1.6 mm	
OT min.	0.8 mm	
MD max.	0.5 mm	
OP	15.2 ± 0.5 mm	

**Note:** The reference value applies 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

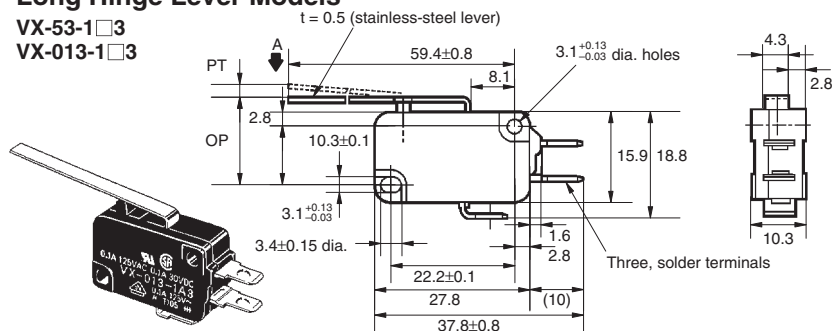


Characteristics	VX-52-1□3	VX-012-1□3
OF max.	30 gf	
RF min.	---	
PT max.	4.0 mm	
OT min.	1.6 mm	
MD max.	0.8 mm	
OP	15.2 ± 1.2 mm	

- Note:** 1. Unless otherwise specified, all units are in millimeters and a tolerance of  $\pm 0.4$  mm applies to all dimensions  
 2. The following illustrations and dimensions are for solder terminal models. Refer to "Terminals" for models with quick-connect terminals (#187).  
 3. The □ in the model number is for the terminal code. (A = Solder Terminal, C2 = #187 quick-connect terminal)  
 4. The operating characteristics are for operation in the A direction(↓)

**Long Hinge Lever Models**

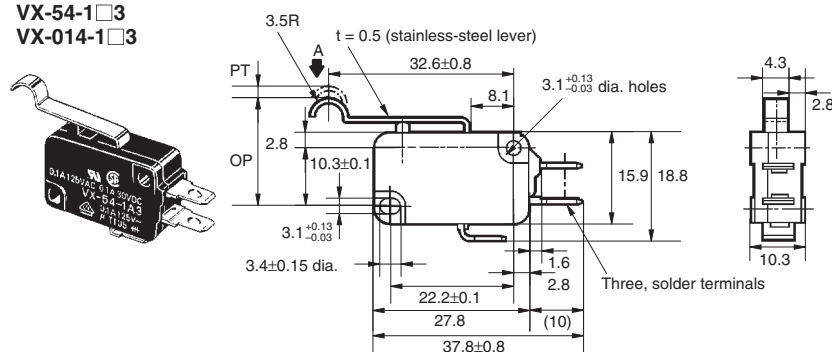
VX-53-1□3  
 VX-013-1□3



Characteristics	VX-53-1□3	VX-013-1□3
OF max.	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**

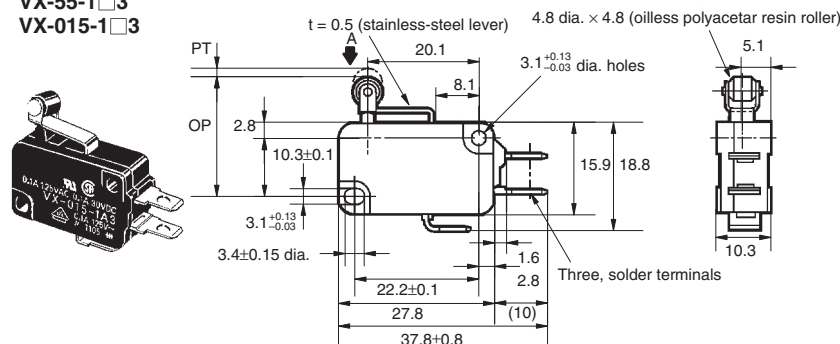
VX-54-1□3  
 VX-014-1□3



Characteristics	VX-54-1□3	VX-014-1□3
OF max.	30 gf	
RF min.	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

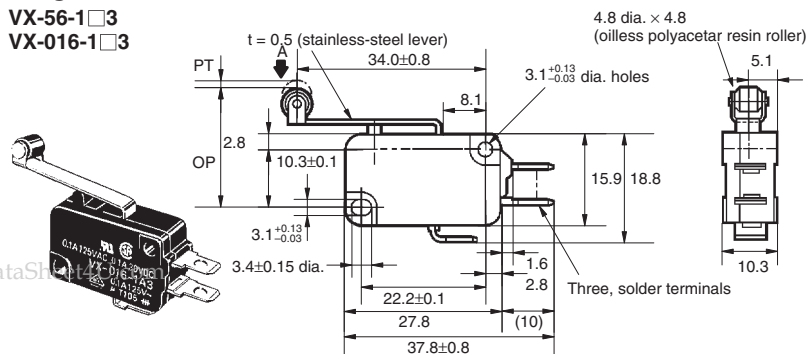


Characteristics	VX-55-1□3	VX-015-1□3
OF max.	60 gf (reference value)	
RF min.	4 gf (reference value)	
PT max.	1.6 mm	
OT min.	0.8 mm	
MD max.	0.5 mm	
OP	20.7 ± 0.6 mm	

**Note:** The reference value applies 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



Characteristics	VX-56-1□3	VX-016-1□3
OF max.	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

## ■ Correct Use

### 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.

### Operation

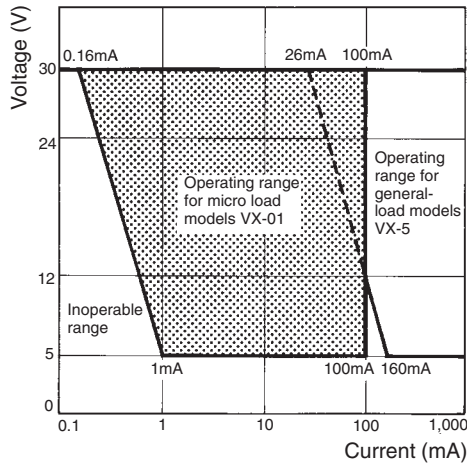
Keep the operation control completely separate from the actuator of the switch, and push it down fully when starting operation. Do not displace the operating position of the actuator when machining.

Consult OMRON in advance if the operating speed is to be extremely slow, or if the pushbutton is to be set somewhere between the free position and operating position.

Mount pin pushbutton switches so that stroke of the pushbutton and the stroke of the operating control overlap on a vertical line. The stroke of the switch, after operation, should be set to 60- 90% that of standard OT (MIN operation).

### Using Microloads

Using a model for ordinary loads to switch microloads may result in faulty operation. Instead, use the models that are designed for microloads and that operate in the following range;



However, even when using microload models within the operating range shown above, if inrush current or inductive voltage spikes occur when the contact is opened or closed, it may increase contact wear and so decrease the service life. Therefore, insert a contact protection circuit where necessary.

## ■ 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.

### Solder Terminal Connection

Quickly finish the soldering of the lead wire to its terminal. Use a soldering iron rated at 60W and preferably complete the soldering within 5 seconds.

Excess wattage or prolonged heating can deteriorate the characteristics of the switch.

### Insulation Distance

When mounting, make sure there is sufficient insulation distance between the switch and its mounting panel. If it is insufficient, install an insulation guard or separator. Always install an insulation guard or separator when mounting the microswitch on a metallic body. Contact your OMRON representative for information about insulation guards and separators.

### Application Environment

Do not use the Switch in locations that are subject to toxic gas, silicon, excessive dust, excessive dirt, high temperatures, high humidity, sudden temperature changes, water splashes, or oil splashes. Otherwise, damage resulting by faulty contact of the Switch contacts, corrosion, or other causes, or other functional faults may occur.

Depending on environmental conditions, the switch should be rechecked about 3 to 6 months after it has been assembled.

# Omron Electronic Components, LLC

## Terms and Conditions of Sales

### I. GENERAL

- Definitions:** The words used herein are defined as follows.
  - Terms:** These terms and conditions
  - Seller:** Omron Electronic Components LLC and its subsidiaries
  - Buyer:** The buyer of Products, including any end user in section III through VI
  - Products:** Products and/or services of Seller
  - Including:** Including without limitation
- Offer; Acceptance:** These Terms are deemed part of all quotations, acknowledgments, invoices, purchase orders and other documents, whether electronic or in writing, relating to the sale of Products by Seller. Seller hereby objects to any Terms proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
- Distributor:** Any distributor shall inform its customer of the contents after and including section III of these Terms.

### II. SALES

- Prices; Payment:** All prices stated are current, subject to change without notice by Seller. Buyer agrees to pay the price in effect at the time the purchase order is accepted by Seller. Payments for Products received are due net 30 days unless otherwise stated in the invoice. Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice.
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- Orders:** Seller will accept no order less than 200 U.S. dollars net billing.
- Currencies:** If the prices quoted herein are in a currency other than U.S. dollars, Buyer shall make remittance to Seller at the then current exchange rate most favorable to Seller; provided that if remittance is not made when due, Buyer will convert the amount to U.S. dollars at the then current exchange rate most favorable to Seller available during the period between the due date and the date remittance is actually made.
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- Financial:** If the financial position of Buyer at any time becomes unsatisfactory to Seller, Seller reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Seller may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
- Cancellation; Etc:** Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Seller fully against all costs or expenses arising in connection therewith.
- Force Majeure:** Seller shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
- Shipping; Delivery:** Unless otherwise expressly agreed in writing by Seller:
  - All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Seller), at which point title to and all risk of loss of the Products shall pass from Seller to Buyer, provided that Seller shall retain a security interest in the Products until the full purchase price is paid by Buyer;
  - Delivery and shipping dates are estimates only; and
  - Seller will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
- Claims:** Any claim by Buyer against Seller for shortage or damage to the Products occurring before delivery to the carrier or any claim related to pricing or other charges must be presented in detail in writing to Seller within 30 days of receipt of shipment.

### III. PRECAUTIONS

- Suitability:** IT IS THE BUYER'S SOLE RESPONSIBILITY TO ENSURE THAT ANY OMRON PRODUCT IS FIT AND SUFFICIENT FOR USE IN A MOTORIZED VEHICLE APPLICATION. BUYER SHALL BE SOLELY RESPONSIBLE FOR DETERMINING APPROPRIATENESS OF THE PARTICULAR PRODUCT WITH RESPECT TO THE BUYER'S APPLICATION INCLUDING (A) ELECTRICAL OR ELECTRONIC COMPONENTS, (B) CIRCUITS, (C) SYSTEM ASSEMBLIES, (D) END PRODUCT, (E) SYSTEM, (F) MATERIALS OR SUBSTANCES OR (G) OPERATING ENVIRONMENT. Buyer acknowledges that it alone has determined that the Products will meet their requirements of the intended use in all cases. Buyer must know and observe all prohibitions of use applicable to the Product/s.
- Use with Attention:** The followings are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible use of any Product, nor to imply that any use listed may be suitable for any Product:
  - Outdoor use, use involving potential chemical contamination or electrical interference.

- Use in consumer Products or any use in significant quantities.
  - Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
  - Systems, machines, and equipment that could present a risk to life or property.
- Prohibited Use:** NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
  - Motorized Vehicle Application:** USE OF ANY PRODUCT/S FOR A MOTORIZED VEHICLE APPLICATION MUST BE EXPRESSLY STATED IN THE SPECIFICATION BY SELLER.
  - Programmable Products:** Seller shall not be responsible for the Buyer's programming of a programmable Product.

### IV. WARRANTY AND LIMITATION

- Warranty:** Seller's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Seller (or such other period expressed in writing by Seller). SELLER MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT ALL OTHER WARRANTIES, NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS.
- Buyer Remedy:** Seller's sole obligation hereunder shall be to replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product or, at Seller's election, to repay or credit Buyer an amount equal to the purchase price of the Product; provided that there shall be no liability for Seller or its affiliates unless Seller's analysis confirms that the Products were correctly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Seller before shipment.
- Limitation on Liability:** SELLER AND ITS AFFILIATES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. FURTHER, IN NO EVENT SHALL LIABILITY OF SELLER OR ITS AFFILIATES EXCEED THE INDIVIDUAL PRICE OF THE PRODUCT ON WHICH LIABILITY IS ASSERTED.
- Indemnities:** Buyer shall indemnify and hold harmless Seller, its affiliates and its employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Seller is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products.

### V. INFORMATION; ETC.

- Intellectual Property:** The intellectual property embodied in the Products is the exclusive property of Seller and its affiliates and Buyer shall not attempt to duplicate it in any way without the written permission of Seller. Buyer (at its own expense) shall indemnify and hold harmless Seller and defend or settle any action brought against Seller to the extent that it is based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party.
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- Change In Specifications:** Product specifications and descriptions may be changed at any time based on improvements or other reasons. It is Seller's practice to change part numbers when published ratings or features are changed, or when significant engineering changes are made. However, some specifications of the Product may be changed without any notice.
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- Amendment:** These Terms constitute the entire agreement between Buyer and Seller relating to the Products, and no provision may be changed or waived unless in writing signed by the parties.
- Severability:** If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision.

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# Certain Precautions on Specifications and Use

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  - (i) Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
  - (ii) Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
  - (iii) Use in consumer products or any use in significant quantities.
  - (iv) Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this product.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
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**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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