

# Snap Action Switch

# V

## General Purpose Snap Action Switch

- Industry standard design with switching currents of 10A to 21A
- Widely used for applications where long life expectancy and high reliability is required.
- Choose from a variety of levers, terminals and operating forces.
- Right and Left Barrier options are available for the V-21 and V-16 models
- Heat resistant versions of the V-15 and V-10 are available.
- RoHS Compliant



## Ordering Information

### Model Number Legend

V -          -             -    -   

1    2    3    4    5    6    7    8    9

- |  |  |   |
|--|--|---|
| <p><b>1. Ratings</b></p> <p>21: 21 A at 250 VAC<br/>         16: 16 A at 250 VAC<br/>         15: 15 A at 250 VAC<br/>         11: 11 A at 250 VAC<br/>         10: 10 A at 250 VAC</p> <p><b>2. Contact Gap</b></p> <p>None: 1 mm (F gap)<br/>         G: 0.5 mm (G gap)</p> <p><b>3. Actuator</b></p> <p>None: Pin plunger</p> <p>1: Short hinge lever<br/>         2: Hinge lever<br/>         3: Long hinge lever<br/>         4: Simulated roller lever<br/>         5: Short hinge roller lever<br/>         6: Hinge roller lever</p> | <p><b>4. Contact Form</b></p> <p>COM Terminal, Bottom position:</p> <p>1: SPDT<br/>         2: SPST-NC<br/>         3: SPST-NO</p> <p>COM Terminal, Side position:</p> <p>4: SPDT<br/>         5: SPST-NC<br/>         6: SPST-NO</p> <p><b>5. Terminals</b></p> <p>A: Solder terminals<br/>         C2: Quick-connect terminal (#187)<br/>         C: Quick-connect terminal (#250)</p> <p><b>6. Insulation Barrier</b></p> <p>None: Without Barrier<br/>         R: Right-hand barrier<br/>         L: Left-hand barrier<br/>         (Barriers available for V-21 and V-16, only)</p> | <p><b>7. Maximum Operating Force</b></p> <p>6: 400 gf<br/>         5: 200 gf<br/>         4: 100 gf</p> <p><b>Note:</b> These OF values are for the pin plunger models.</p> <p><b>8. Special Purpose</b></p> <p>None: Standard<br/>         T: Heat resistive<br/>         (V-15 and V-10, only)</p> <p><b>9. Mounting Hole Size</b></p> <p>None: 3.1 mm<br/>         K: 2.9 mm</p> |
|--|--|---|

**Note:** Consult Omron regarding nomenclature combinations and part numbers not found in this datasheet.

## Available Combinations

				Thermoplastic case				Thermosetting case					
				Model		V-21	V-16		V-11	V-15		V-10	
				Rated Current		21 A	16 A		11 A	15 A		10 A	
COM terminal position	Insulation Barrier	Heat Resistance	OF Terminal Symbol	400 gf	400 gf	200 gf	100 gf	400 gf	200 gf	200 gf	100 gf		
Bottom	No	Standard (80°C)	Solder terminals (A)	---	○	○	○	○	○	○	○		
			Quick-connect terminals (#187)(C2)	---	○	○	○	○	○	○	○		
			Quick-connect terminals (#250)(C)	○	○	○	○	○	○	○	○		
		Heat resistant (150°C)	Solder terminals (A)	---	---	---	---	○	○	○	○		
			Quick-connect terminals (#187)(C2)	---	---	---	---	○	○	○	○		
			Quick-connect terminals (#250)(C)	---	---	---	---	---	---	---	---		
	Yes	Standard (80°C)	Solder terminals (A)	---	○	○	---	---	---	---	---		
			Quick-connect terminals (#187)(C2)	---	○	○	---	---	---	---	---		
			Quick-connect terminals (#250)(C)	○	○	○	---	---	---	---	---		
Side	No	Standard (80°C)	Solder terminals (A)	---	---	---	---	○	○	○	○		
			Quick-connect terminals (#187)(C2)	---	---	---	---	○	○	○	○		
			Quick-connect terminals (#250)(C)	○	---	---	---	---	---	---	---		

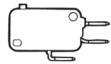
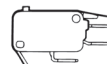
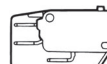







Note: 1. ○: Available model.

Consult OMRON for specific models with standard approval.

## List of Models

### Thermoplastic Case

#### 21 A (OF: 400 gf)

Common terminal position	Contact form	Terminal style	Actuator	Without barrier	Right-hand barrier	Left-hand barrier	
							
Bottom	SPDT	Quick-connect (#250) (C)	Pin plunger 	V-21-1C6	V-21-1CR6	V-21-1CL6	
				V-21-2C6	V-21-2CR6	V-21-2CL6	
				V-21-3C6	V-21-3CR6	V-21-3CL6	
	SPDT		Short hinge lever 	V-211-1C6	V-211-1CR6	V-211-1CL6	
				Hinge lever 	V-212-1C6	V-212-1CR6	V-212-1CL6
					Long hinge lever 	V-213-1C6	V-213-1CR6
				Simulated roller lever 	V-214-1C6	V-214-1CR6	V-214-1CL6
				Short hinge roller lever 	V-215-1C6	V-215-1CR6	V-215-1CL6
Hinge roller lever 	V-216-1C6	V-216-1CR6	V-216-1CL6				

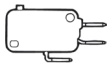



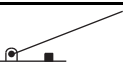



Note: 1. Add "G" to the part number in the appropriate location to obtain a 0.5 mm contact gap. Add "K" to the part number in the appropriate location to obtain 2.9 mm mounting holes. Example: V-21 G2-1C6-K

2. Not all combinations are available. Consult Omron regarding nomenclature combinations and part numbers not found in this datasheet.

16 A (OF: 200 gf)

Common terminal position	Contact form	Terminal style	Actuator	Without barrier	Right-hand barrier	Left-hand barrier
						
Bottom	SPDT	A	Pin plunger 	V-16-1A5	V-16-1AR5	V-16-1AL5
		C2		V-16-1C25	V-16-1C2R5	V-16-1C2L5
		C		V-16-1C5	---	---
	SPST-NC	A		V-16-2A5	V-16-2AR5	V-16-2AL5
		C2		V-16-2C25	V-16-2C2R5	V-16-2C2L5
		C		V-16-2C5	---	---
	SPST-NO	A		V-16-3A5	V-16-3AR5	V-16-3AL5
		C2		V-16-3C25	V-16-3C2R5	V-16-3C2L5
		C		V-16-3C5	---	---
	SPDT	A	Short hinge lever 	V-161-1A5	V-161-1AR5	V-161-1AL5
				C2	V-161-1C25	V-161-1C2R5
				C	V-161-1C5	---
		A	Hinge lever 	V-162-1A5	V-162-1AR5	V-162-1AL5
				C2	V-162-1C25	V-162-1C2R5
				C	V-162-1C5	---
		A	Long hinge lever 	V-163-1A5	V-163-1AR5	V-163-1AL5
				C2	V-163-1C25	V-163-1C2R5
				C	V-163-1C5	---
		A	Simulated roller lever 	V-164-1A5	V-164-1AR5	V-164-1AL5
				C2	V-164-1C25	V-164-1C2R5
				C	V-164-1C5	---
		A	Short hinge roller lever 	V-165-1A5	V-165-1AR5	V-165-1AL5
				C2	V-165-1C25	V-165-1C2R5
				C	V-165-1C5	---
A		Hinge roller lever 	V-166-1A5	V-166-1AR5	V-166-1AL5	
			C2	V-166-1C25	V-166-1C2R5	
			C	V-166-1C5	---	








11 A (OF: 100 gf)

Common terminal position	Contact form	Terminal style	Actuator	Without barrier
				
Bottom	SPDT	A	Pin plunger 	V-11-1A4
		C2		V-11-1C24
		C		V-11-1C4
		A	Short hinge lever 	V-111-1A4
		C2		V-111-1C24
		C		V-111-1C4
		A	Hinge lever 	V-112-1A4
		C2		V-112-1C24
		C		V-112-1C4
		A	Long hinge lever 	V-113-1A4
		C2		V-113-1C24
		C		V-113-1C4
		A	Simulated roller lever 	V-114-1A4
		C2		V-114-1C24
		C		V-114-1C4
		A	Short hinge roller lever 	V-115-1A4
		C2		V-115-1C24
		C		V-115-1C4
A	Hinge roller lever 	V-116-1A4		
C2		V-116-1C24		
C		V-116-1C4		

- Note:** 1. Add "G" to the part number in the appropriate location to obtain a 0.5 mm contact gap. Add "-K" to the part number in the appropriate location to obtain 2.9 mm mounting holes. Examples: 1) V-16G3-1C25-K 2) V-11G-1A4-K  
 2. Not all combinations are available. Consult Omron regarding nomenclature combinations and part numbers not found in this datasheet.

## Thermosetting Case








### Standard models - 15 A / 10 A

Common terminal position	Contact form	Terminal style	Actuator	15 A	10 A		
				200 gf	200 gf	100 gf	
Bottom	SPDT	A	Pin plunger 	V-15G-1A5-K	V-10G-1A5-K	V-10G-1A4-K	
		C2		V-15G-1C25-K	V-10G-1C25-K	V-10G-1C24-K	
		C		V-15G-1C5-K	—	—	
	SPST-NC	A		V-15G-2A5-K	V-10G-2A5-K	V-10G-2A4-K	
		C2		V-15G-2C25-K	V-10G-2C25-K	V-10G-2C24-K	
		C		V-15G-3A5-K	V-10G-3A5-K	V-10G-3A4-K	
	SPST-NO	A		V-15G-3C25-K	V-10G-3C25-K	V-10G-3C24-K	
		C2		V-15G-3C5-K	—	—	
		C		V-15G-4A5-K	V-10G-4A5-K	V-10G-4A4-K	
	Side	SPDT		A	V-15G-5A5-K	V-10G-5A5-K	V-10G-5A4-K
		SPST-NC		A	V-15G-6A5-K	V-10G-6A5-K	V-10G-6A4-K
		SPST-NO		A	V-15G-6A5-K	V-10G-6A5-K	V-10G-6A4-K
Bottom	SPDT	A	Short hinge lever 	V-15G1-1A5-K	V-10G1-1A5-K	V-10G1-1A4-K	
		C2		V-15G1-1C25-K	V-10G1-1C25-K	V-10G1-1C24-K	
		A	Hinge lever 	V-15G2-1A5-K	V-10G2-1A5-K	V-10G2-1A4-K	
		C2		V-15G2-1C25-K	V-10G2-1C25-K	V-10G2-1C24-K	
		A	Long hinge lever 	V-15G3-1A5-K	V-10G3-1A5-K	V-10G3-1A4-K	
		C2		V-15G3-1C25-K	V-10G3-1C25-K	V-10G3-1C24-K	
		A	Simulated roller lever 	V-15G4-1A5-K	V-10G4-1A5-K	V-10G4-1A4-K	
		C2		V-15G4-1C25-K	V-10G4-1C25-K	V-10G4-1C24-K	
		A	Short hinge roller lever 	V-15G5-1A5-K	V-10G5-1A5-K	V-10G5-1A4-K	
		C2		V-15G5-1C25-K	V-10G5-1C25-K	V-10G5-1C24-K	
		A	Hinge roller lever 	V-15G6-1A5-K	V-10G6-1A5-K	V-10G6-1A4-K	
		C2		V-15G6-1C25-K	—	V-10G6-1C24-K	

Note: 1. For SPST-NC and SPST-NO with levers consult Omron.

2. Not all combinations are available. Consult Omron regarding nomenclature combinations and part numbers not found in this datasheet.

### Heat Resistant Models (Up to 150°C) - 15 A / 10A

Common terminal position	Contact form	Terminal style	Actuator	15 A	10 A
				200 gf	100 gf
Bottom	SPDT	Solder Terminals (A)	Pin plunger 	V-15-1A5-T	V-10-1A4-T
			Short hinge lever 	V-151-1A5-T	V-101-1A4-T
			Hinge lever 	V-152-1A5-T	V-102-1A4-T
			Long hinge lever 	V-153-1A5-T	V-103-1A4-T
			Simulated roller lever 	V-154-1A5-T	V-104-1A4-T
			Short hinge roller lever 	V-155-1A5-T	V-105-1A4-T
			Hinge roller lever 	V-156-1A5-T	V-106-1A4-T

Note: 1. Add "G" to the part number in the appropriate location to obtain a 0.5 mm contact gap. Add "-K" to the part number in the appropriate location to obtain 2.9 mm mounting holes. Add "C2" to the part number in the appropriate location to obtain versions with #187 quick-connect terminals. Example: 1) V-15G1-1C25-T-K

2. Not all combinations are available. Consult Omron regarding nomenclature combinations and part numbers not found in this datasheet.

# Specifications

## ■ Ratings (reference values)

Type	Rated voltage	Non-inductive load				Inductive load			
		Resistive load		Lamp load		Inductive load		Motor load	
		NC	NO	NC	NO	NC	NO	NC	NO
V-21	250 VAC	21 A		3 A		12 A		4 A	
	8 VDC	21 A		5 A		12 A		7 A	
	30 VDC	14 A		5 A		12 A		5 A	
	125 VDC	0.6 A		0.1 A		0.6 A		0.1 A	
	250 VDC	0.3 A		0.05 A		0.3 A		0.05 A	
V-16	250 VAC	16 A		2 A		10 A		3 A	
	8 VDC	16 A		4 A		10 A		6 A	
	30 VDC	10 A		4 A		10 A		4 A	
	125 VDC	0.6 A		0.1 A		0.6 A		0.1 A	
	250 VDC	0.3 A		0.05 A		0.3 A		0.05 A	
V-15	250 VAC	15 A		2 A		10 A		3 A	
	8 VDC	15 A		4 A		10 A		6 A	
	30 VDC	10 A		4 A		10 A		4 A	
	125 VDC	0.6 A		0.1 A		0.6 A		0.1 A	
	250 VDC	0.3 A		0.05 A		0.3 A		0.05 A	
V-11	250 VAC	11 A		1.5 A		6 A		2 A	
	8 VDC	11 A		3 A		6 A		3 A	
	30 VDC	6 A		3 A		6 A		3 A	
	125 VDC	0.6 A		0.1 A		0.6 A		0.1 A	
	250 VDC	0.3 A		0.05 A		0.3 A		0.05 A	
V-10	250 VAC	10 A		1.5 A		6 A		2 A	
	8 VDC	10 A		3 A		6 A		3 A	
	30 VDC	6 A		3 A		6 A		3 A	
	125 VDC	0.6 A		0.1 A		0.6 A		0.1 A	
	250 VDC	0.3 A		0.05 A		0.3 A		0.05 A	

- Note:**
- The above current values are the normal current values of models with a contact gap of 1 mm (gap F), which vary with the normal current values of models with a contact gap of 0.5 mm (gap G).
  - Inductive load has a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).
  - Lamp load has an inrush current of 10 times the steady-state current.
  - Motor load has an inrush current of 6 times the steady-state current.
  - The ratings values apply under the following test conditions: Ambient temperature: 20±2°C, Ambient humidity: 65±5%, Operating frequency: 30 operations/min

## ■ Approved Standards

UL1054 (File No. E41515)

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

Rated voltage	V-21	V-16	V-15	V-11	V-10
125 VAC	21 A, 1/2 HP	16 A, 1/2 HP	15 A, 1/2 HP	11 A, 1/3 HP	10 A, 1/3 HP
250 VAC					
125 VDC	0.6 A				
250 VDC	0.3 A				

EN 61058-1 (File No. 129608, VDE approval)

Rated voltage	V-21	V-16	V-11
250 VAC	20 (4) A	16 (4) A	11 (3) A

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

EN 61058-1 (File No. T9451451, TÜV Rheinland approval)

Rated voltage	V-15	V-10
250 VAC	15 A	10 A
250 VDC	0.3 A	

Testing conditions: 5E4 (50,000 operations), T85 (0°C to 85°C)

## ■ Characteristics

<b>Operating speed</b>	0.1 mm to 1 m/s (plunger models)
<b>Operating frequency</b>	Mechanical: 600 operations/minute, max. Electrical: 30 operations/minute, max.
<b>Insulation resistance</b>	100 MΩ min. (at 500 VDC)
<b>Contact resistance</b>	15 mΩ max.
<b>Dielectric strength (see note 2)</b>	1,000 VAC, 50/60 Hz for 1 min between terminals of the same polarity V-21, V-16 and V-11: 2,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ground, and between each terminal and non-current-carrying metal parts V-15 and V-10: 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
<b>Vibration resistance (see note 3)</b>	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
<b>Shock resistance (see note 3)</b>	Destruction: 1,000 m/s <sup>2</sup> (approx. 100G) max. Malfunction: V-21/V-16/V-15: 300 m/s <sup>2</sup> (approx. 30G) max. V-11/V10: 200 m/s <sup>2</sup> (approx. 20G) max.
<b>Life expectancy</b>	Mechanical: 50,000,000 operations min. (60 operations/minute) Electrical: V-21/V-16/V-15: 100,000 operations min. (30 operations/minute) (V-15 heat resistive: 20,000 operations min. (30 ops/minute)) V-11/V-10: 300,000 operations min. (30 operations/minute) (V-10 heat resistive: 50,000 operations min. (30 ops/minute))
<b>Degree of protection</b>	IEC IP40
<b>Degree of protection against electric shock</b>	Class I
<b>Proof tracking index (PTI)</b>	175
<b>Ambient operating temperature</b>	-25°C to 80°C (at 60% RH max.) with no icing -25°C to 150°C for heat resistive models (at 60% RH max.) with no icing.
<b>Ambient operating humidity</b>	85% max. (for 5°C to 35°C)
<b>Weight</b>	Approx. 6.2 g (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 pin plunger models, the above values apply for use at both the free position and total travel position. For lever models, they apply at the total travel position.

4. For testing conditions, contact your OMRON sales representative.

## ■ Contact Specifications

Item		V-21	V-16	V-15	V-11	V-10
Contact	Specification	Rivet				
	Material	Silver alloy				Silver
	Gap (standard value)	1 mm (F gap type) or 0.5 mm (G gap type)				
Inrush current	NC	50 A max.	40 A max.	36 A max.	24 A max.	
	NO					
Minimum applicable load		160 mA at 5 VDC				

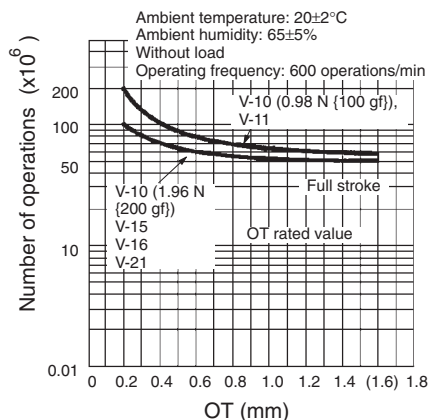
**Note:** Minimum applicable loads are indicated by N standard reference values. This value represents the failure rate at a 60% ( $\lambda_{60}$ ) reliability level (JIS C5003). The equation  $\lambda_{60}=0.5 \times 10^{-6}$  / operations indicates that a failure rate of 1/2,000,000 operations can be expected at a reliability level of 60%

# Engineering Data

## Mechanical service life

(Pin plunger models)

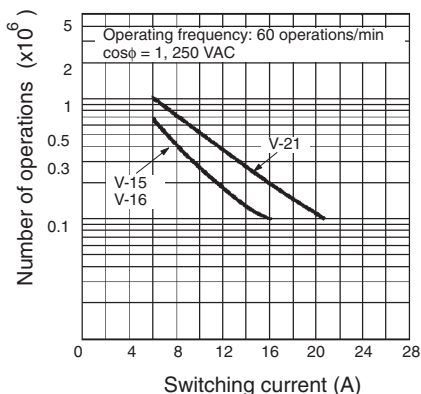
V-21/-16/-15/-10



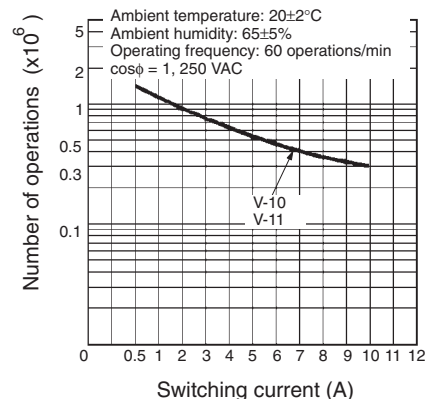
## Electrical service life

(Pin plunger models)

V-21/-16/-15



V-11/-10



## Contact Form

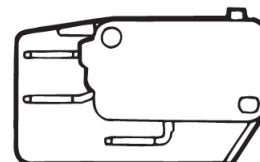
Common terminal position	Contact form		
	SPDT	SPST-NC*	SPST-NO*
Bottom type			
Side type			

\* The SPST-NC and SPST-NO contact form types listed in the ordering information tables are for Pin Plunger models only. For information concerning lever models consult Omron.

## Barrier direction (V-21 and V-16)

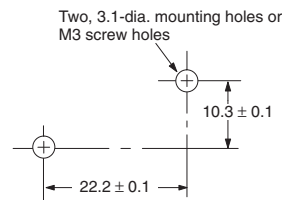
Right-hand Barrier

Left-hand Barrier



## Mounting Holes

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.



# 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 table is for the SPDT contact specifications. Two terminals will be available for SPST-NO or SPST-NC contact specifications. For terminal positions, refer to the above *Contact Form*
3. Right-angle PCB terminal type is available with some models (not shown). Drawings will be provided if requested.
- D5: Pins at right angles, to the right  
 D6: Pins at right angle, to the left

Terminal type	Solder Terminal (A)	Quick-connect Terminal (#187) (C2)	Quick-connect Terminal (#250) (C)
COM bottom position	<p>t = 0.5 Three, solder terminals</p>	<p>t = 0.5 Three, quick-connect terminals (#187)</p>	<p>t = 0.8 Three, quick-connect terminals (#250)</p>
COM side position			
Terminal dimensions	<p>Note: Indicates the length to the center of the 1.6-dia. holes</p>	<p>1.6-dia. terminal hole</p>	<p>1.65-dia. terminal hole</p>



# ■ Dimensions and Operating Characteristics

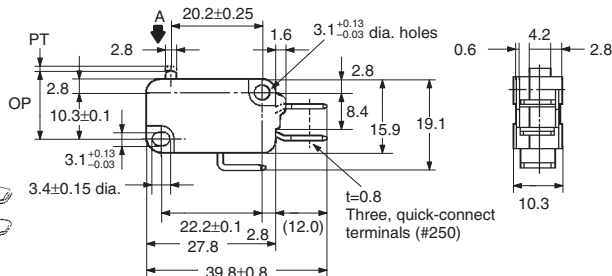
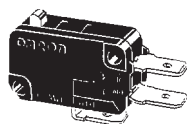
## Thermoplastic Case Models

- 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 drawings are for quick-connect terminals (#250) (terminals C). V models also incorporate terminals A and C2, which are omitted from the following drawings. Refer to *Terminals* section for the dimensions of these terminals.
  3. The □ in the model number is for the terminal code.
  4. The illustrations for V-21, V-16 and V-11 show a hole size of 3.1 mm. V-21, V-16 and V-11 models with a suffix "K" have a hole size of 2.9 mm.
  5. The operating characteristics are for operation in the A direction ( ↓ ).

## Pin Plunger Models

(Without Barrier)

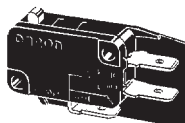
- V-21-1□6
- V-16-1□5
- V-11-1□4



Characteristics	V-21-1□6	V-16-1□5
OF max.	400 gf	200 gf
RF min.	80 gf	50 gf
PT max.	1.2 mm	
OT min.	1.0 mm	
MD max.	0.4 mm	
OP	14.7 ± 0.4 mm	

(With Right-hand Barrier)

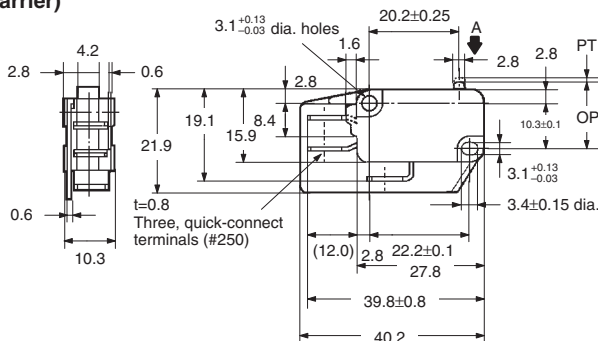
- V-21-1□R6
- V-16-1□R5



Characteristics	V-11-1□4	V-11-1□5
OF max.	100 gf	200 gf
RF min.	20 gf	50 gf
PT max.	1.2 mm	
OT min.	1.0 mm	
MD max.	0.4 mm	
OP	14.7 ± 0.4 mm	

(With Left-hand Barrier)

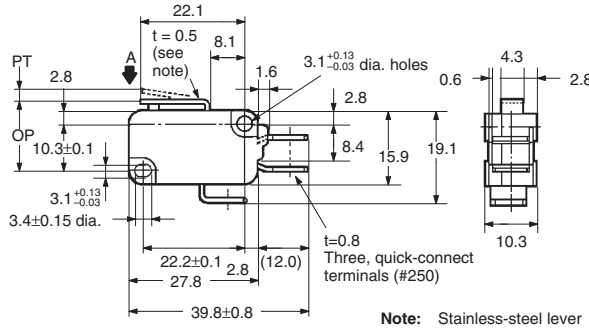
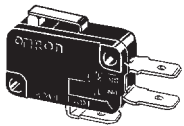
- V-21-1□L6
- V-16-1□L5



- 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 drawings are for quick-connect terminals (#250) (terminals C). V models also incorporate terminals A and C2, which are omitted from the following drawings. Refer to *Terminals* section for the dimensions of these terminals.  
 3. The □ in the model number is for the terminal code.  
 4. The illustrations for V-21, V-16 and V-11 show a hole size of 3.1 mm. V-21, V-16 and V-11 models with a suffix "K" have a hole size of 2.9 mm.  
 5. The operating characteristics are for operation in the A direction ( ↓ ).

### Short Hinge Lever Models

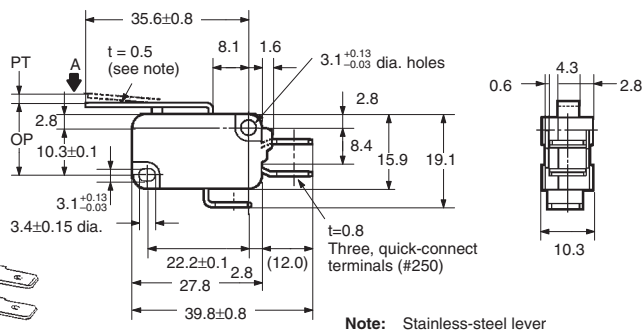
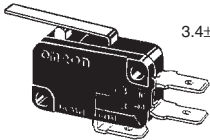
- V-211-1□6  
 V-161-1□5  
 V-111-1□4



Characteristics	V-211-1□6	V-161-1□5	V-111-1□4
OF max.	400 gf	200 gf	100 gf
RF min.	50 gf	50 gf	15 gf
PT max.	1.6 mm		
OT min.	0.8 mm		
MD max.	0.6 mm		
OP	15.2 ± 0.5 mm		

### Hinge Lever Models

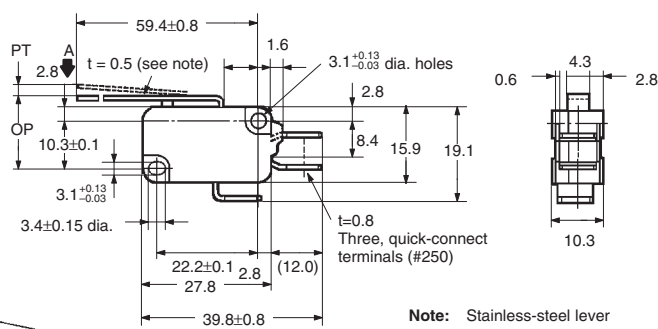
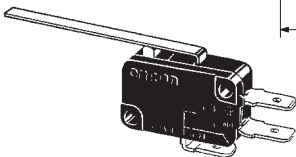
- V-212-1□6  
 V-162-1□5  
 V-112-1□4



Characteristics	V-212-1□6	V-162-1□5	V-112-1□4
OF max.	250 gf	125 gf	60 gf
RF min.	25 gf	14 gf	6 gf
PT max.	4.0 mm		
OT min.	1.6 mm		
MD max.	1.5 mm		
OP	15.2 ± 1.2 mm		

### Long Hinge Lever Models

- V-213-1□6  
 V-163-1□5  
 V-113-1□4

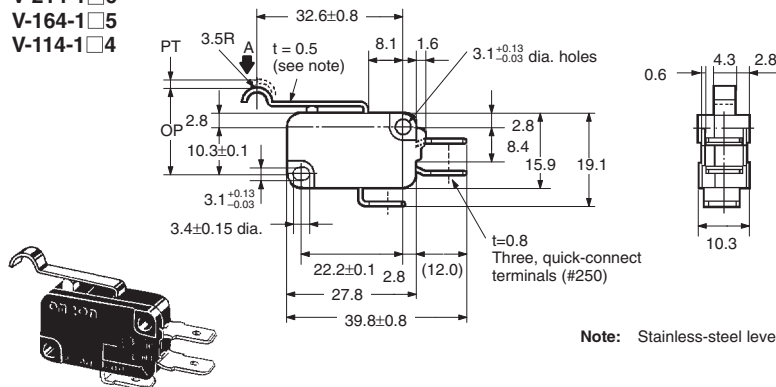


Characteristics	V-213-1□6	V-163-1□5	V-113-1□4
OF max.	130 gf	70 gf	35 gf
RF min.	12 gf	6 gf	---
PT max.	9.0 mm		
OT min.	2.0 mm		3.2 mm
MD max.	2.8 mm		
OP	15.2 <sup>+2.6</sup> / <sub>-3.2</sub> mm		15.2 ± 2.6 mm

- 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 drawings are for quick-connect terminals (#250) (terminals C). V models also incorporate terminals A and C2, which are omitted from the following drawings. Refer to *Terminals* section for the dimensions of these terminals.
  3. The □ in the model number is for the terminal code.
  4. The illustrations for V-21, V-16 and V-11 show a hole size of 3.1 mm. V-21, V-16 and V-11 models with a suffix "K" have a hole size of 2.9 mm.
  5. The operating characteristics are for operation in the A direction ( ↓ ).

### Simulated Roller Lever Models

V-214-1□6  
V-164-1□5  
V-114-1□4



Characteristics	V-214-1□6	V-164-1□5	V-114-1□4
OF max.	250 gf	125 gf	60 gf
RF min.	25 gf	14 gf	6 gf
PT max.	4.0 mm		
OT min.	1.6 mm		
MD max.	1.5 mm		
OP	18.7 ± 1.2 mm		

### Short Hinge Roller Lever Models

V-215-1□6  
V-165-1□5  
V-115-1□4



Characteristics	V-215-1□6	V-165-1□5	V-115-1□4
OF max.	480 gf	240 gf	120 gf
RF min.	50 gf	50 gf	15 gf
PT max.	1.6 mm		
OT min.	0.8 mm		
MD max.	0.6 mm		
OP	20.7 ± 0.6 mm		

### Hinge Roller Lever Models

V-216-1□6  
V-166-1□5  
V-116-1□4



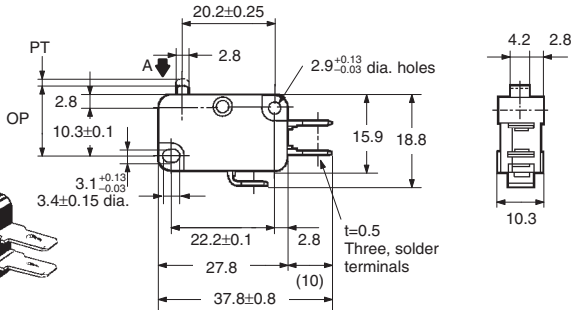
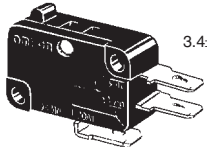
Characteristics	V-216-1□6	V-166-1□5	V-116-1□4
OF max.	250 gf	125 gf	60 gf
RF min.	25 gf	14 gf	6 gf
PT max.	4.0 mm		
OT min.	1.6 mm		
MD max.	1.5 mm		
OP	20.7 ± 1.2 mm		

## Thermosetting Case Models

- 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 are for quick-connect terminals (#250) (terminals C). Refer to *Terminals* section for the dimensions of other terminals.  
 3. The □ in the model number is for the terminal code.  
 4. The illustrations show models with a suffix “K”, which have a hole size of 2.9 mm. Omit the “K” to obtain models with hole size = 3.1 mm.  
 5. The operating characteristics are for operation in the A direction ( ↓ ).

### Pin Plunger Models

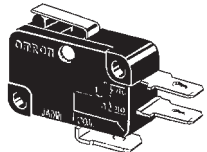
V-15G-1□5-K  
 V-10G-1□5-K  
 V-10G-1□4-K



Characteristics	V-15G-1□5-K V-10G-1□5-K	V-10G-1□4-K
OF max.	200 gf	100 gf
RF min.	50 gf	20 gf
PT max.	1.2 mm	
OT min.	1.3 mm	
MD max.	0.3 mm	
OP	14.7 ± 0.4 mm	

### Short Hinge Lever Models

V-15G1-1□5-K  
 V-10G1-1□5-K  
 V-10G1-1□4-K

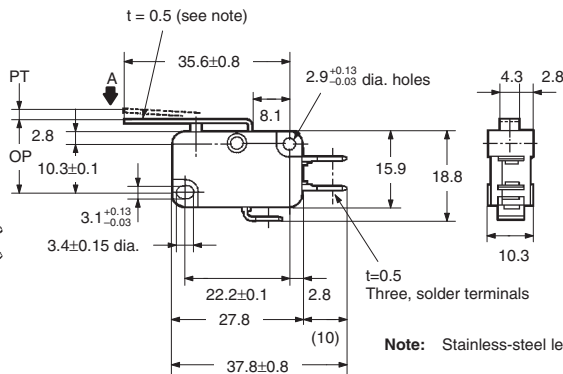
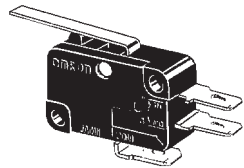


**Note:** Stainless-steel lever

Characteristics	V-15G1-1□5-K V-10G1-1□5-K	V-10G1-1□4-K
OF max.	200 gf	100 gf
RF min.	50 gf	15 gf
PT max.	1.5 mm	
OT min.	1.0 mm	
MD max.	0.5 mm	
OP	15.2 ± 0.5 mm	

### Hinge Lever Models

V-15G2-1□5-K  
 V-10G2-1□5-K  
 V-10G2-1□4-K

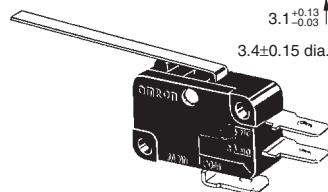


**Note:** Stainless-steel lever

Characteristics	V-15G2-1□5-K V-10G2-1□5-K	V-10G2-1□4-K
OF max.	125 gf	60 gf
RF min.	14 gf	6 gf
PT max.	3.3 mm	
OT min.	2.3 mm	
MD max.	0.8 mm	
OP	15.2 <sup>+2.6</sup> / <sub>-3.2</sub> mm	15.2 ± 1.2 mm

### Long Hinge Lever Models

V-15G3-1□5-K  
 V-10G3-1□5-K  
 V-10G3-1□4-K



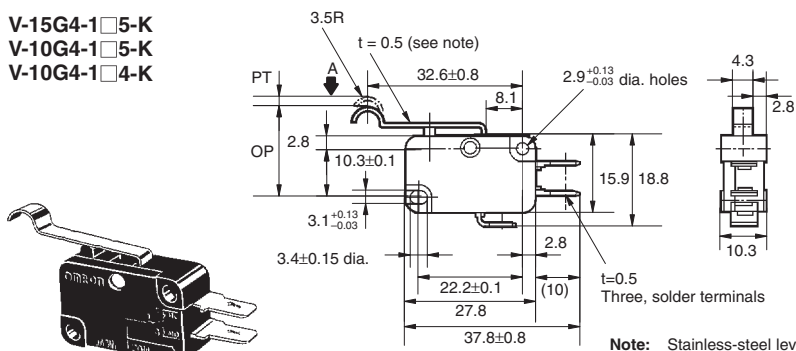
**Note:** Stainless-steel lever

Characteristics	V-15G3-1□5-K V-10G3-1□5-K	V-10G3-1□4-K
OF max.	70 gf	35 gf
RF min.	6 gf	- - - gf
PT max.	9.0 mm	7.6 mm
OT min.	3.0 mm	3.2 mm
MD max.	2.0 mm	
OP	15.2 ± 2.6 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 are for quick-connect terminals (#250) (terminals C). Refer to *Terminals* section for the dimensions of other terminals.  
 3. The □ in the model number is for the terminal code.  
 4. The illustrations show models with a suffix “K”, which have a hole size of 2.9 mm. Omit the “K” to obtain models with hole size = 3.1 mm.  
 5. The operating characteristics are for operation in the A direction ( ↓ ).

### Simulated Roller Lever Models

V-15G4-1□5-K  
 V-10G4-1□5-K  
 V-10G4-1□4-K

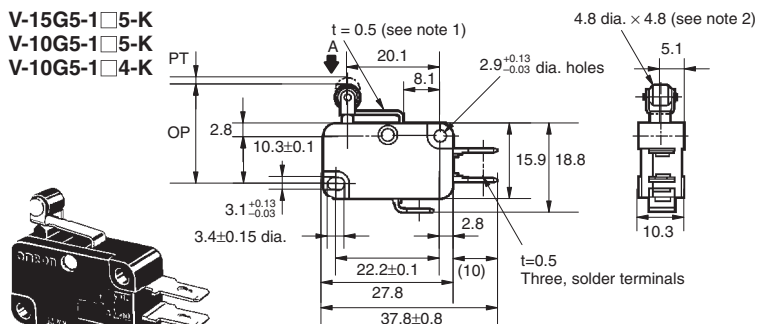


Characteristics	V-15G4-1□5-K V-10G4-1□5-K	V-10G4-1□4-K
OF max.	125 gf	60 gf
RF min.	14 gf	6 gf
PT max.	3.3 mm	
OT min.	2.3 mm	
MD max.	0.8 mm	
OP	18.7 ± 1.2 mm	

Note: Stainless-steel lever

### Short Hinge Roller Lever Models

V-15G5-1□5-K  
 V-10G5-1□5-K  
 V-10G5-1□4-K

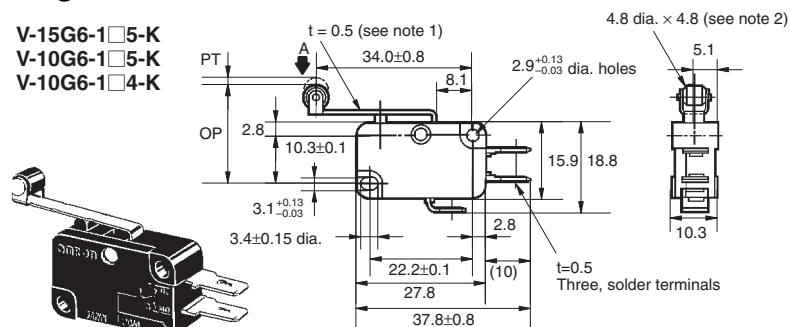


Characteristics	V-15G5-1□5-K V-10G5-1□5-K	V-10G5-1□4-K
OF max.	240 gf	120 gf
RF min.	50 gf	15 gf
PT max.	1.5 mm	
OT min.	1.0 mm	
MD max.	0.5 mm	
OP	20.7 ± 0.6 mm	

- Note: 1. Stainless-steel lever  
 2. Oilless polyacetal resin roller

### Hinge Roller Lever Models

V-15G6-1□5-K  
 V-10G6-1□5-K  
 V-10G6-1□4-K



Characteristics	V-15G6-1□5-K V-10G6-1□5-K	V-10G6-1□4-K
OF max.	125 gf	60 gf
RF min.	14 gf	6 gf
PT max.	3.3 mm	
OT min.	2.3 mm	
MD max.	0.8 mm	
OP	20.7 ± 1.6 mm	

- Note: 1. Stainless-steel lever  
 2. Oilless polyacetal resin roller

## Accessories

Refer to the “V/VX/D3C Common Accessories” datasheet for information regarding VAL, VAM and VAV external actuators (sold separately).

# Precautions

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Be sure to read the precautions and information common to all Snap Action and Detection Switches, contained in the Technical User's Guide, "Snap Action Switches, Technical Information" for correct use.

## ■ Correct Use

### Terminal Connection

To solder the lead to the solder terminal, apply a soldering iron rated at 60 W max. quickly (within 5 seconds) with the actuator at the free position.

Note that applying a soldering iron for too long a time or using one that is rated at more than 60 W may degrade the switch characteristics.

Use an appropriate mating connector for #187 or #250 quick connect terminals.

### Specifications Approved by TÜV Rheinland According to EN61058-1

#### Appropriate Cable Size (mm<sup>2</sup>)

Model	Solder terminal
V-10	0.75, 1.25, 2.0
V-15	1.25, 2.0

## Operation

Make sure that the operating body pushes the switch actuator with an adequate force when the switch is to be operated, and that it does not touch the actuator when the switch is released.

Do not change the operating position by modifying the actuator.

Do not use the switch in a application where the operating speed is extremely slow or the actuator is set in the midpoint between the free position and operating position.

Install the pin plunger switch so that the operating force is applied in alignment with the stroke of the actuator. The switch should be set so that its stroke is in the range of 60 to 90% of the rated OT (minimum value) when the switch has been operated.

## ■ Cautions

### Insulation Distance

According to EN61058-1, the minimum insulation thickness for this switch should be 1.1 mm and minimum clearance distance between the terminal and mounting plate should be 1.0 mm. If the insulation distance cannot be provided in the product incorporating the switch, either use a switch with insulation barrier or use a separator to ensure sufficient insulation distance.

# 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.
- Discounts:** Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (a) the invoice is paid according to Seller's payment terms and (b) Buyer has no past due amounts owing to Seller.
- Interest:** Seller, at its option, may charge Buyer 1.5% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
- 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.
- Governmental Approvals:** Buyer shall be responsible for all costs involved in obtaining any government approvals regarding the importation or sale of the Products.
- Taxes:** All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Seller or required to be collected directly or indirectly by Seller for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Seller.
- 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.
- Property; Confidentiality:** Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Seller. All information and materials supplied by Seller to Buyer relating to the Products are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.
- Performance Data:** Performance data is provided as a guide in determining suitability and does not constitute a warranty. It may represent the result of Seller's test conditions, and the users must correlate it to actual application requirements.
- 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.
- Errors And Omissions:** The information on Seller's website or in other documentation has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.
- Export Controls:** Buyer shall comply with all applicable laws, regulations and licenses regarding (a) export of the Products or information provided by Seller; (b) sale of Products to forbidden or other proscribed persons or organizations; (c) disclosure to non-citizens of regulated technology or information.

### VI. MISCELLANEOUS

- Waiver:** No failure or delay by Seller in exercising any right and no course of dealing between Buyer and Seller shall operate as a waiver of rights by Seller.
- Assignment:** Buyer may not assign its rights hereunder without Seller's written consent.
- Law:** These Terms are governed by Illinois law (without regard to conflict of laws). Federal and state courts in Cook County, Illinois have exclusive jurisdiction for any dispute hereunder.
- 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.

# Certain Precautions on Specifications and Use

1. **Suitability for Use.** Seller shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in Buyer's application or use of the Product. At Buyer's request, Seller will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases but the following is a non-exhaustive list of applications for which particular attention must be given:
  - (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.
2. **Programmable Products.** Seller shall not be responsible for the user's programming of a programmable product, or any consequence thereof.
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4. **Change in Specifications.** Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Seller representative at any time to confirm actual specifications of purchased Product.
5. **Errors and Omissions.** The information in this publication has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors, or omissions.
6. **RoHS Compliance.** Where indicated, our products currently comply, to the best of our knowledge as of the date of this publication, with the requirements of the European Union's Directive on the Restriction of certain Hazardous Substances ("RoHS"), although the requirements of RoHS do not take effect until July 2006. These requirements may be subject to change. Please consult our website for current information.

Complete "Terms and Conditions of Sale" for product purchase and use are on Omron's website at <http://www.components.omron.com> – under the "About Us" tab, in the Legal Matters section.

**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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