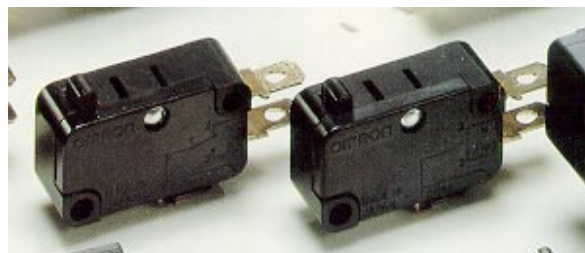


Miniature Basic Switch

V

Reliable Basic Micro Switch

- Compatible with all industry standard V3 switches.
- Ratings up to 21 A available.
- Six variations of standard levers including straight and roller.
- High temperature (150°C) available.



Ordering Information

Model Number Legend

General Purpose Type

V - -

1 2 3 4 5 6 7 8

1. Ratings

21: 21A
16: 16A
15: 15A

2. Contact Gap

None: 1mm (F gap)
G: 0.5mm (G ap)

3. Actuator

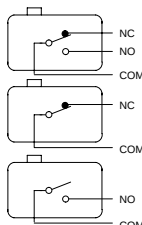
None: pin plunger
1: short hinge lever
2: hinge lever
3: long hinge lever
4: simulated hinge lever
5: short hinge roller lever
6: hinge roller lever

4. Contact form and COMMON terminal position

1: SPDT
bottom

2: SPST-NC
bottom

3: SPST-NO
bottom



5. Terminal

A: solder/quick connect terminal (#187)
C2: quick connect terminal (#187)
C: quick connect terminal (#250)
B: screw terminal
E: solder terminal

6. Barrier (models with thermoplastic case only)

R: Right hand barrier
L: Left hand barrier

7. OF max.*

6: 400g
5: 200g
4: 100g

*These forces apply to the models with pin plunger actuator

8. Special purpose

T: Heat resistive type (TV)

Combination

General-purpose

Classification		Model	Ratings	Terminal					OF max. (pin plunger)			With barrier	Approved standards
				Shape (see note)					100 gf (0.98 N)	200 gf (1.96 N)	400 gf (3.92 N)		
				A	C2	C	B	E					
Standard model	Thermoplastic case	V-21	21 A, 250 V			Yes					Yes	Yes	UL, CSA, VDE, SEMKO, DEMKO, SETI, KEMA, NEMKO, SEV
		V-16	16 A, 250 V	Yes	Yes	Yes			Only upon request	Yes	Only upon request	Yes	
	Thermosetting case	V-15	15 A, 250 V	Yes	Yes	Yes	Yes	Yes	Only upon request	Yes	Only upon request		UL, CSA, TUV
Special model	Heat resistive	V-	10 and 15 A, 250 V	Yes					Yes	Yes	Only upon request		UL, CSA

Actuator	Contact form	*Connect Terminal	15A Standard type	16A Standard type	21A Standard type	15A Heat Resistant type
Pin plunger 	SPDT	A	V-15-1A5	V-16-1A5	—	V-15-1A5-T
		C2	V-15-1C25	V-16-1C25	—	—
		C	V-15-1C5	V-16-1C5	V-21-1C6	V-15-1C5-T
		B	V-15-1B5	—	—	—
		E	V-15-1E5	—	—	—
	SPST-NC	A	V-15-2A5	V-16-2A5	—	V-15-2A5-T
		C2	V-15-2C25	V-16-2C25	—	—
		C	V-15-2C5	V-16-2C5	V-21-2C6	V-15-2C5-T
	SPST-NO	A	V-15-3A5	V-16-3A5	—	V-15-3A5-T
		C2	V-15-3C25	V-16-3C25	—	—
		C	V-15-3C5	V-16-3C5	V-21-3C6	V-15-3C5-T
Hinge short lever 	SPDT	A	V-151-1A5	V-161-1A5	—	V-151-1A5-T
Hinge lever 		C2	V-151-1C25	V-161-1C25	—	—
		C	V-151-1C5	V-161-1C5	V-211-1C6	V-151-1C5-T
		B	V-151-1B5	—	—	—
		E	V-151-1E5	—	—	—
		A	V-152-1A5	V-162-1A5	—	V-152-1A5-T
Hinge long lever 		C2	V-152-1C25	V-162-1C25	—	—
		C	V-152-1C5	V-162-1C5	V-212-1C6	V-152-1C5-T
		B	V-152-1B5	—	—	—
		E	V-152-1E5	—	—	—
		A	V-152-1A5	V-163-1A5	—	V-153-1A5-T
Simulated roller lever 		C2	V-152-1C25	V-163-1C25	—	—
		C	V-152-1C5	V-163-1C5	V-213-1C6	V-153-1C5-T
		B	V-152-1B5	—	—	—
		E	V-152-1E5	—	—	—
		A	V-154-1A5	V-164-1A5	—	V-154-1A5-T
Hinge roller short lever 		C2	V-154-1C25	V-164-1C25	—	—
		C	V-154-1C5	V-164-1C5	V-214-1C6	V-154-1C5-T
		B	V-154-1B5	—	—	—
		E	V-154-1E5	—	—	—
		A	V-155-1A5	V-165-1A5	—	V-155-1A5-T
Hinge roller lever 		C2	V-155-1C25	V-165-1C25	—	—
		C	V-155-1C5	V-165-1C5	V-215-1C6	V-155-1C5-T
		B	V-155-1B5	—	—	—
		E	V-155-1E5	—	—	—
		A	V-156-1A5	V-166-1A5	—	V-156-1C5-T
Hinge roller lever 		C2	V-156-1C25	V-166-1C25	—	—
		C	V-156-1C5	V-166-1C5	V-216-1C5	V-156-1C5-T
		B	V-156-1B5	—	—	—
		E	V-156-1E5	—	—	—

Note: *Refer to Ordering Information.

5. Terminals

- A: Solder/quick-connect terminal (#187)
- C2: Quick-connect terminal (#187)
- C: Quick-connect terminal (#250)
- B: Screw terminal
- E: Solder terminal

Specifications

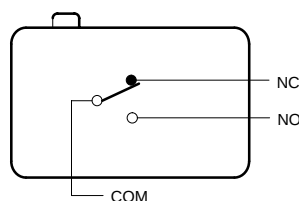
■ Ratings

Ratings	Rated voltage	Non-inductive load				Inductive load			
		Resistive load		Lamp load		Inductive load		Motor load	
		NC	NO	NC	NO	NC	NO	NC	NO
21 A	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	
16 A	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	
15 A	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	

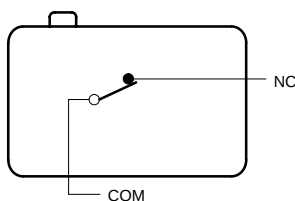
- Note:**
1. The above current values are the normal current values of models with a contact gap of 1 mm (gap F), which vary with the normal current values of models with a contact gap of 0.5 mm (gap G).
 2. Inductive load has a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).
 3. Lamp load has an inrush current of 10 times the steady-state current.
 4. Motor load has an inrush current of 6 times the steady-state current.

Contact Form

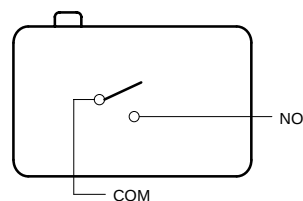
SPDT



SPST-NC



SPST-NO



■ Characteristics

Operating speed	0.1 mm to 1 m/s (at pin plunger)
Operating frequency	Mechanical: 600 operations/min Electrical: 60 operations/min
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance	15 mΩ max. (initial value)
Inrush current (NC/NO)	V-21: 50 A max., V-16: 40 A max., V-15: 36 A max., V-11: 24 V max., V-10: 24 A max.
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between non-continuous terminals 2,000 VAC (1,500 VAC for V-15 and V-10), 50/60 Hz for 1 min between each terminal and ground
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	Mechanical: 1,000 m/s ² min. (approx. 100G min.) Malfunction: V-21/V-16/V-15: 300 m/s ² (approx. 30G min.) V-11/V-10: 200 m/s ² (approx. 20G min.)
Life expectancy	Mechanical: 50,000,000 operations min. Electrical: V-21/V-16/V-15: 100,000 operations min. V-11/V-10: 300,000 operations min.
Ambient temperature	Operating: -25°C to 80°C (with no icing) -25°C to 150°C for heat-resistant model
Ambient humidity	Operating: 85% max.
Contact	Specifications: Rivet Materials: V-21/V-16/V-15: Silver alloy V-11/V-10: Silver
Weight	Approx. 6.2 g

Note: The operating speed value shown is for pin plunger models. For hinge lever models, this speed is for the plunger parts.

■ Approved Standards

UL (File No. E32667)/CSA (File No. LR21642)/
VDE (File No. 716)/SEMKO (File No. 9114062)
TÜV (File No. 940 3007)

■ Operating Characteristics

Switch model	V-21-1□6	V-16-1□5	V-15-1□5
OF max. RF min.	400g 80g	200g 50g	200g 50g
PT max. OT min. MD max.	1.2mm 1.0mm 0.4mm (0.3mm)		1.6mm 0.8mm 0.6mm (0.5mm)
FP max. OP	14.7mm ± 0.4mm		15.2mm ± 0.5mm

Switch model	V-211-1□6	V-161-1□5	V-151-1□5
OF max. RF min.	400g 80g	200g 50g	
PT max. OT min. MD max.	1.6mm 0.8mm 0.6mm (0.5mm)		
FP max. OP	15.2mm ± 0.5mm		

Switch model	V-212-1□6	V-162-1□5	V-152-1□5
OF max. RF min.	250g 25g	125g 14g	
PT max. OT min. MD max.	4.0mm 1.6mm 1.5mm (0.8mm)		
FP max. OP	15.2mm ± 1.2mm		

Switch model	V-213-1□6	V-163-1□5	V-153-1□5
OF max. RF min.	130g 12g	65g 6g	70g 6g
PT max. OT min. MD max.	9.0mm 2.0mm 2.8mm (2.0mm)		
FP max. OP	15.2mm ^{+2.6} _{-3.2}		

Switch model	V-214-1□6	V-164-1□5	V-154-1□5
OF max. RF min.	250g 25g	125g 14g	125g 14g
PT max. OT min. MD max.	4.0mm 1.6mm 1.5mm (0.8mm)		
FP max. OP	18.7mm ± 1.2mm		

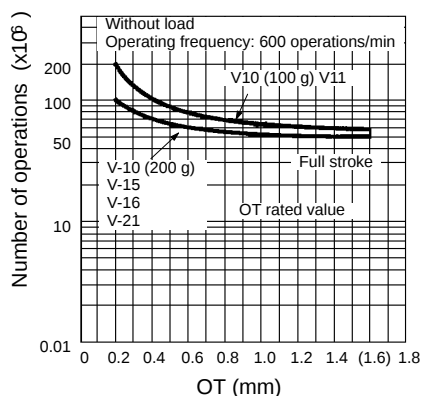
Switch model	V-215-1□6	V-165-1□5	V-155-1□5
OF max. RF min.	480g 50g	240g 50g	240g 50g
PT max. OT min. MD max.	1.6mm 0.8mm 0.6mm (0.5mm)		
FP max. OP	20.7mm ± 0.6mm		

Switch model	V-216-1□6	V-166-1□5	V-156-1□5
OF max. RF min.	250g 25g	125g 14g	125g 14g
PT max. OT min. MD max.	4.0mm 1.6mm 1.5mm (0.8mm)		
FP max. OP	20.7mm ± 1.2mm		

Engineering Data

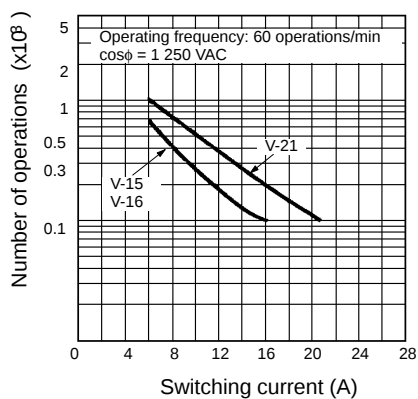
Mechanical Life Expectancy

V-21/-16/-15/-11/-10

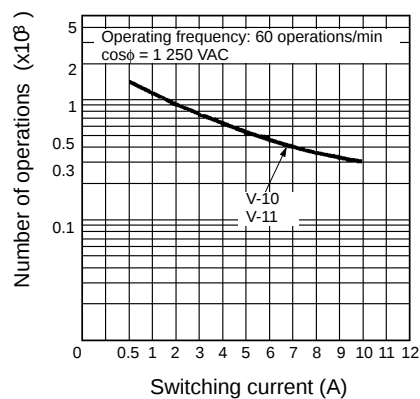


Electrical Life Expectancy

V-21/-16/-15



V-11/-10



Dimensions

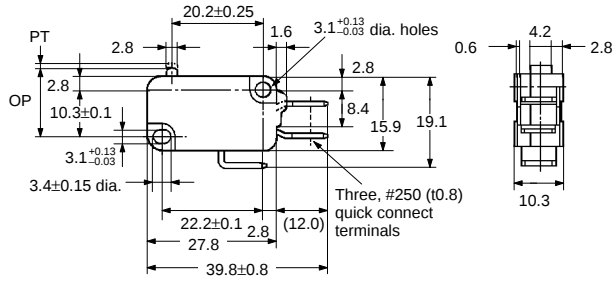
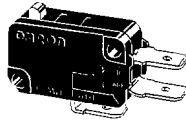
- Note:**
1. All units are in millimetres unless otherwise indicated.
 2. Unless otherwise specified, a tolerance of ± 0.4 mm applies to all dimensions.
 3. The following illustrations and drawings are for #250-series models with tab terminals (terminals C). V models with a switching current of 16 A or 11 A incorporate terminals A and C2. These models are different from #250-series models in terminal size only. Terminals A, C2, and side terminals are omitted from the following drawings. Refer to *Kinds of "Terminals"* on page NO TAG for these terminals.

Pin Plunger

(Without Barrier)

V-21-1□6

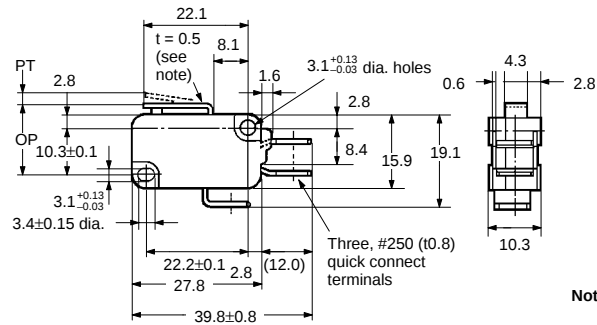
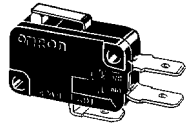
V-16-1□5



Short Lever

V-211-1□6

V-161-1□5

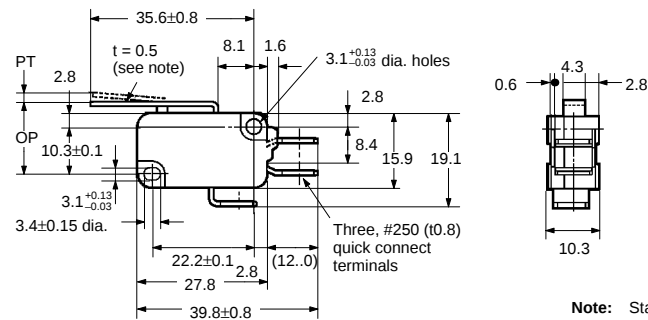
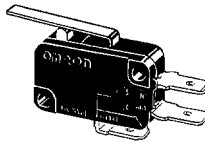


Note: Stainless steel lever

Standard Lever

V-212-1□6

V-162-1□5

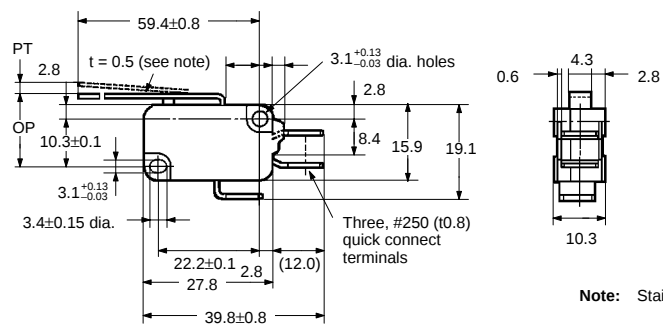
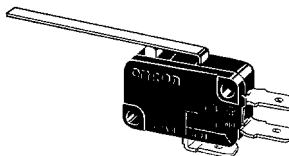


Note: Stainless steel lever

Long Lever

V-213-1□6

V-163-1□5

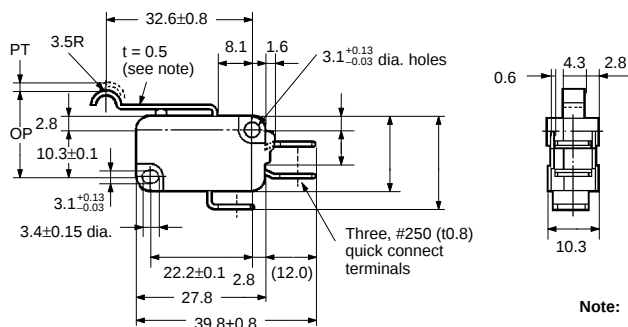
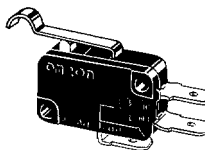


Note: Stainless steel lever

Simulated Roller Lever

V-214-1□6

V-164-1□5

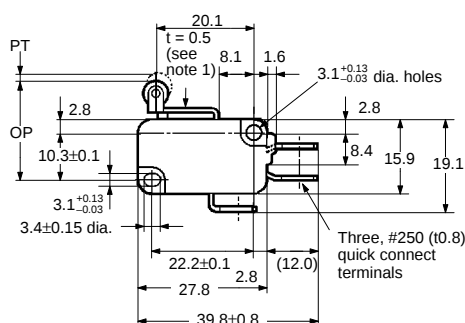
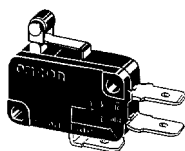


Note: Stainless steel lever

Short Roller Lever

V-215-1□6

V-165-1□5

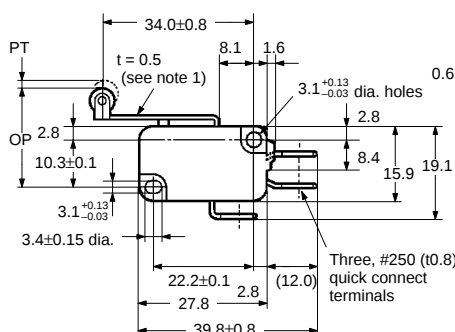
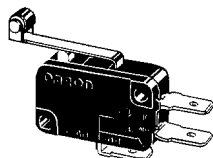


Note: 1. Stainless steel lever
2. Polyacetal resin roller

Standard Roller Lever

V-216-1□6

V-166-1□5



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

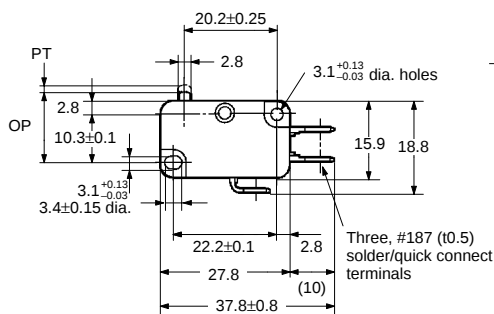
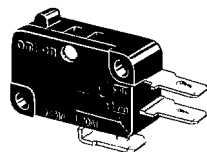
Thermoplastic Case (V-15/-10 Models)

The following illustration and drawing are for #187-series models with solder and tab terminals (terminals A). V models with a switching current of 15 A or 10 A incorporate terminals B, C2, and E. These models are different from #250-series models in terminal size only. Terminals B, C2, E, and side terminals are omitted from the following drawing. Refer to page NO TAG for these terminals.

Pin Plunger

V-15-1□5

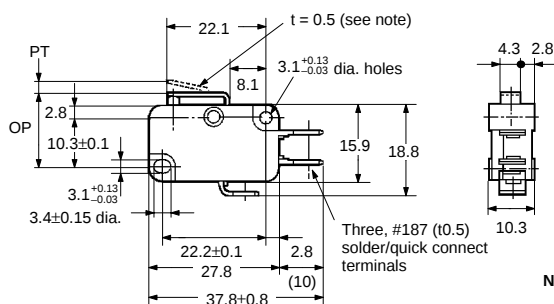
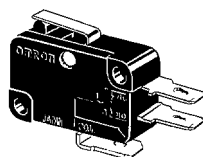
V-10-1□5



Short Lever

V-151-1□5

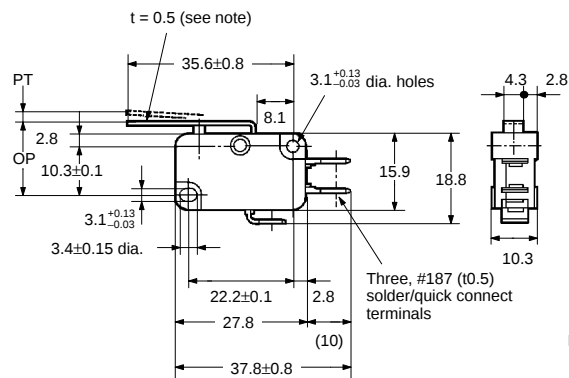
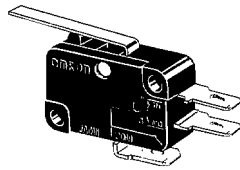
V-101-1□5



Note: Stainless steel lever

Standard Lever

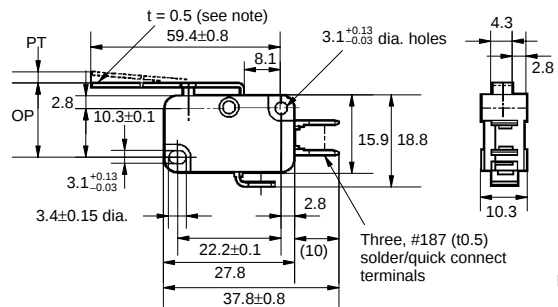
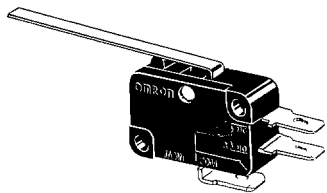
V-152-1□5



Note: Stainless steel lever

Long Lever

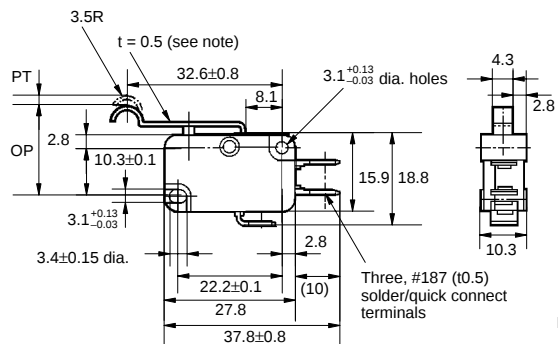
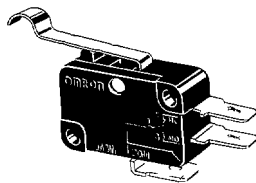
V-153-1□5



Note: Stainless steel lever

Simulated Lever

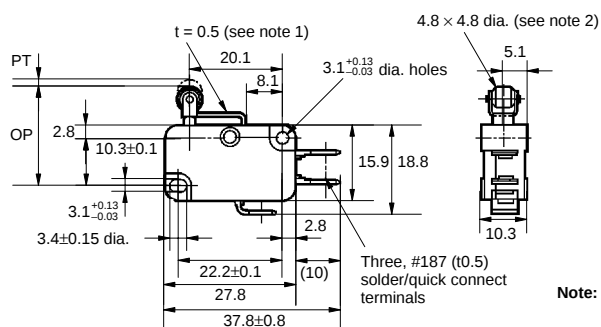
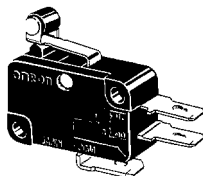
V-154-1□5



Note: Stainless steel lever

Short Roller Lever

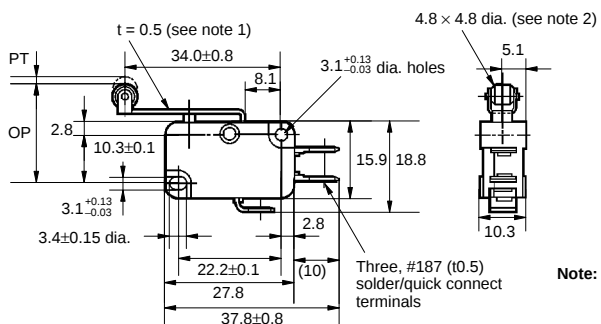
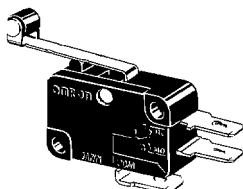
V-155-1□5



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

Standard Roller Lever

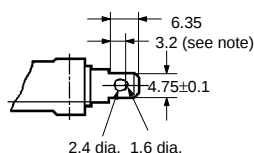
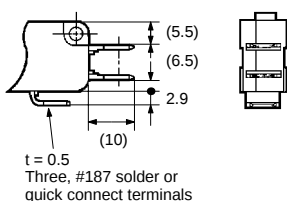
V-156-1□5



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

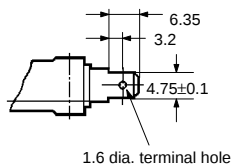
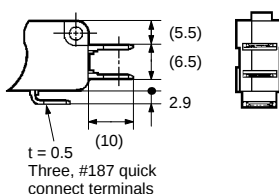
■ Terminals

Solder/Quick-connect (#187) Terminal (A)

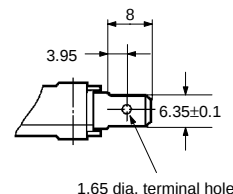
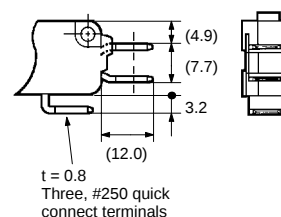


Note: Indicates the length to the center of the 1.6 dia. holes

Quick-connect (#187) Terminal (C2)

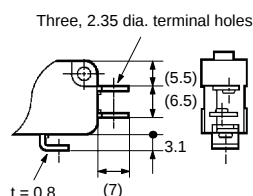


Quick-connect (#250) Terminal (C)

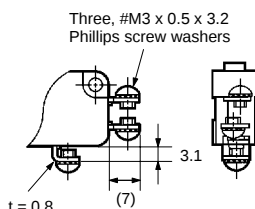


Bottom Terminal

Solder Terminal (E)



Screw Terminal (B)

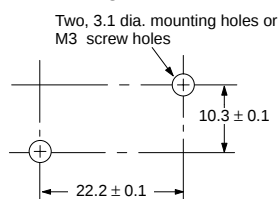


Precautions

Mounting

Use two M3 mounting screws with an appropriate screwdriver to mount the switch. Tighten the screws to a torque of 4 to 6 kg • cm (0.39 to 0.59 N • m).

Mounting Holes



When soldering a lead wire to a terminal of the V, use a soldering iron with a maximum capacity of 60 W and do not take more than 5 s to solder the lead wire, otherwise the characteristics of the V may be altered.

Operation

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.

Separator

When mounting a switch, check the insulation distance between the switch and the mounting plate. If the distance is not enough, mount the switch with an insulation guard or separator or use a switch that incorporates an insulation guard. Especially, when mounting a switch to a metal object, be sure to use an insulation guard or separator.