

## ■ V.Motion Detecting Device ■

# Micro Switch




● Z15 Series

● V Series

● VAP Series

### Certification Details

Z15 Series 

V Series   

Motion  
Detecting  
Device

Micro  
Switch

Limit  
Switch

# Z15 Series



## Specifications

CONTACT ARRANGEMENT		1a+1b				
MATERIAL		Ag Alloy				
CONTACT & CONTACT DISTANCE				Z15G : 0.5mm	Z15H : 0.25mm	
INSULATION RESISTANCE		100M $\Omega$ 500VDC				
CONTACT RESISTANCE		50m $\Omega$ or lower				
CONTACT RATING	NON LOAD	RESISTIVE LOAD	15A(10) 125VAC 15A(10) 250VAC 10A 500VAC		15A 8VDC 15A 14VDC 6(2)A 30VDC 0.5A 125VDC 0.25A 250VDC	
		LAMP LOAD	NORMINAL OPEN NO		MORMINAL CLOSE NC	
			1.5A 125VAC 1.25A 250VAC 0.75A 500VAC	1.5A 8VDC 1.5A 14VDC 1.5A 30VDC 0.5A 125VDC 0.25A 250VDC	3A 125VAC 2.5A 250VAC 1.5A 500VAC	3A 8VDC 3A 14VDC 3A 30VDC 0.5A 125VDC 0.25A 250VDC
	INDUCTIVE LOAD	INDUCTIVE LOAD	15(10)A 125VAC 15(10)A 250VAC 6A 500VAC		15A 8VDC 10A 14VDC 5(1)A 30VDC 0.05A 125 VDC 0.03A 250VDC	
		MOTOR LOAD	NORMINAL OPEN NO		MORMINAL CLOSE NC	
			2.5A 125VAC 1.5A 250VAC 0.75A 500VAC	2.5A 8VDC 2.5A 14VDC 2.5(1)A 30VDC 0.05A 125VDC 0.03A 250VDC	5A 125VAC 3A 250VAC 1.5A 500VAC	5A 8VDC 5A 14VDC 5(1)A 30VDC 0.05A 125VDC 0.03A 250VDC
MIN. CARRY CURRENT		NORMINAL OPEN NO		MORMINAL CLOSE NC		
		15A		30A		




















- The values in the blanks are ratings of Z15H type switch. The Z15H type switch has AC ratings of 125 V and 250 V.
- The aforementioned values are steady-state current values.
- The inductive load has a power factor of 0.4 or more (AC), and a time constant of 7 m/s or less (DC).
- The inrush current is ten times larger than steady-state current in the lamp load, and six times, in the motor load.

OPERATING SPEED		0.01mm/sec ~ 0.5m/sec
OPERATING FREQUENCY	ELECTRICAL	Min. 20 / Min.
	MECHANICAL	Min. 240 / Min.
DIELECTICAL STRENGTH	NON CONTINROUS TERMINAL	Z15G : 1000VAC 1Min. Z15H : 600VAC 1Min.
	TERMINAL & EARTH	2000VAC 1Min.
	TERMINAL & NON CHARGED METAL PART	2000VAC 1Min.
EXPECTED LIFE	ELECTRICAL	Min. 500,000
	MECHANICAL	Min. 20,000,000
VIBRATION	MALFUNCTION DURABILITY	10Hz~55Hz Durable Amplitude 1.5mm
SHOCK	MALFUNCTION DURABILITY	Max. 30G
	MECHANICAL DURABILITY	Max. 100G
ELECTRIC SHOCK PROTECTION		Class 1
AMBIENT TEMPERATURE		-25 $^{\circ}$ C~+80 $^{\circ}$ C(WITH NO ICING)
AMBIENT HUMIDITY		35%~85% RH
TORQUE		1.2N · m (12.24kgf · cm)

※ This is the case for the push-button type (The values are for the actuator for the lever type).

In the types other than the push-button type, the mechanical life is 10 million times, and the operating error is 1 ms or less.

Z15 Series

<p>Z15G-01B</p> 	<p>Z15G-010B</p> 	<p>Z15G-10B</p> 	<p>Z15G-03B</p> 
<p>Z15G-030B</p> 	<p>Z15G-031B</p> 	<p>Z15G-05B</p> 	<p>Z15G-052B</p> 
<p>Z15G-063B</p> 	<p>Z15G-062B</p> 	<p>Z15G-061B</p> 	<p>Z15G-06B</p> 
<p>Z15H-060B</p> 	<p>Z15H-08B</p> 	<p>Z15G-09B</p> 	<p>Z15G-091B</p> 
<p>Z15G-092B</p> 	<p>Z15G-07B</p> 	<p>Z15G-073B</p> 	

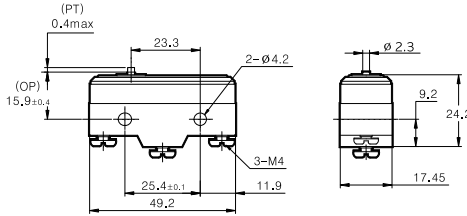
Motion  
Detecting  
Device

Micro  
Switch  
Limit  
Switch

**Dimension** Unit : mm

**Z15G-01B**

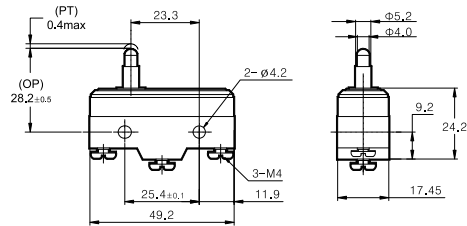
KS : Z4G1P01B



OF	250~350gf(2.45~3.43N)
RF	114gf(1.12N)
PT	0.4mm
OT	0.13mm
MD	0.05mm
OP	15.9±0.4mm

**Z15G-010B**

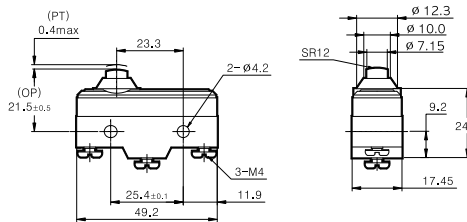
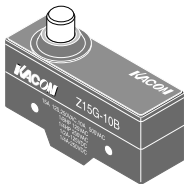
KS : Z4G1P03B



OF	250 ~ 350gf(2.45 ~ 3.43N)
RF	114gf(1.12N)
PT	0.4mm
OT	1.6mm
MD	0.05mm
OP	28.2±0.5mm

**Z15G-10B**

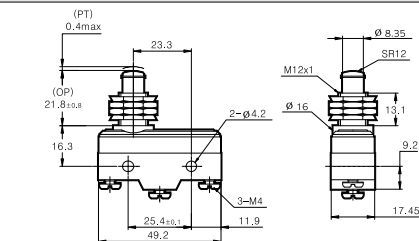
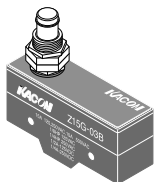
KS : Z4G1P09B



OF	250 ~ 350gf(2.45 ~ 3.43N)
RF	114gf(1.12N)
PT	0.4mm
OT	1.6mm
MD	0.05mm
OP	21.5±0.5mm

**Z15G-03B**

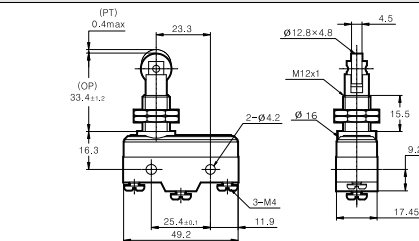
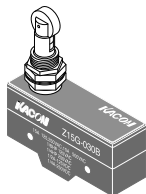
KS : Z4G1P05B



OF	250 ~ 350gf(2.45 ~ 3.43N)
RF	114gf(1.12N)
PT	0.4mm
OT	5.5mm
MD	0.05mm
OP	21.8±0.8mm

**Z15G-030B**

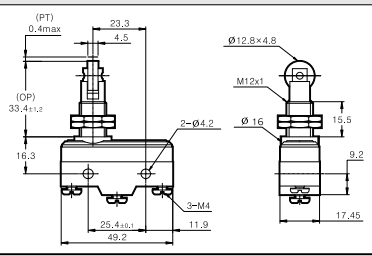
KS : Z4G1P07B



OF	250 ~ 350gf(2.45 ~ 3.43N)
RF	114gf(1.12N)
PT	0.4mm
OT	3.58mm
MD	0.05mm
OP	33.4±1.2mm

Z15 Series

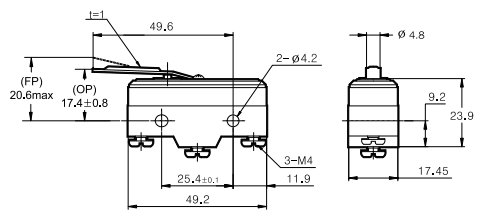
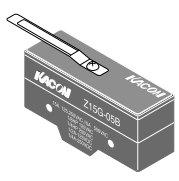
Z15G-031B



OF	250 ~ 350gf(2.45 ~ 3.43N)
RF	114gf(1.12N)
PT	0.4mm
OT	3.58mm
MD	0.05mm
OP	33.4±1.2mm

Z15G-05B

KS : Z4G1R01B

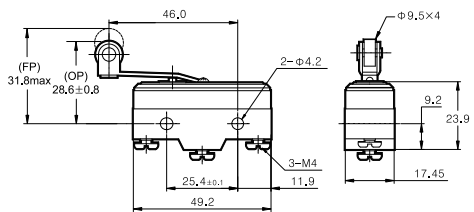
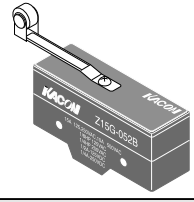


OF	141gf(1.38N)
RF	14gf(0.14N)
OT	1.6mm
MD	1.3mm
FP	20.6mm
OP	17.4±0.8mm

Motion Detecting Device

Z15G-052B

KS : Z4G1R03B

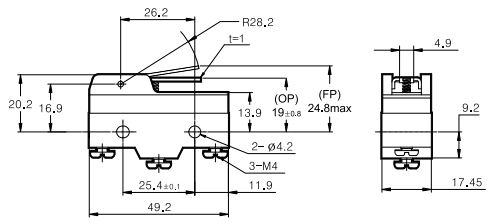
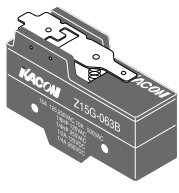


OF	141gf(1.38N)
RF	14gf(0.14N)
OT	1.6mm
MD	1.3mm
FP	31.8mm
OP	28.6±0.8mm

Micro Switch  
Limit Switch

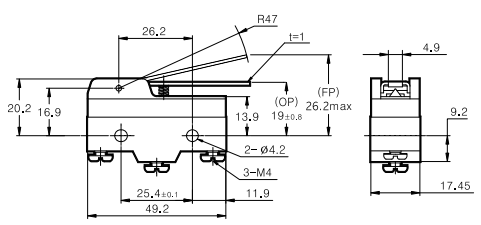
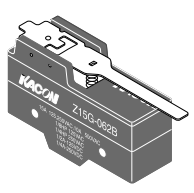
Z15G-063B

KS : Z4G1L05B



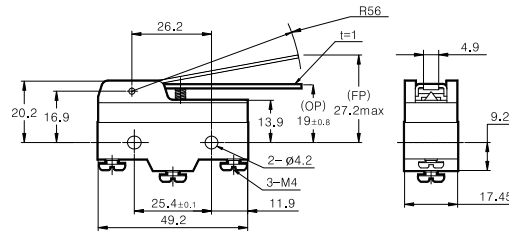
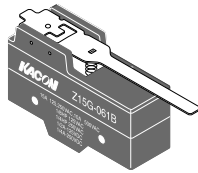
OF	160gf(1.57N)
RF	28gf(0.27N)
OT	2.0mm
MD	1.0mm
FP	24.8mm
OP	19.0±0.8mm

Z15G-062B



OF	95gf(0.95N)
RF	18gf(0.18N)
OT	4.2mm
MD	0.95mm
FP	26.2mm
OP	19.0±0.8mm

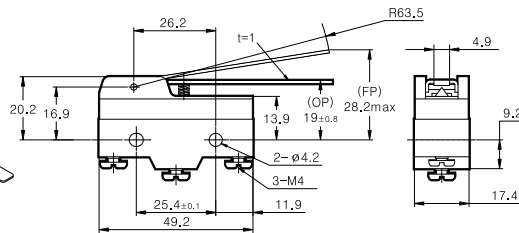
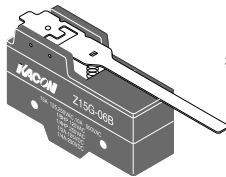
Z15G-061B



OF	80gf(0.78N)
RF	15.5gf(0.15N)
OT	4.8mm
MD	1.12mm
FP	27.2mm
OP	19.0±0.8mm

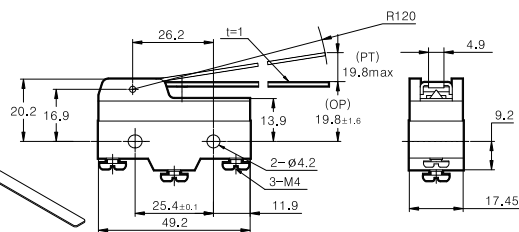
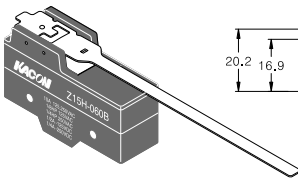
Z15G-06B

KS : Z4G1L01B



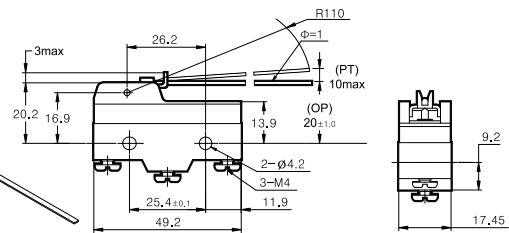
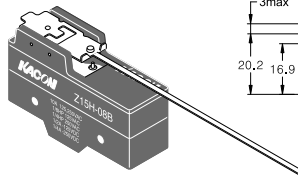
OF	70gf(0.69N)
RF	14gf(0.14N)
OT	5.6mm
MD	1.27mm
FP	28.2mm
OP	19.0±0.8mm

Z15H-060B



OF	6gf(58.8mN)
RF	0.5gf(4.90mN)
PT	19.8mm
OT	10.0mm
MD	2.0mm
OP	19.8±1.6mm

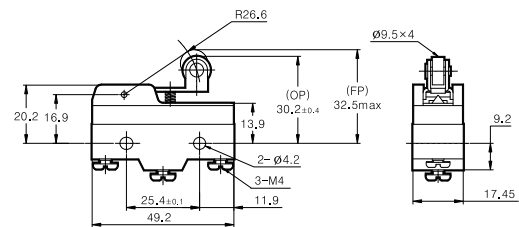
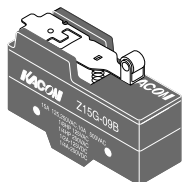
Z15H-08B



OF	4gf(39.2mN)
RF	0.3gf(2.94mN)
PT	10.0mm
OT	6.0mm
MD	3.0mm
OP	20.0±1.0mm

Z15G-09B

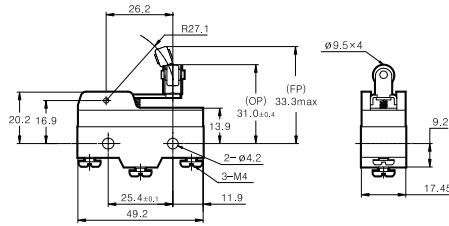
KS : Z4G1L07B



OF	160g(1.57N)
RF	42g(0.41N)
OT	2.4mm
MD	0.5mm
FP	32.5mm
OP	30.2±0.4mm

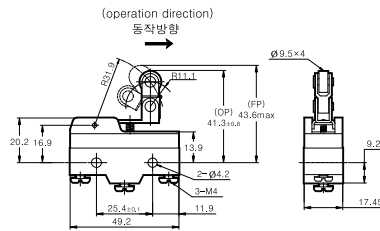
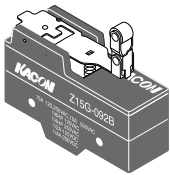
Z15 Series

Z15G-091B



OF	170gf(1.67N)
RF	42gf(0.41N)
PT	2.4mm
OT	0.51mm
MD	33.3mm
OP	31.0±0.4mm

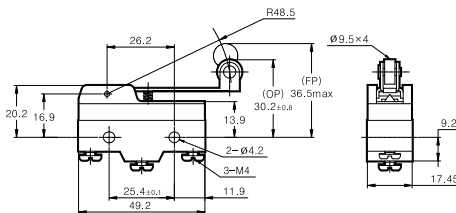
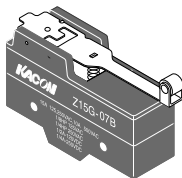
Z15G-092B



OF	170gf(1.67N)
RF	42gf(0.41N)
PT	2.4mm
OT	0.51mm
MD	43.6mm
OP	41.3±0.8mm

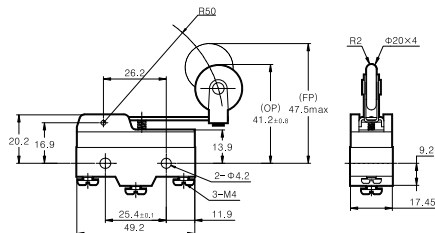
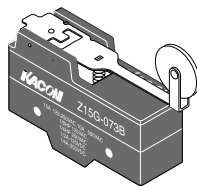
Z15G-07B

KS : Z4G1L03B



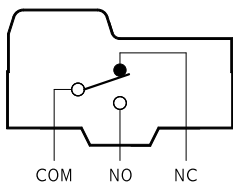
OF	100gf(0.98N)
RF	22gf(0.22N)
PT	4.0mm
OT	1.02mm
MD	36.5mm
OP	30.2±0.8mm

Z15G-073B



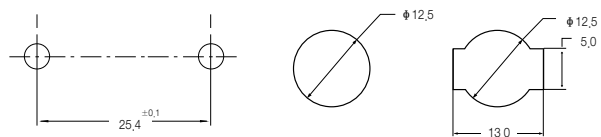
OF	100gf(0.98N)
RF	21gf(0.21N)
PT	4.0mm
OT	1.6mm
MD	47.5mm
OP	41.2±0.8mm

DIAGRAM



COM : COMMON TERMINAL  
 NO : NNORMAL OPEN TERMINAL  
 NC : NORMAL CLOSE TERMINAL

PANEL CUT OUT



Motion  
Detecting  
Device

Micro  
Switch  
  
Limit  
Switch

### Glossary

Definition of operating characteristics	Category	Abbr.	Term	Unit	Definition
<p>Center of the switch mounting hole</p>	Force	Force required for operation	OF	g, kg g-mm	Force on the actuator required for the motion from the free position to the operating position
		Restoring force	RF	g, kg g-mm	Force on the actuator required for the motion from the operating limit position to the restoring position
		Force required for entire motion	TF	g, kg g-mm	Force on the actuator required for the motion from the operating position to the operating limit position
	Motion	Motion to the operating position	PT	mm, deg	Distance or angle from the free position of the actuator to the operating position
		Motion after operation	OT	mm, deg	Distance or angle from the operating position of the actuator to the operating limit position
		Hysteresis distance	MD	mm, deg	Distance or angle from the operating position of the actuator to the restoring position
		Total motion	TT	mm, deg	Distance or angle from the free position of the actuator to the operating limit position
	Position	Free position	FP	mm, deg	The position of the operating part when no force is applied from outside
		Operating position	OP	mm, deg	The position of the actuator when the external force is applied to the actuator and the moving contact reverses from the free position
		Restoring position	RP	mm, deg	The position of the actuator when the external force to the actuator is reduced and the moving contact reverses from the operating position to the free position
		Operating limit position	TTP	mm, deg	The position of the actuator when the actuator reaches the actuator stop position

### Option

SAFETY COVER

**ZSC1**

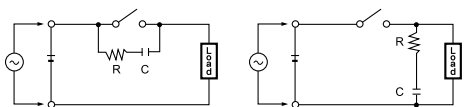
**ZSC2**



**Per-Caution**

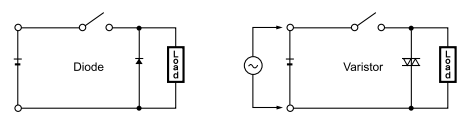
**Electrical precautions**

- **Electrical conditions**
  - Check the rating because the contact has different breaking capacities for AC and DC.
  - For microvoltage and microcurrent, use the contact for microload.
  - Check the inrush current, steady-state current and inrush time.
  - Measure the contact resistance at DC 6 V~DC 8 V and 1A (Comply with the voltage drop method for the microcurrent).
  - The difference between the steady-state current and inrush current may vary according to the load type. Check the inrush current value.
  
- **The ratings are based on the following conditions.**
  - Inductive load: power factor 0.4 or more (AC), time constant 7 ms or less (DC)
  - Lamp load: Inrush current  $\geq 10 \times$  Steady-state current
  - Motor load: Inrush current  $\geq 6 \times$  Steady-state current
  
- **Notes for the circuit**
  - In the inductive load breaking circuit, the surge and inrush current at the opening/closing of the circuit may cause contact problems. Therefore, it is desirable to insert a protection circuit as follows.



Normally used for DC circuits. A resistor of several ohms is required.  
 When used for AC circuit, the load must be small.  
 R: Tens~100 Ω  
 C: 0.05~0.1 uF

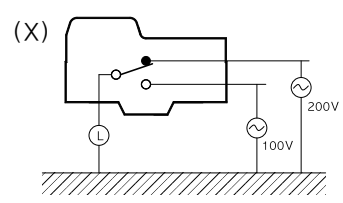
Used both for AC and DC circuits.  
 R: Tens of ohms  
 C: 0.1~0.2 uF



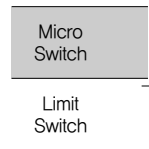
Used only for DC circuits. Select a diode with sufficient margin to the inverse withstand voltage.

Used both for AC and DC circuits. Select a varistor that is 1.5 times higher than the power supply voltage.

- Do not connect different polarities and types of power to one switch contact.
- Do not apply the voltage between contacts (This causes the mixed contact and contact weld).



- **Application to the electronic circuits (low voltage and current)**
  1. The microswitch generates bouncing and chattering between contacts when it is switched on/off. This causes troubles, including noises and wrong pulses, to the electronic circuits or acoustic devices.
  2. When bouncing and chattering cause problems, studies are required to provide an absorption circuit in addition to the CR circuit.
  3. In the areas that require high contact reliability, the Ag contacts, which have been widely used, are hardly used. Au contacts have high performances for microvoltage and microcurrent.

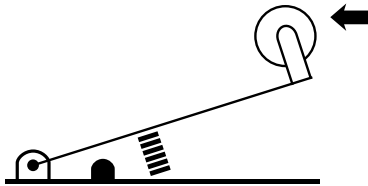


**Mechanical precautions**

- **Mechanical conditions**
  - Select the actuator according to the operating method.
  - Do not apply excessive force to the actuator.
  - Check the switching speed and frequency.
    - 1) If the switching speed is too slow and unstable, poor contact or contact weld may occur.
    - 2) If the switching speed is too high, switching may not be completed.

### ● Precautions

- The operating method, cam or dog type, frequency, motion after switching significantly influence the product life and accuracy. Use the cams or dogs that have general shapes.
- Do not allow the load to one side of the switch actuator, and prevent the partial wear.
- Adjust the actuator so that it does not pass beyond OT. The proper operating stroke is 70 %~100 % of the standard OT.
- If OT passes beyond the limit, it may cause failure.
- Use the switch considering the characteristics of the actuator. In the case of the roller arm lever, do not apply force in the arrowed direction in the figure.
- Avoid the modification of the operating position by processing the actuator.



### Mounting precautions

#### ● Environment

- If the switch is not waterproof and sealed, do not use the product in the environment where oil or water scatters or bursts. Use the protective cover to avoid direct exposure to the liquid. A limit switch is more proper for this case than the standard switch.
- Contact us when using the limit switch outside or with special cutting oil so that the deterioration of the switch material is expected.
- Place the switch on the place where it is not directly exposed to the processing waste or dusts. Protect the actuator and switch body from the cutting waste or foreign matters.

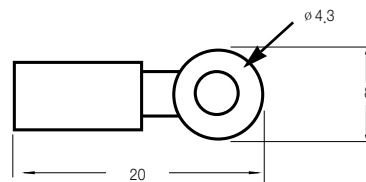
- Do not use the switch in the temperature and air conditions other than specified. The allowable ambient temperature varies according to the product type (Check the product specifications). In the case of abrupt thermal change, the heat impact deforms the switch and causes failure.
- When mounting the switch in the place where operating errors or accidents may happen in the normal operator or equipment conditions, additional measures are required.

#### ● Precautions for the panel mounting type

- Use M4 screws for fixing. Mount the product firmly using flat or spring washers. The proper tightening torque is 12~15 kgf · cm (1.18~1.47 N · m).
- The proper tightening torque for the hexagonal nut of the actuator is 50 kgf · cm (4.9 N · m).
- When mounting the panel mounting push-button type on the side using screws, remove the hexagonal nuts from the actuator part.
- For the connection with lead terminals, use crimp terminals at a tightening torque of 8~12 kgf · cm (0.78~1.18 N · m). (Recommended wire spec.: VCT 1.25 mm<sup>2</sup> two-wire, three-wire)

#### ● Precautions for the drip-proof type

- Do not soak the product in oil because this product is not completely oil-tight.
- Avoid using this product in the condition where temperature abruptly changes.



※ Specifications and materials can change without prior notice.

# V Series



## Specification

CONTACT ARRANGEMENT			1a+1b			
MATERIAL			Ag AlLoy			
CONTACT & CONTACT DISTANCE			0.5mm			
INSULATION RESISTANCE			100M $\Omega$ 500VDC			
CONTACT RESISTANCE			50m $\Omega$			
			NORMINAL OPEN NO		MORMINAL CLOSE NC	
COACTACT RATING	NON INDUCTIVE LOAD	RESISTIVE LOAD	15A 125VAC	10A 8VDC	15A 125VAC	15A 8VDC
			10A 250VAC	5A 14VDC	15A 250VAC	15A 14VDC
				2A 30VDC		10A 30VDC
				0.5A 125VDC		0.6A 125VDC
				0.25A 250VDC		0.3A 250VDC
		LAMP LOAD	1.5A 125VAC	1.5A 8VDC	3A 125VAC	4A 8VDC
	1.0A 250VAC		1.5A 14VDC	2A 250VAC	4A 14VDC	
			1.0A 30VDC		4A 30VDC	
				0.1A 125VDC		0.1A 125V
			0.05A 250VDC		0.05A 250VDC	
	INDUCTIVE LOAD	INDUCTIVE LOAD	10A 125VAC	8A 8VDC	10A 125VAC	10A 8VDC
6A 250VAC			4A 14VDC	10A 250VAC	10A 14VDC	
			1.5A 30VDC		6A 30VDC	
			0.05A 125VDC		0.6A 125VDC	
			0.03A 250VDC		0.3A 250VDC	
	MOTOR LOAD	MOTOR LOAD	2A 125VAC	2.5A 8VDC	4A 125VAC	6A 8VDC
1A 250VAC			2.5A 14VDC	3A 250VAC	6A 14VDC	
			1.5A 30VDC		4A 30VDC	
			0.05A 125VDC		0.1A 125VDC	
			0.04A 250VDC		0.05A 250VDC	
MIN. CURRY CURRENT			NORMINAL OPEN NO		MORMINAL CLOSE NC	
			15A		30A	

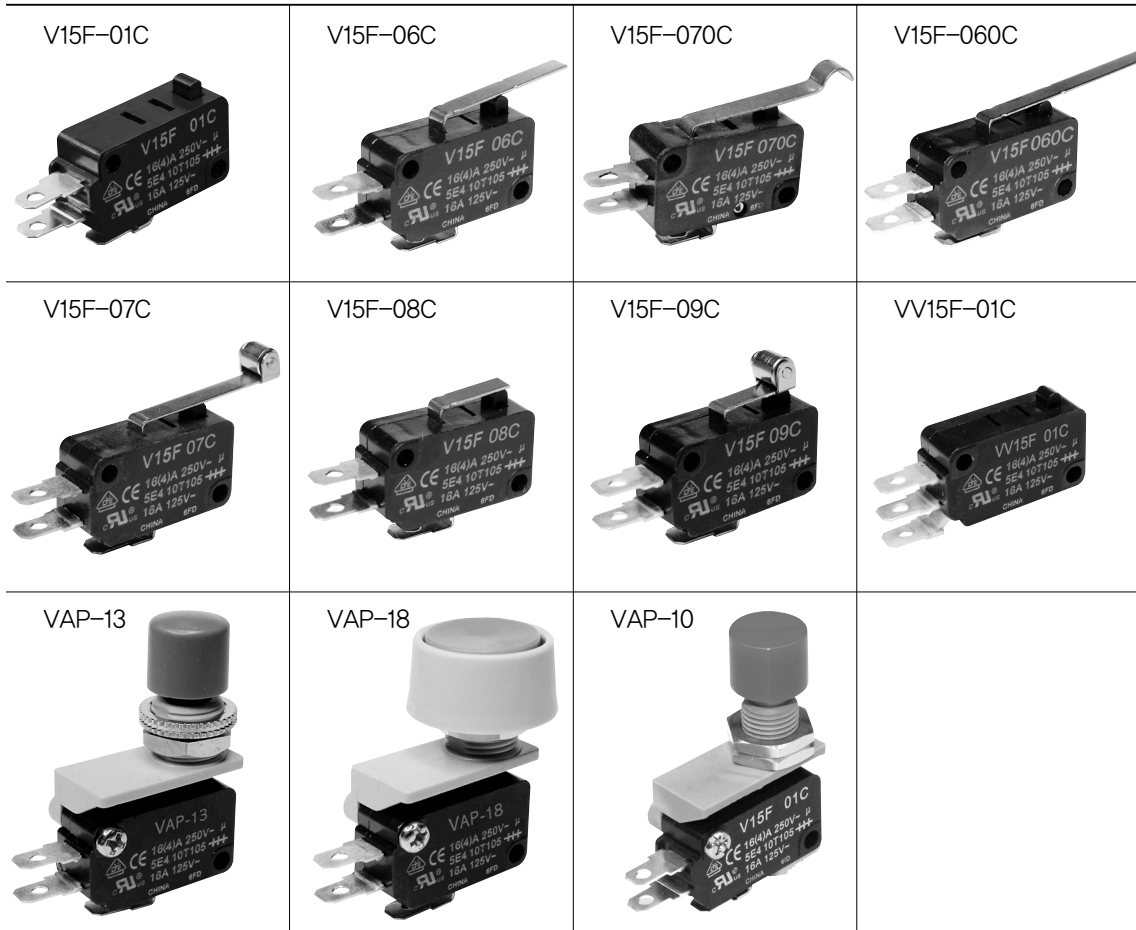
Motion Detecting Device

Micro Switch  
Limit Switch

- The aforementioned values are steady-state current values.
- The inductive load has a power factor of 0.4 or more (AC), and a time constant of 7 m/s or less (DC).
- The inrush current is ten times larger than steady-state current in the lamp load, and six times, in the motor load.

OPERATING SPEED		0.1mm/sec ~ 0.5m/sec
OPERATING FREQUENCY	ELECTRICAL	Max. 20 / Min.
	MECHANICAL	Max. 60 / Min.
DIELETICAL STRENGTH	NON CONTINROUS TERMINAL	1,000VAC 1Min.
	TERMINAL & NON CHARGED METAL PART	1,500VAC 1Min.
EXPECTED LIFE	ELECTRICAL	Min. 100,000
	MECHANICAL	Min. 1,000,000
VIBRATION		10~55Hz(Durable Amplitude 1.5mm)
SHOCK		30G
AMBIENT TEMPERATURE		-25 $^{\circ}$ C ~ +80 $^{\circ}$ C
AMBIENT HUMIDITY		35%~80% RH

※ The material and the specification of the product can be changed without notice for better quality.



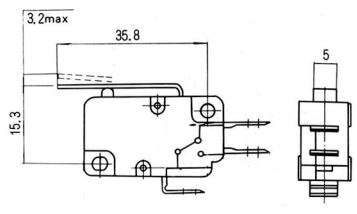
**Dimension** Unit : mm

**V15F-01C**

PT	1.7mm MAX.
MD	0.4mm MAX.
OT	0.8mm MIN.
OP	14.7±0.6mm

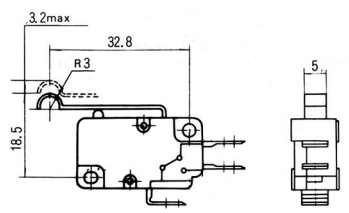
V Series

V15F-06C



PT	3.2mm MAX.
MD	1.2mm MAX.
OT	1.2mm MIN.
OP	15.3±1.2mm

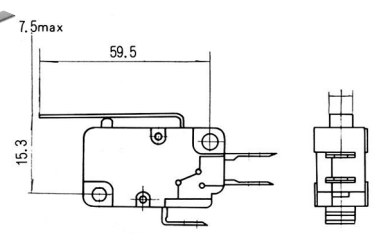
V15F-070C



PT	3.2mm MAX.
MD	1.2mm MAX.
OT	1.2mm MIN.
OP	15.5±1.2mm

Motion Detecting Device

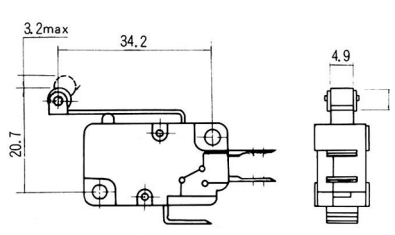
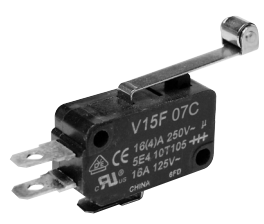
V15F-060C



PT	7.5mm MAX.
MD	2.2mm MAX.
OT	2.2mm MIN.
OP	15.3±2.6mm

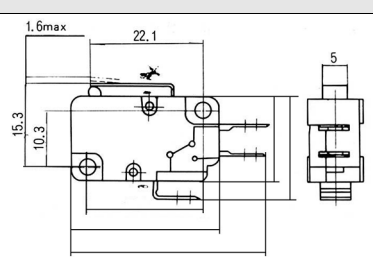
Micro Switch  
Limit Switch

V15F-07C



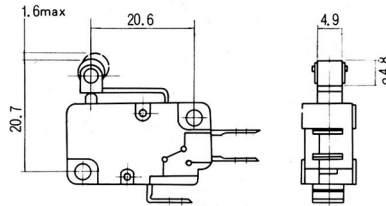
PT	3.2mm MAX.
MD	1.2mm MAX.
OT	1.2mm MIN.
OP	20.7±1.2mm

V15F-08C



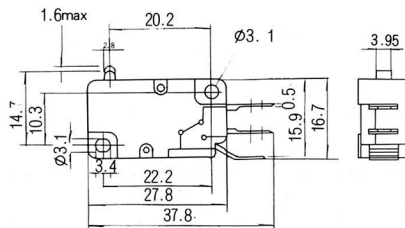
PT	1.6mm MAX.
MD	0.5mm MAX.
OT	0.8mm MIN.
OP	15.3±0.8mm

V15F-09C



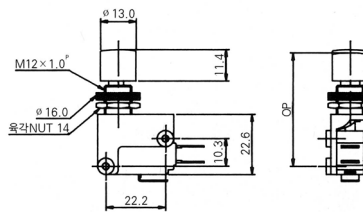
PT	1.6mm MAX.
MD	0.5mm MAX.
OT	0.8mm MIN.
OP	20.7±0.8mm

VV15F-01C



PT	1.6mm MAX.
MD	0.4mm MAX.
OT	0.8mm MIN.
OP	14.7±0.6mm

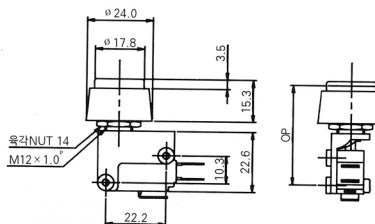
VAP-13



· Button Color K, B, R, G, Y

PT	1.6mm MAX.
MD	0.4mm MAX.
OT	0.8mm MIN.
OP	14.7±0.6mm

VAP-18

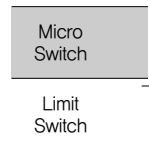


· Button Color K, B, R, G, Y

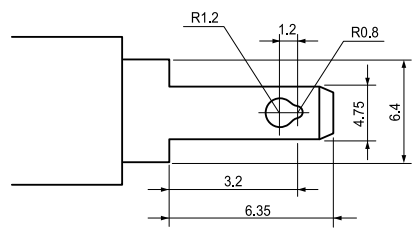
PT	1.6mm MAX.
MD	0.4mm MAX.
OT	0.8mm MIN.
OP	14.7±0.6mm

Glossary

Definition of operating characteristics	Category	Abbr.	Term	Unit	Definitio
<p>Center of the switch mounting hole</p>	Force	Force required for operation	OF	g, kg g-mm	Force on the actuator required for the motion from the free position to the operating position
		Restoring force	RF	g, kg g-mm	Force on the actuator required for the motion from the operating limit position to the restoring position
		Force required for entire motion	TF	g, kg g-mm	Force on the actuator required for the motion from the operating position to the operating limit position
	Motion	Motion to the operating position	PT	mm, deg	Distance or angle from the free position of the actuator to the operating position
		Motion after operation	OT	mm, deg	Distance or angle from the operating position of the actuator to the operating limit position
		Hysteresis distance	MD	mm, deg	Distance or angle from the operating position of the actuator to the restoring position
		Total motion	TT	mm, deg	Distance or angle from the free position of the actuator to the operating limit position
	Position	Free position	FP	mm, deg	The position of the operating part when no force is applied from outside
		Operating position	OP	mm, deg	The position of the actuator when the external force is applied to the actuator and the moving contact reverses from the free position
		Restoring position	RP	mm, deg	The position of the actuator when the external force to the actuator is reduced and the moving contact reverses from the operating position to the free position
		Operating limit position	TTP	mm, deg	The position of the actuator when the actuator reaches the actuator stop position



Terminal



※ Quick Connect Tab #187 / Soldering

# Memo

A large rectangular area filled with a fine grid pattern, intended for writing a memo. The grid is composed of small squares and covers most of the page's content area.

**KACON**