



# Operation Manual

## Product Name

Mechanical Valve

## Model/ Series

VM100-A Series

Made-to-Order Products (X207A, X219A)

**SMC Corporation**

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# Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)<sup>\*1)</sup>, and other safety regulations.

\*1) ISO 4414: Pneumatic fluid power - General rules and safety requirements for systems and their components  
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components  
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements  
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots  
etc.



## **Danger**

**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.



## **Warning**

**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.



## **Caution**

**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.



## **Warning**

### **1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

### **2. Only personnel with appropriate training should operate machinery and equipment.**

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

### **3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

### **4. Our products cannot be used beyond their specifications. Our products are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not covered.**

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.



# Safety Instructions

## Caution

**We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing industries.**

**Use in non-manufacturing industries is not covered.**

Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.

The new Measurement Act prohibits use of any unit other than SI units in Japan.

## Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

### Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.\*2)  
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.  
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

**\*2) Vacuum pads are excluded from this 1 year warranty.**

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty

### Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

## Design precautions



### Warning

#### (1) Actuator drive

When an actuator, such as a cylinder, is to be driven take appropriate measures to prevent potential danger caused by actuator operation.

#### (2) Maintenance space

When installing the products, allow access for maintenance.

#### (3) Ventilation

When using the valve in a closed control panel, etc., install ventilating openings to prevent an increase of pressure inside the control panel, and to prevent heat generated by other equipment from building up.

## Selection



### Warning

#### (1) Confirm the specifications.

The product is designed for use only in compressed air systems. Do not use fluids other than compressed air. Do not operate at pressures or temperatures, etc., beyond the range of specifications, as this can cause damage or malfunction.

#### (2) Use in low temperature environments

When using the valve in a low temperature condition, take appropriate measures to avoid freezing of drainage, moisture etc. in low temperature.

## Mounting



### Warning

#### (1) If air leakage increases or the equipment does not operate properly, stop operation.

Unexpected motion can cause injury.

#### (2) Check the mounting conditions

Make sure that screws and fittings are properly tightened and the piping is not bent or flattened. Connect the compressed air supply to the product and perform appropriate functional and leakage inspections to check it is mounted properly.

#### (3) Painting of the valve

Models or specifications printed or marked on the product should not be erased, removed or covered up. Do not paint resin parts, as this may have an adverse effect due to the solvent in the paint.



### Caution

#### (1) Transportation, installation, piping, wiring, operation, handling, and maintenance should be performed by personnel with sufficient knowledge and experience.

There is a risk of injury.

**(2) Do not disassemble or modify the product.**

This may cause human injury and/or an accident. Contact SMC for repairs and maintenance of the product.

**(3) Do not wipe the product using chemicals.**

## **Piping**



### **Caution**

**1. Before piping**

Before piping, perform air blow (flushing) or cleaning to remove any cutting chips, cutting oil, dust, etc. from the piping.

**2. Piping to product**

When piping to the product, refer to the symbols and labels on the product to avoid mistakes in the position of the supply port, etc.

**3. Sealant tape**

When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not enter the mechanical piping. If sealant tape is used, leave 1 thread ridges exposed at the end of the threads.

**4. One-touch fitting installation**

Refer to Fittings & Tubing Precautions from 1 to 5 shown in Best Pneumatics on SMC's website (URL <https://www.smcworld.com>) for the recommended piping conditions.

**5. Connection of M5 fittings**

First, tighten the fitting by hand, then give it an additional approximately 1/6 to 1/4 turns with a tool. Excessive tightening may damage the thread or deform the gasket, causing air leakage.

The reference torque is 1 to 1.5Nm.

**6. Connection of R1/8 and NPT1/8 fittings**

First, tighten the fitting by hand, then give it an additional approximately 2 to 3 turns with a tool. Standard tightening torque of the thread sizes R1/8 and NPT1/8 is 3 to 5 N·m.

**7. Follow the procedures of the manufacturer when fittings other than SMC are used.**

Confirm that no problem will occur in the operating conditions.

**8. If positioning is required, if the fitting is loosened after it has been tightened, it may cause air leakage.**

## **Lubrication**



### **Caution**

**1. The product has been lubricated for life by the manufacturer, and does not require lubrication in service.**

**2. Use turbine oil Class 1, ISO VG32 (with no additives), if lubricated.**

Use turbine oil Class 1, ISO VG32 (with no additives), if lubricated.

Besides, if the lubrication is suspended halfway, the original lubricant will be lost and may result in a malfunction. Be sure to keep lubricating continuously. For details about lubricant manufacturers' brands, refer to the SMC website.

## **Air Supply**



### **Warning**

**(1) Use clean air.**

Do not use compressed air that contains chemicals, organic solvents based synthetic oils, salts or corrosive gases, etc., as this can cause damage or malfunction.



### **Caution**

**1. Install air filters.**

Install air filters close to valves on the upstream side. A filtration degree of 5 micrometer or less should be selected.

**2. Install an aftercooler, air dryer or drain catch before the filter.**

Compressed air that contains excessive drainage may cause malfunction of valves and other pneumatic equipment. Therefore, take appropriate measures to ensure air quality, such as by providing an after cooler, water separator.

**3. If excessive carbon powder is seen, install a mist separator on the upstream side of the valve.**

If excessive carbon powder is generated by the compressor, it may adhere to the inside of the valves and cause malfunction.

**4. Grease is applied to the inner parts of the valve.**

Grease may enter on the downstream side of the valve.

**For detailed information regarding the quality of the compressed air described above, refer to SMC's Cleaning Systems".**

## **Operating Environment**



### **Warning**

- 1. Do not use in an environment where corrosive gases, chemicals, sea water, water or steam are present.**
- 2. Do not operate in a location subject to vibration or impact.**
- 3. Use a protective cover, etc. to shield the product from direct sunlight.**
- 4. Shield the product from radiated heat generated by nearby heat sources.**
- 5. Employ suitable protective measures in a location where there is contact with oil or welding spatter, etc.**
- 6. Avoid using in a location where it could be splashed by liquids such as oils, coolant and water, and dust.**

Because it does not have a waterproof or dustproof construction, fluids or dust could enter the valve, leading to malfunction. Therefore, take measures such as providing a protective cover to prevent direct exposure.

## **Maintenance**



### **Warning**

#### **1. Removal of equipment, and supply/exhaust of compressed air**

When equipment is serviced, first confirm that measures are in place to prevent dropping of driven objects and/or equipment running out of control, etc. Then cut the supply pressure and power, and exhaust all compressed air from the system using its residual pressure release function.

When the equipment is to be started again after remounting, first confirm that measures are in place to prevent lurching of actuators, etc., and then confirm that the equipment can operate normally.

#### **2. Before performing maintenance, confirm that measures are taken to prevent sudden action and protect workers.**

#### **3. Draining**

Remove condensate from air filters regularly. If condensate in the drain bowl is not emptied on a regular basis, the condensate will overflow and allow it to enter the compressed air lines. This will cause a malfunction of pneumatic equipment. If the drain bowl is difficult to check and remove, installation of a drain bowl with an auto drain option is recommended.



## Specific Product Precautions for Mechanical Valve

### Design precautions



#### Warning

##### 1. Cannot be used for sealing pressure.

Since VM100 is a poppet type valve, fluid flows backwards when the pressure on port 2 rises. Since the valve is subject to a little amount of air leakage, it cannot be used for applications such as holding pressure (including vacuum).

##### 2. Not suitable for use as an emergency shutoff valve, etc.

This valve is not designed for safety applications such as an emergency shutoff valve. If the valves are used in this type of system, other reliable safety assurance measures must also be adopted.

##### 3. Supply vacuum pressure to port 1 when using vacuum pressure.

### Mounting



#### Warning

##### 1. Do not move the mechanical operation beyond the operating limit position.

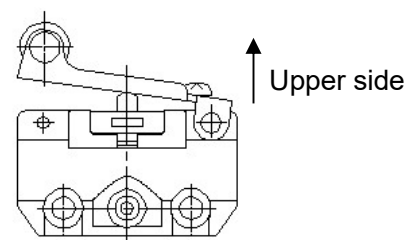
This could damage the mechanical valve itself and lead to equipment malfunction. Refer to Chapter 7, "Mechanical Operating Conditions" in this Operation Manual for the main precautions.

##### 2. Never perform additional machining such as enlarging the body mounting hole or to the valve body.

Scratches or dust may result in air leakage or unexpected failure.

##### 3. Roller lever type valve is recommended to be mounted in the orientation that the roller lever faces upward.

Strokes that are shown in Chapter 4 in this Operation Manual are the values when the valve is operated with the roller lever facing upward as shown in the Fig. If the valve is operated in other mounting orientations, the values may be different from those shown in Chapter 4 due to potential changes in the clearance of the components of the roller lever.



## Operation



### Warning

1. **Operate all manual mechanical valves (e.g. button type, selector type, flip toggle type) by hand only.**

If tools or other equipment such as a cylinder, cam or hammer are used, the actuator or the mechanical valve will be damaged, which may result in malfunction of the equipment.

2. **Select the angle and the maximum speed of the operating cam and the dog of the mechanism so that they do not exceed the maximum values.**

This could damage the mechanical valve itself and lead to equipment malfunction. Refer to Chapter 7, "Mechanical Operating Conditions" in this Operation Manual for the main precautions.



### Caution

1. **After operating for a long time, it will take some time for the valve to restart as the resistance between the seal and the parts increases.**

Please consult SMC if the operating condition is maintained for a long period of time.

## Maintenance



### Warning

1. **Perform inspection on a regular basis as necessary, such as at the beginning of operation, to make sure that the mechanical valve operates properly.**
2. **Do not disassemble, repair and modify the product.**

This may lead to malfunction of equipment, injury and equipment damage. Please contact SMC for repair and maintenance of the product.

3. **Strokes of the roller lever type, roller plunger type, and cross roller plunger type**

When the actuator performs strokes with something like a cam always rotated in contact with the roller of the actuator, the roller may be worn and it may cause change in the strokes. Ensure that the actuator stroke is within the stroke range shown in section 7-1 when the product is serviced.

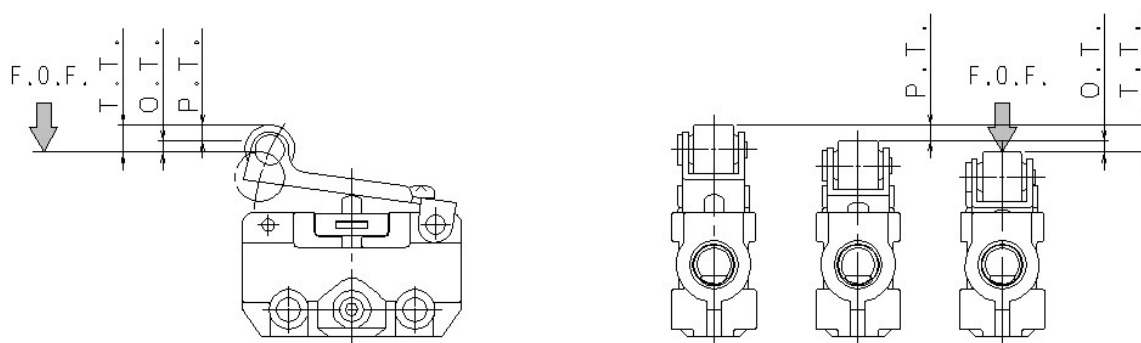
## 2. Application

This product is a valve for signal transmission used for a pneumatic control circuit of machining equipment or general industrial machinery, etc.

## 3. Specifications

Piping	Side ported type	Bottom ported type
Fluid	Compressed air	
Operating pressure	-100 kPa to 1 MPa	
Operating temperature	-5 to 60 °C (No freezing)	
Sonic conductance	1(P)→2(A): 0.6 dm <sup>3</sup> /(s·bar)	1(P)→2(A): 0.5 dm <sup>3</sup> /(s·bar)
	2(P)→3(R): 0.5 dm <sup>3</sup> /(s·bar)	2(P)→3(R): 0.45 dm <sup>3</sup> /(s·bar)
Lubrication	Unnecessary. If lubricated, use turbine oil, (ISO VG32)	
Port size (nominal)	Rc1/8, NPT1/8, G1/8	M5
Function	N.C. type	
Construction	Poppet type	
Number of positions	2 or 3	
Number of ports	2 or 3	
Weight (Basic type)	60 g	67 g

## 4. Models and Strokes



F.O.F. <Full Operating Force> --- Required force to total travel position, from free position of the actuator to total travel position.

P.T. <Pre-travel> --- From free position to initial valve operating position.

O.T. <Over Travel> --- From initial valve operating position to total travel position.

T.T. <Total Travel> --- From free position to total travel position.

Type	Model		F.O.F. at 0.5 MPa (Note 1)	P.T. (Note 1)	O.T. (Note 1)	T.T. (Note 1)
	2 port	3 port				
Basic type	VM120-01-00A VM121-01-00A VM122-M5-00A VM123-M5-00A	VM130-01-00A VM131-01-00A VM132-M5-00A VM133-M5-00A	26N	1.5mm	1.5mm	3mm
Roller lever	VM121-01-01A VM121-01-01SA VM123-M5-01A VM123-M5-01SA	VM131-01-01A VM131-01-01SA VM133-M5-01A VM133-M5-01SA	13N	3.2mm	2.3mm	5.5mm
One way roller lever	VM121-01-02A VM121-01-02SA VM123-M5-02A VM123-M5-02SA	VM131-01-02A VM131-01-02SA VM133-M5-02A VM133-M5-02SA	13N	3.2mm	2.3mm	5.5mm
Straight plunger	VM120-01-05A VM122-M5-05A	VM130-01-05A VM132-M5-05A	29N	2mm	1.5mm	3.5mm
Roller plunger	VM120-01-06A VM120-01-06SA VM122-M5-06A VM122-M5-06SA	VM130-01-06A VM130-01-06SA VM132-M5-06A VM132-M5-06SA	29N	2mm	1.5mm	3.5mm
Cross roller plunger	VM120-01-07A VM120-01-07SA VM122-M5-07A VM122-M5-07SA	VM130-01-07A VM130-01-07SA VM132-M5-07A VM132-M5-07SA	29N	2mm	1.5mm	3.5mm
Toggle lever	VM120-01-08A VM122-M5-08A	VM130-01-08A VM132-M5-08A	13N	—	—	60°
Mushroom push button	VM120-01-30RA VM120-01-30BA VM120-01-30GA VM120-01-30YA VM122-M5-30RA VM122-M5-30BA VM122-M5-30GA VM122-M5-30YA	VM130-01-30RA VM130-01-30BA VM130-01-30GA VM130-01-30YA VM132-M5-30RA VM132-M5-30BA VM132-M5-30GA VM132-M5-30YA	27N	—	—	6.5mm
Extended push button	VM120-01-32RA VM120-01-32BA VM120-01-32GA VM120-01-32YA VM122-M5-32RA VM122-M5-32BA VM122-M5-32GA VM122-M5-32YA	VM130-01-32RA VM130-01-32BA VM130-01-32GA VM130-01-32YA VM132-M5-32RA VM132-M5-32BA VM132-M5-32GA VM132-M5-32YA	27N	—	—	6.5mm
Flush push button	VM120-01-33A VM122-M5-33A	VM130-01-33A VM132-M5-33A	27N	—	—	6.5mm
Twist selector (2 position)	VM120-01-34RA VM120-01-34BA VM120-01-34GA VM120-01-34YA VM122-M5-34RA VM122-M5-34BA VM122-M5-34GA VM122-M5-34YA	VM130-01-34RA VM130-01-34BA VM130-01-34GA VM130-01-34YA VM132-M5-34RA VM132-M5-34BA VM132-M5-34GA VM132-M5-34YA	15N	—	—	90°
Key selector (2 position)	VM120-01-36A VM122-M5-36A	VM130-01-36A VM132-M5-36A	15N	—	—	90°
Twist selector (3 position)	(3 port) VM131-01-35RA VM131-01-35BA VM131-01-35GA VM131-01-35YA VM133-M5-35RA VM133-M5-35BA VM133-M5-35GA VM133-M5-35YA	(5 port) VM151-01-35RA VM151-01-35BA VM151-01-35GA VM151-01-35YA VM153-M5-35RA VM153-M5-35BA VM153-M5-35GA VM153-M5-35YA	20N	—	—	45°

Note 1) Representative values are shown here.

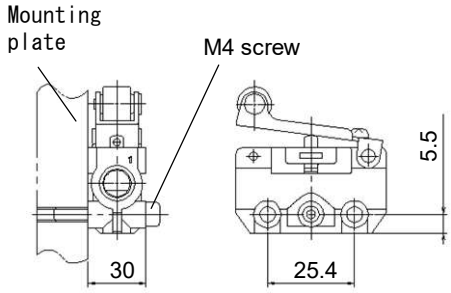
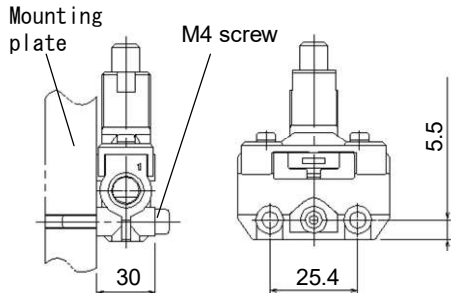
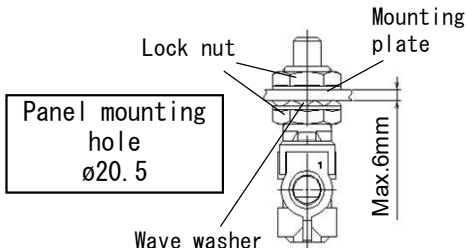
Note 2) Actuator can be changed and replaced (excluding roller lever type and selector 3 position type).

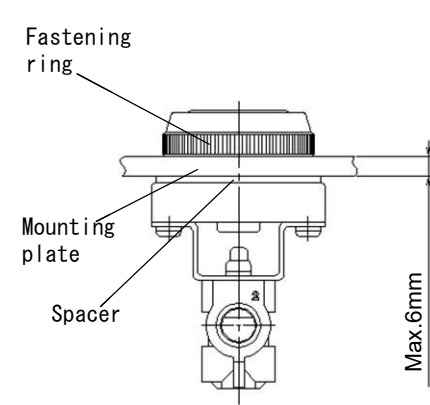
Note 3) Refer to page 19 for replacement of the mushroom button, extended push button, flush push button, and single unit of the fastening ring. Parts other than mentioned above cannot be replaced.

Note 4) The handle of the selector head (for 2 position or 3 position) cannot be removed or replaced on its own.

## 5. Installation and Mounting Orientation

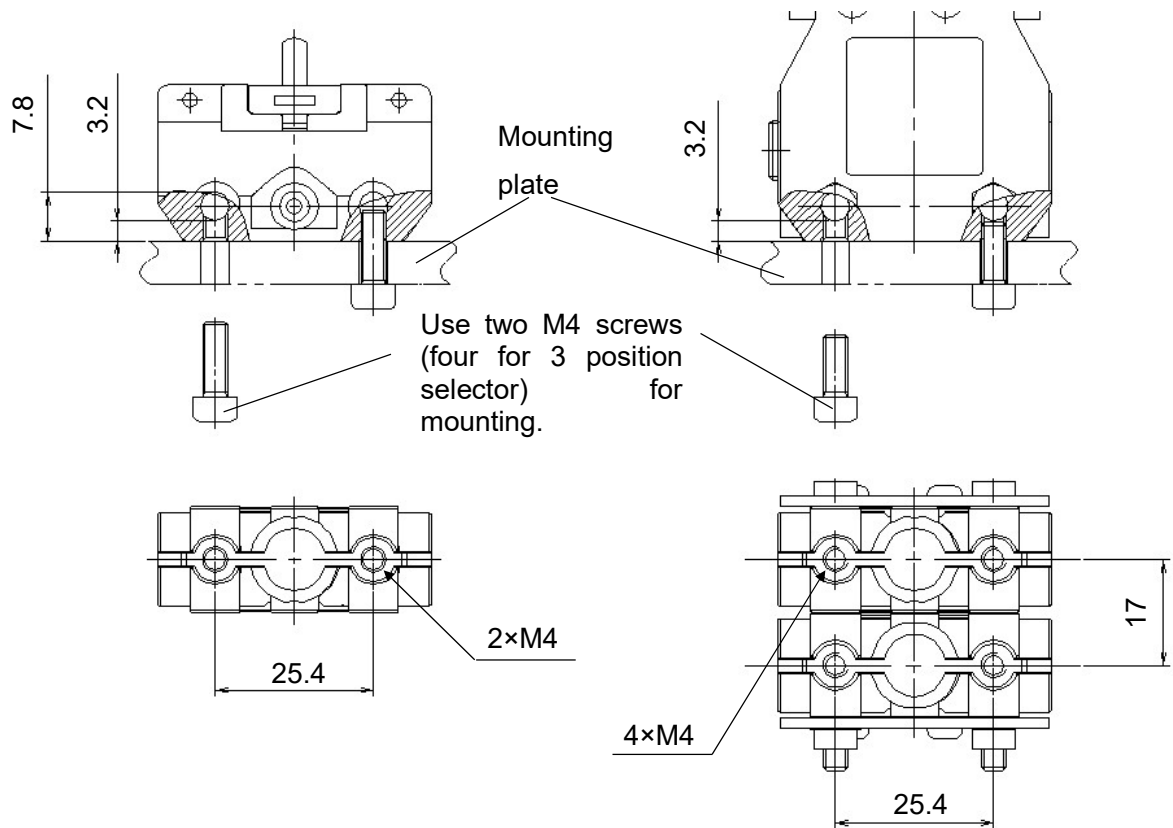
### 5-1. Product number with each actuator

Type	Model		Mounting dimensions
	2 port	3 port	
Roller lever	VM121-01-01A VM121-01-01SA VM123-M5-01A VM123-M5-01SA	VM131-01-01A VM131-01-01SA VM133-M5-01A VM133-M5-01SA	 <p>Fix at two points using M4 screws.</p>
One way roller lever	VM121-01-02A VM121-01-02SA VM123-M5-02A VM123-M5-02SA	VM131-01-02A VM131-01-02SA VM133-M5-02A VM133-M5-02SA	
Straight plunger	VM120-01-05A VM122-M5-05A	VM130-01-05A VM132-M5-05A	 <p>Fix at two points using M4 screws.</p>
Roller plunger	VM120-01-06A VM120-01-06SA VM122-M5-06A VM122-M5-06SA	VM130-01-06A VM130-01-06SA VM132-M5-06A VM132-M5-06SA	
Cross roller plunger	VM120-01-07A VM120-01-07SA VM122-M5-07A VM122-M5-07SA	VM130-01-07A VM130-01-07SA VM132-M5-07A VM132-M5-07SA	
Toggle lever	VM120-01-08A VM122-M5-08A	VM130-01-08A VM132-M5-08A	 <p>Use two lock nuts of M14 and with width across flats of 17 for mounting.</p>

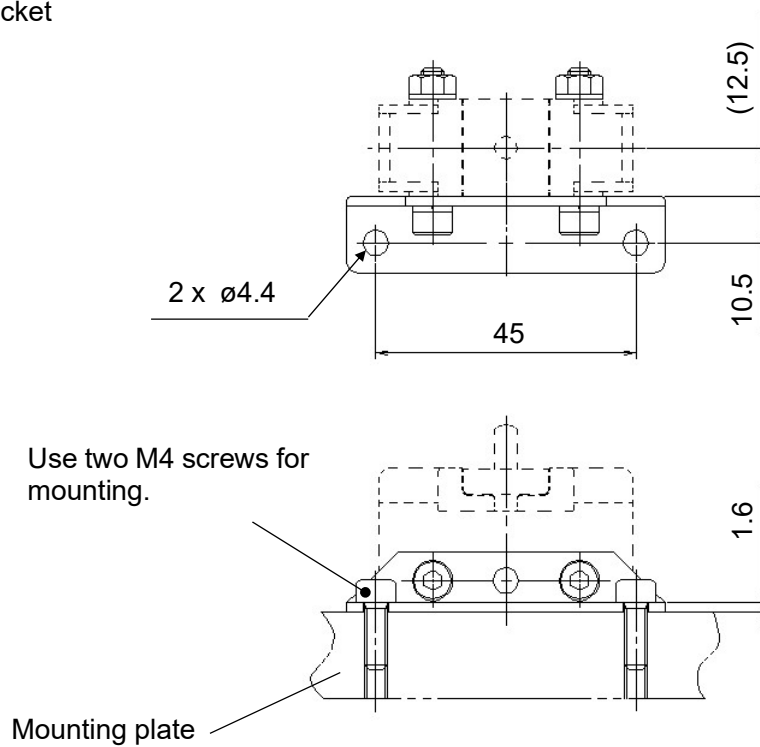
Type	Model		Mounting dimensions
	2 port	3 port	
Mushroom push button	VM120-01-30RA VM120-01-30BA VM120-01-30GA VM120-01-30YA VM122-M5-30RA VM122-M5-30BA VM122-M5-30GA VM122-M5-30YA	VM130-01-30RA VM130-01-30BA VM130-01-30GA VM130-01-30YA VM132-M5-30RA VM132-M5-30BA VM132-M5-30GA VM132-M5-30YA	 <p>Fastening ring</p> <p>Mounting plate</p> <p>Spacer</p> <p>Max. 6mm</p> <p>Panel mounting hole  <math>\phi 30.5</math></p> <p>Mount to <math>\phi 30.5</math> hole using the fastening ring on top. When the product is mounted onto a board with thickness of about 6mm, use a 1.5mm spacer.</p>
Extended push button	VM120-01-32RA VM120-01-32BA VM120-01-32GA VM120-01-32YA VM122-M5-32RA VM122-M5-32BA VM122-M5-32GA VM122-M5-32YA	VM130-01-32RA VM130-01-32BA VM130-01-32GA VM130-01-32YA VM132-M5-32RA VM132-M5-32BA VM132-M5-32GA VM132-M5-32YA	
Flush push button	VM120-01-33A VM122-M5-33A	VM130-01-33A VM132-M5-33A	
Twist selector (2 position)	VM120-01-34RA VM120-01-34BA VM120-01-34GA VM120-01-34YA VM122-M5-34RA VM122-M5-34BA VM122-M5-34GA VM122-M5-34YA	VM130-01-34RA VM130-01-34BA VM130-01-34GA VM130-01-34YA VM132-M5-34RA VM132-M5-34BA VM132-M5-34GA VM132-M5-34YA	
Key selector (2 position)	VM120-01-36A VM122-M5-36A	VM130-01-36A VM132-M5-36A	
Selector (3 position)	VM131-01-35RA VM131-01-35BA VM131-01-35GA VM131-01-35YA VM133-M5-35RA VM133-M5-35BA VM133-M5-35GA VM133-M5-35YA	VM151-01-35RA VM151-01-35BA VM151-01-35GA VM151-01-35YA VM153-M5-35RA VM153-M5-35BA VM153-M5-35GA VM153-M5-35YA	

## 5-2. Bottom mounting type

Selector type (for 3 position) has the thread depth of 3.2 and four mounting screw positions.



## 5-3. With bracket



## 6. Operating Force

Full operating force increases according to the increase of the supply pressure.

Full operating force for each product type can be found by the formula below.

$$F \doteq \frac{F1}{26} \times F2$$

F1: Full operating force at 0.5MPa of the product type (F.O.F on page 11)

F2: Full operating force at supply pressure found from Fig.1

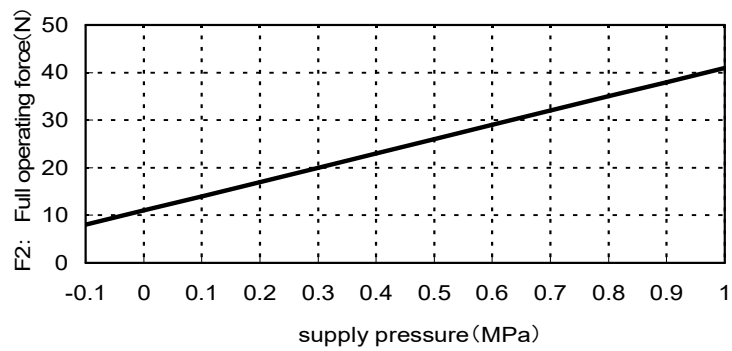


Fig. 1



## 7. Mechanical Operating Conditions

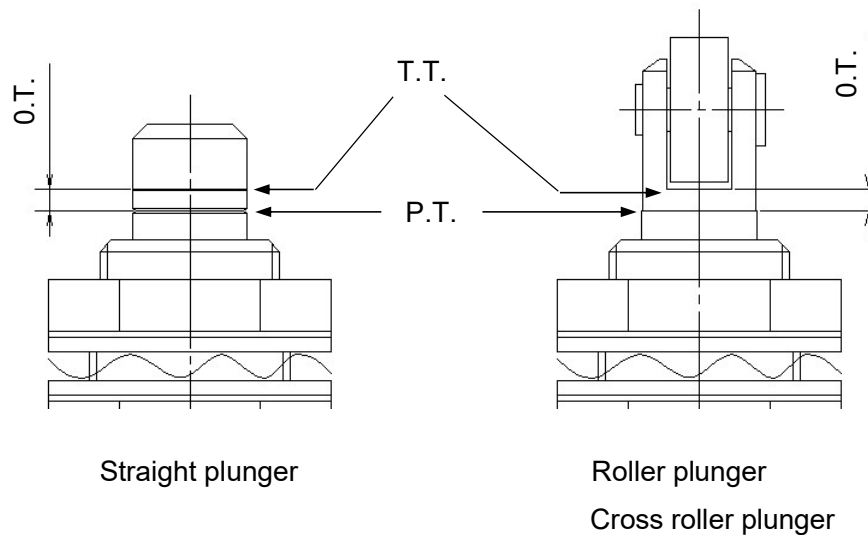
### 7-1. Stroke range

Use a mechanical operating product within the stroke range calculated by the formula below.

$$\text{Stroke range} = (\text{P.T.} + 0.5 \times \text{O.T.}) \text{ to } (\text{P.T.} + \text{O.T.} - 0.1)$$

Actuator	Stroke range (mm)
Basic	2.2 to 2.9
Roller lever	4.3 to 5.4
One way lever	4.3 to 5.4
Straight plunger	2.7 to 3.4
Roller plunger	2.7 to 3.4
Cross roller plunger	2.7 to 3.4

Fig. shown below shows the groove and step as a guide for P.T. and T.T. point positions of plunger type. Please use these values as a guide for adjusting stroke.



### 7-2. Maximum angle and maximum speed limit for cam and dog

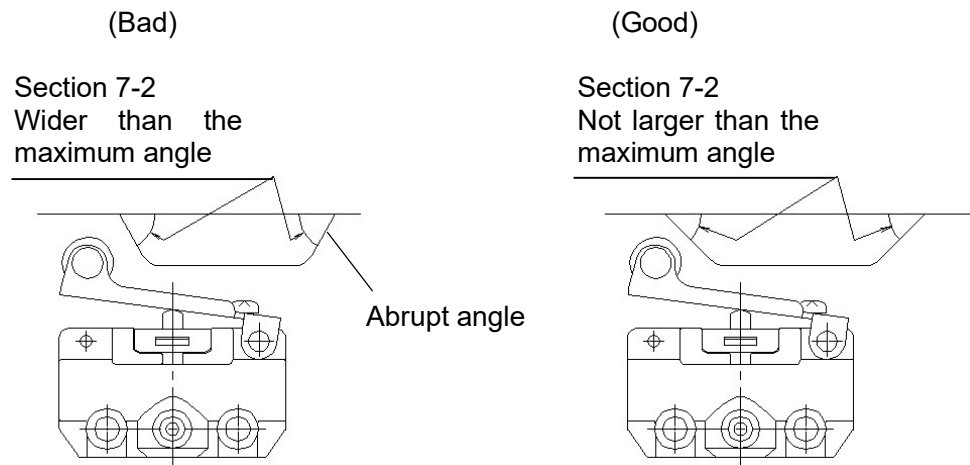
Actuator	Max. angle for dog	Max. speed for dog (m/s)
Roller lever	30°	0.7
	45°	0.3
One way roller lever	30°	0.7
	45°	0.3
Straight plunger	-	0.2
Roller plunger	30°	0.3
Cross roller plunger	30°	0.3

### 7-3. Cam and dog materials

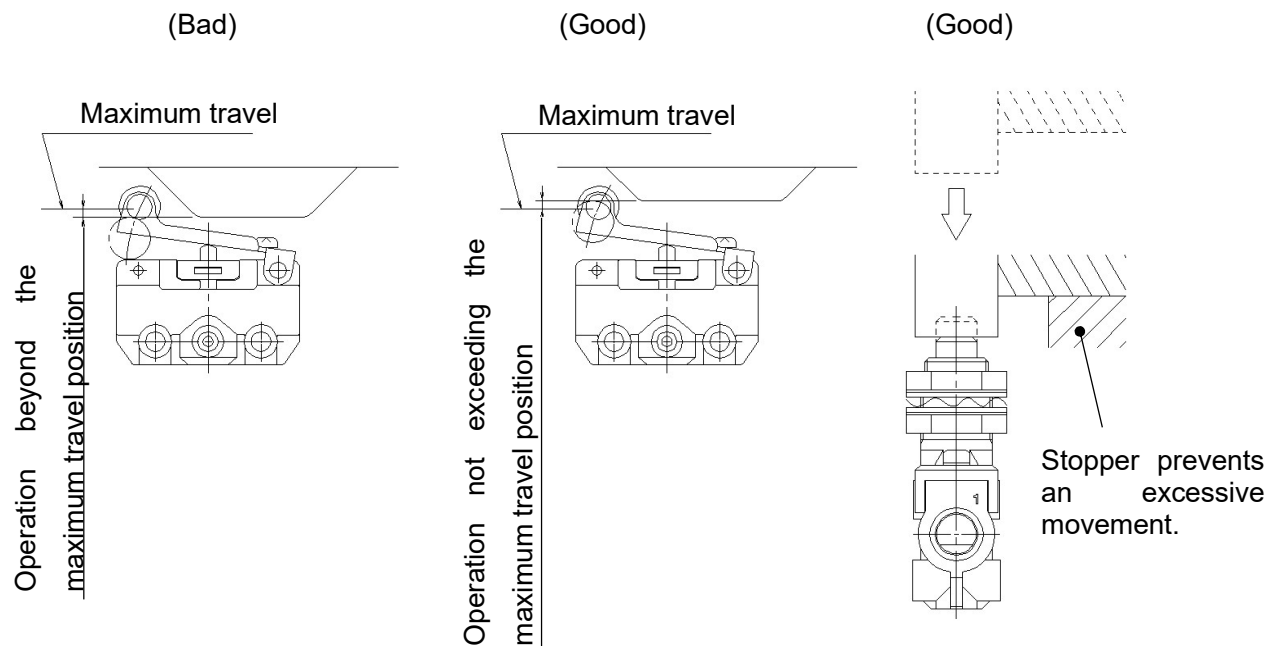
Roller material	Dog material	Finish accuracy for dog
Polyacetal	Metal	Rz 6.3 or less
Hard steel	Metal, resin	Rz 25 or less

#### 7-4. Operation mechanism and configuration

1. Avoid acute angles on limit switch actuator.



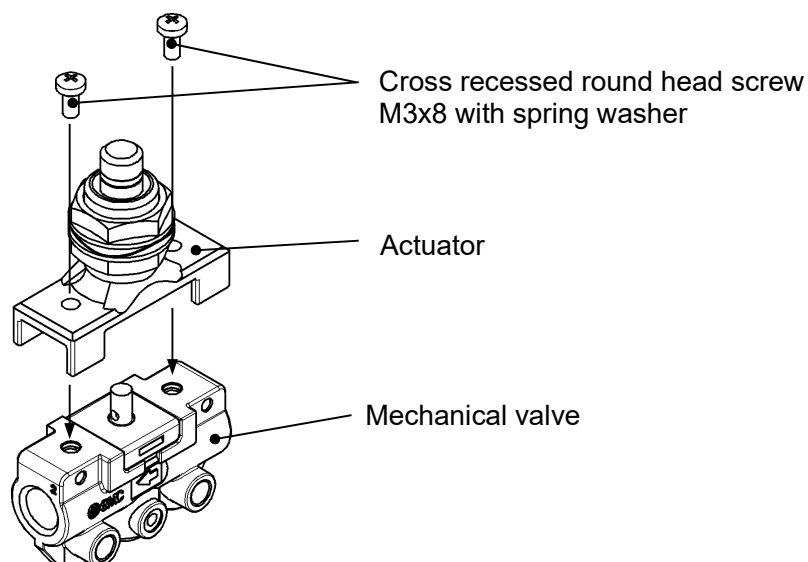
2. Do not allow stroke beyond the maximum travel position.



## 8. Replacement of the Actuator

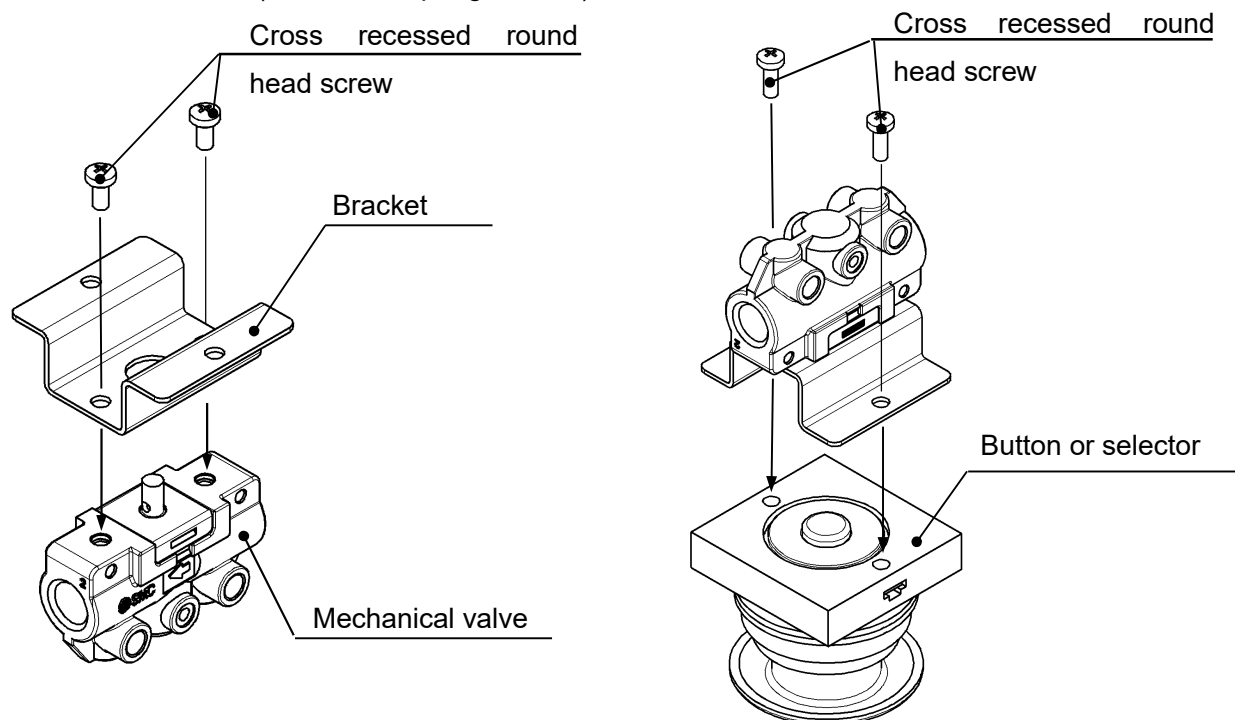
### 8-1. Plunger and flip toggle types

Mount an actuator to the mechanical valve with two screws (M3x8 with spring washer) as shown in the Fig. below. Phillips head screw driver is needed.



### 8-2. Button type, Selector type

1. Mount a bracket to the mechanical valve using two screws (M3x6 with spring washer).
2. Mount a button or selector to the bracket (that is already mounted to the mechanical valve) with two screws (M3 x8 with spring washer).



#### [Supplied screws]

Type	Quantity	Notes
M3x6 with spring washer	2	
M3x8 with spring washer	4	Only two screws are used for mounting of VM100 series valve.

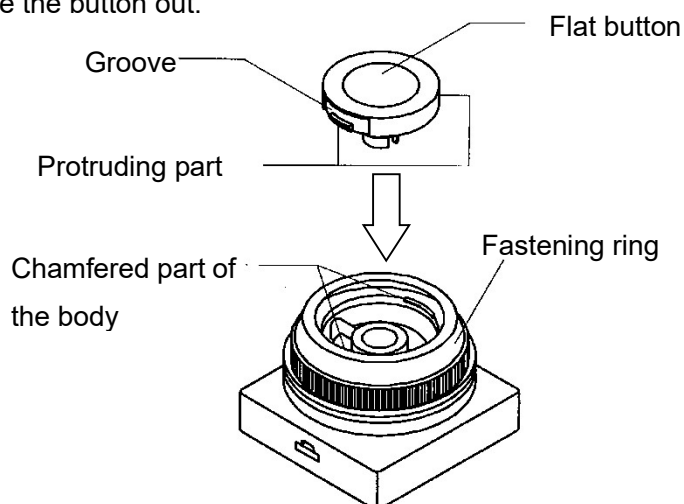
### 8-3. Replacement of the button

Follow the procedure below to change the button.

#### (1) Flat button

Installation - Choose the button from 4 colors (red, green, black and yellow). Push the protruding part of the button into the body.

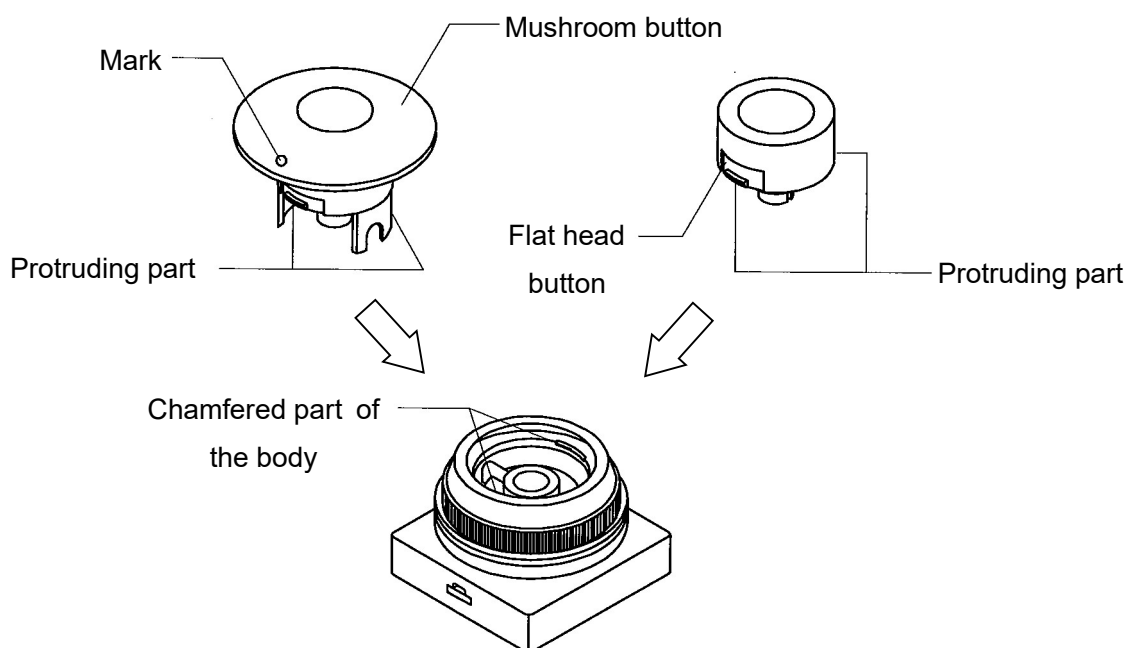
Removal - Remove fastening ring. Insert a small screwdriver into the groove of the button to take the button out.



#### (2) Mushroom button and flat head button

One specified button is set when the product is shipped.

	Mushroom button	Flat head button
Mounting	Align the protruding part of the button with the recessed part of the body and push in. (Use the mark on the button as a reference to align the protruding part)	Align the protruding part of the button with the recessed part of the body and push in.
Removal	Use your thumb to pry the button upwards.	Remove the fastening ring. Insert a small screwdriver into the groove of the button to take the button out.



## 9. Product Number of the Actuator

[Actuator number]

Actuator		Actuator number	Remarks
Mechanical operation	Basic	—	—
	Roller lever	Not replaceable	—
	One way roller lever	Not replaceable	—
	Straight plunger	VM-05B	—
	Roller plunger	VM-06B	POM roller
		VM-06BS	Hard steel roller
	Cross roller plunger	VM-07B	POM roller
		VM-07BS	Hard steel roller
Manual operation	Flip toggle	VM-08B	—
	Mushroom button	VM-30AR	Red
		VM-30AB	Black
		VM-30AG	Green
		VM-30AY	Yellow
	Flat head button	VM-32AR	Red
		VM-32AB	Black
		VM-32AG	Green
		VM-32AY	Yellow
	Flat button	VM-33A	One set includes red, black, green and yellow.
	Selector (2 position)	VM-34AR	Red
		VM-34AB	Black
		VM-34AG	Green
		VM-34AY	Yellow
	Key selector (2 position)	VM-36A	—
	Selector (3 position)	Not replaceable	—

[Button number]

Color	Mushroom button	Flat head button	Flat button
Red	3402186R	3402187R	3402188R
Black	3402186B	3402187B	3402188B
Green	3402186G	3402187G	3402188G
Yellow	3402186Y	3402187Y	3402188Y

Fastening ring number: 3402184

[Bracket part number]

- VM1-B

The bracket can only be used for side mounting of side ported type.

## 10. Precautions on Made-to-Order Products (X207A, X219A)

### 10-1. Specifications

X207A · · · · Alternate Type, Mushroom Push Button

X219A · · · · Push-lock Turn-reset Type, Mushroom Push Button

### 10-2. Precautions for mounting

#### [Task 1] Removal of the push button and fastening ring

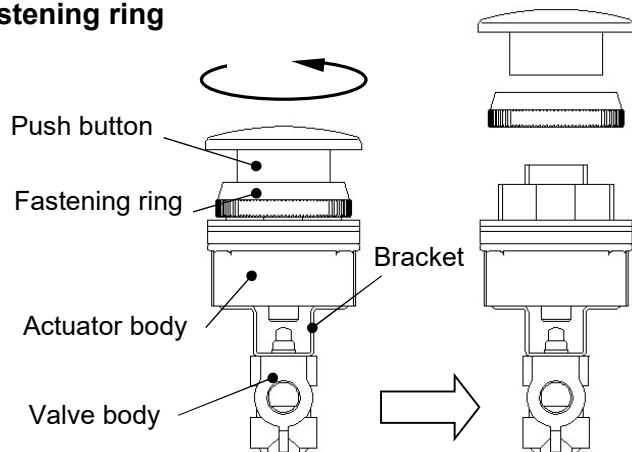
Remove them from the body turning them counterclockwise in the order of the pushbutton and fastening ring.



#### Caution

When mounting on a panel, be sure to hold the actuator body to tighten or remove the push button and fastening ring. If you work by holding the valve body, a load is applied in the tensile direction, which may lead to deformation of the bracket.

If the bracket is deformed, the mechanical valve will not operate properly.

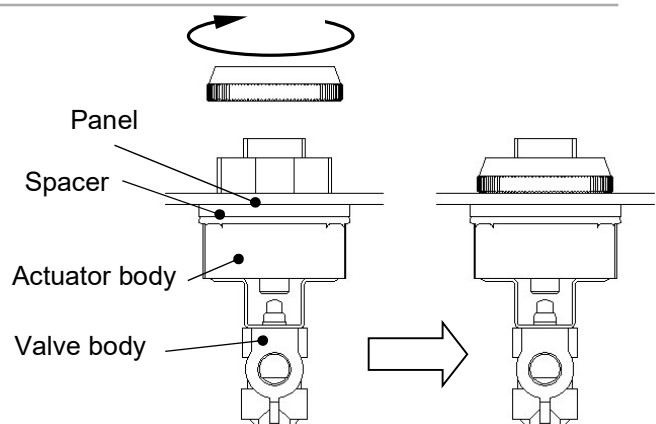


Remove the push button by holding the actuator body.

#### [Task 2] Mounting the valve to the panel

By holding the actuator body, insert the valve to the panel and fix it by using the fastening ring.

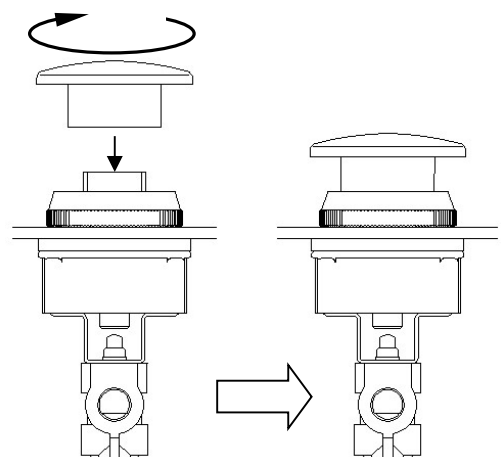
Remove three spacers attached to the valve depending on the panel thickness



Mount the push button by holding the actuator body

#### [Task 3] Mounting the push button

Tighten the push button clockwise by hand and further tighten it until load is applied.



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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.  
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Revision history	
A: Safety Instructions changed.	2023.12
B:Change of the note on the operating environment (6) and Safety Instructions. Addition of Made-to-Order Products.	2024.2