



Mechanical Valves

Series VM

| | | | |
|-----------------|--|--|--------------|
| Model | VM1000 | VM100 | VM200 |
| Dimensions (mm) | Side ported 11 x 36 x 16 Bottom ported 11 x 28 x 25 | Side ported 17 x 44 x 25 Bottom ported 17 x 44 x 30 | 25 x 40 x 52 |

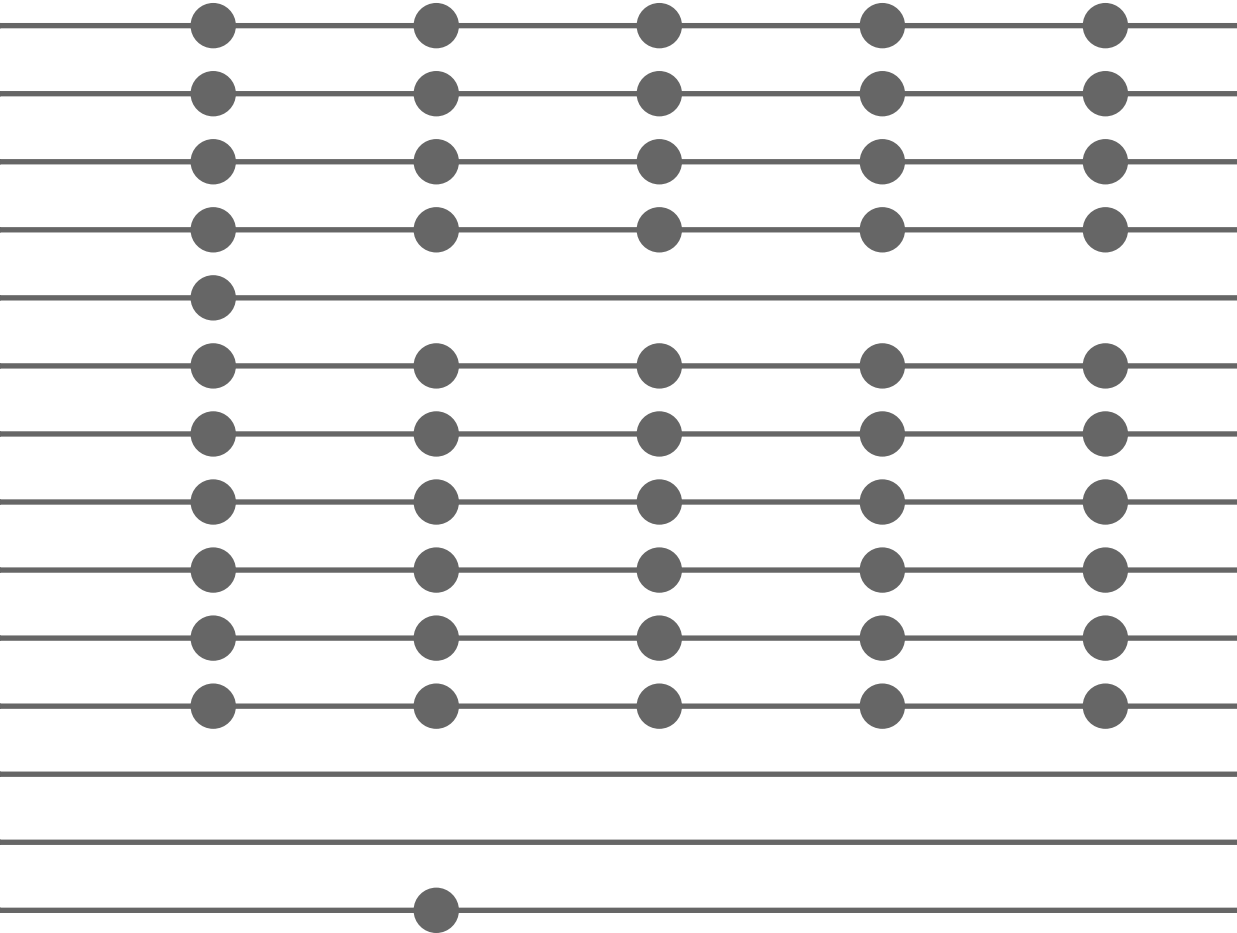
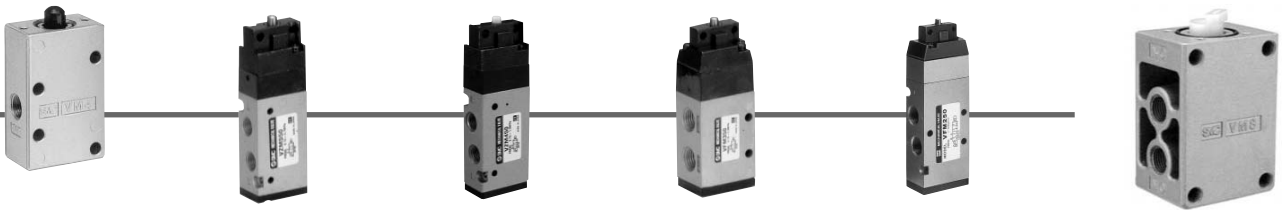
| | | | |
|-----------------------------|--|---|---|
| Basic | | | |
| Roller lever | | ● | ● |
| One way roller lever | | ● | ● |
| Straight plunger | | ● | ● |
| Roller plunger | | ● | ● |
| Cross roller plunger | | ● | ● |
| Toggle lever | | ● | ● |
| Push button (Mushroom) | | ● | ● |
| Push button (Extended) | | ● | ● |
| Push button (Flush) | | ● | ● |
| Twist selector (2 position) | | ● | ● |
| Key selector (2 position) | | ● | ● |
| Twist selector (3 position) | | ● | ● |
| Foot pedal | | ● | ● |
| Push-pull | | ● | ● |

| | | | |
|-----------------------------------|----------|-----------|-----------|
| | P. 5-6-8 | P. 5-6-12 | P. 5-6-20 |
| Effective area (mm ²) | 1 | 2.5 | 19 |
| Number of ports | 2, 3 | 2, 3 | 2, 3 |
| | Poppet | Poppet | Poppet |
| Function | | | |

Mechanical Valves

- A
- A
- A
- A
- VM**
- VR
- VH
- VHS

| | | | | | |
|--------------|---------------|---------------|---------------|---------------|--------------|
| VM400 | VZM500 | VZM400 | VFM300 | VFM200 | VM800 |
| 21 x 35 x 53 | 18 x 28 x 87 | 18 x 30 x 91 | 26 x 35 x 94 | 23 x 40 x 115 | 30 x 40 x 57 |



| | | | | | |
|-----------------|-----------------------------|-------------------------------|-----------------------------|-------------------------------|-----------------|
| P. 5-6-26 | P. 5-6-41 | P. 5-6-35 | P. 5-6-48 | P. 5-6-54 | P. 5-6-32 |
| 7 | 10.8 | 9.9 | 18 | 18 | 6 |
| 3 | 5 | 5 | 5 | 5 | 3 |
| Balanced poppet | Rubber spool | Metal spool | Rubber spool | Metal spool | Balanced poppet |
| | | | | | |
| NO NC | 4(A) 2(B) 5(R)1(P) 3(R2) | * 2(B) 4(A) 3(EB)1(P)5(EA) | 2(B) 4(A) 3(EB)1(P)5(EA) | * 2(B) 4(A) 3(EB)1(P)5(EA) | OUT NO NC |

⚠ Precautions

Be sure to read before handling. Refer to pages 5-12-2 to 6 for Safety Instructions and Solenoid Valve Precautions.

Mounting

Definition of Symbol

⚠ Warning

1. Conditions for mechanical operation

Do not move the mechanical operation beyond the operating limit position, as this could damage the mechanical valve itself and lead to equipment malfunction.

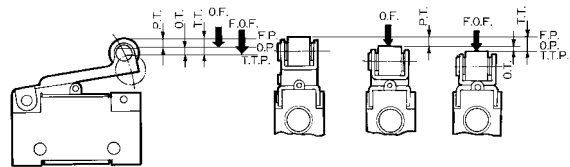
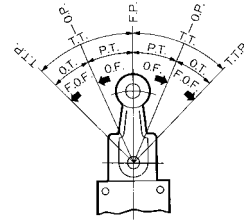
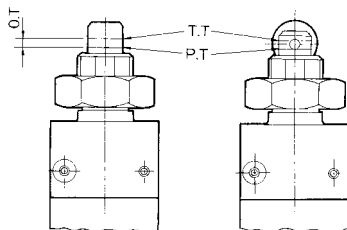
• Actuator stroke

Operate the mechanism within the stroke range that has been obtained through the formula given below. (Do not move beyond the operating limit position.)

Operating stroke: (P.T. + 0.5 x O.T.) to (P.T. + O.T. - 0.1)

| Series | Actuator | | Actuator stroke (mm) |
|--------------------------------------|----------------------|----------------------------------|----------------------------|
| VM1000 | Basic | T.T. = 4.8 mm (T.T. = 2.5 mm) | 3.7 to 4.7 (2.2 to 2.4) |
| | Roller lever | | 3.5 to 4.4 |
| | One way roller lever | | 3.5 to 4.4 |
| VM100 | Basic | | 2.2 to 2.9 |
| | Roller lever | | 4.3 to 5.3 |
| | One way roller lever | | 4.3 to 5.3 |
| | Straight plunger | | 2.7 to 3.4 |
| | Roller plunger | | 2.7 to 3.4 |
| | Cross roller plunger | | 2.7 to 3.4 |
| | Basic | | 4.0 to 4.9 |
| VM200 | Roller lever | | 8.7 to 10.7 |
| | One way roller lever | | 9.5 to 11.7 |
| | Straight plunger | | 4.5 to 5.4 |
| | Roller plunger | | 4.5 to 5.4 |
| | Cross roller plunger | | 4.5 to 5.4 |
| VM400 | Basic | | 2.5 to 3.4 |
| | Roller lever | | 6.2 to 8.2 |
| | One way roller lever | | 6.5 to 8.7 |
| | Straight plunger | | 4.5 to 5.4 |
| | Roller plunger | | 4.5 to 5.4 |
| VZM500 VZM400 VFM300 VFM200 | Basic | | 2.0 to 2.9 |
| | Roller lever | | 4.2 to 6.0 |
| | One way roller lever | | 4.7 to 6.7 |
| | Straight plunger | | 2.5 to 3.4 |
| | Roller plunger | | 2.5 to 3.4 |

For straight and roller plunger types, there is a groove indicating P.T. and T.T. for stroke adjustment.



- F.P. (Free Position) No external force applied.
- O.P. (Operating Position) Internal valve opening position.
- T.T.P. (Total Travel Position).... Includes over travel.
- O.F. (Operating Force)..... Operating force required to initial valve opening position.
- F.O.F. (Full Operating Force) .. Required force to total travel position.
- P.T. (Pre-travel) From free position to initial valve opening 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.

Caution

This product cannot be used for applications in which the pressure must be sealed because there will be a slight leakage. Please consult with SMC for this type of application.

Pressure Source

⚠ Warning

Operable fluid is either air or inert gas only. It cannot be used for corrosive gas and fluid.

⚠ Caution

When using vacuum pressure for VM100, supply vacuum pressure to P port.

- A
- A
- A
- A
- VM
- VR
- VH
- VHS

⚠ Precautions

Be sure to read before handling. Refer to pages 5-12-2 to 6 for Safety Instructions and Solenoid Valve Precautions.

Mounting

⚠ Warning

2. Conditions for mechanical operation

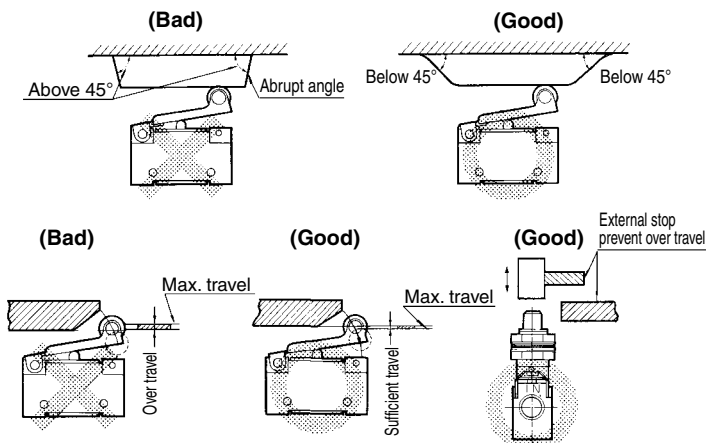
- Cam and dog angle and maximum speed

Select the angle and the maximum speed of the operating cam and the dog of the mechanism from within the selection range given in the table below.

If they are operated beyond the selection range, the cam and the dog could apply impact shocks to the actuator, leading to damage.

| Series | Actuator | Angle limit switch actuator | Max. speed limit switch actuator (m/s) |
|--------------------------------------|-------------------------|-----------------------------|--|
| VM1000 | Roller lever | 30° | 0.7 |
| | | 45° | 0.3 |
| | One way roller lever | 30° | 0.7 |
| | | 45° | 0.3 |
| VM100 VM200 VM400 | 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 |
| VZM500 VZM400 VFM300 VFM200 | Roller lever | 30° | 1.5 |
| | | 45° | 0.7 |
| | One way roller lever | 30° | 0.7 |
| | | 45° | 0.3 |
| | Straight plunger | — | 0.4 |
| | Roller plunger | 30° | 0.7 |
| VM800 | Roller lever | 30° | 0.5 |
| | | 45° | 0.2 |
| | Adjustable roller lever | 30° | 0.2 |
| | | 45° | 0.1 |
| | Adjustable rod lever | — | 0.2 |

Avoid abrupt angles on limit switch actuator.



Cam and Dog Material

| Roller material | Plunger material | Plunger surface finish |
|-----------------|------------------|------------------------|
| Polyacetal | Steel | ▽▽▽ |
| Steel | Steel, Resin | ▽▽ |

3. Never perform additional machining such as enlarging the body mounting holes.

As doing so could lead to abnormal conditions such as air leakage.

4. Operate all manual valves such as the push pin types, the selector types, and the flip toggle types with your finger.

If a hammer or other tools are used, or it is operated mechanically through the use of a cylinder or the like, damage could result.

Environments

⚠ Caution

1. Do not operate it in an area in which fluids such as oil, coolant, or water splash on it or dust comes in contact with it. 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. Perform inspections on a regular basis as necessary, such as at the beginning of an operation, to make sure that the mechanical valve operates properly.

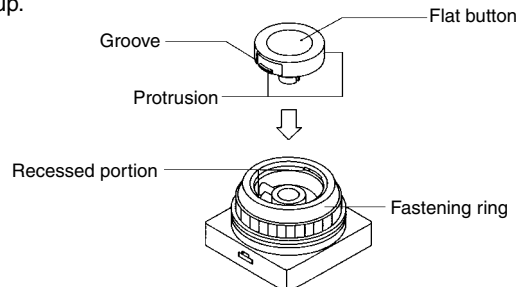
Failure to observe this precaution could lead to unsafe operation, such as unintended operation or malfunction.

How to Change the Buttons

Replace the button in the following manner to change color of the button.

1. Push button (Flush type)

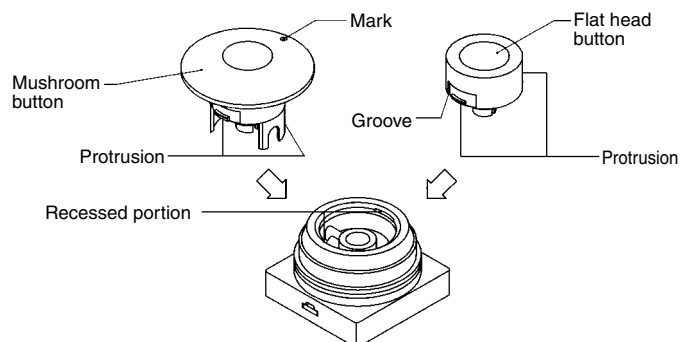
- Installation Of the four colors, red, green, black, and yellow, select and align the protruding portion of the button with the recessed portion of the body and push in.
- Removal Remove the fastening ring and insert the tip of a small flat screwdriver into the groove of the button to pry it up.



2. Push button (Mushroom and extended types)

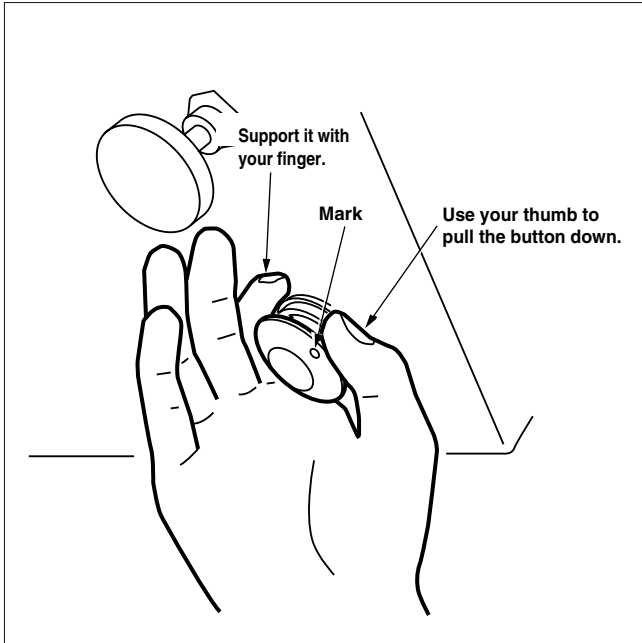
At the time of shipment, only 1 button of the color that you specified is attached to the body.

| | Mushroom type | Extended type |
|----------|---|--|
| Mounting | Align the protruding portion of the button with the recessed portion of the body and push in. (Use the mark on the button as a reference to align the protruding part.) | Align the protruding portion of the button with the recessed portion of the body and push in. |
| Removal | Placing your finger under the collar of the button on the side of the mark, tilt it upward. | Remove the fastening ring and insert the tip of a small flat screwdriver into the groove of the button to pry it up. |



How to remove a mushroom button

How to remove at panel mount



Replacement parts

1. Use the part numbers listed below to order individual mushroom head or flat head buttons.

| Color | Mushroom button | Extended button |
|--------|-----------------|-----------------|
| Red | 3402186R | 3402187R |
| Black | 3402186B | 3402187B |
| Green | 3402186G | 3402187G |
| Yellow | 3402186Y | 3402187Y |

| Color | Push button (Flush) |
|--------|---------------------|
| Red | 3402188R |
| Black | 3402188B |
| Green | 3402188G |
| Yellow | 3402188Y |

2. To order single fastening ring, use the part number below.
Fastening ring: 3402184

3. To order a single push button for series VM1000 and a single cover use the part number below.

| Color | Push button | Cover for push button |
|-------|-------------|-------------------------|
| Red | 3410701-R | 3410703 (White only) |
| Black | 3410701-B | |
| Green | 3410701-G | |

S□A

V□A

S□A

V□A

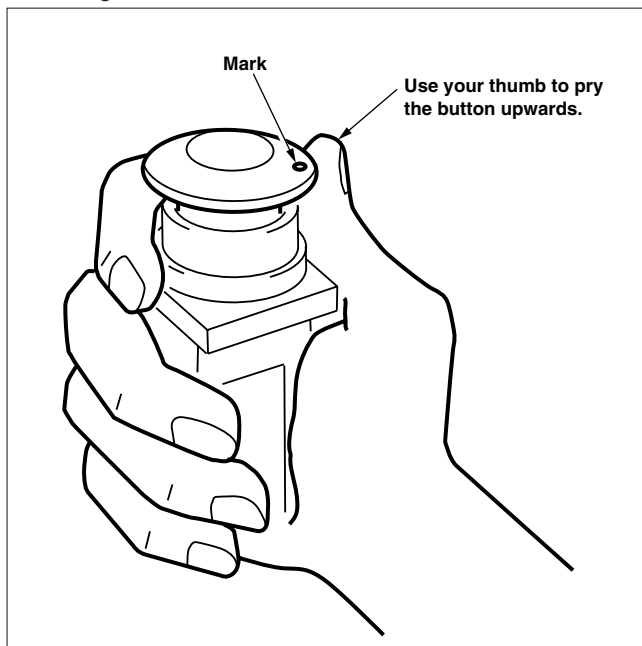
VM

VR

VH

VHS

Removing the valve as a unit



2/3 Port Mechanical Valve

Series VM100

Compact size.
Piping options:
Side piping, Bottom piping
A variety of actuator types.



Specifications

| Piping | Side ported | Bottom ported |
|-------------------------------|---|---------------|
| Fluid | Air/Inert gas | |
| Operating pressure | -100 kPa to 1.0 MPa | |
| Ambient and fluid temperature | -5 to 60°C (No freezing) | |
| Effective area | 2.5 mm ² | |
| Lubrication | Not required (Use turbine oil Class 1 ISO VG32, if lubricated.) | |
| Port size | 1/8 | M5 x 0.8 |
| Weight (Basic) | 95 g | 110 g |

Model

| | Side ported | | Bottom ported | | Actuator part no. | Application | |
|----------------------|-----------------------------|--------------|---------------|--------------|-------------------|-------------------|---|
| | 2 port | 3 port | 2 port | 3 port | | | |
| Mechanical operation | Basic | VM120-01-00 | VM130-01-00 | VM122-M5-00 | VM132-M5-00 | — | |
| | | VM121-01-00 | VM131-01-00 | VM123-M5-00 | VM133-M5-00 | — | |
| | Roller lever | VM121-01-01 | VM131-01-01 | VM123-M5-01 | VM133-M5-01 | — | Polyacetal roller |
| | | VM121-01-01S | VM131-01-01S | VM123-M5-01S | VM133-M5-01S | — | Hard steel roller |
| | One way roller lever | VM121-01-02 | VM131-01-02 | VM123-M5-02 | VM133-M5-02 | — | Polyacetal roller |
| | | VM121-01-02S | VM131-01-02S | VM123-M5-02S | VM133-M5-02S | — | Hard steel roller |
| | Straight plunger | VM120-01-05 | VM130-01-05 | VM122-M5-05 | VM132-M5-05 | VM-05B | — |
| | Roller plunger | VM120-01-06 | VM130-01-06 | VM122-M5-06 | VM132-M5-06 | VM-06B | Polyacetal roller |
| | | VM120-01-06S | VM130-01-06S | VM122-M5-06S | VM132-M5-06S | VM-06BS | Hard steel roller |
| | Cross roller plunger | VM120-01-07 | VM130-01-07 | VM122-M5-07 | VM132-M5-07 | VM-07B | Polyacetal roller |
| VM120-01-07S | | VM130-01-07S | VM122-M5-07S | VM132-M5-07S | VM-07BS | Hard steel roller | |
| Manual operation | Toggle lever | VM120-01-08 | VM130-01-08 | VM122-M5-08 | VM132-M5-08 | VM-08B | — |
| | Push button (Mushroom) | VM120-01-30R | VM130-01-30R | VM122-M5-30R | VM132-M5-30R | VM-30AR | Red |
| | | VM120-01-30B | VM130-01-30B | VM122-M5-30B | VM132-M5-30B | VM-30AB | Black |
| | | VM120-01-30G | VM130-01-30G | VM122-M5-30G | VM132-M5-30G | VM-30AG | Green |
| | | VM120-01-30Y | VM130-01-30Y | VM122-M5-30Y | VM132-M5-30Y | VM-30AY | Yellow |
| | Push button (Extended) | VM120-01-32R | VM130-01-32R | VM122-M5-32R | VM132-M5-32R | VM-32AR | Red |
| | | VM120-01-32B | VM130-01-32B | VM122-M5-32B | VM132-M5-32B | VM-32AB | Black |
| | | VM120-01-32G | VM130-01-32G | VM122-M5-32G | VM132-M5-32G | VM-32AG | Green |
| | Push button (Flush) | VM120-01-32Y | VM130-01-32Y | VM122-M5-32Y | VM132-M5-32Y | VM-32AY | Yellow |
| | | VM120-01-33 | VM130-01-33 | VM122-M5-33 | VM132-M5-33 | VM-33A | With a set of red, black, green, yellow |
| | Twist selector (2 position) | VM120-01-34R | VM130-01-34R | VM122-M5-34R | VM132-M5-34R | VM-34AR | Red |
| | | VM120-01-34B | VM130-01-34B | VM122-M5-34B | VM132-M5-34B | VM-34AB | Black |
| | | VM120-01-34G | VM130-01-34G | VM122-M5-34G | VM132-M5-34G | VM-34AG | Green |
| | | VM120-01-34Y | VM130-01-34Y | VM122-M5-34Y | VM132-M5-34Y | VM-34AY | Yellow |
| | Key selector (2 position) | VM120-01-36 | VM130-01-36 | VM122-M5-36 | VM132-M5-36 | VM-36A | — |
| | Twist selector (3 position) | VM131-01-35R | VM151-01-35R | VM133-M5-35R | VM153-M5-35R | — | Red |
| | | VM131-01-35B | VM151-01-35B | VM133-M5-35B | VM153-M5-35B | — | Black |
| | | VM131-01-35G | VM151-01-35G | VM133-M5-35G | VM153-M5-35G | — | Green |
| | | VM131-01-35Y | VM151-01-35Y | VM133-M5-35Y | VM153-M5-35Y | — | Yellow |
| (3 port) | | (5 port) | (3 port) | (5 port) | — | — | |



Note 1) Actuator replacement is available for all types except for roller lever, one way roller lever, and 3 position selector.

Note 2) For push button (mushroom), push button (extended), push button (flush) and a single unit of fastening ring, refer to pages 5-6-6 to 5-6-7. The other parts are not replaceable.

Note 3) The handle of the selector (2 position and 3 position) cannot be removed or replaced alone.

How to Order

VM1 **3** **1** **01** **01** **S**

Port size

| | |
|------------|--------------------------|
| 01 | Rc 1/8 |
| M5 | M5 x 0.8 (Female thread) |
| N01 | NPT 1/8 |
| F01 | G 1/8 |

Piping direction and the length of push rod

| | 0 | 1 | 2 | 3 |
|---------|-------------|-------------|---------------|---------------|
| Length | Long | Short | Long | Short |
| Porting | Side ported | Side ported | Bottom ported | Bottom ported |

Number of ports

| | |
|----------|--------|
| 2 | 2 port |
| 3 | 3 port |

Actuator type

| | |
|-----------|-----------------------------|
| 00 | Basic |
| 01 | Roller lever |
| 02 | One way roller lever |
| 05 | Straight plunger |
| 06 | Roller plunger |
| 07 | Cross roller plunger |
| 08 | Toggle lever |
| 30 | Push button (Mushroom) |
| 32 | Push button (Extended) |
| 33 | Push button (Flush) |
| 34 | Twist selector (2 position) |
| 36 | Key selector (2 position) |
| 35 | Twist selector (3 position) |

Suffix for actuator

| | |
|----------|-------------------|
| S | Hard steel roller |
| R | Red |
| B | Black |
| G | Green |
| Y | Yellow |

Color of push button selector

Suffix for indicator light

| | |
|----------|--|
| Z | With miniature indicator light (Bottom piping type only) |
|----------|--|

| Actuator | Height of rod push | Side ported | | Bottom ported | |
|-----------------------------|--------------------|-------------|-------|---------------|-------|
| | | Long | Short | Long | Short |
| Basic | 00 | ○ | ○ | ○ | ○ |
| Roller lever | 01 | x | ○ | x | ○ |
| One way roller lever | 02 | x | ○ | x | ○ |
| Straight plunger | 05 | ○ | x | ○ | x |
| Roller plunger | 06 | ○ | x | ○ | x |
| Cross roller plunger | 07 | ○ | x | ○ | x |
| Toggle lever | 08 | ○ | x | ○ | x |
| Push button (Mushroom) | 30 | ○ | x | ○ | x |
| Push button (Extended) | 32 | ○ | x | ○ | x |
| Push button (Flush) | 33 | ○ | x | ○ | x |
| Twist selector (2 position) | 34 | ○ | x | ○ | x |
| Key selector (2 position) | 36 | ○ | x | ○ | x |
| Twist selector (3 position) | 35 | x | ○ | x | ○ |

Combination possible: ○, Combination impossible: x

S□A

V□A

S□A

V□A

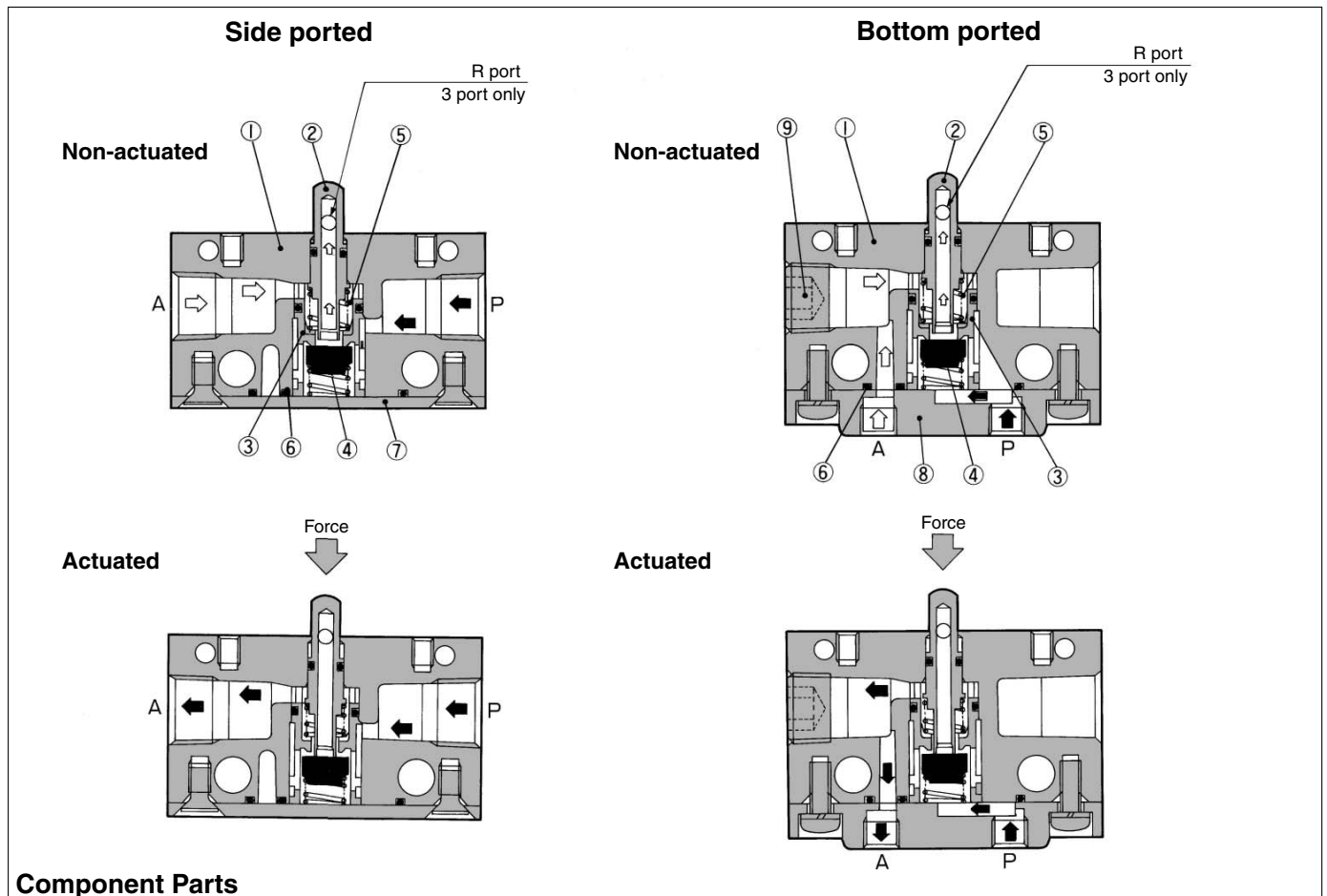
VM

VR

VH

VHS

Construction



Component Parts

| No. | Description | Material | Note |
|-----|-------------|-----------------|-----------------|
| ① | Valve | ZDC | Metallic plated |
| ② | Plunger | POM | |
| ③ | Valve sheet | POM | |
| ④ | Valve | NBR | |
| ⑤ | Spring | Stainless steel | |

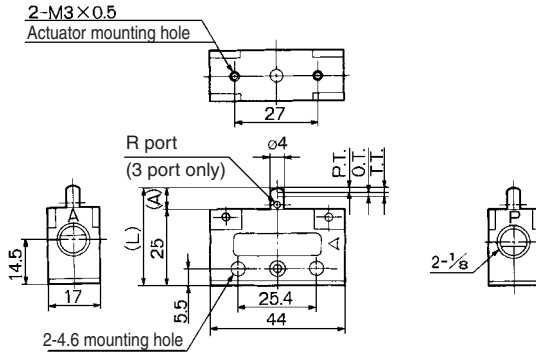
| No. | Description | Material | Note |
|-----|--------------------------|--------------|-----------------|
| ⑥ | Gasket | NBR | |
| ⑦ | Cover | Rolled steel | |
| ⑧ | Sub-plate | ZDC | Metallic plated |
| ⑨ | Hexagon socket head plug | Rolled steel | |

Series VM100

Series VM100/Side Ported

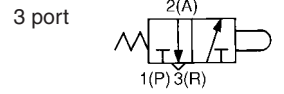
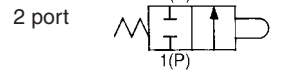
Basic

VM120-01-00
VM130-01-00
VM121-01-00
VM131-01-00



| Model | L | A |
|----------------------------|------|-----|
| VM120-01-00 VM130-01-00 | 32.5 | 7.5 |
| VM121-01-00 VM131-01-00 | 28.5 | 3.5 |

JIS Symbol

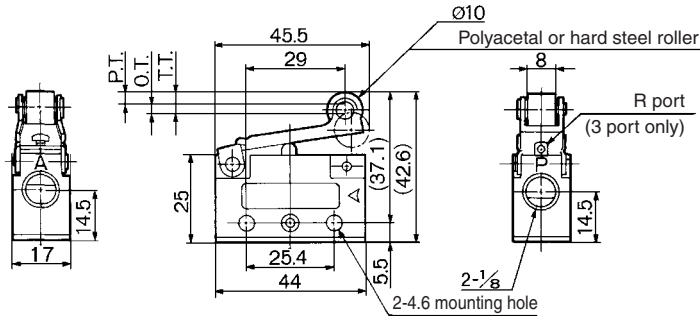


* 0.5 MPa supply

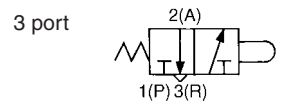
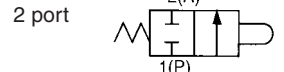
| | |
|---------|--------|
| F.O.F.* | 20 N |
| P.T. | 1.5 mm |
| O.T. | 1.5 mm |
| T.T. | 3.0 mm |

Roller lever

VM121-01-01
VM131-01-01
VM121-01-01S
VM131-01-01S



JIS Symbol

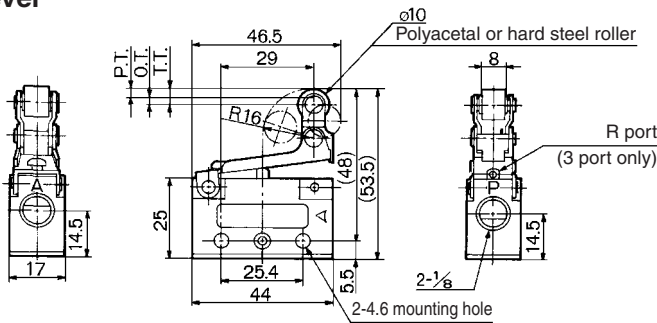


* 0.5 MPa supply

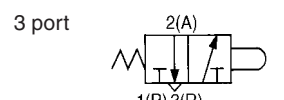
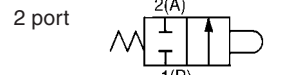
| | |
|---------|--------|
| F.O.F.* | 10 N |
| P.T. | 3.2 mm |
| O.T. | 2.3 mm |
| T.T. | 5.5 mm |

One way roller lever

VM121-01-02
VM131-01-02
VM121-01-02S
VM131-01-02S



JIS Symbol

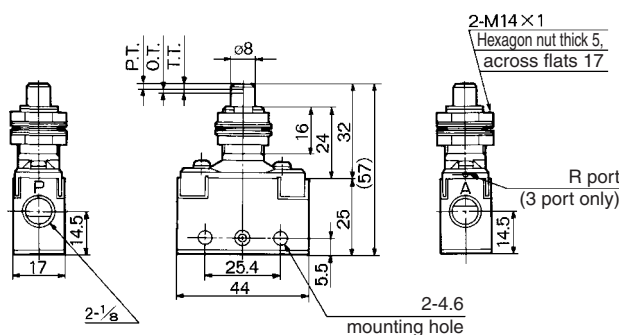


* 0.5 MPa supply

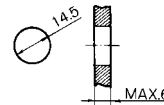
| | |
|---------|--------|
| F.O.F.* | 10 N |
| P.T. | 3.2 mm |
| O.T. | 2.3 mm |
| T.T. | 5.5 mm |

Straight plunger

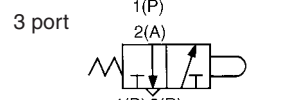
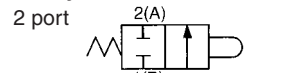
VM120-01-05
VM130-01-05



Panel mounting hole



JIS Symbol

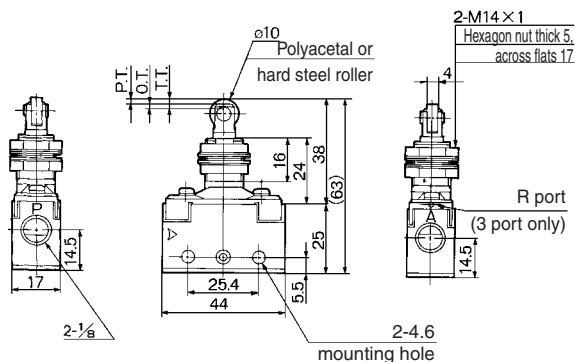


* 0.5 MPa supply

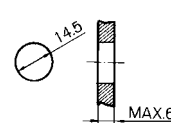
| | |
|---------|--------|
| F.O.F.* | 23 N |
| P.T. | 2.0 mm |
| O.T. | 1.5 mm |
| T.T. | 3.5 mm |

Roller plunger

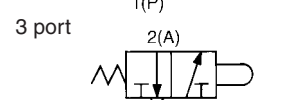
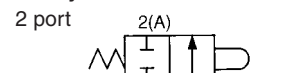
VM120-01-06
VM130-01-06
VM120-01-06S
VM130-01-06S



Panel mounting hole



JIS Symbol



* 0.5 MPa supply

| | |
|---------|--------|
| F.O.F.* | 23 N |
| P.T. | 2.0 mm |
| O.T. | 1.5 mm |
| T.T. | 3.5 mm |

