

# Valve Mounted Guide Cylinder

## MVGQ Series

ø12, ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

### Valve, Speed Controller, and Cylinder are formed into one unit.

Easy piping wiring work for Valve, Speed Controller and Cylinder can be formed into one unit, further can be equipped into a more compact design.

#### The optimum valve series for each bore size

| ø12, ø16, ø20  | ø25, ø32 | ø40, ø50, ø63 | ø80, ø100 |
|----------------|----------|---------------|-----------|
| Valve: SYJ3000 | SYJ5000  | SYJ7000       | VF3000    |

#### Switching between rod extended when energized and rod retracted when energized is easy.

It is able to switch easily by changing the orientation of the switching plate for the SYJ3000, SYJ5000, SYJ7000 series, and by changing the mounting orientation of the valve for the VF3000 series.

#### Two kinds of guide rod bearings suited for individual use

##### Slide Bearing

Strength against side load is more than 2 times\* as compared current stopper cylinder (round bar type). Suitable for use with lateral loads accompanied by impact, as in stoppers.

##### Ball Bushing Bearing

Smooth operation is suitable for pushing, lifter and applications. (\* Comparison to SMC RSQ□ series, round bar type)

#### Can be mounted from two directions.

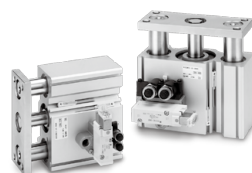
#### Non-rotating accuracy

#### Cylinder position can be detected.

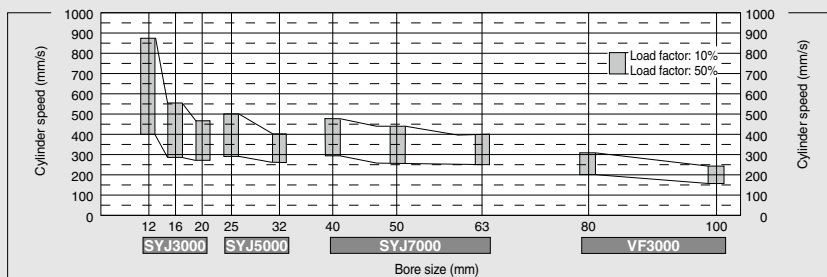
Built-in magnet for auto-switches

#### Built-in speed controller

Selection of meter-out or meter-in control is possible.



#### Maximum Driving Speed of Cylinders



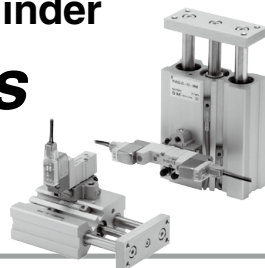
#### Series Variations

| Bore size<br>(mm) | Standard stroke (mm) |    |    |    |    |    |    |     |     |     |     |     | Applicable<br>valve series | Positions/No. of solenoid |        | Detailed<br>specifications |        |
|-------------------|----------------------|----|----|----|----|----|----|-----|-----|-----|-----|-----|----------------------------|---------------------------|--------|----------------------------|--------|
|                   | 10                   | 20 | 25 | 30 | 40 | 50 | 75 | 100 | 125 | 150 | 175 | 200 |                            |                           |        |                            |        |
| 12                | ●                    | ●  |    | ●  | ●  | ●  | ●  | ●   |     |     |     |     | SYJ3000                    | 2 position                | Single | P.1254                     |        |
| 16                | ●                    | ●  |    | ●  | ●  | ●  | ●  | ●   |     |     |     |     |                            |                           | Double |                            |        |
| 20                |                      | ●  |    | ●  | ●  | ●  | ●  | ●   | ●   | ●   | ●   | ●   | SYJ5000                    | 2 position                | Single |                            |        |
| 25                |                      | ●  |    | ●  | ●  | ●  | ●  | ●   | ●   | ●   | ●   | ●   |                            |                           | Double |                            |        |
| 32                |                      |    | ●  |    |    | ●  | ●  | ●   | ●   | ●   | ●   | ●   | SYJ7000                    | 2 position                | Single | P.1258                     |        |
| 40                |                      |    |    | ●  | ●  | ●  | ●  | ●   | ●   | ●   | ●   | ●   |                            |                           | Double |                            |        |
| 50                |                      |    |    | ●  | ●  | ●  | ●  | ●   | ●   | ●   | ●   | ●   | VF3000                     | 2 position                | Single |                            | P.1264 |
| 63                |                      |    |    | ●  | ●  | ●  | ●  | ●   | ●   | ●   | ●   | ●   |                            |                           | Double |                            |        |
| 80                |                      |    |    |    |    |    | ●  | ●   | ●   | ●   | ●   | ●   |                            |                           |        |                            |        |
| 100               |                      |    |    | ●  |    |    | ●  | ●   | ●   | ●   | ●   | ●   |                            |                           |        |                            |        |

# Valve Mounted Guide Cylinder

## MVGQ Series

ø12, ø16, ø20



### How to Order

#### How to Order

When ordering valve mounted guide cylinder, the MVGQ series, specify the models of both the cylinder and the valve.

Ex.) MVGQM12-30-M9BWM-B ..... 1  
SYJ3130-5LZ-MA ..... 1

**Cylinder stroke (mm)**  
Refer to page 1255 for standard strokes.

**Bore size**

|    |       |
|----|-------|
| 12 | 12 mm |
| 16 | 16 mm |
| 20 | 20 mm |

**Bearing**

|   |                      |
|---|----------------------|
| M | Slide bearing        |
| L | Ball bushing bearing |

**Number of auto switches**

|     |        |
|-----|--------|
| NII | 2 pcs. |
| S   | 1 pc.  |
| n   | n pcs. |

#### Auto switch

NII Without auto switch (Built-in magnet)  
\* For the applicable auto switch model, refer to page 1255.

#### Rod extended/retracted when energized

Note)  
NII Rod extended when energized  
B Rod retracted when energized  
Note) Based on the case of 2 position single solenoid valve.

#### Cylinder

MVGQ **M** **12** - **30** - **M9BW** - - -

#### Valve

SYJ3 **1** **3** **0** - **5** **L** **Z** - **MA** -

#### Type of actuation

|   |                            |
|---|----------------------------|
| 1 | 2 position single solenoid |
| 2 | 2 position double solenoid |

\* Please consult with SMC for 3 position type.

#### Speed controller specifications

|      |           |
|------|-----------|
| MA   | Meter-out |
| MB * | Meter-in  |

**Made to Order**  
\* Refer to page 1255 for details.

#### Coil specification

|     |                                             |
|-----|---------------------------------------------|
| NII | Standard                                    |
| T   | With energy saving circuit (24/12 VDC only) |

\* The energy saving circuit is not available for W□.

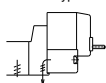
| DC specifications | AC specifications (50/60 Hz) |
|-------------------|------------------------------|
| 5 24 VDC          | 1 100 VAC                    |
| 6 12 VDC          | 2 200 VAC                    |
| V 6 VDC           | 3 100 VAC [115 VAC]          |
| S 5 VDC           | 4 220 VAC [230 VAC]          |
| R 3 VDC           | * W□: DC only                |

#### 200 VAC, 220 VAC specifications

An AC specification solenoid valve using a grommet, L, or M plug connector has a built-in rectifier circuit in its pilot valve section to activate the DC coil. The 200 VAC or 220 VAC specification pilot valve contains a rectifier circuit that generates heat when it is energized. Therefore, do not touch its exterior surface because it could be very hot, depending on the energizing conditions.

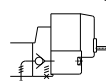
#### Body option

0: Pilot valve individual exhaust type



R port P/E port

3: Main/Pilot valve common exhaust type



R port P/E port

#### Electrical entry

| 24 V, 12 V, 6 V, 5 V, 3 VDC<br>100 V, 110 V, 200 V, 220 VAC |                                         |                                         |                             | 24 V, 12 VDC<br>6 V, 5 V, 3 VDC |
|-------------------------------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------|---------------------------------|
| Grommet                                                     | L plug connector                        | M plug connector                        | MN: Without lead wire       | W□: Without connector cable     |
| G: Lead wire length: 300 mm                                 | L: With lead wire (Wire length: 300 mm) | M: With lead wire (Wire length: 300 mm) | WO: Without connector cable |                                 |
|                                                             |                                         |                                         |                             |                                 |
| H: Lead wire length: 600 mm                                 | LN: Without lead wire                   | LO: Without connector                   | MO: Without connector       |                                 |
|                                                             |                                         |                                         |                             |                                 |

#### Light/Surge voltage suppressor

|     |                                                   |
|-----|---------------------------------------------------|
| NII | Without light/surge voltage suppressor            |
| S   | With surge voltage suppressor                     |
| Z   | With light/surge voltage suppressor               |
| R   | With surge voltage suppressor (No polarity)       |
| U   | With light/surge voltage suppressor (No polarity) |

\* In the case of AC, since the rectifier prevents the production of surge voltage, there is no type "S".  
\* R, U: DC only  
\* With energy saving circuit: For type "Z" only

\* 2 sockets are attached to "LN" and "MN" types.

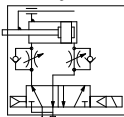
\* Refer to page 1274 for the connector cable for M8.

Note 1) □: Cable length symbol. Insert the symbol referring to page 1274.

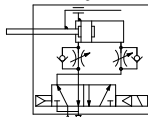
## Symbol

### Meter-out

Rod extended when energized

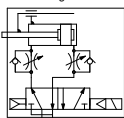


Rod retracted when energized

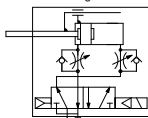


### Meter-in (Semi-standard)

Rod extended when energized



Rod retracted when energized



The allowable lateral load, the allowable rotational torque for a plate, and the operation range of a stopper are the same as these of the MGQ series. For details, refer to the Web Catalog.

## Standard Stroke

| Model                   | Standard stroke (mm)                          |
|-------------------------|-----------------------------------------------|
| MVGQ <sup>M</sup> 12,16 | 10, 20, 30, 40, 50, 75, 100                   |
| MVGQ <sup>M</sup> 20    | 20, 30, 40, 50, 75, 100<br>125, 150, 175, 200 |

### Intermediate stroke (mm)

As for the intermediate strokes (in 1 mm increments) other than the standard strokes above are manufactured by means of installing a spacer.

Example) In the case of MVGQM20-35 st, a 5 mm width spacer is installed in the MVGQM20-40 st body; thus, the full length dimension are the same as the 40 st.



## Made to Order Specifications

[Click here for details](#)

| Symbol | Specifications                                               |
|--------|--------------------------------------------------------------|
| -XA□   | Change of guide rod end shape                                |
| -XC79  | Tapped hole, drilled hole, pinned hole machined additionally |

## Specifications

|                                    |                                                     |                                        |
|------------------------------------|-----------------------------------------------------|----------------------------------------|
| Bore size (mm)                     | 12, 16, 20                                          |                                        |
| Action                             | Double acting                                       |                                        |
| Fluid                              | Air                                                 |                                        |
| Bearing type                       | Slide bearing (MVGQM), Ball bushing bearing (MVGQL) |                                        |
| Operating pressure range (MPa)     | 2 position single                                   | 0.15 to 0.7                            |
|                                    | 2 position double                                   | ø12, ø16: 0.12 to 0.7, ø20: 0.1 to 0.7 |
| Ambient and fluid temperature (°C) | -10 to 50°C (No freezing)                           |                                        |
| Piston speed (mm/s)                | 50 to 500 (Refer to the page 1253.)                 |                                        |
| Cushion                            | Rubber bumper on both ends                          |                                        |
| Lubrication                        | Non-lube                                            |                                        |
| Stroke length tolerance (mm)       | +1.5<br>0                                           |                                        |

## Solenoid Valve Specifications

| Model                                                          |            |                            | SYJ3000 series                                                                      |
|----------------------------------------------------------------|------------|----------------------------|-------------------------------------------------------------------------------------|
| Manual override                                                |            |                            | Non-locking push type, Push-turn locking slotted type, Push-turn locking lever type |
| Pilot exhaust                                                  |            |                            | Pilot valve individual exh. type, Main/Pilot valve common exh. type                 |
| Impact/Vibration resistance (m/s <sup>2</sup> ) <sup>(1)</sup> |            |                            | 150/30                                                                              |
| Enclosure                                                      |            |                            | Dustproof (= M8 connector: IP65)                                                    |
| Electrical entry                                               |            |                            | Grommet (G)/(H), L plug connector (L), M plug connector (M), M8 connector (W)       |
| Coil rated voltage (V)                                         | DC         |                            | 24, 12, 6, 5, 3                                                                     |
|                                                                | AC50/60 Hz |                            | 100*, 110*, 200*, 220*                                                              |
| Allowable voltage                                              |            |                            | ±10% of the rated voltage*                                                          |
| Power consumption <sup>(2)</sup>                               | DC         | Standard type              | 0.35 (With indicator light: 0.4)                                                    |
|                                                                |            | With energy saving circuit | 0.1 (With indicator light only)                                                     |
| Apparent power <sup>(2)</sup><br>(VA)                          | AC         | 100 V                      | 0.78 (With indicator light: 0.81)                                                   |
|                                                                |            | 110 V                      | 0.86 (With indicator light: 0.89)                                                   |
|                                                                |            | [115 V]                    | [0.94 (With indicator light: 0.97)]                                                 |
|                                                                |            | 200 V                      | 1.18 (With indicator light: 1.22)                                                   |
|                                                                |            | 220 V                      | 1.30 (With indicator light: 1.34)                                                   |
|                                                                |            | [230 V]                    | [1.42 (With indicator light: 1.46)]                                                 |
| Surge voltage suppressor                                       |            |                            | Diode (Non-polar type: Varistor)                                                    |
| Indicator light                                                |            |                            | LED                                                                                 |

\* Conforming to IEC60529

\* 100 VAC and 115 VAC, 200 VAC and 230 VAC are common.

\* Allowable voltage fluctuation for 115 VAC or 230 VAC is -15 to +5% of the rated voltage.

\* For types S, Z and T with an energy saving circuit, the voltage will drop due to the internal circuit. Allowable voltage fluctuation must be in the range below.

Types S, Z 24 VDC: -7 to +10%, 12 VDC: -4 to +10%

Type T 24 VDC: -8 to +10%, 12 VDC: -6 to +10%

Note 1) Impact resistance: No malfunction resulted from the impact test using a drop impact tester. The test was performed on the axis and right angle directions of the main valve and armature, one time each in both energized and de-energized states.

Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 2000 Hz. Test was performed at both energized and de-energized states to the axis and right angle directions of the main valve and armature. (Value in the initial stage.)

Note 2) At the rated voltage.

## Applicable Auto Switches/Refer to pages 1341 to 1435 for further information on auto switches.

| Type                    | Special function                          | Electrical entry | Indicator light | Wiring (Output)         | Load voltage |                     | Auto switch model  |         | Lead wire length (m) |       |       |       |   | Pre-wired connector | Applicable load |            |
|-------------------------|-------------------------------------------|------------------|-----------------|-------------------------|--------------|---------------------|--------------------|---------|----------------------|-------|-------|-------|---|---------------------|-----------------|------------|
|                         |                                           |                  |                 |                         | DC           | AC                  | Perpendicular      | In-line | 0.5 (Nil)            | 1 (M) | 3 (L) | 5 (Z) |   |                     |                 |            |
| Solid state auto switch | Diagnostic indication (2-color indicator) | Grommet          | Yes             | 3-wire (NPN)            | 5 V, 12 V    | —                   | M9NV               | M9N     | ●                    | ●     | ●     | ●     | ● | ○                   | IC circuit      | Relay, PLC |
|                         |                                           |                  |                 | 3-wire (PNP)            | 12 V         | M9PV                | M9P                | ●       | ●                    | ●     | ●     | ●     | ○ | ○                   | IC circuit      |            |
|                         |                                           |                  |                 | 2-wire                  | 12 V         | M9BV                | M9B                | ●       | ●                    | ●     | ●     | ●     | ○ | ○                   | —               |            |
|                         | Water resistant (2-color indicator)       | Grommet          | Yes             | 3-wire (NPN)            | 5 V, 12 V    | M9NWV               | M9NW               | ●       | ●                    | ●     | ●     | ●     | ○ | ○                   | IC circuit      |            |
|                         |                                           |                  |                 | 3-wire (PNP)            | 12 V         | M9PWV               | M9PW               | ●       | ●                    | ●     | ●     | ●     | ○ | ○                   | IC circuit      |            |
|                         |                                           |                  |                 | 2-wire                  | 12 V         | M9BWV               | M9BW               | ●       | ●                    | ●     | ●     | ●     | ○ | ○                   | —               |            |
| Reed auto switch        | —                                         | Grommet          | Yes             | 3-wire (NPN)            | 5 V, 12 V    | M9NAV <sup>*1</sup> | M9NA <sup>*1</sup> | ●       | ●                    | ●     | ●     | ●     | ○ | ○                   | IC circuit      | Relay, PLC |
|                         |                                           |                  |                 | 3-wire (PNP)            | 12 V         | M9PAV <sup>*1</sup> | M9PA <sup>*1</sup> | ●       | ●                    | ●     | ●     | ●     | ○ | ○                   | IC circuit      |            |
|                         |                                           |                  |                 | 2-wire                  | 12 V         | M9BAV <sup>*1</sup> | M9BA <sup>*1</sup> | ●       | ●                    | ●     | ●     | ●     | ○ | ○                   | —               |            |
|                         |                                           |                  |                 | 2-wire                  | 24 V         | A96V                | A96                | ●       | ●                    | ●     | ●     | ●     | ○ | ○                   | —               |            |
| Reed auto switch        | —                                         | Grommet          | No              | 3-wire (NPN equivalent) | 5 V          | A93V <sup>*2</sup>  | A93                | ●       | ●                    | ●     | ●     | ●     | ○ | ○                   | IC circuit      | Relay, PLC |
|                         |                                           |                  |                 | 2-wire                  | 12 V         | A90V                | A90                | ●       | ●                    | ●     | ●     | ●     | ○ | ○                   | —               |            |

\*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance.

Consult with SMC regarding water resistant types with the above model numbers.

\*2 1 m type lead wire is only applicable to D-A93.

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NW 3 m ..... L (Example) M9NWL

1 m ..... M (Example) M9NWM 5 m ..... Z (Example) M9NWLZ

\* Since there are other applicable auto switches than listed, refer to page 1271 for details.

\* For details about auto switches with pre-wired connector, refer to pages 1410 and 1411.

\* Auto switches are shipped together (not assembled).

\* Solid state auto switches marked with "○" are produced upon receipt of order.

# MVGQ Series

## Weight

(kg)

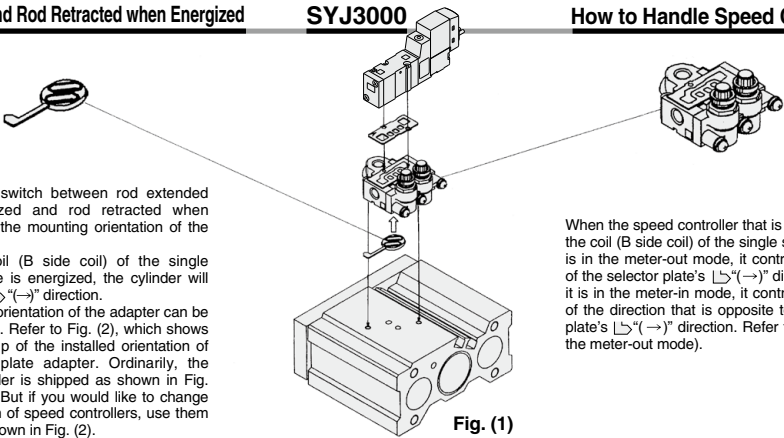
| Bearing type         | Bore size (mm) | Type    | Standard stroke (mm) |      |      |      |      |      |      |      |      |      |      |  |
|----------------------|----------------|---------|----------------------|------|------|------|------|------|------|------|------|------|------|--|
|                      |                |         | 10                   | 20   | 30   | 40   | 50   | 75   | 100  | 125  | 150  | 175  | 200  |  |
| Slide bearing        | 12             | MVGQM12 | 0.23                 | 0.28 | 0.32 | 0.35 | 0.39 | 0.49 | 0.59 | –    | –    | –    | –    |  |
|                      | 16             | MVGQM16 | 0.35                 | 0.40 | 0.46 | 0.51 | 0.56 | 0.69 | 0.81 | –    | –    | –    | –    |  |
|                      | 20             | MVGQM20 | –                    | 0.55 | 0.62 | 0.70 | 0.77 | 0.95 | 1.10 | 1.25 | 1.40 | 1.55 | 1.70 |  |
| Ball bushing bearing | 12             | MVGQL12 | 0.24                 | 0.27 | 0.30 | 0.36 | 0.39 | 0.47 | 0.54 | –    | –    | –    | –    |  |
|                      | 16             | MVGQL16 | 0.36                 | 0.40 | 0.45 | 0.53 | 0.58 | 0.71 | 0.83 | –    | –    | –    | –    |  |
|                      | 20             | MVGQL20 | –                    | 0.55 | 0.61 | 0.71 | 0.76 | 0.91 | 1.05 | 1.19 | 1.33 | 1.47 | 1.61 |  |

(Note) The factors indicated above are of the single solenoid with grommet (G). Add 0.01 kg for the double solenoids.

## Changing between Rod Extended when Energized and Rod Retracted when Energized

SYJ3000

## How to Handle Speed Controller



It is able to switch between rod extended when energized and rod retracted when energized by the mounting orientation of the selector plate.

When the coil (B side coil) of the single solenoid valve is energized, the cylinder will move in the  $\rightarrow$  ("→") direction.

The installed orientation of the adapter can be changed 180°. Refer to Fig. (2), which shows the relationship of the installed orientation of the selector plate adapter. Ordinarily, the speed controller is shipped as shown in Fig. (2) (a) or (b). But if you would like to change the orientation of speed controllers, use them in (c) or (d) shown in Fig. (2).

When the speed controller that is on the side of the coil (B side coil) of the single solenoid valve is in the meter-out mode, it controls the speed of the selector plate's  $\rightarrow$  ("→") direction. When it is in the meter-in mode, it controls the speed of the direction that is opposite to the selector plate's  $\rightarrow$  ("→") direction. Refer to Fig. (3) (for the meter-out mode).

Fig. (2)

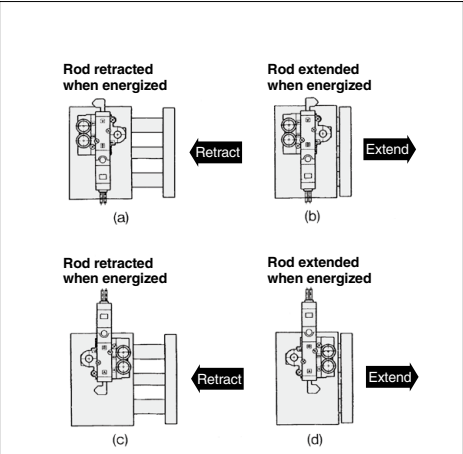
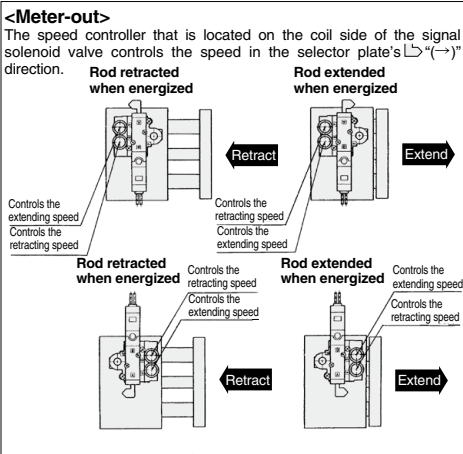
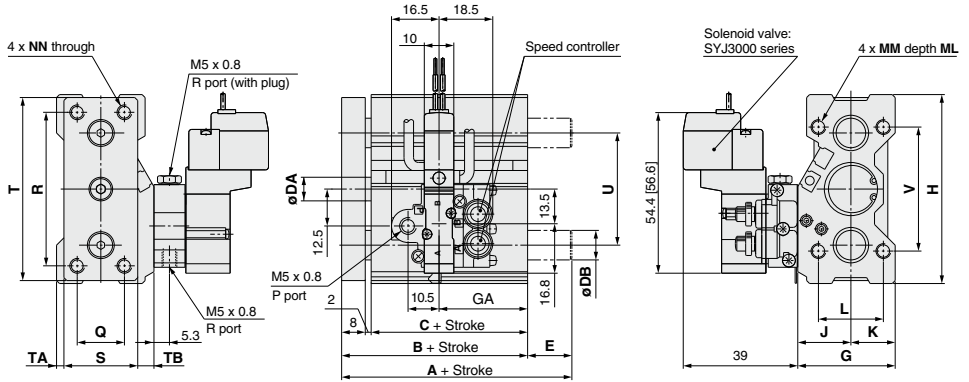
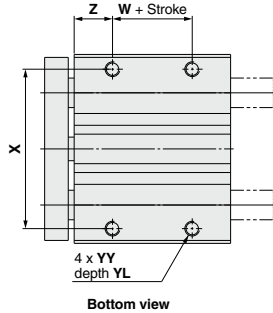


Fig. (3)



ø12, ø16, ø20

MVGQM, MVGQL



\* The figures show when attached to SYJ3130-□G.  
\* [ ] : Denotes AC.

## MVGQM, MVGQL Common Dimensions

| Bore size<br>(mm) | Standard stroke<br>(mm)                        | Applicable<br>solenoid<br>valve | B  | C  | DA | G  | GA             |               | H  | J  | K  | L  | MM       | ML | NN       | Q  | R  | S  | T  | TA  | TB  | U  | V  | W  | X  | YY       | YL | Z  |
|-------------------|------------------------------------------------|---------------------------------|----|----|----|----|----------------|---------------|----|----|----|----|----------|----|----------|----|----|----|----|-----|-----|----|----|----|----|----------|----|----|
|                   |                                                |                                 |    |    |    |    | Up to<br>10 st | Over<br>10 st |    |    |    |    |          |    |          |    |    |    |    |     |     |    |    |    |    |          |    |    |
| 12                | 10, 20, 30, 40,<br>50, 75, 100                 | SYJ3000<br>series               | 39 | 29 | 6  | 29 | 20             | 30            | 58 | 16 | 13 | 18 | M4 x 0.7 | 10 | M4 x 0.7 | 14 | 48 | 22 | 56 | 2   | 5   | 36 | 40 | 5  | 50 | M4 x 0.7 | 7  | 12 |
| 16                |                                                |                                 | 43 | 33 | 8  | 33 | 23             | 30            | 64 | 18 | 15 | 22 | M5 x 0.8 | 13 | M5 x 0.8 | 16 | 52 | 25 | 62 | 2.5 | 5.5 | 38 | 42 | 7  | 54 | M5 x 0.8 | 8  | 13 |
| 20                | 20, 30, 40, 50, 75, 100,<br>125, 150, 175, 200 |                                 | 47 | 37 | 10 | 36 |                | 30            | 74 | 19 | 17 | 26 | M5 x 0.8 | 13 | M5 x 0.8 | 18 | 60 | 30 | 72 | 2   | 4   | 46 | 52 | 10 | 64 | M5 x 0.8 | 8  | 13 |

Note 1) It is possible to manufacture the intermediate strokes other than the standard strokes by means of installing a spacer.

Note 2) For the electrical entry except the grommet type, refer to page 1254.

## MVGQM (Slide bearing) A, DB, E Dimensions

| Bore size<br>(mm) | Symbol<br>Stroke | A           |            | DB | E           |            |
|-------------------|------------------|-------------|------------|----|-------------|------------|
|                   |                  | Up to 50 st | Over 50 st |    | Up to 50 st | Over 50 st |
| 12                |                  | 39          |            | 8  | 0           |            |
| 16                |                  | 43          |            | 10 | 0           |            |
| 20                |                  | 47          | 61.5       | 12 | 0           | 14.5       |

## MVGQL (Ball bushing bearing) A, DB, E Dimensions

| Bore size<br>(mm) | Symbol<br>Stroke | A           |            | DB | E           |            |
|-------------------|------------------|-------------|------------|----|-------------|------------|
|                   |                  | Up to 30 st | Over 30 st |    | Up to 30 st | Over 30 st |
| 12                |                  | 43          | 55         | 6  | 4           | 16         |
| 16                |                  | 49          | 65         | 8  | 6           | 22         |
| 20                |                  | 57          | 74         | 10 | 10          | 27         |

# Valve Mounted Guide Cylinder

## MVGQ Series

ø25, ø32, ø40, ø50, ø63

### How to Order

#### How to Order

When ordering valve mounted guide cylinder, the MVGQ series, specify the models of both the cylinder and the valve.

Ex.) MVGQM25-30-M9BWM-B ..... 1  
SYJ5140-5LZ-MA ..... 1

#### Cylinder stroke (mm)

Refer to page 1259 for standard strokes.

#### Bore size

| Bearing |                      |
|---------|----------------------|
| M       | Slide bearing        |
| L       | Ball bushing bearing |

| Stroke (mm) | Bore (mm) | Series  |
|-------------|-----------|---------|
| 25          | 25        | SYJ5000 |
| 32          | 32        | series  |
| 40          | 40        | SYJ7000 |
| 50          | 50        | series  |
| 63          | 63        |         |

#### Auto switch

| Nil | Without auto switch (Built-in magnet)                       |
|-----|-------------------------------------------------------------|
|     | * For the applicable auto switch model, refer to page 1259. |

#### Number of auto switches

| Nil | 2 pcs. |
|-----|--------|
| S   | 1 pc.  |
| n   | n pcs. |

#### Rod extended/retracted when energized

| Nil | Rod extended when energized  |
|-----|------------------------------|
| B   | Rod retracted when energized |

Note) Based on the case of 2 position single solenoid valve.

#### Cylinder

MVGQ M 25 - 30 - M9BW

#### Valve

SYJ 5 1 4 0 - 5 L Z - MA

#### Valve series

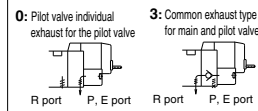
|   |                |
|---|----------------|
| 5 | SYJ5000 series |
| 7 | SYJ7000 series |

#### Type of actuation

|   |                            |
|---|----------------------------|
| 1 | 2 position single solenoid |
| 2 | 2 position double solenoid |

\* Please consult with SMC for 3 position type.

#### Body option



#### Coil specifications

| Nil | Standard                                    |
|-----|---------------------------------------------|
| T   | With power saving circuit <24, 12 VDC only> |

\* Power saving circuit is not available in the case of D, Y, DO, YO or W□ type.

#### Rated voltage

| DC | AC (50/60 Hz)       |
|----|---------------------|
| 5  | 24 VDC              |
| 6  | 12 VDC              |
| V  | 6 VDC               |
| S  | 5 VDC               |
| R  | 3 VDC               |
|    | 1 100 VAC           |
|    | 2 200 VAC           |
|    | 3 110 VAC [115 VAC] |
|    | 4 220 VAC [230 VAC] |

\* DC specifications of type D, Y, DO and YO are only available with 12 and 24 VDC.

\* For type W□, DC voltage is only available.

#### Speed controller specifications

|     |           |
|-----|-----------|
| MA  | Meter-out |
| MB* | Meter-in  |

\* Semi-standard

#### Port thread type

| Nil | Rc  |
|-----|-----|
| N   | NPT |
| F   | G   |

#### Light/Surge voltage suppressor

##### Electrical entry for G, H, L, M, W

| Nil | Without light/surge voltage suppressor               |
|-----|------------------------------------------------------|
| S   | With surge voltage suppressor                        |
| Z   | With light/surge voltage suppressor                  |
| R   | With surge voltage suppressor (Non-polar type)       |
| U   | With light/surge voltage suppressor (Non-polar type) |

\* For AC voltage valves there is no "S" option. It is already built-in to the rectifier circuit.  
\* For type "R" and "U", DC voltage is only available.  
\* Power saving circuit is only available in the "Z" type.

##### Electrical entry for D, Y

| Nil | Without light/surge voltage suppressor               |
|-----|------------------------------------------------------|
| S   | With surge voltage suppressor (Non-polar type)       |
| Z   | With light/surge voltage suppressor (Non-polar type) |

\* DOZ and YOZ are not available.  
\* For AC voltage valves there is no "S" option. It is already built-in to the rectifier circuit.

#### Electrical entry

| 24, 12, 6, 5, 3 VDC<br>100, 110, 200, 220 VAC |                                          |                                          |                              | 24, 12, 6, 5, 3 VDC              | 24, 12, 6, 5, 3 VDC                      |
|-----------------------------------------------|------------------------------------------|------------------------------------------|------------------------------|----------------------------------|------------------------------------------|
| Grommet                                       | L plug connector                         | M plug connector                         |                              | DIN terminal                     | M8 connector                             |
| <b>G:</b> Lead wire length 300 mm             | <b>L:</b> With lead wire (Length 300 mm) | <b>M:</b> With lead wire (Length 300 mm) | <b>MN:</b> Without lead wire | <b>D, Y :</b> With connector     | <b>W□:</b> Without connector cable       |
|                                               |                                          |                                          |                              |                                  |                                          |
| <b>H:</b> Lead wire length 600 mm             | <b>LN:</b> Without lead wire             | <b>LO:</b> Without connector             | <b>MO:</b> Without connector | <b>DO, YO:</b> Without connector | <b>W□:</b> With connector cable (Note 1) |
|                                               |                                          |                                          |                              |                                  |                                          |

#### Manual override

| Nil: Non-locking push type | D: Push-turn locking slotted type | E: Push-turn locking lever type |
|----------------------------|-----------------------------------|---------------------------------|
|                            |                                   |                                 |

\* LN, MN type: with 2 sockets.

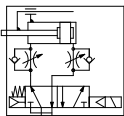
\* For connector cable of M8 connector, refer to page 872.

Note 1) Enter the cable length symbols in □. Please be sure to fill in the blank referring to page 872.

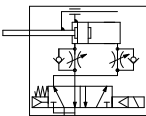
## Symbol

### Meter-out

Rod extended when energized

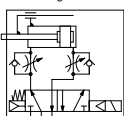


Rod retracted when energized

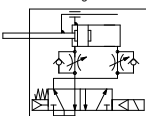


### Meter-in (Semi-standard)

Rod extended when energized



Rod retracted when energized



## Standard Stroke

| Model                                  | Standard stroke (mm)                          |
|----------------------------------------|-----------------------------------------------|
| <b>MVGQ<sup>M</sup> 25</b>             | 20, 30, 40, 50, 75, 100<br>125, 150, 175, 200 |
| <b>MVGQ<sup>M</sup> 32, 40, 50, 63</b> | 25, 50, 75, 100,<br>125, 150, 175, 200        |

### Intermediate stroke (mm)

\* As for the intermediate strokes (by the 1 stroke interval) for ø25, ø32 other than the standard strokes above are manufactured by means of installing a spacer.  
Ex.) In the case of MVGQM25-21 st, an interface of 9 mm wide (5 mm + 4 mm) is installed inside of the MVGQ20-30 st, and thus the full length dimension of the body is the same as 30 st.

\* As for the intermediate strokes (by the 5 stroke interval) for ø40 to ø63 other than the standard strokes above are manufactured by means of installing a spacer.  
Ex.) In the case of MVGQM50-40 st, an interface of 10 mm wide is installed inside of the MVGQ50-50 st, and thus the full length dimension of the body is the same as 50 st.



## Made to Order Specifications

[Click here for details](#)

| Symbol | Specifications                                               |
|--------|--------------------------------------------------------------|
| -XA□   | Change of guide rod end shape                                |
| -XC79  | Tapped hole, drilled hole, pinned hole machined additionally |

## Specifications

|                                    |                                                     |             |
|------------------------------------|-----------------------------------------------------|-------------|
| Bore size (mm)                     | <b>25, 32, 40, 50, 63</b>                           |             |
| Action                             | Double acting                                       |             |
| Fluid                              | Air                                                 |             |
| Bearing type                       | Slide bearing (MVGQM), Ball bushing bearing (MVGQL) |             |
| Operating pressure range (MPa)     | 2 position single                                   | 0.15 to 0.7 |
|                                    | 2 position double                                   | 0.1 to 0.7  |
| Ambient and fluid temperature (°C) | -10 to 50°C (No freezing)                           |             |
| Piston speed (mm/s)                | 50 to 500 (Refer to the page 1253)                  |             |
| Cushion                            | Rubber bumper on both ends                          |             |
| Lubrication                        | Non-lube                                            |             |
| Stroke length tolerance (mm)       | +1.5<br>0                                           |             |

## Solenoid Valve Specifications

|                                                                |  |  |                                                                                                    |  |
|----------------------------------------------------------------|--|--|----------------------------------------------------------------------------------------------------|--|
| Model                                                          |  |  | SYJ5000, SYJ7000 series                                                                            |  |
| Manual override                                                |  |  | Non-locking push type, Push-turn locking slotted type, Push-turn locking lever type                |  |
| Pilot exhaust                                                  |  |  | Pilot valve individual exh. type, Main/Pilot valve common exh. type                                |  |
| Impact/Vibration resistance (m/s <sup>2</sup> ) <sup>(1)</sup> |  |  | 150/30                                                                                             |  |
| Enclosure                                                      |  |  | Dustproof                                                                                          |  |
| Electrical entry                                               |  |  | Grommet (G)/(H), L plug connector (L), M plug connector (M),<br>DIN terminal (D), M8 connector (W) |  |
|                                                                |  |  | G, H, L, M, W                                                                                      |  |

\* Conforming to IEC60529

+ 100 VAC and 115 VAC, 200 VAC and 230 VAC are common.

\* Allowable voltage fluctuation for 115 VAC or 230 VAC is -15 to +5% of the rated voltage.

\* For types S, Z and T with an energy saving circuit, the voltage will drop due to the internal circuit. Allowable voltage fluctuation must be in the range below.

Types S, Z 24 VDC: -7 to +10 %, 12 VDC: -4 to +10 %

Type T 24 VDC: -8 to +10 %, 12 VDC: -6 to +10 %

Note 1) Impact resistance: No malfunction occurred when it is tested in the axial direction and at the right angles to the main valve and armature in both energized and de-energized states every once for each condition. (Value in the initial state)

Vibration resistance: No malfunction occurred in one sweep test between 45 and 2000 Hz. Test was performed at both energized and deenergized states in the axial direction and at the right angles to the main valve and armature. (Value in the initial state)

Note 2) At the rated voltage.

## Applicable Auto Switches/Refer to pages 1341 to 1435 for further information on auto switches.

| Type                                | Special function | Electrical entry | Indicator light  | Wiring (Output) | Load voltage |                     | Auto switch model  |         | Lead wire length (m) |       |       |       |            | Pre-wired connector | Applicable load |            |
|-------------------------------------|------------------|------------------|------------------|-----------------|--------------|---------------------|--------------------|---------|----------------------|-------|-------|-------|------------|---------------------|-----------------|------------|
|                                     |                  |                  |                  |                 | DC           | AC                  | Perpendicular      | In-line | 0.5 (Nil)            | 1 (M) | 3 (L) | 5 (Z) |            |                     |                 |            |
| Solid state auto switch             | —                | Grommet          | Yes              | 3-wire (NPN)    | 5 V, 12 V    | —                   | M9NV               | M9N     | ●                    | ●     | ●     | ○     | ○          | IC circuit          | Relay, PLC      |            |
|                                     | 3-wire (PNP)     |                  |                  | M9PV            |              |                     | M9P                | ●       | ●                    | ●     | ○     | ○     | IC circuit |                     |                 |            |
|                                     | 2-wire           |                  |                  | 12 V            | M9BV         |                     | M9B                | ●       | ●                    | ●     | ○     | ○     | —          |                     |                 |            |
|                                     | 3-wire (NPN)     |                  |                  | 5 V, 12 V       | M9NVW        |                     | M9NW               | ●       | ●                    | ●     | ○     | ○     | IC circuit |                     |                 |            |
|                                     | 3-wire (PNP)     |                  |                  |                 | M9PVW        |                     | M9PW               | ●       | ●                    | ●     | ○     | ○     | IC circuit |                     |                 |            |
|                                     | 2-wire           |                  |                  | 12 V            | M9BWW        |                     | M9BW               | ●       | ●                    | ●     | ○     | ○     | —          |                     |                 |            |
| Water resistant (2-color indicator) | Grommet          | Yes              | 3-wire (NPN)     | 5 V, 12 V       | —            | M9NAV <sup>*1</sup> | M9NA <sup>*1</sup> | ○       | ○                    | ●     | ○     | ○     | IC circuit | Relay, PLC          |                 |            |
|                                     |                  |                  | 3-wire (PNP)     |                 |              | M9PAV <sup>*1</sup> | M9PA <sup>*1</sup> | ○       | ○                    | ●     | ○     | ○     | IC circuit |                     |                 |            |
|                                     |                  |                  | 2-wire           | 12 V            |              | M9BAV <sup>*1</sup> | M9BA <sup>*1</sup> | ○       | ○                    | ●     | ○     | ○     | —          |                     |                 |            |
|                                     |                  |                  | 3-wire           | 5 V             |              | —                   | A96V               | A96     | ●                    | —     | ●     | —     | —          |                     | IC circuit      | —          |
|                                     |                  |                  | (NPN equivalent) |                 |              |                     | A93V <sup>*2</sup> | A93     | ●                    | ●     | ●     | —     | —          |                     | Relay, PLC      |            |
|                                     |                  |                  | 2-wire           | 24 V            |              | 12 V                | 100 V or less      | A90V    | A90                  | ●     | —     | ●     | —          |                     | —               | IC circuit |

\*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance.

Consult with SMC regarding water resistant types with the above model numbers.

\*2 1 m type lead wire is only applicable to D-A93.

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NW  
1 m ..... M (Example) M9NW  
3 m ..... L (Example) M9NL  
5 m ..... Z (Example) M9NZ

\* Solid state auto switches marked with "○" are produced upon receipt of order.

\* Since there are other applicable auto switches than listed, refer to page 1271 for details.

\* For details about auto switches with pre-wired connector, refer to pages 1410 and 1411.

\* Auto switches are shipped together (not assembled).

# MVGQ Series

## Weight

| Bearing type  | Bore size (mm) | Model   | Standard stroke (mm) |      |      |      |      |      |      |      |      |      |      |  |
|---------------|----------------|---------|----------------------|------|------|------|------|------|------|------|------|------|------|--|
|               |                |         | 20                   | 25   | 30   | 40   | 50   | 75   | 100  | 125  | 150  | 175  | 200  |  |
| Slide bearing | 25             | MVGQM25 | 0.93                 | —    | 1.03 | 1.14 | 1.23 | 1.54 | 1.78 | 2.02 | 2.26 | 2.50 | 2.74 |  |
|               | 32             | MVGQM32 | —                    | 1.61 | —    | —    | 2.01 | 2.39 | 2.79 | 3.19 | 3.59 | 3.99 | 4.39 |  |
| Ball bushing  | 25             | MVGQL25 | 0.94                 | —    | 1.03 | 1.18 | 1.27 | 1.47 | 1.68 | 1.89 | 2.10 | 2.31 | 2.52 |  |
|               | 32             | MVGQL32 | —                    | 1.42 | —    | —    | 1.77 | 2.19 | 2.55 | 2.91 | 3.27 | 3.63 | 3.99 |  |

Note) The factors indicated above are of the single solenoid with grommet (G). Add 0.02 kg for the double solenoids.

The allowable lateral load, the allowable rotational torque for a plate, and the operation range of a stopper are the same as those of the MGQ series. For details, refer to the Web Catalog.

## Changing between Rod Extended when Energized and Rod Retracted when Energized SYJ5000

## How to Handle Speed Controller

It is able to switch between rod extended when energized and rod retracted when energized by the mounting orientation of the selector plate.

When the coil (B side coil) of the single solenoid valve is energized, the cylinder will move in the  $\rightarrow$  ("→") direction.

The installed orientation of the adapter can be changed 180°. Refer to Fig. (2), which shows the relationship of the installed orientation of the selector plate adapter. Ordinarily, the speed controller is shipped as shown in Fig. (2) (a) or (b). But if you would like to change the orientation of speed controllers, use them in (c) or (d) shown in Fig. (2).

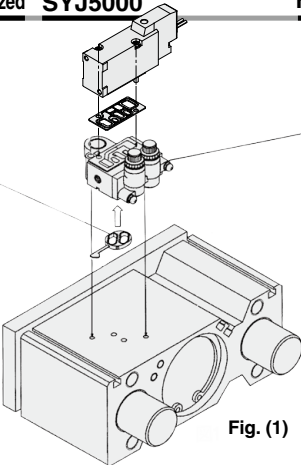


Fig. (1)

When the speed controller that is on the side of the coil (B side coil) of the single solenoid valve is in the meter-out mode, it controls the speed of the selector plate's  $\rightarrow$  ("→") direction. When it is in the meter-in mode, it controls the speed of the direction that is opposite to the selector plate's  $\rightarrow$  ("→") direction. Refer to Fig. (3) (for the meter-out mode).

Fig. (2)

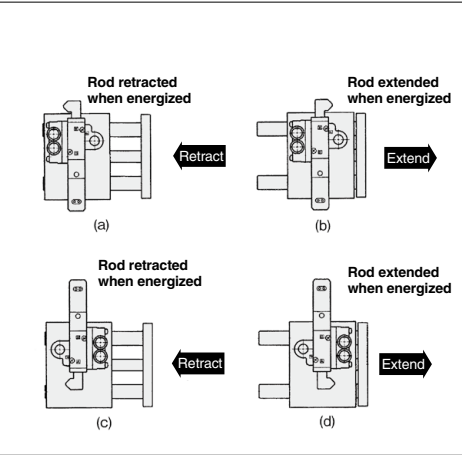
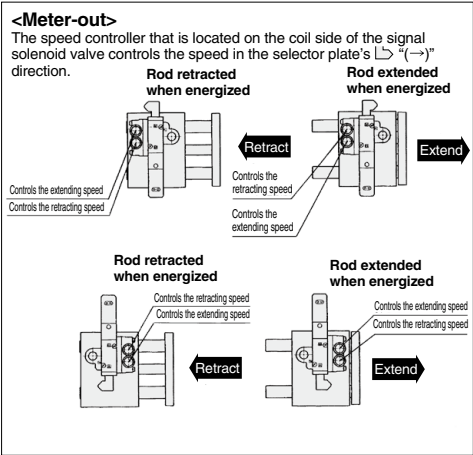


Fig. (3)





## Weight

(kg)

| Bearing type         | Bore size (mm) | Model   | Standard stroke (mm) |      |      |      |      |      |      |      |
|----------------------|----------------|---------|----------------------|------|------|------|------|------|------|------|
|                      |                |         | 25                   | 50   | 75   | 100  | 125  | 150  | 175  | 200  |
| Slide bearing        | 40             | MVGQM40 | 1.88                 | 2.47 | 2.69 | 3.10 | 3.51 | 3.92 | 4.33 | 4.74 |
|                      | 50             | MVGQM50 | 2.77                 | 3.32 | 3.88 | 4.44 | 5.00 | 5.56 | 6.12 | 6.68 |
|                      | 63             | MVGQM63 | 3.24                 | 3.86 | 4.46 | 5.08 | 5.70 | 6.32 | 6.94 | 7.56 |
| Ball bushing bearing | 40             | MVGQL40 | 1.69                 | 2.05 | 2.50 | 2.86 | 3.22 | 3.58 | 3.94 | 4.30 |
|                      | 50             | MVGQL50 | 2.34                 | 2.82 | 3.42 | 3.91 | 4.40 | 4.89 | 5.38 | 5.87 |
|                      | 63             | MVGQL63 | 2.88                 | 3.42 | 4.08 | 4.62 | 5.16 | 5.70 | 6.24 | 6.78 |

Note) The factors indicated above are of the single solenoid with grommet (G). Add 0.01 kg for the double solenoids.

## Changing between Rod Extended when

## Energized and Rod Retracted when Energized

**SYJ7000**

## How to Handle Speed Controller

It is able to switch between rod extended when energized and rod retracted when energized by the mounting orientation of the selector plate.

When the coil that is located in the selector plate's  $\swarrow$  direction is energized, the cylinder moves into the extension side.

The valve orientation can also be changed 180°. Refer to Fig. (5), which shows the relationship between the selector plate and the installed orientation of the valve.

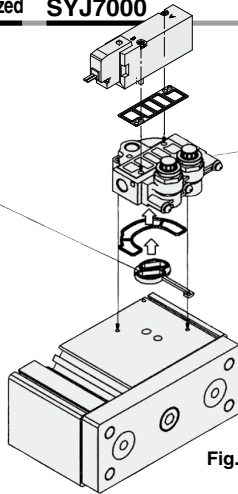


Fig. (4)

When the speed controller that is located on the side of the selector plate's  $\swarrow$  direction is in the meter-out mode, the speed controller controls the speed on the extension side. When it is in the meter-in mode, it controls the speed on the retraction side.

Refer to Fig. (6) (for the meter-out mode).

Fig. (5)

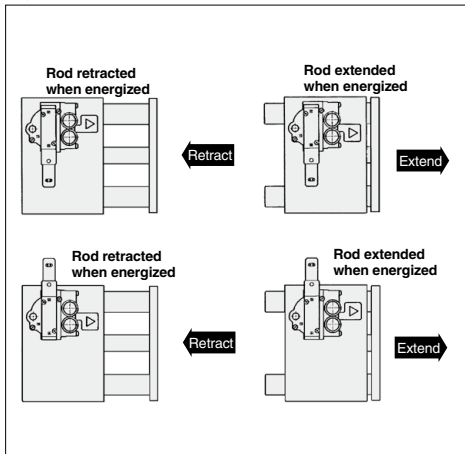
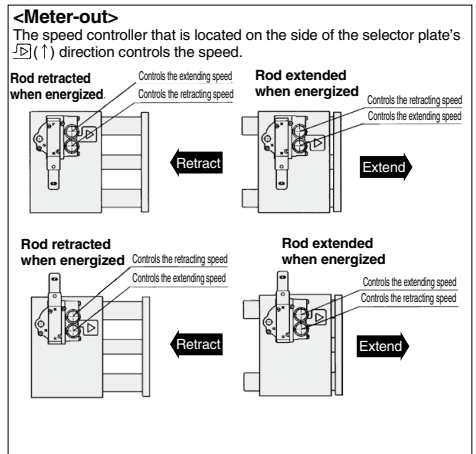


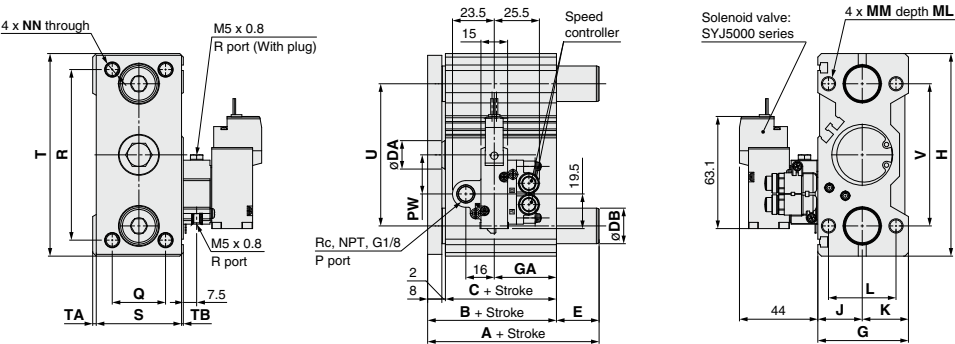
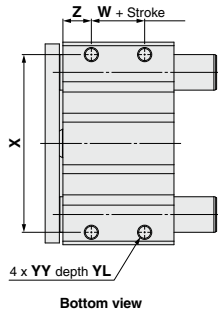
Fig. (6)



# MVGQ Series

ø25, ø32

MVGQM, MVGQL



\* The figures show when attached to SYJ5140-□G.

## MVGQM, MVGQL Common Dimensions

(mm)

| Bore size<br>(mm) | Standard stroke<br>(mm)                        | Applicable<br>solenoid<br>valve | B    | C    | DA | G  | GA    |               | H  | J  | K  | L         | MM       | ML        | NN       | PW   | Q  | R  | S   | T  | TA | TB | U  | V  | W   | X         | YY       | YL | Z  |
|-------------------|------------------------------------------------|---------------------------------|------|------|----|----|-------|---------------|----|----|----|-----------|----------|-----------|----------|------|----|----|-----|----|----|----|----|----|-----|-----------|----------|----|----|
|                   |                                                |                                 |      |      |    |    | 20 st | Over<br>20 st |    |    |    |           |          |           |          |      |    |    |     |    |    |    |    |    |     |           |          |    |    |
| 25                | 20, 30, 40, 50, 75, 100,<br>125, 150, 175, 200 | SYJ5000<br>series               | 47.5 | 37.5 | 12 | 42 | 30    | 35            | 88 | 21 | 21 | 32        | M6 x 1.0 | 15        | M6 x 1.0 | 15.5 | 26 | 70 | 38  | 86 | 2  | 2  | 56 | 62 | 10  | 76        | M6 x 1.0 | 9  | 14 |
| 32                | 25, 50, 75, 100,<br>125, 150, 175, 200         |                                 | 47.5 | 37.5 | 16 | 51 | 35    | 114           | 25 | 26 | 38 | M8 x 1.25 | 20       | M8 x 1.25 | 22       | 30   | 96 | 48 | 112 | 2  | 1  | 80 | 80 | 5  | 100 | M8 x 1.25 | 11       | 16 |    |

Note 1) It is possible to manufacture the intermediate strokes other than the standard strokes by means of installing a spacer.  
Note 2) For the electrical entry except the grommet type, refer to page 1258.

## MVGQM (Slide bearing) A, DB, E Dimensions

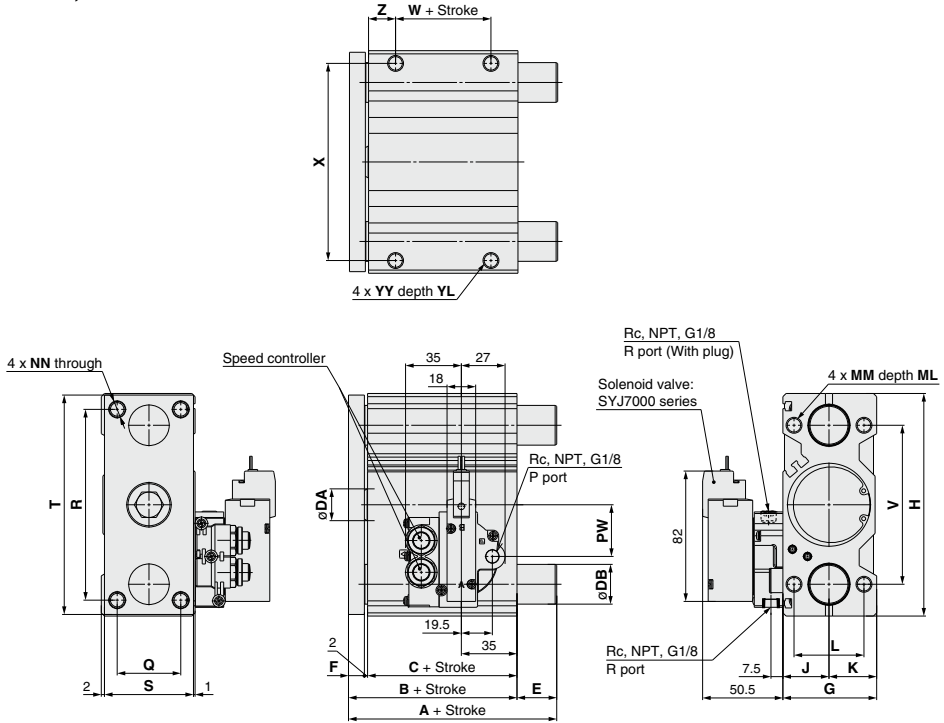
| Bore size<br>(mm) | Symbol<br>Stroke | A           |            | DB | E           |            |
|-------------------|------------------|-------------|------------|----|-------------|------------|
|                   |                  | Up to 50 st | Over 50 st |    | Up to 50 st | Over 50 st |
| 25                |                  | 47.5        | 62         | 16 | 0           | 14.5       |
| 32                |                  | 71.5        |            | 20 | 24          |            |

## MVGQL (Ball bushing bearing) A, DB, E Dimensions

| Bore size<br>(mm) | Symbol<br>Stroke | A           |            | DB | E           |            |
|-------------------|------------------|-------------|------------|----|-------------|------------|
|                   |                  | Up to 30 st | Over 30 st |    | Up to 30 st | Over 30 st |
| 25                |                  | 63.5        | 79.5       | 13 | 16          | 32         |
| 32                |                  | Up to 50 st | Over 50 st | 16 | Up to 50 st | Over 50 st |
|                   |                  | 53          | 90         |    | 5.5         | 42.5       |

ø40, ø50, ø63

MVGQM, MVGQL



\* The figures show when attached to SYJ7140-□G.

## MVGQM, MVGQL Common Dimensions

| Bore size (mm) | Standard stroke (mm) | Applicable solenoid valve | B  | C  | DA | F  | G  | H   | J    | K    | L  | MM        | ML | NN        | PW   | Q  | R   | S  | T   | V   | W  | X   | YY        | YL   | Z  |
|----------------|----------------------|---------------------------|----|----|----|----|----|-----|------|------|----|-----------|----|-----------|------|----|-----|----|-----|-----|----|-----|-----------|------|----|
| 40             | 25, 50, 75, 100,     | SYJ7000 series            | 54 | 44 | 16 | 8  | 51 | 124 | 25   | 26   | 38 | M8 x 1.25 | 20 | M8 x 1.25 | 27   | 30 | 106 | 48 | 122 | 90  | 10 | 110 | M8 x 1.25 | 11   | 17 |
| 50             | 125, 150, 175, 200   |                           | 56 | 44 | 20 | 10 | 59 | 140 | 29   | 30   | 44 | M10 x 1.5 | 25 | M10 x 1.5 | 32.5 | 40 | 120 | 56 | 138 | 100 | 10 | 124 | M10 x 1.5 | 12.5 | 17 |
| 63             |                      |                           | 61 | 49 | 20 | 10 | 72 | 150 | 35.5 | 36.5 | 44 | M10 x 1.5 | 25 | M10 x 1.5 | 29.8 | 50 | 130 | 69 | 148 | 110 | 10 | 132 | M10 x 1.5 | 15   | 19 |

Note 1) It is possible to manufacture the intermediate strokes other than the standard strokes by means of installing a spacer.

Note 2) For the electrical entry except the grommet type, refer to page 1258.

## MVGQM (Slide bearing) A, DB, E Dimensions

| Bore size (mm) | Symbol | A    | DB | E    |
|----------------|--------|------|----|------|
| 40             |        | 71.5 | 20 | 17.5 |
| 50             |        | 81   | 25 | 25   |
| 63             |        | 81   | 25 | 20   |

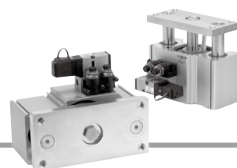
## MVGQL (Ball bushing bearing) A, DB, E Dimensions

| Bore size (mm) | Symbol | A           |            | DB | E           |            |
|----------------|--------|-------------|------------|----|-------------|------------|
| Stroke         |        | Up to 50 st | Over 50 st |    | Up to 50 st | Over 50 st |
| 40             |        | 54          | 90         | 16 | 0           | 36         |
| 50             |        | 60          | 102        | 20 | 4           | 46         |
| 63             |        | 61          | 102        | 20 | 0           | 41         |

# Valve Mounted Guide Cylinder

## MVGQ Series

ø80, ø100



### How to Order

#### How to Order

When ordering valve mounted guide cylinder, the MVGQ series, specify the models of both the cylinder and the valve.

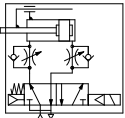
Ex.) MVGQM80-50-M9BWM-B ..... 1  
VF3140-5LZ-MA ..... 1

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|---------------------------------------|-----|------------------|----|-------------------|----------------|--------|------------------|-----------------------------|-------------------|------------------------------|--|--|---|--------------|----------------|--|--|----|-------------|-------------------|
| <p><b>Cylinder stroke (mm)</b><br/>Refer to page 1265 for standard strokes.</p> <p><b>Bore size</b></p> <table border="1"> <tr> <td>80</td> <td>80 mm</td> </tr> <tr> <td>100</td> <td>100 mm</td> </tr> </table> <p><b>Bearing</b></p> <table border="1"> <tr> <td>M</td> <td>Slide bearing</td> </tr> <tr> <td>L</td> <td>Ball bushing bearing</td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                            |                                        | 80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 80 mm                                  | 100               | 100 mm                             | M                                                                                                                                                                                                                                                                                                                                                                        | Slide bearing                       | L                                                                                                                                                                                                                                       | Ball bushing bearing     | <p><b>Auto switch</b></p> <table border="1"> <tr> <td>Nil</td> <td>Without auto switch (Built-in magnet)</td> </tr> </table> <p>* For the applicable auto switch model, refer to page 1265.</p> <p><b>Number of auto switches</b></p> <table border="1"> <tr> <td>Nil</td> <td>2 pcs.</td> </tr> <tr> <td>S</td> <td>1 pc.</td> </tr> <tr> <td>n</td> <td>n pcs.</td> </tr> </table> <p><b>Rod extended/retracted when energized</b> (Note)</p> <table border="1"> <tr> <td>Nil</td> <td>Rod extended when energized</td> </tr> <tr> <td>B</td> <td>Rod retracted when energized</td> </tr> </table> <p>(Note) Based on the case of 2 position single solenoid valve.</p> |                   | Nil               | Without auto switch (Built-in magnet) | Nil | 2 pcs.           | S  | 1 pc.             | n              | n pcs. | Nil              | Rod extended when energized | B                 | Rod retracted when energized |  |  |   |              |                |  |  |    |             |                   |
| 80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 80 mm                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 100 mm                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| M                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Slide bearing                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Ball bushing bearing                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Without auto switch (Built-in magnet)  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2 pcs.                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1 pc.                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| n                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | n pcs.                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Rod extended when energized            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Rod retracted when energized           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| <p><b>Cylinder</b></p> <p><b>MVGQ</b> <b>M</b> <b>80</b> - <b>50</b> - <b>M9BW</b> [ ] - [ ] - [ ]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        | <p><b>Valve</b></p> <p><b>VF3</b> <b>1</b> <b>4</b> <b>0</b> - <b>5</b> <b>L</b> <b>Z</b> [ ] - <b>MA</b> [ ] - [ ]</p>                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| <p><b>Type of actuation</b></p> <table border="1"> <tr> <td>1</td> <td>2 position single solenoid</td> </tr> <tr> <td>2</td> <td>2 position double solenoid</td> </tr> </table> <p>* Please consult with SMC for 3 position type.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2 position single solenoid             | 2                 | 2 position double solenoid         | <p><b>Speed controller specifications</b></p> <table border="1"> <tr> <td>MA</td> <td>Meter-out</td> </tr> <tr> <td>MB</td> <td>Meter-in</td> </tr> </table> <p>* Semi-standard</p> <p><b>Manual override</b></p> <p>Nil: Non-locking push type Manual override</p> <p>B: Locking type B (Slotted) Manual override</p> <p>C: Locking type C (Manual) Manual override</p> |                                     | MA                                                                                                                                                                                                                                      | Meter-out                | MB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Meter-in          |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2 position single solenoid             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2 position double solenoid             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| MA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Meter-out                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| MB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Meter-in                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| <p><b>Body option</b></p> <p>0: Pilot valve individual exhaust type</p> <p>R port P/E port</p> <p>3: Main/Pilot valve * common exhaust type</p> <p>R port P/E port</p> <p>* Semi-standard</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        | <p><b>Rated voltage</b></p> <table border="1"> <tr> <td>1</td> <td>100 VAC, 50/60 Hz</td> </tr> <tr> <td>2</td> <td>200 VAC, 50/60 Hz</td> </tr> <tr> <td>3*</td> <td>110 to 120 VAC, 50/60 Hz</td> </tr> <tr> <td>4*</td> <td>220 VAC, 50/60 Hz</td> </tr> <tr> <td>5</td> <td>24 VDC</td> </tr> <tr> <td>6*</td> <td>12 VDC</td> </tr> <tr> <td>7*</td> <td>240 VAC, 50/60 Hz</td> </tr> </table> <p>Maximum rated voltage for L/M type plug connectors is 220 VAC.<br/>* Semi-standard<br/>For other rated voltages, please consult with SMC.</p> |                                        | 1                 | 100 VAC, 50/60 Hz                  | 2                                                                                                                                                                                                                                                                                                                                                                        | 200 VAC, 50/60 Hz                   | 3*                                                                                                                                                                                                                                      | 110 to 120 VAC, 50/60 Hz | 4*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 220 VAC, 50/60 Hz | 5                 | 24 VDC                                | 6*  | 12 VDC           | 7* | 240 VAC, 50/60 Hz |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 100 VAC, 50/60 Hz                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 200 VAC, 50/60 Hz                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| 3*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 110 to 120 VAC, 50/60 Hz               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| 4*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 220 VAC, 50/60 Hz                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 24 VDC                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| 6*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 12 VDC                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| 7*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 240 VAC, 50/60 Hz                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| <p><b>Light/Surge voltage suppressor</b></p> <table border="1"> <tr> <td>Nil</td> <td>Without light/surge voltage suppressor</td> </tr> <tr> <td>S<sup>(1)</sup></td> <td>With surge voltage suppressor</td> </tr> <tr> <td>Z<sup>(2)</sup></td> <td>With light/surge voltage suppressor</td> </tr> </table> <p>Note 1) Applicable to the grommet type only.<br/>Note 2) "GZ", "HZ" are not available.</p>                                                                                                                                                                                                                                                                                                                                      |                                        | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Without light/surge voltage suppressor | S <sup>(1)</sup>  | With surge voltage suppressor      | Z <sup>(2)</sup>                                                                                                                                                                                                                                                                                                                                                         | With light/surge voltage suppressor | <p><b>Made to Order</b></p> <p>* Refer to page 1265 for details.</p> <p><b>Port thread type</b></p> <table border="1"> <tr> <td>Nil</td> <td>Rc</td> </tr> <tr> <td>N</td> <td>NPT</td> </tr> <tr> <td>F</td> <td>G</td> </tr> </table> |                          | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Rc                | N                 | NPT                                   | F   | G                |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Without light/surge voltage suppressor |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| S <sup>(1)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | With surge voltage suppressor          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| Z <sup>(2)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | With light/surge voltage suppressor    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Rc                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | NPT                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | G                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                   |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| <p><b>Electrical entry</b></p> <table border="1"> <tr> <td>G</td> <td>Grommet (Lead wire length: 300 mm)</td> <td>L</td> <td>L plug connector</td> <td>With lead wire</td> </tr> <tr> <td>H</td> <td>Grommet (Lead wire length: 600 mm)</td> <td>LO</td> <td>LO plug connector</td> <td>Without connector</td> </tr> <tr> <td>E</td> <td>Grommet terminal</td> <td>M</td> <td>M plug connector</td> <td>With lead wire</td> </tr> <tr> <td>T</td> <td>Conduit terminal</td> <td>MO</td> <td>MO plug connector</td> <td>Without connector</td> </tr> <tr> <td></td> <td></td> <td>D</td> <td>DIN terminal</td> <td>With connector</td> </tr> <tr> <td></td> <td></td> <td>DO</td> <td>DO terminal</td> <td>Without connector</td> </tr> </table> |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        | G                 | Grommet (Lead wire length: 300 mm) | L                                                                                                                                                                                                                                                                                                                                                                        | L plug connector                    | With lead wire                                                                                                                                                                                                                          | H                        | Grommet (Lead wire length: 600 mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | LO                | LO plug connector | Without connector                     | E   | Grommet terminal | M  | M plug connector  | With lead wire | T      | Conduit terminal | MO                          | MO plug connector | Without connector            |  |  | D | DIN terminal | With connector |  |  | DO | DO terminal | Without connector |
| G                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Grommet (Lead wire length: 300 mm)     | L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | L plug connector                       | With lead wire    |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Grommet (Lead wire length: 600 mm)     | LO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | LO plug connector                      | Without connector |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Grommet terminal                       | M                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | M plug connector                       | With lead wire    |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
| T                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Conduit terminal                       | MO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | MO plug connector                      | Without connector |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                        | D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | DIN terminal                           | With connector    |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                        | DO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | DO terminal                            | Without connector |                                    |                                                                                                                                                                                                                                                                                                                                                                          |                                     |                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   |                   |                                       |     |                  |    |                   |                |        |                  |                             |                   |                              |  |  |   |              |                |  |  |    |             |                   |

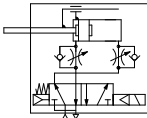
## Symbol

### Meter-out

Rod extended when energized

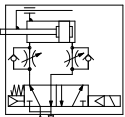


Rod retracted when energized

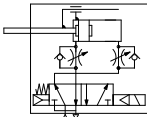


### Meter-in (Semi-standard)

Rod extended when energized



Rod retracted when energized



**Made to Order Specifications**  
[Click here for details](#)

| Symbol | Specifications                                               |
|--------|--------------------------------------------------------------|
| -XA□   | Change of guide rod end shape                                |
| -XC79  | Tapped hole, drilled hole, pinned hole machined additionally |

## Specifications

|                                    |                                                                     |
|------------------------------------|---------------------------------------------------------------------|
| Bore size (mm)                     | 80, 100                                                             |
| Action                             | Double acting                                                       |
| Fluid                              | Air                                                                 |
| Bearing type                       | Slide bearing (MVGQM), Ball bushing bearing (MVGQL)                 |
| Operating pressure range (MPa)     | 2 position single<br>2 position double<br>0.15 to 0.9<br>0.1 to 0.9 |
| Ambient and fluid temperature (°C) | -10 to 50°C (No freezing)                                           |
| Piston speed (mm/s)                | 50 to 350 (Refer to the page 1253)                                  |
| Cushion                            | Rubber bumper on both ends                                          |
| Lubrication                        | Non-lube                                                            |
| Stroke length tolerance (mm)       | +1.5<br>0                                                           |

## Solenoid Valve Specifications

|                                                   |            |                                                                                               |                                               |
|---------------------------------------------------|------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------|
| Model                                             |            | VF3000 series                                                                                 |                                               |
| Manual override                                   |            | Non-locking push type, Locking B type*, Locking C type*                                       |                                               |
| Pilot exhaust                                     |            | Pilot valve individual exh. type, Main/Pilot valve common exh. type*                          |                                               |
| Mounting orientation                              |            | Universal                                                                                     |                                               |
| Impact/Vibration resistance (m/s.) <sup>(1)</sup> |            | 300/50                                                                                        |                                               |
| Enclosure                                         |            | Dustproof                                                                                     |                                               |
| Electrical entry                                  |            | Grommet, Grommet terminal, Conduit terminal, DIN terminal, L plug connector, M plug connector |                                               |
| Coil rated voltage (V)                            | AC50/60 Hz | 100, 200, 12*, 24*, 48*, 110*, 220*, 240*                                                     |                                               |
|                                                   | DC         | 24, 6*, 12*, 48*, 100*, 110*                                                                  |                                               |
| Allowable voltage                                 |            | -15% to 10% of the rated voltage                                                              |                                               |
| Apparent power <sup>(2)</sup>                     | AC         | Inrush                                                                                        | 5.6 VA (50 Hz), 5.0 VA (60 Hz)                |
|                                                   |            | Holding                                                                                       | 3.4 VA (50 Hz), 2.3 VA (60 Hz)                |
| Power consumption (W) <sup>(2)</sup>              | DC         | 1.8, 2 (With indicator light)                                                                 |                                               |
|                                                   |            | AC                                                                                            | Varistor, Neon bulb (LED for less than 100 V) |
| Light/Surge voltage suppressor                    | DC         | Varistor, LED (Neon bulb for 100 V or more)                                                   |                                               |

Note 1) Impact resistance: No malfunction resulted from the impact test using a drop impact tester. The test was performed on the axis and right angle direction of the main valve and armature, one time each in both energized and de-energized states.  
 Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 2000 Hz. Test was performed at both energized and de-energized states to the axis and right angle direction of the main valve and armature. (Value in the initial stage.)

Note 2) At the rated voltage.  
 \* Semi-standard

## Standard Stroke

| Model         | Standard stroke (mm)                  | Intermediate stroke (mm)                                                                                                                                                                                                                                                                                                                                                |
|---------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MVGQ M 80,100 | 25, 50, 75, 100<br>125, 150, 175, 200 | As for the intermediate strokes (by the 5 stroke interval) other than the standard strokes at left are manufactured by means of installing a spacer with the width of 5, 10, 15, 20 mm.<br>Ex.) In the case of MVGQM80-40 st, an interface of 10 mm wide is installed inside of the MVGQM80-50 st, and thus the full length dimension of the body is the same as 50 st. |

## Applicable Auto Switches/Refer to pages 1341 to 1435 for further information on auto switches.

| Type                    | Special function                          | Electrical entry | Indicator light | Wiring (Output)         | Load voltage  |    | Auto switch model   |                    | Lead wire length (m) |       |       |       |            | Pre-wired connector | Applicable load |            |
|-------------------------|-------------------------------------------|------------------|-----------------|-------------------------|---------------|----|---------------------|--------------------|----------------------|-------|-------|-------|------------|---------------------|-----------------|------------|
|                         |                                           |                  |                 |                         | DC            | AC | Perpendicular       | In-line            | 0.5 (Nil)            | 1 (M) | 3 (L) | 5 (Z) |            |                     |                 |            |
| Solid state auto switch | —                                         | Grommet          | Yes             | 3-wire (NPN)            | 5 V, 12 V     | —  | M9NV                | M9N                | ●                    | ●     | ●     | ○     | ○          | IC circuit          | Relay, PLC      |            |
|                         | 3-wire (PNP)                              |                  |                 | M9PV                    |               |    | M9P                 | ●                  | ●                    | ●     | ○     | ○     |            |                     |                 |            |
|                         | 2-wire                                    |                  |                 | 12 V                    | M9BV          |    | M9B                 | ●                  | ●                    | ●     | ○     | ○     | —          |                     |                 |            |
|                         | 3-wire (NPN)                              |                  |                 | 5 V, 12 V               | M9NVW         |    | M9NW                | ●                  | ●                    | ●     | ○     | ○     | IC circuit |                     |                 |            |
|                         | 3-wire (PNP)                              |                  |                 | 12 V                    | M9PWW         |    | M9PW                | ●                  | ●                    | ●     | ○     | ○     | IC circuit |                     |                 |            |
|                         | 2-wire                                    |                  |                 | 12 V                    | M9BWW         |    | M9BW                | ●                  | ●                    | ●     | ○     | ○     | —          |                     |                 |            |
| Solid state auto switch | Diagnostic indication (2-color indicator) | Grommet          | Yes             | 3-wire (NPN)            | 5 V, 12 V     | —  | M9NAV <sup>*1</sup> | M9NA <sup>*1</sup> | ○                    | ○     | ●     | ○     | ○          | IC circuit          | Relay, PLC      |            |
|                         |                                           |                  |                 | 3-wire (PNP)            |               |    | M9PAV <sup>*1</sup> | M9PA <sup>*1</sup> | ○                    | ○     | ●     | ○     | ○          |                     |                 |            |
|                         |                                           |                  |                 | 2-wire                  | 12 V          |    | M9BAV <sup>*1</sup> | M9BA <sup>*1</sup> | ○                    | ○     | ●     | ○     | ○          | —                   |                 |            |
|                         | Water resistant (2-color indicator)       |                  |                 | 3-wire (NPN equivalent) | 5 V           |    | A96V                | A96                | ●                    | —     | ●     | —     | —          | IC circuit          |                 | —          |
|                         |                                           |                  |                 | 2-wire                  | 24 V          |    | 12 V                | A93V <sup>*2</sup> | A93                  | ●     | ●     | ●     | ●          | —                   |                 | —          |
|                         |                                           |                  |                 | 2-wire                  | 100 V or less |    | 100 V or less       | A90V               | A90                  | ●     | —     | ●     | —          | —                   |                 | IC circuit |

\*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

\*2 1 m type lead wire is only applicable to D-A93.

\* Lead wire length symbols: 0.5 m ..... Nil (Example) M9NVW  
 1 m ..... M (Example) M9NWM  
 3 m ..... L (Example) M9NWL  
 5 m ..... Z (Example) M9NVZ

\* Solid state auto switches marked with "○" are produced upon receipt of order.

\* Since there are other applicable auto switches than listed, refer to page 1271 for details.

\* For details about auto switches with pre-wired connector, refer to pages 1410 and 1411.

\* Auto switches are shipped together (not assembled).

# MVGQ Series

## Weight

| Bearing type         | Bore size (mm) | Model    | Standard stroke (mm) |       |       |       |       |       |       |       |
|----------------------|----------------|----------|----------------------|-------|-------|-------|-------|-------|-------|-------|
|                      |                |          | 25                   | 50    | 75    | 100   | 125   | 150   | 175   | 200   |
| Slide bearing        | 80             | MVGQM80  | 6.15                 | 7.08  | 7.98  | 8.90  | 9.82  | 10.73 | 11.66 | 12.58 |
|                      | 100            | MVGQM100 | 9.45                 | 10.76 | 12.06 | 13.39 | 14.72 | 16.05 | 17.38 | 18.71 |
| Ball bushing bearing | 80             | MVQL80   | 5.98                 | 6.87  | 8.44  | 9.28  | 10.12 | 10.96 | 11.80 | 12.64 |
|                      | 100            | MVQL100  | 8.83                 | 10.02 | 12.27 | 13.45 | 14.63 | 15.81 | 16.99 | 18.17 |

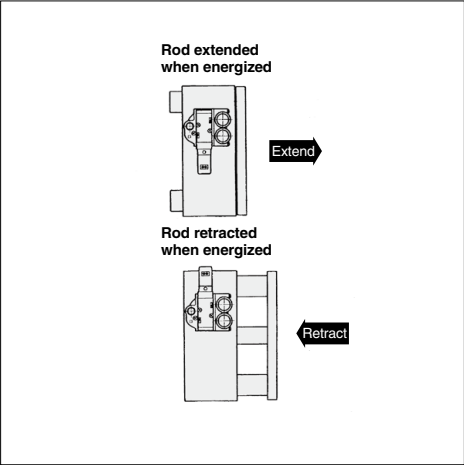
Note) The factors indicated above are of the single solenoid with grommet (G). Add 0.08 kg for the double solenoids.

The allowable lateral load, the allowable rotational torque for a plate, and the operation range of a stopper are the same as those of the MGQ series. For details, refer to the Web Catalog.

## Changing between Rod Extended when Energized and Rod Retracted when Energized

It is able to switch between rod extended when energized and rod retracted when energized by the mounting orientation of the valve. Refer to Fig. (2).

Fig. (2)



## VF3000

## How to Handle Speed Controller

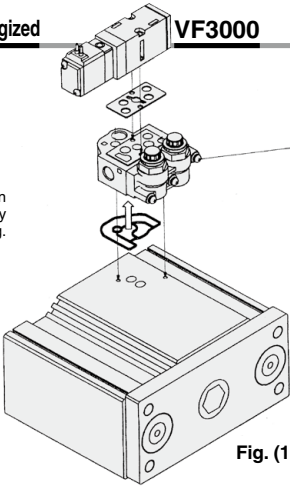
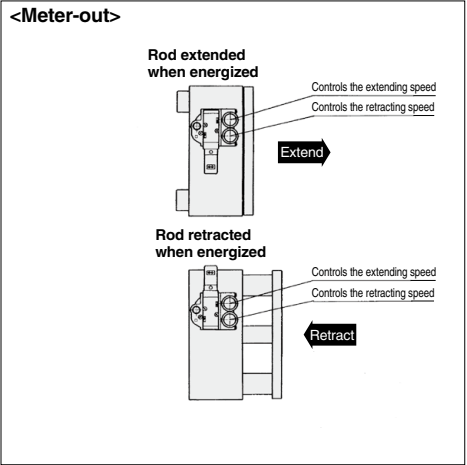


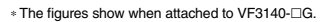
Fig. (1)

Coil (coil in A side) of the single solenoid valve and the speed controller in the opposite side at the rod extended when energized control the extending speed at meter-out and the retracting speed at meter-in. Refer to Fig. (3).

Fig. (3)



## MVGQM, MVGQL



### MVGQM, MVGQL Common Dimensions

(mm)

Note 2) For the electrical entry except the grommet type, refer to page 1264.

### MVGQM (Slide bearing) A, DB, E Dimensions

| Symbol<br>Bore size (mm) | A   | DB | E    |
|--------------------------|-----|----|------|
| 80                       | 93  | 28 | 18.5 |
| 100                      | 105 | 36 | 21   |

### MVGQL (Ball bushing bearing) A, DB, E Dimensions

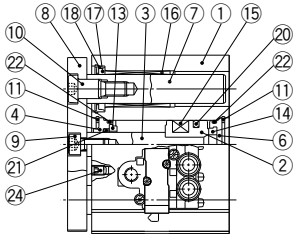
| Bore size (mm) | Symbol | A           |            | DB | E           |            |
|----------------|--------|-------------|------------|----|-------------|------------|
|                | Stroke | Up to 50 st | Over 50 st |    | Up to 50 st | Over 50 st |
| 80             |        | 84          | 143        | 25 | 9.5         | 68.5       |
| 100            |        | 89          | 153        | 30 | 5           | 69         |

# MVGQ Series

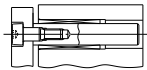
## Construction

### MVGQM series

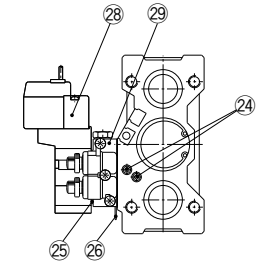
#### MVGQM12 to 25



50 stroke or less

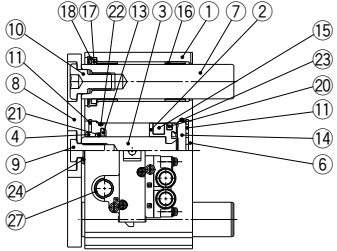


ø12, ø16

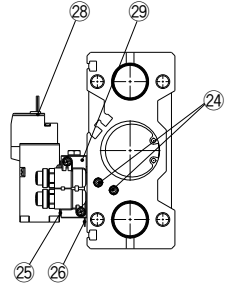


ø20, ø25 Over 50 stroke

#### MVGQM32 to 100



ø50 or more



### Component Parts

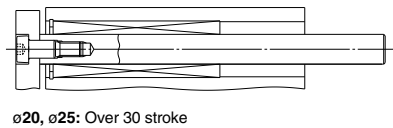
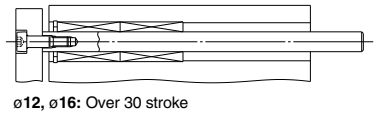
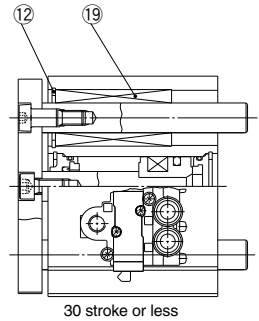
| No. | Description         | Material                  | Note                           |
|-----|---------------------|---------------------------|--------------------------------|
| 1   | Body                | Aluminum alloy            | Hard anodized                  |
| 2   | Piston              | Aluminum alloy            |                                |
| 3   | Piston rod          | Stainless steel           | ø12 to ø25                     |
|     |                     | Carbon steel              | ø32 to ø100 Hard chrome plated |
| 4   | Collar              | Aluminum alloy            | ø12 to ø40 Anodized            |
|     |                     | Bearing alloy             | ø50 to ø100 Painted            |
| 5   | Bushing             | Special friction material | ø50 to ø100                    |
| 6   | Head cover          | Aluminum alloy            | ø12 to ø63 Chromated           |
|     |                     |                           | ø80 to ø100 Painted            |
| 7   | Guide rod           | Carbon steel              | Hard chrome plated             |
| 8   | Plate               | Carbon steel              | Nickel plated                  |
| 9   | Plate mounting bolt | Carbon steel              | Nickel plated                  |
| 10  | Guide bolt          | Carbon steel              | Nickel plated                  |
| 11  | Retaining ring      | Carbon tool steel         | Phosphate coated               |
| 12  | Retaining ring      | Carbon tool steel         | Phosphate coated               |

| No. | Description                   | Material      | Note             |
|-----|-------------------------------|---------------|------------------|
| 13  | Bumper A                      | Urethane      |                  |
| 14  | Bumper B                      | Urethane      |                  |
| 15  | Magnet                        | —             |                  |
| 16  | Slide Bearing                 | Bearing alloy |                  |
| 17  | Felt                          | Felt          |                  |
| 18  | Holder                        | Resin         |                  |
| 19  | Ball bushing                  |               |                  |
| 20  | Piston seal                   | NBR           |                  |
| 21  | Rod seal                      | NBR           |                  |
| 22  | Gasket A                      | NBR           |                  |
| 23  | Gasket B                      | NBR           |                  |
| 24  | Hexagon socket head cap screw | Carbon steel  | Nickel plated    |
| 25  | Manifold gasket               |               |                  |
| 26  | Selector plate                |               | ø12 to ø63 only  |
| 27  | Adapter gasket                |               | ø25 to ø100 only |
| 28  | Solenoid valve                |               |                  |
| 29  | Adapter assembly              |               |                  |

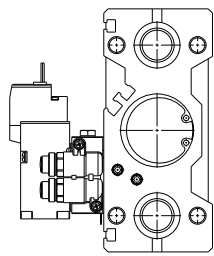
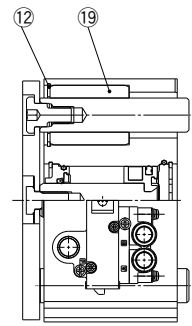


**MVGQL series**

**MVGQL12 to 25**



**MVGQL32 to 100**



**Replacement Parts**

| No.      | Description                          | Kit no.                      |          |          |          |                  |          |                  |          |                              |           |
|----------|--------------------------------------|------------------------------|----------|----------|----------|------------------|----------|------------------|----------|------------------------------|-----------|
|          |                                      | ø12                          | ø16      | ø20      | ø25      | ø32              | ø40      | ø50              | ø63      | ø80                          | ø100      |
| 20 to 23 | Seal kit                             | MGQ12-PS                     | MGQ16-PS | MGQ20-PS | MGQ25-PS | MGQ32-PS         | MGQ40-PS | MGQ50-PS         | MGQ63-PS | MGQ80-PS                     | MGQ100-PS |
| 25 to 29 | Solenoid valve with adapter assembly | SYJ3□3□□-□□□□-M <sub>A</sub> |          |          |          | SYJ5□4□□-□□□□-M□ |          | SYJ7□4□□-□□□□-M□ |          | VF3□4□-□□□□-M <sub>A</sub> □ |           |

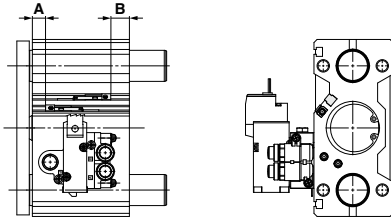
Note 1) Seal kit includes 20 to 23. Order the seal kit, based on each bore size.  
Note 2) For the specifying way of ordering numbers for the solenoid valve with adapter assembly, refer to pages 1254, 1258 and 1264.  
\* Since the seal kit does not include a grease pack, order it separately.  
**Grease pack part no.:** GR-S-010 (10 g)

**Port thread type**

|     |     |
|-----|-----|
| Nil | Rc  |
| N   | NPT |
| F   | G   |

# Auto Switch Mounting

## Auto Switch Proper Mounting Position (Detection at Stroke End)



### Auto Switch Proper Mounting Position

(mm)

| Auto switch model | D-M9□<br>D-M9□V<br>D-M9□W<br>D-M9□WV<br>D-M9□A<br>D-M9□AV |      | D-A9□<br>D-A9□V |      | D-Z7□/Z80<br>D-Y59□/Y7P<br>D-Y69□/Y7PV<br>D-Y7□W<br>D-Y7□WV |      |
|-------------------|-----------------------------------------------------------|------|-----------------|------|-------------------------------------------------------------|------|
|                   | A                                                         | B    | A               | B    | A                                                           | B    |
| Bore size         |                                                           |      |                 |      |                                                             |      |
| 12                | 6                                                         | 8    | 2               | 4    | 1                                                           | 3    |
| 16                | 9                                                         | 9    | 5               | 5    | 4                                                           | 4    |
| 20                | 9.5                                                       | 12.5 | 5.5             | 8.5  | 4.5                                                         | 7.5  |
| 25                | 9.5                                                       | 13   | 5.5             | 9    | 4.5                                                         | 8    |
| 32                | 10.5                                                      | 12   | 6.5             | 8    | 5.5                                                         | 7    |
| 40                | 14.5                                                      | 14.5 | 10.5            | 10.5 | 9.5                                                         | 9.5  |
| 50                | 12.5                                                      | 16.5 | 8.5             | 12.5 | 7.5                                                         | 11.5 |
| 63                | 15                                                        | 19   | 11              | 15   | 10                                                          | 14   |
| 80                | 18                                                        | 23.5 | 14              | 19.5 | 13                                                          | 18.5 |
| 100               | 22.5                                                      | 28.5 | 18.5            | 24.5 | 17.5                                                        | 23.5 |

Note) Adjust the auto switch after confirming the operating conditions in the actual setting.

## Minimum Stroke for Auto Switch Mounting

(mm)

| Auto switch model                 | No. of auto switches mounted | ø12                   | ø16 | ø20 | ø25 | ø32 | ø40 | ø50 | ø63 | ø80 | ø100 |
|-----------------------------------|------------------------------|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|
| D-A9□                             | 1 pc.                        | 5 <sup>Note 1)</sup>  |     | 5   |     |     |     |     |     |     |      |
|                                   | 2 pcs.                       | 10 <sup>Note 1)</sup> |     | 10  |     |     |     |     |     |     |      |
| D-A9□V<br>D-M9□V                  | 1 pc.                        | 5                     |     |     |     |     |     |     |     |     |      |
|                                   | 2 pcs.                       | 10                    |     |     |     |     |     |     |     |     |      |
| D-M9□                             | 1 pc.                        | 5 <sup>Note 1)</sup>  |     |     |     | 5   |     |     |     |     |      |
|                                   | 2 pcs.                       | 10 <sup>Note 1)</sup> | 10  |     |     |     |     |     |     |     |      |
| D-M9□W                            | 1 pc.                        | 5 <sup>Note 2)</sup>  |     |     |     |     |     |     |     |     |      |
|                                   | 2 pcs.                       | 10 <sup>Note 2)</sup> | 10  |     |     |     |     |     |     |     |      |
| D-M9□WV<br>D-M9□AV                | 1 pc.                        | 5 <sup>Note 2)</sup>  |     |     |     |     |     |     |     |     |      |
|                                   | 2 pcs.                       | 10                    |     |     |     |     |     |     |     |     |      |
| D-M9□A                            | 1 pc.                        | 5 <sup>Note 2)</sup>  |     |     |     |     |     |     |     |     |      |
|                                   | 2 pcs.                       | 10 <sup>Note 2)</sup> |     |     |     |     |     |     |     |     |      |
| D-Z7□<br>D-Z80<br>D-Y59□<br>D-Y7P | 1 pc.                        | 5 <sup>Note 1)</sup>  |     |     |     | 5   |     |     |     |     |      |
|                                   | 2 pcs.                       | 10 <sup>Note 1)</sup> |     | 10  |     |     |     |     |     |     |      |
| D-Y69□<br>D-Y7PV                  | 1 pc.                        | 5                     |     |     |     |     |     |     |     |     |      |
|                                   | 2 pcs.                       | 5                     |     |     |     |     |     |     |     |     |      |
| D-Y7□W<br>D-Y7□WV                 | 1 pc.                        | 5 <sup>Note 2)</sup>  |     |     |     |     |     |     |     |     |      |
|                                   | 2 pcs.                       | 10 <sup>Note 2)</sup> |     |     |     |     |     |     |     |     |      |

Note 1) Confirm that it is possible to secure the minimum bending radius of 10 mm of the auto switch lead wire before use.

Note 2) Confirm that it is possible to securely set the auto switch(es) within the range of indicator green light ON range before use.

For in-line entry type, please also consider Note 1) shown above.

## Operating Range

(mm)

| Auto switch model                          | Bore size |     |     |     |     |     |     |      |     |      |
|--------------------------------------------|-----------|-----|-----|-----|-----|-----|-----|------|-----|------|
|                                            | 12        | 16  | 20  | 25  | 32  | 40  | 50  | 63   | 80  | 100  |
| D-A9□/A9□V                                 | 7         | 9.5 | 9   | 9   | 9   | 9   | 9   | 10.5 | 10  | 10.5 |
| D-M9□/M9□V<br>D-M9□W/M9□WV<br>D-M9□A/M9□AV | 4         | 5.5 | 5   | 5   | 5.5 | 5   | 5.5 | 5.5  | 6.5 | 7    |
| D-Z7□/Z80                                  | 7.5       | 8.5 | 9.5 | 9.5 | 11  | 11  | 11  | 13   | 13  | 14   |
| D-Y59□/Y69□<br>D-Y7P/Y7PV<br>D-Y7□W/Y7□WV  | 5         | 6   | 6   | 6.5 | 8.5 | 8.5 | 9   | 10   | 10  | 11.5 |

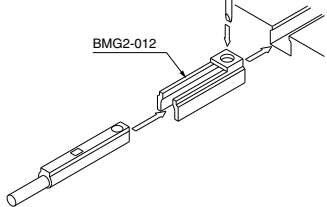
\* Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion)

There may be the case it will vary substantially depending on an ambient environment.

Auto Switch Mounting Bracket: Part No.

| Auto switch model                                        | Bore size (mm) |
|----------------------------------------------------------|----------------|
|                                                          | ø12 to ø100    |
| D-A9□/A9□V<br>D-M9□/M9□V<br>D-M9□W/M9□WV<br>D-M9□A/M9□AV | BMG2-012       |

• D-A9□(V), M9□(V), M9□W(V), M9□A(V)



Other than the models listed in “How to Order”, the following auto switches are applicable.  
For detailed specifications, refer to pages 1341 to 1435.

| Auto switch type | Model                 | Electrical entry (Fetching direction) | Features                        |
|------------------|-----------------------|---------------------------------------|---------------------------------|
| Reed             | D-Z73, Z76            | Grommet (In-line)                     | —                               |
|                  | D-Z80                 |                                       | Without indicator light         |
| Solid state      | D-Y69A, Y69B, Y7PV    | Grommet (Perpendicular)               | —                               |
|                  | D-Y7NWV, Y7PWV, Y7BWV |                                       | Diagnostic indication (2-color) |
|                  | D-Y59A, Y59B, Y7P     | Grommet (In-line)                     | —                               |
|                  | D-Y7NW, Y7PW, Y7BW    |                                       | Diagnostic indication (2-color) |

\* For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 1410 and 1411 for details.  
\* Normally closed (NC = b contact) solid state auto switches (D-M9□E(V)/Y7G/Y7H) are also available. For details, refer to pages 1360 and 1362.



## MVGQ Series

# Specific Product Precautions 1

Be sure to read this before handling the products. Refer to page 9 for safety instructions, pages 10 to 19 for actuator and auto switch precautions, and 3/4/5 port solenoid valve precautions on the SMC website: <https://www.smcworld.com>

### Selection

#### Warning

##### 1. Confirm the specifications.

Products in this catalog are designed to be used for compressed air systems (including vacuum). If not operated within the designated pressure or temperature, it may damage the products or cause malfunction. (Refer to specifications.)

##### 2. Energizing continuously for a long period of time.

When the valve is continuously energized for a long period of time, the performance may deteriorate, shorten the service life or effect peripheral equipment adversely since temperature rises when coils generate heat. Use the DC specification and energy saving circuit types when the valve is energized for a long period of time or energizing time becomes longer than non-energizing time during a day. Another way will be to make the valve N.O. (Normally Open), which shortens energizing time.

### Manual Operation

#### Warning

Since the devices in connection are operated by manual override, make sure that there is no danger.

##### ■ Non-locking push type [Standard type]

Push in the direction of the arrow.



##### ■ Push-turn locking slotted type [D type]

Push and turn in the direction of the arrow.

If this is not turned, it can be used in the same way as the non-locking push type.



The position when locked



#### Caution

When operating D type with the driver, use a watchmaker's screwdriver and turn it lightly. [Torque: Less than 0.1 N·m]

##### ■ Push-turn locking lever type [E type]

Push and turn in the direction of the arrow.

If this is not turned, it can be used in the same way as the non-locking push type.



The position when locked



#### Caution

When locking the manual override with the push-turn locking type (D and E types), be sure to push it down before turning. Turning without first pushing it down can cause damage to the manual override and malfunction such as air leakage, etc.

### Output Port

#### Caution

For the SYJ series, due to the main valve construction, as air is output to the output port on the side opposite of where the energized pilot valve and manual override are located, be careful when using double solenoid or 3-position valves.

Check the symbol for details.

### Solenoid Valve for 200, 220 VAC Specifications

#### Warning

Solenoid valves with grommet and L/M type plug connector AC specifications have a built-in rectifier circuit in the pilot section to operate the DC coil.

With 200, 220 VAC specification pilot valves, this built-in rectifier generates heat when energized. The surface may become hot depending on the energized condition; therefore, do not touch the solenoid valves.

### Common Exhaust Type for Main and Pilot Valve

#### Caution

Pilot air is exhausted through the main valve body rather than directly to atmosphere.

- Suitable for applications where exhausting the pilot valve to atmosphere would be detrimental to the surrounding working environment.
- For use in extremely dirty environments where there is the possibility that dust could enter the pilot exhaust and damage the valve.

Ensure that the piping of exhaust air is not too restrictive.



## MVGQ Series

# Specific Product Precautions 2

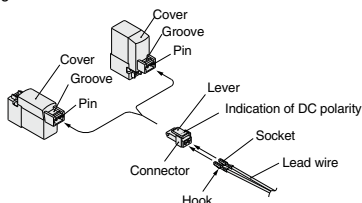
Be sure to read this before handling the products. Refer to page 9 for safety instructions, pages 10 to 19 for actuator and auto switch precautions, and 3/4/5 port solenoid valve precautions on the SMC website: <https://www.smcworld.com>

### Plug Connector

## Caution

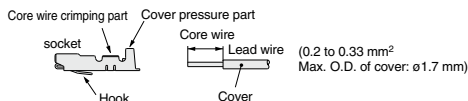
### 1. Connector installation and removal

- To install the connector, squeeze the lever and the connector body with your fingers, slide the connector straight over the pin, and lock it in place by pushing the tab of the lever into the groove in the cover.
- To remove the connector, press the lever with your thumb to disengage the tab from the groove, and pull the connector straight out.



### 2. Crimping the lead wire into the socket

Peel approximately 3.2 to 3.7 mm of insulation from the tip of the lead wire, make sure that the ends of the core wire are even, insert the wire into the socket, and crimp it with a crimping tool. At this time, make sure that the insulation of the lead wire does not enter the area in which the core wire is crimped. (Please contact SMC for details on the special crimping tool.)



### 3. Attaching and detaching lead wires with sockets

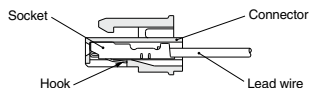
#### ● Attaching

Insert the sockets into the square holes of the connector (with ⊕ and ⊖ indication), continue to push the sockets all the way in until the lock by hooking into the seats in the connector. (When they are pushed in, their hooks open and they are locked automatically.) Then confirm that they are locked by pulling lightly on the lead wires.

#### ● Detaching

To detach a socket from a connector, pull out the lead wire while pressing the socket's hook with a stick having a thin tip (approx. 1 mm).

If the socket is re-used as it is, spread the hook to the outside.



### Plug Connector Lead Wire Length

## Caution

Standard length is 300 mm, but the following lengths are also available.

### How to Order Connector Assembly

For DC: **SY100-30-4A**

For 100 VAC: **SY100-30-1A**

For 200 VAC: **SY100-30-2A**

For other voltages of AC: **SY100-30-3A**

Without lead wire: **SY100-30-A**  
(with connector and 2 of sockets only)

● Lead wire length

| Nil | 300 mm  |
|-----|---------|
| 6   | 600 mm  |
| 10  | 1000 mm |
| 15  | 1500 mm |
| 20  | 2000 mm |
| 25  | 2500 mm |
| 30  | 3000 mm |
| 50  | 5000 mm |

### How to Order

Include the connector assembly part number together with the part number for the plug connector's solenoid valve without connector.

Ex.) In case of 2000 mm of lead wire

**For DC**

SYJ3130-5LO-MA

SY100-30-4A-20

**For AC**

SYJ3130-1LO-MA

SY100-30-1A-20



## MVGQ Series

# Specific Product Precautions 3

Be sure to read this before handling the products. Refer to page 9 for safety instructions, pages 10 to 19 for actuator and auto switch precautions, and 3/4/5 port solenoid valve precautions on the SMC website: <https://www.smcworld.com>

### Surge Voltage Suppressor

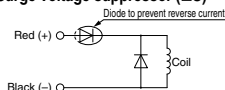
## Caution

<For DC>

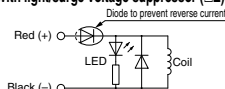
Grommet, L/M Plug Connector

#### ■ Standard type (with polarity)

Surge voltage suppressor (□S)

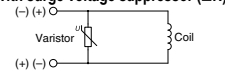


With light/surge voltage suppressor (□Z)

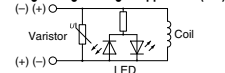


#### ■ Non-polar type

With surge voltage suppressor (□R)



With light/surge voltage suppressor (□U)

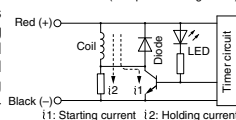


- Connect the standard type in accordance with the +, - polarity indication. (The non-polar type can be used with the connections made either way.)
- Since voltage specifications other than standard 24 and 12 VDC do not have diodes for polarity protection, be careful not to make errors in the polarity.
- When wiring is done at the factory, positive (+) is red and negative (-) is black.

#### ■ With power saving circuit

Power consumption is decreased by 1/4 by reducing the wattage required to hold the valve in an energized state. (Effective energizing time is over 62 ms at 24 VDC.)

Electric circuit (with power saving circuit)



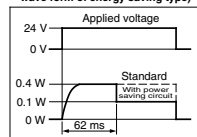
i1: Starting current i2: Holding current

### Operating Principle

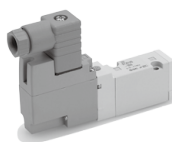
With the above circuit, the current consumption when holding is reduced to save energy. Please refer to the electric wave data to the right.

- Please be careful not to reverse the polarity, since a diode to prevent the reversed current is not provided for the power saving circuit.

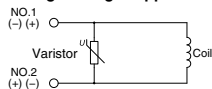
(In the case of SY4□□□0T, the electric wave form of energy saving type)



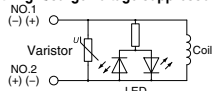
### DIN Terminal



With surge voltage suppressor (DS)



With light/surge voltage suppressor (DZ)

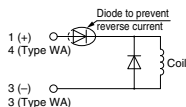


DIN terminal has no polarity.

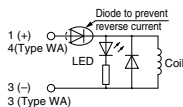
### M8 Connector

#### ■ Standard type (with polarity)

With surge voltage suppressor (□S)

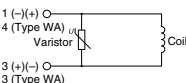


With light/surge voltage suppressor (□Z)

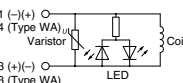


#### ■ Non-polar type

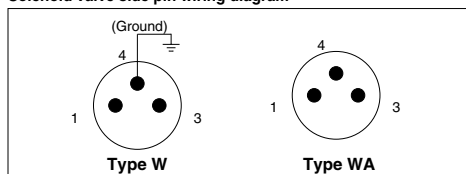
With surge voltage suppressor (□R)



With light/surge voltage suppressor (□U)



### Solenoid valve side pin wiring diagram



- For the standard type, connect + to 1 and - to 3 for Type W according to polarity, while + to 4 and - to 3 for Type WA.
- Please be careful not to reverse the polarity, since a diode to prevent the reversed current is not provided for DC voltages other than 24 and 12 VDC.
- The WA-type valve cannot be grounded.



## MVGQ Series

# Specific Product Precautions 4

Be sure to read this before handling the products. Refer to page 9 for safety instructions, pages 10 to 19 for actuator and auto switch precautions, and 3/4/5 port solenoid valve precautions on the SMC website: <https://www.smcworld.com>

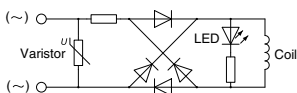
### Surge Voltage Suppressor

#### <For AC>

(There is no "S" type because the generation of surge voltage is prevented by a rectifier.)

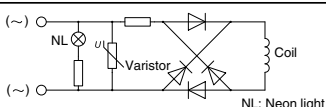
#### Grommet, L/M Plug Connector

##### With light (□Z)



##### DIN Terminal

##### With light (DZ)



Note) Surge voltage suppressor of varistor has residual voltage corresponding to the protective element and rated voltage; therefore, protect the controller side from the surge. The residual voltage of the diode is approximately 1 V.

### M8 Connector

## Caution

1. M8 connectors compliant with IP65 (enclosure) are protected against dust and water, however, they cannot be used in water.  
Use SMC's lead wire assembly (V100-49-1-□) or a connector for FA sensor (M8 thread 3 pin type) conforming to NECA (Nippon Electric Control Equipment Industries Association) standard 4202 (IEC60947-5-2) for the connectors used. When the connectors are used with SYJ3000 manifolds, use the connectors with O.D. 10.5 mm or smaller. If the connectors have O.D. 10.5 mm or greater, they cannot be connected since they interfere with manifolds.
2. When installing connectors, be sure to tighten them by hand since using tools may damage them. (0.4 to 0.6 N-m)
3. Do not apply a force of 30N or more since it may not meet IP65.

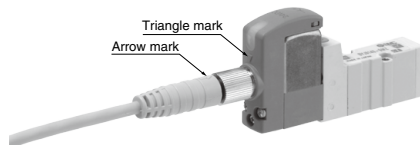
## Caution

When using connectors other than M8 or not tightening them sufficiently, IP65 cannot be met.

### M8 Connector

## Caution

- How to mount connectors with a lead wire



Note) When installing a connector cable, directions must be confirmed. When installing SMC's connector cable (V100-49-1□), align the arrow mark of the connector and the triangle mark of the valve.  
Twisting without alignment may damage pins and cause malfunction.

### Connector Cable

- Refer to how to order the connector cable for M8 shown below.

### How to order

1. When ordering the solenoid valve and the connector cable at the same time  
(Connector cable is shipped together.)

SY<sup>3</sup>/<sub>7</sub>□□□-□□□□-□□

Electrical entry

W1: Cable length 300 mm

W2: Cable length 500 mm

W3: Cable length 1000 mm

W4: Cable length 2000 mm

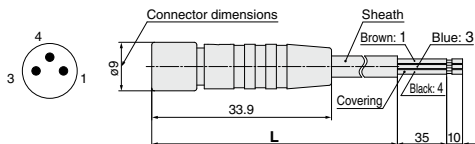
W7: Cable length 5000 mm

(Example 1) Cable length 300 mm

SY312-5W1ZE-C4

→ Cable entry symbol

2. When ordering a connector cable only



| Cable length (L) | No.         |
|------------------|-------------|
| 300 mm           | V100-49-1-1 |
| 500 mm           | V100-49-1-2 |
| 1000 mm          | V100-49-1-3 |
| 2000 mm          | V100-49-1-4 |
| 5000 mm          | V100-49-1-7 |

|                |                      |
|----------------|----------------------|
| Sheath O.D.    | φ3.4 mm              |
| Cover diameter | φ1.16 mm             |
| Conductor area | 0.16 mm <sup>2</sup> |

