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, VZ3000, VZ5000, 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, VZ3000, VZ5000 series, and by changing the mounting orientation of the valve for the VF3000 series.

Can be mounted from two directions.

Can be mounted from two directions.

Cylinder position can be detected.

Built-in magnet for auto-switches

Non-rotating accuracy

Built-in speed controller

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

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)

Maximum Driving Speed of Cylinders

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>Standard stroke (mm)</th>
<th>SYJ3000</th>
<th>VZ3000</th>
<th>VZ5000</th>
<th>VF3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>10 20 25 30 40 50 75 100 125 150 175 200</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>63</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Effective area (mm²) (Cv factor) Detail specifications

- SYJ3000 2 position Single 1.2 (0.067) P.852
- SYJ3000 2 position Double 4.5 (0.25) P.856
- VZ3000 2 position Single 12.5 (0.7) P.862
- VZ3000 2 position Double 16 (0.9) P.862
- VZ5000 2 position Single 20 (1.0) P.862
- VZ5000 2 position Double 25 (1.1) P.862
- VF3000 2 position Single 25 (1.1) P.862
- VF3000 2 position Double 30 (1.3) P.862

Non-rotating accuracy

- SYJ3000 2 position Single 1.2 (0.067) P.852
- SYJ3000 2 position Double 4.5 (0.25) P.856
- VZ3000 2 position Single 12.5 (0.7) P.862
- VZ3000 2 position Double 16 (0.9) P.862
- VZ5000 2 position Single 20 (1.0) P.862
- VZ5000 2 position Double 25 (1.1) P.862
- VF3000 2 position Single 25 (1.1) P.862
- VF3000 2 position Double 30 (1.3) P.862

Series Variations

- SYJ3000 2 position Single 1.2 (0.067) P.852
- SYJ3000 2 position Double 4.5 (0.25) P.856
- VZ3000 2 position Single 12.5 (0.7) P.862
- VZ3000 2 position Double 16 (0.9) P.862
- VZ5000 2 position Single 20 (1.0) P.862
- VZ5000 2 position Double 25 (1.1) P.862
- VF3000 2 position Single 25 (1.1) P.862
- VF3000 2 position Double 30 (1.3) P.862
Valve Mounted Guide Cylinder

**MVGQ Series**

**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

**Bore size**

<table>
<thead>
<tr>
<th>Nil</th>
<th>2 pcs.</th>
<th>M</th>
<th>1 pc.</th>
<th>n pcs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>12 mm</td>
<td>16</td>
<td>16 mm</td>
<td>20</td>
</tr>
</tbody>
</table>

**Number of auto switches**

<table>
<thead>
<tr>
<th>Nil</th>
<th>Without auto switch</th>
<th>B</th>
<th>Rod extended when energized</th>
<th>B</th>
<th>Rod retracted when energized</th>
</tr>
</thead>
</table>

**Auto switch**

<table>
<thead>
<tr>
<th>Nil</th>
<th>Without auto switch (Built-in magnet)</th>
<th>S</th>
<th>Meter-out</th>
<th>MA</th>
<th>Meter-in</th>
</tr>
</thead>
</table>

**Cylinder stroke (mm)**

Refer to page 853 for standard strokes.

**Ex.**

1. MVGQM12-30-MA-30-B ················ 1
2. SYJ3130-5LZ-MA ······························· 1

**Cylinder**

**Valve**

**Type of actuation**

1. 2 position single solenoid
2. 2 position double solenoid

* Please consult with SMC for 3 position type.

**Speed controller specifications**

<table>
<thead>
<tr>
<th>MA</th>
<th>Meter-out</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB</td>
<td>Meter-in</td>
</tr>
</tbody>
</table>

**Note**

Based on the case of 2 position single solenoid valve.

**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

**Coil specification**

<table>
<thead>
<tr>
<th>Nil</th>
<th>Standard</th>
<th>T</th>
<th>With energy saving circuit (24/12 VDC only)</th>
</tr>
</thead>
</table>

* The energy saving circuit is not available for W.

**DC specifications**

<table>
<thead>
<tr>
<th>S</th>
<th>24 VDC</th>
<th>1</th>
<th>100 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>12 VDC</td>
<td>2</td>
<td>200 VAC</td>
</tr>
<tr>
<td>V</td>
<td>6 VDC</td>
<td>3</td>
<td>100 VAC [15 VAC]</td>
</tr>
<tr>
<td>S</td>
<td>5 VDC</td>
<td>4</td>
<td>220 VAC [230 VAC]</td>
</tr>
<tr>
<td>R</td>
<td>3 VDC</td>
<td>+</td>
<td>DC only</td>
</tr>
</tbody>
</table>

**AC specifications (50/60 Hz)**

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.

**Electrical entry**

<table>
<thead>
<tr>
<th>24 V, 12 V, 6 V, 5 V, 3 VDC</th>
<th>24 V, 12 VDC, 6 V, 5 V, 3 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 V, 110 V, 200 V, 220VAC</td>
<td></td>
</tr>
</tbody>
</table>

**Grommet**

L: With lead wire (Wire length: 300 mm)

M: With lead wire (Wire length: 300 mm)

MN: Without lead wire

**W0**

Without connector cable

**W1**

With connector cable

**Light/Surge voltage suppressor**

<table>
<thead>
<tr>
<th>Nil</th>
<th>Without light/surge voltage suppressor</th>
<th>S</th>
<th>With surge voltage suppressor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>With light/surge voltage suppressor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>With surge voltage suppressor (No polarity)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* 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

**Note**

1) Insert the symbol referring to page 872.

* 2 sockets are attached to “LN” and “MN” types.
* Refer to page 872 for the connector cable for MB.

**Manual override**

D: Push-turn locking slotted type

E: Push-turn locking lever type

**Made to Order**

**Refer to page 853 for details.**

**Semi-standard**
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 Best Pneumatics No. 2-2.

### Standard Stroke

<table>
<thead>
<tr>
<th>Model</th>
<th>Standard stroke (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVGQ 12, 16</td>
<td>10, 20, 30, 40, 50, 75, 100</td>
</tr>
<tr>
<td>MVGQ 20</td>
<td>20, 30, 40, 50, 75, 100</td>
</tr>
<tr>
<td></td>
<td>125, 150, 175, 200</td>
</tr>
</tbody>
</table>

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.

### 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: 0.12 to 0.7, 0.20: 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 page 851.)

#### Cushion

- Rubber bumper on both ends

#### Lubrication

- Non-lube

#### Stroke length tolerance (mm)

- ±0.2

### Solenoid Valve Specifications

#### Model

- SY3000 series

#### Manual override

- Non-locking push type, Push-turn locking

#### Pilot exhaust

- Slotted type, Push-turn locking lever type

#### Impact/Vibration resistance (m/s²) (1)

- T 100 V: –7 to +10%, 12 V: –6 to +10%
- T 24 VDC: –8 to +10%, 12 VDC: –6 to +10%

#### Enclosure

- Dustproof (+ M6 connector: IP66)

#### Electrical entry

- Grommet (G)/(H), L plug connector (L), M plug connector (M), H8 connector (W)

#### Coil rated voltage (V)

- DC: 24, 12, 6, 5, 3
- AC: 50/60 Hz

#### Allowable voltage

- ±10% of the rated voltage

#### Power consumption (2)

- DC: 0.35 (With indicator light: 0.4)
- AC: 0.1 (With indicator light only)

#### Apparent power (2)

- DC: 110 V [115 V]: 0.86 (With indicator light: 0.89) [0.94 (With indicator light: 0.97)]
- AC: 200 V: 1.18 (With indicator light: 1.22)
- 220 V [230 V]: 1.30 (With indicator light: 1.34) [1.42 (With indicator light: 1.46)]

#### Surge voltage suppressor

- Diode (Non-polar type: Varistor)

#### Indicator light

- LED

### Made to Order Specifications

- Change of guide rod end shape
- Tapped hole, drilled hole, pinned hole machined additionally

#### Symbol

- XA: Change of guide rod end shape
- XC79: Tapped hole, drilled hole, pinned hole machined additionally

### Applicable Auto Switches

Refer to pages 941 to 1067 for further information on auto switches.

#### Type

- Solid state auto switch
- Speed switch

#### Electrical entry

- Diagnostic indication (2-color indicator)
- Water resistant (2-color indicator)

#### Wiring (Output)

- 3-wire (NPN)
- 3-wire (PNP)
- 2-wire
- 3-wire (NPN)
- 3-wire (PNP)
- 2-wire

#### Bore size (mm)

- 12, 16, 20

#### Load voltage

- DC: 24 V
- AC: 5V, 12V

#### Auto switch model

- M9NV, M9N, M9PV, M9P, M9BV, M9B, M9NW, M9N, M9PV, M9BV, M9B, M9BV, M9B

#### Lead wire length (m)

- 0.5 (Nil)
- 1 (M)
- 3 (L)
- 5 (Z)

#### Pre-wired connector

- IC circuit
- IC circuit
- IC circuit
- IC circuit

#### Applicable load

- Relay, PLC
- IC circuit
- IC circuit
- IC circuit

### Notes

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

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

3. Since there are other applicable auto switches than listed, refer to page 869 for details.

4. For details about auto switches with pre-wired connector, refer to pages 1014 and 1015.

5. Auto switches are shipped together (not assembled).

### Made to Order Specifications

Refer to pages 941 to 1067 for further information on auto switches.
**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 selector plate.

When the coil (B side coil) of the single solenoid valve is energized, the cylinder will move in the " Rod extended when energized" 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).

**How to Handle Speed Controller**

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 " Rod extended when energized" direction. When it is in the meter-in mode, it controls the speed of the direction that is opposite to the selector plate's " Rod retracted when energized" direction. Refer to Fig. (3) (for the meter-out mode).

---

**Weight (kg)**

<table>
<thead>
<tr>
<th>Bearing type</th>
<th>Bore size (mm)</th>
<th>Type</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>75</th>
<th>100</th>
<th>125</th>
<th>150</th>
<th>175</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slide bearing</td>
<td>12</td>
<td>MVGQM12</td>
<td>0.23</td>
<td>0.28</td>
<td>0.32</td>
<td>0.35</td>
<td>0.39</td>
<td>0.49</td>
<td>0.59</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>MVGQM16</td>
<td>0.35</td>
<td>0.40</td>
<td>0.46</td>
<td>0.51</td>
<td>0.56</td>
<td>0.69</td>
<td>0.81</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>MVGQM20</td>
<td>--</td>
<td>0.55</td>
<td>0.62</td>
<td>0.70</td>
<td>0.77</td>
<td>0.96</td>
<td>1.10</td>
<td>1.25</td>
<td>1.40</td>
<td>1.55</td>
<td>1.70</td>
</tr>
<tr>
<td>Ball bushing bearing</td>
<td>12</td>
<td>MVGQL12</td>
<td>0.24</td>
<td>0.27</td>
<td>0.30</td>
<td>0.36</td>
<td>0.39</td>
<td>0.47</td>
<td>0.54</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>MVGQL16</td>
<td>0.36</td>
<td>0.40</td>
<td>0.45</td>
<td>0.53</td>
<td>0.58</td>
<td>0.71</td>
<td>0.83</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>MVGQL20</td>
<td>--</td>
<td>0.55</td>
<td>0.61</td>
<td>0.71</td>
<td>0.76</td>
<td>0.91</td>
<td>1.05</td>
<td>1.19</td>
<td>1.33</td>
<td>1.47</td>
<td>1.61</td>
</tr>
</tbody>
</table>

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

*MVGQM, MVGQL Common Dimensions (mm)*

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>Standard stroke (mm)</th>
<th>Applicable solenoid valve</th>
<th>B</th>
<th>C</th>
<th>DA</th>
<th>G</th>
<th>GA</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>MM</th>
<th>ML</th>
<th>NN</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>TA</th>
<th>TB</th>
<th>U</th>
<th>V</th>
<th>W</th>
<th>X</th>
<th>YY</th>
<th>YL</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>10, 20, 30, 40, 50, 75, 100</td>
<td>SYJ3000 series</td>
<td>39</td>
<td>29</td>
<td>6</td>
<td>29</td>
<td>20</td>
<td>30</td>
<td>58</td>
<td>16</td>
<td>13</td>
<td>18</td>
<td>M4 x 0.7</td>
<td>10</td>
<td>M4 x 0.7</td>
<td>14</td>
<td>48</td>
<td>22</td>
<td>56</td>
<td>2</td>
<td>5</td>
<td>36</td>
<td>40</td>
<td>5</td>
<td>50</td>
<td>M4 x 0.7</td>
<td>7</td>
</tr>
<tr>
<td>16</td>
<td>20, 30, 40, 50, 75, 100, 125, 150, 170, 200</td>
<td>43</td>
<td>33</td>
<td>8</td>
<td>33</td>
<td>23</td>
<td>30</td>
<td>64</td>
<td>18</td>
<td>15</td>
<td>22</td>
<td>M5 x 0.8</td>
<td>13</td>
<td>M5 x 0.8</td>
<td>16</td>
<td>52</td>
<td>25</td>
<td>62</td>
<td>2.5</td>
<td>5.5</td>
<td>38</td>
<td>42</td>
<td>7</td>
<td>54</td>
<td>M5 x 0.8</td>
<td>8</td>
<td>13</td>
</tr>
</tbody>
</table>

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 852.

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

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>Symbol</th>
<th>A (Up to 50 st)</th>
<th>Over 50 st</th>
<th>DB (Up to 50 st)</th>
<th>Over 50 st</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>39</td>
<td>8</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>43</td>
<td>10</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>47</td>
<td>61.5</td>
<td>12</td>
<td>0</td>
<td>14.5</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>Symbol</th>
<th>A (Up to 30 st)</th>
<th>Over 30 st</th>
<th>DB (Up to 30 st)</th>
<th>Over 30 st</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>43</td>
<td>55</td>
<td>6</td>
<td>4</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>49</td>
<td>65</td>
<td>8</td>
<td>6</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>57</td>
<td>74</td>
<td>10</td>
<td>10</td>
<td>27</td>
<td></td>
</tr>
</tbody>
</table>
Valve Mounted Guide Cylinder

**MVGQ Series**

ø25, ø32, ø40, ø50, ø63

**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
VZ3140-5LZ-MA ······························· 1

**Cylinder stroke (mm)**

Refer to page 857 for standard strokes.

**Auto switch**

- **Nil** Without auto switch
- **(Built-in magnet)**
  - For the applicable auto switch model, refer to page 857.

**Number of auto switches**

- **Nil**
- **S** 1 pc.
- **n** n pcs.

**Rod extended/retracted when energized**

- **Nil**
- **B** Rod retracted when energized
  - (Built-in magnet)
  - For the applicable auto switch model, refer to page 857.

**Made to Order**

- **Nil** Non-locking push type
  - (Built-in magnet)
  - For the applicable auto switch model, refer to page 857.

**Port thread type**

- **Nil**
- **F** G
- **G**

**Speed controller specifications**

- **MA** Meter-out
- **MB** Meter-in
  - For the applicable auto switch model, refer to page 857.

**Manual override**

- **Nil** Non-locking push type
- **B** Locking type B
  - (Soldered)
- **C** Locking type C
  - (Manual)

**Light/Surge voltage suppressor**

- **Nil** Without light/surge voltage suppressor
- **S** With surge voltage suppressor
- **Z** With light/surge voltage suppressor
  - Note) “GZ”, “HZ” and “DOZ” are not available.

**Electrical entry**

- **G** Lead wire length: 300 mm
- **H** Lead wire length: 600 mm
- **L** With lead wire (wire length: 30 mm)
- **M** Without lead wire
- **D** With connector
  - For other rated voltages, please consult with SMC.

**Rated voltage**

- **1** 100 VAC 50/60 Hz
- **2** 200 VAC 50/60 Hz
- **3** 110 VAC 50/60 Hz
- **4** 220 VAC 50/60 Hz
- **5** 24 VDC
- **6** 12 VDC

**Bore size**

- **25** 25 mm
- **32** 32 mm
- **40** 40 mm
- **50** 50 mm
- **63** 63 mm

**Valve series**

- **3** VZ3000 series
- **5** VZ5000 series

**Type of actuation**

- **1** 2 position single solenoid
- **2** 2 position double solenoid
  - Please consult with SMC for 3 position type.

**Body option**

- **R** Pilot valve individual exhaust type
- **P/E** port
- **3** Main/Pilot valve common exhaust type

**Electrical entry**

- **G** Lead wire length: 300 mm
- **L** With lead wire (wire length: 30 mm)
- **M** Without lead wire
- **D** With connector

**Number of auto switches**

- **Nil**
- **S** 1 pc.
- **n** n pcs.

Note) Based on the case of 2 position single solenoid valve.
Valve Mounted Guide Cylinder  
**MVGQ Series**

### Specifications

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>25, 32, 40, 50, 63</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action</td>
<td>Double acting</td>
</tr>
<tr>
<td>Fluid</td>
<td>Air</td>
</tr>
<tr>
<td>Bearing type</td>
<td>Slide bearing (MVGQM), Ball bushing bearing (MVGQL)</td>
</tr>
<tr>
<td>Operating pressure range (MPa)</td>
<td>2 position single 0.15 to 0.7, 2 position double 0.1 to 0.7</td>
</tr>
<tr>
<td>Ambient and fluid temperature (°C)</td>
<td>–10 to 50°C (No freezing)</td>
</tr>
<tr>
<td>Piston speed (mm/s)</td>
<td>50 to 500 (Refer to the page 851)</td>
</tr>
<tr>
<td>Cushion</td>
<td>Rubber bumper on both ends</td>
</tr>
<tr>
<td>Lubrication</td>
<td>Non-lube</td>
</tr>
<tr>
<td>Stroke length tolerance (mm)</td>
<td>0.1</td>
</tr>
</tbody>
</table>

#### Solenoid Valve Specifications

**Model**  
VZ3000/VZ5000 series

- **Manual override:** Non-locking push type, Locking slotted type, Locking lever type
- **Pilot exhaust:** Pilot valve individual exh. type, Man/Pilot valve common exh. type
- **Mounting orientation:** Universal
- **Impact/Vibration resistance (m/s²) (1):** 300/50
- **Enclosure:** Dust proof
- **Electrical entry:** Grommet (G)/(H), L plug connector (L), M plug connector (M), DIN terminal (D)
- **Coil rated voltage (V):** AC50/60Hz DC 100, 200, 24", 48", 110", 220" 24", 6", 12", 48" Allowable voltage (%) –15 to 10% of the rated voltage
- **Power consumption (W) [Current: mA] (2):** DC 1.8 (With indicator light 2.1) [24 VDC: 75 (With light: 87.5)]
- **Apparent power (VA) [Current: mA] (2):** AC Start-up 4.5 to 50 Hz, 4.2/60 Hz Holding 3.5/50 Hz, 360 Hz
- **Surge voltage suppressor:** DC: Diode, AC: Varistor
- **Indicator light:** DC: LED (Red), AC: Neon bulb

#### Standard Stroke

**Model**  
MVGQ

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>20, 30, 40, 50, 75, 100, 125, 150, 175, 200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate stroke (mm)</td>
<td>—</td>
</tr>
</tbody>
</table>

**Intermediate stroke (mm):** —

- As for the intermediate strokes (by the 1 stroke interval) for ø25, ø32 other than the standard strokes at left are manufactured by means of installing a spacer.

- As for the intermediate strokes (by the 8 stroke interval) for ø40 to ø63 other than the standard strokes at left are manufactured by means of installing a spacer.

- Ex.) In the case of MGVGQ20-30 st, an interface of 9 mm wide (5 mm + 4 mm) is installed inside of the MVGQ20-30 st, and by means of installing a spacer.

#### Applicable Auto Switches

Refer to pages 941 to 1067 for further information on auto switches.

<table>
<thead>
<tr>
<th>Type</th>
<th>Special function</th>
<th>Electrical entry</th>
<th>Wiring (Output)</th>
<th>Load voltage</th>
<th>Auto switch model</th>
<th>Lead wire length (m)</th>
<th>Pre-wired connector</th>
<th>Applicable load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid state auto switch</td>
<td>—</td>
<td>Grommet</td>
<td>Yes</td>
<td>3-wire (PNP)</td>
<td>DC 5 V, 12 V</td>
<td>M9NV, M9N</td>
<td>0.5 (N), 1 (M), 2 (L), 3 (Z), 4 (Z)</td>
<td>IC circuit</td>
</tr>
<tr>
<td>Diagnostic indication (2-color indicator)</td>
<td>—</td>
<td>Grommet</td>
<td>Yes</td>
<td>3-wire (PNP)</td>
<td>AC 12 V</td>
<td>M9PV, M9P</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Water resistant (2-color indicator)</td>
<td>—</td>
<td>Grommet</td>
<td>Yes</td>
<td>3-wire (PNP)</td>
<td>DC 12 V</td>
<td>M9BV, M9B</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Reed auto switch</td>
<td>—</td>
<td>Grommet</td>
<td>Yes</td>
<td>3-wire (NPN equivalent)</td>
<td>DC 5 V</td>
<td>A96V, A96</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Non-locking</td>
<td>2-wire</td>
<td>DC 12 V</td>
<td>100 V</td>
<td>A93</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>Relay, PLC</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>100 V or less A90</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

* 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.

---

**Symbol**

- **Meter-out**
  - Rod extended when energized
  - Rod retracted when energized

- **Meter-in** (Semi-standard)
  - Rod extended when energized
  - Rod retracted when energized

---

**Symbol Specifications**

- **Reed**
  - Meter-in (Semi-standard)
  - Rod extended when energized
  - Rod retracted when energized

---

**Grommet**

- **Electrical entry**
  - Grommet (G)/(H), L plug connector (L), M plug connector (M), DIN terminal (D)

---

**Diaphragm**

- **Vogut**
  - DC: LED (Red), AC: Neon bulb

---

**PLC**

- **Relay**
  - 300/500

---

**Solid state auto switches marked with “*” are produced upon receipt of order.**

---

**Water resistant types with the above model numbers are manufactured.**

---

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

---

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

---

**Since there are other applicable auto switches than listed, refer to page 869 for details.**

---

**Auto switches are shipped together (not assembled).**
MVGQ Series

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

<table>
<thead>
<tr>
<th>Bearing type</th>
<th>Bore size (mm)</th>
<th>Model</th>
<th>Standard stroke (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slide bearing</td>
<td>25</td>
<td>MVGQ25</td>
<td>0.98 1.06 1.17 1.26 1.57 1.81 2.05 2.29 2.53 2.77</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>MVGQ32</td>
<td>1.64 2.04 2.42 2.82 3.22 3.62 4.02 4.42</td>
</tr>
<tr>
<td>Ball bushing bearing</td>
<td>25</td>
<td>MVGL25</td>
<td>0.97 1.06 1.21 1.30 1.50 1.71 1.92 2.13 2.34 2.55</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>MVGL32</td>
<td>1.45 1.80 2.22 2.58 2.94 3.30 3.66 4.02</td>
</tr>
</tbody>
</table>

Note: The factors indicated above are of the single solenoid with grommet (G). Add 0.05 kg for the double solenoids.

### 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 (→) 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 (→) direction. When it is in the meter-in mode, it controls the speed of the direction that is opposite to the selector plate’s (←) direction. Refer to Fig. (3) (for the meter-out mode).

### VZ3000

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 Best Pneumatics No. 2-2.
**Changing between Rod Extended when Energized and Rod Retracted when Energized**

VZ5000

**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 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.

When the speed controller that is located on the side of the selector plate’s 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).

---

**Weight**

<table>
<thead>
<tr>
<th>Bearing type</th>
<th>Bore size (mm)</th>
<th>Model</th>
<th>Standard stroke (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slide bearing</td>
<td>40</td>
<td>MVGQM40</td>
<td>1.91  2.50  2.72  3.13  3.54  3.95  4.36  4.77</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>MVGQM50</td>
<td>2.80  3.35  3.91  4.47  5.03  5.59  6.15  6.71</td>
</tr>
<tr>
<td></td>
<td>63</td>
<td>MVGQM63</td>
<td>3.27  3.89  4.49  5.11  5.73  6.35  6.97  7.59</td>
</tr>
<tr>
<td>Ball bushing bearing</td>
<td>40</td>
<td>MVGQL40</td>
<td>1.72  2.08  2.53  2.89  3.25  3.61  3.97  4.33</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>MVGQL50</td>
<td>2.37  2.85  3.45  3.94  4.43  4.92  5.41  5.90</td>
</tr>
<tr>
<td></td>
<td>63</td>
<td>MVGQL63</td>
<td>2.91  3.45  4.11  4.65  5.19  5.73  6.27  6.81</td>
</tr>
</tbody>
</table>

Note) The factors indicated above are of the single solenoid with grommet (G). Add 0.04 kg for the double solenoids.

---

**Fig. (5)**

**Fig. (6)**
MVGQM, MVGQL

MVGQM, MVGQL Common Dimensions

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>Standard stroke (mm)</th>
<th>B</th>
<th>C</th>
<th>DA</th>
<th>GA</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>MM</th>
<th>ML</th>
<th>NN</th>
<th>PW</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>TA</th>
<th>TB</th>
<th>U</th>
<th>V</th>
<th>W</th>
<th>X</th>
<th>YY</th>
<th>YL</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>25, 30, 40, 50, 75, 100, 125, 150, 175, 200</td>
<td>47.5</td>
<td>37.5</td>
<td>12</td>
<td>35</td>
<td>21</td>
<td>21</td>
<td>19</td>
<td>26</td>
<td>38</td>
<td>114</td>
<td>2</td>
<td>2</td>
<td>56</td>
<td>62</td>
<td>10</td>
<td>76</td>
<td>86</td>
<td>2</td>
<td>5</td>
<td>9</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>25, 50, 75, 100, 125, 150, 175, 200</td>
<td>47.5</td>
<td>37.5</td>
<td>16</td>
<td>35</td>
<td>21</td>
<td>25</td>
<td>19</td>
<td>38</td>
<td>116</td>
<td>144</td>
<td>2</td>
<td>1</td>
<td>80</td>
<td>80</td>
<td>10</td>
<td>100</td>
<td>112</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 856.

MVGQM (Slide bearing) A, DB, E Dimensions

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>Symbol</th>
<th>Stroke</th>
<th>A</th>
<th>DB</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td></td>
<td></td>
<td>47.5</td>
<td>62</td>
<td>16</td>
</tr>
<tr>
<td>32</td>
<td></td>
<td></td>
<td>71.5</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>Symbol</th>
<th>Stroke</th>
<th>A</th>
<th>DB</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td></td>
<td></td>
<td>63.5</td>
<td>79.5</td>
<td>13</td>
</tr>
<tr>
<td>32</td>
<td></td>
<td></td>
<td>53</td>
<td>90</td>
<td>16</td>
</tr>
</tbody>
</table>
The figures show when attached to VZ5140-G.

MVGQM, MVGQL Common Dimensions

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>Standard stroke (mm)</th>
<th>Applicable solenoid valve</th>
<th>B</th>
<th>C</th>
<th>DA</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>MM</th>
<th>ML</th>
<th>NN</th>
<th>PW</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>V</th>
<th>W</th>
<th>X</th>
<th>YY</th>
<th>YL</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>25, 50, 75, 100, 125, 150, 175, 200</td>
<td>VZ5000 series</td>
<td>54</td>
<td>44</td>
<td>16</td>
<td>8</td>
<td>51</td>
<td>124</td>
<td>25</td>
<td>26</td>
<td>38</td>
<td>20</td>
<td>12</td>
<td>30</td>
<td>108</td>
<td>48</td>
<td>122</td>
<td>90</td>
<td>10</td>
<td>110</td>
<td>11</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>56</td>
<td>44</td>
<td>20</td>
<td>10</td>
<td>59</td>
<td>140</td>
<td>29</td>
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<td>44</td>
<td>32.5</td>
<td>40</td>
<td>120</td>
<td>56</td>
<td>138</td>
<td>100</td>
<td>10</td>
<td>124</td>
<td>125</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>63</td>
<td>61</td>
<td>49</td>
<td>20</td>
<td>10</td>
<td>72</td>
<td>150</td>
<td>35.5</td>
<td>36.5</td>
<td>44</td>
<td>25</td>
<td>M10 x 1.5</td>
<td>29.8</td>
<td>50</td>
<td>130</td>
<td>69</td>
<td>148</td>
<td>110</td>
<td>10</td>
<td>132</td>
<td>M10 x 1.5</td>
<td>15</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 856.

MVGQM (Slide bearing) A, DB, E Dimensions

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>Symbol</th>
<th>A</th>
<th>DB</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td></td>
<td>71.5</td>
<td>20</td>
<td>17.5</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td>81</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>63</td>
<td></td>
<td>81</td>
<td>25</td>
<td>20</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>Symbol</th>
<th>A</th>
<th>DB</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td></td>
<td>54</td>
<td>90</td>
<td>16</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td>60</td>
<td>102</td>
<td>4</td>
</tr>
<tr>
<td>63</td>
<td></td>
<td>61</td>
<td>102</td>
<td>0</td>
</tr>
</tbody>
</table>

VZ5000 series

Rc, NPT, G 1/8
P port
Rc, NPT, G 1/8
R port
Rc, NPT, G 1/8
R port (with plug)

MVGQM, MVGQL Common Dimensions

* The figures show when attached to VZ5140-G.
**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

**Cylinder stroke (mm)**
Refer to page 863 for standard strokes.

- **MVGQ**
  - ø80, ø100

**Bore size**
- M: Slide bearing
- L: Ball bushing bearing

**Auto switch**
- Nil: Without auto switch (Built-in magnet)
- For the applicable auto switch model, refer to page 863.

**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.

**Speed controller specifications**
- MA: Meter-out
- MB: Meter-in
- Semi-standard

**Manual override**
- Nil: Non-locking push type
- Manual override

**Made to Order**
- Refer to page 863 for details.

**Port thread type**
- Rc
- N: NPT
- F: G

**Light/Surge voltage suppressor**
- Nil: Without light/surge voltage suppressor
- S: With surge voltage suppressor
- Z: With light/surge voltage suppressor

Note 1) Applicable to the grommet type only.
Note 2) "GZ", "HZ" are not available.

**Electrical entry**
- G: Grommet (Lead wire length: 300 mm)
- L: L plug connector
- LO: Without lead wire
- M: M plug connector
- MO: Without connector
- D: DIN terminal
- DO: Without connector

Maximum rated voltage for L/M type plug connectors is 220 VAC.
+ Semi-standard
For other rated voltages, please consult with SMC.

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

- Lead wire length symbols: 0.5 m ·········· Nil (Example) M9NW
  1 m ·········· M (Example) M9NNW
  3 m ·········· L (Example) M9NWL
  5 m ·········· Z (Example) M9NWZ

- Since there are other applicable auto switches than listed, refer to page 869 for details.
- For details about auto switches with pre-wired connector, refer to pages 1014 and 1015.
- Auto switches are shipped together (not assembled).

Valve Mounted Guide Cylinder MVGQ Series

Specifications

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>80, 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action</td>
<td>Double acting</td>
</tr>
<tr>
<td>Fluid</td>
<td>Air</td>
</tr>
<tr>
<td>Bearing type</td>
<td>Slide bearing (MVGQ), Ball bushing bearing (MVGQL)</td>
</tr>
<tr>
<td>Operating pressure range (MPa)</td>
<td>2 position single: 0.15 to 0.9</td>
</tr>
<tr>
<td></td>
<td>2 position double: 0.1 to 0.9</td>
</tr>
<tr>
<td>Ambient and fluid temperature (°C)</td>
<td>–10 to 50°C (No freezing)</td>
</tr>
<tr>
<td>Piston speed (mm/s)</td>
<td>50 to 350 (Refer to the page 851)</td>
</tr>
<tr>
<td>Cushion</td>
<td>Rubber bumper on both ends</td>
</tr>
<tr>
<td>Lubrication</td>
<td>Non-lube</td>
</tr>
<tr>
<td>Stroke length tolerance (mm)</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Solenoid Valve Specifications

Model | VFS3000 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/s²) | (1) 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
| DC 100, 200, 125, 245, 485, 1150, 2205, 2450 |
Allowable voltage | –15% to 10% of the rated voltage
Apparent power (W) | (2) AC Inrush 5.6 VA (50 Hz), 5.0 VA (60 Hz) Holding 3.4 VA (50 Hz), 2.3 VA (60 Hz)
| DC 1.8, 2 (With indicator light) Light/Surge voltage suppressor | AC Varistor, Neon bulb (LED for less than 100 V) 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.

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

Standard Stroke

<table>
<thead>
<tr>
<th>Model</th>
<th>Standard stroke (mm)</th>
<th>Intermediate stroke (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVGQ</td>
<td>25, 50, 75, 100, 125, 150, 175, 200</td>
<td></td>
</tr>
</tbody>
</table>

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.

Ex.) In the case of MVGQM80-40 st, an interface of 10 mm was installed inside of the MVGQM80-50 st, and thus the full length dimension of the body is the same as 50 st.
**MVGQ Series**

### Weight (kg)

<table>
<thead>
<tr>
<th>Bearing type</th>
<th>Bore size (mm)</th>
<th>Model</th>
<th>Standard stroke (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25</td>
<td>50</td>
<td>75</td>
</tr>
<tr>
<td>Slide bearing</td>
<td>80</td>
<td>MVGQM80</td>
<td>6.15</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>MVGQM100</td>
<td>9.45</td>
</tr>
<tr>
<td>Ball bushing bearing</td>
<td>80</td>
<td>MVGQL80</td>
<td>5.98</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>MVGQL100</td>
<td>8.83</td>
</tr>
</tbody>
</table>

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

### 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).

### VF3000 How to Handle Speed Controller

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).

---

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 Best Pneumatics No. 2-2.
The figures show when attached to VF3140-□G.

**MVGQM, MVGQL Common Dimensions**

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>Standard stroke (mm)</th>
<th>Applicable solenoid valve</th>
<th>B</th>
<th>C</th>
<th>DA</th>
<th>G</th>
<th>GA</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>MM</th>
<th>ML</th>
<th>NN</th>
<th>VW</th>
<th>PW</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>V</th>
<th>W</th>
<th>X</th>
<th>YY</th>
<th>YL</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>25, 50, 75, 100, 125, 150, 175, 200</td>
<td>VF3000 series</td>
<td>74.5</td>
<td>36.5</td>
<td>225</td>
<td>92</td>
<td>40</td>
<td>188</td>
<td>45.5</td>
<td>46.5</td>
<td>56</td>
<td>M12X1.75</td>
<td>30</td>
<td>35</td>
<td>55</td>
<td>55.5</td>
<td>62</td>
<td>M14X2</td>
<td>35</td>
<td>41</td>
<td>44</td>
<td>80</td>
<td>190</td>
<td>221</td>
<td>140</td>
<td>170</td>
</tr>
<tr>
<td>100</td>
<td>84</td>
<td>66</td>
<td>30</td>
<td>112</td>
<td>40</td>
<td>224</td>
<td>55.5</td>
<td>56.5</td>
<td>62</td>
<td>M14X2</td>
<td>41</td>
<td>44</td>
<td>80</td>
<td>190</td>
<td>221</td>
<td>140</td>
<td>170</td>
<td>15</td>
<td>15</td>
<td>166</td>
<td>200</td>
<td>18</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 862.

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

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>Symbol</th>
<th>A</th>
<th>DB</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>93</td>
<td>28</td>
<td>16.5</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>105</td>
<td>36</td>
<td>21</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Bore size (mm)</th>
<th>Symbol</th>
<th>A</th>
<th>DB</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>Up to 50 st</td>
<td>84</td>
<td>143</td>
<td>25</td>
</tr>
<tr>
<td>100</td>
<td>Up to 50 st</td>
<td>89</td>
<td>153</td>
<td>30</td>
</tr>
</tbody>
</table>
**MVGQ Series**

### Construction

#### MVGQM series

**MVGQM12 to 25**

- 50 stroke or less
- \( \phi 12, \phi 16 \)

**MVGQM32 to 100**

- \( \phi 20, \phi 25 \) Over 50 stroke
- \( \phi 50 \) or more

### Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>Aluminum alloy</td>
<td>Hard anodized</td>
</tr>
<tr>
<td>2</td>
<td>Piston</td>
<td>Aluminum alloy</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Piston rod</td>
<td>Stainless steel</td>
<td>( \phi 12 ) to ( \phi 25 )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carbon steel</td>
<td>( \phi 32 ) to ( \phi 100 )</td>
</tr>
<tr>
<td>4</td>
<td>Collar</td>
<td>Aluminum alloy</td>
<td>( \phi 12 ) to ( \phi 40 )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bearing alloy</td>
<td>( \phi 50 ) to ( \phi 100 )</td>
</tr>
<tr>
<td>5</td>
<td>Bushing</td>
<td>Special friction material</td>
<td>( \phi 50 ) to ( \phi 100 )</td>
</tr>
<tr>
<td>6</td>
<td>Head cover</td>
<td>Aluminum alloy</td>
<td>( \phi 12 ) to ( \phi 63 )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hard chrome plated</td>
<td>( \phi 80 ) to ( \phi 100 )</td>
</tr>
<tr>
<td>7</td>
<td>Guide rod</td>
<td>Carbon steel</td>
<td>Hard chrome plated</td>
</tr>
<tr>
<td>8</td>
<td>Plate</td>
<td>Carbon steel</td>
<td>Nickel plated</td>
</tr>
<tr>
<td>9</td>
<td>Plate mounting bolt</td>
<td>Carbon steel</td>
<td>Nickel plated</td>
</tr>
<tr>
<td>10</td>
<td>Guide bolt</td>
<td>Carbon steel</td>
<td>Nickel plated</td>
</tr>
<tr>
<td>11</td>
<td>Retaining ring</td>
<td>Carbon tool steel</td>
<td>Phosphate coated</td>
</tr>
<tr>
<td>12</td>
<td>Retaining ring</td>
<td>Carbon tool steel</td>
<td>Phosphate coated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Bumper A</td>
<td>Urethane</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Bumper B</td>
<td>Urethane</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Magnet</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Slide Bearing</td>
<td>Bearing alloy</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Felt</td>
<td>Felt</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Holder</td>
<td>Resin</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Ball bushing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Piston seal</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Rod seal</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Gasket A</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Gasket B</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Hexagon socket head cap screw</td>
<td>Carbon steel</td>
<td>Nickel plated</td>
</tr>
<tr>
<td>25</td>
<td>Manifold gasket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Selector plate</td>
<td>( \phi 12 ) to ( \phi 63 ) only</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Adapter gasket</td>
<td>( \phi 25 ) to ( \phi 100 ) only</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Solenoid valve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Adapter assembly</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

866
MVGQL series

MVGQL12 to 25

30 stroke or less

$\phi12, \phi16$: Over 30 stroke

50 stroke or more

MVGQL12 to 25

MVGQL32 to 100

$\phi20, \phi25$: Over 30 stroke

Replacement Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Kit no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$\phi12$</td>
</tr>
<tr>
<td>20 to 23</td>
<td>Seal kit</td>
<td>MGQ12-PS</td>
</tr>
<tr>
<td>25 to 29</td>
<td>Solenoid valve with adapter assembly</td>
<td>SYJ3-34-40-M</td>
</tr>
</tbody>
</table>

Note 1) Seal kit includes 2 to 3. 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 852, 856 and 862.

* Since the seal kit does not include a grease pack, order it separately.

Grease pack part no.: GR-S-010 (10 g)
### Auto Switch Proper Mounting Position (Detection at Stroke End)

<table>
<thead>
<tr>
<th>Bore size</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>6</td>
<td>8</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>16</td>
<td>9</td>
<td>9</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>20</td>
<td>9.5</td>
<td>12.5</td>
<td>5.5</td>
<td>8.5</td>
<td>4.5</td>
<td>7.5</td>
</tr>
<tr>
<td>25</td>
<td>9.5</td>
<td>13</td>
<td>5.5</td>
<td>9</td>
<td>4.5</td>
<td>8</td>
</tr>
<tr>
<td>32</td>
<td>10.5</td>
<td>12</td>
<td>6.5</td>
<td>8</td>
<td>5.5</td>
<td>7</td>
</tr>
<tr>
<td>40</td>
<td>14.5</td>
<td>14.5</td>
<td>10.5</td>
<td>10.5</td>
<td>9.5</td>
<td>9.5</td>
</tr>
<tr>
<td>50</td>
<td>12.5</td>
<td>16.5</td>
<td>8.5</td>
<td>12.5</td>
<td>7.5</td>
<td>11.5</td>
</tr>
<tr>
<td>63</td>
<td>15</td>
<td>19</td>
<td>11</td>
<td>15</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>80</td>
<td>18</td>
<td>23.5</td>
<td>14</td>
<td>19.5</td>
<td>13</td>
<td>18.5</td>
</tr>
<tr>
<td>100</td>
<td>22.5</td>
<td>28.5</td>
<td>18.5</td>
<td>24.5</td>
<td>17.5</td>
<td>23.5</td>
</tr>
</tbody>
</table>

### Minimum Stroke for Auto Switch Mounting

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 pc.</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>2 pcs.</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>Auto switch model</th>
<th>Bore size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12</td>
</tr>
<tr>
<td>D-A9°/A9°V</td>
<td>7</td>
</tr>
<tr>
<td>D-M9°/M9°V</td>
<td>4</td>
</tr>
<tr>
<td>D-M9°M9°W/M9°WV</td>
<td>7.5</td>
</tr>
<tr>
<td>D-M9°M9°AV/M9°AV</td>
<td>5</td>
</tr>
</tbody>
</table>

* 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 Proper Mounting Position (Detection at Stroke End)**

- Adjust the auto switch after confirming the operating conditions in the actual setting.
## Auto Switch Mounting Bracket: Part No.

<table>
<thead>
<tr>
<th>Auto switch model</th>
<th>Bore size (mm)</th>
<th>Auto switch model</th>
<th>Bore size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-A9/A9 V</td>
<td>Ø12 to Ø100</td>
<td>BMG2-012</td>
<td></td>
</tr>
<tr>
<td>D-M9/M9 V</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D-M9/W/M9/WV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D-M9/A/M9/AV</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 1014 and 1015 for details.
- Normally closed (NC = b contact), solid state auto switch (D-F9G/F9H/Y7G/Y7H type) are also available. For details, refer to pages 959 and 961.

### Auto Switch Mounting MVGQ Series

For detailed specifications, refer to pages 941 to 1067.

<table>
<thead>
<tr>
<th>Auto switch type</th>
<th>Model</th>
<th>Electrical entry (Fetching direction)</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reed</td>
<td>D-Z73, Z76</td>
<td>Grommet (In-line)</td>
<td>Without indicator light</td>
</tr>
<tr>
<td></td>
<td>D-Z80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solid state</td>
<td>D-Y69A, Y69B, Y7PV</td>
<td>Grommet (Perpendicular)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D-Y7NWV, Y7PW, Y7BWV</td>
<td>Grommet (In-line)</td>
<td>Diagnostic indication (2-color)</td>
</tr>
<tr>
<td></td>
<td>D-Y59A, Y59B, Y7P</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>D-Y7NW, Y7PW, Y7BW</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 1014 and 1015 for details.
**MVGQ Series**

**Precautions 1**
Be sure to read this before handling the products.

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**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.

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**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.

**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.

**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.

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**Plug Connector**

**Warning**

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 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.
Caution
< For DC >
Grommet, L/M plug connector

- Standard type (With polarity)
  With surge voltage suppressor (S)
  Polarity protection diode
  [Diagram]
  Red (+)  Black (-)

- Non-polar type
  With surge voltage suppressor (R)
  [Diagram]
  (+) (+)  (-) (-)
  With light/surge voltage suppressor (U)
  [Diagram]
  (+) (+)  (-) (-)

- Connect the wires by matching their polarities to the + and - marks. (Non-polar type can be connected to either of them.)
- Since the electrical voltage other than 24 VDC, 12 VDC have no feature of polarity protection diode, use caution not to make a mistake of the polarity.
- Valves with diode to prevent reverse current have a voltage drop of approximately 1 V. Be aware of the allowable voltage fluctuation. (Refer to solenoid specifications of each valve for details.)
- If the lead wires are connected beforehand, the red wire is +, and the black wire is -.

- With energy saving circuit
  By reducing electric power required in the holding state, power consumption is reduced to about 1/4 of the standard type. (Effective energizing time is over 62 ms when 24 VDC is applied.)

Working Principle
The circuit shown above reduces current consumption at holding, which reduces the overall power consumption. Refer to the electrical power waveform shown on the right.
- Since the product with an energy-saving circuit does not have a diode to prevent reverse current, avoid mistaking polarity.
- Be aware of the allowable voltage fluctuation, since there is about 0.5 voltage drop due to a transistor. (Refer to solenoid specifications of each valve for details.)

surge voltage suppressor
< for ac >
(Grommet, L/M plug connector)

standard type (with polarity)
With surge voltage suppressor (S)
[Diagram]
Red (+)  Black (-)

Non-polar type
With surge voltage suppressor (R)
[Diagram]
(+)+ (+)  (-) (-)
With light/surge voltage suppressor (U)
[Diagram]
(+)+ (+)  (-) (-)

- Since the standard type has polarity, connect + to 1 and - to 3.
- Since the electrical voltage other than 24 VDC, 12 VDC have no feature of polarity protection diode, use caution not to make a mistake of the polarity.
- Valves with diode to prevent reverse current have a voltage drop of approximately 1 V. Be aware of the allowable voltage fluctuation. (Refer to solenoid specifications of each valve for details.)
**MVGQ Series**

**Precautions 3**
Be sure to read this before handling the products.

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### 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 SYJ5000 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.

- **Example:**
  - **How to mount connectors with a lead wire**

![Diagram of M8 Connector]

**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.

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### 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.)

![Connector Cable Diagram]

(Example 1) Cable length 300 mm

SY312-SW1ZE-C4

**Cable entry symbol**

2. When ordering a connector cable only

![Connector Cable Diagram]

**Cable length (L) | Model**
--- | ---
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

**[Dimensions when installed]**

![Dimensions Diagram]