Coolant Valve

Series SGC

For 0.5 MPa/1.0 MPa/1.6 MPa

- **Flow rate**
  - Av factor (in case of 0.5 MPa specification)
  - SGC2: 155
  - SGC3: 284
  - SGC4: 440

- **Service life:** 5 million cycles or more
  (based on SMC’s test condition)

- With auto switches for verifying whether the valve is open/closed

- Reduction of environmentally harmful chemical substances, Compliant with RoHS Directive

- **Power consumption:** 0.35 W
  (in case of 24 VDC)

**Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com**
**Dry bearings**
Prevents the shaft, which is a sliding part, from vibrating and helps to extend the service life of the rubber components and improves the seal performance of the main valve.

**Squeeze seal**
Completely shuts off the leakage of liquid coolant and increases the scraper effects. These two safety designs result in a dual advantage.

**Scraper**
Prevents foreign materials from entering, while the main valve is activated.

- **Choice of seal materials**
  - NBR, FKM

---

**Variation** *(Common specifications for solenoid valve and air operated valve)*

<table>
<thead>
<tr>
<th>Series</th>
<th>Port size</th>
<th>Thread type</th>
<th>Type of actuation</th>
<th>Operating pressure range (MPa)</th>
<th>Av factor x 10^{-6}m^2</th>
<th>Electrical entry (in case of a solenoid valve)</th>
<th>Bracket</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGC2</td>
<td>3/8 (10A)</td>
<td>Rc G (ISO1179-1)</td>
<td>N.C / N.O</td>
<td>0.5</td>
<td>110</td>
<td>N.C / N.O</td>
<td>Bracket on the left side</td>
</tr>
<tr>
<td></td>
<td>1/2 (15A)</td>
<td>NPT NPTF</td>
<td></td>
<td>1</td>
<td>85</td>
<td>• Conduit terminal</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.6</td>
<td>30</td>
<td>• DIN terminal</td>
<td></td>
</tr>
<tr>
<td>SGC3</td>
<td>3/4 (20A)</td>
<td>N.C / N.O</td>
<td></td>
<td>0.5</td>
<td>155</td>
<td>• Bracket on the right side</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>116</td>
<td>• M12 connector</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.6</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SGC4</td>
<td>1 (25A)</td>
<td></td>
<td></td>
<td>0.5</td>
<td>284</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>170</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.6</td>
<td>109</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.5</td>
<td>440</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>265</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.6</td>
<td>174</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Auto switch**
Able to confirm whether the valve is open/closed. Mountable on the two sides.

**Grease channel**
Prevents the loss of grease and helps to extend the service life.
Coolant Blow Energy Saving

**Improvement Example case 1**

**Improvement of Pressure Loss**

**Before improvement**

- Large diameter piping ($S_1$)
- Small diameter nozzle
- Pressure loss: Small
- Effective area ratio: $2:1$
- Nozzle
- Large diameter piping ($S_2$)

**After improvement**

- Pressure loss is improved by making the effective area ratio $2:1$ between the upstream side and the nozzle.
- Making the effective area in the upstream side larger.
- (Changing to the equipment with larger effective area)
- Attaching a nozzle.

**Effect of Energy Saving Improvement**

- Electric power consumption
- 75% reduction

**Improvement Example case 2**

**Intermittent Blow**

- Addition of coolant valve
- Stops machine bed-washing all the time.
- Machine bed washing is stopped when blowing for cutting or jig by means of a valve.

**Effect of Energy Saving Improvement**

- Electric power consumption
- 20 to 50% reduction

---

**Reduction of electric power consumption of the coolant pump**

- Reducing the number of pumps
- Reducing the size of pumps

Research has revealed that coolant pumps account for 30% of the electric power consumption in a production facility. By reducing the energy consumed by the coolant pump it will substantially contribute to the electric reduction in the whole factory.

**Electric power consumption by purpose (SMC research)**

- Hydraulic pump, etc. 50%
- Air compressor 20%
- Electric power consumption by purpose 30%

Coolant pump

- 30%

---

**Coolant Blow Energy Saving**

**Coolant valve**

**Nozzle**

---

**Example**

**Coolant flow per cycle**

- For cutting
- For cutting
- For jig
- Machine bed washing
- 1 cycle

**Coolant flow per cycle**

- For cutting
- For cutting
- For cutting
- For jig
- Machine bed washing
- 1 cycle

---

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
Introducing our energy saving themes including case studies as well as our energy saving related equipment.

Proposals for Energy Saving Pneumatic Systems

**Splash Proof Air Cylinders**

- Pneumatic model selection program
- Pneumatic cylinder drive system (Ver. 3.00)
  - Automatically selects the most appropriate smallest products to match your energy saving needs.
  - This program is also available from the SMC Web site.

**Energy Saving Program** (Ver.3.1)

- Energy saving planning, improvements, and calculation of coolant circuits is possible.
  - This program is also available from the SMC Web site.

Proposals for Energy Saving Pneumatic Systems (CAT. E02-21)

- Introducing our energy saving themes including case studies as well as our energy saving related equipment.

**Coolant Catch System**

- Coolant pump
- Coolant valve
- Series SGC

**Pressure Switches** P.393

- Coolant line pressure control
  - 2-color display high precision digital pressure switch ISE80
  - General purpose pressure switch ISG

**Industrial Filters** P.391

- Coolant liquid filtration
  - Low maintenance filter FN
  - Bag filter FGF

**Nozzles for Blow** P.390

- Nozzle for blow KN

**Energy Saving Related Material**

- Automatic selection of the most appropriate smallest products to match energy saving needs.
  - This program is also available from the SMC Web site.
Coolant Valve
Series SGC

How to Order

External pilot solenoid
SGC 2 2 1 A - 05 10 Y - 1 T Z - - - A
Air operated
SGCA 2 2 1 A - 05 10

1. Series
2. Valve type
3. Seal material
4. Pressure range
5. Thread type
6. Port size
7. Pilot valve
8. Rated voltage
9. Electrical entry
10. Light / surge voltage suppressor
11. Manual override
12. Bracket mounting position

Table (1) Electrical entry/Light/Surge Voltage Suppressor

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Electrical entry</th>
<th>Without light/surge voltage suppressor</th>
<th>With surge voltage suppressor</th>
<th>With light/surge voltage suppressor</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>T</td>
<td>—</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>W</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>W (Note)</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>DC</td>
<td>D</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>W</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>DO</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Note) If a AC specification without DIN Terminal (DO) is selected, always use a DIN connector with surge voltage suppressor as the connector.
**Auto switches**

(for verifying whether the valve is open/closed)

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Special function</th>
<th>Electrical entry</th>
<th>Indicator light</th>
<th>Wiring (Output)</th>
<th>Load voltage</th>
<th>Applicable load</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>D-M9N</td>
<td>—</td>
<td>Grommet</td>
<td>3-wire (NPN)</td>
<td>24 V</td>
<td>Relay, PLC</td>
</tr>
<tr>
<td>B</td>
<td>D-M9P</td>
<td>—</td>
<td>Grommet</td>
<td>3-wire (PNP)</td>
<td>5 V, 12 V</td>
<td>Relay, PLC</td>
</tr>
<tr>
<td>C</td>
<td>D-M9B</td>
<td>Grommet</td>
<td>Yes</td>
<td>2-wire</td>
<td>12 V</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>D-M9NA</td>
<td>Water resistance</td>
<td>Grommet</td>
<td>3-wire (NPN)</td>
<td>24 V</td>
<td>Relay, PLC</td>
</tr>
<tr>
<td>F</td>
<td>D-M9PA</td>
<td>(2-color display)</td>
<td>Grommet</td>
<td>3-wire (PNP)</td>
<td>5 V, 12 V</td>
<td>Relay, PLC</td>
</tr>
<tr>
<td>G</td>
<td>D-M9BA</td>
<td></td>
<td>Yes</td>
<td>2-wire</td>
<td>12 V</td>
<td></td>
</tr>
</tbody>
</table>

* The auto switches are included when shipped (unmounted).

**Applicable auto switches**  Refer to page 385 to 388 for detailed auto switch specifications.

**Solid state auto switch**

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Special function</th>
<th>Electrical entry</th>
<th>Indicator light</th>
<th>Wiring (Output)</th>
<th>Load voltage</th>
<th>Applicable load</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>D-M9N</td>
<td>—</td>
<td>Grommet</td>
<td>3-wire (NPN)</td>
<td>24 V</td>
<td>Relay, PLC</td>
</tr>
<tr>
<td>B</td>
<td>D-M9P</td>
<td>—</td>
<td>Grommet</td>
<td>3-wire (PNP)</td>
<td>5 V, 12 V</td>
<td>Relay, PLC</td>
</tr>
<tr>
<td>C</td>
<td>D-M9B</td>
<td>Grommet</td>
<td>Yes</td>
<td>2-wire</td>
<td>12 V</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>D-M9NA</td>
<td>Water resistance</td>
<td>Grommet</td>
<td>3-wire (NPN)</td>
<td>24 V</td>
<td>Relay, PLC</td>
</tr>
<tr>
<td>F</td>
<td>D-M9PA</td>
<td>(2-color display)</td>
<td>Grommet</td>
<td>3-wire (PNP)</td>
<td>5 V, 12 V</td>
<td>Relay, PLC</td>
</tr>
<tr>
<td>G</td>
<td>D-M9BA</td>
<td></td>
<td>Yes</td>
<td>2-wire</td>
<td>12 V</td>
<td></td>
</tr>
</tbody>
</table>

**Option**  
(For detail, refer to page 384)

**Cable for M12 connector**

\[ \text{V100 - 200 - 1 - 4} \]

**Specification**

1. For DC
2. For AC

**Cable length (L)**

- 1: 1000 [mm]
- 2: 3000 [mm]
- 3: 5000 [mm]

* The auto switches are included when shipped (unmounted).
**Series SGC**

**Characteristics**

<table>
<thead>
<tr>
<th>Pressure specification</th>
<th>Model</th>
<th>Port size</th>
<th>Orifice dia. ø (mm)</th>
<th>Flow characteristics Av x 10⁻⁶m³</th>
<th>Orifice water</th>
<th>Mass (kg)</th>
<th>Air operated type</th>
<th>External pilot solenoid type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 MPa</td>
<td>SGC(A)22-05-10</td>
<td>3/8</td>
<td>ø15</td>
<td>110</td>
<td>4.6</td>
<td>0.69 (0.74)</td>
<td>0.73 (0.78)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SGC(A)22-05-15</td>
<td>1/2</td>
<td>ø15</td>
<td>115</td>
<td>4.5</td>
<td>0.69 (0.74)</td>
<td>0.73 (0.78)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SGC(A)32-05-20</td>
<td>3/4</td>
<td>ø20</td>
<td>284</td>
<td>11.8</td>
<td>1.04 (1.11)</td>
<td>1.08 (1.15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SGC(A)42-05-25</td>
<td>¹</td>
<td>ø25</td>
<td>440</td>
<td>18.3</td>
<td>1.70 (1.77)</td>
<td>1.74 (1.81)</td>
<td></td>
</tr>
<tr>
<td>1.0 MPa</td>
<td>SGC(A)22-10-10</td>
<td>3/8</td>
<td>ø12</td>
<td>85</td>
<td>3.5</td>
<td>0.69 (0.74)</td>
<td>0.73 (0.78)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SGC(A)22-10-15</td>
<td>1/2</td>
<td>ø12</td>
<td>116</td>
<td>4.8</td>
<td>0.69 (0.74)</td>
<td>0.73 (0.78)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SGC(A)32-10-20</td>
<td>3/4</td>
<td>ø14</td>
<td>170</td>
<td>7.1</td>
<td>1.04 (1.11)</td>
<td>1.08 (1.15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SGC(A)42-10-25</td>
<td>¹</td>
<td>ø17</td>
<td>265</td>
<td>11.0</td>
<td>1.70 (1.77)</td>
<td>1.74 (1.81)</td>
<td></td>
</tr>
<tr>
<td>1.6 MPa</td>
<td>SGC(A)22-16-10</td>
<td>3/8</td>
<td>ø9</td>
<td>30</td>
<td>1.25</td>
<td>0.69 (0.74)</td>
<td>0.73 (0.78)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SGC(A)22-16-15</td>
<td>1/2</td>
<td>ø9</td>
<td>64</td>
<td>2.7</td>
<td>0.69 (0.74)</td>
<td>0.73 (0.78)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SGC(A)32-16-20</td>
<td>3/4</td>
<td>ø12</td>
<td>109</td>
<td>4.5</td>
<td>1.04 (1.11)</td>
<td>1.08 (1.15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SGC(A)42-16-25</td>
<td>¹</td>
<td>ø15</td>
<td>174</td>
<td>7.3</td>
<td>1.70 (1.77)</td>
<td>1.74 (1.81)</td>
<td></td>
</tr>
</tbody>
</table>

**Valve Specification**

**Operating fluid**
- Coolant

**Fluid temperature**
- SGCA(A)A, B
  - –5 to 60°C

**Ambient temperature**
- –5 to 50°C

**Leakage from the valve seat**
- 20 cm³/min or less (water pressure)

**Operating pressure range**
- SGC(A)22-05-10: 0 to 0.5 MPa
- SGC(A)22-10-10: 0 to 1.0 MPa
- SGC(A)32-16-10: 0 to 1.6 MPa

**External air operated**
- SGC(A)22-05-10
- SGC(A)22-10-10
- SGC(A)22-16-10
- SGC(A)32-16-20

**Pressure**
- SGC(A)1: 0.25 to 0.7 MPa
- SGC(A)2: 0.5 MPa specification: 0.25 MPa to 0.7 MPa
  - 1.0, 1.6 MPa specification: 0.3 MPa to 0.7 MPa

**Lubrication**
- Not required (Use turbine oil Class 1 (ISO VG32), if lubricated.

**Temperature**
- –5 to 50°C

**How to Order Pilot Valve**

**Pilot solenoid valve specification**

<table>
<thead>
<tr>
<th>Model</th>
<th>Electrical entry</th>
<th>Coil rated voltage V</th>
<th>Allowable voltage fluctuation</th>
<th>Power consumption W</th>
<th>Apparent voltage VA</th>
<th>Surge voltage suppressor</th>
<th>Indicator light</th>
<th>Enclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td>V116-1</td>
<td>Conduit terminal, DIN terminal, M12 connector</td>
<td>DC 12 V, 24 V</td>
<td>±10% of rated voltage</td>
<td>0.35 W (With indicator light: 0.58 W)</td>
<td>100 V</td>
<td>Varistor</td>
<td>LED (Neon bulb when AC with DIN terminal and M12 connector)</td>
<td>IEC60529 standard IP65, JISC0920</td>
</tr>
<tr>
<td></td>
<td>Conduit terminal, DIN terminal, M12 connector</td>
<td>AC 100 V, 110 V, 200 V, 220 V</td>
<td>0.78 (With indicator light: 0.87)</td>
<td>0.86 (With indicator light: 0.97)</td>
<td>0.86 (With indicator light: 1.07)</td>
<td>1.05 (With indicator light: 1.30)</td>
<td>1.05 (With indicator light: 1.30)</td>
<td>1.27 (With indicator light: 1.46)</td>
</tr>
</tbody>
</table>

**How to Order Pilot Valve**

1. **Rated voltage**
   - 1: 100 V, 50/60 Hz
   - 2: 200 V, 50/60 Hz
   - 3: 110 V (115 V) 50/60 Hz
   - 4: 220 V (230 V) 50/60 Hz
   - 5: 24 VDC
   - 6: 12 VDC

2. **Electrical entry**
   - T: Conduit terminal
   - D: DIN terminal
   - DO: DIN terminal (without connector)
   - W: M12 connector

3. **Light / surge voltage suppressor**
   - N: None
   - S: With surge voltage suppressor (AC)
   - Z: With light / surge voltage suppressor (AC)

Note 1: Refer to Table (1) on page 378 for combinations with electrical entry.
- *: DOS, DCZ are not available.
- **: For AC specifications, NIL is only set for electrical entry DO.

**JIS Symbol**

<table>
<thead>
<tr>
<th>Type of actuation</th>
<th>Normally closed</th>
<th>Normally open</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air operated type</td>
<td>SGC(A)22-10</td>
<td>SGC(A)22-25</td>
</tr>
<tr>
<td>External pilot solenoid type</td>
<td>SGC(A)22-10</td>
<td>SGC(A)22-15</td>
</tr>
</tbody>
</table>

* ( ) : Mass including the bracket
+ Add the mass of an auto switch additionally.

**Valve Specification**

- External air operated
- Mass including the bracket
- Electrical entry DO.
- NIL set for electrical entry DO.
Construction

Normally closed

Normally open

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 assembly</td>
<td>Cast iron</td>
<td>Plated</td>
</tr>
<tr>
<td>2</td>
<td>Cover assembly</td>
<td>Aluminum die-casted</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Plate assembly</td>
<td>Iron</td>
<td>Valve component, NBR, FKM</td>
</tr>
<tr>
<td>4</td>
<td>Valve body</td>
<td>Stainless steel</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Valve cover</td>
<td>NBR, FKM</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Piston assembly</td>
<td>Stainless steel, Aluminum</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Return spring</td>
<td>Stainless steel, Piano wire</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Pilot solenoid valve</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Filter</td>
<td>Copper</td>
<td></td>
</tr>
</tbody>
</table>
### Series SGC

#### Dimensions

**Air operated type**

<table>
<thead>
<tr>
<th>Model</th>
<th>Main port</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGCA2</td>
<td>3/8</td>
<td>63</td>
<td>49.6</td>
<td>29</td>
<td>14.5</td>
<td>103.3</td>
<td>111.3</td>
<td>117.8</td>
<td>26</td>
<td>26</td>
<td>52</td>
<td>4.5</td>
<td>44.5</td>
<td>25</td>
<td>26.3</td>
</tr>
<tr>
<td>SGCA2</td>
<td>1/2</td>
<td>63</td>
<td>49.6</td>
<td>29</td>
<td>14.5</td>
<td>103.3</td>
<td>111.3</td>
<td>117.8</td>
<td>26</td>
<td>26</td>
<td>52</td>
<td>4.5</td>
<td>44.5</td>
<td>25</td>
<td>26.3</td>
</tr>
<tr>
<td>SGCA3</td>
<td>3/4</td>
<td>80</td>
<td>59</td>
<td>35</td>
<td>17.5</td>
<td>112</td>
<td>120.5</td>
<td>127</td>
<td>35</td>
<td>31</td>
<td>62</td>
<td>5.5</td>
<td>48</td>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td>SGCA4</td>
<td>1</td>
<td>90</td>
<td>74</td>
<td>44</td>
<td>22</td>
<td>135.9</td>
<td>144.5</td>
<td>151</td>
<td>40</td>
<td>36</td>
<td>72</td>
<td>6.5</td>
<td>60</td>
<td>35</td>
<td>39.5</td>
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</tbody>
</table>

**External pilot solenoid type**

<table>
<thead>
<tr>
<th>Model</th>
<th>Main port</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGCA2</td>
<td>3/8</td>
<td>63</td>
<td>49.6</td>
<td>29</td>
<td>14.5</td>
<td>103.3</td>
<td>111.3</td>
<td>117.8</td>
<td>26</td>
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<td>52</td>
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<td>44.5</td>
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</tr>
<tr>
<td>SGCA2</td>
<td>1/2</td>
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<td>14.5</td>
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<td>44.5</td>
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<td>26.3</td>
</tr>
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<td>SGCA3</td>
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<td>59</td>
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<td>17.5</td>
<td>112</td>
<td>120.5</td>
<td>127</td>
<td>35</td>
<td>31</td>
<td>62</td>
<td>5.5</td>
<td>48</td>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td>SGCA4</td>
<td>1</td>
<td>90</td>
<td>74</td>
<td>44</td>
<td>22</td>
<td>135.9</td>
<td>144.5</td>
<td>151</td>
<td>40</td>
<td>36</td>
<td>72</td>
<td>6.5</td>
<td>60</td>
<td>35</td>
<td>39.5</td>
</tr>
</tbody>
</table>

Pilot port (2 locations)

---

**Bracket**

4 x øK

---

**Manual override**

2 x 1/8" (Back side PE: Filter standard installation)
**Dimensions**

**External pilot solenoid type**
(DIN terminal)

**External pilot solenoid type**
(M12 connector)

<table>
<thead>
<tr>
<th>Model</th>
<th>Main port</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>O</th>
<th>PP</th>
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</thead>
<tbody>
<tr>
<td>SGC2</td>
<td>3/8</td>
<td>63</td>
<td>49.6</td>
<td>29</td>
<td>14.5</td>
<td>103.3</td>
<td>111.3</td>
<td>155.8</td>
<td>26</td>
<td>26</td>
<td>52</td>
<td>4.5</td>
<td>44.5</td>
<td>25</td>
<td>26.3</td>
<td>115</td>
<td>79.9</td>
</tr>
<tr>
<td>SGC2</td>
<td>15</td>
<td>63</td>
<td>49.6</td>
<td>29</td>
<td>14.5</td>
<td>103.3</td>
<td>111.3</td>
<td>155.8</td>
<td>26</td>
<td>26</td>
<td>52</td>
<td>4.5</td>
<td>44.5</td>
<td>25</td>
<td>26.3</td>
<td>115</td>
<td>79.9</td>
</tr>
<tr>
<td>SGC3</td>
<td>20</td>
<td>3/4</td>
<td>80</td>
<td>59</td>
<td>35</td>
<td>17.5</td>
<td>112</td>
<td>120.5</td>
<td>165</td>
<td>35</td>
<td>31</td>
<td>62</td>
<td>5.5</td>
<td>48</td>
<td>30</td>
<td>31</td>
<td>124.2</td>
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<tr>
<td>SGC4</td>
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<td>1</td>
<td>90</td>
<td>74</td>
<td>44</td>
<td>22</td>
<td>135.3</td>
<td>144.5</td>
<td>189</td>
<td>40</td>
<td>36</td>
<td>72</td>
<td>6.5</td>
<td>60</td>
<td>35</td>
<td>39.5</td>
<td>148.2</td>
</tr>
</tbody>
</table>

---

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
How to Fix an Auto Switch

When tightening an auto switch mounting screw, use a watchmaker’s screwdriver with a handle of approximately 5 to 6 mm in diameter. Furthermore, use a tightening torque of approximately 0.05 to 0.15 N-m.

Auto Switch Proper Mounting Position

<table>
<thead>
<tr>
<th>Model</th>
<th>D-M9(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGC(A)2-05-10</td>
<td>A 5</td>
</tr>
<tr>
<td></td>
<td>B 5</td>
</tr>
<tr>
<td>SGC(A)2-10-15</td>
<td>A 6</td>
</tr>
<tr>
<td></td>
<td>B 5</td>
</tr>
<tr>
<td>SGC(A)2-16-15</td>
<td>A 7</td>
</tr>
<tr>
<td></td>
<td>B 5</td>
</tr>
<tr>
<td>SGC(A)3-05-20</td>
<td>A 4</td>
</tr>
<tr>
<td></td>
<td>B 4</td>
</tr>
<tr>
<td>SGC(A)3-10-20</td>
<td>A 6</td>
</tr>
<tr>
<td></td>
<td>B 4</td>
</tr>
<tr>
<td>SGC(A)3-16-20</td>
<td>A 7</td>
</tr>
<tr>
<td></td>
<td>B 4</td>
</tr>
<tr>
<td>SGC(A)4-05-25</td>
<td>A 3</td>
</tr>
<tr>
<td></td>
<td>B 3</td>
</tr>
<tr>
<td>SGC(A)4-10-25</td>
<td>A 6</td>
</tr>
<tr>
<td></td>
<td>B 3</td>
</tr>
<tr>
<td>SGC(A)4-16-25</td>
<td>A 7</td>
</tr>
<tr>
<td></td>
<td>B 3</td>
</tr>
</tbody>
</table>

* The above dimensions including a mounted auto switch are for reference only. Please be sure that the auto switch works appropriately.

Option

Cable for M12 connector (Female connector with cable)

**V100-200-1-4**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Cable length (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 For DC</td>
<td>1 For AC</td>
</tr>
<tr>
<td>2 For DC</td>
<td>1000 [mm]</td>
</tr>
<tr>
<td>8 For AC</td>
<td>3000 [mm]</td>
</tr>
<tr>
<td>9 For AC</td>
<td>5000 [mm]</td>
</tr>
</tbody>
</table>

Lock ring
For DC: Nickel plated
For AC: Orange

Terminal no.
1 BROWN: Grounding
2 WHITE: Not used
3 BLUE: Power supply for valve
4 BLACK: Power supply for valve

How to Order

Include the part number of the female connector with cable together with the part number for the solenoid valve.

Example) In case of lead wire length, 1,000 mm

For DC
SGC221A-0510Y-5WZ V100-200-1-4

For AC
SGC221A-0510Y-1WZ V100-200-2-4

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
# Series SGC
## Auto Switch Specifications

### Auto Switch Common Specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Solid state auto switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leakage current</td>
<td>3-wire: 100 µA or less   2-wire: 0.8 mA or less</td>
</tr>
<tr>
<td>Operating time</td>
<td>1 ms or less</td>
</tr>
<tr>
<td>Impact resistance</td>
<td>1000 m/s²</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>50 MΩ or more at 500 VDC Mega (between lead wire and case)</td>
</tr>
<tr>
<td>Withstand voltage</td>
<td>1000 VAC for 1 minute (between lead wire and case)</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>–10 to 60°C</td>
</tr>
<tr>
<td>Enclosure</td>
<td>IEC60529 standard IP67</td>
</tr>
<tr>
<td>Standard</td>
<td>CE marking</td>
</tr>
</tbody>
</table>

### Lead Wire Length

**Lead wire length indication**  
(Example) **D-M9P**

<table>
<thead>
<tr>
<th>Lead wire length</th>
<th>0.5 m</th>
<th>1 m</th>
<th>3 m</th>
<th>5 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note 1)** Applicable auto switch with 5 m lead wire “Z”  
Manufactured upon receipt of order as standard.  
**Note 2)** Lead wire length of 1 m (M) is only available for DM9□. For DM9□, it will be made upon request.
Basic Wiring

### Solid state 3-wire, NPN
- Sink input specifications
- OR connection for NPN output

### Solid state 3-wire, PNP
- Source input specifications
- OR connection for NPN output

### Solid state 2-wire
- AND connection for NPN output
- 2-wire with 2-switch AND connection

Example of Connection to PLC (Programmable Logic Controller)

- **Sink input specifications**
  - 3-wire, NPN

- **Source input specifications**
  - 3-wire, PNP

2-wire

Example of AND (Serial) and OR (Parallel) Connection

- **3-wire**
  - AND connection for NPN output
    - (using relays)
  - OR connection for NPN output

2-wire with 2-switch AND connection

- Load voltage at ON = Power supply voltage – Residual voltage
  - = 24 V – 4 V x 2 pcs.
  - = 16 V

Example: Power supply is 24 VDC.
Internal voltage drop in switch is 4 V.

2-wire with 2-switch OR connection

- Load voltage at OFF = Leakage current x 2 pcs. x Load impedance
  = 1 mA x 2 pcs. x 3 kΩ
  = 6 V

Example: Load impedance is 3 kΩ.
Leakage current from switch is 1 mA.
**Grommet**

- 2-wire load current is reduced (2.5 to 40 mA).
- Flexibility is 1.5 times greater than the conventional model (SMC comparison).
- Using flexible cable as standard spec.

---

**Caution**

Do not fix the auto switch with the existing screw installed on the auto switch body. The auto switch may be damaged if a screw other than the one supplied is used.

---

**Auto Switch Internal Circuit**

**D-M9N**

![Diagram of D-M9N]

**D-M9P**

![Diagram of D-M9P]

**D-M9B**

![Diagram of D-M9B]

---

**Auto Switch Specifications**

**D-M9□ (With indicator light)**

<table>
<thead>
<tr>
<th>Auto switch model</th>
<th>D-M9N</th>
<th>D-M9P</th>
<th>D-M9B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical entry direction</td>
<td>In-line</td>
<td>In-line</td>
<td>In-line</td>
</tr>
<tr>
<td>Wiring type</td>
<td>3-wire</td>
<td>2-wire</td>
<td>—</td>
</tr>
<tr>
<td>Output type</td>
<td>NPN</td>
<td>PNP</td>
<td>—</td>
</tr>
<tr>
<td>Applicable load</td>
<td>IC circuit, Relay, PLC</td>
<td>24 VDC relay, PLC</td>
<td>—</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>5, 12, 24 VDC (4.5 to 28 V)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Current consumption</td>
<td>10 mA or less</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Load voltage</td>
<td>28 VDC or less</td>
<td>—</td>
<td>24 VDC (10 to 28 VDC)</td>
</tr>
<tr>
<td>Load current</td>
<td>40 mA or less</td>
<td>2.5 to 40 mA</td>
<td>—</td>
</tr>
<tr>
<td>Internal voltage drop</td>
<td>0.8 V or less at 10 mA (2 V or less at 40 mA)</td>
<td>4 V or less</td>
<td>—</td>
</tr>
<tr>
<td>Leakage current</td>
<td>100 µA or less at 24 VDC</td>
<td>0.8 mA or less</td>
<td>—</td>
</tr>
<tr>
<td>Indicator light</td>
<td>Red LED illuminates when turned ON.</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Standard</td>
<td>CE marking</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

---

**Precautions**

- Lead wires — Oilproof flexible heavy-duty vinyl cord: ø2.7 x 3.2 ellipse, 0.15 mm², 2 cores (D-M9B), 3 cores (D-M9N, D-M9P).

Note 1) Refer to page 385 for solid state switch common specifications.

Note 2) Refer to page 385 for lead wire lengths.

---

**Mass (g)**

<table>
<thead>
<tr>
<th>Auto switch model</th>
<th>D-M9N</th>
<th>D-M9P</th>
<th>D-M9B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead wire length (m)</td>
<td>0.5</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>14</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>41</td>
<td>41</td>
<td>38</td>
</tr>
<tr>
<td>5</td>
<td>68</td>
<td>68</td>
<td>63</td>
</tr>
</tbody>
</table>

---

**Dimensions (mm)**

**D-M9□**

![Dimensions of D-M9□]

---

**Solid State Auto Switch Direct Mounting Style**

**D-M9N/D-M9P/D-M9B**

---

**Auto Switch Model**

**D-M9N/L50132**

**D-M9P/L50098**

**D-M9B/L50098**

---

**Note**

- Refer to SMC website for the details of the products conforming to the international standards.
Auto Switch Specifications

<table>
<thead>
<tr>
<th></th>
<th>D-M9 NA</th>
<th>D-M9 PA</th>
<th>D-M9 BA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto switch model</td>
<td>D-M9 NA</td>
<td>D-M9 PA</td>
<td>D-M9 BA</td>
</tr>
<tr>
<td>Electrical entry direction</td>
<td>In-line</td>
<td>In-line</td>
<td>In-line</td>
</tr>
<tr>
<td>Wiring type</td>
<td>NPN</td>
<td>3-wire</td>
<td>2-wire</td>
</tr>
<tr>
<td>Output type</td>
<td>IC circuit, Relay, PLC</td>
<td>24 VDC relay, PLC</td>
<td>—</td>
</tr>
<tr>
<td>Applicable load</td>
<td>5, 12, 24 VDC (4.5 to 28 V)</td>
<td>24 VDC (10 to 28 VDC)</td>
<td>—</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>10 mA or less</td>
<td>2.5 to 40 mA</td>
<td>0.8 V or less</td>
</tr>
<tr>
<td>Current consumption</td>
<td>28 VDC or less</td>
<td>40 mA or less</td>
<td>40 mA or less</td>
</tr>
<tr>
<td>Load voltage</td>
<td>24 VDC (10 to 28 VDC)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Load current</td>
<td>0.8 V or less at 10 mA (2 V or less at 40 mA)</td>
<td>4 V or less</td>
<td>28 VDC or less —</td>
</tr>
<tr>
<td>Internal voltage drop</td>
<td>100 µA or less at 24 VDC</td>
<td>0.8 V or less at 10 mA (2 V or less at 40 mA)</td>
<td>—</td>
</tr>
<tr>
<td>Leakage current</td>
<td>Operating position........Red LED illuminates</td>
<td>Optimum operating position........Green LED illuminates</td>
<td>100 µA or less at 24 VDC</td>
</tr>
<tr>
<td>Indicator light</td>
<td>Standard</td>
<td>CE marking</td>
<td></td>
</tr>
</tbody>
</table>

Caution

Do not fix the auto switch with the existing screw installed on the auto switch body. The auto switch may be damaged if a screw other than the one supplied is used.

Auto Switch Internal Circuit

D-M9 NA

D-M9 PA

D-M9 BA

Indicator light/Display method

ON

Operating range

Display Red Green Red

OFF

Optimum operating position

Mass

<table>
<thead>
<tr>
<th>Auto switch model</th>
<th>D-M9 NA</th>
<th>D-M9 PA</th>
<th>D-M9 BA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead wire length (m)</td>
<td>0.5</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>68</td>
<td>68</td>
</tr>
</tbody>
</table>

Dimensions (mm)

D-M9 NA

Note 1) Refer to page 385 for solid state switch common specifications.

Note 2) Refer to page 385 for lead wire lengths.
**Pilot Solenoid Valve Specification**

<table>
<thead>
<tr>
<th>Pilot solenoid valve specification</th>
<th>SF4-□□□□50-X240</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical entry</td>
<td>Conduit terminal, DIN terminal, M12 connector</td>
</tr>
<tr>
<td>Coil rated voltage V</td>
<td>DC 24 V, Other (Option)</td>
</tr>
<tr>
<td></td>
<td>AC (50/60 Hz) 100 V, 200, Other (Option)</td>
</tr>
<tr>
<td>Allowable voltage fluctuation</td>
<td>–15 to 10% of rated voltage</td>
</tr>
<tr>
<td>Power consumption W</td>
<td>DC 1.8 W (With indicator light: 2 W)</td>
</tr>
<tr>
<td></td>
<td>AC</td>
</tr>
<tr>
<td>Inrush</td>
<td>5.6 VA (50 Hz)</td>
</tr>
<tr>
<td>Holding</td>
<td>3.4 VA (50 Hz)</td>
</tr>
<tr>
<td></td>
<td>2.3 VA (60 Hz)</td>
</tr>
<tr>
<td>Light / surge voltage suppressor</td>
<td>DC ZNR (Varistor), LED (Neon bulb for 100 V or more)</td>
</tr>
<tr>
<td></td>
<td>AC ZNR (Varistor), Neon bulb (LED for less than 100 V)</td>
</tr>
</tbody>
</table>

**How to Order Pilot Valve**

<table>
<thead>
<tr>
<th>SF4 - □□□□ - □□□□□ - X240</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Rated voltage</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Electrical entry</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Manual override</td>
</tr>
<tr>
<td>Light / surge voltage suppressor</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

* TS, DOS, DOZ are not available.

**Dimensions**

Equivalent to the standard models except the dimensions given in the diagram.

**Conduit terminal**

**DIN terminal**

**M12 connector**

---

**Pilot valve: SF4**

Equivalent to the standard models except for 7, 8, 11. Refer to page 378.

**Made to Order**

**Pilot Valve: SF4**

---

**SF4 - □□□□ - □□□□□ - X240**

---

**Dimensions**

Equivalent to the standard models except the dimensions given in the diagram.

---

**Conduit terminal**

**DIN terminal**

**M12 connector**

---

**Model**

<table>
<thead>
<tr>
<th>Model</th>
<th>Main port</th>
<th>G</th>
<th>O</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGC2</td>
<td>3/8</td>
<td>163</td>
<td>125.3</td>
<td>72.8</td>
</tr>
<tr>
<td>SGC2</td>
<td>1/2</td>
<td>163</td>
<td>125.3</td>
<td>72.8</td>
</tr>
<tr>
<td>SGC3</td>
<td>3/4</td>
<td>172.2</td>
<td>134.5</td>
<td>87.8</td>
</tr>
<tr>
<td>SGC4</td>
<td>1</td>
<td>196.2</td>
<td>158.5</td>
<td>89.7</td>
</tr>
</tbody>
</table>

---

**Model**

<table>
<thead>
<tr>
<th>Model</th>
<th>Main port</th>
<th>G</th>
<th>O</th>
<th>PP</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGC2</td>
<td>3/8</td>
<td>163</td>
<td>125.3</td>
<td>79.1</td>
</tr>
<tr>
<td>SGC2</td>
<td>1/2</td>
<td>163</td>
<td>125.3</td>
<td>79.1</td>
</tr>
<tr>
<td>SGC3</td>
<td>3/4</td>
<td>172.2</td>
<td>134.5</td>
<td>85</td>
</tr>
<tr>
<td>SGC4</td>
<td>1</td>
<td>196.2</td>
<td>158.5</td>
<td>96</td>
</tr>
</tbody>
</table>

---

**Model**

<table>
<thead>
<tr>
<th>Model</th>
<th>Main port</th>
<th>G</th>
<th>O</th>
<th>PP</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGC2</td>
<td>3/8</td>
<td>163</td>
<td>125.3</td>
<td>79.1</td>
</tr>
<tr>
<td>SGC2</td>
<td>1/2</td>
<td>163</td>
<td>125.3</td>
<td>79.1</td>
</tr>
<tr>
<td>SGC3</td>
<td>3/4</td>
<td>172.2</td>
<td>134.5</td>
<td>85</td>
</tr>
<tr>
<td>SGC4</td>
<td>1</td>
<td>196.2</td>
<td>158.5</td>
<td>96</td>
</tr>
</tbody>
</table>
### Nozzle with Self-Align Fitting / KN

<table>
<thead>
<tr>
<th>Model</th>
<th>Nozzle diameter D</th>
<th>Connection size</th>
<th>With across flats</th>
<th>L1</th>
<th>L2</th>
</tr>
</thead>
<tbody>
<tr>
<td>KN-10-400</td>
<td>ø4</td>
<td>ø10</td>
<td>14 17</td>
<td>29.5</td>
<td>17</td>
</tr>
<tr>
<td>KN-10-600</td>
<td>ø6</td>
<td>ø10</td>
<td>14 17</td>
<td>27.7</td>
<td>17</td>
</tr>
<tr>
<td>KN-12-400</td>
<td>ø4</td>
<td>ø12</td>
<td>17 19</td>
<td>41.3</td>
<td>17</td>
</tr>
<tr>
<td>KN-12-600</td>
<td>ø6</td>
<td>ø12</td>
<td>17 19</td>
<td>31.2</td>
<td>17</td>
</tr>
<tr>
<td>KN-16-400</td>
<td>ø4</td>
<td>ø16</td>
<td>22 24</td>
<td>40.1</td>
<td>17</td>
</tr>
<tr>
<td>KN-16-600</td>
<td>ø6</td>
<td>ø16</td>
<td>22 24</td>
<td>38.4</td>
<td>17</td>
</tr>
<tr>
<td>KN-20-400</td>
<td>ø4</td>
<td>ø20</td>
<td>26 27</td>
<td>45.6</td>
<td>17</td>
</tr>
<tr>
<td>KN-20-600</td>
<td>ø6</td>
<td>ø20</td>
<td>26 27</td>
<td>43.9</td>
<td>17</td>
</tr>
</tbody>
</table>

### Nozzle with Male Thread / KN

<table>
<thead>
<tr>
<th>Model</th>
<th>Nozzle diameter D</th>
<th>Connection size</th>
<th>With across flats</th>
<th>L1</th>
<th>A*</th>
</tr>
</thead>
<tbody>
<tr>
<td>KN-R02-600</td>
<td>ø6</td>
<td>R1/4</td>
<td>14 27</td>
<td>21</td>
<td>1.1</td>
</tr>
<tr>
<td>KN-R03-400</td>
<td>ø4</td>
<td>R3/8</td>
<td>17 32</td>
<td>25.4</td>
<td></td>
</tr>
<tr>
<td>KN-R03-600</td>
<td>ø6</td>
<td>R3/8</td>
<td>17 30</td>
<td>23.7</td>
<td></td>
</tr>
<tr>
<td>KN-R04-400</td>
<td>ø4</td>
<td>R1/2</td>
<td>22 42</td>
<td>33.6</td>
<td></td>
</tr>
<tr>
<td>KN-R04-600</td>
<td>ø6</td>
<td>R1/2</td>
<td>22 40</td>
<td>31.8</td>
<td></td>
</tr>
<tr>
<td>KN-R06-600</td>
<td>ø6</td>
<td>R3/4</td>
<td>27 50</td>
<td>40.1</td>
<td></td>
</tr>
<tr>
<td>KN-R06-800</td>
<td>ø8</td>
<td>R3/4</td>
<td>27 48</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>KN-R10-800</td>
<td>ø8</td>
<td>R1</td>
<td>36 63</td>
<td>52.3</td>
<td></td>
</tr>
</tbody>
</table>

* Reference dimension of “R” thread after installation.

### Pivoting Nozzle with Self-Align Fitting / KNK

<table>
<thead>
<tr>
<th>Model</th>
<th>Nozzle diameter D</th>
<th>Connection size</th>
<th>With across flats</th>
<th>L1</th>
<th>L2</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNK-10-600</td>
<td>ø6</td>
<td>ø10</td>
<td>17 17 17</td>
<td>41.7</td>
<td>17</td>
</tr>
<tr>
<td>KNK-12-600</td>
<td>ø6</td>
<td>ø12</td>
<td>17 17 19</td>
<td>41.2</td>
<td>17</td>
</tr>
<tr>
<td>KNK-16-600</td>
<td>ø6</td>
<td>ø16</td>
<td>17 24 24</td>
<td>41.8</td>
<td>17</td>
</tr>
<tr>
<td>KNK-20-600</td>
<td>ø6</td>
<td>ø20</td>
<td>17 27 27</td>
<td>43.8</td>
<td>17</td>
</tr>
</tbody>
</table>

### Pivoting Nozzle with Male Thread / KNK

<table>
<thead>
<tr>
<th>Model</th>
<th>Nozzle diameter D</th>
<th>Connection size</th>
<th>With across flats</th>
<th>L1</th>
<th>A*</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNK-R02-600</td>
<td>ø6</td>
<td>R1/4</td>
<td>17 17</td>
<td>38</td>
<td>31.9</td>
</tr>
<tr>
<td>KNK-R03-400</td>
<td>ø4</td>
<td>R3/8</td>
<td>17 17</td>
<td>39</td>
<td>32.4</td>
</tr>
<tr>
<td>KNK-R04-400</td>
<td>ø4</td>
<td>R1/2</td>
<td>17 22</td>
<td>42.2</td>
<td>34.1</td>
</tr>
</tbody>
</table>

* Reference dimension of “R” thread after installation.
**Low Maintenance Filter**

<table>
<thead>
<tr>
<th>Series</th>
<th>Port size</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FN1</td>
<td>Rc1</td>
<td>MAX.80</td>
</tr>
<tr>
<td>FN4</td>
<td>Rc2</td>
<td>MAX.80</td>
</tr>
</tbody>
</table>

Features:
- Element replacement not required.
- Structure that enables automatic back-flushing of element.

---

**Automatic back-flushing**

System circuit allows the automatic back-flushing when the element is clogged.

![Diagram of automatic back-flushing](image)

---

**Filter for Cleaning Solvent Quick Change**

<table>
<thead>
<tr>
<th>Series</th>
<th>Port size</th>
<th>Maximum operating pressure</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FQ1</td>
<td>Rc1/2, 3/4, 1</td>
<td>1 MPa</td>
<td>Max. 80</td>
</tr>
</tbody>
</table>

Features:
- Low flow filtration (MAX. 30 ℓ/min)
- No tools required.
- Takes only 60 seconds for element replacement.
## Related Products

### Industrial Filter (Vessel type)

**FGA**

<table>
<thead>
<tr>
<th>Series</th>
<th>Port size</th>
<th>Maximum operating pressure</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FGA</td>
<td>Flange: JIS 10KFF 25 to 15 D (1/8 to 6&quot;)</td>
<td>1 MPa</td>
<td>Max. 80</td>
</tr>
</tbody>
</table>

**Features**
- Large flow vertical element type (MAX. 3200 l/min)
- Easy handling of filtered impurities

**FGB**

<table>
<thead>
<tr>
<th>Series</th>
<th>Port size</th>
<th>Maximum operating pressure</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FGB</td>
<td>Flange: JIS 10KFF 25 to 15 D (1/8 to 6&quot;)</td>
<td>1 MPa</td>
<td>Max. 80</td>
</tr>
</tbody>
</table>

**Features**
- Large flow suspended type (MAX. 3800 l/min)

**FGC**

<table>
<thead>
<tr>
<th>Series</th>
<th>Port size</th>
<th>Maximum operating pressure</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FGC</td>
<td>Flange: JIS 10KFF 25 to 15 D (1/8 to 6&quot;)</td>
<td>1, 2, 4 MPa</td>
<td>Max. 80</td>
</tr>
</tbody>
</table>

**Features**
- High pressure and low flow rate type (MAX. 80 l/min)

**FGD**

<table>
<thead>
<tr>
<th>Series</th>
<th>Port size</th>
<th>Maximum operating pressure</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FGD</td>
<td>Rc3/8, 1/2, 3/4</td>
<td>0.7, 1 MPa</td>
<td>Max. 80</td>
</tr>
</tbody>
</table>

**Features**
- Low flow filtration. (MAX. 60 l/min)
- Antistatic specification (FGDE, FGDF) can be selected.

**FGE**

<table>
<thead>
<tr>
<th>Series</th>
<th>Port size</th>
<th>Maximum operating pressure</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FGE</td>
<td>R1, 2</td>
<td>0.7 MPa</td>
<td>Max. 80</td>
</tr>
</tbody>
</table>

**Features**
- Medium flow filtration. (MAX. 230 l/min)
- Easy element replacement with V band type (with cover splash prevention structure)

**FGF**

<table>
<thead>
<tr>
<th>Series</th>
<th>Port size</th>
<th>Maximum operating pressure</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FGF</td>
<td>Rc 2, 4B Flange, 6B Flange</td>
<td>0.5 MPa</td>
<td>Max. 80</td>
</tr>
</tbody>
</table>

**Features**
- Highly effective for filtration of high temperature and high viscosity fluids
- Ideal for large flow filtration. (MAX. 2000 l/min)
- Easy handling of filtered impurities

### Bag Filter

<table>
<thead>
<tr>
<th>Series</th>
<th>Port size</th>
<th>Maximum operating pressure</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FGF</td>
<td>Rc 2, 4B Flange, 6B Flange</td>
<td>0.5 MPa</td>
<td>Max. 80</td>
</tr>
</tbody>
</table>

**Features**
- Highly effective for filtration of high temperature and high viscosity fluids
- Ideal for large flow filtration. (MAX. 2000 l/min)
- Easy handling of filtered impurities

---

**Port size**

**Series**

**FGC**

<table>
<thead>
<tr>
<th>Series</th>
<th>Port size</th>
</tr>
</thead>
<tbody>
<tr>
<td>FGC</td>
<td>Flange: JIS 10KFF 25 to 15 D (1/8 to 6&quot;)</td>
</tr>
</tbody>
</table>

**Temperature (°C)**

Max. 80
### 2-Color Display High Accuracy Digital Pressure Switch

<table>
<thead>
<tr>
<th>Series</th>
<th>Set pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISE80</td>
<td>-0.105 to 1.1 MPa</td>
</tr>
<tr>
<td>ISE80H</td>
<td>-0.105 to 2.2 MPa</td>
</tr>
</tbody>
</table>

**Features**
- Stainless steel diaphragm applicable to various fluids
- IP65
- With One-touch fittings (Straight, elbow type)
- Rear ported, bottom ported

### 10 MPa/15 MPa 2-color Display Digital Pressure Switch

<table>
<thead>
<tr>
<th>Series</th>
<th>Set pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISE75</td>
<td>0.4 to 10 MPa</td>
</tr>
<tr>
<td>ISE75H</td>
<td>0.5 to 15 MPa</td>
</tr>
</tbody>
</table>

**Features**
- 2-color display (Green and Red)
- Irregular value at a glance
- Metal body type (Die-cast aluminum)

### General Purpose Pressure Switch

<table>
<thead>
<tr>
<th>Series</th>
<th>Set pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISG11</td>
<td>0.02 to 0.3 MPa</td>
</tr>
<tr>
<td>ISG12</td>
<td>0.05 to 0.7 MPa</td>
</tr>
<tr>
<td>ISG13</td>
<td>0.1 to 1.0 MPa</td>
</tr>
</tbody>
</table>

**Features**
- For various fluids and waterproof
Series SGC
Specific Product Precautions 1
Be sure to read this before handling.
Refer to front matters 42 and 43 for Safety Instructions, and pages 17 to 19 for 2 Port Solenoid Valves for Fluid Control Precautions.

⚠️ Warning

Extended periods of continuous energization
If a valve is continuously energized for long periods, heat generation of the coil may result in reduced performance and shorter service life. This may also have an adverse effect on the peripheral equipment in proximity. Should a valve be continuously energized for long periods, or its daily energized state exceeds its non energized state, please use an energy saving type valve with DC specifications. Additionally, when using with AC, energizing for long periods of time continuously, select the air-operated valve and use the continuous duty type of the VT307 for a pilot valve.

⚠️ Warning

Manual Override

Since connected equipment will be actuated when the manual override is operated, first confirm that conditions are safe.

- Non-locking push type
  Press in the direction of the arrow.

- Push-turn locking slotted type [D type]
  While pressing, turn in the direction of the arrow (90° clockwise). If it is not turned, it can be operated the same way as the non-locking type.

⚠️ Caution

When operating the locking type D with a screwdriver, turn it gently using a flat head watchmaker’s screwdriver. [Torque: Less than 0.1 N·m]
When locking the manual override on the push-turn locking type (D), be sure to push it down before turning. Turn without first pushing it down can cause damage to the manual override and trouble such as air leakage, etc.

⚠️ Warning

1. Do not apply external force to the coil section.
   When tightening is performed, apply a wrench or other tool to the outside of the piping connection parts.
2. Do not warm the coil assembly with a heat insulator, etc.
   Use tape, heaters, etc., for freeze prevention on the piping and body only. They can cause the coil to burn out.
3. Secure with brackets, except in the case of steel piping and copper fittings.

⚠️ Warning

Light / Surge Voltage Suppressor

Surge voltage suppressor (TS/DS)

1 \((-\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\·

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**Series SGC**

**Specific Product Precautions 2**

Be sure to read this before handling.
Refer to front matters 42 and 43 for Safety Instructions, and pages 17 to 19 for 2 Port Solenoid Valves for Fluid Control Precautions.

---

**Light / Surge Voltage Suppressor**

**Caution**

“For AC”

Conduit terminal

Surge voltage suppressor (TS)

1 (varistor) 2 (coil)

Surge voltage suppressor (TZ)

1 (varistor) 2 (coil)

DIN terminal

Surge voltage suppressor (DS)

1 (varistor) 2 (coil)

Surge voltage suppressor (DZ)

1 (varistor) 2 (coil)

M12 connector

Surge voltage suppressor (WS)

3 (varistor) 4 (coil)

Surge voltage suppressor (WZ)

3 (varistor) 4 (coil)

---

**M12 Connector**

**Caution**

1. M12 connector types have an IP65 (enclosure) rating, offering protection from dust and water. However please note: these products are not intended for use in water.

2. Do not use a tool to mount the connector, as this may cause damage. Only tighten by hand. (0.4 to 0.6 N·m)

3. The excessive stress on the cable connector will not be able to satisfy the IP65 rating. Please use caution and do not apply a stress of 30 N or greater.

Note that if a connector other than the one stated above is used or if the connector is not tight enough, the IP65 standards will not be satisfied.

---

**Pin assignment of M12 connector on valve side**

4-pin type

1 (grounding) 2 (not used) 3 (power supply) 4 (power supply)

---

Note) For connecting a female connector with cable, adjust the connector key to the M12 connector key in the valve side since there is an orientation.

Be careful not to squeeze it in the wrong direction, as problems such as pin damage may occur.

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Note) For AC, surge voltage suppressor or light/surge voltage suppressor is available.
Caution
Connection
1. Loosen the holding screw and remove the cover from the terminal block.
2. Loosen the screw in the terminal block. Insert the lead core wires or crimped terminals to the terminals, and secure the wires by re-tightening the terminal screw.
3. Secure the cord by fastening the ground nut.

When making connections, take note that using other than the supported size (ø4.5 to ø7) heavy duty cord will not satisfy IP65 (enclosure) standards. Also, be sure to tighten the ground nut and holding screw within their specified torque ranges.

Compatible cable
Cord O.D.: ø4.5 to ø7
(Reference) 0.5 to 1.5 mm², 2-core or 3-core, equivalent to JIS C 3306

Applicable crimped terminals
O-terminals: Equivalent to R1.25-3 defined in the JIS C2805

How to Use Conduit Terminal

Caution
Connection
1. Loosen the holding screw and pull the connector out of the solenoid valve terminal block.
2. After removing the holding screw, insert a flat head screwdriver, etc. into the notch on the bottom of the terminal block and pry it open, separating the terminal block and the housing.
3. Loosen the screw (slotted screws) in the terminal block. Insert the lead core wires or crimped terminals to the terminals according to the connection method, and secure the wires by re-tightening the terminal screw.
4. Secure the cord by fastening the ground nut.

When making connections, take note that using other than the supported size (ø4.5 to ø7) heavy duty cord will not satisfy IP65 (enclosure) standards. Also, be sure to tighten the ground nut and holding screw within their specified torque ranges.

Changing the entry direction
After separating the terminal block and housing, the cord entry can be changed by attaching the housing in the opposite direction 180°.

Be careful not to damage the element, etc. with the cord’s lead wires.
Plug in and pull out the connector vertically without tilting to one side.

Compatible cable
Cord O.D.: ø4.5 to ø7
(Reference) 0.5 to 1.5 mm², 2-core or 3-core, equivalent to JIS C 3306

Applicable crimped terminals
O-terminals: Equivalent to R1.25-4M defined in the JIS C2805
Rod-terminals: Up to size 1.5
If an AC specification without DIN Terminal (DO) is selected, always use a DIN connector with surge voltage suppressor as the connector.

### Caution

#### DIN Connector Part No.

<table>
<thead>
<tr>
<th>Without light</th>
<th>DC Spec. only</th>
<th>V100-61-1</th>
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#### With Surge Voltage Suppressor

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<th>Rated voltage</th>
<th>Voltage symbol</th>
<th>Model no.</th>
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<td>24 VDC</td>
<td>DC 24 VS</td>
<td>V100-61-5-05</td>
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<td>12 VDC</td>
<td>DC 12 VS</td>
<td>V100-61-5-06</td>
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<tr>
<td>100 VAC</td>
<td>100/110 VS</td>
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<tr>
<td>200 VAC</td>
<td>200/220 VS</td>
<td>V100-61-4-02</td>
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<td>100/110 VS</td>
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<td>V100-61-4-07</td>
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</table>

#### With Light / Surge Voltage Suppressor

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<tr>
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<th>Voltage symbol</th>
<th>Model no.</th>
</tr>
</thead>
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<tr>
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<tr>
<td>240 VAC</td>
<td>240 VZ</td>
<td>V100-61-2-07</td>
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</tbody>
</table>

### Operating Environment

**Caution**

Products with IP65 enclosures (based on IEC60529) are protected against dust and water, however, these products cannot be used in water.