Normal Close High Vacuum Solenoid Valve

Minimum operating pressure

\[1 \times 10^{-6}\text{ Pa(abs)}\]

* OUT side

Leakage

<table>
<thead>
<tr>
<th>Type</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1.3 \times 10^{-9}\text{ Pa}\cdot\text{m}^3/\text{s})</td>
<td>(1.3 \times 10^{-11}\text{ Pa}\cdot\text{m}^3/\text{s})</td>
</tr>
</tbody>
</table>

Compression fitting

A self-aligning tube fitting that uses ferrule rings to compress the tubing, affecting the seal when the nut is tightened.

Face seal fitting

A fitting with high leak integrity from vacuum to positive pressure, that forms a seal through the placement of a metal gasket at the end of the sleeve and the tightening of the nut.

2 types of fitting

Power consumption

<table>
<thead>
<tr>
<th>Size</th>
<th>XSA (W)</th>
<th>Existing model (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>XSA1</td>
<td>4.5</td>
<td>6</td>
</tr>
<tr>
<td>XSA2</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>XSA3</td>
<td>10.5</td>
<td>11.5</td>
</tr>
</tbody>
</table>

Max. 25% reduction

Max. 18% lighter

Weight

New

Weight

Fluid temperature

5 to 60°C

Reverse pressure potential

0.5 MPa(G)

Rated voltage

AC 100 V, 200 V, 110 V, 220 V, 240 V, 48 V, 24 V, 230 V

DC 24 V, 12 V

Applications

Photovoltaic cell manufacturing

Semiconductor manufacturing

LCD manufacturing

Medical

Food

Series XSA

New RoHS

Note) Except grommet/AC

Note) Except grommet/AC
Flame resistance
UL94V-0 conformed

Electrical entry
Face seal fitting and compression fitting are available.
Applicable to highly airtight piping.

Power consumption:
* DC/Class B
  4.5 W (Size 1)
  7 W (Size 2)
  10.5 W (Size 3)

Reduced particle generation
Moving the spring from the sliding part of the armature to the body reduced contact with the spring, reducing particle generation.

Improved sealing performance
Larger spring creates firm seal!
Leakage (Internal): 1.3 x 10^{-9} Pa·m^3/s

Face seal fitting and compression fitting are available.

Variations

<table>
<thead>
<tr>
<th>Model</th>
<th>Orifice diameter</th>
<th>Fitting/Port size (inch)</th>
<th>Minimum operating pressure Pa(abs)</th>
<th>Leakage Pa·m^3/s</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ø2</td>
<td>ø3</td>
<td>ø4.5</td>
<td>ø6</td>
</tr>
<tr>
<td>XSA1</td>
<td>●</td>
<td>●</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>XSA2</td>
<td>—</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>XSA3</td>
<td>—</td>
<td>—</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>
Normal Close
High Vacuum Solenoid Valve

Series XSA

How to Order

Valve size  Orifice diameter  Fitting size
1  Size 1  1  ø2  2  1/4
   2  ø3
2  Size 2  2  ø3  2  1/4
   3  ø4.5  3  3/8
   4  ø6
3  Size 3  3  ø4.5  2  1/4
   4  ø6

Fitting type
V  Face seal fitting
S  Compression fitting

Voltage
1  100 VAC
2  200 VAC
3  110 VAC
4  220 VAC
5  24 VDC
6  12 VDC
7  240 VAC
8  48 VAC
B  24 VAC
J  230 VAC

Table: Spacer Part No.

<table>
<thead>
<tr>
<th>Model</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>XSA1</td>
<td>XSA1R-8-1</td>
</tr>
<tr>
<td>XSA2</td>
<td>XSA2R-8-1</td>
</tr>
</tbody>
</table>

Note) Not CE-compliant

For other special option, refer to page 5.

Special electrical entry direction
## Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>XSA1-12</th>
<th>XSA1-22</th>
<th>XSA2-22</th>
<th>XSA2-32</th>
<th>XSA2-43</th>
<th>XSA3-32</th>
<th>XSA3-43</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid</td>
<td>Air, inert gas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orifice diameter (mm)</td>
<td>2</td>
<td>3</td>
<td>4.5</td>
<td>6</td>
<td>4.5</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Withstand pressure (MPa(G))</td>
<td></td>
<td></td>
<td></td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum operating pressure (Pa(abs)/OUT side)</td>
<td>1 x 10⁻⁶</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum operating pressure (MPa(G)/IN side)</td>
<td></td>
<td></td>
<td></td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum operating pressure differential (MPa(See Note 1))</td>
<td>0.8</td>
<td>0.3</td>
<td>1.0</td>
<td>0.3</td>
<td>0.1</td>
<td>0.8</td>
<td>0.3</td>
</tr>
<tr>
<td>Reverse pressure potential (MPa(See Note 2))</td>
<td>0.5</td>
<td>0.25</td>
<td>0.4</td>
<td>0.2</td>
<td>0.05</td>
<td>0.2</td>
<td>0.15</td>
</tr>
<tr>
<td>Leakage Pa·m³/s</td>
<td>Internal: 1.3 x 10⁻⁹</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piping connection system</td>
<td>Face seal fitting/Compression fitting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection size (inch)</td>
<td>1/4</td>
<td>3/8</td>
<td>1/4</td>
<td>3/8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient and fluid temperature (°C)</td>
<td>5 to 60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage (Note 4)</td>
<td>100/110/200/220/230/240/248 VAC 12/24 VDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption (W)(Note 5)</td>
<td>DC: 4.5</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apparent power (VA)(Note 5)</td>
<td>AC: 7</td>
<td>9.5</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coil temperature rise (°C)(Note 6)</td>
<td>DC: 50</td>
<td>65</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allowable voltage fluctuation</td>
<td>±10% or less of rated voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allowable leakage voltage</td>
<td>DC: 2% or less of rated voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apparent power (VA)(Note 5)</td>
<td>AC: 5% or less of rated voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coil insulation type</td>
<td>Class B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (kg)(Note 7)</td>
<td>Face seal fitting: 0.28</td>
<td>0.41</td>
<td>0.42</td>
<td>0.53</td>
<td>0.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compression fitting: 0.28</td>
<td>0.41</td>
<td>0.42</td>
<td>0.53</td>
<td>0.55</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes
- **Note 1** Operating pressure differential indicates the difference between Port 1 (high pressure side) and Port 2 (low pressure side).
- **Example** In the case of 0.3 MPa, Port 2 is a vacuum (1 Torr or less), while Port 1 can be pressurized to 0.2 MPa(G).
- **Note 2** Reverse pressure potential indicates the pressure which can be applied from Port 2 when Port 1 is at atmospheric pressure.
- **Note 3** Leakage at 20°C of ambient temperature, 0.1 MPa of differential pressure. Gas permeation is not included.
- **Note 4** AC type is equipped with full-wave rectifier.
- **Note 5** Power consumption/Apparent power: The value at 20°C of ambient temperature and when the rated voltage is applied. (Variation: ±10%)
- **Note 6** The value at 20°C of ambient temperature and when the rated voltage is applied. The value depends on the ambient environment. This is for reference.
- **Note 7** Indicates case of grommet type.

## Construction/Operation

### Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Solenoid coil</td>
<td>Cu + Fe + Resin</td>
</tr>
<tr>
<td>2</td>
<td>Core</td>
<td>Fe</td>
</tr>
<tr>
<td>3</td>
<td>Tube</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>4</td>
<td>Seat (PET seat to shut the residual magnetism)</td>
<td>PET</td>
</tr>
<tr>
<td>5</td>
<td>Armature assembly</td>
<td>FKM, Stainless steel, Resin (PPS)</td>
</tr>
<tr>
<td>6</td>
<td>Spring</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>7</td>
<td>Body</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>8</td>
<td>O-ring</td>
<td>FKM</td>
</tr>
<tr>
<td>9</td>
<td>Spacer</td>
<td>Al</td>
</tr>
</tbody>
</table>

### Option

- **Spacer**: A spacer used to raise the body when fastening it onto a flat area.

### Operating principle

By energizing the solenoid coil, the armature assembly overcomes the composite force, consisting of the force acting on the poppet due to differential pressure and the reactive force of the spring, and is adsorbed to the core side, opening the poppet.

When energizing of the solenoid coil is canceled, the armature assembly is separated from the core side by the reactive force of the spring, closing the poppet.
## Dimensions

### Grommet: G

![Grommet: G Diagram](image)

### Conduit: C

![Conduit: C Diagram](image)

### Flat terminal: F

![Flat terminal: F Diagram](image)

### DIN terminal: D

![DIN terminal: D Diagram](image)

### Terminal: T

![Terminal: T Diagram](image)

### Dimensions (mm)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>XSA1-L2S</td>
<td>22</td>
<td>55</td>
<td>24</td>
<td>63</td>
<td>30</td>
<td>8.5</td>
<td>20</td>
<td>3</td>
<td>8</td>
<td>1/4</td>
<td>27</td>
<td>53.5</td>
<td>30</td>
<td>40</td>
<td>47.5</td>
<td>53.5</td>
</tr>
<tr>
<td>XSA1-L2V</td>
<td>50</td>
<td>63</td>
<td>31.5</td>
<td>73.5</td>
<td>35</td>
<td>22</td>
<td>11.5</td>
<td>5</td>
<td>10</td>
<td>3/8</td>
<td>29.5</td>
<td>63</td>
<td>49.5</td>
<td>50</td>
<td>25.5</td>
<td>63</td>
</tr>
<tr>
<td>XSA2-L2S</td>
<td>25</td>
<td>56</td>
<td>30</td>
<td>64.5</td>
<td>11.5</td>
<td>24.5</td>
<td>32</td>
<td>1/4</td>
<td>3/8</td>
<td>67.5</td>
<td>67</td>
<td>69.5</td>
<td>57.5</td>
<td>57.5</td>
<td>64</td>
<td>57</td>
</tr>
<tr>
<td>XSA2-L2V</td>
<td>64.5</td>
<td>11.5</td>
<td>78</td>
<td>67.5</td>
<td>35</td>
<td>54</td>
<td>32</td>
<td>61.5</td>
<td>28</td>
<td>35</td>
<td>72</td>
<td>58.5</td>
<td>66</td>
<td>66</td>
<td>66</td>
<td>57</td>
</tr>
<tr>
<td>XSA2-3S</td>
<td>64.5</td>
<td>31</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>XSA3-3S</td>
<td>56</td>
<td>24</td>
<td>63</td>
<td>30</td>
<td>8.5</td>
<td>20</td>
<td>3</td>
<td>8</td>
<td>1/4</td>
<td>27</td>
<td>53.5</td>
<td>30</td>
<td>40</td>
<td>47.5</td>
<td>53.5</td>
<td>45.5</td>
</tr>
<tr>
<td>XSA3-3V</td>
<td>63</td>
<td>31</td>
<td>78</td>
<td>40</td>
<td>24.5</td>
<td>3/8</td>
<td>28</td>
<td></td>
<td>61.5</td>
<td>28</td>
<td>35</td>
<td>72</td>
<td>58.5</td>
<td>66</td>
<td>66</td>
<td>66</td>
</tr>
<tr>
<td>XSA3-43S</td>
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<td>31</td>
<td>78</td>
<td>40</td>
<td>24.5</td>
<td>3/8</td>
<td>28</td>
<td></td>
<td>61.5</td>
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<td>72</td>
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</tr>
<tr>
<td>XSA3-43V</td>
<td>67</td>
<td>62.5</td>
<td>64.5</td>
<td>31</td>
<td>78</td>
<td>40</td>
<td>24.5</td>
<td>3/8</td>
<td>28</td>
<td></td>
<td>72</td>
<td>58.5</td>
<td>66</td>
<td>66</td>
<td>66</td>
<td>66</td>
</tr>
</tbody>
</table>

### Notes

- Applicable cable O.D.: ø6 to ø12
- With spacer: 2 x 5.5
- Without spacer: 2 x M5 thread depth M
- Spacer: (Face seal fitting)
- Compression fitting:
- Face seal fitting:
- Terminal part: Flat terminal connector
- Series 250

---

**Normal Close**

**High Vacuum Solenoid Valve**

**Series XSA**

---

**SMC**
Special Electrical Entry Direction

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Electrical entry direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90°</td>
</tr>
<tr>
<td>B</td>
<td>180°</td>
</tr>
<tr>
<td>C</td>
<td>270°</td>
</tr>
</tbody>
</table>

Enter standard product number.
Replacement Parts

* DIN Connector Part No.

<For Class B Coil>

<table>
<thead>
<tr>
<th>Electrical option</th>
<th>Rated voltage</th>
<th>Connector part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>24 VDC</td>
<td>C18312G6GCU</td>
</tr>
<tr>
<td></td>
<td>12 VDC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 VAC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>110 VAC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 VAC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>220 VAC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>230 VAC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>240 VAC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24 VAC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>48 VAC</td>
<td></td>
</tr>
</tbody>
</table>

* With light

<table>
<thead>
<tr>
<th>Electrical option</th>
<th>Rated voltage</th>
<th>Connector part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 VDC</td>
<td>GDM2A-L5</td>
<td></td>
</tr>
<tr>
<td>12 VDC</td>
<td>GDM2A-L6</td>
<td></td>
</tr>
<tr>
<td>100 VAC</td>
<td>GDM2A-L1</td>
<td></td>
</tr>
<tr>
<td>110 VAC</td>
<td>GDM2A-L1</td>
<td></td>
</tr>
<tr>
<td>200 VAC</td>
<td>GDM2A-L2</td>
<td></td>
</tr>
<tr>
<td>220 VAC</td>
<td>GDM2A-L2</td>
<td></td>
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<tr>
<td>230 VAC</td>
<td>GDM2A-L2</td>
<td></td>
</tr>
<tr>
<td>240 VAC</td>
<td>GDM2A-L2</td>
<td></td>
</tr>
<tr>
<td>24 VAC</td>
<td>GDM2A-L5</td>
<td></td>
</tr>
<tr>
<td>48 VAC</td>
<td>GDM2A-L15</td>
<td></td>
</tr>
</tbody>
</table>

* Select an appropriate DIN connector suitable for the coil insulation type.

• Gasket Part No. for DIN Connector

VCW20-1-29-1 (For Class B Coil)

• Lead Wire Assembly for Flat Terminal

(Set of 2 pcs.)

VX021S-1-16FB
Design

⚠️ Warning
1. Cannot be used as an emergency shutoff valve etc.
The valve presented in this catalog is not designed for safety applications such as an emergency shutoff valve. If valves are used in this type of system, other reliable safety assurance measures should also be adopted.

2. Extended periods of continuous energization
The solenoid coil will generate heat when continuously energized. Avoid using in a tightly shut container. Install it in a well ventilated area. Furthermore, do not touch it while it is being energized or right after it is energized.

Selection

⚠️ Warning
1. Fluid
   1) Type of fluid
      Before using a fluid, check whether it is compatible with the materials of each model by referring to the fluids listed in this catalog. (Refer to the Component Parts on page 3.)

2. Fluid quality
   <Air>
   1) Use clean air.
      Do not use compressed air that contains chemicals, synthetic oils including organic solvents, salt or corrosive gases, etc., as it can cause damage or malfunction.

   2) Install an air filter, if necessary.
      Install an air filter close to the valve on the upstream side. A filtration degree of 5 μm or less should be selected.

   3) Install an aftercooler or air dryer, if necessary.
      Compressed air that contains excessive drainage may cause a malfunction of the valve and other pneumatic equipment. To prevent this, install an aftercooler or air dryer, etc.

   4) If excessive carbon powder is generated, eliminate it by installing a mist separator on the upstream side of the valve.
      If excessive carbon powder is generated by the compressor, it may adhere to the inside of the valve and cause a malfunction.
      Refer to the Best Pneumatics No.5 catalog for further details on compressed air quality.

   <Vacuum>
   Vacuum piping direction: Connect the piping so that the pressure in the secondary side is lower.
   Avoid entry of foreign matter.

3. Ambient environment
   Use within the operable ambient temperature range. Check the compatibility between the product’s composition materials and the ambient atmosphere. Be certain that the fluid used does not touch the external surface of the product.

⚠️ Warning
4. Countermeasures against static electricity
Take measures to prevent static electricity since some fluids can cause static electricity.

Caution

1. Leakage voltage
   Particularly when using a resistor in parallel with a switching element and using a C-R element (surge voltage suppressor) to protect the switching element, take note that leakage current will flow through the resistor, C-R element, etc., creating a possible danger that the valve may not turn off.

Mounting

⚠️ Warning
1. If air leakage increases or equipment does not operate properly, stop operation.
   After mounting is completed, confirm that it has been done correctly by performing a suitable function test.

2. 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.

3. The solenoid valve can be mounted to any direction, but recommended mounting direction of the coil is upward.
   When mounting a valve with its coil positioned downward, foreign matter in the fluid will adhere to the iron core leading to a malfunction. Especially for strict leakage control, the coil must be positioned upward.

4. 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.

5. Avoid sources of vibration, or adjust the arm from the body to the minimum length so that resonance will not occur.

6. Painting and coating
   Warnings or specifications printed or labeled on the product should not be erased, removed or covered up.
Caution

1. Preparation before piping
   Before mounting, clean the sealing surface with ethanol etc.

2. Avoid connecting ground lines to piping, as this may cause electric corrosion of the system.

3. Mounting of fitting
   Tighten the fitting as follows.
   After the tightening, confirm that there is no leakage from the fitting.

<table>
<thead>
<tr>
<th>Fitting Type</th>
<th>Tightening Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face seal fitting</td>
<td>1/8 turn after tightening by hand</td>
</tr>
<tr>
<td>Compression fitting</td>
<td>1 1/4 turns after tightening by hand</td>
</tr>
</tbody>
</table>

4. Connection of piping to products
   When connecting piping to a product, avoid mistakes regarding the supply port etc.

Caution

1. As a rule, use electrical wire with a cross sectional area of 0.5 to 1.25 mm² for wiring.
   Furthermore, do not allow excessive force to be applied to the lines.

2. Use electrical circuits which do not generate chattering in their contacts.

3. Use voltage which is within ±10% of the rated voltage. In cases with a DC power supply where importance is placed on responsiveness, stay within ±5% of the rated value. The voltage drop is the value in the lead wire section connecting the coil.

4. When a surge from the solenoid affects the electrical circuitry, install a surge voltage suppressor etc., in parallel with the solenoid. Or, adopt an option that comes with the surge voltage protection circuit. (However, a surge voltage occurs even if the surge voltage protection circuit is used. For details, please consult with SMC.)

Warning

1. Do not use in an atmosphere having corrosive gases, chemicals, sea water, water, water vapor, or where there is direct contact with any of these.

2. Do not use in explosive atmospheres.

3. Do not use in locations subject to vibration or impact.

4. Do not use in locations where radiated heat will be received from nearby heat sources.

5. Employ suitable protective measures in locations where there is contact with water droplets, oil, or welding spatter, etc.

Warning

1. Removing the product
   Confirm that the valve temperature has dropped sufficiently before performing work. If touched inadvertently, there is a danger of being burned.
   1) Shut off the fluid supply and release the fluid pressure in the system.
   2) Shut off the power supply.
   3) Dismount the product.

2. Low frequency operation
   Switch valves at least once every 30 days to prevent a malfunction. Also, in order to use it under the optimum state, conduct a regular inspection once a half year.
**Series XSA**

**Specific Product Precautions 3**

Be sure to read this before handling. Refer to the back cover for Safety Instructions. For Common Precautions, refer to “Handling Precautions for SMC Products” and the Operation Manual on SMC website, http://www.smcworld.com

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**Electrical Connections**

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## Caution

### Grommet

Class B coil: AWG20 Insulator O.D. 2.5 mm

![Grommet Diagram]

### DIN terminal

Since internal connections are shown below for the DIN terminal, make connections to the power supply accordingly.

#### Rated voltage

<table>
<thead>
<tr>
<th></th>
<th>Lead wire color</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>Black</td>
</tr>
<tr>
<td>100 VAC</td>
<td>Blue</td>
</tr>
<tr>
<td>200 VAC</td>
<td>Red</td>
</tr>
<tr>
<td>Other AC</td>
<td>Gray</td>
</tr>
</tbody>
</table>

* There is no polarity.

### Conduit terminal

In the case of the conduit terminal, make connections according to the marks shown below.

- Use the tightening torques below for each section.
- Properly seal the terminal connection (G1/2) with the special wiring conduit etc.

![Conduit Terminal Diagram]

### Conduit

Use the tightening torque below for the conduit.

Class B coil: AWG20 Insulator O.D. 2.5 mm

![Conduit Diagram]

### Lead wire color

<table>
<thead>
<tr>
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<td>Other AC</td>
<td>Gray</td>
</tr>
</tbody>
</table>

* There is no polarity.

Note) For cable O.D. of ø9 to ø12 mm, remove the internal parts of the rubber seal before using.

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**Description**

<table>
<thead>
<tr>
<th></th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal</td>
<td>VCW20-15-6</td>
</tr>
</tbody>
</table>

Note) Please order separately.
Electrical Circuits

**Caution**

**[DC circuit]**

<table>
<thead>
<tr>
<th>Without electrical option</th>
<th>With surge voltage suppressor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grommet, Flat terminal</td>
<td>Grommet, DIN terminal, Conduit terminal, Conduit</td>
</tr>
</tbody>
</table>

**[AC circuit]**

*For AC, the standard product is equipped with surge voltage suppressor.*

<table>
<thead>
<tr>
<th>Without electrical option</th>
<th>With light/surge voltage suppressor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grommet, DIN terminal, Conduit terminal, Conduit</td>
<td>DIN terminal, Conduit terminal</td>
</tr>
</tbody>
</table>

For Common Precautions, refer to “Handling Precautions for SMC Products” and the Operation Manual on SMC website, http://www.smcworld.com
These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)\(^1\), and other safety regulations.

<table>
<thead>
<tr>
<th>Caution:</th>
<th>Warning:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.</td>
<td>Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.</td>
</tr>
<tr>
<td>Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.</td>
<td></td>
</tr>
</tbody>
</table>

**Warning**

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

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

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

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

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

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

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

   1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
   2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
   3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
   4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

**Caution**

1. The product is provided for use in manufacturing industries.

   The product herein described is basically provided for peaceful use in manufacturing industries. If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary. If anything is unclear, contact your nearest sales branch.

**Limited warranty and Disclaimer/Compliance Requirements**

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

**Limited warranty and Disclaimer**

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.\(^2\)

   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

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

   A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

**Compliance Requirements**

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

**Caution**

SMC products are not intended for use as instruments for legal metrology. Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordered by the metrology (measurement) laws of each country.

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\(^1\) ISO 4414: Pneumatic fluid power – General rules relating to systems.

\(^2\) ISO 4413: Hydraulic fluid power – General rules relating to systems.

IEC 60204-1: Safety of machinery – Electrical equipment of machines.

Part 1: General requirements

ISO 10218-1: Manipulating industrial robots – Safety.


ISO 10218-7: Manipulating industrial robots – Safety.

ISO 10218-8: Manipulating industrial robots – Safety.


ISO 10218-14: Manipulating industrial robots – Safety.


ISO 10218-17: Manipulating industrial robots – Safety.


