Pilot Operated 2-Port Solenoid Valve/
Zero Pressure Differential Operation
For Steam

Enclosure: IP65

Low-noise construction
Operation noise is reduced due to full wave rectifier type solenoid and special valve construction.

Internal leakage of 1.0 cm³/min or less is achieved by using special FKM seal material. Reliability is improved due to a piston main valve and a rubber seal made of special FKM.

Improved corrosion resistance
Use of special magnetic material

Flame resistance conforms to UL94V-0.
Flame resistant mold coil material

Zero pressure differential

Weight 490 g (VXS2230)

Compact and Lightweight

New VXS Series VXS22/23

CAT.ES70-38A

Dimensions of the VXS2230 [3/8 (10A)]

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-8200-Outside Local Area: (800) 258-8200-www.stevenengineering.com
Solenoid valves for various fluids used in a wide variety of applications

Pilot operated 2-port solenoid valve for steam / Zero pressure differential operation

**New Series VXS22/23**

**For Steam**

### Working principles

**Valve opened – when there is pressure**
- When the coil is energized, the armature assembly is attracted into the core of the tube assembly and the pilot valve is opened.
- When the pilot valve is opened and the pressure inside the pilot chamber decreases, resulting in the pressure difference from the inlet pressure. Then the piston assembly is lifted and the main valve is opened.

**Valve opened – when there is no pressure or under low minute pressure**
- Armature assembly interacts with piston assembly at location. The piston assembly is pulled upward when the armature assembly is attracted to open main valve.

<table>
<thead>
<tr>
<th>Solenoid valve (Port size)</th>
<th>Orifice symbol (diameter)</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VXS22</td>
<td>3 (10 mm)</td>
<td>C37, Stainless</td>
</tr>
<tr>
<td>VXS23</td>
<td>3 (10 mm)</td>
<td>FKM</td>
</tr>
<tr>
<td>Port symbol (Port size)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>02 (1/4)</td>
<td>3 (10 mm)</td>
<td>C37, Stainless</td>
</tr>
<tr>
<td>03 (3/8)</td>
<td>4 (15 mm)</td>
<td>FKM</td>
</tr>
<tr>
<td>04 (1/2)</td>
<td>4 (15 mm)</td>
<td></td>
</tr>
<tr>
<td>06 (5/8)</td>
<td>5 (20 mm)</td>
<td></td>
</tr>
<tr>
<td>08 (7/8)</td>
<td>6 (25 mm)</td>
<td></td>
</tr>
<tr>
<td>10 (1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Features 1**

- For various industries which use steam

### Applications

- Steam cooker
- Dish/container sterilizer
- Steam press
- Steam dryer
- Boiler
- Steam heater
The new VX series, with its improved construction, replaces our previous VX range.
Pilot Operated 2-Port Solenoid Valve for Steam
Zero Pressure Differential Operation

**Series VXZ22/23**

For Steam

**Valve**
- Normally closed (N.C.)

**Solenoid Coil**
- Coil: Class H

**Rated Voltage**
- 100 VAC, 200 VAC, 110 VAC, 220 VAC, 240 VAC, 230 VAC, 48 VAC

**Material**
- Body: C37, Stainless steel
- Seal: FKM

The VXZ series is recommended when air, water or oil is fluid medium.

Pilot Operated 2-Port Solenoid Valve
Zero Pressure Differential Operation

**Series VXS22/23**

**Normally Closed (N.C.) / Normally Open (N.O.)**

<table>
<thead>
<tr>
<th>Solenoid valve (Port size)</th>
<th>Orifice symbol (diameter)</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>3 (10 mmø)</td>
<td></td>
</tr>
<tr>
<td>VXZ22</td>
<td>4 (15 mmø)</td>
<td></td>
</tr>
<tr>
<td>VXZ23</td>
<td>5 (20 mmø)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 (25 mmø)</td>
<td></td>
</tr>
<tr>
<td>Port symbol (Port size)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>02 (1/4)</td>
<td>–</td>
<td>C37, Stainless</td>
</tr>
<tr>
<td>03 (3/8)</td>
<td>–</td>
<td>steel</td>
</tr>
<tr>
<td>04 (1/2)</td>
<td>–</td>
<td>NBR FKM EPDM</td>
</tr>
<tr>
<td>–</td>
<td>06 (3/4)</td>
<td></td>
</tr>
<tr>
<td>–</td>
<td>10 (1)</td>
<td></td>
</tr>
</tbody>
</table>

**Electrical Entry**
- Grommet
- Conduit
- Conduit terminal

**Model Seal Body**
- VXZ22 VXZ23

**Orifice symbol (diameter)**

<table>
<thead>
<tr>
<th>Material</th>
<th>10 mmø</th>
<th>15 mmø</th>
<th>20 mmø</th>
<th>25 mmø</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBR</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>FKM</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>EPDM</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

**Port size (Nominal size)**
- 1/4 (8A)
- 3/8 (10A)
- 1/2 (15A)
- 3/4 (20A)
- 1 (25A)

**Zero Differential Pressure Type**
- Pilot Operated 2-Port Solenoid Valve

**Rated Voltage**
- 100 VAC, 200 VAC, 110 VAC, 220 VAC, 240 VAC, 230 VAC, 48 VAC
- Body C37, Stainless steel
- Seal FKM
- Solenoid Coil: Class H

**Solenoid Valve (Port size)**
- VXZ22
- VXZ23

**Orifice symbol (diameter)**
- 3 (10 mmø)
- 4 (15 mmø)
- 5 (20 mmø)
- 6 (25 mmø)

**Model**
- VXS2230
- VXS2240
- VXS2350
- VXS2360

**Material**
- Body: C37, Stainless steel
- Seal: FKM

**Approved**

---

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
### Standard Specifications

<table>
<thead>
<tr>
<th>Valve specifications</th>
<th>Pilot operated 2-port piston type/Zero pressure differential operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Withstand pressure (MPa) (Water pressure)</td>
<td>3.0</td>
</tr>
<tr>
<td>Body material</td>
<td>C37, Stainless steel</td>
</tr>
<tr>
<td>Seal material</td>
<td>FKM</td>
</tr>
<tr>
<td>Enclosure</td>
<td>Dusttight, Water-jet-proof (IP65)</td>
</tr>
<tr>
<td>Environment</td>
<td>Location without corrosive or explosive gases</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coil specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>100 VAC, 200 VAC, 110 VAC, 220 VAC, 230 VAC, 240 VAC, 48 VAC</td>
</tr>
<tr>
<td>Allowable voltage range</td>
<td>±10% of rated voltage</td>
</tr>
<tr>
<td>Allowable leakage voltage</td>
<td>10% or less of rated voltage</td>
</tr>
<tr>
<td>Coil insulation type</td>
<td>Class H (Full wave rectifier type)</td>
</tr>
</tbody>
</table>

⚠️ Be sure to read “Specific Product Precautions.”

### Solenoid Coil Specifications

**AC Specification (Class H coil, Full wave rectifier type)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Apparent power (VA) Note 2</th>
<th>Temperature rise (°C) Note 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>VXS2</td>
<td>18</td>
<td>120</td>
</tr>
<tr>
<td>VXS23</td>
<td>20</td>
<td>120</td>
</tr>
</tbody>
</table>

**Note 1:** The value at ambient temperature of 20°C and when the rated voltage is applied.

**Note 2:** There is no difference in the frequency and the inrush and energized apparent power, since a rectifying circuit is used.

Apparent power when the solenoid temperature is 20°C.

### Applicable Fluid Check List / All Options

VXS2 | S | R1 | 0 |  | | |

Option symbol

<table>
<thead>
<tr>
<th>Fluid and application</th>
<th>Option symbol</th>
<th>Seal material</th>
<th>Body material</th>
<th>Guide ring and piston ring material</th>
<th>Coil insulation type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steam (1 MPa or less)</td>
<td>S, Q</td>
<td>FKM</td>
<td>C37, Stainless steel</td>
<td>PPS</td>
<td>H</td>
</tr>
</tbody>
</table>

* Use the VXZ series for air, water and oil when a fluid other than steam is used. (Refer to page 1 for detail.)

Dimensions

For Steam

Construction

Dimensions

Corporate Office: (850) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
Series VXS22/23

For Steam
(1 MPa, 183 °C or less)

Model/Valve Specifications

N.C.

Passage symbol

Normally Closed (N.C.)

<table>
<thead>
<tr>
<th>Port size (Nominal size)</th>
<th>Orifice diameter (mm)</th>
<th>Model</th>
<th>Min. operating pressure differential (MPa)</th>
<th>Max. operating pressure differential (MPa)</th>
<th>Flow-rate characteristics</th>
<th>Max. system pressure (MPa)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4 (8A)</td>
<td>10</td>
<td>VXS2230-02</td>
<td>0</td>
<td>1.0</td>
<td>58</td>
<td>1.0</td>
<td>490</td>
</tr>
<tr>
<td>3/8 (10A)</td>
<td>15</td>
<td>VXS2230-03</td>
<td>0</td>
<td>1.0</td>
<td>67</td>
<td>1.0</td>
<td>660</td>
</tr>
<tr>
<td>1/2 (15A)</td>
<td>20</td>
<td>VXS2240-04</td>
<td>0</td>
<td>1.0</td>
<td>130</td>
<td>1.0</td>
<td>1200</td>
</tr>
<tr>
<td>3/4 (20A)</td>
<td>25</td>
<td>VXS2350-06</td>
<td>0</td>
<td>1.0</td>
<td>220</td>
<td>1.0</td>
<td>1340</td>
</tr>
<tr>
<td>1 (25A)</td>
<td>30</td>
<td>VXS2360-10</td>
<td>0</td>
<td>1.0</td>
<td>290</td>
<td>1.0</td>
<td>1500</td>
</tr>
</tbody>
</table>

Note) Weight of grommet type. Add 10 g for conduit type, 60 g for conduit terminal type respectively.

* Refer to “Glossary of Terms” on page 12 for details on the maximum operating pressure differential and the maximum system pressure.

Ambient and Fluid Temperature

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Fluid temperature (°C)</th>
<th>Ambient temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC, Class H coil</td>
<td>Steam, 183 or less</td>
<td>–10 to 60</td>
</tr>
</tbody>
</table>

Note) Dew point temperature: –10 °C or less

Valve Leakage Rate

Internal Leakage

<table>
<thead>
<tr>
<th>Seal material</th>
<th>Leakage rate (Air)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FKM</td>
<td>1.0 cm³/min or less</td>
</tr>
</tbody>
</table>

Refer to page 9 for selection.
**Table (1) Model – Orifice Diameter – Port Size**

<table>
<thead>
<tr>
<th>Solenoid valve (Port size)</th>
<th>Orifice symbol (diameter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VXS22</td>
<td>VXS23</td>
</tr>
<tr>
<td>Port symbol</td>
<td>Orifice size</td>
</tr>
<tr>
<td>02 (1/4)</td>
<td>3 (10 mm)</td>
</tr>
<tr>
<td>03 (3/8)</td>
<td>4 (16 mm)</td>
</tr>
<tr>
<td>04 (1/2)</td>
<td>5 (20 mm)</td>
</tr>
<tr>
<td>-</td>
<td>6 (25 mm)</td>
</tr>
</tbody>
</table>

Normally Closed (N.C.)

**Table (2) Rated Voltage – Electrical Option**

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>L&lt;sub&gt;spec&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specifications</td>
<td>Voltage symbol</td>
</tr>
<tr>
<td>AC</td>
<td>100 V</td>
</tr>
<tr>
<td>2</td>
<td>200 V</td>
</tr>
<tr>
<td>3</td>
<td>110 V</td>
</tr>
<tr>
<td>4</td>
<td>220 V</td>
</tr>
<tr>
<td>7</td>
<td>240 V</td>
</tr>
<tr>
<td>8</td>
<td>48 V</td>
</tr>
<tr>
<td>J</td>
<td>230 V</td>
</tr>
</tbody>
</table>

Note: Light is available only for conduit terminal type.
Construction

Normally closed (N.C.)

Body material: C37, Stainless steel

Working principles

<Valve opened – when there is pressure>

When the coil is energized, the armature assembly is attracted into the core of the tube assembly and the pilot valve is opened.

When the pilot valve is opened and the pressure inside the pilot chamber decreases, resulting in the pressure difference from the inlet pressure. Then, the piston assembly is lifted and the main valve is opened.

<Valve opened – when there is no pressure or under low minute pressure>

Armature assembly interacts with piston assembly at location. The piston assembly is pulled upward when the armature assembly is attracted to open the main valve.

<Valve closed>

When the coil is de-energized, the armature assembly returns by the reacting force of the return spring and the pilot valve is closed.

When the pilot valve is closed, the pressure inside the pilot chamber increases, resulting that the pressure difference from the inlet pressure is lost and the main valve is closed.

Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Body material</td>
</tr>
<tr>
<td>1</td>
<td>Body</td>
<td>C37</td>
</tr>
<tr>
<td>2</td>
<td>Bonnet</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Piston assembly</td>
<td>PPS, Stainless steel (PTFE, FKM)</td>
</tr>
<tr>
<td>4</td>
<td>Return spring</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>O-ring</td>
<td>FKM</td>
</tr>
<tr>
<td>6</td>
<td>Armature assembly</td>
<td>Stainless steel, PPS</td>
</tr>
<tr>
<td>7</td>
<td>Tube assembly</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Solenoid coil</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Hexagon socket head bolt</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>10</td>
<td>Name plate</td>
<td>AL</td>
</tr>
<tr>
<td>11</td>
<td>Clip</td>
<td>SK</td>
</tr>
</tbody>
</table>

The materials in parentheses are the seal materials.
Dimensions/Body Material: C37, Stainless Steel

VXS22□0/VXS23□0

Grommet: G

Conduit: C

Conduit terminal: T

<table>
<thead>
<tr>
<th>Model</th>
<th>Port size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>Electrical entry (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grommet: L M Conduit: L M Conduit terminal: L N R</td>
</tr>
<tr>
<td>N.C.</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>VXS2230</td>
<td>1/4, 3/8</td>
<td>85.5</td>
<td>11</td>
<td>35</td>
<td>50</td>
<td>22.5</td>
<td>30</td>
<td>20</td>
<td>22</td>
<td>40</td>
<td>77 72.5 71 43 71 106.5 74.5</td>
</tr>
<tr>
<td>VXS2240</td>
<td>1/2</td>
<td>90.5</td>
<td>14</td>
<td>35</td>
<td>60</td>
<td>22.5</td>
<td>37</td>
<td>26</td>
<td>29.5</td>
<td>52</td>
<td>84  22.5 76 43 78 106.5 74.5</td>
</tr>
<tr>
<td>VXS2350</td>
<td>3/4</td>
<td>109</td>
<td>18</td>
<td>40</td>
<td>80</td>
<td>25</td>
<td>47.5</td>
<td>32.5</td>
<td>36</td>
<td>65</td>
<td>100.5 25.5 93 46 93 109 77</td>
</tr>
<tr>
<td>VXS2360</td>
<td>1</td>
<td>115</td>
<td>21</td>
<td>40</td>
<td>90</td>
<td>25</td>
<td>55</td>
<td>35</td>
<td>40.5</td>
<td>70</td>
<td>106.5 25.5 99 46 99 109 77</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Port size</th>
<th>a</th>
<th>b</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
<th>h</th>
<th>i</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.C.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>490</td>
</tr>
<tr>
<td>VXS2230</td>
<td>1/4, 3/8</td>
<td>52</td>
<td>67</td>
<td>14</td>
<td>1.6</td>
<td>22.5</td>
<td>5.5</td>
<td>7.5</td>
<td>28</td>
<td>490</td>
</tr>
<tr>
<td>VXS2240</td>
<td>1/2</td>
<td>60</td>
<td>75</td>
<td>17</td>
<td>2.3</td>
<td>28.5</td>
<td>6.5</td>
<td>8.5</td>
<td>35</td>
<td>660</td>
</tr>
<tr>
<td>VXS2350</td>
<td>3/4</td>
<td>68</td>
<td>87</td>
<td>22</td>
<td>2.6</td>
<td>37</td>
<td>8.5</td>
<td>9</td>
<td>43</td>
<td>1200</td>
</tr>
<tr>
<td>VXS2360</td>
<td>1</td>
<td>73</td>
<td>92</td>
<td>22</td>
<td>2.6</td>
<td>40</td>
<td>8.5</td>
<td>9</td>
<td>45</td>
<td>1340</td>
</tr>
</tbody>
</table>

For Steam

Specifications

C37, Stainless Steel

Approved

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-8200-Outside Local Area: (800) 258-8200-www.stevenengineering.com
Series VXS22/23

For Steam

Replacement Parts

- Solenoid coil assembly part number

AC, Class H coil (DIN terminal is not available.)

**VX02** 2N-1G-R-H

Series

- With full wave rectifier

- Electrical entry

G: Grommet  C: Conduit  T: With conduit terminal

<table>
<thead>
<tr>
<th>Electrical entry</th>
<th>G</th>
<th>C</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G</td>
<td>C</td>
<td>T</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Refer to the table (1) for the available combinations between electrical option (L) and rated voltage.
- The rectifier and the surge voltage suppressor are integrated as standard.

**Rated voltage**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Symbol</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 V AC 50/60 Hz</td>
<td>H</td>
<td>Class H</td>
</tr>
<tr>
<td>200 V AC 50/60 Hz</td>
<td>H</td>
<td>Class H</td>
</tr>
<tr>
<td>110 V AC 50/60 Hz</td>
<td>H</td>
<td>Class H</td>
</tr>
<tr>
<td>220 V AC 50/60 Hz</td>
<td>H</td>
<td>Class H</td>
</tr>
<tr>
<td>240 V AC 50/60 Hz</td>
<td>H</td>
<td>Class H</td>
</tr>
<tr>
<td>48 V AC 50/60 Hz</td>
<td>H</td>
<td>Class H</td>
</tr>
<tr>
<td>230 V AC 50/60 Hz</td>
<td>H</td>
<td>Class H</td>
</tr>
</tbody>
</table>

Note) Refer to the table (1) for the available combinations.

**Table (1) Rated Voltage – Electrical Option**

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Voltage symbol</th>
<th>Voltage</th>
<th>With light</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>100 V</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>2</td>
<td>200 V</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>3</td>
<td>110 V</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>4</td>
<td>220 V</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>7</td>
<td>240 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>48 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>230 V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note) Light is available only for conduit terminal type.
Pilot Operated 2-Port Solenoid Valve for Steam
Series VXS22/23
For Steam

- **Name plate part number**
  - AZ-T- Valve model
  - Enter by referring to "How to Order" (Single Unit).

- **Clip part number**
  - For VXS22: VX022N-10
  - For VXS23: VX023N-10
Solenoid Valve
Flow-rate Characteristics
(How to indicate flow-rate characteristics)

1. Indication of Flow-rate Characteristics
The flow-rate characteristics in equipment such as a solenoid valve, etc. are indicated in their specifications shown in Table (1).

<table>
<thead>
<tr>
<th>Corresponding equipment</th>
<th>Indication by international standard</th>
<th>Other indications</th>
<th>Conformed standards</th>
</tr>
</thead>
</table>
| Process fluid control equipment | $Av$ | — | IEC60534-2-3: 1997  
JIS B 2005: 1995  
Equipment: JIS B 8471, 8472, 8473 |
| Pneumatic equipment | $C, b$ | — | ISO 6358: 1989  
JIS B 8390: 2000 |
| | — | $S$ | JIS B 8390: 2000  
Equipment: JIS B 8373, 8374, 8375, 8379, 8381 |
| | | | $Cv$ ANSI/(NFPA)T3.21.3: 1990 |

2. Flow-rate Characteristics
Note) Use this chart as a guide. In the case of finding an accurate flow rate, refer to pages 9 to 11.

For Saturated Steam

How to read the chart
The sonic range pressure to generate a flow rate of 400 kg/h is $P_1$ Approx. 0.64 MPa for ø15 orifice (VXS224□-04).
The holding heat slightly differs depending on the pressure $P_1$, but at 400 kg/h it is approx. 25900 kcal/h.
3. Process Fluid Control Equipment

(1) Conformed standard
JIS B 2005: 1995: Test method for the flow coefficient of a valve
Equipment standards: JIS B 8471: Solenoid valve for water
JIS B 8472: Solenoid valve for steam
JIS B 8473: Solenoid valve for fuel oil

(2) Definition of flow-rate characteristics
*Av* factor: Value of the clean water flow rate represented by m³/s which runs through a valve (equipment for test) when the pressure differential is 1 Pa. It is calculated using the following formula.

\[
Av = \sqrt{\frac{\rho}{\Delta P}} \quad \text{m}^2
\]

\[
\Delta P : \text{Pressure differential [Pa]}
\]

\[
Q : \text{Flow rate [m}^3/\text{s]}
\]

\[
\rho : \text{Density of fluid [kg/m}^3]\]

(3) Formula of flow rate
It is described by the practical units. Also, the flow-rate characteristics are shown in Chart (1).

For saturated steam:

When \( P_2 < \frac{P_1 - 0.1}{2} \), sonic flow

\[
Q = 8.3 \times 10^6 \cdot Av \cdot \sqrt{\frac{(P_1 - 0.1)^2}{4} + 0.1 \times P_1} \quad \text{m}^3/\text{s}
\]

When \( P_2 > \frac{P_1 - 0.1}{2} \), subsonic flow

\[
Q = 8.3 \times 10^6 \cdot Av \cdot \Delta P \quad \text{m}^3/\text{s}
\]

\[
\Delta P = P_1 - P_2
\]

\[
Q : \text{Flow rate [m}^3/\text{s]}
\]

\[
Av : \text{Flow coefficient [m}^2]\]

\[
\Delta P : \text{Pressure differential [Pa]}
\]

\[
P_1 : \text{Upstream pressure [MPa]}
\]

\[
P_2 : \text{Downstream pressure [MPa]}
\]

Conversion of flow coefficient:

\[
Av = 28 \times 10^{-6} \cdot Kv = 24 \times 10^{-6} \cdot Cv
\]

Here, 

\[
Kv \text{ factor} \quad : \text{Value of the clean water flow rate represented by m}^3/\text{h which runs through a valve at 5 to 40°C, when the pressure differential is 1 bar.}
\]

\[
Cv \text{ factor (Reference values):} \quad \text{Figures representing the flow rate of clean water by US gal/min which runs through a valve at 60°F, when the pressure differential is 1 lbf/in}^2 \text{ (psi).}
\]

Value is different from *Kv* and *Cv* factors for pneumatic purpose due to different test method.
Example 1)
Find the pressure differential when water 15 \[ l/min \] runs through a solenoid valve with an \( Av = 45 \times 10^{-6} \ [m^2] \). Since \( Q_0 = 15/45 = 0.33 \ [l/min] \), according to Chart (1), if reading \( \Delta P \) when \( Q_0 \) is 0.33, it will be 0.031 \ [MPa] \).

(4) Test method
Attach a test equipment with the test circuit shown in Fig. (2). Next, pour water at 5 to 40°C, then measure the flow rate with a pressure differential of 0.075 MPa. However, the pressure differential needs to be set with a large enough difference so that the Reynolds number does not go below a range of \( 4 \times 10^4 \).

By substituting the measurement results for formula (1) to figure out \( Av \).

Chart (1) Flow-rate characteristics

Example 1

Upstream pressure

\( P_1 = 1 \) MPa
\( P_1 = 0.8 \) MPa
\( P_1 = 0.6 \) MPa
\( P_1 = 0.5 \) MPa
\( P_1 = 0.4 \) MPa
\( P_1 = 0.3 \) MPa
\( P_1 = 0.2 \) MPa
\( P_1 = 0.1 \) MPa
\( P_1 = 0.075 \) MPa

Water flow rate \( Q_0 \) \([l/min]\) \( \text{when} \ Av = 1 \times 10^{-6} \ [m^2] \)

<table>
<thead>
<tr>
<th>Temperature ([°C])</th>
<th>Pressure ([MPa])</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.2</td>
</tr>
<tr>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>0.4</td>
<td>0.6</td>
</tr>
<tr>
<td>0.5</td>
<td>0.7</td>
</tr>
<tr>
<td>0.6</td>
<td>0.8</td>
</tr>
<tr>
<td>0.7</td>
<td>0.9</td>
</tr>
<tr>
<td>0.8</td>
<td>1.0</td>
</tr>
<tr>
<td>0.9</td>
<td>1.1</td>
</tr>
<tr>
<td>1.0</td>
<td>1.2</td>
</tr>
<tr>
<td>1.1</td>
<td>1.3</td>
</tr>
<tr>
<td>1.2</td>
<td>1.4</td>
</tr>
<tr>
<td>1.3</td>
<td>1.5</td>
</tr>
<tr>
<td>1.4</td>
<td>1.6</td>
</tr>
<tr>
<td>1.5</td>
<td>1.7</td>
</tr>
<tr>
<td>1.6</td>
<td>1.8</td>
</tr>
<tr>
<td>1.7</td>
<td>1.9</td>
</tr>
<tr>
<td>1.8</td>
<td>2.0</td>
</tr>
</tbody>
</table>

The chart above is calculated using the Antoine equation.
Glossary of Terms

Pressure Terminology

1. Maximum operating pressure differential
   The maximum pressure differential (the difference between the inlet and outlet pressure) which is allowed for operation, with the valve closed or open. When the outlet pressure is 0 MPa, this becomes the maximum operating pressure.

2. Minimum operating pressure differential
   The minimum pressure differential (the difference between the inlet pressure and outlet pressure) required to keep the main valve stably operated.

3. Maximum system pressure
   The maximum pressure that can be applied inside the pipelines. (Line pressure) [The pressure differential of the solenoid valve portion must be less than the maximum operating pressure differential.]

4. Proof pressure
   The pressure in which the valve must be withstanded without a drop in performance after holding for 1 minute under prescribed pressure (static pressure) and returning to the operating pressure range. [Value under the prescribed conditions]

Electrical Terminology

1. Apparent power (VA)
   Volt-ampere is the product of voltage (V) and current (A). Power consumption (W): For AC, W = V · A. cosθ. For DC, W = V · A. Note) cosθ shows power factor. cosθ = 0.6

2. Surge voltage
   A high voltage which is momentarily generated by shutting off the power in the shut-off area.

3. Enclosure
   A degree of protection defined in the "JIS C 0920: Waterproof test of electric machinery/appliance and the degree of protection against the intrusion of solid foreign objects". Verify the degree of protection for each product.

   IP — Second characteristic numeral
   First characteristic numeral

   ● First Characteristics:
   Degrees of protection against solid foreign objects
   0 Non-protected
   1 Protected against solid foreign objects of 50 mm ø and greater
   2 Protected against solid foreign objects of 12 mm ø and greater
   3 Protected against solid foreign objects of 2.5 mm ø and greater
   4 Protected against solid foreign objects of 1.0 mm ø and greater
   5 Dust-protected
   6 Dusttight

   ● Second Characteristics:
   Degrees of protection against water
   0 Non-protected
   1 Protected against vertically falling water drops
   2 Protected against vertically falling water drops when enclosure tilted up to 15°
   3 Protected against rain when enclosure tilted up to 60°
   4 Protected against splashing water
   5 Protected against water jets
   6 Protected against powerful water jets
   7 Protected against the effects of temporary immersion in water
   8 Protected against the effects of continuous immersion in water
   9 Immersible type
   — Submersible type

Example) IP65: Dusttight. Low jetproof type
 "Low jetproof type" means that no water intrudes inside an equipment that could hinder from operating normally by means of applying water for 3 minutes in the prescribed manner. Take appropriate protection measures, since a device is not usable in an environment where a droplet of water is splashed constantly.

Others

1. Material
   NBR: Nitrile rubber
   FKM: Fluoro rubber – Product name: Viton®, Dai-el®, etc.
   EPDM: Ethylene propylene rubber

2. Oil-free treatment
   The degreasing and washing of wetted parts.

3. Passage symbol
   In the JIS symbol (          ) IN and OUT are in a blocked condition (†), but actually in the case of reverse pressure (OUT> IN), there is a limit to the blocking. (†) is used to indicate that blocking of reverse pressure is not possible.
Safety Instructions

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.

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

\(\sqrt{\text{etc.}}\)

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.

\[\text{Warning}\]

\[\text{Caution:}\]

\[\text{Warning:}\]

\[\text{Danger:}\]

\[\text{Caution}\] indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

\[\text{Warning}\] indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

\[\text{Danger}\] indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
Safety Instructions

Safety Instructions

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

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. 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.
**Warning**

1. Do not use the valves in an atmosphere having corrosive gases, chemicals, sea water, water, water steam, 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.

**Caution**

1. Do not apply lubricant to the solenoid valve. Scale and sludge are generated by the reaction of oil and steam, and cause destruction and malfunction.

**Operating Environment**

1. Lubrication
   Doing lubricant to the solenoid valve. Scale and sludge are generated by the reaction of oil and steam, and cause destruction and malfunction.

2. Storage
   In case of long term storage after use with heated water, thoroughly remove all moisture to prevent rust and deterioration of rubber materials, etc.

3. Depending on the water quality, the brass body may corrode due to dezincification, causing internal leakage. Inspect the product once every six months. If any problem is found, replace it with a product with a stainless steel body.

**Maintenance**

1. Do not apply lubricant to the solenoid valve. Scale and sludge are generated by the reaction of oil and steam, and cause destruction and malfunction.

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

**Operating Precautions**

1. Valve will reach high temperatures from high temperature fluids. Use caution, as there is a danger of being burned if a valve is touched directly.
2. Arrange piping so that condensate will not accumulate in the solenoid valve. Install the piping to the solenoid valve higher than peripheral piping. Be sure to avoid installing the piping to the solenoid valve at the lowest part of the piping layout. If condensate accumulates in the solenoid valve or peripheral piping, the steam entering the piping will cause steam hammer. This will lead to destruction and malfunction of the solenoid valve and piping. If steam hammer causes problems, install by-pass piping to thoroughly discharge condensate from the piping. Apply steam to the device afterwards to start operation.
3. Make sure when using pilot type 2-port solenoid valves that the flow direction is from 1 (IN) to 2 (OUT). The valve is designed based on a flow direction of 1 (IN) to 2 (OUT) and harnesses the fluid pressure of port 1 (IN) when the valve opens or closes. If reverse pressure (2 (OUT) to 1 (IN)) is applied, it may lead to a reduced service life or cause damage to parts early on due to chattering or pulses from the main valve (diaphragm, piston, etc.). If there is a possibility that reverse pressure will be applied, take countermeasures by installing the check valve, etc. at the downstream side. When installing the check valve, allow ample space between the valve and the check valve. If it is placed near the valve, it may cause chattering and pulses in the main valve.

**Caution**

1. The valve of the pilot-operated 2-port solenoid valve may be opened momentarily and result in fluid leakage when pressure is applied to the valve suddenly (if the pump or supply valve starts, for example) while the valve is closed. Please be cautious of this.
**Series VXS**

**Specific Product Precautions 2**

Be sure to read before handling.

Refer to back pages 1 and 2 for Safety Instructions, “Handling Precautions for SMC Products” (M-E03-3) for 2 Port Solenoid Valves for Fluid Control Precautions.

---

### Design

#### Warning

1. **Cannot be used as an emergency shutoff valve, etc.**
   
The valves presented in this catalog are not designed for safety applications such as an emergency shutoff valve. If the 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.

3. **This solenoid valve cannot be used for explosion proof applications.**

4. **Maintenance space**
   
The installation should allow sufficient space for maintenance activities.

5. **Actuator drive**
   
When an actuator, such as a cylinder, is to be driven using a valve, take appropriate measures to prevent potential danger caused by actuator operation.

6. **Pressure (including vacuum) holding**
   
It is not usable for an application such as holding the pressure (including vacuum) inside of a pressure vessel because air leakage is entailed in a valve.

7. **When the conduit type is used as equivalent to an IP65 enclosure, install a wiring conduit, etc.**

8. **When an impact, such as steam hammer, etc., caused by the rapid pressure fluctuation is applied, the solenoid valve may be damaged. Give an attention to it.**

---

### Selection

#### Warning

1. **Confirm the specifications.**
   
Give careful consideration to the operating conditions such as the application, fluid and environment, and use within the operating ranges specified in this catalog.

2. **Fluid**
   
   1. **Type of fluid**
      
      This product is applicable only for steam of 183°C/1 MPa or less.

   2. **Flammable oil, gas**
      
      Do not use with these fluids, as they can cause destruction or malfunction.

   3. **Corrosive gas**
      
      Cannot be used since it will lead to cracks by stress corrosion or result in other incidents.

   4. **Use an oil-free specification when any oily particle must not enter the passage.**

   5. **Applicable fluid on the list may not be used depending on the operating condition. Give adequate confirmation, and then determine a model, just because the compatibility list shows the general case.**

3. **Steam quality**
   
The use of a steam which contains foreign matter can cause problems such as malfunction and seal failure by promoting wear of the valve seat and armature, and by sticking to the sliding parts of the armature, etc. Install a suitable filter (strainer) immediately upstream from the valve. As a general rule, use 80 to 100 mesh.

   When used to supply water to boilers, substances such as calcium and magnesium which generate hard scale and sludge are included. Since this scale and sludge can cause the valve to malfunction, install water softening equipment, and a filter (strainer) directly upstream from the valve to remove these substances.

   Do not use steam which includes chemicals, synthetic oils containing organic solvents, salt or corrosive gases, etc., as it can cause destruction or malfunction.

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

---

Approved
Series VXS
Specific Product Precautions 3

Be sure to read before handling.
Refer to back pages 1 and 2 for Safety Instructions, “Handling Precautions for SMC Products” (M-E03-3) for 2 Port Solenoid Valves for Fluid Control Precautions.

**Caution**

1. Leakage voltage
   Particularly 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.

2. Low temperature operation
   1. The valve can be used in an ambient temperature of between –10 to –20°C. However, take measures to prevent freezing or solidification of impurities, etc.
   2. When using valves for water application in cold climates, take appropriate countermeasures to prevent the water from freezing in tubing by draining the water, etc. When warming by a heater, etc., be careful not to expose the coil portion to a heater. Installation of a dryer, heat retaining of the body is recommended to prevent a freezing condition in which the dew point temperature is high and the ambient temperature is low, and the high flow runs.

**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. Be sure not to position the coil downwards.
   When mounting a valve with its coil positioned downwards, foreign objects in the fluid will adhere to the iron core leading to a malfunction.

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. Secure with brackets, except in the case of steel piping and copper fittings.

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

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

**Selection**

- **Switching element**
- **Leakage voltage**

- **Power supply**

10% or less of rated voltage

**Piping**

1. Preparation before piping
   Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

2. Wrapping of pipe tape
   When connecting pipes, fittings, etc., be sure that chips from the pipe threads and sealing material do not enter the valve.

3. If an excessive amount of thread sealant such as seal tape or liquid thread sealant is used during piping, it will get inside the product and lead to malfunction.

4. Always tighten threads with the proper tightening torque.
   When attaching fittings to valves, tighten with the proper tightening torque shown below.

**Warning**

1. When connecting piping to products, refer to its instruction manual to avoid mistakes regarding the supply port, etc.

2. Steam generated in a boiler contains a large amount of drainage. Be sure to operate it with a drain trap installed.

3. Arrange piping so that condensate will not accumulate in the solenoid valve.

4. Secure with brackets, except in the case of steel piping and copper fittings.

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.

**Montaging**

- **Pipe tape**

**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. Be sure not to position the coil downwards.
   When mounting a valve with its coil positioned downwards, foreign objects in the fluid will adhere to the iron core leading to a malfunction.

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. Secure with brackets, except in the case of steel piping and copper fittings.

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

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

**Back page 5**

 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
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. The voltage drop is the value in the lead wire section connecting the coil.

**Electrical Circuits**

**Caution**

[AC, Class H coil (Full wave rectifier type) circuit]

* The standard product is equipped with surge voltage suppressor.

Grommet, Conduit, Conduit terminal

Conduit terminal with light

1. Rectifier element
2. Light

---

**Electrical Connections**

**Caution**

Conduit

When used as an IP65 equivalent, use seal (part no. VCW20-15-6) to install the wiring conduit. Also, use the tightening torque below for the conduit.

- Class H coil: AWG18 Insulator O.D. 2.2 mm
- For the replacement of the solenoid coil, cut the lead wire within this range.

Conduit port size G1/2

- Tightening torque 0.5 to 0.6 N·m

Seal (VCW20-15-6)

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**Electrical Connections**

**Caution**

Grommet

Class H coil: AWG18 Insulator O.D. 2.2 mm

For the replacement of the solenoid coil, cut the lead wire within this range.

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**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.

**Rated voltage** | **Lead wire color**
--- | ---
100 VAC | Blue
200 VAC | Red
Other AC | Gray

* There is no polarity.

**Description**

<table>
<thead>
<tr>
<th>Part no.</th>
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<tr>
<td>Seal VCW20-15-6</td>
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Note) Please order separately.

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**Round head combination screw**

M3 Tightening torque 0.5 to 0.6 N·m

**Terminal cover**

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**Conduit terminal**

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**View A-A**

(Internal connection diagram)
Safety Instructions: Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.