Molded coil specifications have been added!

- Grommet/Molded
- Flat terminal/Molded

The production of the VDW10/20/30 series was discontinued. (Except for VDW10/20 manifold and 3 port type)
For details about new series: VDW10/20 → page 453
VDW30 → VX2 series
**For Water and Air**

**Compact Direct Operated 2/3 Port Solenoid Valve**

### VDW Series

The production of the VDW10/20/30 series was discontinued.
(Except for VDW10/20 manifold and 3 port type)
For details about new series: VDW10/20 → page 453
VDW30 → VX2 series

---

**Improved durability (Nearly twice the life of the previous series)**

The use of a unique magnetic material reduces the operating resistance of moving parts, while improving service life, wear and corrosion resistance.

**Improved corrosion resistance**
Special material introduced

**High flow rate: Cv factor**
0.04 to 0.46 (2 port)

**Universal porting**
VDW200/300 (3 port)

**Improved environment resistance**
Environment resistance is improved by using a molded coil. (Enclosure IP65 or equivalent, grommet mold)

**Clip type**
Ease of maintenance has been improved.
Changing of the coil is made easy by means of clip design. (2 port)

**Threaded assembly**
Simplifies maintenance.

**Brass (C37)/Stainless steel manifolds added to series (2 port)**

**Threaded for bottom mounting**
Special bracket can be mounted.

---

**Lineup by Compact Design**

<table>
<thead>
<tr>
<th>2 Port</th>
<th>3 Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø17</td>
<td>Ø20.5</td>
</tr>
<tr>
<td>VDW10</td>
<td>VDW20</td>
</tr>
<tr>
<td>VDW200</td>
<td>VDW300</td>
</tr>
</tbody>
</table>

The production was discontinued.
The production of the VDW10/20/30 series was discontinued. (Except for VDW10/20 manifold and 3 port type)
For details about new series: VDW10/20 → page 453
VDW30 → VX2 series

---

### How to Order Valves (Single Unit)

**VDW10/20/30 Series**

#### Series

- **1** 10
- **2** 20
- **3** 30

#### Valve type

- N.C.

#### Voltage

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Voltage</th>
<th>Grommet / Tape winding (G)</th>
<th>Flat terminal, Molded (F)</th>
<th>Grommet / Molded (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 VAC (50/60 Hz)</td>
<td>●</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2</td>
<td>200 VAC (50/60 Hz)</td>
<td>●</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>3</td>
<td>110 VAC (50/60 Hz)</td>
<td>●</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>220 VAC (50/60 Hz)</td>
<td>●</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>5</td>
<td>24 VDC</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>6</td>
<td>12 VDC</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>V</td>
<td>6 VDC</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>S</td>
<td>5 VDC</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>R</td>
<td>3 VDC</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

* Please consult with SMC regarding other voltages.

---

**Made to Order**

(Refer to page 474.)

**Material and insulation type**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Body material</th>
<th>Seal material</th>
<th>Coil insulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td>—</td>
<td>—</td>
<td>Class B</td>
</tr>
<tr>
<td>A</td>
<td>Brass (C37)</td>
<td>FKM</td>
<td>—</td>
</tr>
<tr>
<td>B</td>
<td>—</td>
<td>EPDM</td>
<td>—</td>
</tr>
<tr>
<td>G</td>
<td>Stainless steel</td>
<td>NBR</td>
<td>—</td>
</tr>
<tr>
<td>H</td>
<td>—</td>
<td>FKM</td>
<td>—</td>
</tr>
<tr>
<td>J</td>
<td>—</td>
<td>EPDM</td>
<td>—</td>
</tr>
<tr>
<td>L</td>
<td>—</td>
<td>FKM</td>
<td>—</td>
</tr>
</tbody>
</table>

* Note) The armature assembly is a corrosion resistant construction.

**Thread type**

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

**Port size**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Port size</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>M5</td>
<td>1/8 (6A)</td>
<td>10</td>
</tr>
<tr>
<td>01</td>
<td>1/4 (8A)</td>
<td>20</td>
</tr>
<tr>
<td>02</td>
<td>—</td>
<td>30</td>
</tr>
</tbody>
</table>

**Orifice diameter**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Orifice diameter (mm ø)</th>
<th>Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>1.6</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>3.2</td>
<td>30</td>
</tr>
</tbody>
</table>

---

The production was discontinued.
## Standard Specifications

### Valve construction
- **Fluid** (Note 2): Water (except waste water or agricultural water), Air, Low vacuum
- **Withstand pressure (MPa)**: 2.0
- **Ambient temperature (°C)**: –10 to 50
- **Fluid temperature (°C)**: 1 to 50 (No freezing)
- **Environment**: Location without corrosive or explosive gases
- **Valve leakage (cm³/min)**: 0 (with water pressure) 1 or less (Air)
- **Mounting orientation**: Unrestricted
- **Vibration/Impact (m/s²)**: Note 4
- **Rated voltage**: 24 VDC, 12 VDC, 6 VDC, 5 VDC, 3 VDC, 100 VAC, 110 VAC, 200 VAC, 220 VAC (50/60 Hz)
- **Allowable voltage fluctuation (%)**: ±10% of rated voltage
- **Coil insulation type**: Class B
- **Enclosure**: Dust-proof (equivalent to IP40)
- **Power consumption (W)**: 2.5 (VDW10), 3 (VDW20/30)

### Valve specifications
- **Model**: VDW10/20/30 Series
- **Made to Order**: For details, refer to page 489.
- **Symbol Specifications**: -X23 Oil-free specification, -X60 Lead wire length: 600 mm specification, -X133 Seal material: Perfluoroelastomer specification
- **Non-leak (10⁻⁶ Pa·m³/sec) / Vacuum (0.1Pa·abs) specification**: -X22

### Coil specifications
- **Model**: VDW10/20/30 Series
- **Made to Order**: The production was discontinued.
- **Symbol Specifications**: -X23 Oil-free specification, -X60 Lead wire length: 600 mm specification, -X133 Seal material: Perfluoroelastomer specification
- **Non-leak (10⁻⁶ Pa·m³/sec) / Vacuum (0.1Pa·abs) specification**: -X22

### Characteristic Specifications
- **Model**: VDW10, VDW20, VDW30
- **Orifice dia. (mm ø)**
  - **Model**: VDW10
    - M5: 1, 1.6, 2.3, 3.2, 4
  - **Model**: VDW20
    - 1/8 (6A): 1, 1.6, 2.3, 3.2
    - 1/4 (8A): 2, 3, 4
  - **Model**: VDW30
    - 1/8 (6A): 1, 2, 3, 4
    - 1/4 (8A): 1, 2, 3, 4
- **Max. operating pressure differential (MPa) (Note 1)**
  - **Pressure port 1**: 0 to 1.0
- **Operating Pressure range (MPa) (Note 2)**
  - **Model**: VDW10
    - M5: 0 to 1.0
  - **Model**: VDW20
    - 1/8 (6A): 0 to 1.0
    - 1/4 (8A): 0 to 1.0
  - **Model**: VDW30
    - 1/8 (6A): 0 to 1.0
    - 1/4 (8A): 0 to 1.0
- **Weight (kg)**
  - **Model**: VDW10
    - M5: 0.08
  - **Model**: VDW20
    - 1/8 (6A): 0.1
    - 1/4 (8A): 0.26
  - **Model**: VDW30
    - 1/8 (6A): 0.1
    - 1/4 (8A): 0.26

### Flow Rate Characteristics
- **Model**: VDW10, VDW20, VDW30
- **Orifice dia. (mm ø)**
  - **Model**: VDW10
    - M5: 1, 1.6
  - **Model**: VDW20
    - 1/8 (6A): 1, 1.6
    - 1/4 (8A): 1, 1.6
  - **Model**: VDW30
    - 1/8 (6A): 1, 1.6
    - 1/4 (8A): 1, 1.6
- **Kv**: 0.03, 0.06, 0.06, 0.06, 0.15, 0.25, 0.25, 0.25
- **Cv converted**: 0.03, 0.06, 0.06, 0.06, 0.15, 0.25, 0.25, 0.25
- **Cv**: 0.03, 0.06, 0.06, 0.06, 0.15, 0.25, 0.25, 0.25
- **b**: 0.03, 0.06, 0.06, 0.06, 0.15, 0.25, 0.25, 0.25
- **C [dm³/(s·bar)]**: 0.03, 0.06, 0.06, 0.06, 0.15, 0.25, 0.25, 0.25

Note 1) The maximum operating pressure differential changes depending on the flow direction of the fluid. Refer to page 494 for details.

Note 2) For low vacuum specifications, the operating pressure range is 1 Torr (1.33 x 10⁻² Pa) to 1.0 MPa. Please consult with SMC if using below 1 Torr (1.33 x 10⁻² Pa).
The production of the VDW10/20/30 series was discontinued. (Except for VDW10/20 manifold and 3 port type) For details about new series: VDW10/20 → page 453
VDW30 → VX2 series

### Construction

#### VDW11

1. Body
2. Tube assembly
3. Coil assembly
4. Armature assembly
5. O-ring (Body)
6. Return spring
7. Cover
8. Clip

#### VDW21

1. Body
2. Tube assembly
3. Coil assembly
4. Armature assembly
5. O-ring (Body)
6. Return spring
7. Cover
8. Clip

#### VDW31

1. Body
2. Tube assembly
3. Coil assembly
4. Armature assembly
5. O-ring (Body)
6. Return spring
7. Cover
8. Clip

The production was discontinued.

### Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>Brass (C37)  Stainless steel</td>
</tr>
<tr>
<td>2</td>
<td>Tube assembly</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>3</td>
<td>Coil assembly</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>Armature assembly</td>
<td>Stainless steel, PPS, NBR</td>
</tr>
<tr>
<td>5</td>
<td>O-ring (Body)</td>
<td>NBR</td>
</tr>
<tr>
<td>6</td>
<td>Return spring</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>7</td>
<td>Cover</td>
<td>SPCE</td>
</tr>
<tr>
<td>8</td>
<td>Clip</td>
<td>Stainless steel</td>
</tr>
</tbody>
</table>
**VDW10/20/30 Series**

The production of the VDW10/20/30 series was discontinued. (Except for VDW10/20 manifold and 3 port type)

For details about new series: VDW10/20 → page 453

VDW30 → VX2 series

---

**Dimensions**

**VDW11**
- Lead wire: L Approx. 300
- Rectifier element: AC type
- 2 (OUT) port
- 1 (IN) port

**VDW21**
- Lead wire: L Approx. 300
- Rectifier element: AC type
- 2 (OUT) port
- 1 (IN) port

**VDW31**
- Lead wire: L Approx. 300
- Rectifier element: AC type
- 2 (OUT) port
- 1 (IN) port

---

**Bracket assembly part no.**

- **10, 20 series**
  - VDW 2 0 –15A–1

- **30 series**
  - VCW20 –12 –01A
Compact Direct Operated
2 Port Solenoid Valve for Water and Air **VDW10/20/30 Series**

The production of the VDW10/20/30 series was discontinued. (Except for VDW10/20 manifold and 3 port type)
For details about new series: VDW10/20 → page 453
VDW30 → VX2 series

**Bracket assembly part no.**
- **20 series**
  - VDW20 — 15A — 1
- **30 series**
  - VCW20 — 12 — 01A
How to Order Manifold

**VV2DW 2** - 05 01 -

- **Series**: 1 10 2 20 3 30

- **CE-compliant**: Nil — Q —

- **Option**: Nil None Q CE-compliant

- **Material**: Manifold part no.
  - Symbol: N
  - Material: Brass (C37)
  - Seal material: FKM

- **Stations**: 02 2 stations

- **Material**: Valve part no.
  - Symbol: F
  - Material: Stainless steel
  - Seal material: EPDM

- **Material**: N.C. for manifold
  - Symbol: F

- **Thread type**: Nil Rc F G N NPT

- **Material**: Out port size
  - Symbol: M5
  - Port size: 1/8 (6A)

- **Material**: OUT port size
  - Symbol: M5
  - Port size: 1/4 (8A)

- **Material**: 100 VAC (50/60 Hz) 200 VAC (50/60 Hz) 110 VAC (50/60 Hz) 220 VAC (50/60 Hz) 24 VDC 12 VDC 6 VDC 5 VDC 3 VDC

- **Grommet / Tape winding**: Nil — Nil — Nil —

- **Material**: Coil type (Note)
  - Symbol: G
  - Material: Grommet / Tape winding
  - Seal material: FKM

- **Material**: Orifice diameter (mm)
  - Symbol: 1
  - Orifice diameter: 1.6

- **Material**: Blanking plate assembly
  - Symbol: G
  - Material: Stainless steel

How to Order Valves (For Manifold)

**VDW 2 3 - 5 G - 2 -**

- **Series**: 1 10 2 20 3 30

- **CE-compliant**: Nil — Q —

- **Material**: Body material
  - Symbol: A
  - Material: Brass (C37)
  - Seal material: FKM

- **Material**: Material and insulation type
  - Symbol: B
  - Material: Stainless steel
  - Seal material: EPDM

- **Material**: Coil insulation
  - Symbol: Nil
  - Material: NBR

- **Material**: Orifice diameter (mm)
  - Symbol: Grommet / Tape winding
  - Material: Nil

- **Material**: Orifice diameter (mm)
  - Symbol: Flat terminal / Molded
  - Material: Nil

- **Material**: Orifice diameter (mm)
  - Symbol: Grommet / Molded
  - Material: Nil

Manifold Options

Blanking plate assembly
- **VVDW 2 0 - 3A -**

- **Material**: Plate material
  - Symbol: G
  - Material: Stainless steel
  - Seal material: NBR

- **Material**: Plate material
  - Symbol: H
  - Material: Stainless steel
  - Seal material: FKM

- **Material**: Plate material
  - Symbol: J
  - Material: Stainless steel
  - Seal material: EPDM

- **30 series**

- **Material**: Plate material
  - Symbol: G
  - Material: NBR

- **Material**: Plate material
  - Symbol: H
  - Material: FKM

- **Material**: Plate material
  - Symbol: J
  - Material: EPDM

The production was discontinued.
### Dimensions VV2DW1

#### L Dimension

<table>
<thead>
<tr>
<th>Dimension</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>35</td>
<td>52.5</td>
<td>70</td>
<td>87.5</td>
<td>105</td>
<td>122.5</td>
<td>140</td>
<td>157.5</td>
<td>175</td>
</tr>
<tr>
<td>L2</td>
<td>45</td>
<td>62.5</td>
<td>80</td>
<td>97.5</td>
<td>115</td>
<td>132.5</td>
<td>150</td>
<td>167.5</td>
<td>185</td>
</tr>
<tr>
<td>L3</td>
<td>52</td>
<td>69.5</td>
<td>87</td>
<td>104.5</td>
<td>122</td>
<td>139.5</td>
<td>157</td>
<td>174.5</td>
<td>192</td>
</tr>
</tbody>
</table>

**Manifold composition:**
- 2 stns. x 1
- 3 stns. x 1
- 2 stns. x 2
- 2 stns. + 3 stns.
- 3 stns. x 2
- 2 stns. x 2 + 3 stns.
- 2 stns. + 3 stns. x 2
- 3 stns. x 3
- 2 stns. x 2 + 3 stns. x 2

**Note:** Manifold base consists of the junction of 2 and 3 station bases. Refer to pages 482 and 483 regarding manifold additions.
**VDW10/20/30 Series**

**Dimensions**

**VV2DW2**

![Diagram of VDW2DW2 manifold]

- **Dimensions**:
  - **L1**
  - **L2**
  - **L3**

![Dimensions table]

<table>
<thead>
<tr>
<th>Dimension</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>44</td>
<td>66</td>
<td>88</td>
<td>110</td>
<td>132</td>
<td>154</td>
<td>176</td>
<td>198</td>
<td>220</td>
</tr>
<tr>
<td>L2</td>
<td>53</td>
<td>75</td>
<td>97</td>
<td>119</td>
<td>141</td>
<td>163</td>
<td>185</td>
<td>207</td>
<td>229</td>
</tr>
<tr>
<td>L3</td>
<td>62</td>
<td>84</td>
<td>106</td>
<td>128</td>
<td>150</td>
<td>172</td>
<td>194</td>
<td>216</td>
<td>238</td>
</tr>
</tbody>
</table>

- **Manifold composition**:
  - 2 stns. x 1
  - 3 stns. x 1
  - 2 stns. x 2
  - 2 stns. + 3 stns.
  - 3 stns. x 2
  - 2 stns. + 3 stns. x 2
  - 3 stns. + 2 stns. x 2
  - 3 stns. + 2 stns. x 2 + 3 stns. x 2

- **Note**: Manifold base is consisted of the junction of 2 and 3 station bases. Refer to pages 482 and 483 regarding manifold additions.

![Note]

*When w/o bracket, M4 threads at both ends (4 locations) can be used for other purposes.*

---

**L Dimension** *(mm)*

<table>
<thead>
<tr>
<th>Dimension</th>
<th>n (stations)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>n x M5 x 0.8</td>
</tr>
<tr>
<td></td>
<td>n x 1/8</td>
</tr>
</tbody>
</table>

- **(OUT port)**

---

**Note**: 

- Dimensions are provided for manifold configurations.
- Refer to pages 482 and 483 for manifold additions.
### L Dimension

<table>
<thead>
<tr>
<th>Dimension</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>70</td>
<td>105</td>
<td>140</td>
<td>175</td>
<td>210</td>
<td>245</td>
<td>280</td>
<td>315</td>
<td>350</td>
</tr>
<tr>
<td>L2</td>
<td>82</td>
<td>117</td>
<td>152</td>
<td>187</td>
<td>222</td>
<td>257</td>
<td>292</td>
<td>327</td>
<td>362</td>
</tr>
<tr>
<td>L3</td>
<td>94</td>
<td>129</td>
<td>164</td>
<td>199</td>
<td>234</td>
<td>269</td>
<td>304</td>
<td>339</td>
<td>374</td>
</tr>
</tbody>
</table>

**Manifold composition**
- 2 stns. x 1
- 3 stns. x 1
- 2 stns. x 2
- 2 stns. + 3 stns.
- 3 stns. x 2
- 2 stns. x 2 + 3 stns.
- 3 stns. x 3
- 2 stns. x 2 + 3 stns. x 2

*Note: Manifold base is consisted of the junction of 2 and 3 station bases. Refer to pages 482 and 483 regarding manifold additions.*
### Manifold Exploded View

<table>
<thead>
<tr>
<th>Bracket assembly</th>
<th>Manifold base for 2 stations</th>
<th>Passage pipe assembly</th>
<th>Manifold base for 3 stations</th>
<th>Bracket assembly</th>
</tr>
</thead>
</table>

* Figure shows VV2DW2.

### Manifold additions

1. Install a passage pipe assembly in between the manifold bases to be added.
2. Connect the respective manifold bases with a connecting plate assembly. (Tightening torque: 0.9 ± 0.1 N·m)
3. Attach brackets to the manifold bases. (when equipped with brackets) (Tightening torque: 0.9 ± 0.1 N·m)

**Note**
- Manifold can be increased by every 2 or 3-station unit.
- Order one set each of manifold base, connection plate assembly and passage pipe assembly.
<Manifold base>  • 10, 20 series
VVDW 20 - 2 C 1 - 01

Material
- C: Brass (C37)
- S: Stainless steel

Stations
- 1: For 2 stations
- 2: For 3 stations

Thread type
- Nil
- Rc
- F
- G
- N
- NPT

OUT port size
- Symbol: M5
- Port size: M5

Note: Two sets of connecting plate and mounting screws.

<Connecting plate assembly>  • 10, 20 series
VVDW 20 - 4A

Note: The production was discontinued.

<Passage pipe assembly>  • 10, 20 series
VVDW 20 - 6A

Note: The production was discontinued.

<Bracket assembly>  • 10, 20 series
VVDW 20 - 5A

Note: Consists of a set for D and U sides.
Compact Direct Operated
3 Port Solenoid Valve for Water and Air

VDW200/300 Series

How to Order Valves (Single Unit)

For Water, Air, Vacuum

VD W 2 50 - 1 G - 2 - 01 - - - - -

Series

2 200
3 300

Valve type

C.O.

Flat terminal, Molded (F)

Grommet / Tape winding (G)

Voltage

Symbol Voltage Grommet / Tape winding (G) Flat terminal, Molded (F) Grommet / Molded (W)
1 100 VAC (50/60 Hz) ● — ●
2 200 VAC (50/60 Hz) ● — ●
3 110 VAC (50/60 Hz) ● — ●
4 220 VAC (50/60 Hz) ● — ●
5 24 VDC ● ● ●
6 12 VDC ● ● ●
V 6 VDC ● ● ●
S 5 VDC ● ● ●
R 3 VDC ● ● ●

Coil type

Symbol Voltage Grommet / Tape winding (G) Flat terminal, Molded (F) Grommet / Molded (W)
G — Grommet / Tape winding W — Grommet / Molded

Magnet wire protection: Tape winding Magnet wire protection: Resin Molded

F — Flat terminal / Molded

Material and insulation type

Symbol Body material Seal material Coil insulation
Nil NBR FKM Nil
A Brass (C37) FKM Nil
B EPDM Nil
G NBR FKM
H Stainless steel EPDM
J FKM
L FKM

Thread type

Symbol Port size Series
Nil Rc
F G°
N NPT Nil

Port size

Symbol Port size Series
M5 M5 —
01 1/8 (6A) — —
02 1/4 (8A) — —

Orifice diameter

Symbol N.C. Orifice diameter (mm ø) N.O. Orifice diameter (mm ø) Series
1 1 1 200
2 1.6 — 300
2 2 —
3 3 1.8 —
4 4 —

Note) The foot bracket is packed with a valve.

Note) The armature assembly is a corrosion resistant construction.

For connection, prepare a fitting compliant with ISO 16030 and JIS B 8674.

For Water, Air, Vacuum

Please consult with SMC regarding other voltages.
### Made to Order
(For details, refer to page 489.)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>-X22</td>
<td>Non-leak (10⁻⁶ Pa·m³/sec) / Vacuum (0.1Pa-abs) specification</td>
</tr>
<tr>
<td>-X60</td>
<td>Oil-free specification</td>
</tr>
<tr>
<td>-X133</td>
<td>Lead wire length: 600 mm specification</td>
</tr>
<tr>
<td></td>
<td>Seal material: Perfluoroelastomer specification</td>
</tr>
</tbody>
</table>

### Standard Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Valve construction</strong></td>
<td>Direct operated poppet</td>
</tr>
<tr>
<td><strong>Fluid</strong></td>
<td>Water (except waste water or agricultural water), Air, Low vacuum</td>
</tr>
<tr>
<td><strong>Withstand pressure (MPa)</strong></td>
<td>2.0</td>
</tr>
<tr>
<td><strong>Ambient temperature (°C)</strong></td>
<td>-10 to 50</td>
</tr>
<tr>
<td><strong>Fluid temperature (°C)</strong></td>
<td>1 to 50 (No freezing)</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td>Location without corrosive or explosive gases</td>
</tr>
<tr>
<td><strong>Valve leakage (cm³/min)</strong></td>
<td>0 (with water pressure)</td>
</tr>
<tr>
<td><strong>Mounting orientation</strong></td>
<td>Unrestricted</td>
</tr>
<tr>
<td><strong>Vibration/Impact (m/s²)</strong></td>
<td>30/150</td>
</tr>
<tr>
<td><strong>Rated voltage</strong></td>
<td>24 VDC, 12 VDC, 100 VAC, 110 VAC, 200 VAC, 220 VAC (50/60 Hz)</td>
</tr>
<tr>
<td><strong>Allowable voltage fluctuation (%)</strong></td>
<td>±10% of rated voltage</td>
</tr>
<tr>
<td><strong>Coil insulation type</strong></td>
<td>Class B</td>
</tr>
<tr>
<td><strong>Enclosure</strong></td>
<td>Dust-proof (equivalent to IP40)</td>
</tr>
<tr>
<td><strong>Power consumption (W)</strong></td>
<td>3</td>
</tr>
</tbody>
</table>

### Characteristic Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Port size</th>
<th>Orifice dia. (mm)</th>
<th>Max. operating pressure differential (MPa)</th>
<th>Operating pressure range (MPa)</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDW200</td>
<td>M5</td>
<td>1/8 (6A)</td>
<td>0.9</td>
<td>0 to 1.0</td>
<td>0.12</td>
</tr>
<tr>
<td>VDW200</td>
<td>1.6</td>
<td></td>
<td>0.7</td>
<td>1/8: 0.27</td>
<td>1/4: 0.30</td>
</tr>
<tr>
<td>VDW300</td>
<td>2</td>
<td>1/8 (6A)</td>
<td>0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VDW300</td>
<td>3</td>
<td>1/4 (8A)</td>
<td>0.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VDW300</td>
<td>4</td>
<td></td>
<td>0.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Flow Rate Characteristics

<table>
<thead>
<tr>
<th>Model</th>
<th>Port size</th>
<th>Orifice dia. (mm)</th>
<th>Water</th>
<th>Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDW200</td>
<td>M5</td>
<td>1/8 (6A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VDW300</td>
<td>1/8 (6A)</td>
<td>1/4 (8A)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note 1) Indicates the maximum operating pressure differential of pressure ports 2 and 3.
Note 2) The maximum operating pressure differential changes depending on the flow direction of the fluid. Refer to page 494 for details.
Note 3) Please consult SMC if using below 1 Torr (1.33 x 10⁻⁵ Pa) to 1.0 MPa.
VDW250

VDW350

Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>Brass (C37)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stainless steel</td>
</tr>
<tr>
<td>2</td>
<td>Tube assembly</td>
<td>Stainless steel</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Coil assembly</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Armature assembly</td>
<td>Stainless steel, PPS, NBR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stainless steel, PPS, FKM, EPDM</td>
</tr>
<tr>
<td>5</td>
<td>O-ring (Body)</td>
<td>NBR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FKM, EPDM</td>
</tr>
<tr>
<td>6</td>
<td>Return spring</td>
<td>Stainless steel</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Cover</td>
<td>SPCE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Socket</td>
<td>C36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stainless steel</td>
</tr>
<tr>
<td>9</td>
<td>O-ring</td>
<td>NBR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FKM, EPDM</td>
</tr>
<tr>
<td>10</td>
<td>Plate</td>
<td>SPCC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Wave washer</td>
<td>Stainless steel</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Compact Direct Operated
3 Port Solenoid Valve for Water and Air  
VDW200/300 Series

Dimensions

VDW250 - 200 Series
- Lead wire: L Approx. 300
- 2 x ø3.5
- ø20.5
- 7.1
- M5, 1/8
- 2 (N.C.) port
- 1 (IN) port
- 2 x M3 x 5

VDW350 - 300 Series
- Lead wire: L Approx. 300
- 36 (27.6)
- ø28
- 86 (82.5)
- 1/8, 1/4
- ø20.5
- 1/8, 1/4
- 1 (IN) port
- 2 (N.C.) port
- 2 x M4
- 1/8: thread depth 4.5
- 1/4: thread depth 6

Bracket assembly part no.
- 200 series
  
  VDW20 — 15A — 1

- 300 series
  
  VCW20 — 12 — 01A
**VDW200/300 Series**

**Dimensions**

**VDW250-□F**

**VDW350-□F**

**Bracket assembly part no.**

- **200 series**
  
  **VDW20 — 15A — 1**

- **300 series**
  
  **VCW20 — 12 — 01A**
### VDW Series

**Made to Order Specifications:**

Please consult with SMC for detailed size, specifications and delivery.

- **1.** Non-leak \(10^{-6} \text{ Pa-m}^3/\text{sec}\)/Vacuum \(0.1 \text{ Pa-abs}\) Specification
  
  Symbol: \(-X22\)

<table>
<thead>
<tr>
<th>VDW</th>
<th>Standard model no.</th>
<th>(-X22(-Q))</th>
</tr>
</thead>
</table>

- **2.** Oil-free Specification
  
  Symbol: \(-X23\)

<table>
<thead>
<tr>
<th>VDW</th>
<th>Standard model no.</th>
<th>(-X23(-Q))</th>
</tr>
</thead>
</table>

- **3.** Lead Wire Length: 600 mm Specification
  
  Symbol: \(-X60\)

<table>
<thead>
<tr>
<th>VDW</th>
<th>Standard model no.</th>
<th>(-X60(-Q))</th>
</tr>
</thead>
</table>

- **4.** Seal Material: Perfluoroelastomer Specification
  
  Symbol: \(-X133\)

<table>
<thead>
<tr>
<th>VDW</th>
<th>Standard model no.</th>
<th>(-X133(-Q))</th>
</tr>
</thead>
</table>

Note: Select from A, H, or L for the material and insulation type.
Pressure Terminology

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

2. Maximum operating pressure
   This indicates the limit of pressure that can be applied inside the pipelines. (Line pressure)
   (The pressure differential of the solenoid valve unit must be no more than the maximum operating pressure differential.)

3. Withstand pressure
   The pressure which must be withstood without a drop in performance after returning to the operating pressure range (The value under the prescribed conditions).

Electrical Terminology

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

2. 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  Dustight

   ● 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 rainfall 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

   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.
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**
Please consult with SMC when using with energization for long periods of time.

3. **Closed liquid circuit**
In a closed circuit, when liquid is static, pressure could rise due to changes in temperature. This pressure rise could cause malfunction and damage to components such as valves. To prevent this, install a relief valve in the system.

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

5. **Maintenance space**
The installation should allow sufficient space for maintenance activities (removal of valve, etc.).

### 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 temperature**
Please use within the operating fluid temperature range.

3. **Fluid quality**
   - **In the case of water**
The use of a fluid 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. In general, a mesh of about 80 to 100 is a guideline for the filter.
   - **In the case of air**
Use ordinary compressed air where a filter of 40 µm or less is provided on the inlet side piping. (Except dry air)

### Caution

1. **Leakage voltage**
When the solenoid valve is operated using the controller, etc., the leakage voltage should be the product allowable leakage voltage or less. 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.

   ![Diagram of Leakage Voltage](image)

   - **AC coil**
   - 10% or less of rated voltage
   - **DC coil**
   - 2% or less of rated voltage

2. **Low temperature operation**
   1) The valves can be used up to an ambient temperature of \(-10^\circ C\), however take measures to prevent solidification of impurities or freezing etc.
   2) When using valves for water application in cold climates, first stop the water supply/discharge of the pump etc., and then take measures to prevent freezing such as draining water in pipe. When heating by steam, be careful not to expose the coil portion to steam. Also, please take measures to prevent freezing such as heating the body.

### Mounting

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. **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.

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. **Operation manual**
The product should be mounted and operated after the Operation Manual is thoroughly read and its contents are understood. Keep the Operation Manual where it can be referred to as needed.

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

---

The production of the VDW10/20/30 series was discontinued. (Except for VDW10/20 manifold and 3 port type)

For details about new series: VDW10/20 → page 453
VDW30 → VX2 series
VDW Series
Specific Product Precautions 2
Be sure to read this before handling the products.
Refer to back page 50 for Safety Instructions and pages 17 to 19 for 2 Port Solenoid Valve for Fluid Control Precautions.

Caution

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. Winding of sealant tape
When connecting pipes, fittings, etc., be sure that chips from the pipe threads and sealing material do not enter the valve. Furthermore, when sealant tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.

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

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

Tightening Torque for Piping

<table>
<thead>
<tr>
<th>Connection threads</th>
<th>Proper tightening torque N·m (kgf·cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M5</td>
<td>1.5 to 2 (15 to 20)</td>
</tr>
<tr>
<td>Rc 1/8</td>
<td>7 to 9 (70 to 90)</td>
</tr>
<tr>
<td>Rc 1/4</td>
<td>12 to 14 (120 to 140)</td>
</tr>
<tr>
<td>Rc 3/8</td>
<td>22 to 24 (220 to 240)</td>
</tr>
</tbody>
</table>

* Reference

Tightening of M5 fitting threads
After tightening by hand, tighten approximately 1/6 turn further with a tightening tool. However, when using miniature fittings, tighten an additional 1/4 turn after tightening by hand. (In cases where there are gaskets in two places, such as a universal elbow or universal tee, double the additional tightening to 1/2 turn.)

5. Connection of piping to products
- When connecting piping to a product, refer to its operation manual to avoid mistakes regarding the supply port, etc.
- Do not apply external force to the coil when holding it to connect piping, as the tube may deform.

Caution

Wiring

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.

Electrical Connections

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.

Electrical Circuit

<table>
<thead>
<tr>
<th>Rated voltage</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 for DC.
* Lead wire: AWG20, outside diameter of insulator 1.79
Operating Environment

**Warning**

1. Do not use the valves in an atmosphere having corrosive gases, chemicals, salt 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.

---

**Maintenance**

**Warning**

1. Perform maintenance according to the procedure in the operation manual. Incorrect handling will cause damage or malfunction to devices or equipment.
2. Removing the product
   1) Shut off the fluid supply and release the fluid pressure in the system.
   2) Shut off the power supply.
   3) Dismount the product.
3. 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.

---

**Caution**

1. Filters and strainers
   1) Be careful regarding clogging of filters and strainers.
   2) Replace filter elements after one year of use, or earlier if the pressure drop reaches 0.1 MPa.
   3) Clean strainers when the pressure drop reaches 0.1 MPa.
   4) Exhaust the drain from an air filter periodically.
2. Storage
   When not using for a long time (more than approx. one month) after use with water, thoroughly remove all moisture to prevent rust and deterioration of rubber materials, etc.

---

Replacing the Solenoid Coils

**Caution**

2 port valve

1. Press the clip in direction ① with a flat head screwdriver, etc., and remove it from the tube assembly groove.
2. Remove the cover in direction ②, and replace the solenoid coil.
3. After inserting the clip into the tube assembly groove from direction ③. After inserting it into the groove, confirm the position and condition of the clip.

---

Inserted position

Inserted condition
Replacing the Solenoid Coils

Caution

3 port valve

After removing the socket with a wrench, etc., lift off the plate, wave washer and cover, and replace the coil assembly. After replacing the coil, first tighten the socket by hand while holding down the plate and wave washer, and then tighten it further with a torque of 0.8 to 1 N·m.

- Precautions when attaching and removing the socket
- Be careful that the O-ring installed on the bottom (plate side) of the socket does not fall out or become chewed up, etc.
- Be sure to secure the body by wrench, etc., and tighten the socket within the tightening torque range given above. If the torque is applied excessively, there is a danger of damaging the threads.

Replacement Parts

- Solenoid coil part no.
  VDW 2 0 - 1 C 1 1

  Series
  1 10
  2 20, 200
  3 30, 300

  Coil type
  C Grommet / Tape winding
  F Flat terminal / Molded
  W Grommet / Molded

  Type
  1 10, 20, 30
  2 200, 300

  Lead wire length
  Nil 300 mm
  L1 600 mm
  Note) Type L1 is optional.

  Voltage
  1 100 VAC
  2 200 VAC
  3 110 VAC
  4 220 VAC
  5 24 VDC
  6 12 VDC
  V 6 VDC
  S 5 VDC
  R 3 VDC

  Coil Type and Voltage Combinations

  Voltage Grommet / Tape winding Flat terminal / Molded Grommet / Molded
  100 VAC ● — ●
  200 VAC ● — ●
  110 VAC ● — ●
  220 VAC ● — ●
  24 VDC ● ● ●
  12 VDC ● ● ●
  6 VDC ● ● ●
  5 VDC ● ● ●
  3 VDC ● ● ●

  Note) To have a label on the cover, enter the part number below together with the coil part number.

AZ-T-VDW Valve model no. on pages 473, 478, 484

- Clip part no. (2 port)
  VDW 2 0 - 10

  Series
  2 10, 20

- Socket assembly part no. (3 port)
  VDW 2 0 - 12A - 01

  Series
  2 200
  3 300

  Port size
  Symbol Port size Series
  05 200 O
  01 300 O
  02 200 O

  Symbol Socket material Seal material
  Nil Brass (C37)
  A NBR
  B FKM
  C EPDM
  D NBR
  G FKM
  H EPDM
  J FKM

  Thread type
  Nil Rc
  F G
  N NPT
Piping to 3 Port Valve N.O. Port

**Caution**

When piping to an N.O. port, be sure to perform piping work while securing the socket by using wrench or other tool. Refer to back page 491 for other precautions related to piping.

---

**Fluid Flow Direction**

**Caution**

The maximum operating pressure differential differs depending on the flow direction of the fluid. If the pressure differential at each port exceeds the values in the table below, valve leakage may occur.

<table>
<thead>
<tr>
<th>3 Port Valve</th>
<th>Orifice diameter (mm ø)</th>
<th>Max. operating pressure differential (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pressure port 1</td>
</tr>
<tr>
<td>VDW200</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>1.6</td>
<td>0.7</td>
</tr>
<tr>
<td>VDW300</td>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Note 1) Indicates the maximum operating pressure differential of pressure ports 2 and 3.

Note 2) When the port 2 pressure is in the higher pressure side, be careful to avoid vibration and impacts, etc.