

## Compact Direct Operated 2/3 Port Solenoid Valve For Water and Air

# Series VDW

VDW10/20/30: 2 Port, VDW200/300: 3 Port

Series VDW10/20/30 2-port type has been remodeled to new compact and lightweight series.  
For details about new series, refer to New VDW for VDW10/20 and to Series VX21 for VDW30, respectively.



**New** Molded coil specifications have been added!



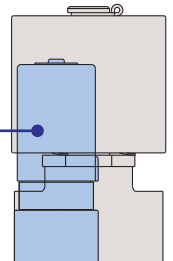
Grommet



Faston™ terminal

### Compact / Lightweight (compared to the VX series)

Single valve volume: Reduced by -75% (VDW20)  
100 g: Reduced approx. by -50%  
(for an orifice size equivalent to  $\varnothing$  2mm)



# Compact Direct Operated 2/3 Port Solenoid Valve For Water and Air

## Series VDW

Series VDW10/20/30 2-port type has been remodeled to new compact and lightweight series.  
For details about new series, refer to New VDW for VDW10/20 and to Series VX21 for VDW30, respectively.

- **Compact (compared to the VX series)**

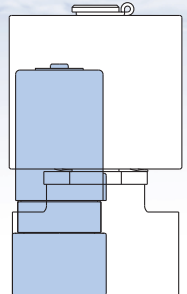
Single valve volume: **Reduced by -75%** (VDW20)

Manifold length: **Reduced by -18%** (VDW30, 7 stations)

- **Lightweight (compared to the VX series)**

**100 g: Reduced approx. by -50%**

(for an orifice size equivalent to  $\varnothing$  2mm)



### 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.

**Clip type**

**Ease of maintenance has been improved.**

Changing the coil is made easy with a clip design. (2 port)

**Threaded assembly**

Simplifies maintenance.

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

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

**Brass (37)/Stainless steel manifolds added to series (2 port)**

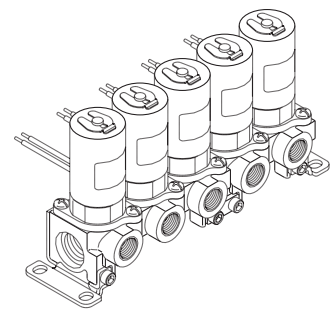
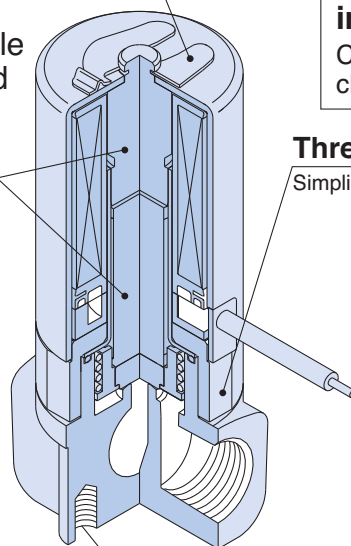
**New**

**Improved environment resistance**

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

**Threaded for bottom mounting**

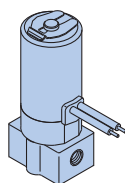
A special bracket can be mounted.



### Lineup by Compact Design

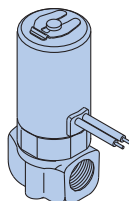
**2 Port**

$\varnothing$ 17



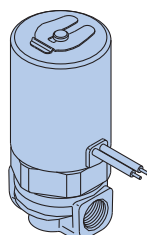
VDW10

$\varnothing$ 20.5



VDW20

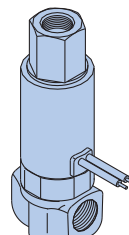
$\varnothing$ 28



VDW30

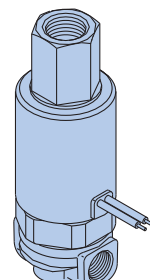
**3 Port**

$\varnothing$ 20.5



VDW200

$\varnothing$ 28



VDW300

# Compact Direct Operated 2 Port Solenoid Valve For Water and Air Series VDW10/20/30



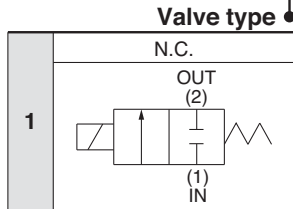
Series VDW10/20/30 2-port type has been remodeled to new compact and lightweight series. For details about new series, refer to New VDW for VDW10/20 and to Series VX21 for VDW30, respectively.

## How to Order Valves (Single unit)

VDW 2 1 - 1 G - 2 - 01 - - - - - Q

For Water, Air, Vacuum

Series	
1	10
2	20
3	30



Made to Order  
(Refer to page 2.)

Option

-	None
F	Foot bracket

Note) The foot bracket is packed with a valve.

### Material and insulation type

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

Note) For deionized water: the armature assembly is a corrosion resistant construction.

Voltage

Symbol	Voltage	Grommet / Tape winding	Faston™ terminal, Molded	Grommet / Molded
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	●	●	●

\* Please consult with SMC regarding other voltages.

### Electrical entry

G – Grommet / Tape winding	W – Grommet / Molded
<p>Magnet wire protection: Tape winding</p>	<p>Magnet wire protection: Molded</p>
<p>F – Faston™ terminal / Molded</p> <p>Magnet wire protection: Molded</p>	

### Series and Coil Type Combinations

Series	Grommet / Tape winding	Faston™ terminal / Molded	Grommet / Molded
10	●	—	●
20	●	●	●
30	●	●	●

### Thread type

-	Rc
F	G
N	NPT

### Port size

Symbol	Port size	Series		
		10	20	30
M5	M5	○	○	—
01	1/8 (6A)	—	○	○
02	1/4 (8A)	—	—	○

### Orifice size

Symbol	Orifice diameter (mm ø)	Series
1	1	10
2	1.6	
1	1.6	20
2	2.3	
3	3.2	30
2	2	
3	3	
4	4	

# Series VDW10/20/30

Series VDW10/20/30 2-port type has been remodeled to new compact and lightweight series.  
For details about new series, refer to New VDW for VDW10/20 and to Series VX21 for VDW30, respectively.



## Standard Specifications

Valve specifications		Direct operated poppet
Fluid <sup>Note 2)</sup>		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 (cm <sup>3</sup> /min)		0 (with water pressure) / 1 (Air)
Mounting orientation		Unrestricted
Vibration/Impact (m/s <sup>2</sup> ) <sup>Note 4)</sup>		30/150
Coil specifications		
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	Grommet / Tape winding	Dust-proof (equivalent to IP40)
	Faston™ terminal / Molded	Dust-tight (equivalent to IP60) <sup>Note 5)</sup>
	Grommet / Molded	Dust-tight / Low jetproof (equivalent to IP65)
Power consumption (W) <sup>Note 3)</sup>		2.5 (VDW10), 3 (VDW20/30)



Note 1) When used under conditions which may cause condensation on the exterior of the product, select Grommet / Molded.

Note 2) When used with deionized water, select "L" (Stainless steel, FKM) for the material and insulation type.

Note 3) Since the AC coil specification includes a rectifier element, there is no difference in power consumption between inrush and holding.

**In case of 110/220 VAC, the power consumption for the VDW10 model is 3W and 3.5W for the VDW20/30.**

Note 4) Vibration resistance ..... No malfunction when tested with one sweep of 5 to 200 Hz in the axial direction and at a right angle to the armature, in both energised and deenergised states.

Impact resistance ..... No malfunction when tested with a drop tester in the axial direction and at a right angle to the armature, one time each in energised and deenergised states.

Note 5) Since electrical connections are exposed, there is no water resistance.



**Made to Order**  
(For details, refer to page 17.)

Symbol	Specifications
X22	Non-leak (10 <sup>-6</sup> Pa·m <sup>3</sup> /sec) / Vacuum (0.1Pa-abs) specification
X23	Oil-free specification
X60	Lead wire length: 600 mm specification
X133	Seal material: FFKM

## Characteristic Specifications

Model	Port size	Orifice dia. (mm ø)	Max. operating pressure differential (MPa) <sup>Note 1)</sup>		Operating Pressure range (MPa) <sup>Note 2)</sup>	Weight (kg)
			Pressure port 1	Pressure port 2		
VDW10	M5	1	0.9	0.4	0 to 1.0	0.08
		1.6	0.4	0.2		
VDW20	M5 1/8 (6A)	1.6	0.7	0.2		0.1
		2.3	0.4	0.1		
		3.2	0.2	0.05		
VDW30	1/8 (6A) 1/4 (8A)	2	0.8	0.2		1/8: 0.23 1/4: 0.26
		3	0.4	0.1		
		4	0.2	0.05		



Note 1) The maximum operating pressure differential changes depending on the fluid flow direction. Refer to back page 6 for details.

Note 2) For low vacuum specifications, the operating pressure range is 1 Torr (1.33 x 10<sup>2</sup> Pa) to 1.0 MPa. Please consult with SMC if using below 1 Torr (1.33 x 10<sup>2</sup> Pa).

## Flow Characteristics

Model	Port size	Orifice dia. (mm ø)	Water		Air		
			1→2 (IN→N.C.)		1→2 (IN→N.C.)		
			N.C.	Av x 10 <sup>-6</sup> m <sup>2</sup>	Cv converted	C [dm <sup>3</sup> /(s·bar)]	b
VDW10	M5	1	0.96	0.04	0.14	0.40	0.04
		1.6	1.7	0.07	0.30	0.25	0.07
VDW20	M5 1/8 (6A)	1.6	1.9	0.08	0.31	0.45	0.09
		2.3	4.3	0.18	0.58	0.45	0.18
		3.2	7.2	0.30	1.2	0.38	0.33
VDW30	1/8 (6A) 1/4 (8A)	2	3.8	0.16	0.52	0.52	0.16
		3	6.7	0.28	1.0	0.52	0.30
		4	11	0.44	1.5	0.49	0.46

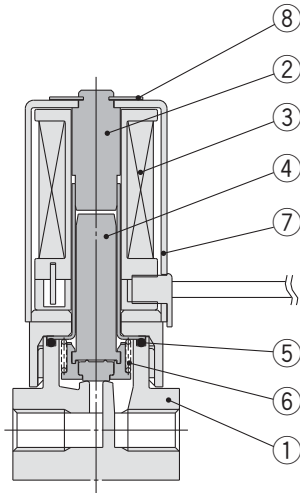


# Compact Direct Operated 2 Port Solenoid Valve For Water and Air *Series VDW10/20/30*

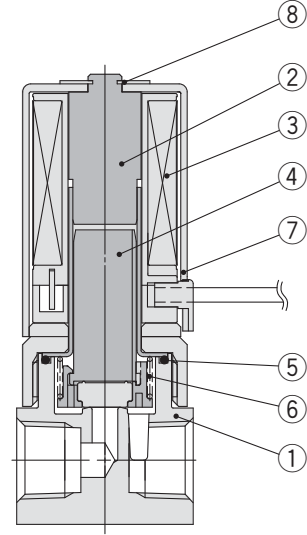
Series VDW10/20/30 2-port type has been remodeled to new compact and lightweight series.  
For details about new series, refer to New VDW for VDW10/20 and to Series VX21 for VDW30, respectively.

## Construction

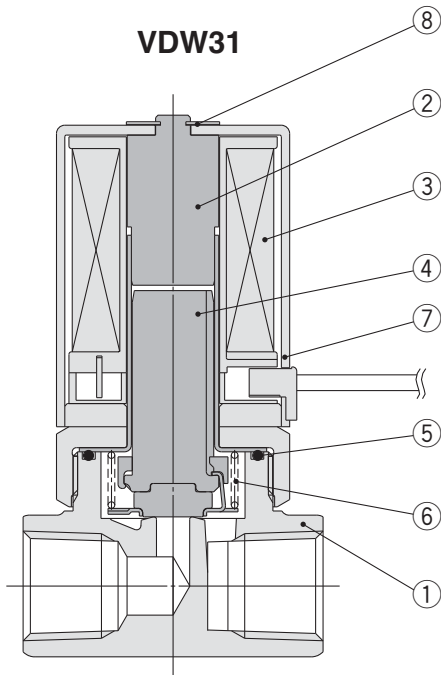
**VDW11**



**VDW21**



**VDW31**



### Component Parts

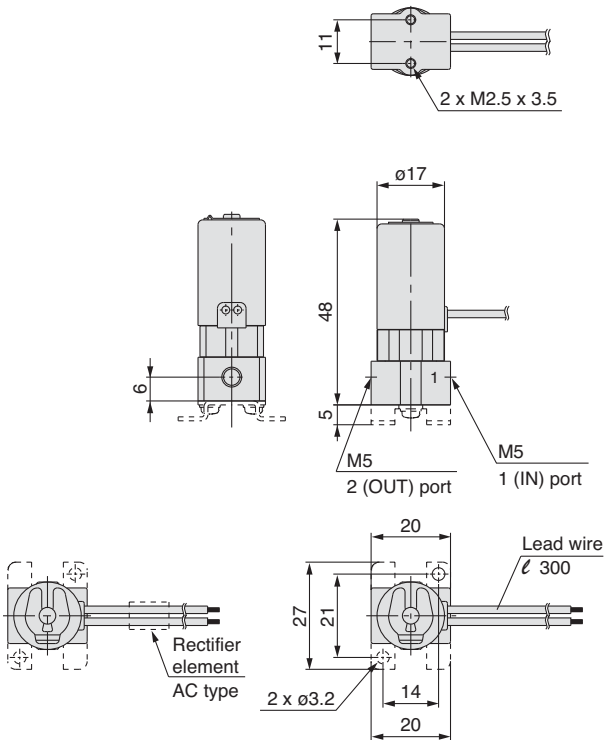
No.	Description	Material	
		Standard	Option
1	<b>Body</b>	Brass (C37)	Stainless steel
2	<b>Tube assembly</b>	Stainless steel	-
3	<b>Coil assembly</b>	-	-
4	<b>Armature assembly</b>	Stainless steel, PPS, NBR	Stainless steel, PPS, FKM, EPDM
5	<b>O-ring (Body)</b>	NBR	FKM, EPDM
6	<b>Return spring</b>	Stainless steel	-
7	<b>Cover</b>	Steel (SPCE)	-
8	<b>Clip</b>	Stainless steel	-

# Series VDW10/20/30

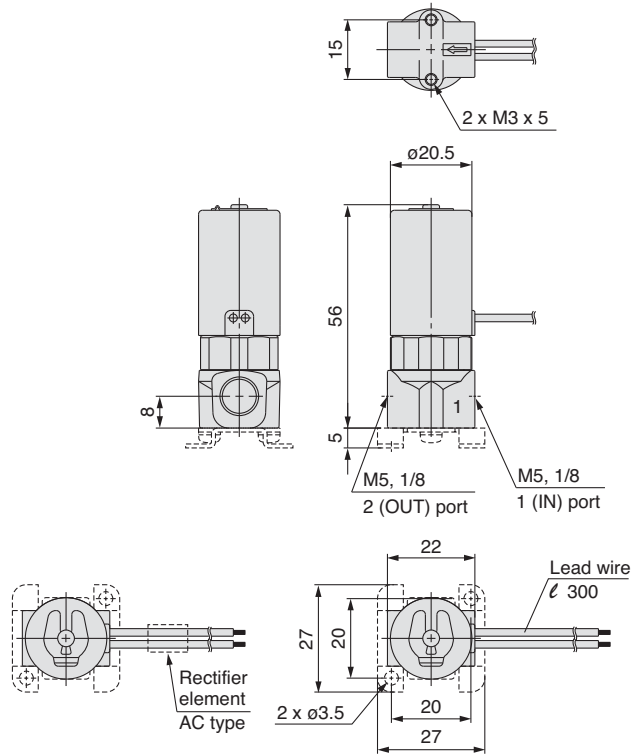
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## Dimensions

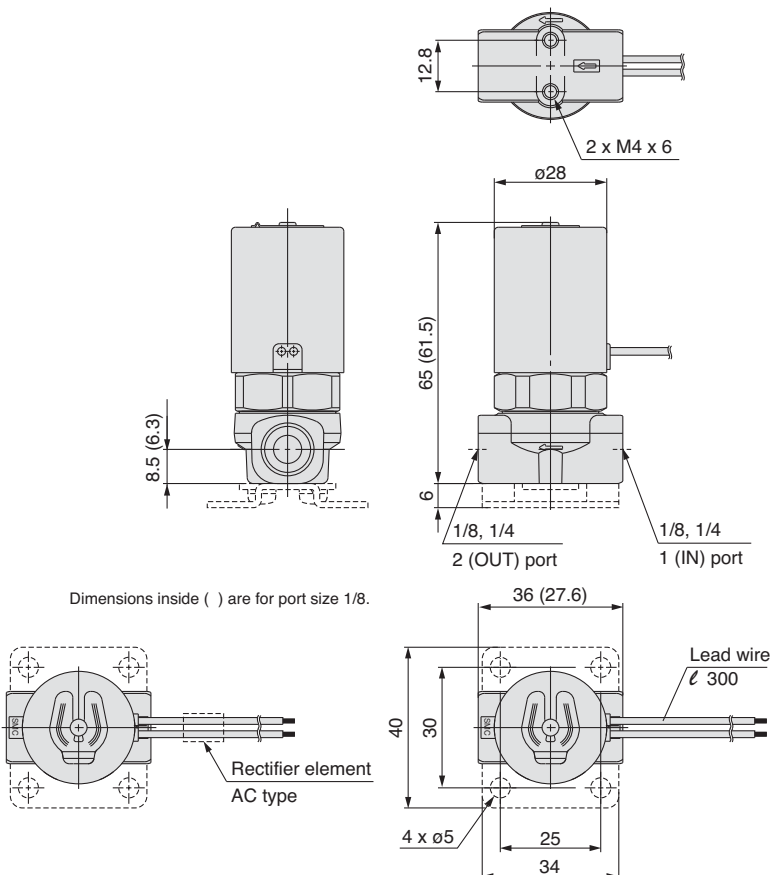
### VDW11-□<sup>G</sup><sub>W</sub>



### VDW21-□<sup>G</sup><sub>W</sub>



### VDW31-□<sup>G</sup><sub>W</sub>



### Bracket assembly part no.

- Series 10, 20

**VDW 2 0 - 15A - 1**

#### • Series

1	10
2	20

- Series 30

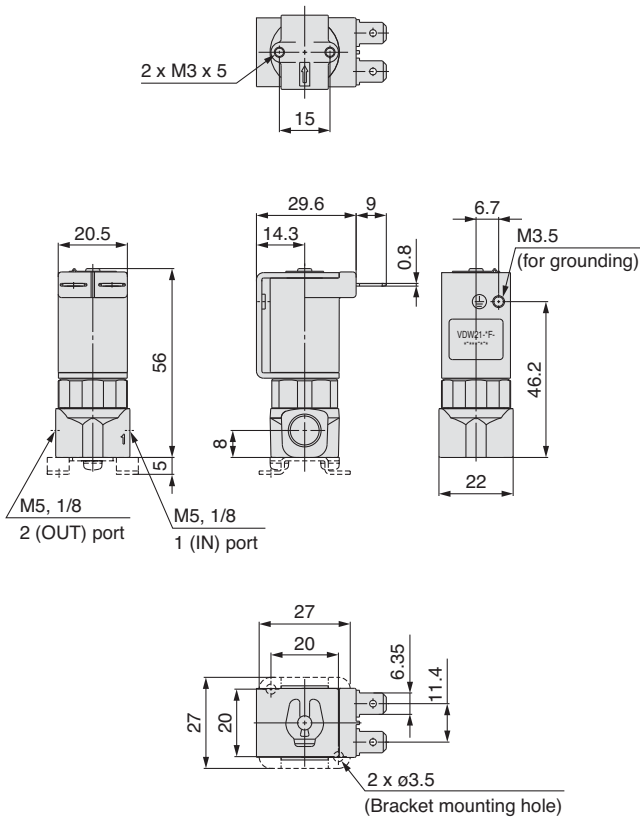
**VCW20 - 12 - 01A**

# Compact Direct Operated 2 Port Solenoid Valve For Water and Air **Series VDW10/20/30**

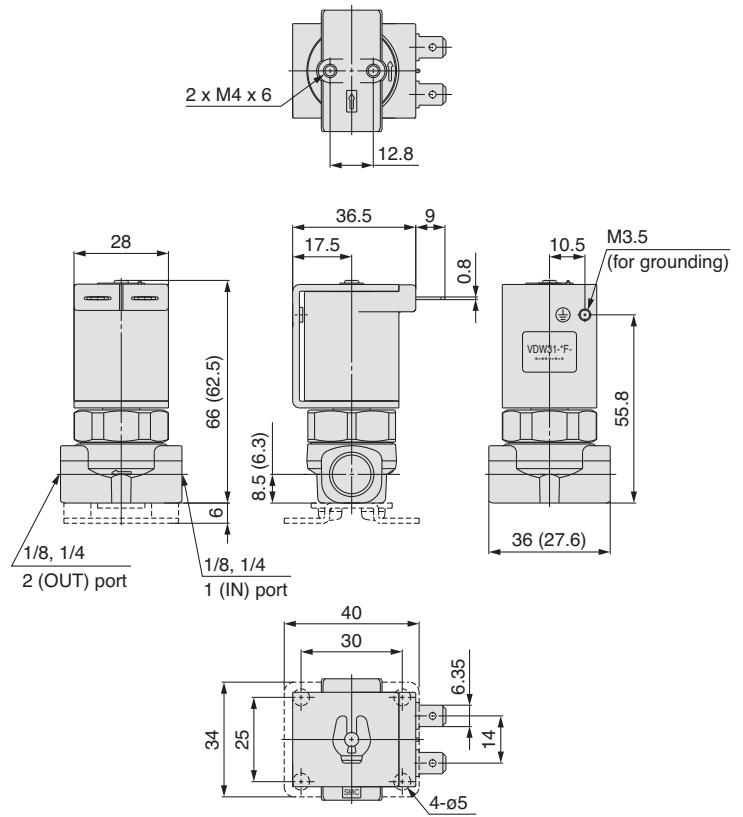
Series VDW10/20/30 2-port type has been remodeled to new compact and lightweight series.  
For details about new series, refer to New VDW for VDW10/20 and to Series VX21 for VDW30, respectively.

## Dimensions

### VDW21-□F



### VDW31-□F



### Bracket assembly part no.

- Series 20

**VDW20 – 15A – 1**

- Series 30

**VCW20 – 12 – 01A**

# Series VDW10/20/30

## How to Order Manifold

**VV2DW 2 - [ ] 05 01 [ ] - [ ] - Q**

**Series**

1	10
2	20
3	30

**Material**

Symbol	Manifold material	Seal material
-		NBR
A	Brass (C37)	FKM
B		EPDM
G	Stainless steel	NBR
H		FKM
J		EPDM

**Option**

-	None
F	With bracket

Note) Series 30 is available with bracket only.

**Thread type**

-	Rc
F	G
N	NPT


**Stations**

02	2 stations
⋮	⋮
10	10 stations

**OUT port size**

Symbol	Port size	Series		
		10	20	30
M5	M5	○	○	—
01	1/8 (6A)	—	○	○
02	1/4 (8A)	—	—	○

Note) IN port sizes are as follows.  
10: 1/8 (6A)  
20: 1/4 (8A)  
30: 3/8 (10A)



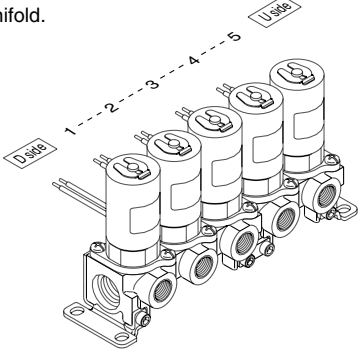
## How to Order Manifold Assembly

Enter the mounting valve and option part numbers under the manifold base part number.

**<Ordering example>**  
**VV2DW2-0501** ..... 1 set    **Manifold part no.**  
**\*VDW23-5G-2** ..... 5 sets    **Valve part no. (Stations 1 to 5)**

“\*” is the symbol for assembly. Add an “\*” in front of the part numbers to have solenoid valves, etc. mounted on the manifold.

Enter together in order, counting from station 1 on the D side.



## How to Order Valves (For manifold)

**VDW 2 3 - 5 G - 2 - [ ] - Q**

**Series**

1	10
2	20
3	30

**Valve type**

3	N.C. for manifold
---	-------------------

**Voltage**

Symbol	Voltage	Grommet / Tape winding	Faston™ terminal, Molded	Grommet / Molded
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	●	●	●

\* Please consult with SMC regarding other voltages.

**Material and insulation type**

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

Note) For deionized water: the armature assembly is a corrosion resistant construction.

**Orifice size**

Symbol	Orifice diameter (mmø)	Series
1	1	10
2	1.6	
1	1.6	20
2	2.3	
3	3.2	
2	2	30
3	3	
4	4	

**Coil type** (Note)

G	Grommet / Tape winding
F	Faston™ terminal / Molded
W	Grommet / Molded

Note) For series and coil type combinations, refer to page 1.

## Manifold Options

### Blanking plate assembly

- Series 10, 20

**VVDW 2 0 - 3A - [ ]**

**Series**

1	10
2	20

**Material**

Symbol	Plate material	Seal material
G		NBR
H	Stainless steel	FKM
J		EPDM

\* Plate material is stainless steel only.

- Series 30

**VVCW20 - 3A - [ ]**

**Material**

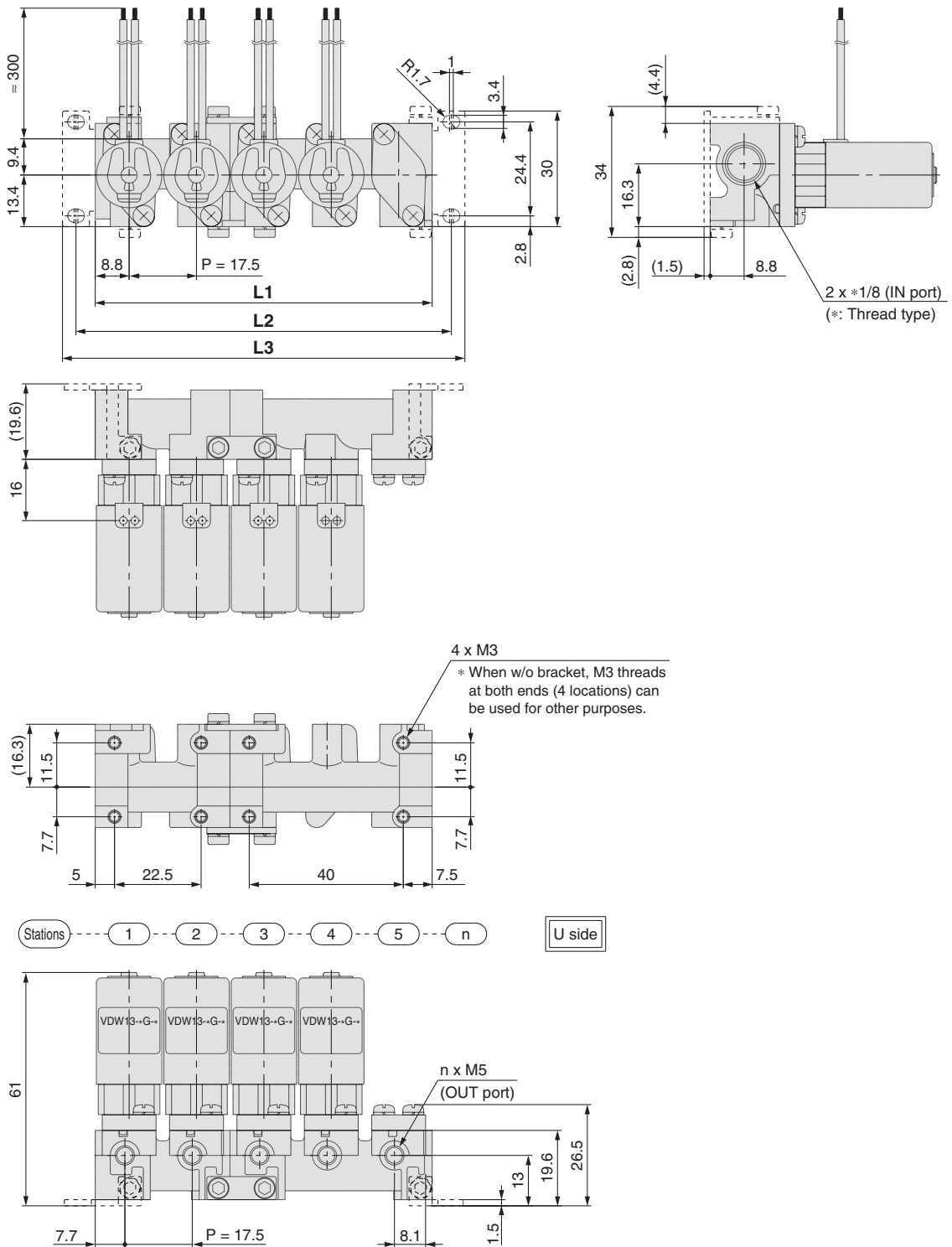
Symbol	Plate material	Seal material
G		NBR
H	Stainless steel	FKM
J		EPDM



# Compact Direct Operated 2 Port Solenoid Valve For Water and Air *Series VDW10/20/30*

## Dimensions

### VV2DW1



### L Dimension

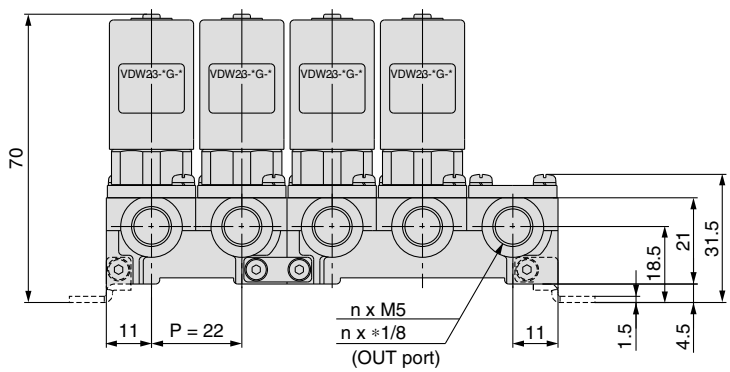
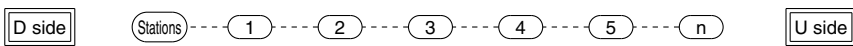
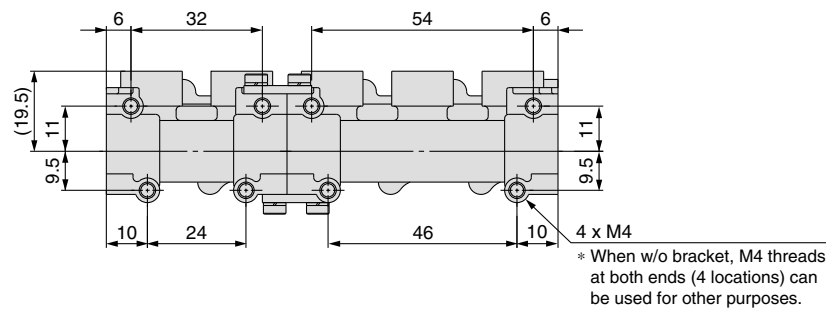
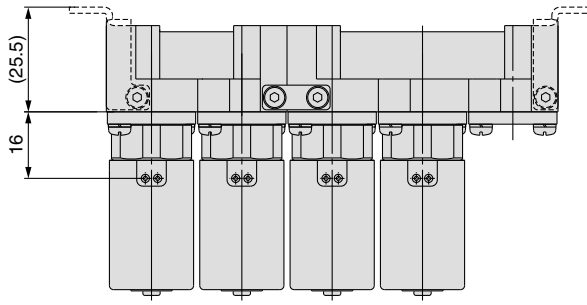
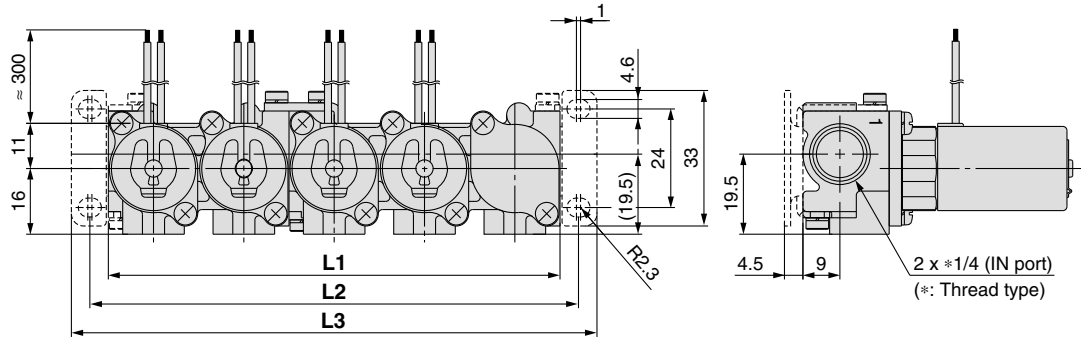
Dimension	n (stations)									
	2	3	4	5	6	7	8	9	10	
<b>L1</b>	35	52.5	70	87.5	105	122.5	140	157.5	175	
<b>L2</b>	45	62.5	80	97.5	115	132.5	150	167.5	185	
<b>L3</b>	52	69.5	87	104.5	122	139.5	157	174.5	192	
Manifold composition	2 stns. x 1	3 stns. x 1	2 stns. x 2	2 stns. + 3 stns.	3 stns. x 2	2 stns. x 2 + 3 stns.	2 stns. + 3 stns. x 2	3 stns. x 3	2 stns. x 2 + 3 stns. x 2	

Note) The manifold base consists of a junction of 2 and 3 station bases.  
Refer to page 10 and 11 regarding manifold additions.

# Series VDW10/20/30

## Dimensions

### VV2DW2



### L Dimension

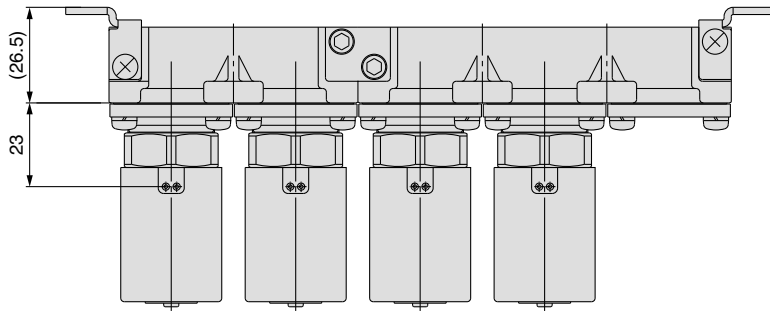
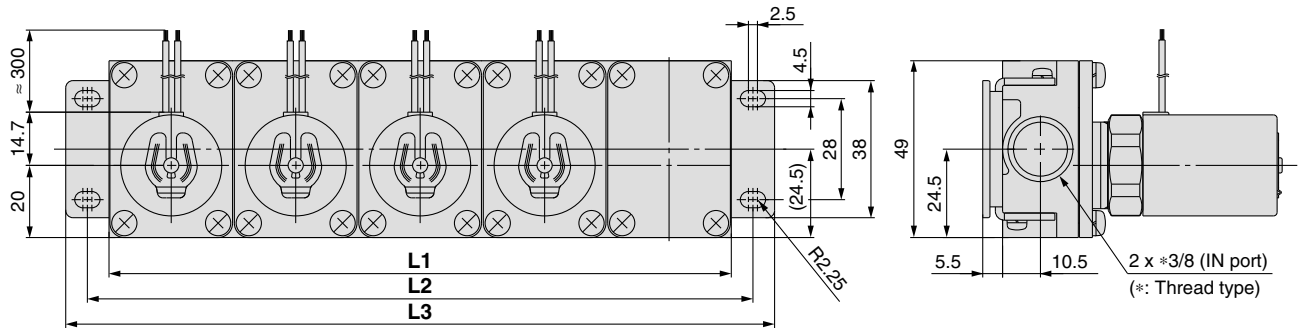
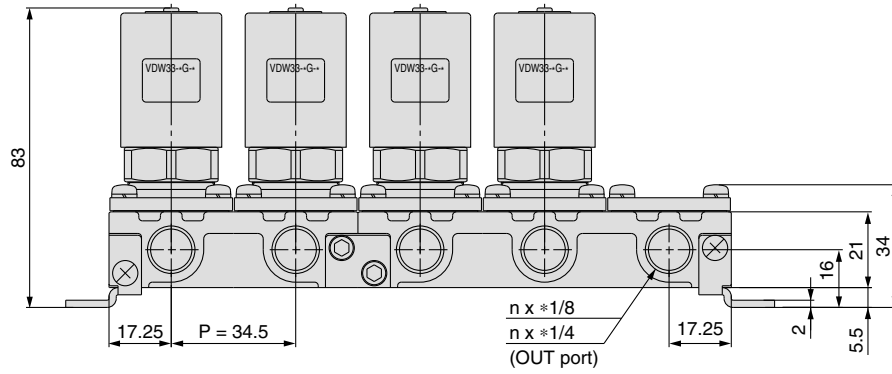
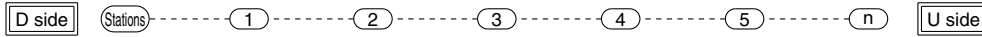
(mm)

Dimension	n (stations)									
	2	3	4	5	6	7	8	9	10	
<b>L1</b>	44	66	88	110	132	154	176	198	220	
<b>L2</b>	53	75	97	119	141	163	185	207	229	
<b>L3</b>	62	84	106	128	150	172	194	216	238	
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) The manifold base consists of a junction of 2 and 3 station bases. Refer to page 10 and 11 regarding manifold additions.

# Compact Direct Operated 2 Port Solenoid Valve For Water and Air **Series VDW10/20/30**

## VV2DW3



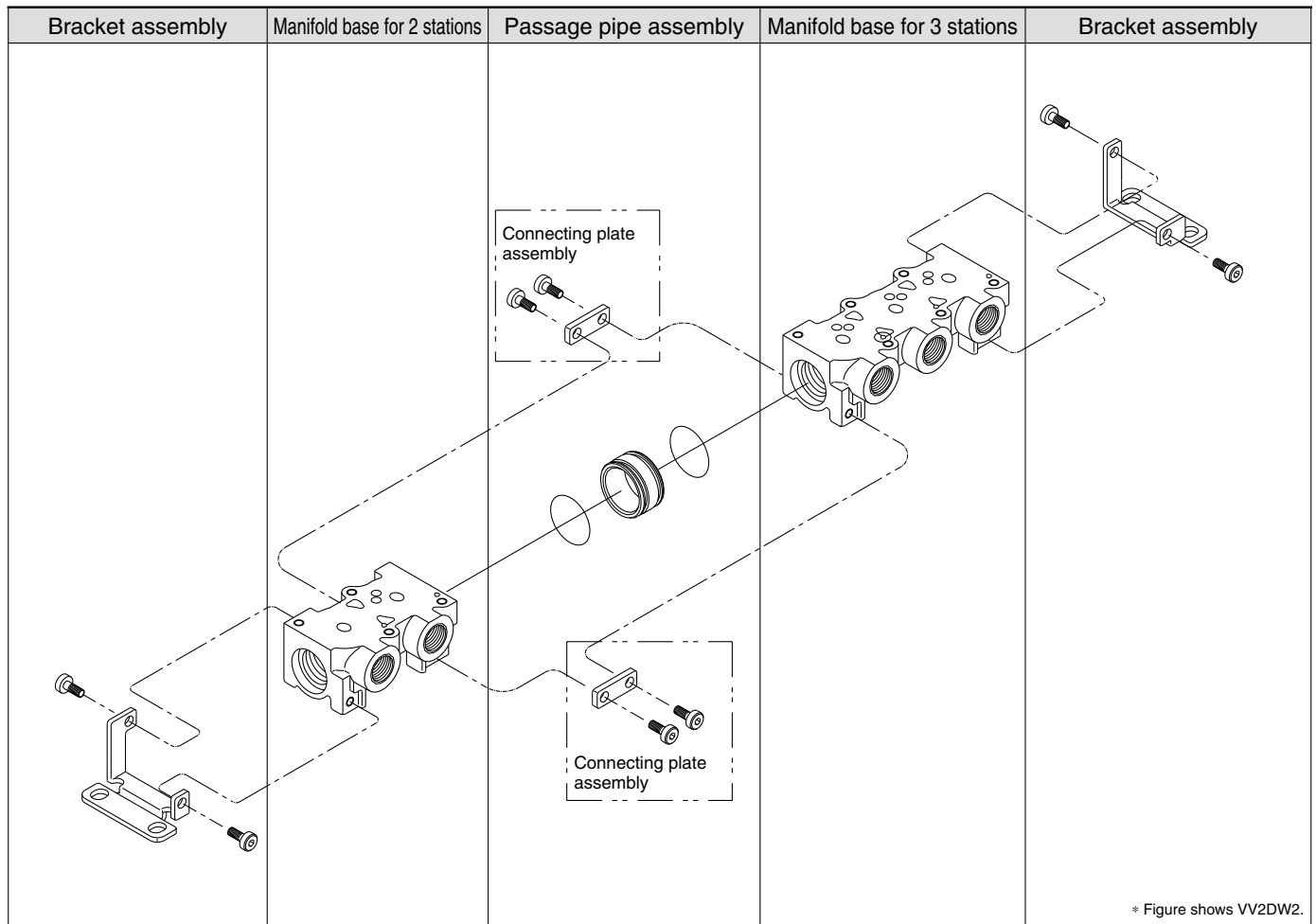
### L Dimension

(mm)

Dimension	n (stations)									
	2	3	4	5	6	7	8	9	10	
L1	69	103.5	138	172.5	207	241.5	276	310.5	345	
L2	81	115.5	150	184.5	219	253.5	288	322.5	357	
L3	93	127.5	162	196.5	231	265.5	300	334.5	369	
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) The manifold base consists of a junction of 2 and 3 station bases.  
Refer to page 10 and 11 regarding manifold additions.

## Manifold Exploded View



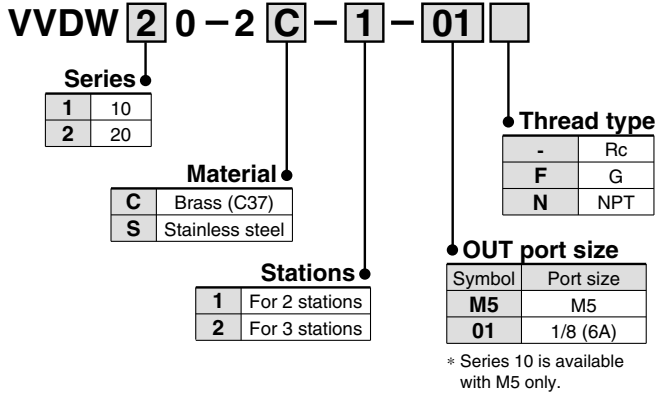
### Manifold additions

- 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:  $0.9 \pm 0.1$  N·m)
- ↓
- 3 Attach brackets to the manifold bases. {when equipped with brackets} (Tightening torque:  $0.9 \pm 0.1$  N·m)

Note) The manifold can be increased in 2 or 3-station units.  
 A manifold base, a connection plate assembly and a passage pipe assembly are required for each manifold increment.

**<Manifold base>**

- Series 10, 20



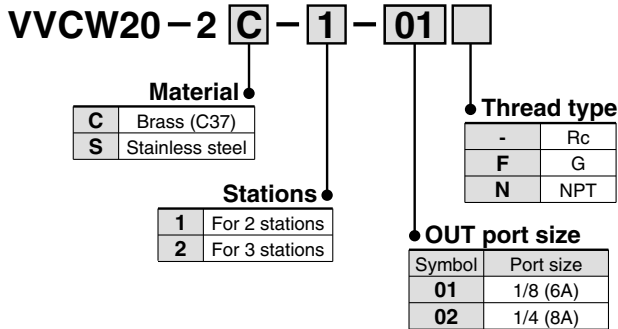
**<Connecting plate assembly>**

- Series 10, 20



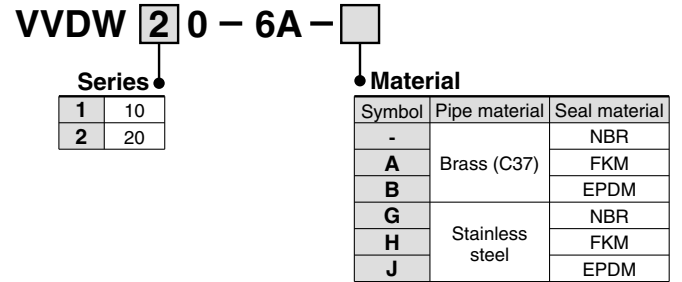
- Series 30
- VVCW20-4A**

- Series 30

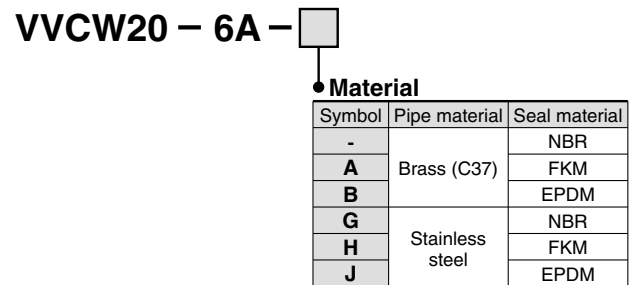


**<Passage pipe assembly>**

- Series 10, 20



- Series 30



**<Bracket assembly>**

- Series 10, 20



- Series 30

**VVCW20-5A**



# Compact Direct Operated 3 Port Solenoid Valve For Water and Air Series **VDW200/300**



## How to Order Valves (Single unit)

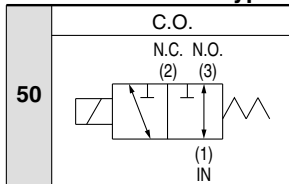
**VDW 2 50 - 1 G - 2 - 01 - - - - - Q**

For Water, Air, Vacuum

Series

2	200
3	300

Valve type



Made to Order  
(Refer to page 13.)

Option

-	None
F	Foot bracket



Note) The foot bracket is packed with a valve.

Material and insulation type

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



Note) For deionized water: The armature assembly is a corrosion resistant construction.

Voltage

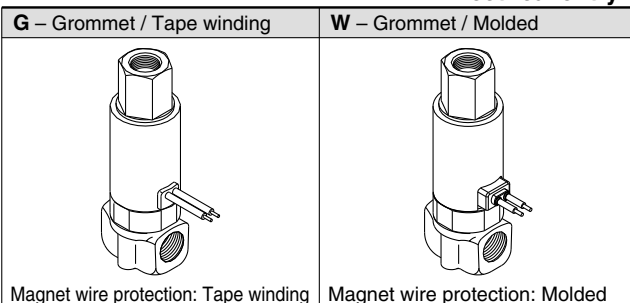
Symbol	Voltage	Grommet / Tape winding	Faston™ terminal, Molded	Grommet / Molded
1	100 VAC (50/60 Hz)	●	—	●
2	200 VAC (50/60 Hz)	●	—	●
3	110 VAC (50/60 Hz)	●	—	●
4	220 VAC (50/60 Hz)	●	—	●
5	24 VDC	●	●	●
6	12 VDC	●	●	●
V	6 VDC	●	●	●
S	5 VDC	●	●	●
R	3 VDC	●	●	●

\* Please consult with SMC regarding other voltages.

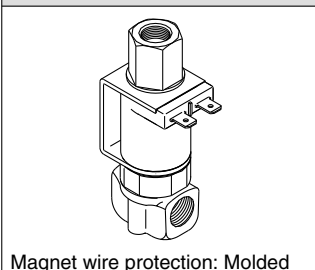
Thread type

-	Rc
F	G
N	NPT

Electrical entry



F – Faston™ terminal / Molded



Port size

Symbol	Port size	Series	
		200	300
M5	M5	○	—
01	1/8 (6A)	○	○
02	1/4 (8A)	—	○

Orifice size

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

# Compact Direct Operated 3 Port Solenoid Valve For Water and Air *Series VDW200/300*

## Standard Specifications



Valve specifications	<b>Valve construction</b>		Direct operated poppet
	<b>Fluid</b> <sup>Note 2)</sup>		Water (except waste water or agricultural water), Air, Low vacuum
	<b>Withstand pressure (MPa)</b>		2.0
	<b>Ambient temperature (°C)</b>		-10 to 50
	<b>Fluid temperature (°C)</b>		1 to 50 (No freezing)
	<b>Environment</b>		Location without corrosive or explosive gases
	<b>Valve leakage (cm<sup>3</sup>/min)</b>		0 (with water pressure) / 1 (Air)
	<b>Mounting orientation</b>		Unrestricted
	<b>Vibration/Impact (m/s<sup>2</sup>)</b> <sup>Note 4)</sup>		30/150
Coil specifications	<b>Rated voltage</b>		24 VDC, 12 VDC, 100 VAC, 110 VAC, 200 VAC, 220 VAC (50/60 Hz)
	<b>Allowable voltage fluctuation (%)</b>		±10% of rated voltage
	<b>Coil insulation type</b>		Class B
	<b>Enclosure</b>	<b>Grommet / Tape winding</b>	Dust-proof (equivalent to IP40)
		<b>Faston™ terminal / Molded</b>	Dust-tight (equivalent to IP60) <sup>Note 5)</sup>
<b>Grommet / Molded</b>		Dust-tight / Low jetproof (equivalent to IP65)	
<b>Power consumption (W)</b> <sup>Note 3)</sup>		3	



- Note 1) Please consult SMC when used under conditions which may cause condensation on the exterior of the product.
- Note 2) When used with deionized water, select "L" (Stainless steel, FKM) for the material and insulator type.
- Note 3) Since the AC coil specification includes a rectifier element, there is no difference in power consumption between inrush and holding.  
**3.5 W in the case of 110/220 VAC**
- Note 4) Vibration resistance ..... No malfunction when tested with one sweep of 5 to 200 Hz in the axial direction and at a right angle to the armature, in both energised and deenergised states.  
Impact resistance ..... No malfunction when tested with a drop tester in the axial direction and at a right angle to the armature, one time each in energised and deenergised states.
- Note 5) Since electrical connections are exposed, there is no water resistance.



**Made to Order**  
(For details, refer to page 17.)

Symbol	Specifications
<b>X22</b>	Non-leak (10 <sup>-6</sup> Pa·m <sup>3</sup> /sec) / Vacuum (0.1Pa-abs) specification
<b>X23</b>	Oil-free specification
<b>X60</b>	Lead wire length: 600 mm specification
<b>X133</b>	Seal material: FFKM

## Characteristic Specifications

Model	Port size	Orifice dia. (mm ø)	Max. operating pressure differential (MPa) <sup>Note 2)</sup>		Operating pressure range (MPa) <sup>Note 3)</sup>	Weight (kg)
			Pressure port 1	Pressure port 2, 3 <sup>Note 1)</sup>		
<b>VDW200</b>	M5 1/8 (6A)	1	0.9	0.3	0 to 1.0	0.12
		1.6	0.7	0.1		
<b>VDW300</b>	1/8 (6A) 1/4 (8A)	2	0.8	0.2		1/8: 0.27 1/4: 0.30
		3	0.4	0.1		
		4	0.2	0.05		



- 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 back page 16 for details.
- Note 3) For low vacuum specifications, the operating pressure range is 1 Torr (1.33 x 10<sup>2</sup> Pa) to 1.0 MPa. Please consult with SMC if using below 1 Torr (1.33 x 10<sup>2</sup> Pa).

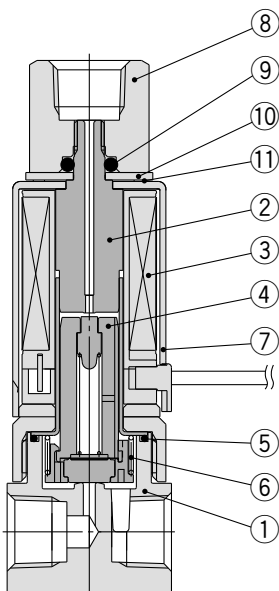
## Flow Characteristics

Model	Port size	Orifice dia. (mm ø)		Water				Air					
				1→2 (IN→N.C.)		1→3 (IN→N.O.)		1→2 (IN→N.C.)			1→3 (IN→N.O.)		
		N.C.	N.O.	Av x 10 <sup>-6</sup> m <sup>2</sup>	Cv converted	Av x 10 <sup>-6</sup> m <sup>2</sup>	Cv converted	C [dm <sup>3</sup> /(s·bar)]	b	Cv	C [dm <sup>3</sup> /(s·bar)]	b	Cv
<b>VDW200</b>	M5 1/8 (6A)	1	1	0.72	0.03	0.96	0.04	0.12	0.35	0.03	0.13	0.52	0.04
		1.6		1.9	0.08			0.31	0.45	0.09			
<b>VDW300</b>	1/8 (6A) 1/4 (8A)	2	1.8	3.8	0.16	3.1	0.13	0.52	0.52	0.16	0.38	0.50	0.12
		3		6.7	0.28			1.0	0.52	0.30			
		4		11	0.44			1.5	0.49	0.46			

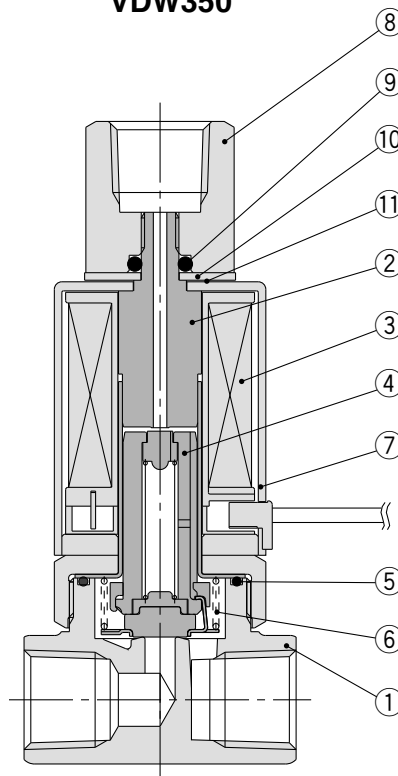
# Series VDW200/300

## Construction

VDW250



VDW350



### Component Parts

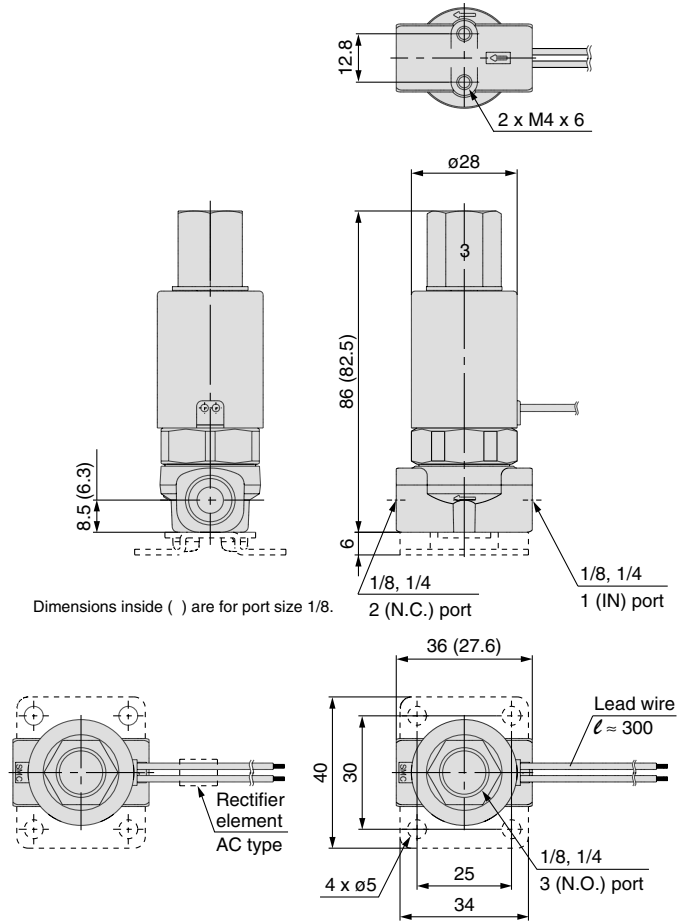
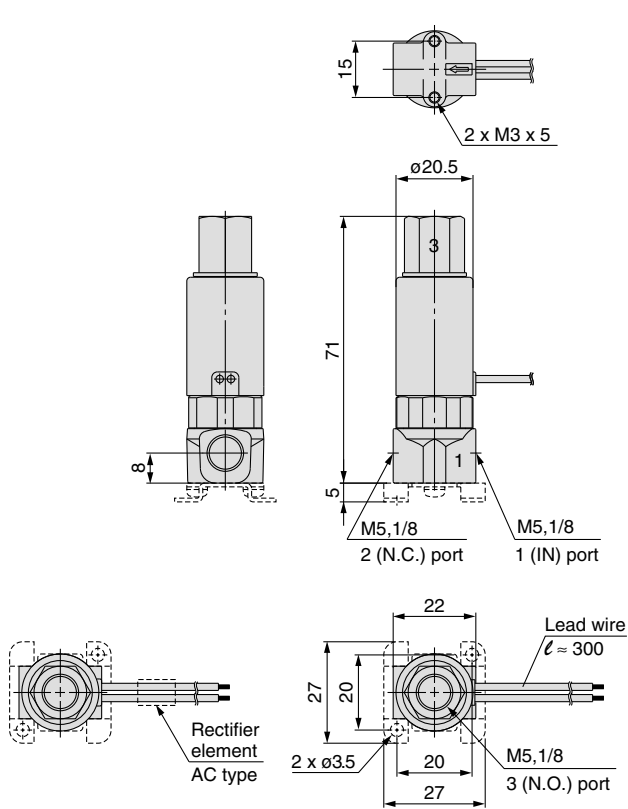
No.	Description	Material	
		Standard	Option
1	<b>Body</b>	Brass (C37)	Stainless steel
2	<b>Tube assembly</b>	Stainless steel	—
3	<b>Coil assembly</b>	—	—
4	<b>Armature assembly</b>	Stainless steel, PPS, NBR	Stainless steel, PPS, FKM, EPDM
5	<b>O-ring (Body)</b>	NBR	FKM, EPDM
6	<b>Return spring</b>	Stainless steel	—
7	<b>Cover</b>	Steel (SPCE)	—
8	<b>Socket</b>	Brass (C36)	Stainless steel
9	<b>O-ring</b>	NBR	FKM, EPDM
10	<b>Plate</b>	Steel (SPCC)	—
11	<b>Wave washer</b>	Stainless steel	—

Compact Direct Operated  
3 Port Solenoid Valve For Water and Air **Series VDW200/300**

**Dimensions**

VDW250-□<sup>G</sup><sub>W</sub>

VDW350-□<sup>G</sup><sub>W</sub>



Dimensions inside ( ) are for port size 1/8.

Bracket assembly part no.

- Series 200

**VDW20-15A-1**

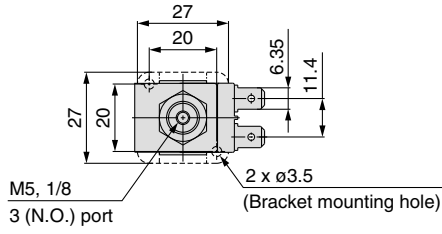
- Series 300

**VCW20-12-01A**

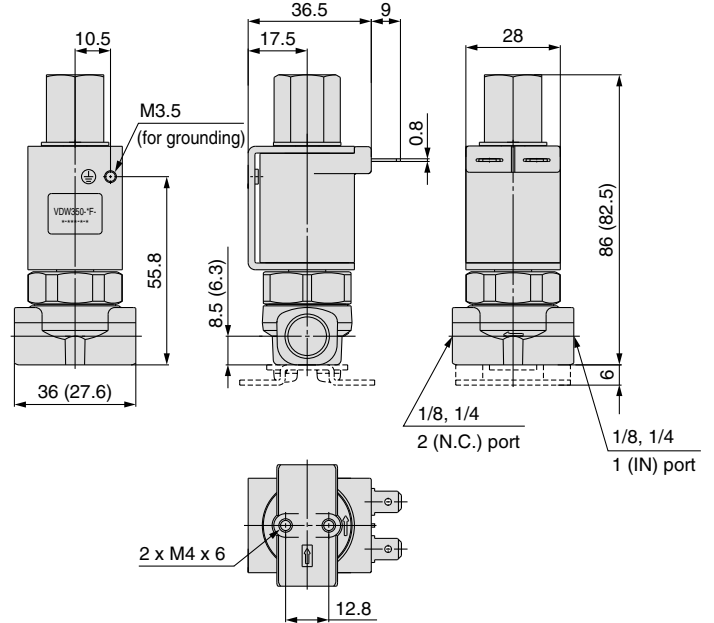
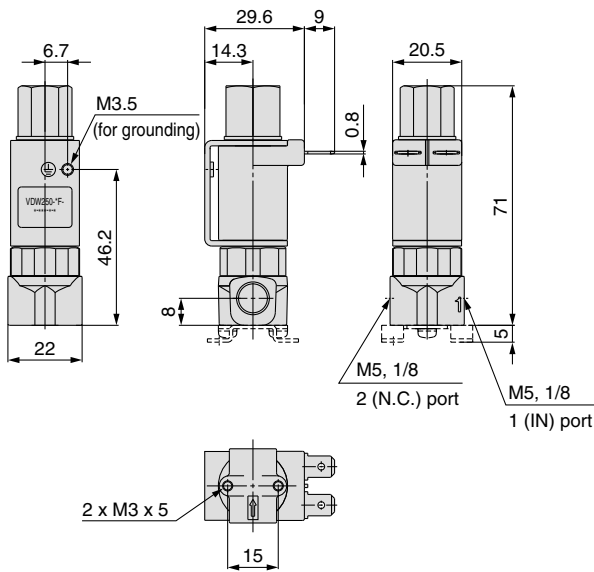
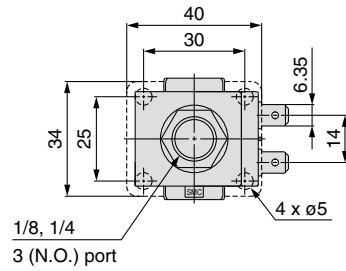
# Series VDW200/300

## Dimensions

### VDW250-□F



### VDW350-□F



### Bracket assembly part no.

- Series 200

**VDW20-15A-1**

- Series 300

**VCW20-12-01A**



# Series VDW Made to Order

Please contact SMC for detailed dimensions, specifications and lead times.



Series VDW10/20/30 2-port type has been remodeled to new compact and lightweight series.  
For details about new series, refer to New VDW for VDW10/20 and to Series VX21 for VDW30, respectively.

**1** Non-leak ( $10^{-6}$  Pa·m<sup>3</sup>/sec) /  
Vacuum (0.1 Pa·abs) Specification **Symbol**  
**X22**  
VDW  – X22

**2** Oil-free Specification **Symbol**  
**X23**  
VDW  – X23

**3** Lead Wire Length: 600 mm  
Specification **Symbol**  
**X60**  
VDW  – X60

**4** Seal Material: FFKM  
Specification **Symbol**  
**X133**  
VDW  – X133





Series VDW


# Safety Instructions

Series VDW10/20/30 2-port type has been remodeled to new compact and lightweight series.  
For details about new series, refer to New VDW for VDW10/20 and to Series VX21 for VDW30, respectively.

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of "**Caution**", "**Warning**" or "**Danger**". To ensure safety, be sure to observe ISO 4411 <sup>Note 1</sup>, JIS B 8370 <sup>Note 2</sup> and other safety practices.

 **Caution** : Operator error could result in injury or equipment damage.

 **Warning** : Operator error could result in serious injury or loss of life.

 **Danger** : In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414: Pneumatic fluid power – General rules relating to systems

Note 2) JIS B 8370: General Rules for Pneumatic Equipment

## Warning

### **1. The compatibility of the pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.**

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or post analysis and/or tests to meet the specific requirements. The expected performance and safety assurance are the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

### **2. Only trained personnel should operate pneumatically operated machinery and equipment.**

Fluids can be dangerous if handled incorrectly. Assembly, handling or repair of the systems using pneumatic equipment should be performed by trained and experienced operators.

### **3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.**

1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driven objects have been confirmed.

2. When equipment is removed, confirm the safety process as mentioned above. Turn off the supply pressure for this equipment and exhaust all residual compressed air in the system.

3. Carefully restart the machinery, confirming that safety measures are being implemented.

### **4. Contact SMC if the product will be used in any of the following conditions:**

1. Conditions and environments beyond the given specifications, or if product is used outdoors.

2. With fluids whose application causes concern due to the type of fluid or additives, etc.

3. An application which has the possibility of having negative effects on people and/or property, requiring special safety analysis.

## ■ Exemption from Liability

1. SMC, its officers and employees shall be exempted from liability for any loss or damage arising out of earthquakes or fire, action by a third person, accidents, customer error with or without intention, product misuse, and any other damages caused by abnormal operating conditions.

2. SMC, its officers and employees shall be exempted from liability for any direct or indirect loss or damage, including consequential loss or damage, loss of profits or loss of chance, claims, demands, proceedings, costs, expenses awards, judgments and any other liability whatsoever including legal costs and expenses, which may be suffered or incurred, whether in tort (including negligence), contract, breach of statutory duty, equity or otherwise.

3. SMC is exempted from liability for any damages caused by operations not contained in the catalogues and/or instruction manuals, and operations outside of the specification range.

4. SMC is exempted from liability for any loss or damage whatsoever caused by malfunctions of its products when combined with other devices or software.



## Series VDW

# 2/3 Port Solenoid Valve for Fluid Control Precautions 1

Be sure to read this before handling.

Series VDW10/20/30 2-port type has been remodeled to new compact and lightweight series.  
For details about new series, refer to New VDW for VDW10/20 and to Series VX21 for VDW30, respectively.

### 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 energisation

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

##### 3. Liquid rings

In cases with a flowing liquid, provide a by-pass valve in the system to prevent the liquid from entering the liquid seal circuit.

##### 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 the valve, etc.).

### 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 catalogue.

##### 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 malfunction and seal failure. These problems are due to wearing of the valve seat and armature, and 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.

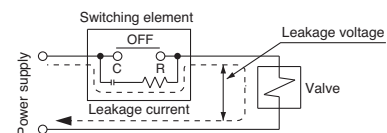
###### In the case of air

Please use ordinary compressed air where a filter of 40  $\mu\text{m}$  or less is provided on the inlet side piping. (Except dry air)

#### ⚠ 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.



###### AC coil

10% or less of rated voltage

###### DC coil

2% or less of rated voltage

##### 2. Low temperature operation

1. Valves can be used from an ambient temperature of  $-10^{\circ}\text{C}$ , however, take measures to prevent solidification of impurities or freezing, etc.
2. When using valves for water applications in cold climates, firstly stop the water supply/discharge of the pump etc., and then take measures to prevent freezing, such as draining water from the piping. When heating by steam, be careful not to expose the coil portion to steam. Also, please take actions to prevent freezing such as heating the body.



# Series VDW 2/3 Port Solenoid Valve for Fluid Control Precautions 2

Be sure to read this before handling.

Series VDW10/20/30 2-port type has been remodeled to new compact and lightweight series.  
For details about new series, refer to New VDW for VDW10/20 and to Series VX21 for VDW30, respectively.

## Mounting

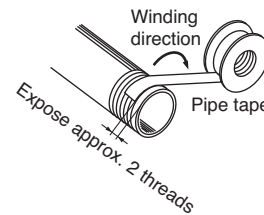
### Warning

- 1. If air leakage increases or the 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 forces 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., to prevent freezing 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. Instruction manual**  
The product should be mounted and operated after the instruction manual is thoroughly read and its contents are understood. Keep the instruction 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.

## Piping

### 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. 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. Furthermore, when pipe 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

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

\* 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 instruction manual to avoid mistakes regarding the supply port, etc.



# Series VDW 2/3 Port Solenoid Valve for Fluid Control Precautions 3

Be sure to read this before handling.

Series VDW10/20/30 2-port type has been remodeled to new compact and lightweight series.  
For details about new series, refer to New VDW for VDW10/20 and to Series VX21 for VDW30, respectively.

## Wiring

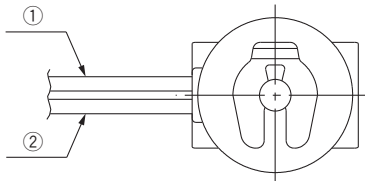
### ⚠ Caution

1. As a rule, use electrical wire with a cross sectional area of 0.5 to 1.25 mm<sup>2</sup> 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.

When using 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



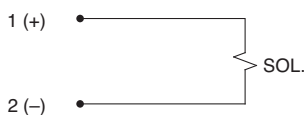
Rated voltage	Lead wire colour	
	①	②
DC	Black	Red
100 VAC	Blue	Blue
200 VAC	Red	Red
Other AC	Grey	Grey

\* There is no polarity.

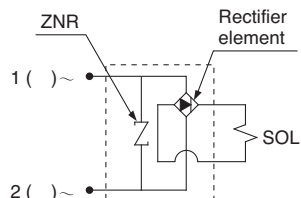
## Electrical Circuit

### ⚠ Caution

DC circuit



AC circuit



## Operating Environment

### ⚠ Warning

1. Do not use the valves in an atmospheres 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 instruction manual.  
Incorrect handling will cause damage or malfunction to devices or equipment.
2. Removing the product
  1. Shut the fluid supply off and release the fluid pressure in the system.
  2. Shut the power supply off.
  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 every six months.

### ⚠ 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.





# Series VDW Specific Product Precautions 1

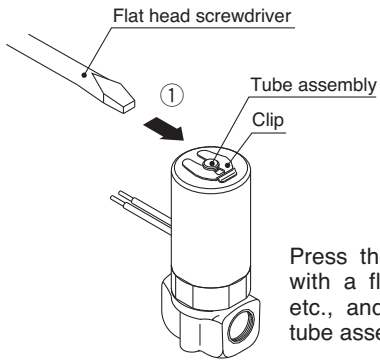
Be sure to read this before handling.

Series VDW10/20/30 2-port type has been remodeled to new compact and lightweight series.  
For details about new series, refer to New VDW for VDW10/20 and to Series VX21 for VDW30, respectively.

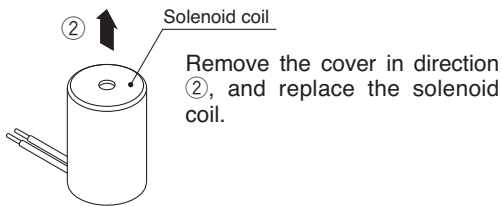
## Replacing the Solenoid Coils

### Caution

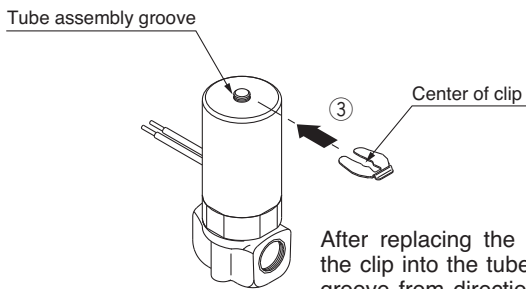
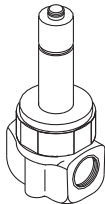
2 port valve



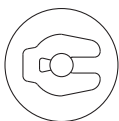
Press the clip in direction ① with a flat head screwdriver, etc., and remove it from the tube assembly groove.



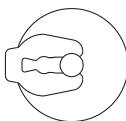
Remove the cover in direction ②, and replace the solenoid coil.



After replacing the coil, insert the clip into the tube assembly groove from direction ③. After inserting it into the groove, confirm the position and condition of the clip.

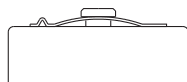


OK



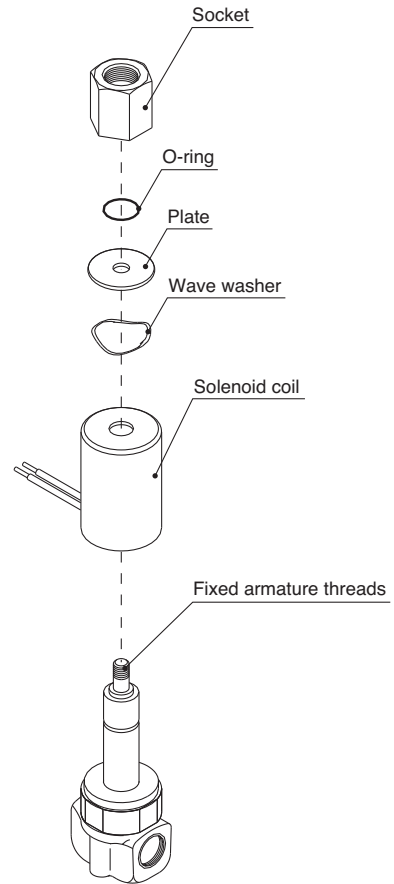
NG

Inserted position



Inserted condition

3 port valve



After removing the socket with a wrench, etc., lift the plate, wave washer and cover off, 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 becomes chewed up, etc.
- Be sure to secure the body with a 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.



# Series VDW Specific Product Precautions 2

Be sure to read this before handling.

Series VDW10/20/30 2-port type has been remodeled to new compact and lightweight series.  
For details about new series, refer to New VDW for VDW10/20 and to Series VX21 for VDW30, respectively.

## Replacement Parts

• Solenoid coil part no.

VDW **2** 0-1 **C** 1-1-□

**Series**

1	10
2	20, 200
3	30, 300

**Coil type**

<b>C</b>	Grommet / Tape winding
<b>F</b>	Faston™ terminal / Molded
<b>W</b>	Grommet / Molded

**Type**

1	10, 20, 30
2	200, 300

**Lead wire length**

-	300 mm
<b>L1</b> (Note)	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
<b>V</b>	6 VDC
<b>S</b>	5 VDC
<b>R</b>	3 VDC

## Series and Coil Type Combinations

Voltage	Grommet / Tape winding	Faston™ 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 page 1/6/12

• Clip part no. (2 port)

VDW **2** 0-10

**Series**

2	10, 20
3	30

• Socket assembly part no. (3 port)

VDW **2** 0-12A-**01**□-□

**Series**

2	200
3	300

**Port size**

Symbol	Port size	Series	
		200	300
<b>M5</b>	M5	○	—
<b>01</b>	1/8 (6A)	○	○
<b>02</b>	1/4 (8A)	—	○

**Material**

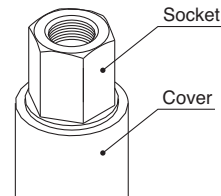
Symbol	Socket material	Seal material
-	Brass (C37)	NBR
<b>A</b>		FKM
<b>B</b>		EPDM
<b>G</b>	Stainless steel	NBR
<b>H</b>		FKM
<b>J</b>		EPDM
<b>L</b>		FKM

**Thread type**

-	Rc
<b>F</b>	G
<b>N</b>	NPT

## Piping to 3 Port Valve N.O. Port

### Caution

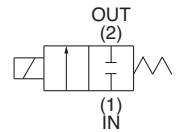


When piping to a N.O. port, be sure to perform piping work while securing the socket by using a wrench or other tool. Refer to back page 3 for other precautions related to piping.

## Fluid Flow Direction

### Caution

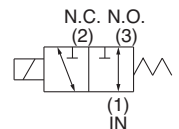
The maximum operating pressure differential differs depending on the flow direction of the fluid. If the pressure differential at each port exceeds the values in the table below, valve leakage may occur.



## 2 Port Valve

Model	Orifice size (mm ø)	Max. operating pressure differential (MPa)	
		Pressure port 1	Pressure port 2 (Note)
VDW10	1	0.9	0.4
	1.6	0.4	0.2
VDW20	1.6	0.7	0.2
	3.2	0.2	0.05
VDW30	2	0.8	0.2
	3	0.4	0.1
	4	0.2	0.05

Note) When applying pressure to port 2, be careful to avoid vibration and impacts, etc.



## 3 Port Valve

Model	Orifice size (mm ø)	Max. operating pressure differential (MPa)	
		Pressure port 1	Pressure port 2, 3 (Note 1)
VDW200	1	0.9	0.3
	1.6	0.7	0.1
VDW300	2	0.8	0.2
	3	0.4	0.1
	4	0.2	0.05

Note 1) Indicates the maximum operating pressure differential between 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.



# Series VDW Specific Product Precautions 3

Be sure to read this before handling.

Series VDW10/20/30 2-port type has been remodeled to new compact and lightweight series.  
For details about new series, refer to New VDW for VDW10/20 and to Series VX21 for VDW30, respectively.

## Glossary

### Pressure

#### 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 a 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).

### Electricity

#### 1. Surge voltage

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

### Other

#### 1. Material

NBR: Nitrile rubber  
FKM: Fluoro rubber = FPM — Trade name: Viton®, DAI-EL™, etc.  
C37: Brass  
EPDM: Ethylene propylene rubber = EPR

### Faston™ Terminals

1. Faston™ is a trademark of Tyco Electronics Corp.

2. For electrical connection of the Faston™ terminal and molded coil, please use Tyco's "Amp/Faston™ connector/250 Series" or the equivalent.

3. When providing a body ground, please use the frame ground (M3.5).

(Recommended fastening bolt: M3.5, length 5 mm)

### Record of changes

B edition \* Addition of molded coil specifications to the VDW10/20/30 series and the VDW200/300 series. KZ





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