Compact Direct Operated 2 Port Solenoid Valve

VDW Series

Air | Medium vacuum | Water

CE RoHS

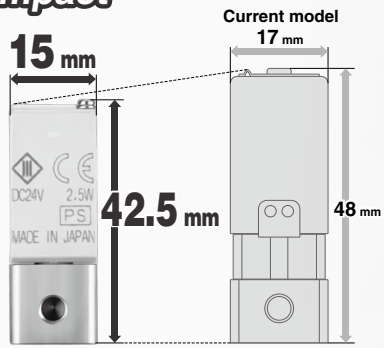
Lightweight

80 g ← **100 g**

Aluminum/Resin(PPS) body (VDW2)

Current Brass body (VDW2)

Compact



(Compared with VDW1, Brass/Stainless steel body)

Environmental performance IP65

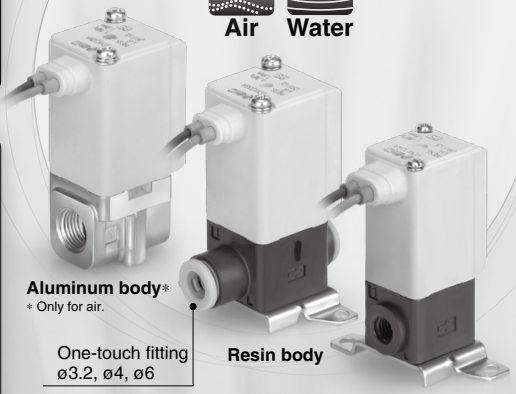
Power consumption 2.5 W 3 W

(VDW1) (VDW2)

Body material

Aluminum • Resin(PPS)

Air | Water



Aluminum body*
* Only for air.

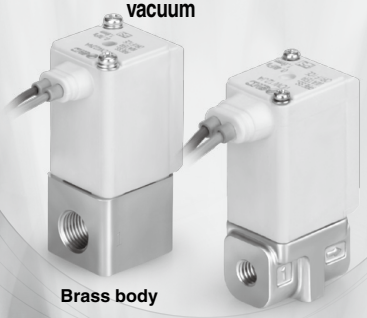
One-touch fitting ø3.2, ø4, ø6

Resin body

Body material

Brass • Stainless Steel

Medium vacuum | Water



Brass body

Stainless steel body

Compact Direct Operated 2 Port Solenoid Valve *VDW Series*

Air Medium vacuum Water

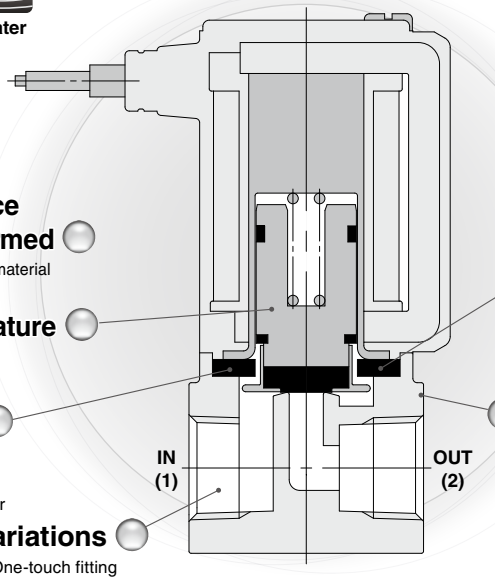
Enclosure
IP65

Flame resistance
UL94V-0 conformed
Flame resistant mold coil material

Improved armature durability

Low-noise construction
Metal noise reduced by the rubber damper

Piping variations
Screw piping, One-touch fitting



Power consumption
2.5 W (VDW1)
3 W (VDW2)

Seal material
NBR (Air, Water)
FKM (Medium vacuum)

Body material
Air Aluminum
Air • Water Resin(PPS)
Water • Medium vacuum Brass, Stainless steel

Body material	Fluid: Air	Fluid: Medium vacuum	Fluid: Water	Size	Orifice diameter: 1	1.6	2.3	3.2	Port size: M5	1/8	ø3.2	ø4	ø6	Other special options
Aluminum	(NBR)			Size 2 (VDW2)	—	●	●	●	●	●				· Special voltage 48 VAC 220 VAC 240 VAC 24 VAC 12 VDC · G thread, NPT thread · Oil-free Note 1) · Low concentration ozone resistant, Deionized water (Seal material: FKM) Note 2) · With bracket
Resin(PPS)	(NBR)		(NBR)	Size 1 (VDW1)	●	●	—	—	●		●	●		
				Size 2 (VDW2)	—	●	●	●	●			●	●	
Brass/ Stainless steel		(FKM)	(NBR)	Size 1 (VDW1)	●	●	—	—	●					
				Size 2 (VDW2)	—	●	●	●	●	●				

The materials in ( ) are the seal materials.

Note 1) As standard for medium vacuum type.
Note 2) For air, water.

Compact Direct Operated 2 Port Solenoid Valve
VDW Series
For Air • Medium Vacuum • Water

Standard Specifications

Valve specifications	Valve construction		Direct operated poppet
	Withstand pressure	MPa	2.0 (resin body type 1.5)
	Max. system pressure Note 3)	MPa	1.0
	Body material		Aluminum, Resin, Brass, Stainless steel
	Seal material		NBR, FKM
	Enclosure		Dusttight, Low jetproof (IP65) Note 2)
	Environment		Location without corrosive or explosive gases
Coil specifications	Rated voltage	AC	100 VAC, 200 VAC, 110 VAC, 230 VAC, (220 VAC, 240 VAC, 48 VAC, 24 VAC) Note 1)
		DC	24 VDC, (12 VDC) Note 1)
	Allowable voltage fluctuation		±10% of rated voltage
	Allowable leakage voltage	AC (With a full wave rectifier)	5% or less of rated voltage
		DC	2% or less of rated voltage
	Coil insulation type		Class B

⚠ **Be sure to read "Specific Product Precautions" before handling.**

Note 1) Voltage in ( ) indicates special voltage. (Refer to page 462.)
Note 2) For enclosure, refer to "Glossary of Terms" on page 466.
When using the product in a place which requires water resistance, please contact SMC.
Note 3) Refer to "Glossary of Terms" on page 466 for details on the maximum system pressure.

Solenoid Coil Specifications

Normally Closed (N.C.)

DC Specification

Size	Power consumption (W) Note 1)	Temperature rise (°C) Note 2)
Size 1	2.5	60
Size 2	3	60

Note 1) Power consumption, Apparent power: The value at ambient temperature of 20°C and when the rated voltage is applied. (Variation: ±10%)
Note 2) The value at ambient temperature of 20°C and when the rated voltage is applied. The value depends on the ambient environment. This is for reference.

AC Specification (With a full wave rectifier)

Size	Apparent power (VA) Note 1) 2)	Temperature rise (°C) Note 3)
Size 1	2.5	60
Size 2	3	60

Note 1) Power consumption, Apparent power: The value at ambient temperature of 20°C and when the rated voltage is applied. (Variation: ±10%)
Note 2) There is no difference in the frequency and the inrush and energized apparent power, since a rectifying circuit is used in the AC (with a full wave rectifier).
Note 3) The value at ambient temperature of 20°C and when the rated voltage is applied. The value depends on the ambient environment. This is for reference.

Selection Steps

Step 1 **Select the fluid.**

Item	Selection item	Page	Symbol
Select the fluid.	Air	Page 456	0
	Water	Page 460	2 ❶
	Medium vacuum	Page 458	4

VDW 1/2 **0** A A ❶

Step 2 **Select "Body material", "Port size" and "Orifice diameter" from "Flow rate — Pressure" of each fluid.**

Item	Selection item		Symbol
Select from "Flow rate — Pressure." • Body material • Port size • Orifice diameter	Size	Size 1	1 ❷
	Body material	Resin	
	Port size	M5	A ❸
	Orifice diameter	1	

VDW **1** 0 **A** A ❷ ❸

Step 3 **Select electric specifications.**

Item	Selection item		Symbol
Select electric specifications.	Voltage	24 VDC	A ❹
	Electrical entry	Grommet	

VDW 1 0 A **A** ❹

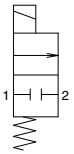
Step 4 **For other special options, refer to page 462.**

For Air Single Unit

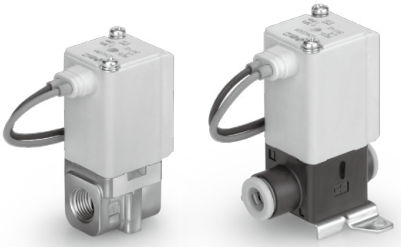
Model/Valve Specifications

N.C.

Symbol



Note) The symbol shows ports 1 and 2 as blocked, but there is actually a limit to the blocking capability when the pressure of port 2 is greater than the pressure of port 1. Please contact SMC when low leakage performance is required.



Normally Closed (N.C.)
Aluminum Body Type

∗ Flow rate characteristics show those when the port size is 1/8 (size 2).

Size	Port size	Orifice diameter (mmø)	Model	Flow rate characteristics Note 1)			Maximum operating Note 2) pressure differential (MPa)	Weight (g)
				C [dm³/(s·bar)]	b	Cv	Pressurized port 1	
2	M5, 1/8	1.6	VDW20	0.30	0.45	0.07	0.7	80
		2.3		0.58	0.45	0.18	0.4	
		3.2		1.10	0.38	0.30	0.2	

Resin Body Type (Built-in One-touch Fittings)

∗ Flow rate characteristics show those when the One-touch fitting with a port size of ø4 (size 1 or 2) is used.

Size	Port size	Orifice diameter (mmø)	Model	Flow rate characteristics Note 1)			Maximum operating Note 2) pressure differential (MPa)	Weight (g)
				C [dm³/(s·bar)]	b	Cv	Pressurized port 1	
1	M5 ø3.2 One-touch fitting ø4 One-touch fitting	1.0	VDW10	0.14	0.40	0.04	0.9	45
		1.6		0.30	0.25	0.07	0.4	
2	M5 ø4 One-touch fitting ø6 One-touch fitting	1.6	VDW20	0.30	0.45	0.07	0.7	80
		2.3		0.42	0.45	0.12	0.4	
		3.2		0.56	0.40	0.16	0.2	

Note 1) The flow rate characteristics of this product have variations.
When the highly precise flow control is required according to the system to be used, select an orifice diameter 1.3 times larger than that shown above and install a restrictor on the downstream side of the solenoid valve to make the adjustment.
Note 2) Refer to "Glossary of Terms" on page 466 for details on the maximum operating pressure differential.

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
−10 Note) to 50	−10 to 50

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

Valve Leakage

Internal Leakage

Seal material	Leakage rate (Air) Note)
NBR	1 cm³/min or less (Aluminum body type)
	15 cm³/min or less (Resin body type)

External Leakage

Seal material	Leakage rate (Air) Note)
NBR	1 cm³/min or less (Aluminum body type)
	15 cm³/min or less (Resin body type)

Note) Leakage is the value at ambient temperature 20°C.

How to Order (Single Unit)

VDW 1 0 A A

Fluid

0	For air

Common Specifications

Valve type	N.C.
Seal material	NBR
Coil insulation type	Class B
Thread type	Rc*

* One-touch fittings are attached to the resin body type.

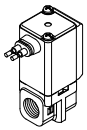
Size/Valve type

Symbol	Size	Valve type
1	Size 1 (VDW1)	Single unit N.C.
2	Size 2 (VDW2)	Single unit N.C.

Body material/Port size/Orifice diameter

Symbol	Body material	Port size	Orifice diameter
A	Resin (PPS) With bracket	M5	1.0
B			1.6
C		ø3.2 One-touch fitting	1.0
D			1.6
E		ø4 One-touch fitting	1.0
F			1.6
A	Resin (PPS) With bracket	M5	1.6
B			2.3
C			3.2
D		ø4 One-touch fitting	1.6
E			2.3
F			3.2
G		ø6 One-touch fitting	1.6
H			2.3
J			3.2
K	Aluminum	M5	1.6
L			2.3
M			3.2
N		1/8	1.6
P			2.3
Q			3.2

Voltage/Electrical entry

Symbol	Voltage	Electrical entry
A	24 VDC	Grommet 
B	100 VAC	
C	110 VAC	
D	200 VAC	
E	230 VAC	
Z	Other voltages	

For other special options, refer to page 462.

Special voltage	48 VAC
	220 VAC
	240 VAC
	24 VDC
	12 VDC
Low concentration ozone resistant (Seal material: FKM)	
Oil-free	
G thread	
NPT thread	
With bracket (Aluminum body only)	

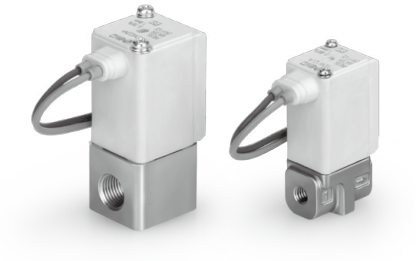
Dimensions→Page 463 (Single unit)

For Medium Vacuum Single Unit

∗ This valve can also be used with air.
(Refer to the valve specifications on page 456 for air.)

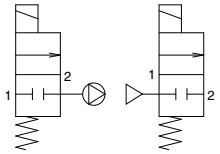
Model/Valve Specifications

N.C.



Symbol (Application example)

Used with vacuum **Used with pressure**



Note) The symbol shows ports 1 and 2 as blocked, but there is actually a limit to the blocking capability when the pressure of port 2 is greater than the pressure of port 1. Please contact SMC when low leakage performance is required.

Normally Closed (N.C.)

∗ Flow rate characteristics show those when the port size is M5 (size 1) or 1/8 (size 2).

Size	Port size	Orifice diameter (mmø)	Model	Flow rate characteristics Note 1)			Maximum operating pressure differential (MPa) Note 2)	Weight (g)
				C [dm³/(s·bar)]	b	Cv		
1	M5	1.0	**VDW14**	0.14	0.40	0.04	0.9	Brass: 65 Stainless steel: 60
		1.6		0.30	0.25	0.07	0.4	
2	M5, 1/8	1.6	**VDW24**	0.30	0.45	0.07	0.7	Brass: 115 Stainless steel: 100
		2.3		0.58	0.45	0.18	0.4	
		3.2		1.10	0.38	0.30	0.2	

Note 1) The flow rate characteristics of this product have variations.
When the highly precise flow control is required according to the system to be used, select an orifice diameter 1.3 times larger than that shown above and install a restrictor on the downstream side of the solenoid valve to make the adjustment.
Note 2) Refer to "Glossary of Terms" on page 466 for details on the maximum operating pressure differential.

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
1 to 50	–10 to 50

Note) With no freezing

Valve Leakage

Internal Leakage

Seal material	Leakage rate Note)
FKM	10^{-6} Pa·m³/sec or less

External Leakage

Seal material	Leakage rate Note)
FKM	10^{-6} Pa·m³/sec or less

Note) Leakage (10^{-6} Pa·m³/sec) is the value at 0.1 Pa·abs and ambient temperature 20°C.

How to Order (Single Unit)

VDW 1 4 A A

Fluid

4	For medium vacuum

Common Specifications

Valve type	N.C.
Seal material	FKM
Coil insulation type	Class B
Thread type	Rc
Oil-free	

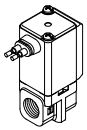
Size/Valve type

Symbol	Size	Valve type
1	Size 1 (VDW1)	Single unit N.C.
2	Size 2 (VDW2)	Single unit N.C.

Body material/Port size/Orifice diameter

Symbol	Body material	Port size	Orifice diameter
G	Brass	M5	1.0
H			1.6
J	Stainless steel	M5	1.0
K			1.6
K	Brass	M5	1.6
L			2.3
M			3.2
N		1/8	1.6
P			2.3
Q			3.2
R	Stainless steel	M5	1.6
S			2.3
T			3.2
U		1/8	1.6
V			2.3
W			3.2

Voltage/Electrical entry

Symbol	Voltage	Electrical entry
A	24 VDC	Grommet 
B	100 VAC	
C	110 VAC	
D	200 VAC	
E	230 VAC	
Z	Other voltages	

For other special options, refer to page 462.

Special voltage	48 VAC
	220 VAC
	240 VAC
	24 VDC
	12 VDC
G thread	
NPT thread	
With bracket	

Dimensions→Page 463 (Single unit)

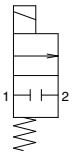
For Water Single Unit

∗ This valve can also be used with air.
(Refer to the valve specifications on page 456 for air.)

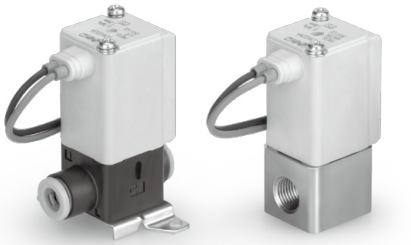
Model/Valve Specifications

N.C.

Symbol



Note) The symbol shows ports 1 and 2 as blocked, but there is actually a limit to the blocking capability when the pressure of port 2 is greater than the pressure of port 1. Please contact SMC when low leakage performance is required.



Normally Closed (N.C.)
C37, Stainless Steel Body Type

∗ Flow rate characteristics show those when the port size is M5 (size 1) or 1/8 (size 2).

Size	Port size	Orifice diameter (mmø)	Model	Flow rate characteristics Note 1)		Maximum operating Note 2) pressure differential (MPa)	Weight (g)
				Kv	Conversion Cv	Pressurized port 1	
1	M5	1.0	**VDW12**	0.034	0.04	0.9	Brass: 65 Stainless steel: 60
		1.6		0.06	0.07	0.4	
2	M5, 1/8	1.6	**VDW22**	0.06	0.07	0.7	Brass: 115 Stainless steel: 100
		2.3		0.15	0.18	0.4	
		3.2		0.26	0.30	0.2	

Resin Body Type

∗ Flow rate characteristics show those when the One-touch fitting with a port size of ø4 (size 1 or 2) is used.

Size	Port size	Orifice diameter (mmø)	Model	Flow rate characteristics Note 1)		Maximum operating Note 2) pressure differential (MPa)	Weight (g)
				Kv	Conversion Cv	Pressurized port 1	
1	M5 ø3.2 One-touch fitting ø4 One-touch fitting	1.0	**VDW12**	0.034	0.04	0.9	45
		1.6		0.06	0.07	0.4	
2	M5 ø4 One-touch fitting ø6 One-touch fitting	1.6	**VDW22**	0.06	0.07	0.7	80
		2.3		0.10	0.12	0.4	
		3.2		0.14	0.16	0.2	

Note 1) The flow rate characteristics of this product have variations.
When the highly precise flow control is required according to the system to be used, select an orifice diameter 1.3 times larger than that shown above and install a restrictor on the downstream side of the solenoid valve to make the adjustment.
Note 2) Refer to "Glossary of Terms" on page 466 for details on the maximum operating pressure differential.

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
1 to 50	–10 to 50

Note) With no freezing

Valve Leakage

Internal Leakage

Note 1) Internal leakage when pressure is supplied to Port 1 (IN).

Seal material	Leakage rate (Water) Note 2)
NBR	0.1 cm^3/min or less (C37, Stainless steel body type)
	1 cm^3/min or less (Resin body type)

External Leakage

Seal material	Leakage rate (Water) Note 2)
NBR	0.1 cm^3/min or less (C37, Stainless steel body type)
	1 cm^3/min or less (Resin body type)

Note 2) Leakage is the value at ambient temperature 20°C.

How to Order (Single Unit)

VDW 1 2 A A

Fluid

2	For water

Common Specifications

Valve type	N.C.
Seal material	NBR
Coil insulation type	Class B
Thread type	Rc

∗ One-touch fittings are attached to the resin body type.

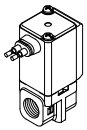
Size/Valve type

Symbol	Size	Valve type
1	Size 1 (VDW1)	Single unit N.C.
2	Size 2 (VDW2)	Single unit N.C.

Body material/Port size/Orifice diameter

Symbol	Body material	Port size	Orifice diameter
A	Resin (PPS) (With bracket)	M5	1.0
B			1.6
C		ø3.2 One-touch fitting	1.0
D			1.6
E		ø4 One-touch fitting	1.0
F			1.6
G	Brass	M5	1.0
H			1.6
J	Stainless steel	M5	1.0
K			1.6
A	Resin (PPS) (With bracket)	M5	1.6
B			2.3
C			3.2
D		ø4 One-touch fitting	1.6
E			2.3
F			3.2
G		ø6 One-touch fitting	1.6
H			2.3
J			3.2
K	Brass	M5	1.6
L			2.3
M			3.2
N		1/8	1.6
P			2.3
Q			3.2
R	Stainless steel	M5	1.6
S			2.3
T			3.2
U		1/8	1.6
V			2.3
W			3.2

Voltage/Electrical entry

Symbol	Voltage	Electrical entry
A	24 VDC	Grommet 
B	100 VAC	
C	110 VAC	
D	200 VAC	
E	230 VAC	
Z	Other voltages	

For other special options, refer to page 462.

Special voltage	48 VAC
	220 VAC
	240 VAC
	24 VDC
	12 VDC
Deionized water (Seal material: FKM)	
Oil-free	
G thread	
NPT thread	
Bracket interchangeable with old type	
With bracket (Brass, Stainless steel body only)	

Dimensions → Page 463 (Single unit)

VDW Series
Other Special Options

Electrical options
(Special voltage)

VDW 1 0 A Z 1A

Enter standard product number.

Electrical option

Electrical option (Special voltage)

Specification	Symbol	Voltage	Electrical entry
Special voltage	1A	48 VAC	Grommet
	1B	220 VAC	
	1C	240 VAC	
	1U	24 VAC	
	1D	12 VDC	

Other options
(Low concentration ozone resistant, Deionized water, oil-free, special thread)

VDW 1 0 A A Z

Enter standard product number.

Other option (Low concentration ozone resistant, Deionized water, oil-free, special thread)

Symbol	Low concentration ozone∗1, ∗4 resistant, Deionized water (Seal material: FKM)	Oil-free∗1	Special∗2, ∗3 thread
Nil	—	—	— (Standard)
A	—	—	G1/8∗5
B			NPT1/8
C			M6
Z	—	○	— (Standard)
D			G1/8∗5
E			NPT1/8
F			M6
G	○	—	— (Standard)
H			G1/8∗5
J			NPT1/8
K			M6
L	○	○	— (Standard)
M			G1/8∗5
N			NPT1/8
P			M6

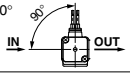
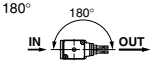
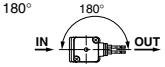
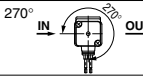
∗1 Applicable for air type (VDW□0) and water type (VDW□2).
∗2 When G or NPT is selected, choose the 1/8 port size standard model.
∗3 When M6 is selected, choose the M5 port size standard model.
∗4 When using deionized water or any other fluid that may corrode C37 (brass), select a stainless steel body.
∗5 For connection, prepare a fitting compliant with ISO 16030 and JIS B 8674.

Special electrical entry direction

VDW □□□□ XC A

Enter standard product number.

Special electrical entry direction

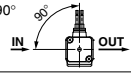
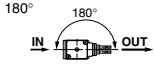
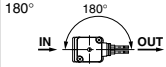
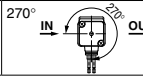
Symbol	Electrical entry direction	
	VDW1	VDW2
A	Not possible	
B		
C	Not possible	

With bracket/Special electrical entry direction

VDW □□□□ XD A

Enter standard product number.

With bracket (Shipped together)/Special electrical entry direction

Symbol	Electrical entry direction	
	VDW1	VDW2
A	Not possible	
B		
C	Not possible	

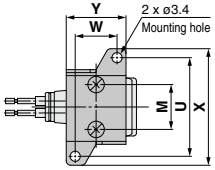
Bracket interchangeable with old type

The brackets are interchangeable with brackets of old VDW10/20 series. For details of exterior dimensions, please contact SMC.

VDW □□□□ XB

Enter standard product number.

Bracket interchangeable with old type (Shipped together)



[mm]

Size	M	U	W	X	Y
VDW1	11	28	11	34	17
VDW2	15	33	14	39	20

∗ Bracket part no.
Size 1: VDW10S-12A-1
Size 2: VDW20S-12A-1

∗ Enter symbols in the order to the right when ordering a combination of electrical option, other options, and bracket interchangeable with old type.

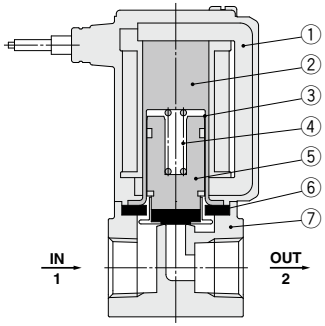
Example) **VDW 2 0 A Z 1A Z XB**

Electrical option
Other option
Bracket interchangeable with old type

Construction

Normally closed (N.C.)

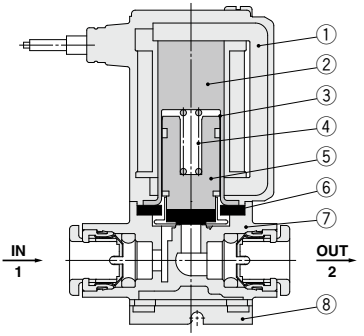
Body material: Aluminum, PPS resin, Brass, Stainless steel



Component Parts

No.	Description	Material
1	**Solenoid coil**	Cu + Fe + Resin
2	**Fixed armature**	Fe
3	**Tube**	Stainless steel
4	**Return spring**	Stainless steel
5	**Armature assembly**	NBR, FKM, Stainless steel, PPS resin
6	**Seal**	NBR, FKM
7	**Body**	Aluminum, PPS resin, Brass, Stainless steel

Body material: PPS resin (One-touch fitting type)



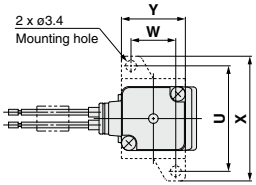
Component Parts

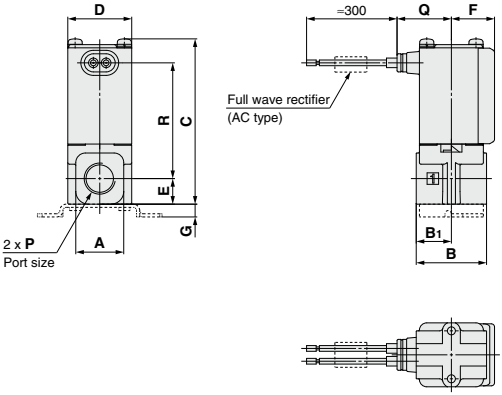
No.	Description	Material
1	**Solenoid coil**	Cu + Fe + Resin
2	**Fixed armature**	Fe
3	**Tube**	Stainless steel
4	**Return spring**	Stainless steel
5	**Armature assembly**	NBR, FKM, Stainless steel, PPS resin
6	**Seal**	NBR, FKM
7	**Body**	PPS resin
8	**Bracket**	SPCC

Dimensions/Single Unit

Body material Aluminum

Grommet





[mm]

Model	Port size P	A	B	B1	C	D	E	F	Mounting bracket dimensions (XD)					Electrical entry	
									G	U	W	X	Y	Grommet	
														Q	R
VDW2	M5, 1/8	15	22	11	51.7	20	8	13.5	4	33	14	39	20	17	36.2

Made to Order

<Special lead wire length>

Produced upon receipt of order. Please contact SMC for lead times.

VDW□□□□□XL□

Lead wire length

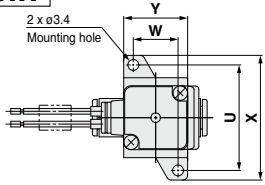
XL1	600 mm
XL2	1000 mm
XL3	1500 mm
XL4	3000 mm

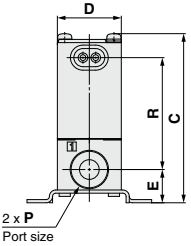
Dimensions/Single Unit

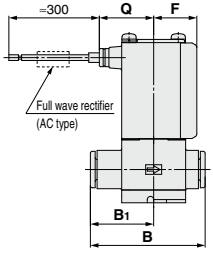
Body material **Resin**

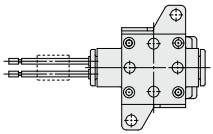
With One-touch fittings

Grommet









For information on handling One-touch fittings and on appropriate tubing, refer to page 469 and the Fittings & Tubing section of the "Handling Precautions for SMC Products" on the SMC website.

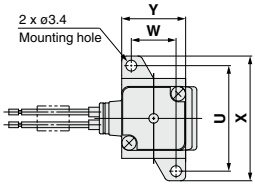
[mm]

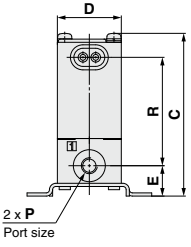
Model	One-touch fitting P	B	B_1	C	D	E	F
VDW1	ø3.2, ø4	31.7	17.1	46.1	15	9.5	11
VDW2	ø4, ø6	35.9	19.8	52.9	20	10.4	13.5

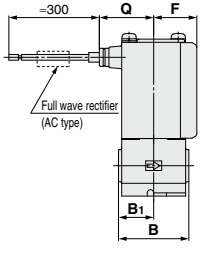
Model	One-touch fitting P	Mounting bracket dimensions				Electrical entry	
						Grommet	
		U	W	X	Y	Q	R
VDW1	ø3.2, ø4	28	11	34	17	15.5	30.35
VDW2	ø4, ø6	33	14	39	20	17	35

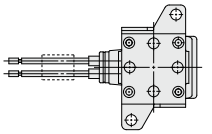
Port size M5/M6

Grommet









[mm]

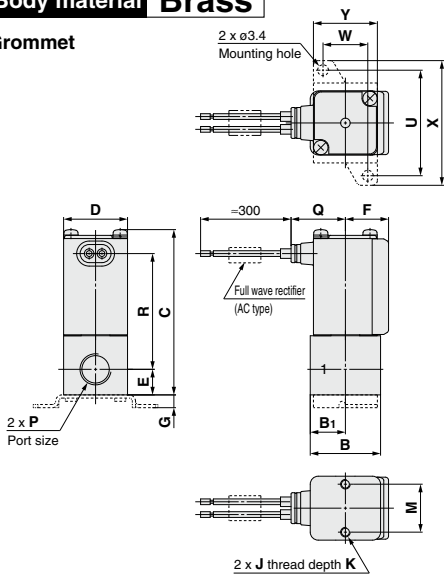
Model	Port size P	B	B_1	C	D	E	F
VDW1	M5(M6)	20	10	46.1	15	9.5	11
VDW2	M5(M6)	22	11	50.9	20	9.5	13.5

Model	Port size P	Mounting bracket dimensions				Electrical entry	
						Grommet	
		U	W	X	Y	Q	R
VDW1	M5(M6)	28	11	34	17	15.5	30.35
VDW2	M5(M6)	33	14	39	20	17	33.9

Dimensions/Single Unit

Body material Brass

Grommet



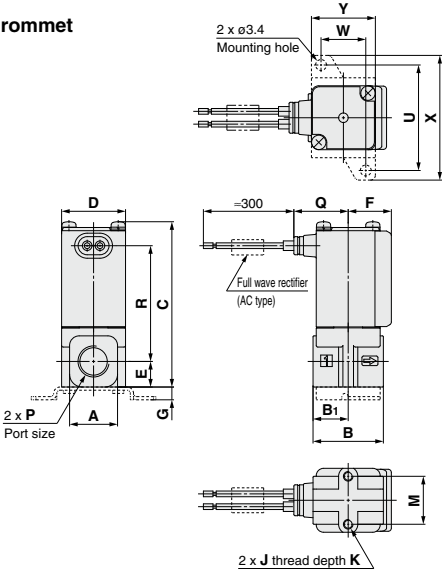
[mm]

Model	Port size P	B	B_1	C	D	E	F	Mounting method		
								J	K	M
VDW1	M5	20	10	42.4	15	6	11	M2.5	4	11
VDW2	M5, 1/8	22	11	51.7	20	8	13.5	M3	5	15

Model	Port size P	Mounting bracket dimensions (XD)					Electrical entry	
		G	U	W	X	Y	Grommet Q	Grommet R
VDW1	M5	4	28	11	34	17	15.5	30.15
VDW2	M5, 1/8	4	33	14	39	20	17	36.2

Body material Stainless Steel

Grommet



[mm]

Model	Port size P	A	B	B_1	C	D	E	F	Mounting method		
									J	K	M
VDW1	M5	12	20	10	42.4	15	6	11	M2.5	4	11
VDW2	M5, 1/8	15	22	11	51.7	20	8	13.5	M3	5	15

Model	Port size P	Mounting bracket dimensions (XD)					Electrical entry	
		G	U	W	X	Y	Grommet Q	Grommet R
VDW1	M5	4	28	11	34	17	15.5	30.15
VDW2	M5, 1/8	4	33	14	39	20	17	36.2