Compact Direct Operated 2 Port Solenoid Valve

VDW Series



Courtesy of Steven Engineering, Inc - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com



or Air • Medium Vacuum • Water

Standard Specifications

	Valve con	struction	Direct operated poppet		
Walter	Withstand pressure	MPa	2.0 (resin body type 1.5)		
	Max. system pressure Note 3)	MPa	1.0		
specifications	Body material		Aluminum, Resin, Brass, Stainless steel		
specifications	Seal material		NBR, FKM		
	Enclosure		Dusttight, Low jetproof (IP65) Note 2)		
	Environment		Location without corrosive or explosive gases		
Bated voltage		AC	100 VAC, 200 VAC, 110 VAC, 230 VAC, (220 VAC, 240 VAC, 48 VAC, 24 VAC) Note 1)		
	Hated voltage	DC	24 VDC, (12 VDC) Note 1)		
Coil	Allowable voltage fluctuation		±10% of rated voltage		
specifications	Allowable leakage	AC (With a full wave rectifier)	5% or less of rated voltage		
	voltage DC		2% or less of rated voltage		
Coil insulation type			Class B		
A Be sure to read "Specific Product Precautions" before hand		ecautions" before hand	lling. Note 1) Voltage in () indicates special voltage. (Refer to page 462.)		

A Be sure to read "Specific Product Precautions" before handling.

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		
Nets d) Development and the American The color of employed terms of				

nt powe $20^\circ C$ and when the rated voltage is applied. (Variation: $\pm 10\%$) 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)

Note 2) For enclosure, refer to "Glossary of Terms" on page 466.

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

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.

Note 1) F er consumption, Apparent power: The value at ambient temperature of 20°C and when the rated voltage is applied. (Variation: $\pm 10\%$)

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



455 ®

VCH

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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

Size	Port size	Orifice diameter	Model	Flow	rate characteristics	Note 1)	Maximum operating Note 2) pressure differential (MPa)	Weight
	(mmø)			C [dm ³ /(s·bar)]	b	Cv	Pressurized port 1	(g)
		1.6		0.30	0.45	0.07	0.7	
2	M5, 1/8	2.3	VDW20	0.58	0.45	0.18	0.4	80
		3.2		1.10	0.38	0.30	0.2	1

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	Model	Flow	rate characteristics	Maximum operating Note 2) pressure differential (MPa)	Weight	
		(mmø)		C [dm3/(s·bar)]	b	Cv	Pressurized port 1	(g)
1	M5	1.0		0.14	0.40	0.04	0.9	45
ø4 One-touch fit	ø4 One-touch fitting	1.6	VDWIO	0.30	0.25	0.07	0.4	45
	M5	1.6		0.30	0.45	0.07	0.7	
2	ø4 One-touch fitting	2.3	VDW20	0.42	0.45	0.12	0.4	80
	ø6 One-touch fitting	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)
NDD	1 cm ³ /min or less (Aluminum body type)
NDh	15 cm ³ /min or less (Resin body type)

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

External Leakage

Seal material	Leakage rate (Air) Note)		
NPP	1 cm ³ /min or less (Aluminum body type)		
NDN	15 cm ³ /min or less (Resin body type)		

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

For Air Single Unit



Common Specifications

Coil insulation type Class B

N.C.

NBR

Rc*

Valve type

Seal material

Thread type

How to Order (Single Unit)

A **VDW** 1 0 Fluid 0 For air

2.3

3.2

Body material/Port

Body

material

With

bracket Е

With

bracket G

Aluminum Ν

1/8

Symbol

Α в Resin

С (PPS)

D

F Α в С Resin D (PPS) Е

F

н

J

κ

L

Μ

Ρ

Q

Size/Valve type

Symbol

1

2

Size

Size 1

(VDW1)

Size 2

(VDW2)

Valve

type

Single

unit

N.C.

Single

unit

N.C

						* One-tou to the re	ch fittings are attached sin body type.
al/Port size/Orifice	diameter		• Volta	age/Ele	ectric	cal entry	
Port size	Orifice diameter		Symbol	Volta	ge	Elec	trical entry
M5	1.0	[Α	24 VE	DC	Grommet	~
WI5	1.6		в	100 V	AC		
ø3 2 One-touch fitting	1.0		-	110.1	AC		AND I
00.2 One-loadin many	1.6		L -	110 V	AC		
a4 One-touch fitting	1.0		D	200 V.	AC		
64 One-toden hang	1.6		E	230 V	AC		
	1.6]	z			Other voltag	jes
M5	2.3	.	[
	3.2	/		1	For other special options,		
	1.6] [ļ	refer	to page 462.	
ø4 One-touch fitting	2.3						48 VAC
	3.2				Sn	ecial voltage	220 VAC
	1.6				op	ecial voltage	240 VAC
ø6 One-touch fitting	2.3] /					24 VAC
	3.2						12 VDC
	1.6				Low	concentration of	ozone resistant
M5	2.3				(Sea	al material: FKN	1)
	3.2				Oil-f	free	
	1.6]/			G th	read	
		12			NIDT	T three ord	

	48 VAC				
Special voltage	220 VAC				
Special voltage	240 VAC				
	24 VAC				
	12 VDC				
Low concentration ozone resistant (Seal material: FKM)					
Oil-free					
G thread					
NPT thread					
With bracket (Aluminum body only)					
Dimensions→Pa	Dimensions→Page 463 (Single unit)				



VCH

457 **SMC** Courtesy of Steven Engineering, Inc - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com



N.C.

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



Symbol (Application example)



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.)

Norma	ally Closed	(N.C.)		* Flow rate characteristics show those when the port size is M5 (size 1) or 1/8 (size 2					
Sizo	Port size	Orifice	Model	Flow	rate characteristics	Note 1)	Maximum operating	Weight	
Size	1 011 3120	(mmø)	woder	C [dm ³ /(s·bar)]	b	Cv	(MPa) Note 2)	(g)	
-	ME	1.0	VDW14	0.14	0.40	0.04	0.9	Brass: 65	
	CIVI	1.6	VDVV14	0.30	0.25	0.07	0.4	Stainless steel: 60	
		1.6		0.30	0.45	0.07	0.7	B	
2	M5, 1/8	2.3	VDW24	0.58	0.45	0.18	0.4	Stainless steel: 100	
		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·m ³ /sec or less

External Leakage

Seal material	Leakage rate Note)
FKM	10 ⁻⁶ Pa·m ³ /sec or less

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

For Medium Vacuum Single Unit



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	

Symbol Size Valve type Symbol Body material Port size Orifice diameter Symbol Voltage Electrical entry 1 Size 1 (VDW1) Single unit (VDW1) N.C. Brass M5 1.0 I.0 I.0 K 1.0 I.0 K Symbol Voltage Electrical entry A 24 VDC Brass M5 1.0 I.0 K C 110 VAC D B 100 VAC C Grommet y Single unit N.C. K K M5 2.3 3.2 Stainless steel M5 2.3 3.2 For other special options, refer to page 462. Y Y Y Y Y M5 3.2 1.6 Y Y Stainless steel 1.6 Y Y Y Y	•Size	/Valve ty	be	●Bod	y material/Po	ort size/O	rifice dia	neter	• Volta	age/Electr	ical entry		
1 Single unit (VDW1) C C Brass M5 M5 1.0 1.6 J Stainless steel M5 1.6 B 100 VAC C 110 VAC K Stainless steel M5 1.6 D 200 VAC C 110 VAC Single unit (VDW2) N.C. K L M5 3.2 C C 110 VAC E 230 VAC Z VDW2) Single unit N.C. K L M5 3.2 1.6 Z Other voltages R M5 2.3 3.2 N5 2.2 VEV For other special options, refer to page 462. N Stainless steel 1.6 2.3 2.2 VEV 48 VAC Stainless steel 1.6 3.2 1.6 2.20 VAC 220 VAC VDV Stainless steel 1.6 2.3 2.2 VEV 48 VAC V V 11/8 2.3 2.2 VEV 240 VAC VAC	Symbol	Size	Valve type	Symbol	Body material	Port size	Orifice diameter		Symbol	Voltage	Elec	ctrical entry	
Size 1 (VDW1) Single N.C. H Drost Ind 1.6 J Stainless steel M5 1.6 Ind Ind			<u>.</u>	G	Brass	M5	1.0		Α	24 VDC	Grommet	~	
K M5 1.0 1.6 1.6 1.6 1.6 1.6 2.3 1.6 2.3 1.6 2.3 1.6 2.3 1.6 2.3 1.6 3.2 1.6 1.8 1.6 2.3 1.6 3.2 1.6 1.8 1.8 3.2 1.8 1.6 1.8 2.3 1.8 1.6 1.8 2.3 1.8 2.3 1.8 2.3 1.8 2.3 1.8 2.3 1.8 2.3 1.8 2.3 1.8 2.3 1.8 2.3 1.8 2.3 1.8 2.3 1.8 2.3 1.8 2.3 1.8 2.3 1.8 2.3 1.8 2.3	1	Size 1	Single	н	Diass	1015	1.6		в	100 VAC	-		
K K		(VDW1)	N.C.	J	Stainless steel	M5	1.0		C	110 VAC	-	1960DU	
K M M 1.6 Z Z Other voltages Single unit N.C. N P 1.6 2.3 3.2 Z Other voltages VD 200 VAC E 230 VAC E 230 VAC E 230 VAC V N P 1.6 1.6 Z Other voltages V N.C. R N N 1.6 Z Other voltages T N.C. Stainless steel 1.6 3.2 N Special voltage 220 VAC V V V 1.8 2.3 N Special voltage 240 VAC 24 VAC 1.2 VDC 1.2 VDC 1.2 VDC				K			1.6	J			-		
2 Single unit N.C. M M 2.3 3.2 1/8 M E 230 VAC N P 1.6 1/8 2.3 3.2 0ther voltages N P 1.6 1/8 2.3 3.2 For other special options, refer to page 462. N N N 1.6 3.2 Special voltage 48 VAC Stainless steel 1.6 1/8 2.3 1.6 220 VAC 220 VAC V V 1.6 1/8 1.6 2.3 1.6 2.20 1.6 2.20				K			1.6	1	D	200 VAC	_		
2 Size 2 (VDW2) Single unit N.C. S T Stainless steel 1/8 2.3 0 0 0 0 0 0 0 0 0 0 0 0 0				L	Brass	M5	2.3		E	230 VAC			
N Brass 1.6 For other special options, refer to page 462. VDW2) N.C. R 1.6 3.2 N.C. Stainless steel 1.6 3.2 Stainless steel 1.6 3.2 V Stainless steel 1.6 V 1.8 2.3 V 1.6 1.8 V 1.6 2.0 V 1.6 1.6 V 1.8 2.3				м			3.2	1	z		Other volta	ges	
P 1/8 2.3 For other special options, refer to page 462. (VDW2) N.C. R 1.6 220 VAC S 1.6 2.3 220 VAC Stainless steel 1.6 2.2 240 VAC V 1/8 2.3 1.6 24 VAC				Ν		1/8	1.6	1	(
2 Single (VDW2) 0 3.2 refer to page 462. R 5 1.6 2.3 2000 VAC T U 1.6 2.2 240 VAC 24 VAC 1.8 1.6 240 VAC 1/8 2.3 1.6 1.6			Single	Р			2.3	/	l	For	For other special options,		
R R 1.6 48 VAC N.C. S 1.6 220 VAC T Stainless steel 3.2 3.2 1.6 1.6 24 VAC 24 VAC 1.2 VDC	2	Size 2		Q			3.2	/		refer to pa	r to page 462.	• /	
S M5 2.3 Special voltage 220 VAC U 3.2 1.6 24 VAC 24 VAC V 1.8 2.3 1.2 1.2 VDC	2 I	(VDW2)	N.C.	R			1.6] /				48 VAC	
T 3.2 Special voltage 240 VAC U 1.6 24 VAC 24 VAC V 1.8 2.3 12 VDC				S		M5	2.3			Spec	necial voltage	220 VAC	
U 1/8 1.6 24 VAC V 1/8 2.3 12 VDC				Т	Stainless steel		3.2				pecial voltage	240 VAC	
V 1/8 2.3 12 VDC				U	Starriess steel		1.6					24 VAC	
				v		1/8	2.3	1				12 VDC	
G thread				W			3.2	į		G	thread		

NPT thread With bracket

Dimensions→Page 463 (Single unit)

VDW SX10 VQ LVM

VCH



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



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

cor, stamess steel body Type				* FIOW rate char	actenstics show those	when the port size is M5 (size i) or i/6 (size z).	
Size	Port size	Orifice diameter Mode		Flow rate characteristics Note 1)		Maximum operating Note 2) pressure differential (MPa)	Weight	
		(mmø)		Kv	Conversion Cv	Pressurized port 1	(9)	
- 1	1 M5	1.0	1.0 VDW12	0.034	0.04	0.9	Brass: 65	
1		1.6	VDWIZ	0.06	0.07	0.4	Stainless steel: 60	
	2 M5, 1/8	1.6		0.06	0.07	0.7	Brass: 115	
2		2.3	VDW22	0.15	0.18	0.4	Stainless steel: 100	
		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	Model	Flow rate characteristics Note 1)		Maximum operating Note 2) pressure differential (MPa)	Weight
		(mmø)		Kv	Conversion Cv	Pressurized port 1	(9)
1	M5	1.0	VDW12	0.034	0.04	0.9	45
· '	ø4 One-touch fitting	1.6	VDW12	0.06	0.07	0.4	45
	M5	1.6		0.06	0.07	0.7	
2 Ø4 One-touch fitting Ø6 One-touch fitting	ø4 One-touch fitting	2.3	VDW22	0.10	0.12	0.4	80
	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).

with sea when the part size is ME (size 1) or 1/0 (size 0)

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

External Leakage

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

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

For Water Single Unit



Common Specifications

N.C.

Valve type

How to Order (Single Unit)

VDW 1 2 A A

Г

* One-touch fittings are attached to the resin body type. • Voltage/Electrical entry Symbol Voltage Electrical entry A 24 VDC B 100 VAC C 110 VAC D 200 VAC			Thread type	Э	Rc					
Voltage/Electrical entry Symbol Voltage Electrical entry A 24 VDC Grommet B 100 VAC Grommet C 110 VAC Grommet D 200 VAC Grommet			* One-touch f to the resin	ittings are body type	attached					
Symbol Voltage Electrical entry A 24 VDC Grommet B 100 VAC Grommet C 110 VAC Grommet D 200 VAC Grommet	Volt	Voltage/Electrical entry								
A 24 VDC Grommet B 100 VAC Grommet C 110 VAC Grommet D 200 VAC Grommet	Symbol	al entry								
B 100 VAC C 110 VAC D 200 VAC E 200 VAC	Α	24 VDC	Grommet	~						
C 110 VAC D 200 VAC	в	100 VAC]	80°						
D 200 VAC	С	110 VAC	^د ،							
	D	200 VAC]		1					
E 230 VAC	Е	230 VAC		<u></u>	/					

	48 VAC	
Special voltage	220 VAC	
Special voltage	240 VAC	
	24 VAC	
	12 VDC	
Deionized water (S	eal material: FKM)	
Oil-free		
G thread	VCH	
NPT thread		
Bracket interchange	eable with old type	VDW
With bracket (Brass, S	tainless steel body only)	
		SX10
Dimensions \rightarrow Pa	ge 463 (Single unit)	VQ
		LVM

														-						
												Seal ma	aterial	NBR						
						FI	luid					Coil ins	ulation type	Class B						
						2 For v	water					Thread	type	Rc						
												* One-tou to the re	ich fittings are esin body type	attached						
Size	/Valve typ	pe		Bod	y mater	ial/Port size/Orifice	diameter		• Volt	age/Elec	trical e	ntry								
Symbol	Size	Valve type		Symbol	Body material	Port size	Orifice diameter	[Symbol	Voltage	e	Elec	trical entry							
			[Α		ME	1.0	[Α	24 VD0	Gro	ommet	<u>s</u>							
				В	Resin	IVI5	1.6		в	100 VA	c		- Sô	21						
				С	(PPS)	ø3.2 One-touch fitting	1.0		-	110.1/4	-		and the second s							
		Oliveral a		D	(With		1.6		U.	TIUVA										
1	Size 1	Single unit N.C.	unit N.C.	unit	E bracket)	1.0		D	200 VA	С			7							
•	(VDW1)			F	F		by one toden nang	1.6		E	230 VA	c		IN CONTRACTOR	-					
							G	Brass	M5	1.0		z		0	ther volta	qes				
						н			1.6						•					
				J	Stainless	M5	1.0		1	F	or other	snecial c	ntions							
			L	K	steel	-	1.6	J		re	fer to pa	ige 462.	priorio,							
			Γ	Α			1.6	1		Г			48 VA	NC						
				в		M5	2.3	1 /			Cossial	valtage	220 V	AC						
						С			3.2	1 /			Special	vollage	240 V	AC				
									D	Resin		1.6	1 [24 VA	NC	
				Е	(PPS) (With	ø4 One-touch fitting	2.3	1					12 VE	C						
				F	bracket)		3.2] [Γ	Deionized	d water (S	eal material:	FKM)						
				G									1.6				Oil-free			
			н		ø6 One-touch fitting	2.3			L	G thread										
				J			3.2			L	NPT three	ad								
	Size 2	Single		К			1.6			L	Bracket in	nterchang	eable with ol	d type						
2	(VDW2)	unit		L		M5	2.3			L	With brack	et (Brass, S	stainless steel b	ody only)						
	. ,	N.C.		М	Brass		3.2													
				N			1.6													
				P		1/8	2.3			Г	Dimensio	\rightarrow Pa	ae 463 (Sin	ale unit)						
				Q			3.2			L			5	<u> </u>						
				R			1.6													
				S		M5	2.3	11												
					Stainless		3.2	11												
				U	31001	1/0	1.6	Į.												
					V		1/8	2.3	1											
			L	W			3.2	}												

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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

⊘SMC



Dimensions/Single Unit





▲ Lead wire length XL1 600 mm XL2 1000 mm XL3 1500 mm XL4 3000 mm VCH VDW SX10 VQ LVM

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a for

Air, Medium Vacuum, Water

Dimensions/Single Unit







D œ ш <u>2 x P</u> Port size

o





							[mm]
Model	Port size P	в	Bı	с	D	Е	F
VDW1	M5(M6)	20	10	46.1	15	9.5	11
VDW2	M5(M6)	22	11	50.9	20	9.5	13.5
		Mounti	ng brac	Electrical entry			
Model	Port size			x	v	Grommet	
	•	U	vv		T	Q	R
VDW1	M5(M6)	28	11	34	17	15.5	30.35
VDW2	M5(M6)	33	14	39	20	17	33.9

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.

Model	One-touch fitting P	в	B1	с	D	Е	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
	One have being	Mounti	ng brac	ket dime	ensions	Electric	al entry
Model	One-touch fitting	Mounti	ng brac	ket dime	ensions	Electric	al entry nmet
Model	One-touch fitting P	Mounti U	ng brac W	ket dime X	ensions Y	Electric Gror Q	al entry nmet
Model	One-touch fitting P ø3.2, ø4	Mounti U 28	ng braci W 11	ket dime X 34	Y 17	Electric Gror Q 15.5	al entry nmet R 30.35
Model VDW1 VDW2	One-touch fitting P Ø3.2, Ø4 Ø4, Ø6	Mounti U 28 33	ng braci W 11 14	ket dime X 34 39	Y 17 20	Electric Gror Q 15.5 17	al entry nmet R 30.35 35



® 464

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Dimensions/Single Unit





										[mm]
								Mounting method		
Model	Port size P	в	B1	С	D	E	F	J	к	М
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

	Derteine	Mount	ing brad	Electrical entry				
Model	Port Size	~	υ	w	v	Y	Grommet	
		G			^		Q	R
VDW1	M5	4	28	11	34	17	15.5	30.15
VDW2	M5, 1/8	4	33	14	39	20	17	36.2

VCH
VDW
SX10
VQ
LVM



												[mm]
F.		Destaine								Moun	ting m	ethod
	Model	Port size	A	в	B1	С	D	E	F	J	к	м
	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
•			Mount	ing bra		noncion	e (YD)	Electric	al ontry			
	Model	Port size	WOULT				5 (ND)	Gror				
<u>, </u>	INIOGEI	Р	G	U	w	Х	Υ	0101				
- 5								u	ĸ			
	VDW1	M5	4	28	11	34	17	15.5	30.15			
<u>' Ur</u>	VDW2	M5, 1/8	4	33	14	39	20	17	36.2			

Body material Stainless Steel

Grommet

<u>2 x P</u>

Port size



SMC

×

465

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VDW Series Glossary of Terms

Pressure Terminology

1. Maximum operating pressure differential

The maximum pressure differential (the difference between the inlet and outlet pressure) which is allowed for operation. When the outlet pressure is 0 MPa, this becomes the maximum operating pressure.

2. Maximum system pressure

The maximum pressure that can be applied inside the pipelines (line pressure).

[The pressure differential in the solenoid valve portion must be less than the maximum operating pressure differential.]

3. Withstand pressure

The pressure in which the valve must be withstood without a drop in performance after holding for one minute under prescribed (static) pressure and returning to the operating pressure range. [value under the prescribed conditions]

Electrical Terminology

1. Surge voltage

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

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.

Second characteristic numeral First characteristic numeral

• First Characteristics:

Degrees of protection against solid foreign objects

- Non-protected
 Protected against solid foreign objects of ø50 mm and greater
 Protected against solid foreign objects of ø12 mm and greater
- 3 Protected against solid loreign objects of ø12 mm and greater
- 4 Protected against solid foreign objects of ø1.0 mm and greater
- 5 Dust-protected 6 Dusttight

Second Characteristics:

Degrees of protection against water

0	Non-protected	
1	Protected against vertically falling water drops	Dripproof type 1
2	Protected against vertically falling water drops when enclosure tilted up to 15°	Dripproof type 2
3	Protected against rainfall when enclosure tilted up to 60°	Rainproof type
4	Protected against splashing water	Splashproof type
5	Protected against water jets	Low jetproof type
6	Protected against powerful water jets	Strong jetproof type
7	Protected against the effects of temporary immersion in water	Immersible type
8	Protected against the effects of continuous immersion in water	Submersible type

Example) IP65: Dusttight, Low jetproof type

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

Others

1. Material

NBR: Nitrile rubber FKM: Fluororubber

2. Oil-free treatment

The degreasing and washing of wetted parts

3. Symbol

Symbol ($\alpha \square + N$) IN and OUT are in a blocked condition (+), but actually in the case of reverse pressure (OUT> IN), there is a limit to the blocking.

Product with flow direction $2\to 1$ with pressure supplied to port 2 and universal specification product are available as specials.



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.

Design

MWarning

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

2. Extended periods of continuous energization

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

3. Liquid rings

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

4. Actuator drive

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

5. Pressure (including vacuum) holding

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

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

Selection

Warning

1. Fluid

1) Type of fluid

Before using a fluid, check whether it is compatible with the materials of each model by referring to the fluids listed in this catalog. Use a fluid with a kinematic viscosity of 50 mm²/s or less. If there is something you do not know, please contact SMC.

2) Flammable oil, Gas

Confirm the specification for leakage in the interior and/or exterior area.

3) Corrosive gas

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

- 4) Depending on water quality, a brass body can cause corrosion and internal leakage may occur. If such abnormalities occur, exchange the product for a stainless steel body.
- 5) Use an oil-free specification when any oily particle must not enter the passage.
- 6) Applicable fluid on the list may not be used depending on the operating condition. Give adequate confirmation, and then determine a model, just because the compatibility list shows the general case.

Selection

Warning

2. Fluid quality

<Air>

1) Use clean air.

Do not use compressed air that contains chemicals, synthetic oils including organic solvents, salt or corrosive gases, etc., as it can cause damage or malfunction.

2) Install an air filter.

Install air filters close to the valves on the upstream side. A filtration degree of 5 μm or less should be selected.

3) Install an aftercooler or air dryer, etc.

Compressed air that contains excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an aftercooler or air dryer, etc.

4) If excessive carbon powder is generated, eliminate it by installing mist separators at the upstream side of valves. If excessive carbon powder is generated by the compressor, it may adhere to the inside of the valves and cause a malfunction.

Refer to Best Pneumatics No.7 for further details on compressed air quality.

<Vacuum>

Please be aware that there is a range of pressure that can be used.



Vacuum piping direction: if the system uses a vacuum pump, we ask that you install the vacuum pump on the secondary side (Port 2).

Also, install a filter on the primary side (Port 1), and be careful that no foreign object is picked up.

Please replace the valve after operating the device approximately 300,000 times.



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.

Selection

AWarning

<Water>

The use of a fluid that contains foreign objects can cause problems such as malfunction and seal failure by promoting wear of the valve seat and armature and by sticking to the sliding parts of the armature etc. Install a suitable filter (strainer) immediately upstream from the valve. As a general rule, use 100 mesh.

The supply water includes materials that create a hard sediment or sludge such as calcium and magnesium. Since this scale and sludge can cause the valve to malfunction, install water softening equipment, and a filter (strainer) directly upstream from the valve to remove these substances.

Tap water pressure:

The water pressure for tap water is normally 0.4 MPa or less. However, in places like a high-rise building, the pressure may be 1.0 MPa. When selecting tap water, be careful of the maximum operating pressure differential.

When using water or heated water, poor operation or leaks may be caused by dezincification, erosion, corrosion, etc. The brass (Brass) body of this product uses dezincification resistant material as a standard. We also offer a stainless steel body type with improved corrosion resistance. Please use the one that fits your needs.

3. Ambient environment

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

Countermeasures against static electricity

Take measures to prevent static electricity since some fluids can cause static electricity.

5. Low temperature operation

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

Selection

▲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.



AC/Class B built-in full wave rectifier coil: 5% or less of rated voltage DC coil: 2% or less of rated voltage

2. Selecting model

Material depends on fluid. Select optimal models for the fluid.

Mounting

🗥 Warning

1. If air leakage increases or equipment does not operate properly, stop operation.

After mounting is completed, confirm that it has been done correctly by performing a suitable function test.

2. Do not apply external force to the coil section.

When tightening is performed, apply a wrench or other tool to the outside of the piping connection parts.

3. Mount a valve with its coil position upwards, not downwards.

When mounting a valve with its coil positioned downwards, foreign objects in the fluid will adhere to the iron core leading to a malfunction. Especially for strict leakage control, such as with vacuum applications and non-leak specifications, the coil must be positioned upwards.

- 4. Do not warm the coil assembly with a heat insulator, etc. Use tape, heaters, etc., for freeze prevention on the piping and body only. They can cause the coil to burn out.
- 5. Secure with brackets, except in the case of steel piping and copper fittings.
- Avoid sources of vibration, or adjust the arm from the body to the minimum length so that resonance will not occur.
- 7. Painting and coating

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

∕ SMC



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.

Piping

MWarning

1. During use, deterioration of the tube or damage to the fittings could cause tubes to come loose from their fittings and thrash about.

To prevent uncontrolled tube movement, install protective covers or fasten tubes securely in place.

2. For piping the tube, fix the product securely using the mounting holes so that the product is not in the air.

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.

Install piping so that it does not apply pulling, pressing, bending or other forces on the valve body.

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

3. Tighten threads with the proper tightening torque.

When using steel piping, tighten with the proper tightening torque shown below.

Lower tightening torque will lead into fluid leakage.

Tightening Torque for Piping

Connection thread	Proper tightening torque (N·m)
M5*	1 to 1.5
M6*	1 to 1.5
Rc1/8	7 to 9

* For resin bodies, the proper tightening torque is 0.4 to 0.6 N·m (reference value). After tightening by hand, tighten by an additional 1/6th rotation with a tightening tool.

4. Connection of piping to products

When connecting piping to a product, refer to its operation manual to avoid mistakes regarding the supply port, etc.

5. 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.



 In applications such as vacuum and non-leak specifications, use caution specifically against the contamination of foreign objects or airtightness of the fittings.

Recommended Piping Conditions

1. When connecting tubes using one-touch fittings, provide some spare tube length shown in Fig. 1, recommended piping configuration.

Also, do not apply external force to the fittings when binding tubes with bands, etc. (see Fig. 2.)



Fig. 1 Recommended piping configuration

				Unit: min
Tube	I	Mounting pitch A	4	Straight
size	Nylon tube	Soft nylon tube	Polyurethane tube	portion length
ø3.2	44 or more	29 or more	25 or more	16 or more
ø4	56 or more	30 or more	26 or more	20 or more
ø6	84 or more	39 or more	39 or more	30 or more



Recommended

Fig. 2 Binding tubes with bands

Wiring

VQ LVM

VCH VDW

SX10

≜Caution

- 1. As a rule, use electric 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 electric circuits which do not generate chattering in their contacts.
- 3. Use voltage which is within $\pm 10\%$ of the rated voltage. In cases with a DC power supply where importance is placed on responsiveness, stay within $\pm 5\%$ of the rated value. The voltage drop is the value in the lead wire section connecting the coil.



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.

Operating Environment

MWarning

- 1. Do not use in an atmosphere having corrosive gases, chemicals, sea water, water, water steam, or where there is direct contact with any of these.
- 2. Do not use in explosive atmospheres.
- 3. Do not use in locations subject to vibration or impact.
- 4. Do not use in locations where radiated heat will be received from nearby heat sources.
- 5. Employ suitable protective measures in locations where there is contact with water droplets, oil or welding spatter, etc.

Maintenance

Warning

1. Removing the product

The valve will reach a high temperature when used with high temperature fluids. Confirm that the valve temperature has dropped sufficiently before performing work. If touched inadvertently, there is a danger of being burned.

- 1) Shut off the fluid supply and release the fluid pressure in the system.
- Shut off the power supply.
- 3) Remove the product.

2. Low frequency operation

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

≜Caution

1. Filters and strainers

- 1) Be careful regarding clogging of filters and strainers.
- Replace filter elements after one year of use, or earlier if the pressure drop reaches 0.1 MPa.
 Clean strainers when the pressure drop reaches 0.1 MPa.
- 2. Lubrication

When using after lubricating, never forget to lubricate continuously.

3. Storage

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

4. Exhaust the drainage from an air filter periodically.

Operating Precautions

Warning

When problems are caused by a water hammer, install water hammer relief equipment (accumulator, etc.), or use an SMC water hammer relief valve (VXR series). For details, please consult with SMC. Operating Precautions

▲Caution

When operating the product with flow direction $2 \rightarrow 1$ with pressure supplied to port 2, there is a risk of the valve opening momentarily and fluid leaking to the downstream side due to a rapid increase of the upstream pressure.

A special product will be available when holding pressure supplied from port 2 in the flow direction 2 \rightarrow 1 with low leakage performance is required.

Universal specification

A special can be available for Universal Specification, where product operation can be both flow from port 1 to port 2 ($1 \rightarrow 2$) and from port 2 to port 1 ($2 \rightarrow 1$).

Electric Connections

▲ Caution

Grommet

Class B coil: AWG20 Outside insulator diameter of 1.8 mm

2 port



Rated voltage	Lead wire color	
	1	2
DC	Black	Red
100 VAC	Blue	Blue
200 VAC	Red	Red
Other AC	Gray	Gray

* There is no polarity.

Electric Circuits

▲ Caution

[DC circuit]

Grommet



[AC circuit]

Grommet

* For AC (Class B), the standard product is equipped with surge voltage suppressor.



One-touch Fitting

ACaution

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.