



## **Pilot Operated 2 Port Solenoid Valve**

Н

## Water Oil Hested water High temperature oil

### Enclosure IP65

### Flame resistance UL94W-0 conformed Flame resistant mold coil material

### Low-noise

### construction

Impact noise reduced by the rubber buffer

## Piping variations



### **Built-in full-wave rectifier type** (AC specification: Insulation type Class B/H)

### Improved durability

Service life is extended by special construction. (compared with current shading coil)

### Reduced buzz noise

Rectified to DC by a full-wave rectifier, resulting in a buzz noise reduction.

Reduced apparent power (Class B, N.C. valve)
 10 VA → 7 VA (VXD23 to 25)

 $20 \text{ VA} \rightarrow 9.5 \text{ VA} (\text{VXD26})$ 

### Improved OFF response

Specially constructed to improve the OFF response when operated with a higher viscosity fluid such as oil.

### Low-noise construction

Specially constructed to reduce impact noise during operation.

### **Clearance**

By providing a buffer and clearance, we reduced the collision sound of the core when ON (when the valve is open). Because of the clearance, when using highly viscous fluids such as oil, the armature does not get stuck and the responsiveness when OFF (when the valve is closed) is improved.

Series VXD

### **Power consumption:**

4.5 w (VXD23 to 25)

7 W (VXD26)

## Improved armature durability

## **Body material**

### Air

Aluminium (VXD $2_A^3$ ) Resin (VXD $2_A^3$ ) C37 (Brass) (VXD $2_B^4$  to  $2_D^6$ ) Stainless steel (VXD $2_B^4$  to  $2_D^6$ )

Water/Oil/Heated water/ High temperature oil

C37 (Brass) Stainless steel

#### Port size Orifice Body Model Size Thread **One-touch fitting** material diameter 3/4 1/4 3/8 1/2 Ø 10 Ø 3/8" 1 Ø 12 0 0 Aluminium 8A O 0 0 Resin \_ \_ \_ \_ \_ VXD2<sup>3</sup> 10A 10 mm Ø 0 0 C37 (Brass) \_ \_ 15A Stainless steel 0 \_ C37 (Brass) 0 10A \_ \_ \_ \_ 15 mm Ø VXD2<sub>B</sub><sup>4</sup> 15A Stainless steel 0 0 \_ C37 (Brass) \_ \_ 0 \_ \_ \_ \_ 20A 20 mm Ø VXD2<sup>5</sup><sub>C</sub> Stainless steel 0 0 C37 (Brass) \_ \_ \_ VXD2<sup>6</sup> 25A 25 mm Ø Stainless steel \_ \_



## Pilot Operated 2 Port Solenoid Valve

Series VXD



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	Flow- Speci	rate Characteristics	L

## Series VXD Common Specifications

### **Standard Specifications**

	Valve construction	1	Pilot operated 2 port diaphragm type					
	Withstand pressur	e	2.0 MPa (Resin body type 1.5 MPa)					
Valve	Body material		Aluminum, Resin, C37 (Brass), Stainless steel, CAC407 (Bronze casting)					
specifications	Seal material		NBR, FKM, EPDM Note 3)					
	Enclosure		Dust-tight, Water-jet-proof type (IP65) Note 1)					
	Environment		Location without the presence of corrosive gases, explosive gases, or constant water adhesi					
	Deted veltere	AC	100 VAC, 200 VAC, 110 VAC, 230 VAC, 220 VAC, 240 VAC, 48 VAC, 24 VAC					
	Rated voltage	DC	24 VDC, 12 VDC					
Coil	Allowable voltage	fluctuation	$\pm$ 10 % of rated voltage					
specifications	Allowable leakage	AC	5 % or less of rated voltage					
	voltage	DC	2 % or less of rated voltage					
	Coil insulation type	e	Class B, Class H					

Note 1) Electrical entry "Faston" type terminal is IP40.

Note 2) For seal material/EPDM, refer to page 21.

### ▲ Be sure to read "Specific Product Precautions" before handling.

### Solenoid Coil Specifications

### Normally Closed (N.C.)

### **DC Specification**

Model

VXD23 to 25

VXD26

### Class B

Class H

Model	Power consumption [W] Note 1)	Temperature rise [°C] Note 2		
VXD23 to 25	4.5	50		
VXD26	7	55		

9

12

Power consumption [W] Note 1) Temperature rise [°C] Note 2)

### Normally Open (N.O.) DC Specification

### Class B

Model	Power consumption [W] Note 1)	Temperature rise [W] Note 2)
VXD2A to 2C	7.5	60
VXD2D	8.5	70

Class H									
Model	Power consumption [W] Note 1)	Temperature rise [°C] Note 2)							
VXD2A to 2C	9	100							
VXD2D	12	100							

Note 1) Power consumption: The value at ambient temperature of 20 °C and when the rated voltage is applied. (Variation: ±10 %)

100

100

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 (Built-in Full-wave Rectifier Type) Class B

Model	Apparent power [VA] Note 1) 2)	Temperature rise [°C] Note 3		
VXD23 to 25	7	60		
VXD26	9.5	70		

### Class B Model Apparent power (VA) Temperature rise [°C]

Niduei	Apparent power (VA)	Temperature rise [ 0]
VXD2A to 2C	9	60
VXD2D	10	70

AC Specification (Built-in Full-wave Rectifier Type)

### Class H

Model	Apparent power [VA] Note 1) 2)	Temperature rise [°C] Note 3)		
VXD23 to 25	9	100		
VXD26	12	100		

### Class H

Model	Apparent power [VA] Note 1) 2)	Temperature rise [°C] Note 3)
VXD2A to 2C	9	100
VXD2D	12	100

Note 1) 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.

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.



# Series VXD Selection Steps

ltem		Selection item	Page		Symbo		
		Air	Page 5		0		
		Water 👗	Page 8		2		
Select the fluid.	-	Oil 🚺	Page 11		3	0	VXD2 3 0 A
		Heated water	Page 14		5		0
		High temperature oil	Page 17		6	1	
Select from "Flow		Size Valve type	8A N.C.	-	3	0	
Select "Body mater	ial", "P	ort size" and '	Orifice di	iamete	r" fro	<b>om</b> "	Flow rate — Pressure" of each flu
		Size	8A		3	2	
rate — Pressure."		Valve type	N.C.				
<ul><li>Body material</li><li>Port size</li></ul>		Body material	Aluminium	inium			VXD2 3 0 A
<ul> <li>Orifice diameter</li> </ul>		Port size	1/4		Α	3	
		Orifice diameter	10				
Select electrical sp Item Select electrical specification.		ation. Selection item Voltage Electrical entry	24 VDC	-	Symbo A	4	VXD2 3 0 A A
For other options,	refer to	]	Grommet	L			3

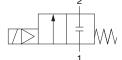




### **Model/Valve Specifications**

N.C.

### Symbol



Refer to "Glossary of Terms" on page 36 for symbol.

### Normally Closed (N.C.)

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0.	
8	No. Contraction of the second se

0

Body	Port size	Orifice diameter	Model	Minimum operating	Maximum operating	pressure differential		Flow-rate	e characte	ristics	Maximum system	Weight Note 2)					
material	1 011 5126	[mm Ø]	Model	pressure differential Note 1) [MPa]	AC	DC	С	b	Cv	Effective area [mm <sup>2</sup> ]	pressure [MPa]	[g]					
	1/4 (8A)						8.5		2.0			370					
Aluminium	3/8 (10A)						9.2	0.35	2.4			370					
	1/2 (15A)	10	VXD230		0.9	0.7	9.2		2.4			370					
	Ø 10	10	VAD230		0.9	0.7	5.6	0.33	1.3			330					
Resin	Ø 3/8"			0.02			4.8	0.33	0.9		1.5	330					
	Ø 12			0.02			7.2	0.33	1.5		1.5	330					
Chaimlana	3/8 (10A)	15	VXD240				18.0	0.35	5.0			720					
Stainless steel, C37	1/2 (15A)	15	15	15	15	VAD240	10 10240		U	1.0	1.0	20.0	0.35	5.5			720
(Brass)	3/4 (20A)	20	VXD250		1.0	1.0	38.0	0.30	9.5			840					
(101033)	1 (25A)	25	VXD260					—		225		1360					

Note 1) Be aware that even if the pressure difference is above the minimum operating pressure differential when the valve is closed, the pressure difference may fall below the minimum operating pressure differential when the valve opens, depending on the power of the supply source (pumps, compressors, etc.) or the type of pipe restrictions.

Note 2) Weight of grommet type. Add 10 g for conduit type, 30 g for DIN terminal type, 60 g for conduit terminal type respectively.

Note 3) If you need a valve for air of C37 (Brass) or SUS (Stainless steel) in the port size of 1/4, use the valve for water.

Refer to "Glossary of Terms" on page 36 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

### Fluid and Ambient Temperature

Fluid temperature [°C]	Ambient temperature [°C]				
-10 Note) to 60	-20 to 60				

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

### Valve Leakage

### **Internal Leakage**

	Leakage rate (Air) Note)					
Seal material	VXD23 to 26					
	(8A to 25A)					
	15 cm <sup>3</sup> /min or less (Aluminium body type)					
NBR, FKM	15 cm <sup>3</sup> /min or less (Resin body type)					
	2 cm <sup>3</sup> /min or less (Metal body type)					

### **External Leakage**

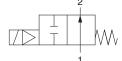
	Leakage rate (Air) Note)
Seal material	VXD23 to 26
	(8A to 25A)
	15 cm <sup>3</sup> /min or less (Aluminium body type)
NBR, FKM	15 cm <sup>3</sup> /min or less (Resin body type)
	1 cm <sup>3</sup> /min or less (Metal body type)

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

### **Model/Valve Specifications**

N.O.

### Symbol



Refer to "Glossary of Terms" on page 36 for symbol.

### Normally Open (N.O.)

Horman																												
Body	Port size	Orifice diameter	Model	Minimum operating	Maximum operating,	pressure differential		Flow-rate	e characte	ristics	Maximum system	Weight Note 2)																
material	1 011 5126	[mm Ø]	Model	pressure differential Note 1) [MPa]	AC	DC	С	b	Cv	Effective area [mm <sup>2</sup> ]	pressure [MPa]	[g]																
	1/4 (8A)						8.5		2.0			390																
Aluminium	3/8 (10A)						9.2	0.35	2.4			390																
	1/2 (15A)	10	VXD2A0		0.6	0.4	9.2	2.4 1.3			390																	
	Ø 10	10	VADZAU	0.02		0.0 0.4	5.6		1.3			350																
Resin	Ø 3/8"				0.02	0.02	0.00							í l			í l						4.8	0.33	0.9	_		350
	Ø 12								7.2		1.5		1.5	350														
01-1-1	3/8 (10A)	15	VXD2B0				18.0	0.35	5.0			740																
Stainless steel, C37	1/2/1541	15	VADZDU			0.7												20.0	0.35	5.5			740					
(Brass)	3/4 (20A)	20	VXD2C0		0.7 0		0.7	38.0	0.30	9.5			860															
(D1033)	1 (25A)	25	VXD2D0					—		225		1390																

Note 1) Be aware that even if the pressure difference is above the minimum operating pressure differential when the valve is closed, the pressure difference may fall below the minimum operating pressure differential when the valve opens, depending on the power of the supply source (pumps, compressors, etc.) or the type of pipe restrictions.

Note 2) Weight of grommet type. Add 10 g for conduit type, 30 g for DIN terminal type, 60 g for conduit terminal type respectively.

Note 3) If you need a valve for air of C37 (Brass) or SUS (Stainless steel) in the port size of 1/4, use the valve for water.

• Refer to "Glossary of Terms" on page 36 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

### Fluid and Ambient Temperature

Fluid temperature [°C]	Ambient temperature [°C]				
-10 Note) to 60	-20 to 60				

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

### Valve Leakage

### Internal Leakage

	Leakage rate (Air) Note)					
Seal material	VXD2A to 2D					
	(8A to 25A)					
	15 cm <sup>3</sup> /min or less (Aluminium body type)					
NBR, FKM	15 cm <sup>3</sup> /min or less (Resin body type)					
	2 cm <sup>3</sup> /min or less (Metal body type)					

### **External Leakage**

Leakage rate (Air) Note)
VXD2A to 2D
(8A to 25A)
15 cm <sup>3</sup> /min or less (Aluminium body type)
15 cm <sup>3</sup> /min or less (Resin body type)
1 cm <sup>3</sup> /min or less (Metal body type)

Note) Leakage is the value at ambient temperature 20  $^\circ\text{C}.$ 



pecifications

For Ai

For Oil For Water

For Heated water

For High temperature oil

Dimensions Construction Options

### How to Order

A

A

## ( E CA ROHS

			VXD2 3 0 A					
Cino	Fluid • 0 Air • Size – Valve type • Body material/Port size/Orifice diameter							
Symbol	Size	Valve type	Symbol	Body	Port size	Orifice diameter		
3	8A	N.C.	A B C	Aluminium	1/4 3/8 1/2			
A Note 1)	10A 15A	N.O.	D E F	Resin	Ø 10 One-touch fitting Ø 3/8" One-touch fitting Ø 12 One-touch fitting	10		
4	10A 15A	N.C.	G H J	C37 (Brass) Stainless	3/8 1/2 3/8	- 15		
B 5 C	20A	N.O. N.C. N.O.	K L M	steel C37 (Brass) Stainless steel	1/2 3/4	20		
6 D	25A	N.C. N.O.	N P	C37 (Brass) Stainless steel	1	25		

Note 1) VXD2A0 only possible with other options with one-touch fitting (-, C, H and Z). Note 2) If you need a valve for air of C37 (Brass) or SUS (Stainless steel) in the port size of 1/4, use the valve for water.

### Voltage/Electrical entry (coil insulation type: Class B) -

B100 VACGrommet (With surge voltage suppressor)Z1N12 VDCsurge voltage suppressC110 VACvoltage suppressor)Z1P48 VACConduit (With surge voltage suppressor)Z1R240 VACConduit (With surge voltage suppressor)Z1R240 VACConduit (With surge voltage suppressor)Z1R240 VACConduit (With surge voltage suppressor)Z1R240 VACConduit (With surge voltage Z2A24 VDCFaston terminal (With surge voltage suppressor)Z2E230 VACDIN terminal (With surge voltageZ2E230 VACDIN terminal (With surge voltageZ2E230 VACDIN terminal (With surge voltageDIN terminal (With surge voltageZ2E230 VACDIN terminal (With surge voltageDIN terminal (With surge voltageConduit (With surge voltageZ2Z24 VDCDIN terminal (With surge voltageDIN terminal (With surge voltageZ2Z240 VACDIN terminal (With surge voltageConduit terminal (With surge voltageZ2R220 VACConduit terminal (With surge voltageConduit terminal (With surge volta		Tonage		(00111	louiution	
B100 VACGrommet (With surge voltage suppressor)Z1N12 VDCsurge voltage suppressC110 VACvoltage suppressor)Z1Q220 VACConduit (With surge voltage suppressor)Z1R240 VACConduit (With surge voltage suppressor)Z1R240 VACConduit (With surge voltage suppressor)Z1N12 VDCFaston terminal (With surge voltage suppressor)Z1N12 VDCFaston terminal (With surge voltage Z2AZ4 VDCFaston terminal (With surge voltage Z2DZ2O VACDIN terminal (With surge voltageZ2E230 VACDIN terminal (With surge voltageZ2E230 VACDIN terminal (With surge voltageDIN terminal (With surge voltageZ2E230 VACDIN terminal (With surge voltageDIN terminal (With surge voltageConduit (With surge voltageZ2V24 VACDIN terminal (With surge voltageConduit terminal (With surge voltageZ2V24 VACConduit terminal (With surge voltageZ2V24 VACConduit terminal (With surge voltageConduit terminal (With surge voltageZ2Q48 VACConduit terminal (With surge voltageConduit terminal (With surge voltageConduit terminal (With surge voltageConduit terminal (With surge voltageConduit terminal (With surge voltageZ2Q48 VACConduit terminal (With surge voltageConduit terminal (With surge voltageZ2R220 VACConduit terminal (With surge voltageZ2R	Symbol	Voltage		Symbol	Voltage	
C110 VAC (With surge voltage suppressor)Z1P48 VAC Z1QConduit (With surge voltage suppressor)F24 VDC G24 VDC VOCDIN terminal (With surge voltage suppressor)Z1S12 VDCConduit (With surge voltage Z2AZ4 VDC Z1YZ4 VDCJ110 VAC VAC VOLAGDIN terminal (With surge voltage suppressor)Z1S12 VDCFaston terminal (With surge voltageM24 VDC QConduit terminal (With surge voltage suppressor)Z2B100 VACDIN terminal (With surge voltage Suppressor)Z2E230 VACP110 VAC VOLAC QConduit (With surge voltage suppressor)Z2G220 VACDIN terminal (With surge voltageV200 VAC SConduit (With surge voltage suppressor)Z2K24 VDCConduit Z2WZ2W VACConduit terminal (With surge voltageY24 VDC VFaston terminal (With surge voltage z1DConduit (With surge voltage suppressor)Z2N200 VACConduit terminal (With surge voltageZ1E12 VDC (With surge voltage z1DDIN terminal (With surge voltage suppressor)Z2T12 VDCDIN terminal (With surge voltageZ1E12 VDC (With surge voltage z1VDIN terminal (With surge voltageZ2D VACZ2D VACDIN terminal (With surge voltageZ1E12 VDC (With surge voltageDIN terminal (With surge voltageZ2D VAC <td< th=""><th>Α</th><th>24 VDC</th><th>Grommet</th><th>Z1W</th><th>24 VAC</th><th>Conduit terminal (With</th></td<>	Α	24 VDC	Grommet	Z1W	24 VAC	Conduit terminal (With
C         110 VAC         (With surge voltage suppressor)         Z1P         48 VAC         Conduit (With surge voltage suppressor)           F         24 VDC         DIN terminal (With surge voltage suppressor)         Z1Y         24 VAC         Conduit (With surge voltage suppressor)           J         110 VAC         DIN terminal (With surge voltage suppressor)         Z1S         12 VDC         Faston terminal (With surge voltage suppressor)           M         200 VAC         Conduit terminal (With surge voltage suppressor)         Z2C         110 VAC         DIN terminal (With surge voltage suppressor)         Z2F         48 VAC         DIN terminal (With surge voltage suppressor)           M         100 VAC         Conduit terminal (With surge voltage suppressor)         Z2W         24 VDC         Conduit terminal (With surge voltage suppressor)         Z2K         24 VDC         Conduit terminal (With surge voltage suppressor)         Z2W         200 VAC         Conduit terminal (With surge voltage suppressor)           Y         24 VDC         Faston terminal (With surge voltage suppressor)         Z2W         200 VAC         Conduit terminal (With surge voltage suppressor)           Z1D         12 VDC         Grommet (With surge voltage suppressor)         Z2W         200 VAC         Z2W         200 VAC           Z1D         12 VDC         Grommet (With surge voltage suppressor)	В	100 VAC	Grommot	Z1N	12 VDC	surge voltage suppressor)
D         200 VAC         voltage suppressor)         ZIQ         220 VAC         Conduit (With surge voltage suppressor)           F         24 VDC         DIN terminal (With surge voltage suppressor)         ZIQ         220 VAC         (With surge voltage suppressor)           J         110 VAC         DIN terminal (With surge voltage suppressor)         ZIS         12 VDC         Faston terminal (With surge voltage           M         24 VDC         Conduit terminal (With surge voltage suppressor)         Conduit terminal (With surge voltage         ZIQ         240 VAC           R         230 VAC         Conduit (With surge voltage suppressor)         Conduit (With surge voltage         ZIQ         240 VAC           R         230 VAC         Conduit (With surge voltage suppressor)         ZIQ         240 VAC         ZIQ         240 VAC           V         200 VAC         Conduit (With surge voltage suppressor)         ZIQ         240 VAC         ZIQ         240 VAC           V         200 VAC         Grommet (With surge voltage         ZIQ         240 VAC         ZIQ         240 VAC           Z1D         24 VDC         Faston terminal (With surge voltage         ZIQ         240 VAC         ZIQ         240 VAC           Z1D         24 VDC         Grommet (With surge voltage         ZIQ	С	110 VAC		Z1P	48 VAC	
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Z1B220 VAC(With surge voltage suppressor)Z2Q48 VACsuppressor, with light)Z1U24 VACsuppressor)Z2R220 VACwith light)Z1U24 VACsuppressor)Z2S240 VACwith light)Z1D12 VDCGrommetZ2W24 VACZ2W24 VACZ1E12 VDCGrommetZ2T12 VDCZ3A24 VDCZ1F48 VACUIN terminal (With surge voltage suppressor)Z3B100 VACDIN terminal (With surge voltageZ3D200 VACZ1H240 VACVACVoltageZ3F48 VACDIN terminal (With surge voltage suppressor)Z3F48 VACDIN terminal (With surge voltageZ3F48 VACDIN terminal (With surge voltageVoltageZ1V24 VACsuppressor)Z3F48 VACSuppressor, without DIN connector)Xihout DINZ1K48 VACConduit terminalZ3H240 VACXihout DIN connector)	Z1A	48 VAC	Grommet	Z2P	230 VAC	
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Voltage suppressor)Z3B100 VACZ1F48 VACDIN terminalZ3C110 VACZ1G220 VACDIN terminalX3C110 VACZ1H240 VACvoltageZ3E230 VACZ1V24 VACsuppressor)Z3F48 VACZ1J12 VDCConduit terminalZ3H240 VACZ1K48 VACConduit terminalZ3H240 VAC			Grommet	Z2T	12 VDC	
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Z1G220 VACDiff terminal (With surge voltage suppressor)Z3D200 VAC(With surge voltageZ1H240 VAC(With surge voltage suppressor,Z3E230 VACvoltageZ1J12 VDCsuppressor)Z3F48 VACsuppressor, without DINZ1K48 VACConduit terminalZ3H240 VAC			DINIA	Z3C	110 VAC	DIN terminal
Z1H240 VAC(With surge voltage voltage suppressor)Z3E230 VACvoltage suppressor, without DINZ1J12 VDCConduit terminalZ3F48 VACsuppressor, without DIN connector)	-			Z3D	200 VAC	
Z1V24 VACvoltage suppressor)Z3F48 VACsuppressor, without DINZ1J12 VDCsuppressor)Z3G220 VACwithout DINZ1K48 VACConduit terminalZ3H240 VACconnector)	Z1H			Z3E	230 VAC	
Z1J12 VDCZ3G220 VACwithout DINZ1K48 VACConduit terminalZ3H240 VACconnector)		-	U U	Z3F	48 VAC	suppressor,
	Z1J	12 VDC	Suppressor)	Z3G	220 VAC	without DIN
<b>71</b> 220 VAC (With surge <b>73</b> V 24 VAC	Z1K	48 VAC	Conduit terminal	Z3H	240 VAC	connector)
	Z1L	220 VAC	(With surge	Z3V	24 VAC	]
Z1M 240 VAC voltage suppressor) Z3J 12 VDC	Z1M	240 VAC	voltage suppressor)	Z3J	12 VDC	

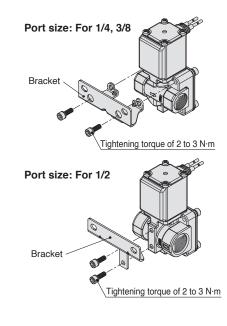
**SMC** 

### •With bracket - No XB Yes

Note) Bracket is standardised with the resin body type  $(VXD230 \stackrel{D}{\underline{E}} \square)$ . No need to add "XB".

\* The bracket for aluminium, C37 (Brass) and stainless steel body type of the VXD23 is shipped together with the product, but not assembled. (Refer to the figure below for mounting.)

### VXD2<sup>3</sup><sub>A</sub>□ Bracket mounting dimensions



### Other options

Symbol	Seal material Note 1)	Oil-free	Port thread
—	NBR	—	Rc, With one-touch fitting Note 2)
Α	NBR		G
В		_	NPT
С	FKM	_	Rc, With one-touch fitting Note 2)
D	NBR	0	G
E		0	NPT
F	FKM		G
G		_	NPT
Н			Rc, With one-touch fitting Note 2)
К	FKM	0	G
L			NPT
Z	NBR	0	Rc, With one-touch fitting Note 2)

Note 1) For low concentration ozone resistant, select seal material FKM.

Note 2) One-touch fittings are attached to the resin body type.

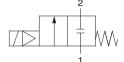


Possible to use this for air. Note that the maximum operating pressure differential and flow-rate characteristics should be within the specifications for air.

### Model/Valve Specifications

### N.C.

### Symbol



Refer to "Glossary of Terms" on page 36 for symbol.

### Normally Closed (N.C.)

Body	Port size	Orifice diameter	Model	Minimum operating	Maximum operating	pressure differential	Flow-rate ch	aracteristics	Maximum system	Weight <sup>Note 2)</sup>
material	1 011 0120	[mm Ø]	Woder	pressure differential Note 1) [MPa]	AC	DC	Av (x 10 <sup>-6</sup> m <sup>2</sup> )	Conversion Cv	pressure [MPa]	[g]
	1/4 (8A)						46	1.9		480
	3/8 (10A)	10	VXD232		0.7	0.5	58	2.4		480
Stainless	1/2 (15A)						58	2.4		480
steel, C37	3/8 (10A)	15	VXD242	0.02			110	4.5	1.5	720
(Brass)	1/2 (15A)	15	VADZ4Z		1.0	1.0	130	5.5		720
	3/4 (20A)	20	VXD252		1.0	1.0	230	9.5		840
	1 (25A)	25	VXD262				310	13		1360

Note 1) Be aware that even if the pressure difference is above the minimum operating pressure differential when the valve is closed, the pressure difference may fall below the minimum operating pressure differential when the valve opens, depending on the power of the supply source (pumps, compressors, etc.) or the type of pipe restrictions.

Note 2) Weight of grommet type. Add 10 g for conduit type, 30 g for DIN terminal type, 60 g for conduit terminal type respectively. • Refer to "Glossary of Terms" on page 36 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum

system pressure.

### Fluid and Ambient Temperature

Fluid temperature [°C]	Ambient temperature [°C]
1 to 60 Note)	-20 to 60

Note) No freezing

### Valve Leakage

### Internal Leakage

Internal Leakage							
Seal material	Leakage rate (Water) Note)	us Ns					
Searmateria	VXD23 to 26 (8A to 25A)	<u>  .</u>					
NBR, FKM	0.2 cm <sup>3</sup> /min or less	5					
External Lea	akage	ō					
Seal material	Leakage rate (Water) Note)						
Searmateriar	VXD23 to 26 (8A to 25A)	E:					
NBR, FKM	0.1 cm <sup>3</sup> /min or less	12					
Note) Leakage is	the value at ambient temperature 20 °C.	Construction					



Specifications

For Aii

For Oil For Water

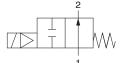
For Heated water

For High temperature oil

### Model/Valve Specifications



### Symbol



Refer to "Glossary of Terms" on page 36 for symbol.

### Normally Open (N.O.)

Body	Port size	Orifice diameter	Model	Minimum operating	Maximum operating	pressure differential	Flow-rate ch	aracteristics	Maximum system	Weight <sup>Note 2)</sup>	
material	1 011 5126	[mm Ø]	Model	pressure differential Note 1) [MPa]	AC	DC	Av (x 10 <sup>-6</sup> m <sup>2</sup> )	Conversion Cv	pressure [MPa]	[g]	
	1/4 (8A)						46	1.9		500	
	3/8 (10A)	10	VXD2A2		0.4	0.3	58	2.4		500	
Stainless	1/2 (15A)						58	2.4		500	
steel, C37	3/8 (10A)	15	VXD2B2	0.02			110	4.5	1.5	740	
(Brass)	1/2 (15A)	15	VADZDZ		0.7	0.7	130	5.5		740	
	3/4 (20A)	20	VXD2C2			0.7	0.7	230	9.5		860
	1 (25A)	25	VXD2D2				310	13		1390	

Note 1) Be aware that even if the pressure difference is above the minimum operating pressure differential when the valve is closed, the pressure difference may fall below the minimum operating pressure differential when the valve opens, depending on the power of the supply source (pumps, compressors, etc.) or the type of pipe restrictions.

Note 2) Weight of grommet type. Add 10 g for conduit type, 30 g for DIN terminal type, 60 g for conduit terminal type respectively.

Refer to "Glossary of Terms" on page 36 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

### Fluid and Ambient Temperature

### Valve Leakage

### Internal Leakage

Seal material

Fluid temperature [°C]	Ambient temperature [°C]						
1 to 60 Note)	-20 to 60						

### Note) No freezing

NBR, FKM	0.2 cm <sup>3</sup> /min or less
External Lea	akage
Seal material	Leakage rate (Water) Note)
Searmalena	VXD2A to 2D (8A to 25A)

Leakage rate (Water) Note)

VXD2A to 2D (8A to 25A)

 NBR, FKM
 0.1 cm³/min or less

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

For Water

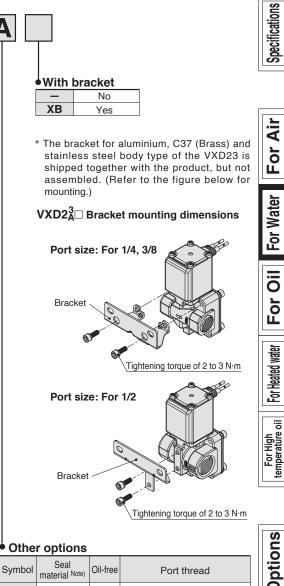
RoHS



					VX	D2 3	<u>2</u> A /
						Flui 2 Wate	
• Size	-Valve 1	type	• E	Body	/ material	/Port size/Orif	ice diameter
Symbol	Size	Valve type	Syı	mbol	Body material	Port size	Orifice diameter
3	8A			A B C	C37 (Brass)	1/4 3/8 1/2	
A	10A 15A	N.O.		D E F	Stainless steel	1/4 3/8 1/2	10
4	10A	N.C.		G H	C37 (Brass)	3/8 1/2	15
В	15A			Stainless steel	3/8 1/2	15	
5 C	20A	N.C. N.O.			C37 (Brass) Stainless steel	3/4	20
6 D	25A	N.C. N.O.			C37 (Brass) Stainless steel	1	25

### Voltage/Electrical entry (coil insulation type: Class B) •

Symbol	Voltage	Electrical			
	vonage	entry	Symbol	Voltage	Electrical entry
A	24 VDC	Grommet	Z1W	24 VAC	Conduit terminal (With
В	100 VAC	Grommet	Z1N	12 VDC	surge voltage suppressor)
С	110 VAC	(With surge	Z1P	48 VAC	
D	200 VAC	voltage	Z1Q	220 VAC	Conduit
Е	230 VAC	suppressor)	Z1R	240 VAC	(With surge voltage
F	24 VDC		Z1Y	24 VAC	suppressor)
G	24 VDC	DINIA	Z1S	12 VDC	Suppressor)
Н	100 VAC	DIN terminal (With surge	Z1T	12 VDC	Faston terminal
J	110 VAC	voltage	Z2A	24 VDC	
K	200 VAC	suppressor)	Z2B	100 VAC	
L	230 VAC	Suppressor)	Z2C	110 VAC	
М	24 VDC		Z2D	200 VAC	DIN terminal
Ν	100 VAC	Conduit terminal	Z2E	230 VAC	(With surge
Р	110 VAC	(With surge	Z2F	48 VAC	voltage suppressor,
Q	200 VAC	voltage	Z2G	220 VAC	with light)
R	230 VAC	suppressor)	Z2H	240 VAC	with light)
S	24 VDC		Z2V	24 VAC	
Т	100 VAC	Conduit	Z2J	12 VDC	
U	110 VAC	(With surge	Z2K	24 VDC	
V	200 VAC	voltage suppressor)	Z2L	100 VAC	
W	230 VAC	suppressor	Z2M	110 VAC	Conduit terminal
Y	24 VDC	Faston terminal	Z2N	200 VAC	(With surge
Z1A	48 VAC	Grommet	Z2P	230 VAC	voltage
Z1B	220 VAC	(With surge	Z2Q	48 VAC	suppressor,
Z1C	240 VAC	voltage	Z2R	220 VAC	with light)
Z1U	24 VAC	suppressor)	Z2S	240 VAC	
Z1D	12 VDC	Grommet	Z2W	24 VAC	
		Grommet	Z2T	12 VDC	
Z1E	12 VDC	(With surge	Z3A	24 VDC	
		voltage suppressor)	Z3B	100 VAC	
Z1F	48 VAC		Z3C	110 VAC	DIN terminal
Z1G	220 VAC	DIN terminal	Z3D	200 VAC	(With surge
Z1H	240 VAC	(With surge	Z3E	230 VAC	voltage
Z1V	24 VAC	voltage suppressor)	Z3F	48 VAC	suppressor,
Z1J	12 VDC	suppressor	Z3G	220 VAC	without DIN
Z1K	48 VAC	Conduit terminal	Z3H	240 VAC	connector)
Z1L	220 VAC	(With surge	Z3V	24 VAC	
Z1M	240 VAC	voltage suppressor)	Z3J	12 VDC	1



• Othe	r options			Suc	
Symbol	Seal material Note)	Oil-free	Port thread	Options	
—	NBR	—	Rc	Ο	
Α	NBR		G		
В		_	NPT	lo.	
С	FKM	—	Rc	Construction	
D	NBR	0	$\sim$	G	Insti
E			NPT	B	
F	FKM	FKM		G	
G		_	NPT	ns	
Н			Rc	Si	
Κ	FKM O	FKM O	G	eu;	
L			NPT	Dimensions	
Z	NBR	0	Rc		

Note) For low concentration ozone resistant and deionised water, select seal material FKM.

Dimensions Page on and after 26 (Single Unit)

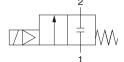


Possible to use this for air and water. Note that the maximum operating pressure differential and flow-rate characteristics should be within the specifications of the fluid used.

### Model/Valve Specifications

### N.C.

### Symbol



Refer to "Glossary of Terms" on page 36 for symbol.

### Normally Closed (N.C.)

6 6 6	
	-
May May	

Body	Body Port size Orifice diameter		Model	Minimum operating	Maximum operating, pressure differential		Flow-rate characteristics		Maximum system	Weight <sup>Note</sup>
material	1 011 5126	[mm Ø]	MOUEI	pressure differential Note 1) [MPa]	AC	DC	Av (x 10 <sup>-6</sup> m <sup>2</sup> )	Conversion Cv	pressure [MPa]	[g]
	1/4 (8A)			0.5			46	1.9		480
	3/8 (10A)	10	VXD233 VXD243		0.5		58	2.4	1.5	480
Stainless	1/2 (15A)						58	2.4		480
steel, C37	3/8 (10A)	15			0.7		110	4.5		720
(Brass)	1/2 (15A)	2 (15A) 15 <b>VXD24</b>	VAD243				130	5.5		720
(101000)	3/4 (20A)	20	VXD253				230	9.5	] [	840
	1 (25A)	25	VXD263				310	13	] [	1360

Note 1) Be aware that even if the pressure difference is above the minimum operating pressure differential when the valve is closed, the pressure difference may fall below the minimum operating pressure differential when the valve opens, depending on the power of the supply source (pumps, compressors, etc.) or the type of pipe restrictions.

Note 2) Weight of grommet type. Add 10 g for conduit type, 30 g for DIN terminal type, 60 g for conduit terminal type respectively.

• Refer to "Glossary of Terms" on page 36 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

### Fluid and Ambient Temperature

Fluid temperature [°C]	Ambient temperature [°C]
-5 <sup>Note)</sup> to 60	-20 to 60

Note) Kinematic viscosity: 50 mm<sup>2</sup>/s or less

### Valve Leakage

### Internal Leakage

	5
Cool motorial	Leakage rate (Oil) Note)
Seal material	VXD23 to 26 (8A to 25A)
FKM	0.2 cm <sup>3</sup> /min or less

### **External Leakage**

Seal material	Leakage rate (Oil) Note)
	VXD23 to 26 (8A to 25A)
FKM	0.1 cm <sup>3</sup> /min or less

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



The kinematic viscosity must not exceed 50 mm<sup>2</sup>/s. The special construction of the armature adopted in the built-in full-wave rectifier type gives an improvement in OFF response by providing clearance on the absorbed surface when it is switched ON.



Specifications

For Aii

For Water

For Oil

For Heated water

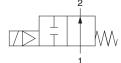
### $\bigwedge$ When the fluid is oil.

The kinematic viscosity must not exceed 50 mm<sup>2</sup>/s. The special construction of the armature adopted in the built-in full-wave rectifier type gives an improvement in OFF response by providing clearance on the absorbed surface when it is switched ON.

### **Model/Valve Specifications**



### Symbol



Refer to "Glossary of Terms" on page 36 for symbol.

### Normally Open (N.O.)

Body	Port size	Orifice diameter			Maximum operating	pressure differential			Maximum system	Weight <sup>Note 2)</sup>
material	1 011 0120	[mm Ø]	model	pressure differential Note 1) [MPa]	AC	DC	Av (x 10 <sup>-6</sup> m <sup>2</sup> )	Conversion Cv	pressure [MPa]	[g]
	1/4 (8A)		VXD2A3		0.4	0.3	46	1.9		500
	3/8 (10A)	10					58	2.4		500
Stainless	1/2 (15A)						58	2.4		500
steel, C37	3/8 (10A)	15	VXD2B3	0.02			110	4.5	1.5	740
(Brass)	1/2 (15A)	15	VADZDJ		0.6	0.6	130	5.5		740
	3/4 (20A)	20	VXD2C3				230	9.5		860
	1 (25A)	25	VXD2D3				310	13		1390

Note 1) Be aware that even if the pressure difference is above the minimum operating pressure differential when the valve is closed, the pressure For High temperature oil difference may fall below the minimum operating pressure differential when the valve opens, depending on the power of the supply source (pumps, compressors, etc.) or the type of pipe restrictions.

Note 2) Weight of grommet type. Add 10 g for conduit type, 30 g for DIN terminal type, 60 g for conduit terminal type respectively.

· Refer to "Glossary of Terms" on page 36 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

### Fluid and Ambient Temperature

Fluid temperature [°C]	Ambient temperature [°C]
-5 <sup>Note)</sup> to 60	-20 to 60

Note) Kinematic viscosity: 50 mm<sup>2</sup>/s or less

### Valve Leakage

Internal L	eakage	S
	Leakage rate (Oil) Note)	
Seal material	VXD2A to 2D (8A to 25A)	ĭ
FKM	0.2 cm <sup>3</sup> /min or less	<u>d</u>
External	Leakage	0
	Leakage rate (Oil) Note)	C

Seal material	Leakage rate (Oil) Note
Searmateria	VXD2A to 2D (8A to 25A)
FKM	0.1 cm <sup>3</sup> /min or less

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



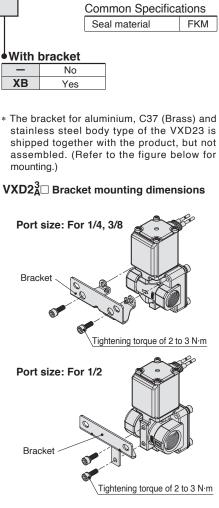


**For Oil** 

				VX	(D2	How to Orde	A A	
0.					3			•With bracket No XB Yes
	-Valve	<b>type</b> Valve		Body		Orifice diameter		* The bracket for aluminium, C
Symbol	Size	type	Symt	material	Port size	Orifice diameter		stainless steel body type of
			Α	007	1/4			shipped together with the pr
3	8A	N.C.	В	C37 (Brass)	3/8			assembled. (Refer to the fig mounting.)
	10A		С	(=	1/2	10		<b>U</b> ,
	15A		D	Stainless	1/4			VXD2 <sup>3</sup> ∏ Bracket mounting
Α		N.O.	E	steel	3/8			
			F		1/2			Port size: For 1/4, 3/8 🛒
4		N.C.	G	C37	3/8			
-	10A		H	(Brass)	1/2	15		
в	15A	N.O.	J	Stainless steel	3/8			Bracket
			К	Sleer	1/2			
5	20A	N.C.	L	C37 (Brass	- 3/4	20		
С	20/1	N.O.	M	Stainless stee				
6	05.4	N.C.	N	C37 (Brass	)	25		Tightening torq
D	25A	N.O.	Р	Stainless stee	/ 1	25		
		oltage/E	Electrical Electrica		insulation t	ype: Class B) ●		Port size: For 1/2

	Vonage	Electrical entry		isulution	type: old35 b) •
Symbol	Voltage	Electrical entry	Symbol	Voltage	Electrical entry
Α	24 VDC	Grommet	Z1W	24 VAC	Conduit terminal (With
В	100 VAC	Grommet	Z1N	12 VDC	surge voltage suppressor)
С	110 VAC	(With surge	Z1P	48 VAC	<b>0</b>
D	200 VAC	voltage	Z1Q	220 VAC	Conduit
Е	230 VAC	suppressor)	Z1R	240 VAC	(With surge
F	24 VDC		Z1Y	24 VAC	voltage suppressor)
G	24 VDC		Z1S	12 VDC	Suppressor)
Н	100 VAC	DIN terminal	Z1T	12 VDC	Faston terminal
J	110 VAC	(With surge voltage	Z2A	24 VDC	
К	200 VAC	suppressor)	Z2B	100 VAC	
L	230 VAC	Suppressor	Z2C	110 VAC	
М	24 VDC		Z2D	200 VAC	DIN terminal
Ν	100 VAC	Conduit terminal	Z2E	230 VAC	(With surge voltage
Р	110 VAC	(With surge	Z2F	48 VAC	suppressor,
Q	200 VAC	voltage suppressor)	Z2G	220 VAC	with light)
R	230 VAC	suppressor	Z2H	240 VAC	, with light (
S	24 VDC	Quartait	Z2V	24 VAC	
Т	100 VAC	Conduit (With surge	Z2J	12 VDC	
U	110 VAC	voltage	Z2K	24 VDC	
V	200 VAC	suppressor)	Z2L	100 VAC	
W	230 VAC	,	Z2M	110 VAC	Conduit terminal
Y	24 VDC	Faston terminal	Z2N	200 VAC	(With surge
Z1A	48 VAC	Grommet	Z2P	230 VAC	voltage
Z1B	220 VAC	(With surge	Z2Q	48 VAC	suppressor,
Z1C	240 VAC	voltage	Z2R	220 VAC	with light)
Z1U	24 VAC	suppressor)	Z2S	240 VAC	
Z1D	12 VDC	Grommet	Z2W	24 VAC	_
		Grommet	Z2T	12 VDC	
Z1E	12 VDC	(With surge	Z3A	24 VDC	_
		voltage suppressor)	Z3B	100 VAC	
Z1F	48 VAC	DIN terminal	Z3C	110 VAC	DIN terminal
Z1G	220 VAC	(With surge	Z3D	200 VAC	(With surge
Z1H	240 VAC	voltage	Z3E	230 VAC	voltage
Z1V	24 VAC	suppressor)	Z3F	48 VAC	suppressor,
Z1J	12 VDC	,	Z3G	220 VAC	without DIN
Z1K	48 VAC	Conduit terminal	Z3H	240 VAC	connector)
Z1L	220 VAC	(With surge	Z3V	24 VAC	
Z1M	240 VAC	voltage suppressor)	Z3J	12 VDC	

**SMC** 



RoHS

### Other options

Symbol	Oil-free	Port thread
_	_	Rc
Α		G
В	_	NPT
D		G
E	0	NPT
Z	0	Rc



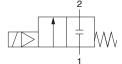
## For Heated water

Possible to use this for air (up to 99 °C) and water. Note that the maximum operating pressure differential and flow-rate characteristics should be within the specifications of the fluid used.

### Model/Valve Specifications



Symbol



Refer to "Glossary of Terms" on page 36 for symbol.

### Normally Closed (N.C.)

Iterna											
Body	Port size	Orifice diameter	Model	Minimum operating	Maximum operating pressure differential		Flow-rate characteristics		Maximum system	Weight <sup>Note 2)</sup>	
material	FUIT SIZE	[mm Ø]	Model	pressure differential Note 1) [MPa]	AC	DC	Av (x 10 <sup>-6</sup> m <sup>2</sup> )	Conversion Cv	pressure [MPa]	[g]	
	1/4 (8A)						46	1.9		480	
Stainless steel, C37 (Brass)	3/8 (10A)	10	VXD235 VXD245	0.02	0.5	58	2.4		480		
	1/2 (10/1)						58	2.4		480	
	3/8 (10A)	15			1.0	) 1.0	110	4.5	1.5	720	
	1/2 (15A)	15	VADZ45				130	5.5	]	720	
	3/4 (20A)	20	VXD255				230	9.5		840	
	1 (25A)	25	VXD265				310	13		1360	

Note 1) Be aware that even if the pressure difference is above the minimum operating pressure differential when the valve is closed, the pressure difference may fall below the minimum operating pressure differential when the valve opens, depending on the power of the supply source (pumps, compressors, etc.) or the type of pipe restrictions.

Note 2) Weight of grommet type. Add 10 g for conduit type, 60 g for conduit terminal type respectively.

Refer to "Glossary of Terms" on page 36

for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

### Fluid and Ambient Temperature

Fluid temperature [°C]	Ambient temperature [°C]
1 to 99	-20 to 60

Note) No freezing

### Valve Leakage

Internal	Leakage

Internal L	eakage	
	Leakage rate (Water) Note)	ns
Seal material	VXD23 to 26 (8A to 25A)	
EPDM	0.2 cm <sup>3</sup> /min or less	ptio
External	Leakage	Ö
Seal material	Leakage rate (Water) Note)	
Sear material	VXD23 to 26 (8A to 25A)	<u>o</u>
EPDM	0.1 cm <sup>3</sup> /min or less	struction
Noto) Lookor	re is the value at empiret temperature 20 °C	

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



Specifications

For Air

For Water

For Oil

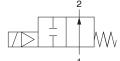
For Heated water

For High temperature oil

### Model/Valve Specifications

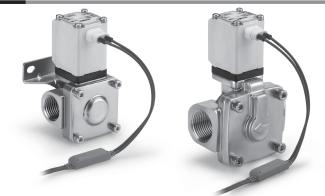






Refer to "Glossary of Terms" on page 36 for symbol.

### Normally Open (N.O.)



Body	Port size	Orifice diameter	Model	Minimum operating	Maximum operating	pressure differential	Flow-rate ch	aracteristics	Maximum system	Weight <sup>Note 2)</sup>
material	1 011 5126	[mm Ø]	Wouer	pressure differential Note 1) [MPa]	AC	DC	Av (x 10 <sup>-6</sup> m <sup>2</sup> )	Conversion Cv	pressure [MPa]	ure [MPa] [g]
	1/4 (8A)						46	1.9		500
	3/8 (10A)	10	VXD2A5		0.4	0.3	58	2.4		500
Stainless	1/2 (15A)						58	2.4		500
steel, C37	3/8 (10A)	15	VXD2B5	0.02			110	4.5	1.5	740
(Brass)	1/2 (15A)	15	VADZDJ		0.7	0.7	130	5.5		740
	3/4 (20A)	20	VXD2C5		0.7	0.7	230	9.5		860
	1 (25A)	25	VXD2D5				310	13		1390

Note 1) Be aware that even if the pressure difference is above the minimum operating pressure differential when the valve is closed, the pressure difference may fall below the minimum operating pressure differential when the valve opens, depending on the power of the supply source (pumps, compressors, etc.) or the type of pipe restrictions.

Note 2) Weight of grommet type. Add 10 g for conduit type, 60 g for conduit terminal type respectively.

• Refer to "Glossary of Terms" on page 36 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

### Fluid and Ambient Temperature

Fluid temperature [°C]	Ambient temperature [°C]				
1 to 99	-20 to 60				
Note) No freezing					

### Valve Leakage

### Internal Leakage

Cool motorial	Leakage rate (Water) Note)	
Seal material	VXD2A to 2D (8A to 25A)	
EPDM	0.2 cm <sup>3</sup> /min or less	

### External Leakage

	•
Seal material	Leakage rate (Water) Note)
	VXD2A to 2D (8A to 25A)
EPDM	0.1 cm <sup>3</sup> /min or less

Note) Leakage is the value at ambient temperature 20  $^\circ\text{C}.$ 

For Heated water

JK 19

RoHS

How to Order

B

					VX	D2 3	<u>5</u> A							
					[	Flu 5 Heated wa	<u> </u>							
• Size	-Valve t	уре		Bod	y material	/Port size/Orif	ice diameter							
Symbol	Size	Valve type		Symbol	Body material	Port size	Orifice diameter							
				Α	007	1/4								
3	<b>3</b> 8A 10A 15A	N.C.		В	C37 (Brass)	3/8								
				С		1/2	10							
				D	01.1	1/4								
Α	IJA	N.O.		Е	Stainless steel	3/8								
				F		1/2								
				G	C37	3/8								
4	10A	N.C.		Н	(Brass)	1/2								
в	15A			J	Stainless	3/8	15							
D		N.O.	N.O. K steel		N.U. K steel		N.O. K steel		K steel		K steel		-	
5		N.C.		L	C37 (Brass)									
С	20A	N.O.		М	Stainless steel	3/4	20							
6		N.C.		Ν	C37 (Brass)									
D	25A	N.O.		Ρ	Stainless steel	1	25							

### Voltage/Electrical entry (coil insulation type: Class H) •

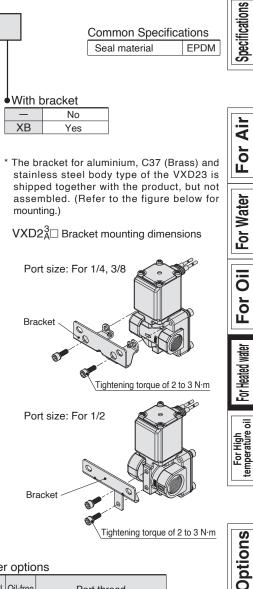
		Electrical
Symbol	Voltage	entry
Α	24 VDC	Grommet
В	100 VAC	Grommet
С	110 VAC	(With surge
D	200 VAC	voltage
Е	230 VAC	suppressor)
G	24 VDC	DINU: INote 1\ 2)
Н	100 VAC	DIN terminal Note 1) 2)
J	110 VAC	(With surge voltage
Κ	200 VAC	suppressor)
L	230 VAC	Suppressor)
Ν	100 VAC	Conduit terminal
Ρ	110 VAC	(With surge
Q	200 VAC	voltage
R	230 VAC	suppressor)
Т	100 VAC	Conduit
U	110 VAC	(With surge
V	200 VAC	voltage
W	230 VAC	suppressor)
Z1A	48 VAC	Grommet
Z1B	220 VAC	(With surge
Z1C	240 VAC	voltage
Z1U	24 VAC	suppressor)
Z1F	48 VAC	DIN terminal Note 1) 2)
Z1G	220 VAC	(With surge
Z1H	240 VAC	voltage
Z1V	24 VAC	suppressor)
Z1K	48 VAC	Conduit terminal
Z1L	220 VAC	(With surge
Z1M	240 VAC	voltage suppressor)
Z1W	24 VAC	vonaye suppressor)
Z1P	48 VAC	Conduit
Z1Q	220 VAC	(With surge
Z1R	240 VAC	voltage
Z1Y	24 VAC	suppressor)

Symbol	Voltage	Electrical entry
Z2A	24 VDC	
Z2B	100 VAC	DIN terminal Note 1) 2
Z2C	110 VAC	(With surge
Z2D	200 VAC	voltage
Z2E	230 VAC	suppressor,
Z2F	48 VAC	with light)
Z2G	220 VAC	
Z2H	240 VAC	
Z2V	24 VAC	
Z2L	100 VAC	
Z2M	110 VAC	Conduit terminal
Z2N	200 VAC	(With surge
Z2P	230 VAC	voltage
Z2Q	48 VAC	suppressor,
Z2R	220 VAC	with light)
Z2S	240 VAC	
Z2W	24 VAC	

Note 1) AC voltage coil for "H" of DIN terminal type does not have full-wave rectifier. Full-wave rectifier is built on the DIN connector side. Please refer to page 35 to order it as an accessory. Note 2) DIN connector insulation class

is Class "B". Note 3) Faston terminal is not

available.



### • Other options

Symbol	Oil-free	Port thread
_	_	Rc
Α		G
В	_	NPT
D		G
E	0	NPT
Z	0	Rc



Dimensions Page on and after 32 (Single Unit)





## For High temperature oil

Possible to use this for air (up to 99 °C) and water. Note that the maximum operating pressure differential and flow-rate characteristics should be within the specifications of the fluid used.

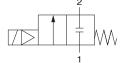
### Mhen the fluid is oil. -

The kinematic viscosity must not exceed 50 mm<sup>2</sup>/s. The special construction of the armature adopted in the built-in full-wave rectifier type gives an improvement in OFF response by providing clearance on the absorbed surface when it is switched ON.

### **Model/Valve Specifications**



Symbol



Refer to "Glossary of Terms" on page 36 for symbol.

### Normally Closed (N.C.)

101110										
Body	Port size	Orifice diameter	Model	Min. operating pressure	Max. operating pr	essure differential	Flow-rate ch	aracteristics	Max. system	Weight <sup>Note 2)</sup>
material	1 011 5126	[mm Ø]	Woder	differential Note 1) [MPa]	AC	DC	Av (x 10 <sup>-6</sup> m <sup>2</sup> )	Conversion Cv	pressure [MPa]	[g]
	1/4 (8A)						46	1.9		480
	3/8 (10A)	10	VXD236		0.5	0.4	58	2.4		480
Stainless	1/2 (15A)						58	2.4		480
steel, C37	7 3/8 (10A)	15	VXD246				110	4.5	1.5	720
(Brass)	1/2 (15A)	15	VAD240				130	5.5	_	720
	3/4 (20A)	20	VXD256		0.7	0.7	230	9.5		840
	1 (25A)	25	VXD266				310	13		1360

Note 1) Be aware that even if the pressure difference is above the minimum operating pressure differential when the valve is closed, the pressure difference may fall below the minimum operating pressure differential when the valve opens, depending on the power of the supply source (pumps, compressors, etc.) or the type of pipe restrictions.

Note 2) Weight of grommet type. Add 10 g for conduit type, 60 g for conduit terminal type respectively.

Refer to "Glossary of Terms" on page 36 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

### Fluid and Ambient Temperature

Fluid temperature [°C]	Ambient temperature [°C]
-5 <sup>Note)</sup> to 100	-20 to 60

Note) Kinematic viscosity: 50 mm<sup>2</sup>/s or less

### Valve Leakage Rate

### Internal Leakage

	Leakage rate (Oil) Note)							
Seal material	VXD23 to 26 (8A to 25A)	VXD27 to 29 (32A to 50A)						
FKM	0.2 cm <sup>3</sup> /min or less	1 cm <sup>3</sup> /min or less						
FKM	0.2 cm <sup>3</sup> /min or less	1 cm <sup>3</sup> /min or less						

### **External Leakage**

Seal material		te (Oil) Note)
Searmateria	VXD23 to 26 (8A to 25A)	VXD27 to 29 (32A to 50A)
FKM	0.1 cm <sup>3</sup> /min or less	0.1 cm <sup>3</sup> /min or less

Note) Leakage is the value at ambient temperature 20  $^\circ\text{C}.$ 

For High temperature oil

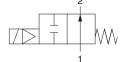
### $\underline{\wedge}$ When the fluid is oil.

The kinematic viscosity must not exceed 50 mm<sup>2</sup>/s. The special construction of the armature adopted in the built-in full-wave rectifier type gives an improvement in OFF response by providing clearance on the absorbed surface when it is switched ON.

### **Model/Valve Specifications**



### Symbol



Refer to "Glossary of Terms" on page 36 for symbol.

### Normally Open (N.O.)

iy Open (	N.U.)								
Port size	Orifice diameter	Model	Minimum operating	Maximum operating	pressure differential	Flow-rate ch	aracteristics	Maximum system	Weight <sup>Note 2)</sup>
1 011 5126	[mm Ø]	MOUEI	pressure differential Note 1) [MPa]	AC	DC	Av (x 10 <sup>-6</sup> m <sup>2</sup> )	Conversion Cv	pressure [MPa]	[g]
1/4 (8A)						46	1.9		500
3/8 (10A)	10	VXD2A6		0.4	0.3	58	2.4		500
1/2 (15A)						58	2.4		500
3/8 (10A)	15		0.02			110	4.5	1.5	740
1/2 (15A)	15	VADZDO		0.6	0.6	130	5.5		740
3/4 (20A)	20	VXD2C6		0.0	0.0	230	9.5		860
1 (25A)	25	VXD2D6				310	13		1390
	Port size 1/4 (8A) 3/8 (10A) 1/2 (15A) 3/8 (10A) 1/2 (15A) 3/4 (20A)	Point size         [mm Ø]           1/4 (8A)         10           3/8 (10A)         10           1/2 (15A)         15           3/8 (10A)         15           3/4 (20A)         20	Port size         Orifice diameter [mm 0]         Model           1/4 (8A)         4         4           3/8 (10A)         10         VXD2A6           1/2 (15A)         15         VXD2B6           3/4 (20A)         20         VXD2C6	Port size         Orifice diameter [mm 0]         Model         Minimum operating pressure differential Note 1) [MPa]           1/4 (8A)         1/4 (8A)         VXD2A6         0.02           3/8 (10A)         10         VXD2B6         0.02           3/8 (10A)         15         VXD2C6         0.02	Port size         Orifice diameter [mm 0]         Model         Minimum operating pressure differential Note 1) [MPa]         Maximum operating AC           1/4 (8A)         1/2 (15A)         0.4         0.4           3/8 (10A)         10         VXD2A6         0.02           3/8 (10A)         15         VXD2B6         0.02           1/2 (15A)         20         VXD2C6         0.6	Port size         Orifice diameter [mm Ø]         Model         Minimum operating pressure differential         Maximum operating pressure differential           1/4 (8A)	Port size         Orifice diameter [mm 0]         Model         Minimum operating pressure differential         Maximum operating pressure differential         How-rate ch           1/4 (8A)         10         VXD2A6         VXD2A6         0.4         0.3         58         58           1/2 (15A)         15         VXD2B6         0.02         0.6         0.6         0.6         110           1/2 (15A)         20         VXD2C6         0.02         0.6         0.6         230	Port size         Orifice diameter [mm 0]         Model         Minimum operating pressure differential         Maximum operating pressure differential         Flow-rate characteristics           1/4 (8A)         1/4 (8A)         Maximum operating pressure differential         AC         DC         Av (x 10 <sup>-6</sup> m <sup>2</sup> )         Conversion Cv           3/8 (10A)         10         VXD2A6         0.4         0.3         58         2.4           3/8 (10A)         15         VXD2B6         0.02         0.6         0.6         110         4.5           1/2 (15A)         15         VXD2C6         0.02         0.6         0.6         0.6         130         5.5	Port size         Orifice diameter [mm 0]         Model         Minimum operating pressure differential Note 1][MPa]         Maximum operating pressure differential         Flow-rate characteristics         Maximum system pressure [MPa]           1/4 (8A)         1/4 (8A)         AC         DC         Av (x 10 <sup>-6</sup> m <sup>2</sup> )         Conversion Cv         pressure [MPa]           3/8 (10A)         10         VXD2A6         0.4         0.3         58         2.4           1/2 (15A)         15         VXD2B6         0.02         110         4.5         130         5.5           3/4 (20A)         20         VXD2C6         0.6         0.6         0.6         230         9.5

Note 1) Be aware that even if the pressure difference is above the minimum operating pressure differential when the valve is closed, the pressure difference may fall below the minimum operating pressure differential when the valve opens, depending on the power of the supply source (pumps, compressors, etc.) or the type of pipe restrictions.

Note 2) Weight of grommet type. Add 10 g for conduit type, 60 g for conduit terminal type respectively.

• Refer to "Glossary of Terms" on page 36 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

### Fluid and Ambient Temperature

Fluid temperature [°C]	Ambient temperature [°C]
-5 <sup>Note)</sup> to 100	-20 to 60

Note) Kinematic viscosity: 50 mm<sup>2</sup>/s or less

### Valve Leakage

Internal L	eakage	S	
Cool motorial	Leakage rate (Oil) Note)	5	
Seal material	VXD2A to 2D (8A to 25A)	ptions	
FKM	0.2 cm <sup>3</sup> /min or less		
External	Leakage		
Cool motorial	Leakage rate (Oil) Note)	ction	
Seal material	VXD2A to 2D (8A to 25A)	E I	

FKM 0.1 cm<sup>3</sup>/min or less

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



For Air

For Water

For Oil

For Heated water

For High temperature oil



For High temperature oil

						Но	w to Orde	r
					<b>VX</b>	D2 3 Flu High temperature	id●	B
•Size	-Valve	type		•Bod	y material	/Port size/Orif	ice diameter	
Symbol	Size	Valve type		Symbol	Body material	Port size	Orifice diameter	
				Α	C37	1/4	_	
3	8A	BA N.C.		BC	(Brass)	3/8	-	
	10A			D		1/2	10	
Α	15A	N.O.		E	Stainless steel	3/8		
				F	01001	1/2		
4		N.C.		G	C37	3/8		
4	10A	N.C.		Н	(Brass)	1/2	15	
в	15A	N.O.		J	Stainless	3/8		
		14.0.		K	steel	1/2		
5	20A	N.C.		L	C37 (Brass)	0/4		
С	20A	N.O.		М	Stainless steel	3/4	20	
6	05.4	N.C.		Ν	C37(Brass)	1	25	
D	25A	N.O.		Р	Stainless steel	1	25	

### Voltage/Electrical entry (coil insulation type: Class H)

Symbol	Voltage	Electrical
Cymbol	voltage	entry
Α	24 VDC	Grommet
В	100 VAC	Grommet
С	110 VAC	(With surge
D	200 VAC	voltage
E	230 VAC	suppressor)
G	24 VDC	DIN terminal Note 1) 2)
Н	100 VAC	(With surge
J	110 VAC	voltage
κ	200 VAC	suppressor)
L	230 VAC	
Ν	100 VAC	Conduit terminal
Р	110 VAC	(With surge
Q	200 VAC	voltage
R	230 VAC	suppressor)
Т	100 VAC	Conduit
U	110 VAC	(With surge
V	200 VAC	voltage
W	230 VAC	suppressor)
Z1A	48 VAC	Grommet
Z1B	220 VAC	(With surge
Z1C	240 VAC	voltage
Z1U	24 VAC	suppressor)
Z1F	48 VAC	DIN terminal Note 1) 2)
Z1G	220 VAC	(With surge
Z1H	240 VAC	voltage
Z1V	24 VAC	suppressor)
Z1K	48 VAC	Conduit terminal
Z1L	220 VAC	(With surge
Z1M	240 VAC	voltage suppressor)
Z1W	24 VAC	vollage suppressor)
Z1P	48 VAC	Conduit
Z1Q	220 VAC	(With surge
Z1R	240 VAC	voltage
Z1Y	24 VAC	suppressor)

Symbol	Voltage	Electrical entry
Z2A	24 VDC	
Z2B	100 VAC	DIN terminal Note 1) 2
Z2C	110 VAC	(With surge
Z2D	200 VAC	voltage
Z2E	230 VAC	suppressor,
Z2F	48 VAC	with light)
Z2G	220 VAC	
Z2H	240 VAC	
Z2V	24 VAC	
Z2L	100 VAC	
Z2M	110 VAC	Conduit terminal
Z2N	200 VAC	(With surge
Z2P	230 VAC	voltage
Z2Q	48 VAC	suppressor,
Z2R	220 VAC	with light)
Z2S	240 VAC	
Z2W	24 VAC	

Note 1) AC voltage coil for "H" of DIN terminal type does not have full-wave rectifier. Full-wave rectifier is built on the DIN connector side. Please refer to page 35 to order it as an accessory.

Note 2) DIN connector insulation class is Class "B".

Note 3) Faston terminal is not available.

	()	U	K A	R	OHS
	<u>c</u>	Comm	on Sj	pecific	ations
		Seal m	ateria	l	FKM
•With I	No Yes				
stainle shippe	acket for a ess steel b ed togethe nbled. (Re ing.)	oody ty r with t	pe of he pr	the VX oduct,	XD23 is but not
	□ Bracke			dimens	sions
<b>Port</b> Brac	size: For	1/4, 3/8			fer I

Tightening torque of 2 to 3 N·m

Tightening torque of 2 to 3 N·m

### Other options

Α

Symbol	Oil-free	Port thread
_	_	Rc
Α		G
В		NPT
D	0	G
E	0	NPT
Z	0	Rc

Port size: For 1/2

Bracket



# VXD Series Other Special Options

Specia	l volta			Options Without DIN connector
	VXI	<b>J</b> 2	30	
			andard	
	proc	iuct n	umber.	
				Electrical optio
				Voltage/Electrical entry
Specification	Symbol	Class H*	Voltage 48 VAC	Electrical entry
	1B		220 VAC	Grommet
	10		240 VAC	(With surge voltage suppressor)
	10		24 VAC	
	1D		12 VDC	Grommet
	1E	-	12 VDC	Grommet (With surge voltage suppressor)
	1F		48 VAC	
Φ	1G		220 VAC	DIN terminal
Special voltage	1H		240 VAC	(With surge voltage suppressor)
No	1V 1J		24 VAC 12 VDC	
cial	1K		48 VAC	
Spe	1L		220 VAC	Conduit terminal
	1M		240 VAC	(With surge voltage suppressor)
	1W		24 VAC	
	1N 1P	-	12 VDC 48 VAC	
	1Q		220 VAC	
	1R		240 VAC	
	1Y		24 VAC	(With surge voltage suppressor)
	1S 1T		12 VDC	Electric el
		_	12 VDC	Flat terminal
	2A		24 VDC	-
	2B 2C		100 VAC 110 VAC	-
	20 2D	Ĭ	200 VAC	-
	2E	Ŏ	230 VAC	DIN terminal
	2F		48 VAC	(With surge voltage suppressor)
	2G		220 VAC	-
	2H 2V		240 VAC 24 VAC	-
light	2V 2J	_	12 VDC	-
글	2K	-	24 VDC	
Ň	2L		100 VAC	
	2M		110 VAC	
	2N 2P		200 VAC 230 VAC	Conduit terminal
	2P 2Q		48 VAC	(With surge voltage suppressor)
	2Q 2R		220 VAC	
	2S		240 VAC	]
	2W		24 VAC	
	2T	—	12 VDC	
_	3A		24 VDC	
cto	3B	_	100 VAC	
Jne	3C 3D	_	110 VAC	-
cor	3D 3E	_	200 VAC 230 VAC	DIN terminal
N	3F	_	48 VAC	(With surge voltage suppressor)
nt	3G	_	220 VAC	
tho	3H	—	240 VAC	
Ň	3V	_	24 VAC	
Without DIN connector	3G 3H	- - - -	220 VAC 240 VAC	(with surge voitage suppressor)

\* Options marked with • are available for Class "H" coil. Applicable for all when the coil insulation class is Class "B".

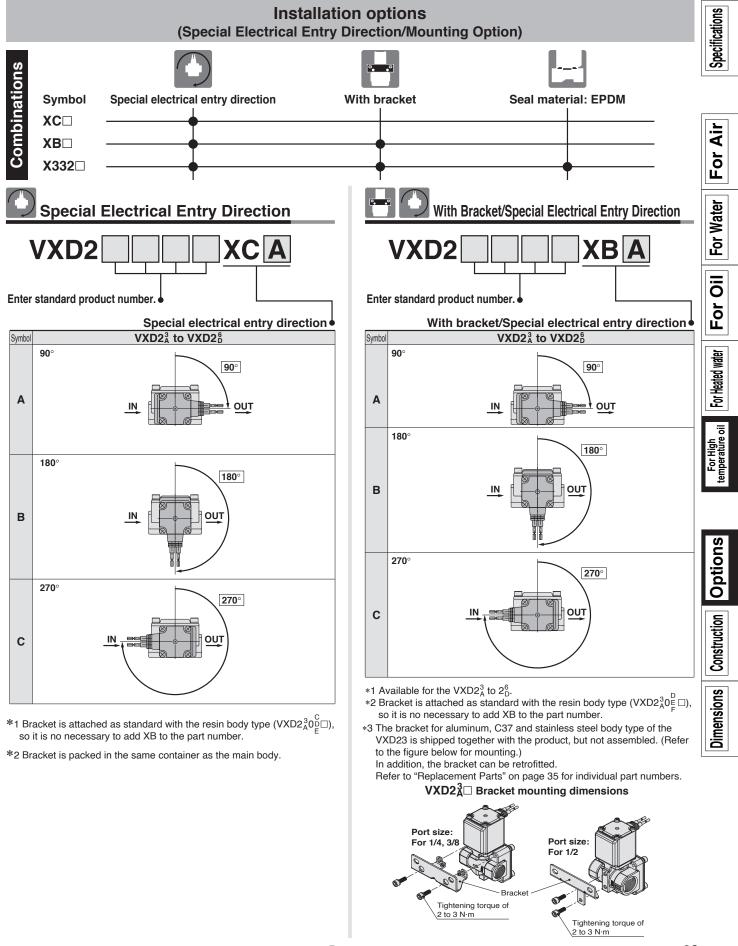
	Enter standa product numb er option (Low concen applicable to deionized	ard • er. tratio	
Symbol	Low concentration ozone resistant and applicable to deionized water *1, *4 (Seal material: FKM)	Oil-free	Port thread*3
Nil	_	-	Rc, With One-touch fitting*2
Α			G*5
В	_	_	NPT
С	0	_	Rc, With One-touch fitting*2
D	_	0	G*5
E		۲Ŭ.	NPT
F	0	_	G*5
<u> </u>			NPT
<u>н</u> к	0	0	Rc, With One-touch fitting*2 G*5
 	0		NPT
-			
	 cable to air (VXD2⊡0) and wa ouch fittings are attached to t		,
*1 Applia *2 One-1 *3 Only Rc, G *4 Wher (brase	ouch fittings are attached to t flange type is available for 32 a, and NPT cannot be selected a using deionized water or any s), select a stainless steel boo connection, prepare a fitting co	ater (VX he resin A to 50 d. y other dy.	D2⊡2). n body type. A. fluid that may corrode C37
*1 Applie *2 One-1 *3 Only Rc, G *4 Wher (brase *5 For c	ouch fittings are attached to t flange type is available for 32 a, and NPT cannot be selected a using deionized water or any s), select a stainless steel boo connection, prepare a fitting co	ater (VX he resid A to 50 d. y other dy. ymplian	D2⊟2). n body type. A. fluid that may corrode C37 t with ISO 16030 and JIS B
	Nouch fittings are attached to t flange type is available for 32 i, and NPT cannot be selected a using deionized water or any s), select a stainless steel boo connection, prepare a fitting co Made to cial lead wire length ed upon receipt of order.	Ater (VX he resi A to 50 d. y other dy. mplian	D2⊟2). n body type. A. fluid that may corrode C37 t with ISO 16030 and JIS B

 $\ast$  Enter symbols in the order below when ordering a combination of electrical option, other option, etc.

Example) VXD2 3 2 A Z 1A Z Electrical option • Other option • S

**SMC** 

## Other Special Options Series VXD



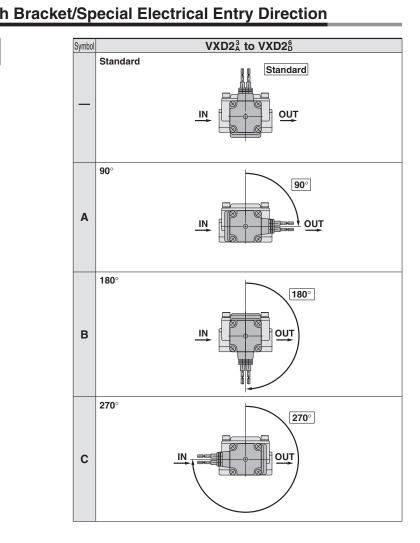
SMC



	Seal Material: EPDM/Witl								
V)	VXD2								
		er standard ● ict number. EPDM sp	pecification ●						
Wit		•	rical entry direction						
	Symbol	Electrical entry direction	Bracket						
	—	Standard							
	Α	90°	None						
	В	180°	None						
	С	270°							
	D	Standard							
	<b>E</b> 90°		With bracket*1						
	F	180°	With bracket						
	G	270°							
	*1 Not a	vailable for the VXD2	<sup>3</sup> <sub>A</sub> (resin body type).						

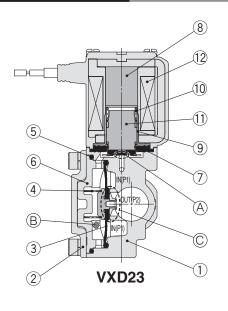
\*1 Not available for the VXD2<sup>A</sup> (resin body type).
\*2 "Other options" (refer to How to Order), which can be combined, are A, B, D, E, Z.

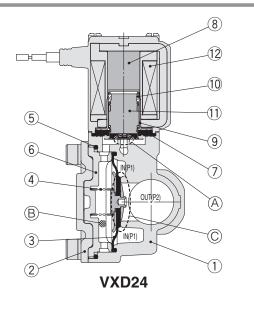
\*3 Available for air and water.

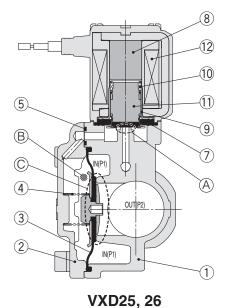


## Series VXD Construction

### Normally Closed (N.C.)







### **Component Parts**

No.	Description	Model	Material
-	Dedu	VXD23	C37 (Brass), Stainless steel, Aluminium, Resin (PBT)
1	Body	VXD24 to 26	C37 (Brass), Stainless steel
2	Bonnet	VXD23, 24	Stainless steel
2	Bonnet	VXD25, 26	C37 (Brass), Stainless steel
3	Diaphragm assembly	VXD23 to 26	Stainless steel, NBR, FKM, EPDM
4	Spring	VXD23 to 26	Stainless steel
5	O-ring	VXD23 to 26	NBR, FKM, EPDM
6	Buffer	VXD23, 24	PPS
7	Stopper		NBR, FKM, EPDM
8	Core		Fe
9	Tube	VXD23 to 26	Stainless steel
10	Spring		Stainless steel
11	Armature assembly		Stainless steel, NBR, FKM, EPDM, Resin (PPS)
12	Solenoid coil		Cu + Fe + Resin

### Operation

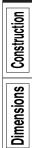
### <Valve opened>

When coil 1 is energized, armature assembly 1 is attracted by core (8) and pilot valve (A) is opened.

When A is opened, the pressure in pressure chamber (B) is reduced and main valve (C) is opened.

#### <Valve closed>

When coil 1 is de-energized, pilot valve (Å) is closed, pressure in pressure chamber (B) increases, and main valve (C) is closed.



Option

Specifications

For Air

For Water

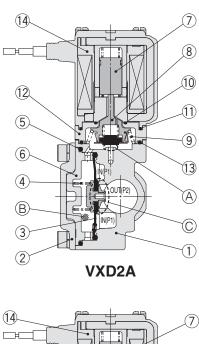
For Oil

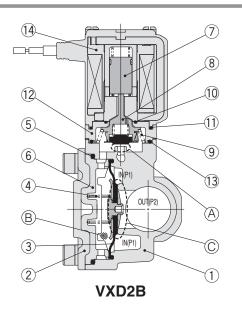
For Heated Water

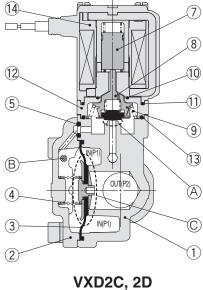
For High Temperature Oil

### **SMC**

### Normally Open (N.O.)







### **Component Parts**

No.	Description	Model	Material					
1	Body	VXD2A	C37 (Brass), Stainless steel, Aluminum, Resin (PBT)					
-	Бойу	VXD2B to 2D	C37 (Brass), Stainless steel					
2	Bonnet	VXD2A, 2B	Stainless steel					
2	Donnet	VXD2C, 2D	C37 (Brass), Stainless steel					
3	Diaphragm assembly	VXD2A to 2D	Stainless steel, NBR, FKM, EPDM					
4	Spring	VXD2A to 2D	Stainless steel					
5	O-ring	VXD2A to 2D	NBR, FKM, EPDM					
6	Buffer	VXD2A, 2B	PPS					
7	Sleeve assembly		Stainless steel, Resin (PPS)					
8	Push rod assembly		Resin (PPS), Stainless steel, NBR, FKM, EPDM					
9	Stopper		Stainless steel					
10	O-ring A	VXD2A to 2D	NBR, FKM, EPDM					
11	O-ring B	VADZA IO ZD	NBR, FKM, EPDM					
12	Adapter		Resin (PPS)					
13	O-ring C		NBR, FKM, EPDM					
14	Solenoid coil		Cu + Fe + Resin					

### Operation

### <Valve opened>

When coil M is energized, (already opened) pilot valve(A) is closed, pressure in pressure chamber(B) increases, and main valve(C) is closed.

### <Valve closed>

When coil  $(\!\!\!B]$  is de-energized, (already closed) pilot valve  $(\!\!\!A]$  is opened, pressure in pressure chamber  $(\!\!\!B]$  decreases, and main valve  $(\!\!C)$  is opened.



For information on handling one-touch fittings (KQ2 series) and appropriate tubing, refer to SMC website, http://www.smc.eu



Specifications

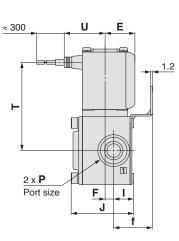
For Oil For Water For Air

For Heated water

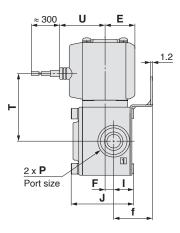
For High temperature oil

## Dimensions/VXD2<sup>3</sup><sub>A</sub> Body Material: Resin (Ø 10, Ø 3/8", Ø 12)

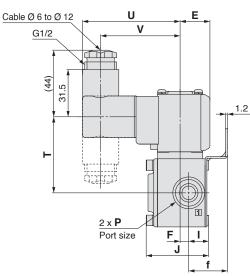
### Grommet

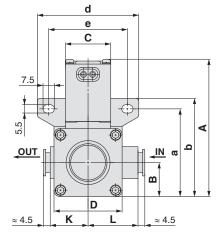


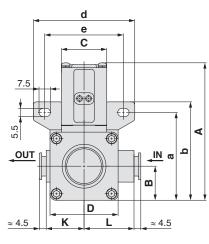
### Grommet (with surge voltage suppressor)

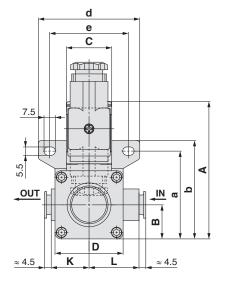


### **DIN terminal**









ptions
Construction
Dimensions

																		[mm]
														Eleo	ctrical e	ntry		
Model	One-touch fitting P	A	в	с	D	E	F	I	J	к	L	Gron	nmet	Grommet ( voltage su	· ·	DII	N termi	nal
												Т	U	Т	U	Т	U	V
VXD2 <sup>3</sup> <sub>A</sub>	Ø 10, Ø 3/8", Ø 12	91 (97)	22.5	30	45	20	6	13.5	41.5	25	33	58.5 (64.5)	27	45 (50.5)	30	50.5 (56)	64.5	52.5
Model	One-touch fitting	Mo	unting b	racket	dimens	ions												

Model Ρ а b d е 25.5 VXD2<sup>3</sup> Ø 10, Ø 3/8", Ø 12 58 65 67 52

(): Denotes the Normally Open (N.O.) dimensions.

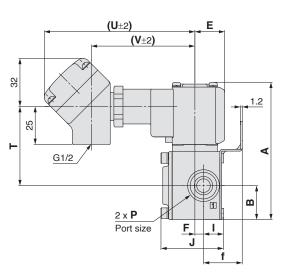


f

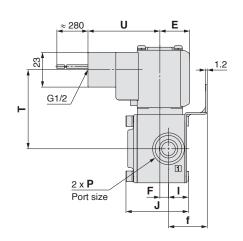


### Dimensions/VXD2<sup>3</sup><sub>A</sub> Body Material: Resin (Ø 10, Ø 3/8", Ø 12)

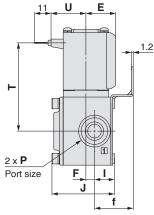
### **Conduit terminal**

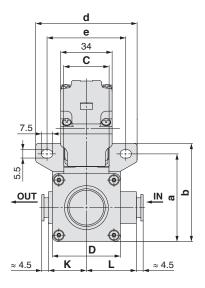


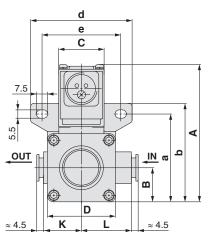
### Conduit

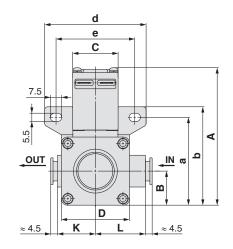


### **Faston terminal**









																		[mm]
														Elec	ctrical e	ntry		
Model	One-touch fitting P	A	в	с	D	Е	F	Т	J	к	L	Conduit terminal	ninal	Con	iduit	Faston terminal		
												Т	U	V	Т	U	Т	U
VXD2 <sup>3</sup> <sub>A</sub>	Ø 10, Ø 3/8", Ø 12	91 (97)	22.5	30	45	20	6	13.5	41.5	25	33	52.5 (58)	99.5	68.5	52.5 (58)	47.5	58.5 (64.5)	23

 
 Model
 One-touch fitting P
 Mounting bracket dimensions

 VXD2<sup>A</sup><sub>A</sub>
 Ø 10, Ø 3/8", Ø 12
 58
 65
 67
 52
 25.5

(): Denotes the Normally Open (N.O.) dimensions.



1.6 7.5

5.5

OUT

IN

8

VXD2<sup>3</sup><sub>A</sub> Port size 04 (1/2) (With bracket)

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2 x P

Port size

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Specifications

For Air

For Water

For Oil

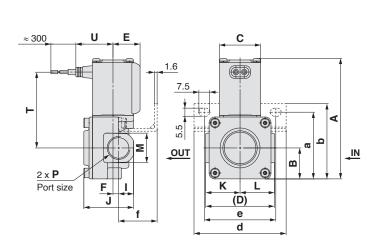
For Heated water

For High temperature oil

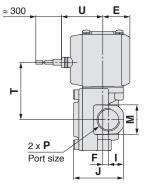
Dimensions Construction Options

## Dimensions/VXD2<sup>3</sup><sub>A</sub> Body Material: Aluminium, C37 (Brass), Stainless Steel

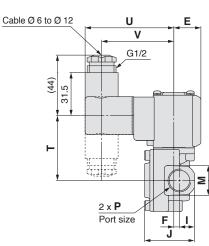
### Grommet

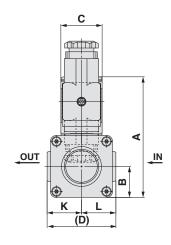


## Grommet (with surge voltage suppressor)



### **DIN terminal**





																				[mm]
												I	N			Elec	ctrical e	entry		
Model	Port size P	A	в	С	D	Е	F	Т	J	к	K L	C37 (Brass), Stainless	Aluminium			Grommet (with surge voltage suppressor)		DIN terminal		nal
	-											steel body	body type	Т	U	Т	U	Т	U	v
VXD2 <sup>3</sup>	1/4, 3/8	88	22.5	30	50	20	4.5	11	37.5	25	25	22	24	55.5	27	42	30	47.5	64.5	50 F
VADZA	1/2	(93.5)	22.5	30	50	20	5	13	42.5	20	25	27	30	(61)	21	(47.5)	30	(53)	04.5	52.5

Model	Port size	M	ounting b	oracket o	limensio	ns
wouer	Р	а	b	d	е	f
	1/4, 3/8	48.5	55	67	50	28
VXD2Å	1/2	47	53.5	67	52	27

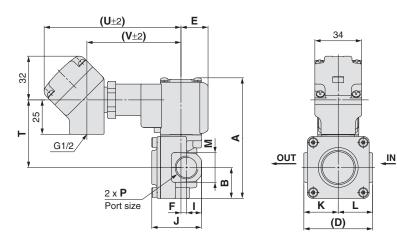
(): Denotes the Normally Open (N.O.) dimensions.

Aluminium body is for air. Refer to page 5 for details.

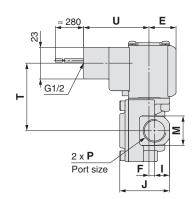


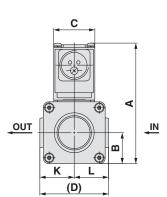
## Dimensions/VXD2<sup>3</sup><sub>A</sub>Body Material: Aluminium, C37 (Brass), Stainless Steel

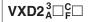
### **Conduit terminal**



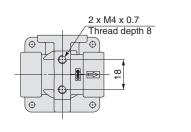
### Conduit



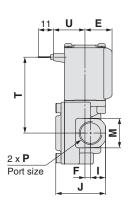


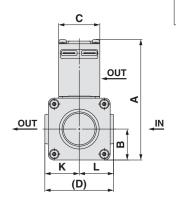


Note) Only the VXD2 <sup>3</sup><sub>A</sub> with port size of 04 (1/2) has threads on the bottom of the body.



### **Faston terminal**





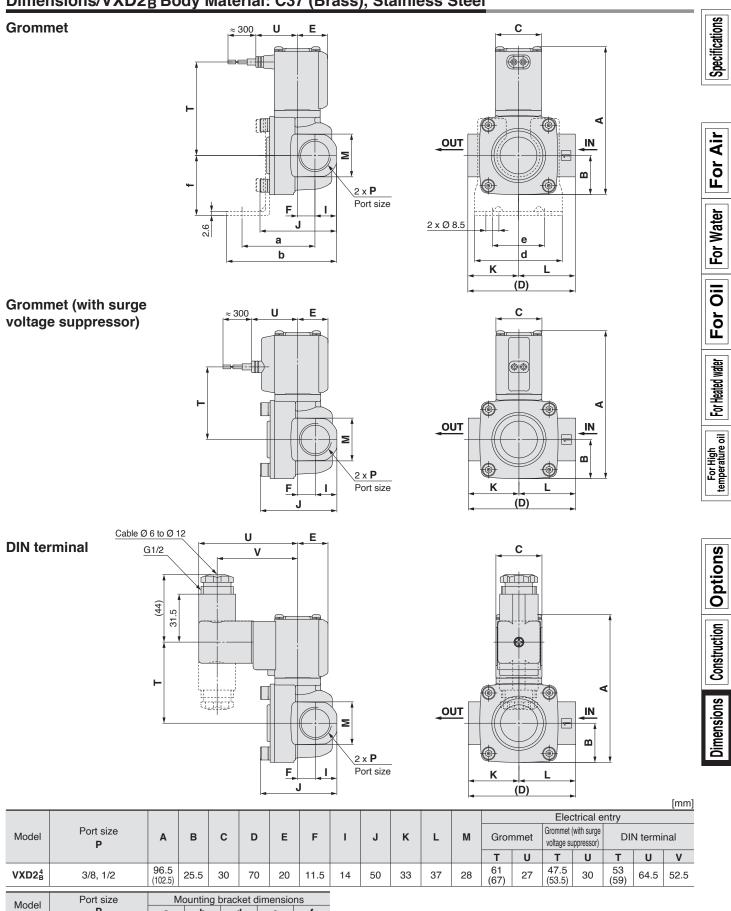
																		[mm]
														Ele	ctrical e	ntry		
Port size <b>P</b>	Α	в	с	D	Е	F	I	J	к	L	м	Con	duit terr	ninal	Cor	iduit	Fas term	
												Т	U	V	Т	U	Т	U
1/4, 3/8	88	00 5	00	50	00	4.5	11	37.5	05	05	22	49.5	00 5	C0 F	49.5	47 5	55.5	00
1/2	(93.5)	22.5	30	50	20	5	13	42.5	25	25	27	(55)	99.5	00.5	(55)	47.5	(61)	23
	<b>P</b> 1/4, 3/8	P A 1/4, 3/8 88	P A B	P A B C	P A B C D	P A B C D E	P         A         B         C         D         E         F           1/4, 3/8         88         22.5         30         50         20         4.5	P         A         B         C         D         E         F         I           1/4, 3/8         88         22.5         30         50         20         4.5         11	P         A         B         C         D         E         F         I         J           1/4, 3/8         88         22.5         30         50         20         4.5         11         37.5	P         A         B         C         D         E         F         I         J         K           1/4, 3/8         88         22.5         30         50         20         4.5         11         37.5         25	P         A         B         C         D         E         F         I         J         K         L           1/4, 3/8         88         22.5         30         50         20         4.5         11         37.5         25         25	P         A         B         C         D         E         F         I         J         K         L         M           1/4, 3/8         88         22.5         30         50         20         4.5         11         37.5         25         22	P         A         B         C         D         E         F         I         J         K         L         M         Con-           1/4, 3/8         88         22.5         30         50         20         4.5         11         37.5         25         22         49.5	P         A         B         C         D         E         F         I         J         K         L         M         Conduit terr           1/4, 3/8         88         22.5         30         50         20         4.5         11         37.5         25         22         49.5         99.5	Port size         A         B         C         D         E         F         I         J         K         L         M         Conduit terminal           1/4, 3/8         88         22.5         30         50         20         4.5         11         37.5         25         25         49.5         99.5         68.5	Port size         A         B         C         D         E         F         I         J         K         L         M         Conduit terminal         Conduit terminal         Conduit terminal           1/4, 3/8         88         22.5         30         50         20         4.5         11         37.5         25         25         22         49.5         99.5         68.5         49.5	P         A         B         C         D         E         F         I         J         K         L         M         Conduit terminal         Conduit           1/4, 3/8         88         22.5         30         50         20         4.5         11         37.5         25         25         22         49.5         99.5         68.5         49.5         47.5	Port size         A         B         C         D         E         F         I         J         K         L         M         Conduit terminal         Conduit         Fast term           1/4, 3/8         88         22.5         30         50         20         4.5         11         37.5         25         25         22         49.5         68.5         49.5         47.5         55.5

( ): Denotes the Normally Open (N.O.) dimensions. Aluminium body is for air. Refer to page 5 for details.





### Dimensions/VXD2<sup>4</sup><sub>B</sub>Body Material: C37 (Brass), Stainless Steel



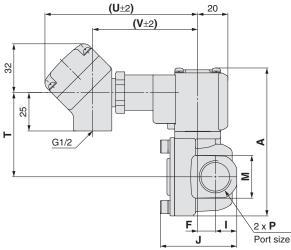
 Model
 P
 a
 b
 d
 e
 f

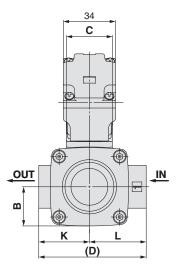
 VXD2<sup>4</sup>/<sub>B</sub>
 3/8, 1/2
 47.5
 71.5
 57
 34
 39

(): Denotes the Normally Open (N.O.) dimensions.

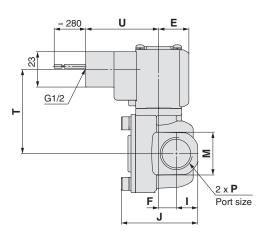
## Dimensions/VXD2<sup>4</sup><sub>B</sub> Body Material: C37 (Brass), Stainless Steel

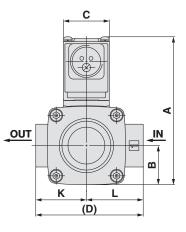
### **Conduit terminal**



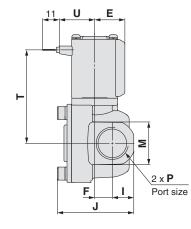


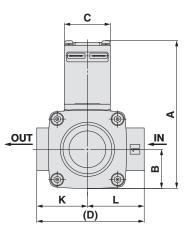
Conduit





### **Faston terminal**





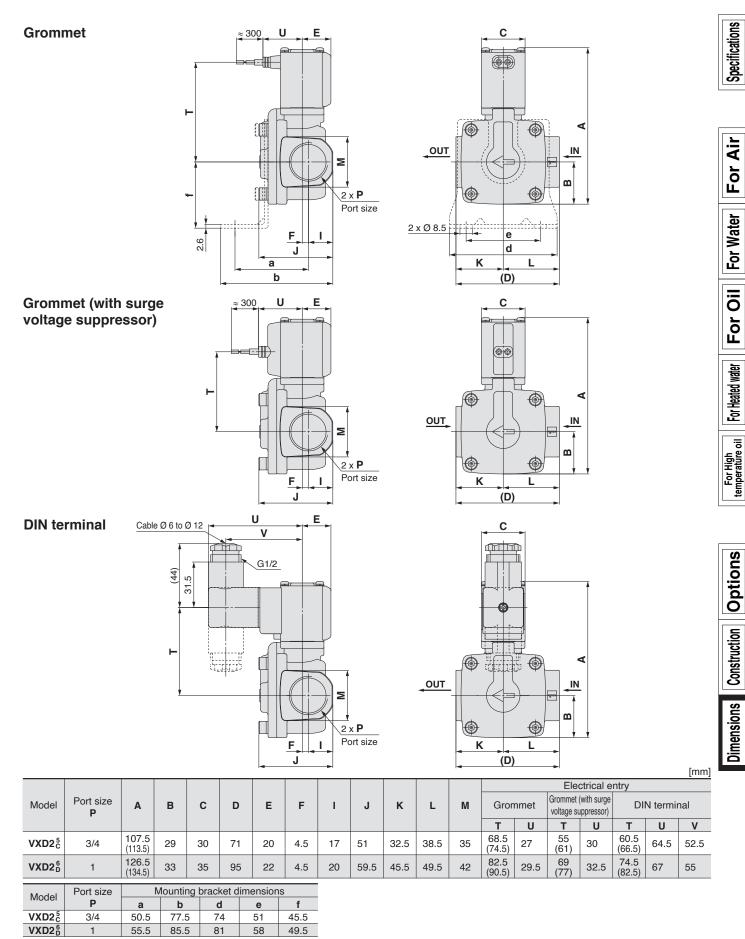
Electrical entry Port size Faston Model F Conduit terminal Conduit в С D Е T. L М Α J Κ Ρ terminal т U ۷ т U т U 96.5 (102.5) 55 (61) 55 (61) 61 68.5  $VXD2^4_B$ 3/8, 1/2 25.5 20 11.5 50 28 99.5 47.5 23 30 70 14 33 37 (67)

(): Denotes the Normally Open (N.O.) dimensions.



[mm]

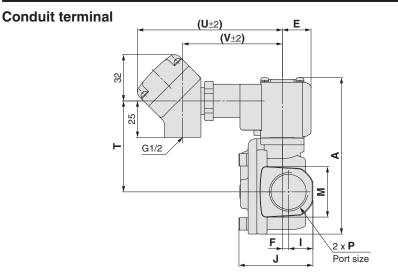
For Air/Water/Oil

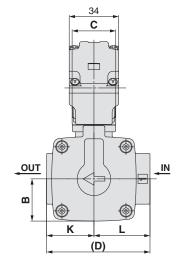


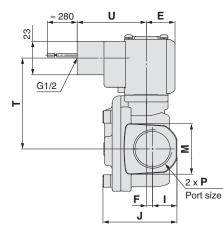
(): Denotes the Normally Open (N.O.) dimensions.

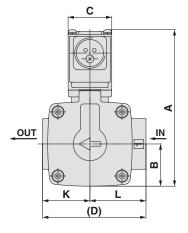
### Series VXD For Air/Water/Oil

## Dimensions/VXD2<sup>5</sup><sub>C</sub>/2<sup>6</sup><sub>D</sub> Body Material: C37 (Brass), Stainless Steel



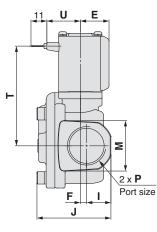


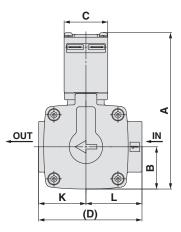




### **Faston terminal**

Conduit





																			[mm]
															Eleo	ctrical e	ntry		
Model	Port size P	Α	в	с	D	Е	F	Т	J	к	L	М	Con	duit terr	ninal	Con	iduit		ston ninal
													Т	U	v	Т	U	Т	U
VXD2 <sup>5</sup>	3/4	107.5 (113.5)	29	30	71	20	4.5	17	51	32.5	38.5	35	62.5 (68.5)	99.5	68.5	62.5 (68.5)	47.5	68.5 (74.5)	23
	1	126.5 (134.5)	33	35	95	22	4.5	20	59.5	45.5	49.5	42	76.5 (84.5)	102	71	76.5 (84.5)	50	82.5 (90.5)	25.5

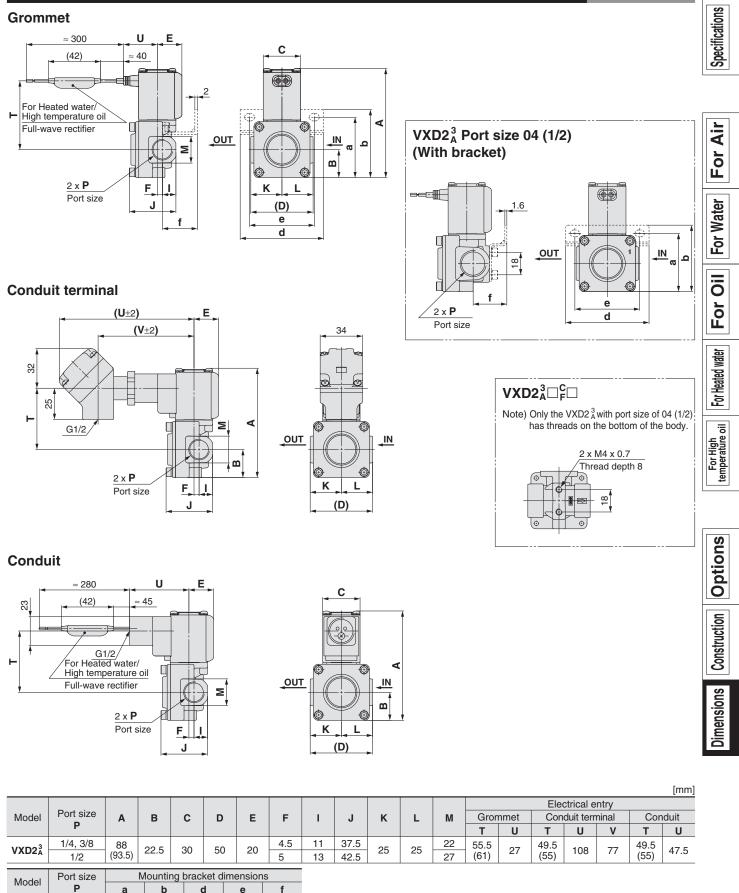
Model	Port size	N	lounting l	bracket d	imension	IS
wouer	Р	а	b	d	е	f
VXD2 <sup>5</sup> <sub>C</sub>	3/4	50.5	77.5	74	51	45.5
	1	55.5	85.5	81	58	49.5

(): Denotes the Normally Open (N.O.) dimensions.



For Heated water/High temperature oil

## Dimensions/VXD2<sup>3</sup><sub>A</sub> Body Material: C37 (Brass), Stainless Steel (1/4, 3/8, 1/2)



47 (): Denotes the Normally Open (N.O.) dimensions.

48.5

55

53.5

67

52

1/4, 3/8

1/2

VXD2<sup>3</sup><sub>A</sub>

28

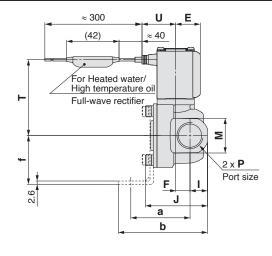
27

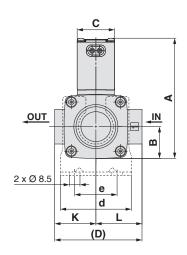
For Heated water/High temperature oil

### Dimensions/VXD2<sup>4</sup><sub>B</sub> Body Material: C37 (Brass), Stainless Steel

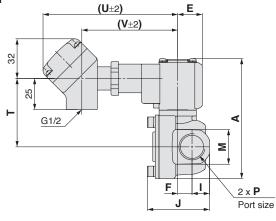
### Grommet

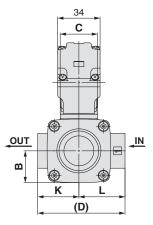
Series VXD



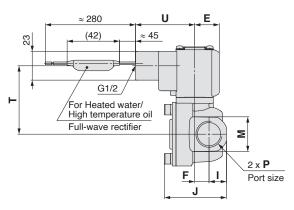


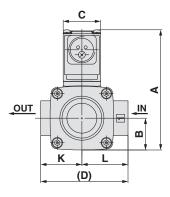
### **Conduit terminal**





### Conduit





																				[mm]
																Eleo	ctrical e	ntry		
M	odel	Port size	Α	В	С	D	Е	F	I.	J	κ	L	М	Gron	Grommet Conduit terminal Conduit					Iduit
		Р												Т	U	Т	U	v	Т	U
٧X	(D2 <sup>4</sup> <sub>B</sub>	3/8, 1/2	96.5 (102.5)	25.5	30	70	20	11.5	14	50	33	37	28	61 (67)	27	55 (61)	108	77	55 (61)	47.5

**SMC** 

Port size Mounting bracket dimensions Model Ρ а b d е f VXD2<sup>4</sup><sub>B</sub> 3/8, 1/2 47.5 39 71.5 57 34

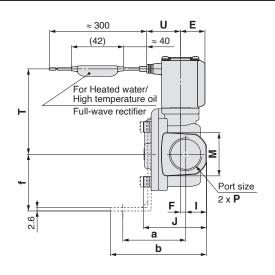
(): Denotes the Normally Open (N.O.) dimensions.

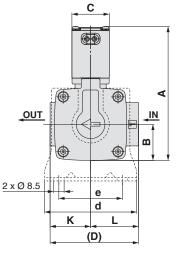
# Pilot Operated 2 Port Solenoid Valve Series VXD

For Heated water/High temperature oil

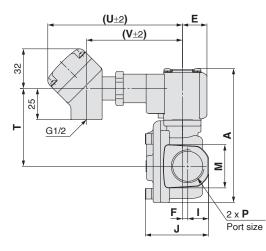
# Dimensions/VXD2<sup>5</sup>/2<sup>6</sup><sub>D</sub> Body Material: C37 (Brass), Stainless Steel

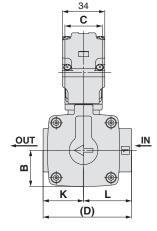
### Grommet



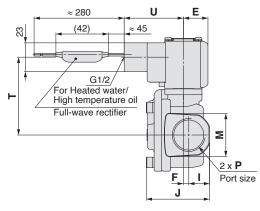


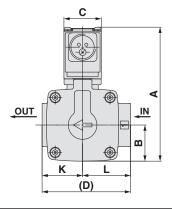
### **Conduit terminal**





### Conduit





	_
ł	
	For High temperature oil
L	
	Options
t	_
	tion

Specifications

For Heated water For Oil For Water For Air

															Ele	ctrical e	ntry		
Model	Port size	Α	в	С	D	Е	F	1	J	к	L	м	Gron	nmet	Con	duit tern	ninal	Cor	nduit
	Р												Т	U	Т	U	V	Т	U
VXD2 <sup>5</sup>	3/4	107.5 (113.5)	29	30	71	20	4.5	17	51	32.5	38.5	35	68.5 (74.5)	27	62.5 (68.5)	108	77	62.5 (68.5)	47.5
	1	126.5 (134.5)	33	35	95	22	4.5	20	59.5	45.5	49.5	42	82.5 (90.5)	29.5	76.5 (84.5)	110.5	79.5	76.5 (84.5)	50
		(104.0)											(30.3)		(04.3)			(04.3)	

Model	Port size	N	lounting l	bracket d	imension	IS
Model	Р	а	b	d	е	f
VXD2 <sup>5</sup>	3/4	50.5	77.5	74	51	45.5
	1	55.5	85.5	81	58	49.5

(): Denotes the Normally Open (N.O.) dimensions.

[mm]

# Series VXD

### **Replacement Parts**

### DIN Connector Part No.

)
J

<coil b="" class="" insulation="" type=""></coil>						
Electrical option	Rated voltage	Connector part no.				
	24 VDC					
	12 VDC					
	100 VAC					
	110 VAC					
None	200 VAC	3G-GDM2A-G				
None	220 VAC	3G-GDIVIZA-G				
	230 VAC					
	240 VAC					
	24 VAC					
	48 VAC					
	24 VDC	GDM2A-L5				
	12 VDC	GDM2A-L6				
	100 VAC	GDM2A-L1				
	110 VAC	GDM2A-L1				
	200 VAC	GDM2A-L2				
With light	220 VAC	GDM2A-L2				
	230 VAC	GDM2A-L2				
	240 VAC	GDM2A-L2				
	24 VAC	GDM2A-L5				
	48 VAC	GDM2A-L15				

<coil class="" h="" insulation="" type=""></coil>						
Electrical option	Rated voltage	Connector part no.				
	24 VDC	GDM2A-G-S5				
	100 VAC					
	110 VAC					
	200 VAC					
None	220 VAC	GDM2A-R				
	230 VAC	GDIMZA-R				
	240 VAC					
	24 VAC					
	48 VAC					
	24 VDC	GDM2A-G-Z5				
	100 VAC	GDM2A-R-L1				
	110 VAC	GDM2A-R-L1				
	200 VAC	GDM2A-R-L2				
With light	220 VAC	GDM2A-R-L2				
	230 VAC	GDM2A-R-L2				
	240 VAC	GDM2A-R-L2				
	24 VAC	GDM2A-R-L5				
	48 VAC	GDM2A-R-L15				

- Gasket Part No. for DIN Connector VCW20-1-29-1 (for Class B) VCW20-1-29-F (for Class H)
- Lead Wire Assembly Part No. for Faston Terminal (Set of 2 pcs.) VX021S-1-16FB
- Bracket Assembly Part No. for the VXD2  $\frac{3}{A}$  Metal Body (C37 (Brass), Stainless steel, Aluminium)

VXD30S-14A-1 Port size: For 1/4, 3/8

# Port size: For 1/2

VXD30S-14A-3

\* 2 mounting screws (M3 hexagon socket head cap screws) are shipped together with the bracket assembly, but not assembled.

# Series VXD **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. Minimum operating pressure differential

The minimum pressure differential (the difference between the inlet pressure and outlet pressure) required to keep the main valve fully open.

### 3. 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 below the maximum operating pressure differential.]

### 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. Apparent power (VA)

Volt-ampere is the product of voltage (V) and current (A). Power consumption (W): For AC,  $W = V \cdot A \cdot \cos \theta$ . For DC,  $W = V \cdot A$ . Note)  $\cos\theta$  shows power factor.  $\cos\theta \approx 0.9$ 

### 2. Surge voltage

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

### Electrical Terminology

# Specifications

For Air

For Water

For Oil

For Heated water

For High temperature oil

### 3. Enclosure

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

Verify the degree of protection for each product.



### First characteristic numeral First Characteristics:

D	Degrees of protection against solid foreign objects					
0	Non-protected					
1	Protected against solid foreign objects of 50 mm Ø and greater					
2	Protected against solid foreign objects of 12 mm Ø and greater					
3	Protected against solid foreign objects of 2.5 mm Ø and greater					
4	Protected against solid foreign objects of 1.0 mm Ø and greater					
5	Dust-protected					
6	Dust-tight					

### 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	Water-jet-proof type					
6	Protected against powerful water jets	Powerful water-jet-proof 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: Dust-tight, Water-jet-proof type

"Water-jet-proof 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 EPDM: Ethylene-propylene rubber

### 2. Oil-free treatment

The degreasing and washing of wetted parts

### 3. Symbol

In the symbol ( The symbol ( In the symbol ( In the symbol ( In the symbol ( In the symbol exactly and the symbol in a blocked condition  $(\pm)$ , but it is not possible to use the valve in cases of reverse pressure, where the Port 2 pressure is higher than the Port 1 pressure.

### **Faston Terminal**

- 1. Faston<sup>™</sup> 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.





# Series VXD Solenoid Valve Flow-rate Characteristics (How to indicate flow-rate characteristics)

### 1. Indication of flow-rate characteristics

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

### Table (1) Indication of Flow-rate Characteristics

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

### 2. Pneumatic equipment

### 2.1 Indication according to the international standards

- (1) Conformed standard
  - ISO 6358: 1989 : Pneumatic fluid power—Components using compressible fluids— Determination of flow-rate characteristics
  - JIS B 8390: 2000 : Pneumatic fluid power—Components using compressible fluids— How to test flow-rate characteristics
- (2) Definition of flow-rate characteristics

The flow-rate characteristics are indicated as a result of a comparison between sonic conductance *C* and critical pressure ratio *b*.

Sonic conductance <i>C</i> :	Value which divides the passing mass flow rate of an equipment in a choked flow condition by the product of the upstream absolute pressure and the density in a standard condition.
Critical pressure ratio <b>b</b> :	Pressure ratio (downstream pressure/upstream pressure) which will turn to a choked flow when the value is smaller than this ratio.
Choked flow :	The flow in which the upstream pressure is higher than the downstream pressure and where sonic speed in a certain part of an equipment is reached. Gaseous mass flow rate is in proportion to the upstream pressure and not dependent on the downstream pressure.
Subsonic flow :	Flow greater than the critical pressure ratio
	Air in a temperature state of 20 °C, absolute pressure 0.1 MPa (= 100 kPa = 1 bar), relative humidity 65 %.
	It is stipulated by adding the "(ANR)" after the unit depicting air volume. (standard reference atmosphere)

Conformed standard: ISO 8778: 1990 Pneumatic fluid power—Standard reference atmosphere, JIS B 8393: 2000: Pneumatic fluid power—Standard reference atmosphere

(3) Formula for flow rate

Described by the practical units as following.

When 
$$\frac{P_{2} + 0.1}{P_{1} + 0.1} \le b$$
, choked flow  
 $Q = 600 \times C (P_{1} + 0.1) \sqrt{\frac{293}{273 + t}}$  ....(1)  
When  $\frac{P_{2} + 0.1}{P_{1} + 0.1} > b$ , subsonic flow  
 $Q = 600 \times C (P_{1} + 0.1) \sqrt{1 - \left[\frac{P_{2} + 0.1}{P_{1} + 0.1} - b\right]^{2}} \sqrt{\frac{293}{273 + t}}$  ....(2)

**Q**: Air flow rate [dm<sup>3</sup>/min (ANR)], dm<sup>3</sup> (cubic decimetre) of SI unit are allowed to be described by L (litre). 1 dm<sup>3</sup> = 1 L

- C : Sonic conductance [dm<sup>3</sup>/(s·bar)]
- **b** : Critical pressure ratio [-]
- **P**<sub>1</sub> : Upstream pressure [MPa]
- **P**<sub>2</sub> : Downstream pressure [MPa]
- *t* : Temperature [°C]

Note) Formula of subsonic flow is the elliptic analogous curve.

Flow-rate characteristics are shown in Graph (1). For details, please make use of SMC's "Energy Saving Program."

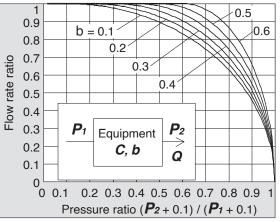
### Example)

Obtain the air flow rate for  $P_1 = 0.4$  [MPa],  $P_2 = 0.3$  [MPa], t = 20 [°C] when a solenoid value is performed in  $C = 2 [dm^{3}/(s \cdot bar)]$  and b = 0.3.

According to formula (1), the maximum flow rate =  $600 \times 2 \times (0.4 + 0.1) \times \sqrt{\frac{293}{273 + 20}} = 600 \text{ [dm<sup>3</sup>/min (ANR)]}$ 

Pressure ratio =  $\frac{0.3 + 0.1}{0.4 + 0.1} = 0.8$ 

Based on Graph (1), the flow rate ratio will be 0.7 when the pressure ratio is 0.8 and b = 0.3. Therefore, flow rate = Maximum flow rate x flow rate ratio =  $600 \times 0.7 = 420 \text{ [dm<sup>3</sup>/min (ANR)]}$ 



Graph (1) Flow-rate characteristics

(4) Test method

Attach a test equipment with the test circuit shown in Fig. (1) while maintaining the upstream pressure to a certain level which does not go below 0.3 MPa. Next, measure the maximum flow to be saturated in the first place, then measure this flow rate at 80 %, 60 %, 40 %, 20 % and the upstream and downstream pressure. And then, obtain the sonic conductance C from this maximum flow rate. Besides that, substitute each data of others for the subsonic flow formula to find **b**, then obtain the critical pressure ratio **b** from that average.

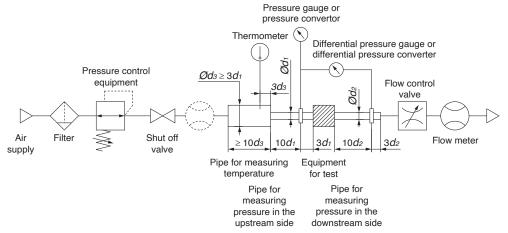


Fig. (1) Test circuit based on ISO 6358, JIS B 8390



For Water For Air

For Oil



# Series VXD

### 2.2 Effective area S

 (1) Conformed standard
 JIS B 8390: 2000: Pneumatic fluid power—Components using compressible fluids— How to test flow-rate characteristics
 Equipment standards: JIS B 8373: 2 port solenoid valve for pneumatics JIS B 8374: 3 port solenoid valve for pneumatics
 JIS B 8375: 4 port, 5 port solenoid valve for pneumatics
 JIS B 8379: Silencer for pneumatics
 JIS B 8381: Fittings of flexible joint for pneumatics

### (2) Definition of flow-rate characteristics

- Effective area *S*: The cross-sectional area having an ideal throttle without friction or without reduced flow. It is deduced from the calculation of the pressure changes inside an air tank when discharging the compressed air in a choked flow, from an equipment attached to the air tank. This is the same concept representing the "easy to run through" as sonic conductance *C*.
- (3) Formula for flow rate

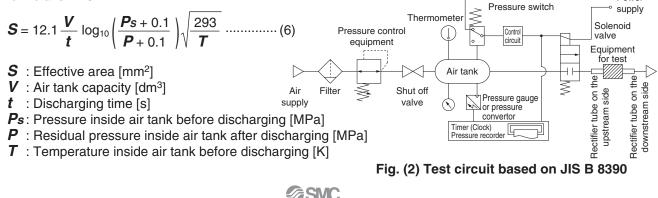
When 
$$\frac{P_2 + 0.1}{P_1 + 0.1} \le 0.5$$
, choked flow  
 $Q = 120 \times S(P_1 + 0.1) \sqrt{\frac{293}{273 + t}}$ .....(3)

When 
$$\frac{P_2 + 0.1}{P_1 + 0.1} > 0.5$$
, subsonic flow  
 $Q = 240 \times S \sqrt{(P_2 + 0.1) (P_1 - P_2)} \sqrt{\frac{293}{273 + t}}$ .....(4)

Conversion with sonic conductance C:

- $S = 5.0 \times C$  .....(5)
- Q : Air flow rate [dm<sup>3</sup>/min(ANR)], dm<sup>3</sup> (cubic decimetre) of SI unit are allowed to be described by L (litre). 1 dm<sup>3</sup> = 1 L
- S : Effective area [mm<sup>2</sup>]
- P1: Upstream pressure [MPa]
- P2 : Downstream pressure [MPa]
- *t* : Temperature [°C]
- Note) Formula for subsonic flow (4) is only applicable when the critical pressure ratio  $\boldsymbol{b}$  is unknown for equipment. In the formula (2) by the sonic conductance  $\boldsymbol{C}$ , it is the same formula as when  $\boldsymbol{b} = 0.5$ .
- (4) Test method

Attach a test equipment with the test circuit shown in Fig. (2) in order to discharge air into the atmosphere until the pressure inside the air tank goes down to 0.25 MPa (0.2 MPa) from an air tank filled with the compressed air at a certain pressure level (0.5 MPa) which does not go below 0.6 MPa. At this time, measure the discharging time and the residual pressure inside the air tank which had been left until it turned to be the normal values to determine the effective area S, using the following formula. The volume of an air tank should be selected within the specified range by corresponding to the effective area of an equipment for test. In the case of JIS B 8373, 8374, 8375, 8379, 8381, the pressure values are in parentheses and the coefficient of the formula is 12.9.



### 2.3 Flow coefficient *Cv* factor

# The United States Standard ANSI/(NFPA)T3.21.3: 1990: Pneumatic fluid power—Flow rating test procedure and reporting method-For fixed orifice components

Defines the flow coefficient, *Cv* factor by the following formula which is based on the test conducted by the test circuit analogous to ISO 6358.

$$\boldsymbol{C}\boldsymbol{V} = \frac{\boldsymbol{Q}}{114.5\sqrt{\frac{\Delta \boldsymbol{P}\left(\boldsymbol{P}_{2}+\boldsymbol{P}_{a}\right)}{T_{1}}}}$$
(7)

 $\Delta \boldsymbol{P}$  : Pressure drop between the static pressure tapping ports [bar]

**P**<sub>1</sub> : Pressure of the upstream tapping port [bar gauge]

 $P_2$ : Pressure of the downstream tapping port [bar gauge]:  $P_2 = P_1 - \Delta P$ 

**Q** : Flow rate [dm<sup>3</sup>/s standard condition]

Pa : Atmospheric pressure [bar absolute]

T<sub>1</sub> : Upstream absolute temperature [K]

Test conditions are  $P_1 + P_a = 6.5 \pm 0.2$  bar absolute,  $T_1 = 297 \pm 5$  K, 0.07 bar  $\leq \Delta P \leq 0.14$  bar.

This is the same concept as effective area A which ISO 6358 stipulates as being applicable only when the pressure drop is smaller than the upstream pressure and the compression of air does not become a problem.

### 3. Process fluid control equipment

(1) Conformed standard

IEC60534-2-3: 1997: Industrial-process control valves. Part 2: Flow capacity, Section Three-Test procedures

JIS B 2005: 1995: How to test flow coefficient of a valve

Equipment standards: JIS B 8471: Solenoid valve for water JIS B 8472: Solenoid valve for steam

JIS B 8473: Solenoid valve for fuel oil

(2) Definition of flow-rate characteristics

Av factor: Value of the clean water flow rate represented by m<sup>3</sup>/s which runs through a valve (equipment for test) when the pressure differential is 1 Pa. It is calculated using the following formula.

$$\boldsymbol{A}\boldsymbol{v} = \boldsymbol{Q}\sqrt{\frac{\rho}{\Delta \boldsymbol{P}}}$$
(8)

Av: Flow coefficient [m<sup>2</sup>]

**Q** : Flow rate [m<sup>3</sup>/s]

 $\Delta \boldsymbol{P}$  : Pressure differential [Pa]

- $\rho$  : Fluid density [kg/m<sup>3</sup>]
- (3) Formula for flow rate

Described by the practical units. Also, the flow-rate characteristics are shown in Graph (2). In the case of liquid:

$$\boldsymbol{Q} = 1.9 \times 10^6 \, \boldsymbol{A} \boldsymbol{v} \sqrt{\frac{\Delta \boldsymbol{P}}{\boldsymbol{G}}} \dots \tag{9}$$

**Q** : Flow rate [l/min]

Av: Flow coefficient [m<sup>2</sup>]

- △**P** : Pressure differential [MPa]
- **G** : Specific gravity [water = 1]

In the case of saturated steam:

$$Q = 8.3 \times 10^6 Av \sqrt{\Delta P (P_2 + 0.1)}$$
 .....(10)

- **Q** : Flow rate [kg/h]
- Av: Flow coefficient [m<sup>2</sup>]
- $\Delta \mathbf{P}$ : Pressure differential [MPa]

 $P_1$ : Upstream pressure [MPa]:  $\Delta P = P_1 - P_2$ 

P2 : Downstream pressure [MPa]

Conversion of flow coefficient:

 $Av = 28 \times 10^{-6} Kv = 24 \times 10^{-6} Cv$  .....(11)

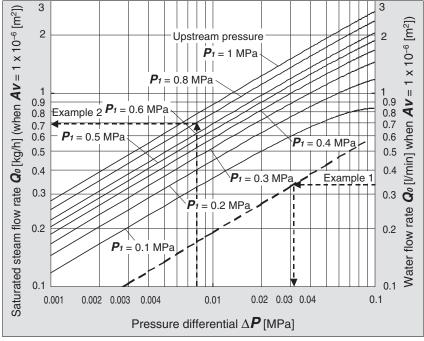
Here,

Kv factor

: Value of the clean water flow rate represented by m<sup>3</sup>/h which runs through a valve at 5 to 40 °C, when the pressure differential is 1 bar.

*Cv* factor (Reference values): Value of the clean water flow rate represented by US gal/min which runs through a valve at 60 °F, when the pressure differential is 1 lbf/in<sup>2</sup> (psi).

Value is different from *Kv* and *Cv* factors for pneumatic purpose due to different test method.



Graph (2) Flow-rate characteristics

Example 1)

Obtain the pressure differential when water 15 [l/min] runs through a solenoid valve with an  $Av = 45 \times 10^{-6} \text{ [m}^2\text{]}$ . Since  $Q_0 = 15/45 = 0.33$  [l/min], according to Graph (2), if reading  $\Delta P$  when  $Q_0$  is 0.33, it will be 0.031 [MPa].

### Example 2)

Obtain the saturated steam flow rate when  $P_1 = 0.8$  [MPa],  $\Delta P = 0.008$  [MPa] with a solenoid valve with an  $Av = 1.5 \times 10^{-6}$  [m<sup>2</sup>].

According to Graph (2), if reading  $Q_0$  when  $P_1$  is 0.8 and  $\Delta P$  is 0.008, it is 0.7 [kg/h]. Therefore, the flow rate  $Q = 0.7 \times 1.5 = 1.05$  [kg/h].

(4) Test method

Attach a test equipment with the test circuit shown in Fig. (3). Next, pour water at 5 to 40 °C, then measure the flow rate with a pressure differential of 0.075 MPa. However, the pressure differential needs to be set with a large enough difference so that the Reynolds number does not go below a range of 4 x  $10^4$ . By substituting the measurement results for formula (8) to figure out Av.

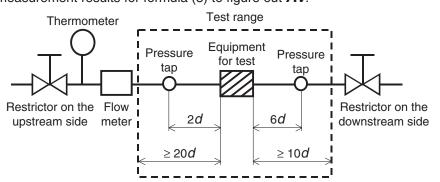


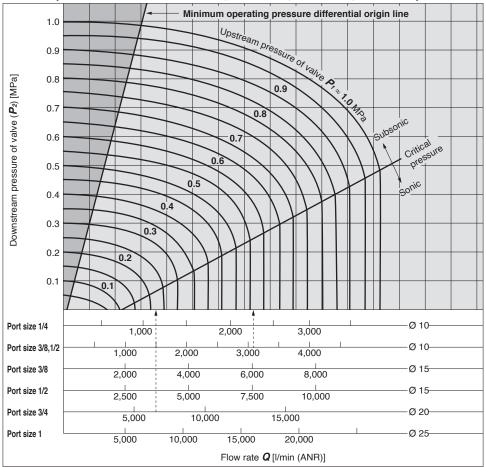
Fig. (3) Test circuit based on IEC60534-2-3, JIS B 2005

SMC

# Series VXD Flow-rate Characteristics

Note) Use this graph as a guide. In the case of obtaining an accurate flow rate, refer to pages 37 through to 41.

### For Air (Orifice diameter: $\emptyset$ 10 mm, $\emptyset$ 15 mm, $\emptyset$ 20 mm, $\emptyset$ 25 mm)



### How to read the graph

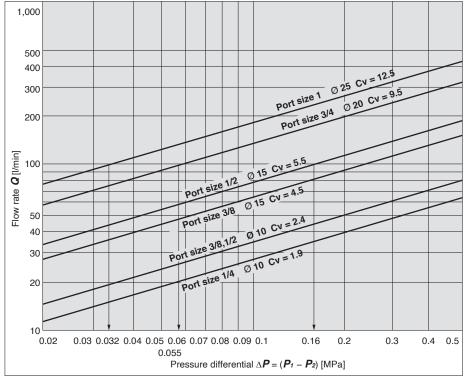
The sonic range pressure to generate a flow rate of 6000 l/min (ANR) is as follows. For a Ø 15 orifice (VXD240 $\Box$ /Port size 3/8), *P*<sub>1</sub>  $\approx$  0.57 MPa, for a Ø 20 orifice (VXD250 $\Box$ /Port size 3/4), *P*<sub>1</sub>  $\approx$  0.22 MPa

# **Marning**

In the area located left to the minimum operating pressure differential origin line in the flow-rate characteristics table, the minimum operating pressure is not generated. Do not use the product in this area as this may cause operation failure (valve opening failure, valve closing failure) or damage of the valve. Select valves with suitable size.

# Series VXD

### For Water



### How to read the graph

The pressure differential to generate a flow rate of 100 l/min water is as follows. For a Ø 15 orifice (VXD242/Port size 1/2),  $\Delta P \approx 0.16$  MPa, for a Ø 20 orifice (VXD252),  $\Delta P \approx 0.055$  MPa, for a Ø 25 orifice (VXD262),  $\Delta P \approx 0.032$  MPa



Be sure to read before handling. Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) and the Operation Manual for 2 Port Solenoid Valves for Fluid Control Precautions. Please download it via our website, http://www.smc.eu

Design

# ▲Design

1. Cannot be used as an emergency shutoff valve etc. The valves presented in this catalogue 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 the conduit type is used as equivalent to an IP65 enclosure, install a wiring conduit etc.
- 7. 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

# **Marning**

1. Minimum operating pressure differential

Be aware that even if the pressure difference is above the minimum operating pressure differential when the valve is closed, the pressure difference may fall below the minimum operating pressure differential when the valve opens, depending on the capacity of the supply source (pumps, compressors, etc.,) or the type of pipe restrictions (the piping is bent continuously due to elbow or tee, or narrow tube nozzle is installed in the end). If the product is used below the minimum operating pressure, the operation becomes unstable, which might cause valve opening or closing failure, or oscillation, leading to failure due to insufficient pressure differential. Select an appropriate valve size with reference to the flow-rate characteristics and flow-rate characteristics table (on pages 37 through to 43).

Selection

# A Warning

### 2. Fluid

### 1) Type of fluid

Select an appropriate valve with reference to the table below for the general fluid. Before using a fluid, check whether it is compatible with the materials of each model by referring to the fluids listed in this catalogue. Use a fluid with a kinematic viscosity of 50 mm<sup>2</sup>/s or less.

### Applicable fluid

For Air	Air
For Water	Air/Water
For Oil	Air/Water/Oil
For Heated water	Air(up to 99 <sup>o</sup> C)/Water/Heated water
For High temperature oil	Air(up to 99 °C)/Water/High temperature oil

### 2) Flammable oil, Gas

Check the specifications 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.

### 3. 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 an air filter close to the valve on the upstream side. A filtration degree of 5  $\mu m$  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 a mist separator on 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.



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### Selection

# **Marning**

### <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 80 to 100 mesh.

The supply water includes materials that create a hard sediment or sludge such as calcium and magnesium. Sediment and sludge can cause the valve to not operate properly. Therefore, install a water softening device, which removes these materials, and a filter (strainer) directly in front of the valve.

### <0il>

Generally, FKM is used as seal material, as it is resistant to oil. The resistance of the seal material may deteriorate depending on the type of oil, manufacturer or additives. Check the resistance before using.

### 4. 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.

### 5. Countermeasures against static electricity

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

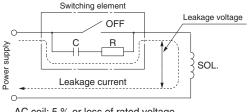
### 6. Low temperature operation

- 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.

# **A**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: 5 % or less of rated voltage DC coil: 2 % or less of rated voltage

Selection

# Caution

2. Selecting model Material depends on fluid. Select optimal models for the fluid.

3. When the fluid is oil. The kinematic viscosity must not exceed 50 mm<sup>2</sup>/s.

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 upward, not downward.

When mounting a valve with its coil positioned downward, 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 upward.

4. Do not warm the coil assembly with a heat insulator etc.

Use tape, heaters, etc., for freeze prevention on the piping and body only. They can cause the coil to burn out.

- 5. Secure with brackets, except in the case of steel piping and copper fittings.
- 6. Avoid sources of vibration, or adjust the arm from the body to the minimum length so that resonance will not occur.

### 7. Painting and coating

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



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### **Disassembly/Assembly Procedures**

# **∆**Caution

1. Before disassembling, be sure to shut off the power supply and pressure supply, and then release the residual pressure.

### Disassembly

### <N.C.>

- 1) Loosen the mounting screws.
- The coil assembly, stopper, return spring, armature assembly and body can be removed.

### <N.O.>

- 1) Loosen the mounting screws.
  - The coil assembly, push rod assembly, O-rings, adapter and body can be removed.

### Assembly

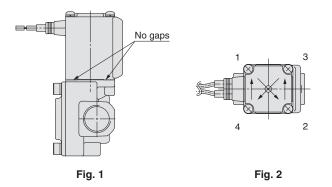
### <Common to N.C. and N.O.>

- 1) Mount the components on the body in the reverse order of disassembly.
- Push the coil assembly against the body and tighten the screws two or more rounds diagonally (Fig. 2) in the status that there are no gaps between the coil assembly and body (Fig. 1).

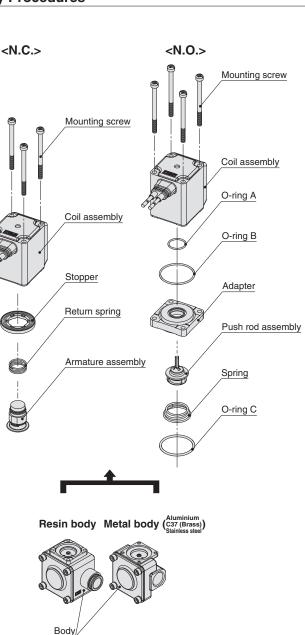
Tighten the screws in the order of " $1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \rightarrow 1 \rightarrow 2 \rightarrow 3 \rightarrow 4$ ".

### Proper Tightening Torque[N·m]

VXD2 <sup>3</sup> <sub>A</sub>	
VXD2 <sup>4</sup> <sub>B</sub>	0.5
VXD2 <sup>5</sup> <sub>C</sub>	
VXD2 <sup>6</sup> <sub>D</sub>	0.7



- \* After tightening the screws, make sure that there are no gaps between the coil and body (Fig. 1).
- \* After the disassembly and assembly have been completed, make sure that no leak occurs from the seal. Additionally, when restarting the valve, make sure that the valve operates correctly after checking the safety.





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Tube

size

Ø 1/8'

Ø 6

Ø 1/4"

Ø 8

Ø 10

Ø 12

Nvlon tube

44 or more

84 or more

89 or more

112 or more

140 or more

168 or more

Recommended

Piping

# **Marning**

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.

# **▲**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.

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.** 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**

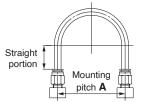
Connection thread	Proper tightening torque [N·m]	
Rc 1/8	7 to 9	
Rc 1/4	12 to 14	
Rc 3/8	22 to 24	
Rc 1/2	28 to 30	
Rc 3/4	20 10 30	
Rc 1	36 to 38	

- 4. When connecting piping to a product Avoid mistakes regarding the supply port etc.
- 5. If the regulator and solenoid valve are connected directly, chattering may occur as both of them generate vibration. Do not connect them.
- 6. If the effective area of piping on the fluid supply side is restricted, the operation may become unstable due to differential pressure fluctuation during valve operation. The piping on the fluid supply side should match the port size of the valve.

### **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.)



safety of the devices, select and install a fuse for each circuit.

use.

2. Do not apply AC voltage to Class "H" coil AC type unless it is built in full-wave rectifier, or the coil will be damaged.

**Recommended Piping Conditions** 

Soft nvlon tube Polvurethane tube

25 or more

39 or more

57 or more

52 or more

69 or more

88 or more

Unacceptable

Mounting pitch A

35 or more

66 or more

70 or more

88 or more

110 or more

132 or more

Fig. 2 Binding tubes with bands

Wiring

1. The solenoid valve is an electrical product. For safety,

install an appropriate fuse and circuit breaker before

When using multiple solenoid valves, it is not sufficient to merely install one fuse on the inlet side. In order to ensure the

Unit: mm

Straight

portion length

16 or more

30 or more

32 or more

40 or more

50 or more

60 or more

# **≜**Caution

**A**Warning

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  $\pm 10$  % 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.
- 4. When a surge from the solenoid affects the electrical circuitry, install a surge voltage suppressor etc., in parallel with the solenoid. Or, adopt an option that comes with the surge voltage protection circuit. (However, a surge voltage occurs even if the surge voltage protection circuit is used.

Fig. 1 Recommended piping configuration



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### **Operating Environment**

# **Marning**

- 1. Do not use in an atmosphere having corrosive gases, chemicals, sea water, water, water vapor, 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

# 

### 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.
- 2) Shut off the power supply.
- 3) Dismount 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.

# **A**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.

### 2. Lubrication

When using after lubricating, never forget to lubricate continuously. **3. Storage** 

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

4. Exhaust the drainage from the air filter periodically.

### **Operating Precautions**

# **A**Warning

- 1. If there is a possibility of reverse pressure being applied to the valve, take countermeasures such as mounting a check valve on the downstream side of the valve.
- 2. When problems are caused by a water hammer, install water hammer relief equipment (accumulator, etc.), or use an SMC water hammer relief valve (Series VXR). For details, please consult with SMC.

### **Operating Precautions**

# **Warning**

- 3. When the pilot type 2 port solenoid valve is closed, and pressure is applied suddenly due to the starting of fluid supply source such as pump and compressor, the valve may open momentarily and fluid may leak.
- 4.If the product is used in the conditions in which rapid decrease in the inlet pressure of the valve and rapid increase in the outlet pressure of the valve are repeated, excessive stress will be applied to the diaphragm, which causes the diaphragm to be damaged and dropped, leading to the operation failure of the valve. Check the operating conditions before use.

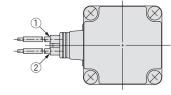
### **Electrical Connections**

# **▲**Caution

### Grommet

Class B coil: AWG20 Insulator O.D. 2.6 mm

Class H coil: AWG18 Insulator O.D. 2.1 mm

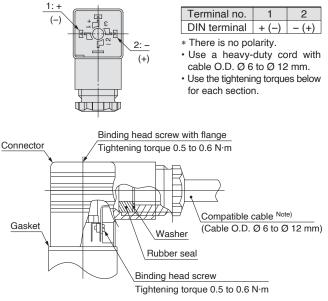


Rated	Lead wir	e colour
voltage	1	2
DC	Black	Red
100 VAC	Blue	Blue
200 VAC	Red	Red
Other AC	Grey	Grey

\* There is no polarity.

### DIN terminal

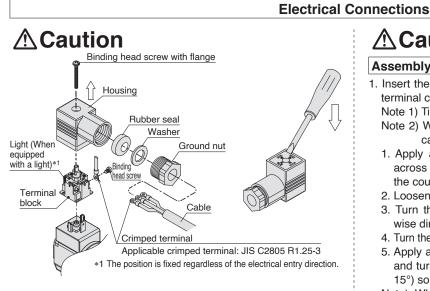
Since internal connections are shown below for the DIN terminal, make connections to the power supply accordingly.



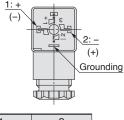
Note) For cable O.D. Ø 9 to Ø 12 mm, remove the internal parts of the rubber seal before using.



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Internal connections are as shown below. Make connections to the power supply accordingly.

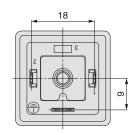


Terminal no.	1	2		
DIN terminal	+(-)	-(+)		
* Thoro is no polority				

There is no polarity

### DIN (EN175301-803) Terminal

This DIN terminal corresponds to the Form A DIN connector with an 18 mm terminal pitch, which complies with EN175301-803B.



### Conduit terminal

### Disassembly

1. Loosen the mounting screw, and remove the terminal cover from the conduit terminal.

### Wiring

- 1. Insert the cable into the conduit terminal.
- 2. Loosen the screw with UP terminal of the conduit terminal, then insert the core wire or the crimped terminal of the lead wire into the terminal, and securely fix it with the screw with UP terminal. Note 1) Tighten the screw to a torque of between 0.5 and 0.6 N·m.

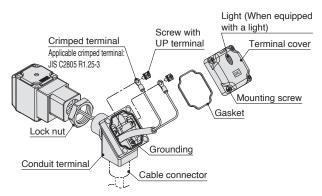
# ∧ Caution

### Assembly

1. Insert the gasket into the conduit terminal, and then clamp the terminal cover with the mounting screw.

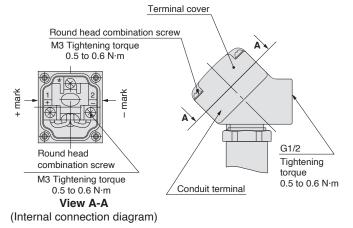
Note 1) Tighten the screw to a torque of between 0.5 and 0.6 N·m. Note 2) When changing the orientation of the conduit terminal, carry out the following procedure.

- 1. Apply a tool (monkey wrench, spanner, etc.) to the width across flats of the conduit terminal, and turn the terminal in the counterclockwise direction.
- 2. Loosen the lock nut.
- 3. Turn the conduit terminal in the clamping direction (clockwise direction) to about 15° ahead of the desired position.
- 4. Turn the lock nut by hand to the coil side until it is lightly tightened.
- 5. Apply a tool to the width across flats of the conduit terminal, and turn it to the desired position (through an angle of about 15°) so as to clamp the conduit terminal.
- Note) When changing the orientation by applying additional tightening force to the conduit terminal from the factory-set position, turn no more than one half a turn.



Make connections according to the marks shown below.

- · Use the tightening torgues below for each section.
- · Properly seal the terminal connection (G1/2) with the special wiring conduit etc.





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### **Electrical Connections**

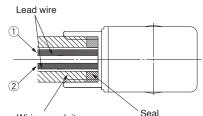
# **A** Caution

### Conduit

When used as an IP65 equivalent, use seal to install the wiring conduit. Also, use the tightening torque below for the conduit.

Class B coil: AWG20 Insulator O.D. 2.5 mm

Class H coil: AWG18 Insulator O.D. 2.1 mm



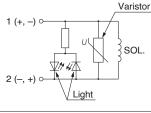
Wiring conduit Seal (Connection G1/2 Tightening torque 0.5 to 0.6 N·m)

Rated voltage	Lead wire color		Description	Part no.
naleu vollage	1	2	Seal	VCW20-15-6
DC	Black	Red	Note) Please	order separately.
100 VAC	Blue	Blue		
200 VAC	Red	Red		
Other AC	Gray	Gray		

\* There is no polarity.

# Electrical Circuits $\bigwedge$ Caution [DC circuit] Grommet, Flat terminal Grommet, DIN terminal, Conduit 1 (+, -) $\circ$ $1 (+, -) \circ$ $2 (-, +) \circ$ SOL. $2 (-, +) \circ$ $2 (-, +) \circ$ Without electrical option With surge voltage suppressor

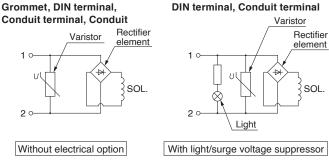
### DIN terminal, Conduit terminal



With light/surge voltage suppressor

### [AC circuit]

\* For AC, the standard product is equipped with surge voltage suppressor.



Note 1) Coil for DIN terminal H type with AC voltage does not have full-wave rectifier. Full-wave rectifier is built in the DIN connector. Refer to page 35 to order it as an accessory.

### **One-touch Fitting**

# 

For information on handling One-touch fittings and on appropriate tubing, refer to page 47 and the Fittings & Tubing section of the "Handling Precautions for SMC Products" on the SMC website.

### ▲ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC) <sup>1</sup>, and other safety regulations.

$\wedge$	Danger:	<b>Danger</b> indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.	1)   
$\wedge$	Warning:	<b>Warning</b> indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.	
$\wedge$	Caution:	<b>Caution</b> indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.	e

# ▲ Warning

- 1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications. Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.
- Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

- 3. Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.
  - 1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
  - 2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
  - 3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.
- 4. Our products cannot be used beyond their specifications. Our products are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not covered.
  - 1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
  - 2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogues and operation manuals.
  - 3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

 ) ISO 4414: Pneumatic fluid power – General rules and safety requirements for systems and their components.
 ISO 4413: Hydraulic fluid power – General rules and safety requirements for systems and their components.
 IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
 ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.

etc.

# ▲ Caution

We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing industries. Use in non-manufacturing industries is not covered. Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.

The new Measurement Act prohibits use of any unit other than SI units in Japan.

### Limited warranty and Disclaimer/Compliance Requirements

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

### Limited warranty and Disclaimer

- 1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.<sup>2)</sup> Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
- 2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
- Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.
- 2) Vacuum pads are excluded from this 1 year warranty. A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

### **Compliance Requirements**

- 1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
- The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

### **SMC Corporation (Europe)**

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+43 (0)2262622800 www.smc.at +32 (0)33551464 www.smc.be +359 (0)2807670 www.smc.bg +385 (0)13707288 www.smc.hr +420 541424611 www.smc.cz +45 70252900 www.smcdk.com +372 651 0370 www.smc.fi +33 (0)164761000 www.smc.fi +33 (0)164761000 www.smc.fance.fr +49 (0)61034020 www.smc.de +30 210 2717265 www.smc.hu +353 (0)14039000 www.smcatla.it +39 101401000 www.smc.hu

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