

Pilot Operated 2 Port Solenoid Valve New



Air



Water



Oil



Heated water High temperature oil
(99°C)



RoHS

Compact

Height

Approx. **7% Smaller***
(7 mm)
(VXD24)

* Comparison with SMC existing model

Lightweight

Weight

20% Lighter*
(90 g)
(VXD23 Resin body)

Options newly added!

Class H/24 VDC
Class H/DIN terminal
Seal material: EPDM

Process Valves

VX2

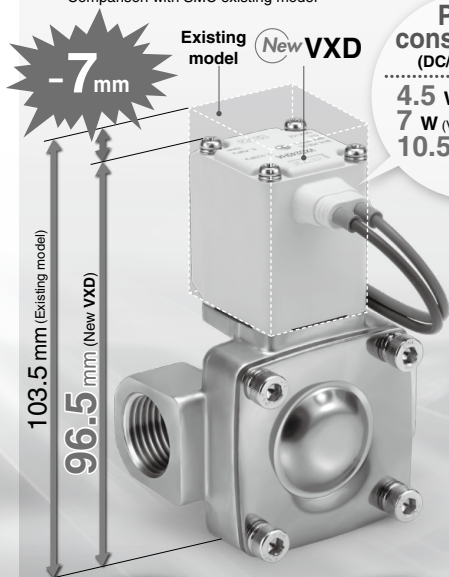
VXD

VXZ

VXS

VXF2

SX10



Power consumption (DC/N.C. valve)

4.5 W (VXD23 to 25)
7 W (VXD26, 27)
10.5 W (VXD28, 29)



Air

Body material

Resin (VXD2₃)

Aluminum (VXD2_{3A})

Bracket standard equipment

Applicable tubing O.D.
ø10, ø12/mm
ø3/8"/inch



Resin body

Aluminum body



Air



Water



Oil



Heated water



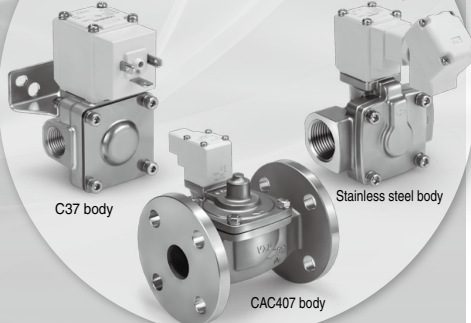
High temperature oil
(99°C)

Body material

C37, Stainless steel, CAC407

(VXD2₃ to 2₅)

(VXD2₇ to 2₉)



C37 body

Stainless steel body

CAC407 body

Solenoid coil type

Insulation type Class B/H



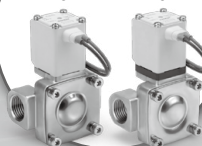
Class B

Class H

Valve type

N.C.

N.O.



Enclosure IP65*

* Electrical entry flat terminal type terminal is IP40.

Series VXD



Pilot Operated 2 Port Solenoid Valve

Series **VXD**



Air



Water



Oil



Heated water



High temperature oil

(99 °C)

(200 °C)

Enclosure

IP65

Flame resistance

UL94V-0 conformed

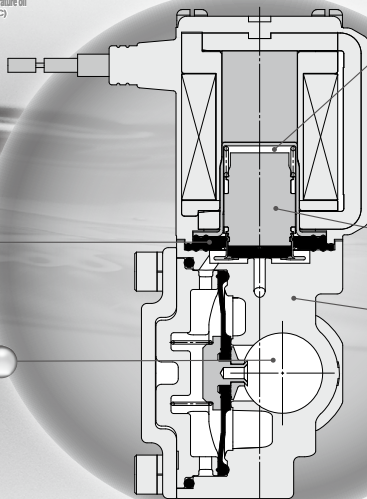
Flame resistant
mold coil material

Low-noise construction

Metal noise reduced
by the rubber bumper

Piping variations

Thread piping, One-touch fitting,
Flange piping



Clearance

By providing a bumper 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.

Power consumption

4.5 W (VXD23 to 25)

7 W (VXD26 to 27)

10.5 W (VXD28 to 29)

Improved armature durability

Body material

Air

Aluminum (VXD2_A³)

Resin (VXD2_A³)

C37, Stainless steel (VXD2_A³ to 2_B⁶)

CAC407 (VXD2_E⁷ to 2_B⁶)

Water/Oil/Heated water/ High temperature oil

C37, Stainless steel (VXD2_A³ to 2_B⁶)

CAC407 (VXD2_E⁷ to 2_B⁶)

Built-in full-wave rectifier type

(AC specification: Insulation type Class B/H)

Improved durability

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

Reduced buzz noise

Rectified to DC by the 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 VA → 9.5 VA (VXD26 to 27)

32 VA → 12 VA (VXD28 to 29)

Improved OFF response

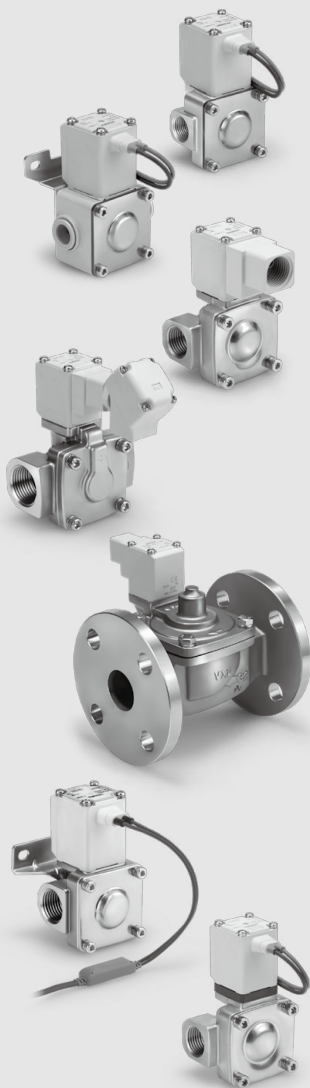
Specially constructed to improve the OFF response when operated with a higher viscosity fluid such as oil.

Low-noise construction

Specially constructed to reduce the metal noise during operation.



Model	Size	Orifice diameter	Body material	Port size										
				Thread					Flange			One-touch fitting		
				1/4	3/8	1/2	3/4	1	32A	40A	50A	ø10	ø3/8"	ø12
VXD2 _A ³	8A 10A 15A	10 mmø	Aluminum	●	●	●	—	—	—	—	—	—	—	—
			Resin	—	—	—	—	—	—	—	—	●	●	●
			C37	—	—	—	—	—	—	—	—	—	—	—
			Stainless steel	—	—	—	—	—	—	—	—	—	—	—
VXD2 _B ⁶	10A 15A	15 mmø	C37	—	●	●	—	—	—	—	—	—	—	
			Stainless steel	—	●	●	—	—	—	—	—	—	—	—
VXD2 _C ⁶	20A	20 mmø	C37	—	—	—	●	—	—	—	—	—	—	
			Stainless steel	—	—	—	●	—	—	—	—	—	—	—
VXD2 _D ⁶	25A	25 mmø	C37	—	—	—	—	●	—	—	—	—	—	
			Stainless steel	—	—	—	—	●	—	—	—	—	—	—
VXD2 _E ⁷	32A	35 mmø	CAC407	—	—	—	—	—	●	—	—	—	—	
VXD2 _F ⁷	40A	40 mmø		—	—	—	—	—	—	●	—	—	—	
VXD2 _G ⁷	50A	50 mmø		—	—	—	—	—	—	—	●	—	—	



Common Specifications	P. 651
Selection Steps	P. 652



For Air

Model/Valve Specifications, Fluid and Ambient Temperature, Valve Leakage Rate ..	P. 653, 654
How to Order	P. 655



For Water

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For Oil

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For Heated water

Model/Valve Specifications, Fluid and Ambient Temperature, Valve Leakage Rate	P. 662, 663
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For High temperature oil

Model/Valve Specifications, Fluid and Ambient Temperature, Valve Leakage Rate ..	P. 665, 666
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Other Special Options	P. 668
Construction	P. 671
Dimensions	

For Air/Water/Oil

Body material: Resin	P. 673
Body material: Aluminum, C37, Stainless steel ...	P. 675
Body material: C37, Stainless steel	P. 677
Body material: CAC407	P. 681

For Heated water/High temperature oil

Body material: C37, Stainless steel	P. 683
Body material: CAC407	P. 686

Replacement Parts	P. 687
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Solenoid Valve Flow-rate Characteristics	P. 689
Flow-rate Characteristics	P. 694
Specific Product Precautions	P. 696

Common Specifications

Standard Specifications

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

Note 1) Electrical entry flat terminal type terminal is IP40.

Note 2) Voltage in () indicates special voltage. (Refer to page 668.)

Note 3) For seal material/EPDM, refer to page 669.

⚠ Be sure to read “Specific Product Precautions” before handling.

Solenoid Coil Specifications

Normally Closed (N.C.)

DC Specification

Class B

Model	Power consumption (W) <small>Note 1)</small>	Temperature rise (°C) <small>Note 2)</small>
VXD23 to 25	4.5	50
VXD26, 27	7	55
VXD28, 29	10.5	65

Class H

Model	Power consumption (W) <small>Note 1)</small>	Temperature rise (°C) <small>Note 2)</small>
VXD23 to 25	9	100
VXD26, 27	12	100
VXD28, 29	15	100

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

Note 2) The value at ambient temperature of 20°C and when the rated voltage is applied. The value depends on the ambient environment.

This is for reference.

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

Class B

Model	Apparent power (VA) <small>Note 1) 2)</small>	Temperature rise (°C) <small>Note 3)</small>
VXD23 to 25	7	60
VXD26, 27	9.5	70
VXD28, 29	12	70

Class H

Model	Apparent power (VA) <small>Note 1) 2)</small>	Temperature rise (°C) <small>Note 3)</small>
VXD23 to 25	9	100
VXD26, 27	12	100
VXD28, 29	15	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.

Normally Open (N.O.)

DC Specification

Class B

Model	Power consumption (W) <small>Note 1)</small>	Temperature rise (°C) <small>Note 2)</small>
VXD2A to 2C	7.5	60
VXD2D, 2E	8.5	70
VXD2F, 2G	12.5	70

Class H

Model	Power consumption (W) <small>Note 1)</small>	Temperature rise (°C) <small>Note 2)</small>
VXD2A to 2C	9	100
VXD2D, 2E	12	100
VXD2F, 2G	15	100

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

Class B

Model	Apparent power (VA)	Temperature rise (°C)
VXD2A to 2C	9	60
VXD2D, 2E	10	70
VXD2F, 2G	14	70

Class H

Model	Apparent power (VA) <small>Note 1) 2)</small>	Temperature rise (°C) <small>Note 3)</small>
VXD2A to 2C	9	100
VXD2D, 2E	12	100
VXD2F, 2G	15	100

Series VXD

Selection Steps

Selection Steps

Step 1 Select the fluid.

Item	Selection item	Page	Symbol
Select the fluid.	Air	Page 653	0
	Water	Page 656	2
	Oil	Page 659	3
	Heated water	Page 662	5
	High temperature oil	Page 665	6

➔ VXD2 3 0 A A

①

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

Item	Selection item	Symbol
Select from "Flow rate — Pressure." • Body material • Port size • Orifice diameter	Size	8A
	Valve type	N.C.
	Body material	Aluminum
	Port size	1/4
	Orifice diameter	10

➔ VXD2 3 0 A A

② ③

Step 3 Select electrical specification.

Item	Selection item	Symbol
Select electrical specification.	Voltage	24 VDC
	Electrical entry	Grommet

➔ VXD2 3 0 A A

④

Step 4 For other special options, refer to page 668.

Process Valves

VX2

VXD

VXZ

VXS

VXF2

SX10

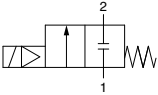


For Air

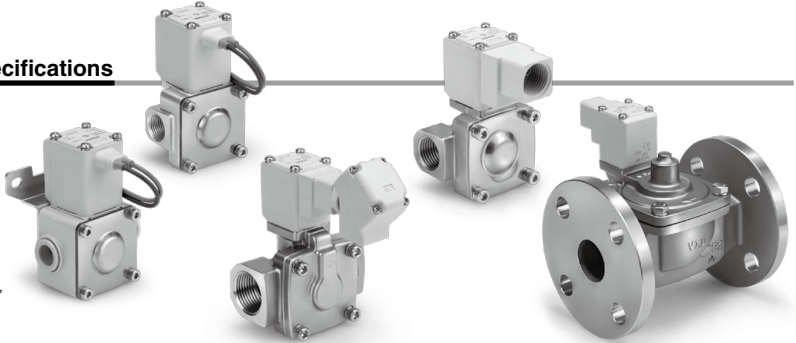
Model/Valve Specifications

N.C.

Symbol



Refer to "Glossary of Terms" on page 688 for symbol.



Normally Closed (N.C.)

Body material	Port size	Orifice diameter (mm)	Model	Min. operating pressure differential (Note 1) (MPa)	Max. operating pressure differential		Flow-rate characteristics				Max. system pressure (MPa)	Weight (g) <small>(Note 2)</small>					
					AC	DC	C	b	Cv	Effective area (mm ²)							
Aluminum	1/4 (8A)	10	VXD230	0.02	0.9	0.7	8.5	0.35	2.0	—	1.5	370					
	3/8 (10A)						9.2		2.4			370					
	1/2 (15A)						9.2		2.4			370					
Resin	ø10						15	VXD240				5.6	0.33	1.3	330		
	ø3/8"											4.8	0.33	0.9	330		
	ø12											7.2	0.33	1.5	330		
Stainless steel, C37	3/8 (10A)	15	VXD240		1.0	1.0	18.0	0.35	5.0			720					
	1/2 (15A)						20.0		5.5			720					
	3/4 (20A)						20	VXD250	38.0			0.30	9.5	840			
CAC407	1 (25A)	25	VXD260				—			225		1360					
	32A Flange	35	VXD270							415		5400					
	40A Flange	40	VXD280							560		6800					
	50A Flange	50	VXD290							880		8400					

Note 1) Be aware that even if the pressure differential is above the minimum operating pressure differential when the valve is closed, the pressure differential 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 688 for details on the minimum operating pressure differential, 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 Rate

Internal Leakage

Seal material	Leakage rate (Air) ^{Note 1)}	
	VXD23 to 26 (8A to 25A)	VXD27 to 29 (32A to 50A)
NBR (FKM) ^{Note 2)}	15 cm ³ /min or less (Aluminum body type) 15 cm ³ /min or less (Resin body type) 2 cm ³ /min or less (Metal body type)	10 cm ³ /min or less

External Leakage

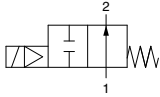
Seal material	Leakage rate (Air) ^{Note 1)}	
	VXD23 to 26 (8A to 25A)	VXD27 to 29 (32A to 50A)
NBR (FKM) ^{Note 2)}	15 cm ³ /min or less (Aluminum body type) 15 cm ³ /min or less (Resin body type) 1 cm ³ /min or less (Metal body type)	1 cm ³ /min or less

Note 1) Leakage is the value at ambient temperature 20°C.

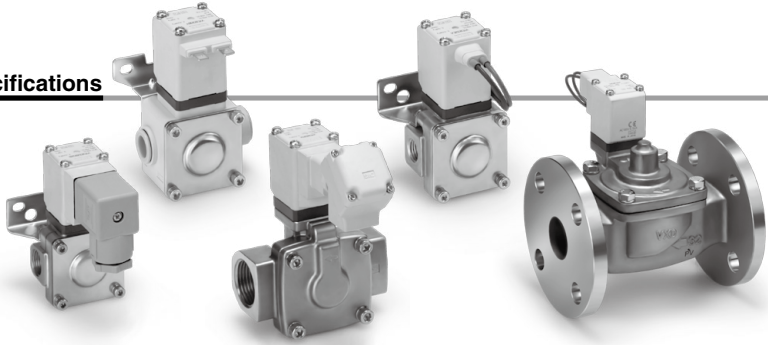
Note 2) For seal material/FKM, refer to "Other options" on page 668 for the selection.



Model/Valve Specifications

N.O.
Symbol


Refer to "Glossary of Terms" on page 688 for symbol.



Normally Open (N.O.)

Body material	Port size	Orifice diameter (mm)	Model	Min. operating pressure differential ^{Note 1)} (MPa)	Max. operating pressure differential		Flow-rate characteristics				Max. system pressure (MPa)	Weight ^{Note 2)} (g)
					AC	DC	C	b	Cv	Effective area (mm ²)		
Aluminum	1/4 (8A)	10	VXD2A0	0.02	0.6	0.4	8.5	0.35	2.0	—	1.5	390
	3/8 (10A)						9.2		2.4			390
	1/2 (15A)						9.2		2.4			390
	ø10						5.6	1.3	350			
Resin	ø3/8"	4.8	0.9				350					
	ø12	7.2	1.5				350					
	3/8 (10A)	15	VXD2B0		18.0	0.35	5.0	740				
1/2 (15A)	20.0				5.5		740					
3/4 (20A)	20				VXD2C0		38.0	0.30	9.5			860
Stainless steel, C37	1 (25A)	25	VXD2D0		0.7	0.7						225
	32A Flange	35	VXD2E0					415	5430			
CAC407	40A Flange	40	VXD2F0	0.03					560	6840		
	50A Flange	50	VXD2G0						880	8440		

Note 1) Be aware that even if the pressure differential is above the minimum operating pressure differential when the valve is closed, the pressure differential 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 688 for details on the minimum operating pressure differential, 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 Rate

Internal Leakage

Seal material	Leakage rate (Air) ^{Note 1)}	
	VXD2A to 2D (8A to 25A)	VXD2E to 2G (32A to 50A)
NBR (FKM) ^{Note 2)}	15 cm ³ /min or less (Aluminum body type) 15 cm ³ /min or less (Resin body type) 2 cm ³ /min or less (Metal body type)	10 cm ³ /min or less

External Leakage

Seal material	Leakage rate (Air) ^{Note 1)}	
	VXD2A to 2D (8A to 25A)	VXD2E to 2G (32A to 50A)
NBR (FKM) ^{Note 2)}	15 cm ³ /min or less (Aluminum body type) 15 cm ³ /min or less (Resin body type) 1 cm ³ /min or less (Metal body type)	1 cm ³ /min or less

Note 1) Leakage is the value at ambient temperature 20°C.

Note 2) For seal material/FKM, refer to "Other options" on page 668 for the selection.

How to Order



VXD2 3 0 A A

Fluid

0 For Air

Size—Valve type

Symbol	Size	Valve type	Symbol	Body material	Port size	Orifice diameter
3	8A 10A 15A	N.C.	A	Aluminum	1/4	10
			B		3/8	
			C		1/2	
			D		ø10 One-touch fitting	
A	N.O.	N.O.	E	Resin	ø3/8" One-touch fitting	10
			F		ø12 One-touch fitting	
4	10A 15A	N.C.	G	C37	3/8	15
			H		1/2	
			J		3/8	
			K		1/2	
B	N.O.	N.O.	L	C37	3/4	20
			M			
5	20A	N.C.	N	C37	1	25
			C			
6	25A	N.C.	P	Stainless steel	32A Flange	35
			D			
7	32A	N.C.	Q	CAC407	40A Flange	40
			E			
8	40A	N.C.	R	CAC407	50A Flange	50
			F			
9	50A	N.C.	S	CAC407		
			G			

Body material/Port size/Orifice diameter

Common Specifications

Seal material	NBR
Coil insulation type	Class B
Thread type	Rc*

* When the body is resin, one-touch fittings are supplied. For body size 32A or more, the ports will be the flange type.

Voltage/Electrical entry

Symbol	Voltage	Electrical entry
A	24 VDC	Grommet
B	100 VAC	Grommet
		(With surge voltage suppressor)
C	110 VAC	Grommet
		(With surge voltage suppressor)
D	200 VAC	Grommet
		(With surge voltage suppressor)
E	230 VAC	Grommet
		(With surge voltage suppressor)
F	24 VDC	DIN terminal
		(With surge voltage suppressor)
G	24 VDC	DIN terminal
		(With surge voltage suppressor)
H	100 VAC	DIN terminal
		(With surge voltage suppressor)
J	110 VAC	DIN terminal
		(With surge voltage suppressor)
K	200 VAC	DIN terminal
		(With surge voltage suppressor)
L	230 VAC	DIN terminal
		(With surge voltage suppressor)
M	24 VDC	Conduit terminal
		(With surge voltage suppressor)
N	100 VAC	Conduit terminal
		(With surge voltage suppressor)
P	110 VAC	Conduit terminal
		(With surge voltage suppressor)
Q	200 VAC	Conduit terminal
		(With surge voltage suppressor)
R	230 VAC	Conduit terminal
		(With surge voltage suppressor)
S	24 VDC	Conduit
		(With surge voltage suppressor)
T	100 VAC	Conduit
		(With surge voltage suppressor)
U	110 VAC	Conduit
		(With surge voltage suppressor)
V	200 VAC	Conduit
		(With surge voltage suppressor)
W	230 VAC	Conduit
		(With surge voltage suppressor)
Y	24 VDC	Flat terminal
Z	Other special options	

For other special options, refer to page 668.

Special voltage	24 VAC
	48 VAC
	220 VAC
	240 VAC
	12 VDC
DIN terminal with light	
Conduit terminal with light	
Without DIN connector	
Low concentration ozone resistant (Seal material: FKM)	
Seal material: EPDM	
Oil-free	
G thread	
NPT thread	
With bracket	
Special electrical entry direction	



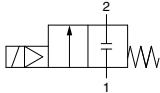
For Water

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

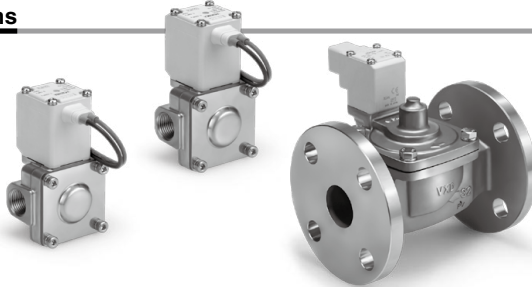
Model/Valve Specifications

N.C.

Symbol



Refer to "Glossary of Terms" on page 688 for symbol.



Normally Closed (N.C.)

Body material	Port size	Orifice diameter (mm)	Model	Min. operating pressure differential ^{Note 1)} (MPa)	Max. operating pressure differential		Flow-rate characteristics		Max. system pressure (MPa)	Weight (g) ^{Note 2)}
					AC	DC	Av (x 10 ⁻⁶ m²)	Conversion Cv		
Stainless steel, C37	1/4 (8A)	10	VXD232	0.02	0.7	0.5	46	1.9	1.5	480
	3/8 (10A)						58	2.4		480
	1/2 (15A)						58	2.4		480
	3/8 (10A)	15	VXD242		110	4.5	720			
	1/2 (15A)				130	5.5	720			
	3/4 (20A)				230	9.5	840			
CAC407	1 (25A)	25	VXD262		1.0	1.0	310	13		1360
	32A Flange	35	VXD272	550			23	5400		
	40A Flange	40	VXD282	740			31	6800		
	50A Flange	50	VXD292	1200			49	8400		

Note 1) Be aware that even if the pressure differential is above the minimum operating pressure differential when the valve is closed, the pressure differential 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 688 for details on the minimum operating pressure differential, 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 Rate

Internal Leakage

Seal material	Leakage rate (Water) ^{Note 1)}	
	VXD23 to 26 (8A to 25A)	VXD27 to 29 (32A to 50A)
NBR (FKM) ^{Note 2)}	0.2 cm ³ /min or less	1 cm ³ /min or less

External Leakage

Seal material	Leakage rate (Water) ^{Note 1)}	
	VXD23 to 26 (8A to 25A)	VXD27 to 29 (32A to 50A)
NBR (FKM) ^{Note 2)}	0.1 cm ³ /min or less	0.1 cm ³ /min or less

Note 1) Leakage is the value at ambient temperature 20°C.

Note 2) For seal material/FKM, refer to "Other options" on page 668 for the selection.

Process Valves

VX2

VXD

VXZ

VXS

VXF2

SX10

INDEX

Series VXD

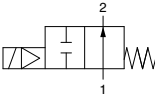


For Water

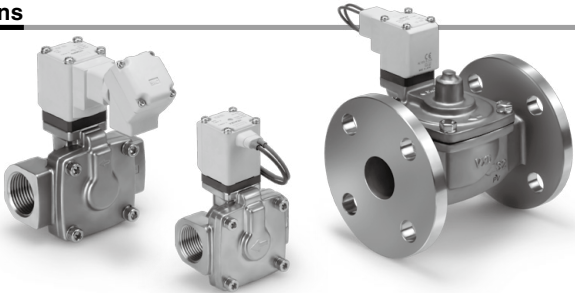
Model/Valve Specifications

N.O.

Symbol



Refer to "Glossary of Terms" on page 688 for symbol.



Normally Open (N.O.)

Body material	Port size	Orifice diameter (mm)	Model	Min. operating pressure differential ^{Note 1)} (MPa)	Max. operating pressure differential		Flow-rate characteristics		Max. system pressure (MPa)	Weight (g)
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv		
Stainless steel, C37	1/4 (8A)	10	VXD2A2	0.02	0.4	0.3	46	1.9	1.5	500
	3/8 (10A)						58	2.4		500
	1/2 (15A)						58	2.4		500
	3/8 (10A)	15	VXD2B2		110	4.5	740			
	1/2 (15A)				130	5.5	740			
	3/4 (20A)				230	9.5	860			
	1 (25A)	25	VXD2D2		0.7	0.7	310	13		1390
	32A Flange	35	VXD2E2				550	23		5430
40A Flange	40	VXD2F2	740	31			6840			
CAC407	50A Flange	50	VXD2G2	0.03			1200	49	8440	

Note 1) Be aware that even if the pressure differential is above the minimum operating pressure differential when the valve is closed, the pressure differential 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 688 for details on the minimum operating pressure differential, 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 Rate

Internal Leakage

Seal material	Leakage rate (Water) ^{Note 1)}	
	VXD2A to 2D (8A to 25A)	VXD2E to 2G (32A to 50A)
NBR (FKM) ^{Note 2)}	0.2 cm ³ /min or less	1 cm ³ /min or less

External Leakage

Seal material	Leakage rate (Water) ^{Note 1)}	
	VXD2A to 2D (8A to 25A)	VXD2E to 2G (32A to 50A)
NBR (FKM) ^{Note 2)}	0.1 cm ³ /min or less	0.1 cm ³ /min or less

Note 1) Leakage is the value at ambient temperature 20°C.

Note 2) For seal material/FKM, refer to "Other options" on page 688 for the selection.



How to Order

VXD2 3 2 A A

Size—Valve type			Body material/Port size/Orifice diameter			
Symbol	Size	Valve type	Symbol	Body material	Port size	Orifice diameter
3	8A 10A 15A	N.C.	A	C37	1/4	10
			B		3/8	
			C		1/2	
			D		1/4	
A		N.O.	E	Stainless steel	3/8	
			F		1/2	
4	10A 15A	N.C.	G	C37	3/8	15
			H		1/2	
B		N.O.	J	Stainless steel	3/8	
			K		1/2	
5	20A	N.C.	L	C37	3/4	20
C		N.O.	M	Stainless steel		
6	25A	N.C.	N	C37	1	25
D		N.O.	P	Stainless steel		
7	32A	N.C.	Q	CAC407	32A Flange	35
E		N.O.				
8	40A	N.C.	R	CAC407	40A Flange	40
F		N.O.				
9	50A	N.C.	S	CAC407	50A Flange	50
G		N.O.				

Common Specifications

Seal material	NBR
Coil insulation type	Class B
Thread type	Rc*

* For body size 32A or more, the ports will be the flange type.

Voltage/Electrical entry

Symbol	Voltage	Electrical entry
A	24 VDC	Grommet
B	100 VAC	Grommet (With surge voltage suppressor)
C	110 VAC	
D	200 VAC	
E	230 VAC	
F	24 VDC	DIN terminal (With surge voltage suppressor)
G	24 VDC	
H	100 VAC	
J	110 VAC	
K	200 VAC	Conduit terminal (With surge voltage suppressor)
L	230 VAC	
M	24 VDC	
N	100 VAC	
P	110 VAC	Conduit (With surge voltage suppressor)
Q	200 VAC	
R	230 VAC	
S	24 VDC	
T	100 VAC	Flat terminal
U	110 VAC	
V	200 VAC	
W	230 VAC	
Y	24 VDC	
Z	Other voltages and electrical option	

For other special options, refer to page 668.

Special voltage	24 VAC
	48 VAC
	220 VAC
	240 VAC
	12 VDC
DIN terminal with light	
Conduit terminal with light	
Without DIN connector	
Applicable to deionized water (Seal material: FKM)	
Seal material: EPDM	
Oil-free	
G thread	
NPT thread	
With bracket	
Special electrical entry direction	



For Oil

* 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.

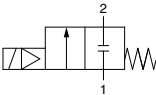
⚠ When the fluid is oil.

The kinematic viscosity must not exceed 50 mm²/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.

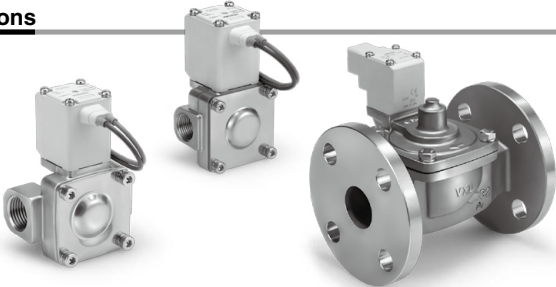
Model/Valve Specifications

N.C.

Symbol



Refer to "Glossary of Terms" on page 688 for symbol.



Normally Closed (N.C.)

Body material	Port size	Orifice diameter (mm)	Model	Min. operating pressure differential ^{Note 1)} (MPa)	Max. operating pressure differential		Flow-rate characteristics		Max. system pressure (MPa)	Weight ^{Note 2)} (g)	
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv			
Stainless steel, C37	1/4 (8A)	10	VXD233	0.02	0.5	0.4	46	1.9	1.5	480	
	3/8 (10A)						58	2.4		480	
	1/2 (15A)						58	2.4		480	
	3/8 (10A)	15	VXD243		0.7	0.7	110	4.5		720	
	1/2 (15A)						130	5.5		720	
	3/4 (20A)						230	9.5		840	
1 (25A)	25	VXD263	310				13	1360			
CAC407	32A Flange	35	VXD273				550	23		5400	
	40A Flange	40	VXD283				740	31		6800	
	50A Flange	50	VXD293				1200	49		8400	

Note 1) Be aware that even if the pressure differential is above the minimum operating pressure differential when the valve is closed, the pressure differential 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 688 for details on the minimum operating pressure differential, maximum operating pressure differential, maximum system pressure.

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
-5 ^{Note)} to 60	-20 to 60

Note) Kinematic viscosity: 50 mm²/s or less

Valve Leakage Rate

Internal Leakage

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

External Leakage

Seal material	Leakage rate (Oil) ^{Note)}	
	VXD23 to 26 (8A to 25A)	VXD27 to 29 (32A to 50A)
FKM	0.1 cm ³ /min or less	0.1 cm ³ /min or less

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



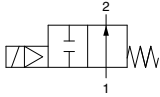
⚠ When the fluid is oil.

The kinematic viscosity must not exceed 50 mm²/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.

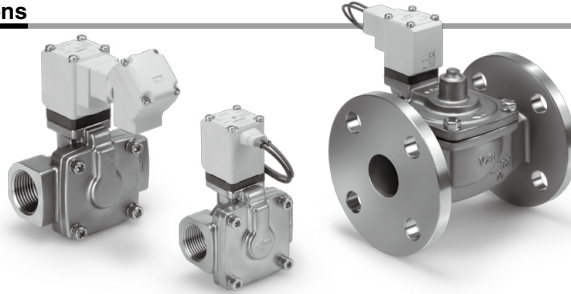
Model/Valve Specifications

N.O.

Symbol



Refer to "Glossary of Terms" on page 688 for symbol.



Normally Open (N.O.)

Body material	Port size	Orifice diameter (mm)	Model	Min. operating pressure differential ^{Note 1)} (MPa)	Max. operating pressure differential		Flow-rate characteristics		Max. system pressure (MPa)	Weight ^{Note 2)} (g)	
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv			
Stainless steel, C37	1/4 (8A)	10	VXD2A3	0.02	0.4	0.3	46	1.9	1.5	500	
	3/8 (10A)						58	2.4		500	
	1/2 (15A)						58	2.4		500	
	3/8 (10A)	15	VXD2B3		110	4.5	740				
	1/2 (15A)				130	5.5	740				
	3/4 (20A)				230	9.5	860				
	25	VXD2D3	0.6		0.6	310	13	1390			
CAC407	32A Flange	35		VXD2E3		0.03		550		23	5430
	40A Flange	40		VXD2F3				740		31	6840
	50A Flange	50	VXD2G3	1200	49			8440			

Note 1) Be aware that even if the pressure differential is above the minimum operating pressure differential when the valve is closed, the pressure differential 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 688 for details on the minimum operating pressure differential, maximum operating pressure differential, maximum system pressure.

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
-5 ^{Note)} to 60	-20 to 60

Note) Kinematic viscosity: 50 mm²/s or less

Valve Leakage Rate

Internal Leakage

Seal material	Leakage rate (Oil) ^{Note)}	
	VXD2A to 2D (8A to 25A)	VXD2E to 2G (32A to 50A)
FKM	0.2 cm ³ /min or less	1 cm ³ /min or less

External Leakage

Seal material	Leakage rate (Oil) ^{Note)}	
	VXD2A to 2D (8A to 25A)	VXD2E to 2G (32A to 50A)
FKM	0.1 cm ³ /min or less	0.1 cm ³ /min or less

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

Process Valves

VX2

VXD

VXZ

VXS

VXF2

SX10



How to Order



VXD2 **3** **3** **A** **A**

Fluid

3 For Oil

Size—Valve type

Symbol	Size	Valve type	Symbol	Body material	Port size	Orifice diameter
3	8A 10A 15A	N.C.	A	C37	1/4	10
			B		3/8	
			C		1/2	
			D		1/4	
A	15A	N.O.	E	Stainless steel	3/8	10
			F		1/2	
4	10A 15A	N.C.	G	C37	3/8	15
			H		1/2	
			J		3/8	
			K		1/2	
5	20A	N.C.	L	C37	3/4	20
			M			
6	25A	N.C.	N	C37	1	25
			P			
7	32A	N.C.	Q	CAC407	32A Flange	35
			R			
8	40A	N.C.	S	CAC407	40A Flange	40
			T			
9	50A	N.C.	U	CAC407	50A Flange	50
			V			

Common Specifications

Seal material	FKM
Coil insulation type	Class B
Thread type	Rc*

* For body size 32A or more, the ports will be the flange type.

Voltage/Electrical entry

Symbol	Voltage	Electrical entry
A	24 VDC	Grommet
		B 100 VAC
		C 110 VAC
D	230 VAC	Grommet (With surge voltage suppressor)
		E 230 VAC
		F 24 VDC
G	24 VDC	DIN terminal (With surge voltage suppressor)
		H 100 VAC
		J 110 VAC
K	230 VAC	Conduit terminal (With surge voltage suppressor)
		L 200 VAC
		M 24 VDC
N	24 VDC	Conduit (With surge voltage suppressor)
		O 100 VAC
		P 110 VAC
Q	230 VAC	Flat terminal
		R 200 VAC
		S 24 VDC
T	24 VDC	Other voltages and electrical option
		U 100 VAC
		V 110 VAC
		W 230 VAC
Y	24 VDC	
Z		Other voltages and electrical option

For other special options, refer to page 668.

Special voltage	24 VAC
	48 VAC
	220 VAC
	240 VAC
	12 VDC
DIN terminal with light	
Conduit terminal with light	
Without DIN connector	
Oil-free	
G thread	
NPT thread	
With bracket	
Special electrical entry direction	



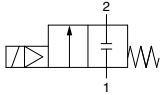
For Heated water

* 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.

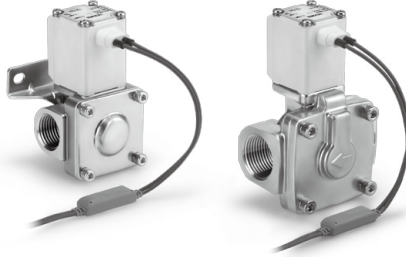
Model/Valve Specifications

N.C.

Symbol



Refer to "Glossary of Terms" on page 688 for symbol.



Normally Closed (N.C.)

Body material	Port size	Orifice diameter (mm)	Model	Min. operating pressure differential ^{Note 1)} (MPa)	Max. operating pressure differential		Flow-rate characteristics		Max. system pressure (MPa)	Weight (g) ^{Note 2)}	
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv			
Stainless steel, C37	1/4 (8A)	10	VXD235	0.02	0.7	0.5	46	1.9	1.5	480	
	3/8 (10A)						58	2.4		480	
	1/2 (15A)						58	2.4		480	
	3/8 (10A)	15	VXD245		110	4.5	720				
	1/2 (15A)				130	5.5	720				
	3/4 (20A)				230	9.5	840				
1 (25A)	25	VXD265	310		13	1360					
CAC407	32A Flange	35	VXD275		0.03			550		23	5400
	40A Flange	40	VXD285			740	31	6800			
	50A Flange	50	VXD295	1200		49	8400				

Note 1) Be aware that even if the pressure differential is above the minimum operating pressure differential when the valve is closed, the pressure differential 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 688 for details on the minimum operating pressure differential, 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 Rate

Internal Leakage

Seal material	Leakage rate (Water) ^{Note)}	
	VXD23 to 26 (8A to 25A)	VXD27 to 29 (32A to 50A)
EPDM	0.2 cm ³ /min or less	1 cm ³ /min or less

External Leakage

Seal material	Leakage rate (Water) ^{Note)}	
	VXD23 to 26 (8A to 25A)	VXD27 to 29 (32A to 50A)
EPDM	0.1 cm ³ /min or less	0.1 cm ³ /min or less

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

Process Valves

VX2

VXD

VXZ

VXS

VXF2

SX10

INDEX

Series VXD

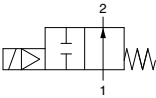


For Heated water

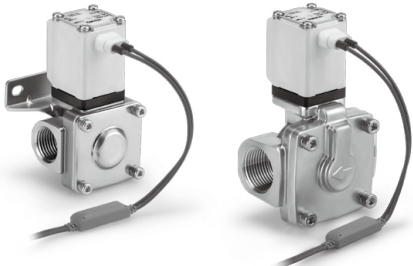
Model/Valve Specifications

N.O.

Symbol



Refer to "Glossary of Terms" on page 688 for symbol.



Normally Open (N.O.)

Body material	Port size	Orifice diameter (mm)	Model	Min. operating pressure differential ^{Note 1)} (MPa)	Max. operating pressure differential		Flow-rate characteristics		Max. system pressure (MPa)	Weight (g) ^{Note 2)}	
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv			
Stainless steel, C37	1/4 (8A)	10	VXD2A5	0.02	0.4	0.3	46	1.9	1.5	500	
	3/8 (10A)						58	2.4		500	
	1/2 (15A)						58	2.4		500	
	3/8 (10A)	15	VXD2B5		110	4.5	740				
	1/2 (15A)				130	5.5	740				
	3/4 (20A)				230	9.5	860				
CAC407	1 (25A)	25	VXD2D5				310	13		1390	
	32A Flange						550	23		5430	
	40A Flange	40	VXD2F5	0.03			740	31		6840	
	50A Flange	50	VXD2G5				1200	49		8440	

Note 1) Be aware that even if the pressure differential is above the minimum operating pressure differential when the valve is closed, the pressure differential 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 688 for details on the minimum operating pressure differential, 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 Rate

Internal Leakage

Seal material	Leakage rate (Water) ^{Note)}	
	VXD2A to 2D (8A to 25A)	VXD2E to 2G (32A to 50A)
EPDM	0.2 cm ³ /min or less	1 cm ³ /min or less

External Leakage

Seal material	Leakage rate (Water) ^{Note)}	
	VXD2A to 2D (8A to 25A)	VXD2E to 2G (32A to 50A)
EPDM	0.1 cm ³ /min or less	0.1 cm ³ /min or less

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



For Heated water



RoHS

How to Order

VXD2 **3** **5** **A** **B**

Fluid

5 For Heated water

Size—Valve type

Symbol	Size	Valve type
3	8A 10A 15A	N.C.
A		N.O.

Body material/Port size/Orifice diameter

Symbol	Body material	Port size	Orifice diameter
A	C37	1/4	10
B		3/8	
C		1/2	
D		1/4	
E	Stainless steel	3/8	10
F		1/2	

4	10A 15A	N.C.
B		N.O.

G	C37	3/8	15
H	Stainless steel	1/2	
J		3/8	
K		1/2	

5	20A	N.C.
C		N.O.

L	C37	3/4	20
M	Stainless steel		

6	25A	N.C.
D		N.O.

N	C37	1	25
P	Stainless steel		

7	32A	N.C.
E		N.O.

Q	CAC407	32A Flange	35
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8	40A	N.C.
F		N.O.

R	CAC407	40A Flange	40
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9	50A	N.C.
G		N.O.


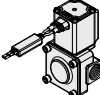
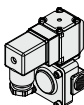
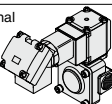
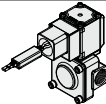
S	CAC407	50A Flange	50
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Common Specifications

Seal material	EPDM
Coil insulation type	Class H
Thread type	Rc*

* For body size 32A or more, the ports will be the flange type.

Voltage/Electrical entry

Symbol	Voltage	Electrical entry
A	24 VDC	Grommet 
B	100 VAC	Grommet (With surge voltage suppressor) 
C	110 VAC	
D	200 VAC	
E	230 VAC	
G	24 VDC	DIN terminal (With surge voltage suppressor Note 1) 2) 
H	100 VAC	
J	110 VAC	
K	200 VAC	
L	230 VAC	Conduit terminal (With surge voltage suppressor) 
N	100 VAC	
P	110 VAC	
Q	200 VAC	
R	230 VAC	Conduit (With surge voltage suppressor) 
T	100 VAC	
U	110 VAC	
V	200 VAC	
W	230 VAC	Other voltages
Z		

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 687 to order it as an accessory.

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

Note 3) Flat terminal is not available.

For other special options, refer to page 668.

Special voltage	24 VAC
	48 VAC
	220 VAC
	240 VAC
Conduit terminal with light	
Seal material: EPDM	
Oil-free	
G thread	
NPT thread	
With bracket	
Special electrical entry direction	

Process Valves

VX2

VXD

VXZ

VXS

VXF2

SX10



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.

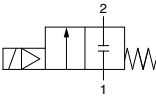
⚠ When the fluid is oil.

The kinematic viscosity must not exceed 50 mm²/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.

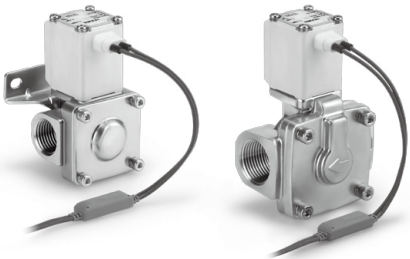
Model/Valve Specifications

N.C.

Symbol



Refer to "Glossary of Terms" on page 688 for symbol.



Normally Closed (N.C.)

Body material	Port size	Orifice diameter (mm)	Model	Min. operating pressure differential ^{Note 1)} (MPa)	Max. operating pressure differential		Flow-rate characteristics		Max. system pressure (MPa)	Weight (g) ^{Note 2)}
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv		
Stainless steel, C37	1/4 (8A)	10	VXD236	0.02	0.5	0.4	46	1.9	1.5	480
	3/8 (10A)						58	2.4		480
	1/2 (15A)						58	2.4		480
	3/8 (10A)	15	VXD246		0.7	0.7	110	4.5		720
	1/2 (15A)						130	5.5		720
	3/4 (20A)						230	9.5		840
1 (25A)	25	VXD266	310				13	1360		
CAC407	32A Flange	35	VXD276				550	23		5400
	40A Flange	40	VXD286				740	31		6800
	50A Flange	50	VXD296				1200	49		8400

Note 1) Be aware that even if the pressure differential is above the minimum operating pressure differential when the valve is closed, the pressure differential 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 688 for details on the minimum operating pressure differential, maximum operating pressure differential, maximum system pressure.

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
-5 ^{Note)} to 100	-20 to 60

Note) Kinematic viscosity: 50 mm²/s or less

Valve Leakage Rate

Internal Leakage

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

External Leakage

Seal material	Leakage rate (Oil) ^{Note)}	
	VXD23 to 26 (8A to 25A)	VXD27 to 29 (32A to 50A)
FKM	0.1 cm ³ /min or less	0.1 cm ³ /min or less

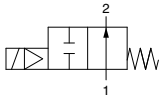
Note) Leakage is the value at ambient temperature 20°C.


For High temperature oil

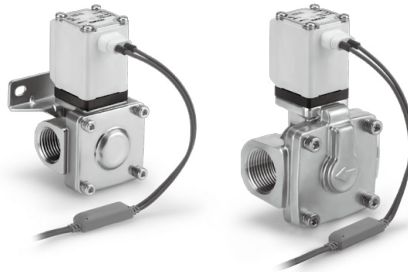
⚠ When the fluid is oil.

The kinematic viscosity must not exceed 50 mm²/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

N.O.
Symbol


Refer to "Glossary of Terms" on page 688 for symbol.



Normally Open (N.O.)

Body material	Port size	Orifice diameter (mm)	Model	Min. operating pressure differential ^(Note 1) (MPa)	Max. operating pressure differential		Flow-rate characteristics		Max. system pressure (MPa)	Weight ^(Note 2) (g)
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv		
Stainless steel, C37	1/4 (8A)	10	VXD2A6	0.02	0.4	0.3	46	1.9	1.5	500
	3/8 (10A)						58	2.4		500
	1/2 (15A)						58	2.4		500
	3/8 (10A)	15	VXD2B6		110	4.5	740			
	1/2 (15A)				130	5.5	740			
	3/4 (20A)				230	9.5	860			
CAC407	1 (25A)	25	VXD2D6	0.03	0.6	0.6	310	13	1390	
	32A Flange	35	VXD2E6				550	23	5430	
	40A Flange	40	VXD2F6				740	31	6840	
	50A Flange	50	VXD2G6				1200	49	8440	

Note 1) Be aware that even if the pressure differential is above the minimum operating pressure differential when the valve is closed, the pressure differential 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 688 for details on the minimum operating pressure differential, maximum operating pressure differential, maximum system pressure.

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
-5 ^{Note)} to 100	-20 to 60

Note) Kinematic viscosity: 50 mm²/s or less

Valve Leakage Rate

Internal Leakage

Seal material	Leakage rate (Oil) ^{Note)}	
	VXD2A to 2D (8A to 25A)	VXD2E to 2G (32A to 50A)
FKM	0.2 cm ³ /min or less	1 cm ³ /min or less

External Leakage

Seal material	Leakage rate (Oil) ^{Note)}	
	VXD2A to 2D (8A to 25A)	VXD2E to 2G (32A to 50A)
FKM	0.1 cm ³ /min or less	0.1 cm ³ /min or less

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

Process Valves

VX2
VXD
VXZ
VXS
VXF2
SX10

INDEX



How to Order



VXD2 **3** **6** **A** **B**

Fluid

6 For High temperature oil

Size—Valve type

Symbol	Size	Valve type	Symbol	Body material	Port size	Orifice diameter
3	8A 10A 15A	N.C.	A	C37	1/4	10
			B		3/8	
			C		1/2	
			D		1/4	
A	15A	N.O.	E	Stainless steel	3/8	10
			F		1/2	
4	10A 15A	N.C.	G	C37	3/8	15
			H		1/2	
			J		3/8	
			K		1/2	
5	20A	N.C.	L	C37	3/4	20
			M			
6	25A	N.C.	N	C37	1	25
			P			
7	32A	N.C.	Q	CAC407	32A Flange	35
			R			
8	40A	N.C.	S	CAC407	40A Flange	40
			T			
9	50A	N.C.	U	CAC407	50A Flange	50
			V			
G	50A	N.O.	W	CAC407	50A Flange	50

Body material/Port size/Orifice diameter

Voltage/Electrical entry

Symbol	Voltage	Electrical entry
A	24 VDC	Grommet
		Grommet
B	100 VAC	Grommet
C	110 VAC	(With surge voltage suppressor)
D	200 VAC	
E	230 VAC	
G	24 VDC	DIN terminal
H	100 VAC	(With surge voltage suppressor Note 1) 2)
J	110 VAC	
K	200 VAC	
L	230 VAC	
N	100 VAC	Conduit terminal
P	110 VAC	(With surge voltage suppressor)
Q	200 VAC	
R	230 VAC	
T	100 VAC	Conduit
U	110 VAC	(With surge voltage suppressor)
V	200 VAC	
W	230 VAC	
Z		Other voltages

Common Specifications

Seal material	FKM
Coil insulation type	Class H
Thread type	Rc*

* For body size 32A or more, the ports will be the flange type.

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 687 to order it as an accessory.

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

Note 3) Flat terminal is not available.

For other special options, refer to page 668.

Special voltage	24 VAC
	48 VAC
	220 VAC
	240 VAC
Conduit terminal with light	
Oil-free	
G thread	
NPT thread	
With bracket	
Special electrical entry direction	

Other Special Options

Electrical Options

(Special voltage, With light, Without DIN connector)

VXD2 3 0 A Z 1A

Enter standard product number.

Electrical option

Electrical specification/Voltage/Electrical entry

Specification	Symbol	Class H*	Voltage	Electrical entry
Special voltage	1A	●	48 VAC	Grommet (With surge voltage suppressor)
	1B	●	220 VAC	
	1C	●	240 VAC	
	1U	●	24 VAC	
	1D	—	12 VDC	Grommet (With surge voltage suppressor)
	1E	—	12 VDC	
	1F	●	48 VAC	DIN terminal (With surge voltage suppressor)
	1G	●	220 VAC	
	1H	●	240 VAC	
	1V	●	24 VAC	
	1J	—	12 VDC	Conduit terminal (With surge voltage suppressor)
	1K	●	48 VAC	
	1L	●	220 VAC	
	1M	●	240 VAC	
	1W	●	24 VAC	Conduit (With surge voltage suppressor)
	1N	—	12 VDC	
	1P	●	48 VAC	
	1Q	●	220 VAC	
	1R	●	240 VAC	Flat terminal
	1Y	●	24 VAC	
	1S	—	12 VDC	
	1T	—	12 VDC	

With light	2A	●	24 VDC	DIN terminal (With surge voltage suppressor)
	2B	●	100 VAC	
	2C	●	110 VAC	
	2D	●	200 VAC	
	2E	●	230 VAC	
	2F	●	48 VAC	
	2G	●	220 VAC	
	2H	●	240 VAC	
	2V	●	24 VAC	Conduit terminal (With surge voltage suppressor)
	2J	—	12 VDC	
	2K	—	24 VDC	
	2L	●	100 VAC	
	2M	●	110 VAC	
	2N	●	200 VAC	
	2P	●	230 VAC	
	2Q	●	48 VAC	
	2R	●	220 VAC	DIN terminal (With surge voltage suppressor)
	2S	●	240 VAC	
	2W	●	24 VAC	
	2T	—	12 VDC	

Without DIN connector	3A	—	24 VDC	DIN terminal (With surge voltage suppressor)
	3B	—	100 VAC	
	3C	—	110 VAC	
	3D	—	200 VAC	
	3E	—	230 VAC	
	3F	—	48 VAC	
	3G	—	220 VAC	
	3H	—	240 VAC	
	3V	—	24 VAC	
	3J	—	12 VDC	

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

Other Options

(Low concentration ozone resistant and applicable to deionized water, Oil-free, Port thread)

VXD2 3 0 A A Z

Enter standard product number.

Other option (Low concentration ozone resistant and applicable to deionized water/Oil-free/Port thread)

Symbol	Low concentration ozone resistant and applicable to deionized water*1 (Seal material: FKM)	Oil-free	Port thread
Nil	—	—	Rc, With One-touch fitting*2
A	—	—	G
B	—	—	NPT
C	○	—	Rc, With One-touch fitting*2
D	—	○	G
E	—	—	NPT
F	○	—	G
G	○	—	NPT
H	—	○	Rc, With One-touch fitting*2
K	○	○	G
L	—	—	NPT
Z	—	○	Rc, With One-touch fitting*2

*1 Applicable to air (VXD2□□0) and water (VXD2□□2).

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

* 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

Process Valves

VX2

VXD

VXZ

VXS

VXF2

SX10

Installation Options
(Special Electrical Entry Direction/Mounting Option)

The following shows combinations that can be selected using installation options.

Combinations	Symbol	Special electrical entry direction	With bracket	Seal material: EPDM
	XC□			
	XB□			
	X332□			

Special Electrical Entry Direction

VXD2□□□□XC**A**

Enter standard product number.

Special electrical entry direction	
Symbol	VXD2 _A ³ to VXD2 _B ³
A	
B	
C	

* For the VXD2_E² to VXD2_G³, only grommet and flat terminal types are applicable.

With Bracket/Special Electrical Entry Direction

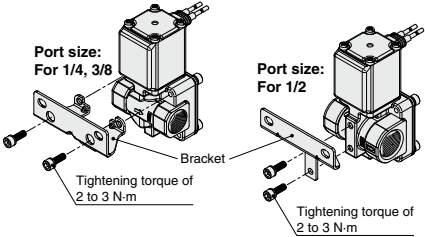
VXD2□□□□XB**A**

Enter standard product number.

With bracket/Special electrical entry direction	
Symbol	VXD2 _A ³ to VXD2 _B ³
Standard	
B	
A	
C	

- *1 Available for the VXD2_A³ to 2_B³.
- *2 Bracket is attached as standard with the resin body type (VXD2_A³₀^C□□), so it is no necessary to add XB to the part number.
- *3 Bracket is packed in the same container as the main body.

VXD2_A³□ Bracket mounting dimensions



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

Example) **VXD2** **3** **2** **A** **Z** **1A** **Z** **XB** **A**

Electrical option ● Special electrical entry direction ●

Other option ● With bracket ●

Installation Options

(Special Electrical Entry Direction/Mounting Option)



Seal Material: EPDM/With Bracket/
Special Electrical Entry Direction

VXD2 **X332**

Enter standard
product number.

When the fluid is oil, enter the part number
for water (VXD2□2).

* VXD2 3 → VXD2 2

Refer to page 658 for model selection.

EPDM specification

With bracket/Special electrical entry direction

Symbol	Specifications	
	Electrical entry direction	Bracket
Nil	IN side (Standard)	None
A	90°	
B	180°	
C	270°	
D	IN side (Standard)	With bracket*1
E	90°	
F	180°	
G	270°	

*1 Not available for the VXD2³_A (resin body type) and the VXD2³_E to VXD2³_G.

*2 "Other options" (refer to page 668), which can be combined, are Nil, A, B, D, E, Z (Oil-free, G thread specifications, NPT thread specifications).

*3 Available for air and water.

*4 Electrical entry direction

Symbol	VXD2 ³ _A to VXD2 ³ _D	Symbol	VXD2 ³ _A to VXD2 ³ _D
Nil D	Standard 	A E	90°
B F	180° 	C G	270°

* Enter symbols in the order below when ordering a combination of electrical option, other option, seal material: EPDM, with bracket, mounting holes on the bottom side of the body and special electrical entry direction.

Example) **VXD2** 1 2 A Z 1A Z **X332** A

Electrical option

Other option

Seal material: EPDM/
With bracket/Mounting holes
on the bottom side of the body/
Special electrical entry direction

Process Valves

VX2

VXD

VXZ

VXS

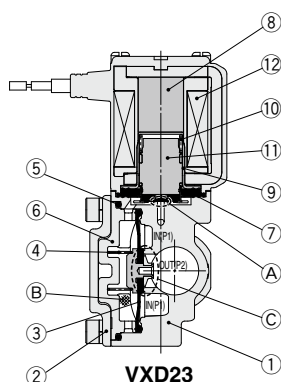
VXF2

SX10

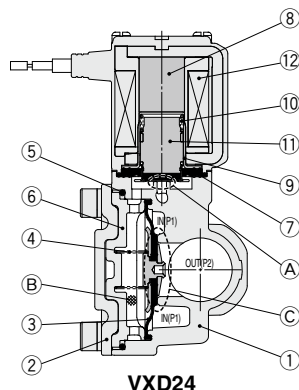
INDEX

Series VXD Construction

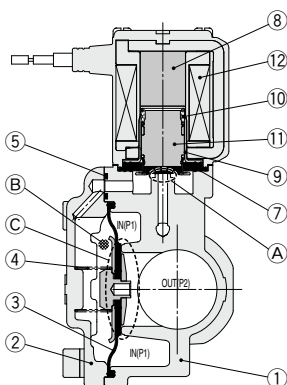
Normally Closed (N.C.)



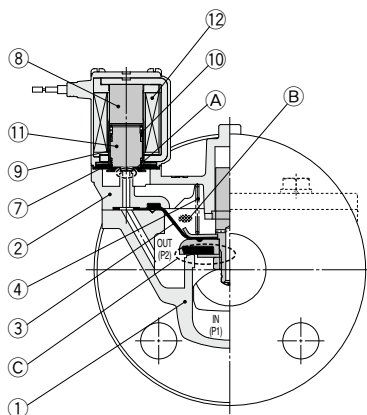
VXD23



VXD24



VXD25, 26



VXD27, 28, 29

Component Parts

No.	Description	Model	Material
1	Body	VXD23	C37, Stainless steel, Aluminum, Resin (PBT)
		VXD24 to 26	C37, Stainless steel
		VXD27 to 29	CAC407
2	Bonnet	VXD23, 24	Stainless steel
		VXD25, 26	C37, Stainless steel
		VXD27 to 29	CAC407
3	Diaphragm assembly	VXD23 to 29	Stainless steel, NBR, FKM, EPDM
4	Spring	VXD23 to 29	Stainless steel
5	O-ring	VXD23 to 26	NBR, FKM, EPDM
6	Buffer	VXD23, 24	PPS
7	Stopper		NBR, FKM, EPDM
8	Core	VXD23 to 29	Fe
9	Tube		Stainless steel
10	Spring		Stainless steel
11	Armature assembly		Stainless steel, NBR, FKM, EPDM, Resin (PPS)
12	Solenoid coil		Cu + Fe + Resin

Operation

<Valve open>

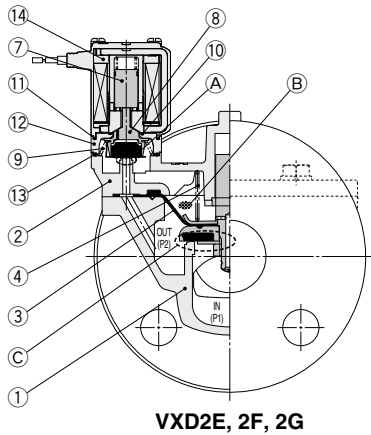
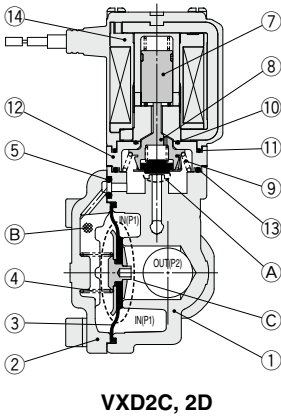
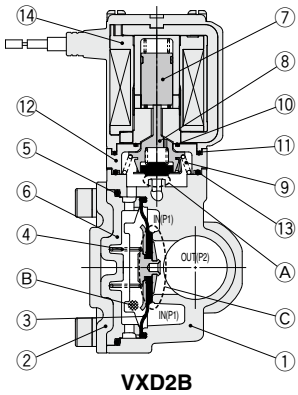
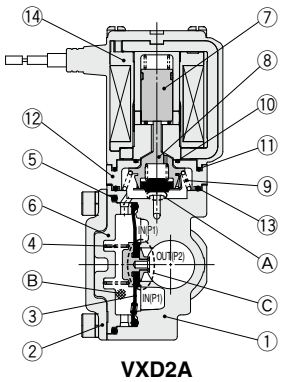
When coil 12 is energized, armature assembly 11 is attracted by core 8 and pilot valve A is open.

When A is open, the pressure in pressure chamber B is reduced and main valve C is open.

<Valve closed>

When coil 12 is de-energized, pilot valve A is closed, pressure in pressure chamber B increases, and main valve C is closed.

Normally Open (N.O.)



Component Parts

No.	Description	Model	Material
1	Body	VXD2A	C37, Stainless steel, Aluminum, Resin (PBT)
		VXD2B to 2D	C37, Stainless steel
		VXD2E to 2G	CAC407
2	Bonnet	VXD2A, 2B	Stainless steel
		VXD2C, 2D	C37, Stainless steel
		VXD2E to 2G	CAC407
3	Diaphragm assembly	VXD2A to 2G	Stainless steel, NBR, FKM, EPDM
4	Spring	VXD2A to 2G	Stainless steel
5	O-ring	VXD2A to 2D	NBR, FKM, EPDM
6	Buffer	VXD2A, 2B	PPS
7	Sleeve assembly	VXD2A to 2G	Stainless steel, Resin (PPS)
8	Push rod assembly		Resin (PPS), Stainless steel, NBR, FKM, EPDM
9	Stopper		Stainless steel
10	O-ring A		NBR, FKM, EPDM
11	O-ring B		NBR, FKM, EPDM
12	Adapter		Resin (PPS)
13	O-ring C		NBR, FKM, EPDM
14	Solenoid coil		Cu + Fe + Resin

Operation

<Valve open>

When coil (14) is energized, (already open) pilot valve (A) is closed, pressure in pressure chamber (B) increases, and main valve (C) is closed.

<Valve closed>

When coil (14) is de-energized, (already closed) pilot valve (A) is open, pressure in pressure chamber (B) decreases, and main valve (C) is open.

Process Valves

VX2

VXD

VXZ

VXS

VXF2

SX10

INDEX

Series VXD

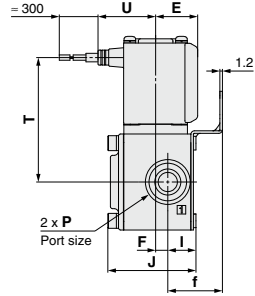
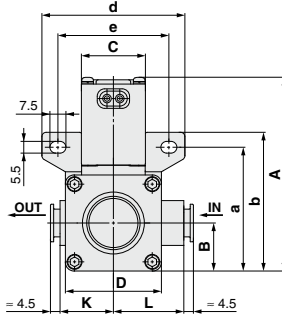


For Air

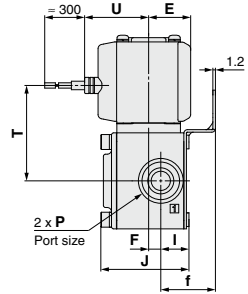
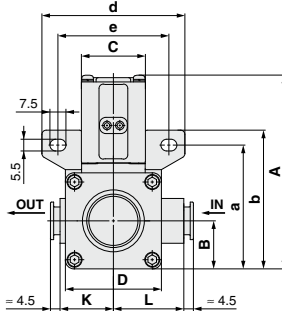
For information on handling One-touch fittings and appropriate tubing, refer to page 698 and KQ2 series One-touch fittings in Best Pneumatics No. 6.
The KQ2 series information can be downloaded from the following SMC website, <http://www.smcworld.com>

Dimensions/VXD2³_A Body Material: Resin (ø10, ø3/8", ø12)

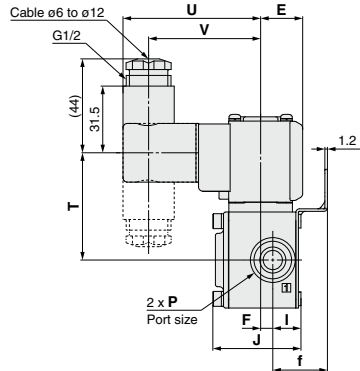
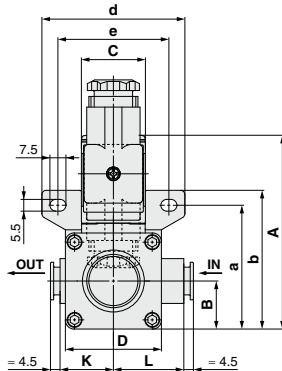
Grommet



Grommet (with surge voltage suppressor)



DIN terminal



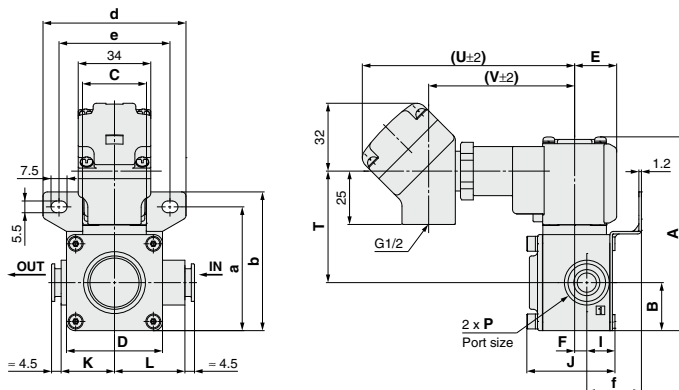
													(mm)					
Model	One-touch fitting P	A	B	C	D	E	F	I	J	K	L	Electrical entry						
												Grommet		Grommet (with surge voltage suppressor)		DIN terminal		
												T	U	T	U	T	U	V
VXD2 ³ _A	ø10, ø3/8", ø12	91 (97)	22.5	30	45	20	6	13.5	41.5	25	33	58.5 (64.5)	27	45 (50.5)	30	50.5 (56)	64.5	52.5
Model	One-touch fitting P	Mounting bracket dimensions																
		a	b	d	e	f												
VXD2 ³ _A	ø10, ø3/8", ø12	58	65	67	52	25.5												

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

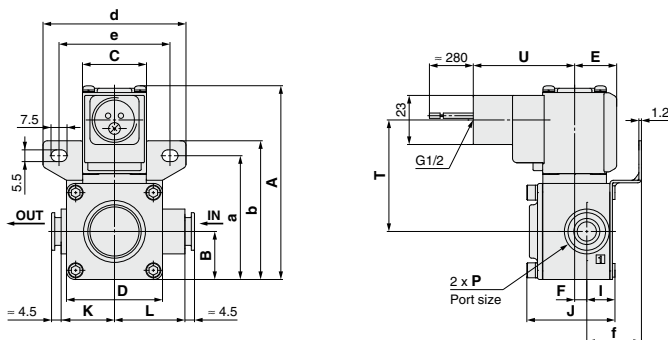


Dimensions/VXD_{2A}³ Body Material: Resin (ø10, ø3/8", ø12)

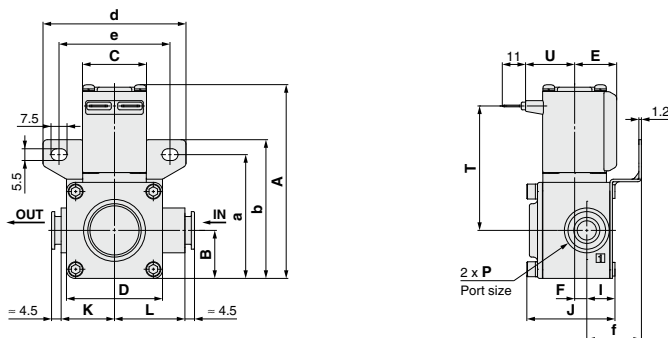
Conduit terminal



Conduit



Flat terminal



																	(mm)			
Model	One-touch fitting P	A	B	C	D	E	F	I	J	K	L	Electrical entry								
												Conduit terminal			Conduit		Flat terminal			
												T	U	V	T	U	T	U		
VXD2A	ø10, ø3/8", ø12	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																		
		a	b	d	e	f														
VXD2A	ø10, ø3/8", ø12	58	65	67	52	25.5														

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

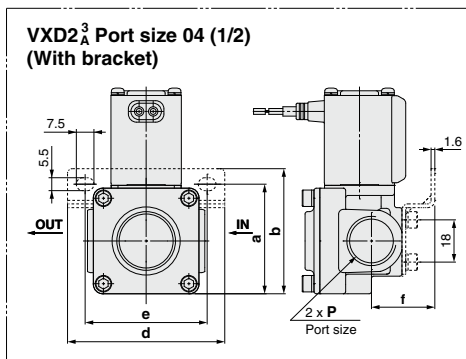
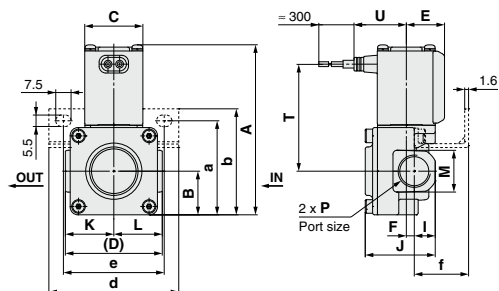
Series VXD



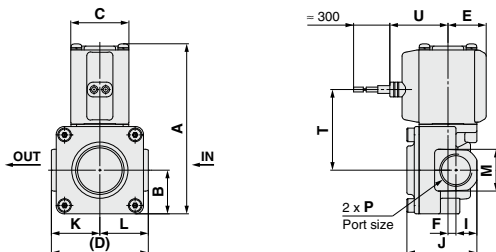
For Air/Water/Oil

Dimensions/VXD2³_A Body Material: Aluminum, C37, Stainless Steel

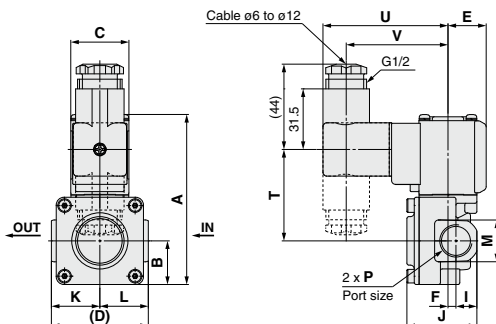
Grommet



Grommet (with surge voltage suppressor)



DIN terminal



(mm)

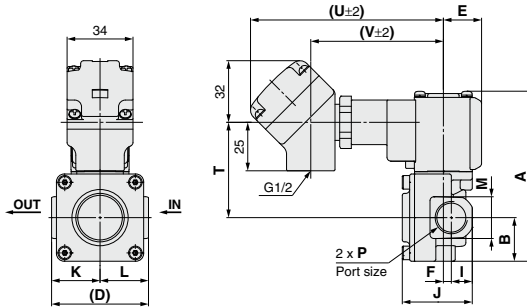
Model	Port size P	A	B	C	D	E	F	I	J	K	L	M		Electrical entry						
												C37, Stainless steel body	Aluminum body type	Grommet		Grommet (with surge voltage suppressor)		DIN terminal		
VXD2 ³ _A	1/4, 3/8	88	22.5	30	50	20	4.5	11	37.5	25	25	22	24	55.5	27	42	47.5	64.5	52.5	
	1/2	(93.5)					5	13	42.5			27	30	(61)		(47.5)	30	(53)		
Model	Port size P	Mounting bracket dimensions																		
		a	b	d	e	f														
VXD2 ³ _A	1/4, 3/8	48.5	55	67	52	28														
	1/2	47	53.5			27														

(): Denotes the Normally Open (N.O.) dimensions.
Aluminum body is for air. Refer to page 653 for details.

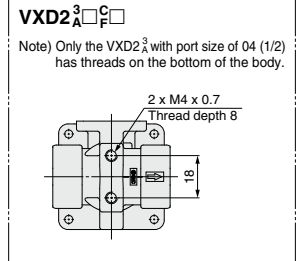
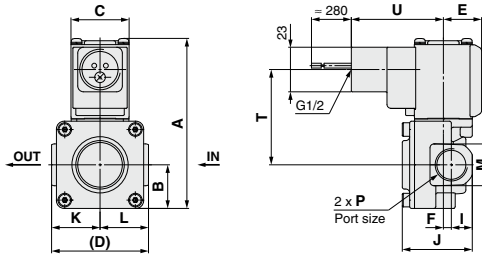


Dimensions/VXD_{2A}³ Body Material: Aluminum, C37, Stainless Steel

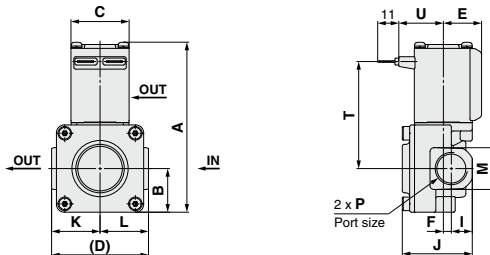
Conduit terminal



Conduit



Flat terminal



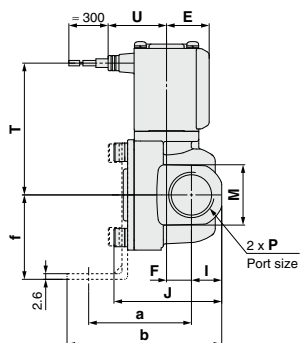
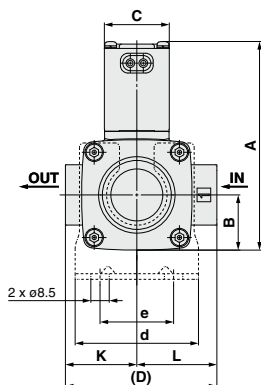
																				(mm)	
Model	Port size P	A	B	C	D	E	F	I	J	K	L	M		Electrical entry							
												C37, Stainless steel body	Aluminum body	Conduit terminal			Conduit		Flat terminal		
														T	U	V	T	U	T	U	
VXD2 ³ _A	1/4, 3/8	88 (93.5)	22.5	30	50	20	4.5	11	37.5	25	25	22	24	49.5	99.5	68.5	49.5	47.5	55.5	23	
	5						13	42.5	27			30	(55)		(55)	(61)					

(): Denotes the Normally Open (N.O.) dimensions.
Aluminum body is for air. Refer to page 653 for details.

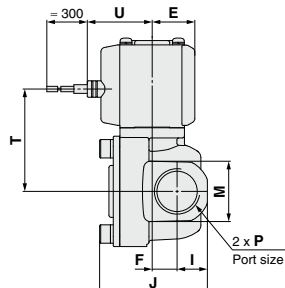
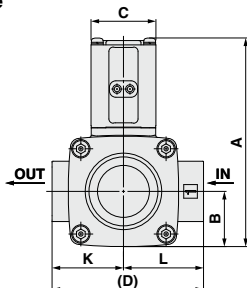


Dimensions/VXD2⁴_B Body Material: C37, Stainless Steel

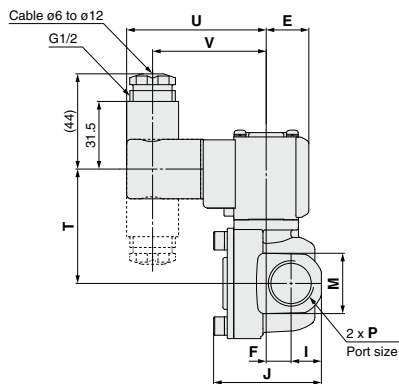
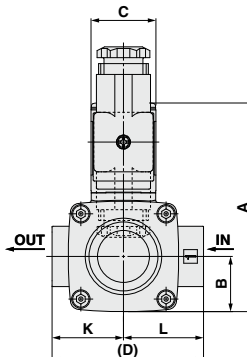
Grommet



Grommet (with surge voltage suppressor)



DIN terminal



Model	Port size P	A	B	C	D	E	F	I	J	K	L	M	Electrical entry (mm)					
													Grommet					
													T	U	T	U	V	
VXD2 ⁴ _B	3/8, 1/2	96.5 (102.5)	25.5	30	70	20	11.5	14	50	33	37	28	61 (67)	27	47.5 (53.5)	30	53 (59)	64.5 52.5

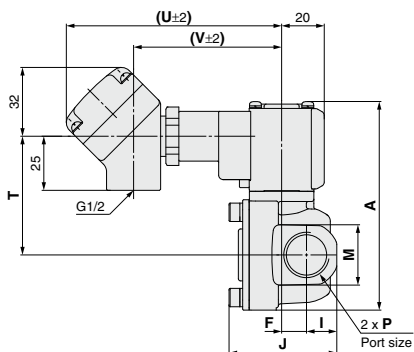
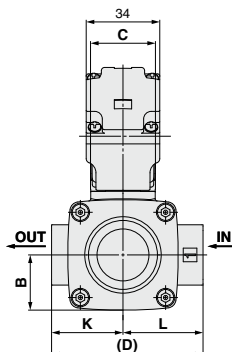
Model	Port size P	Mounting bracket dimensions				
		a	b	d	e	f
VXD2 ⁴ _B	3/8, 1/2	47.5	71.5	57	34	39

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

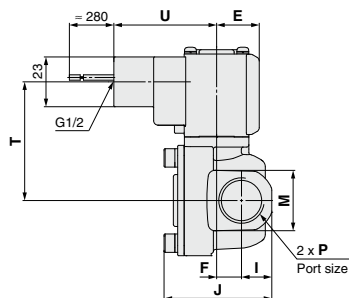
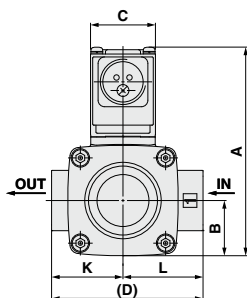


Dimensions/VXD_{2B}⁴ Body Material: C37, Stainless Steel

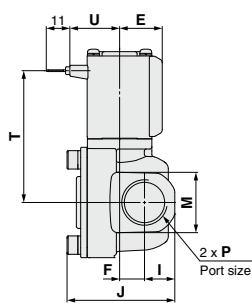
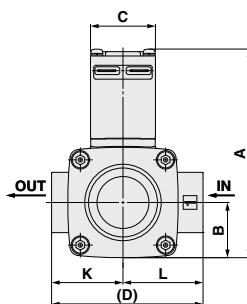
Conduit terminal



Conduit



Flat terminal



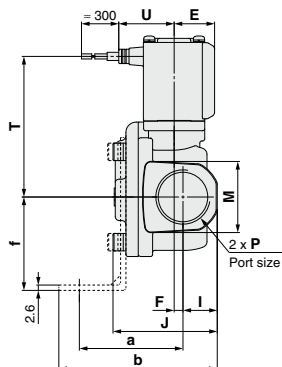
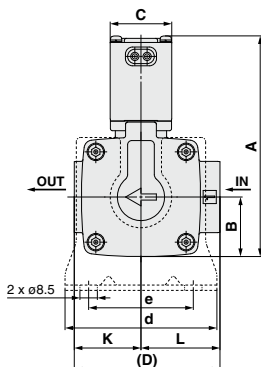
													(mm)						
Model	Port size P	A	B	C	D	E	F	I	J	K	L	M	Electrical entry						
													Conduit terminal			Conduit		Flat terminal	
													T	U	V	T	U	T	U
VXD2 _B ⁴	3/8, 1/2	96.5 (102.5)	25.5	30	70	20	11.5	14	50	33	37	28	55 (61)	99.5	68.5	55 (61)	47.5	61 (67)	23

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

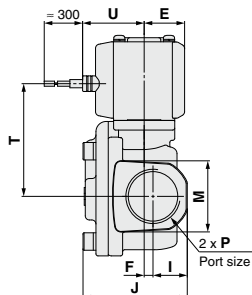
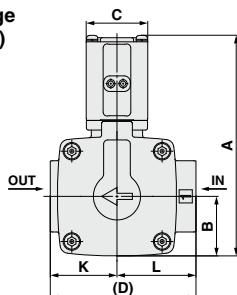


Dimensions/VXD2⁵_C/2⁶_D Body Material: C37, Stainless Steel

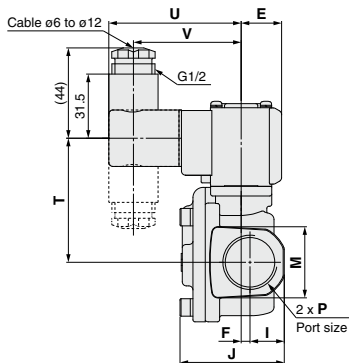
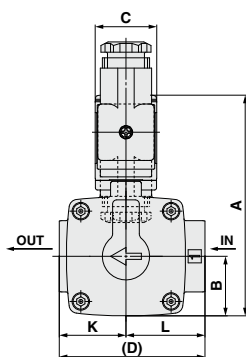
Grommet



Grommet (with surge voltage suppressor)



DIN terminal



(mm)

Model	Port size P	A	B	C	D	E	F	I	J	K	L	M	Electrical entry						
													Grommet		Grommet (with surge voltage suppressor)		DIN terminal		
													T	U	T	U	T	U	V
VXD2 ⁵ _C	3/4	107.5 (113.5)	29	30	71	20	4.5	17	51	32.5	38.5	35	68.5 (74.5)	27	55 (61)	30	60.5 (66.5)	64.5	52.5
VXD2 ⁶ _D	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	69 (77)	32.5	74.5 (82.5)	67	55

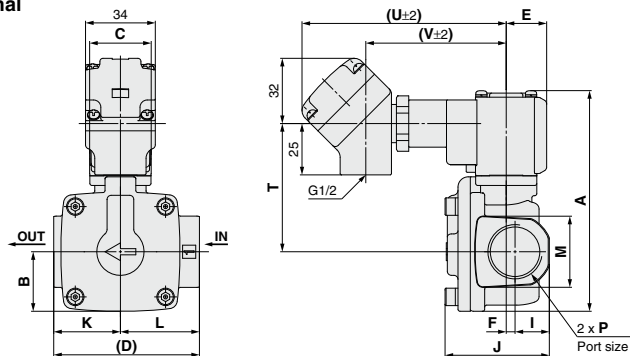
Model	Port size P	Mounting bracket dimensions				
		a	b	d	e	f
VXD2 ⁵ _C	3/4	50.5	77.5	74	51	45.5
VXD2 ⁶ _D	1	55.5	85.5	81	58	49.5

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

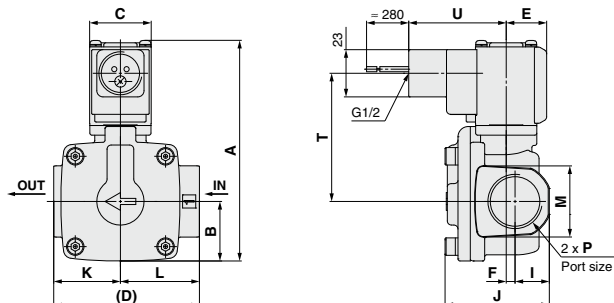


Dimensions/VXD⁵_C/2⁶_D Body Material: C37, Stainless Steel

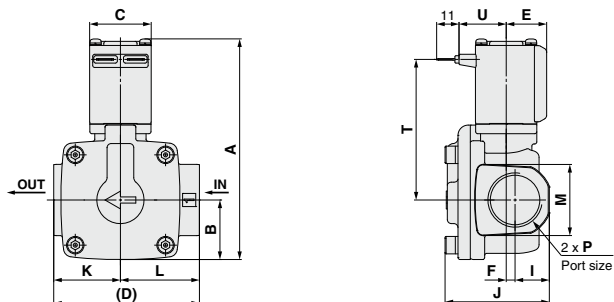
Conduit terminal



Conduit



Flat terminal



(mm)

Model	Port size P	A	B	C	D	E	F	I	J	K	L	M	Electrical entry						
													Conduit terminal			Conduit		Flat terminal	
													T	U	V	T	U	T	U
VXD _C ⁵	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
VXD _D ⁶	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 P	Mounting bracket dimensions				
		a	b	d	e	f
VXD ⁵ _C	3/4	50.5	77.5	74	51	45.5
VXD ⁶ _D	1	55.5	85.5	81	58	49.5

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

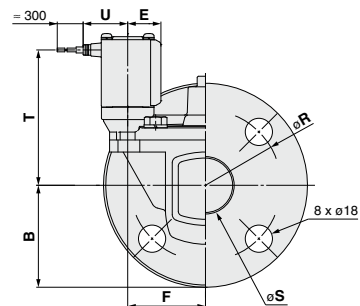
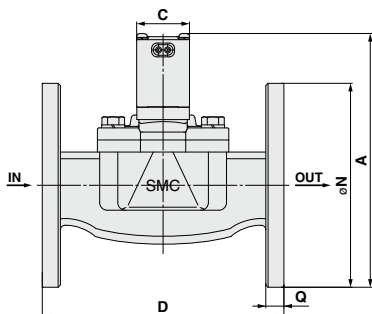
Series VXD



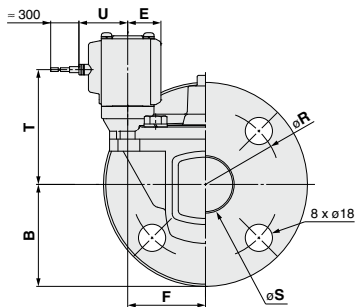
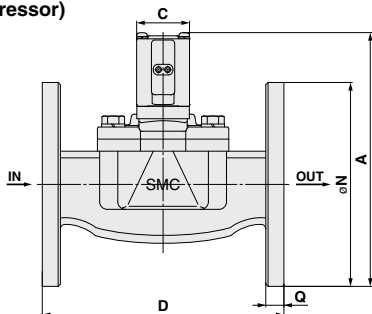
For Air/Water/Oil

Dimensions/VXD_E⁷/2F⁸/2G⁹ Body Material: CAC407

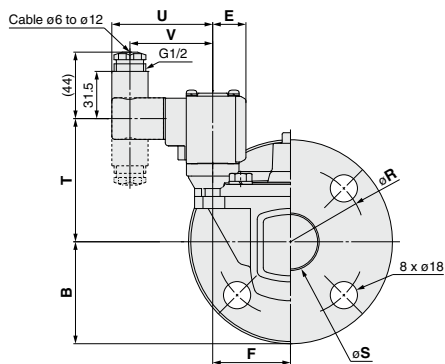
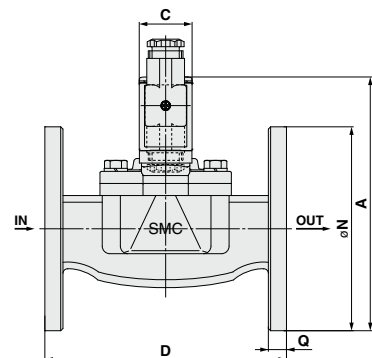
Grommet



Grommet (with surge voltage suppressor)



DIN terminal



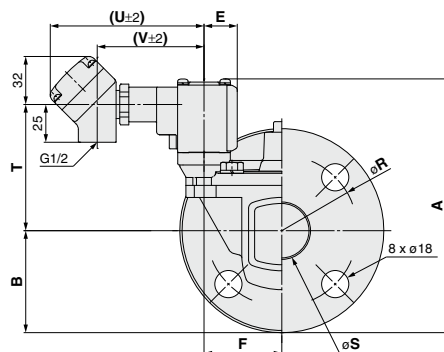
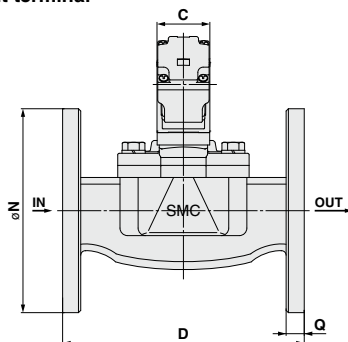
												(mm)						
Model	Applicable flange	A	B	C	D	E	F	N	Q	R	S	Electrical entry						
												Grommet		Grommet (with surge voltage suppressor)		DIN terminal		
												T	U	T	U	T	U	V
VXD _E ⁷	32A	168 (176)	67.5	35	160	22	51.5	135	12	100	36	90 (98)	29.5	76 (84)	32.5	82 (90)	67	55
VXD _F ⁸	40A	179.5 (187.5)	70	40	170	24.5	54.5	140	14	105	42	98.5 (106.5)	32	85 (93)	35	90.5 (98.5)	69.5	57.5
VXD _G ⁹	50A	192.5 (200.5)	77.5	40	180	24.5	59	155	14	120	52	104 (112)	32	90.5 (98.5)	35	96 (104)	69.5	57.5

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

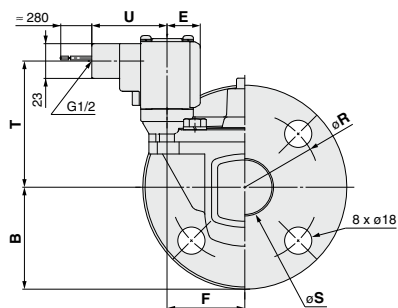
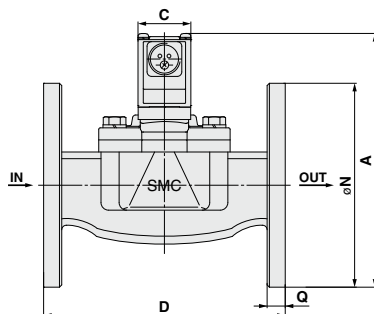


Dimensions/VXD⁷_E/2⁸_F/2⁹_G Body Material: CAC407

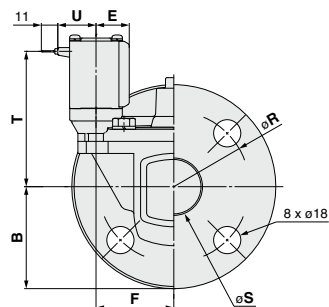
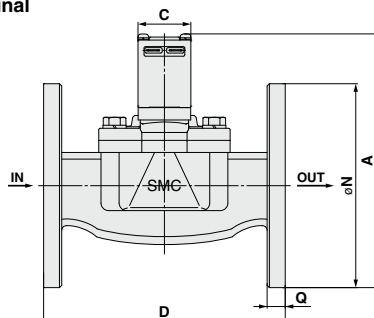
Conduit terminal



Conduit



Flat terminal



Model	Applicable flange	A	B	C	D	E	F	N	Q	R	S	(mm)					
												Electrical entry					
												Conduit terminal		Conduit		Flat terminal	
												T	U	V	T	U	T
VXD ⁷ _E	32A	168 (176)	67.5	35	160	22	51.5	135	12	100	36	84 (92)	102	71	84 (92)	50	90 (98)
VXD ⁸ _F	40A	179.5 (187.5)	70	40	170	24.5	54.5	140	14	105	42	92.5 (100.5)	104.5	73.5	92.5 (100.5)	52.5	98.5 (106.5)
VXD ⁹ _G	50A	192.5 (200.5)	77.5	40	180	24.5	59	155	14	120	52	98 (106)	104.5	73.5	98 (106)	52.5	104 (112)

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

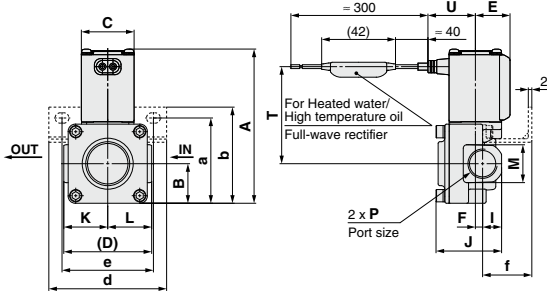
Series VXD



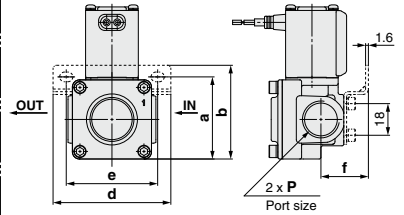
For Heated water/High temperature oil

Dimensions/VXD_{2A}³ Body Material: C37, Stainless Steel (1/4, 3/8, 1/2)

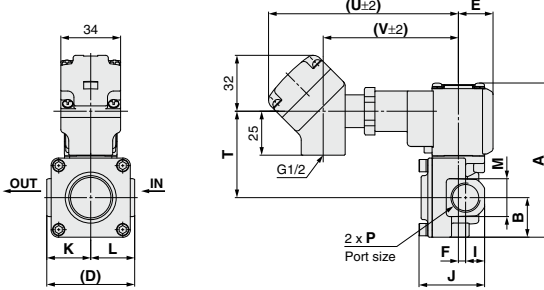
Grommet



VXD_{2A}³ Port size 04 (1/2) (With bracket)

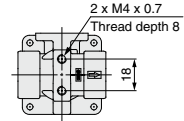


Conduit terminal

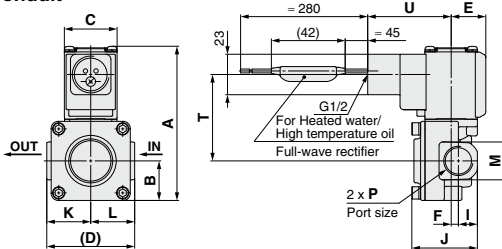


VXD_{2A}³ C F

Note) Only the VXD₂³ with port size of 04 (1/2) has threads on the bottom of the body.



Conduit



(mm)

Model	Port size P	A	B	C	D	E	F	I	J	K	L	M	Electrical entry							
													Grommet		Conduit terminal		Conduit			
													T	U	T	U	V	T	U	
VXD2A ³	1/4, 3/8	88	22.5	30	50	20	4.5	11	37.5	25	25	22	55.5	27	49.5	108	77	49.5	47.5	
	1/2	(93.5)					5	13	42.5			27	(61)		(55)		(55)			

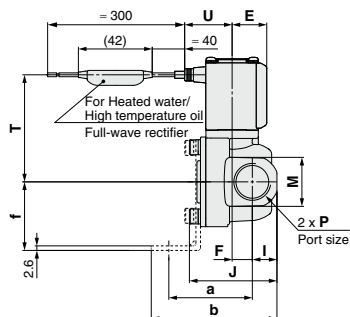
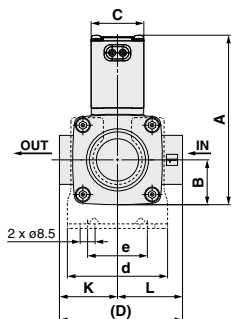
Model	Port size P	Mounting bracket dimensions				
		a	b	d	e	f
VXD _{2A} ³	1/4, 3/8	48.5	55	67	52	28
	1/2	47	53.5			27

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

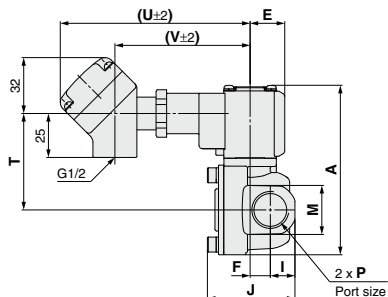
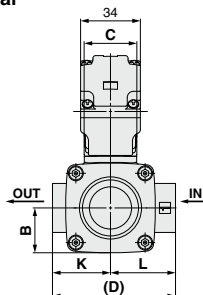


Dimensions/VXD_{2B}⁴ Body Material: C37, Stainless Steel

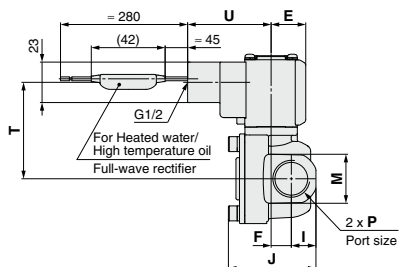
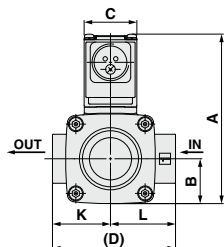
Grommet



Conduit terminal



Conduit



(mm)																			
Model	Port size P	A	B	C	D	E	F	I	J	K	L	M	Electrical entry						
													Grommet		Conduit terminal		Conduit		
													T	U	T	U	V	T	U
VXD2 ⁴	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
Model	Port size P	Mounting bracket dimensions																	
		a	b	d	e	f													
VXD2 ⁴	3/8, 1/2	47.5	71.5	57	34	39													

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

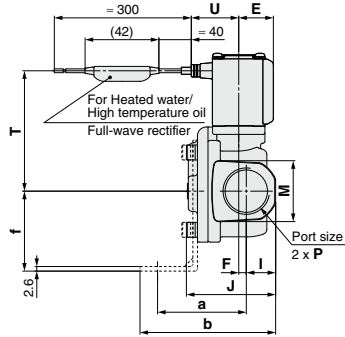
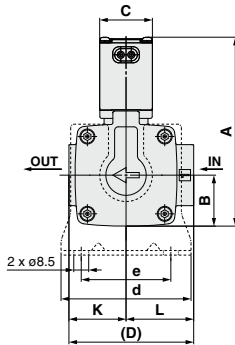
Series VXD



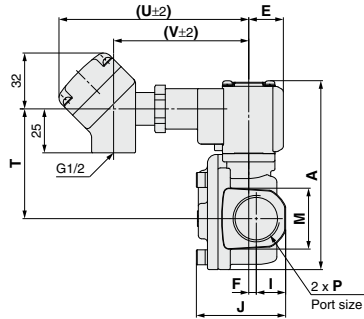
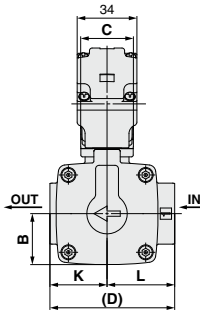
For Heated water/High temperature oil

Dimensions/VXD_{2C/2D}^{5/6} Body Material: C37, Stainless Steel

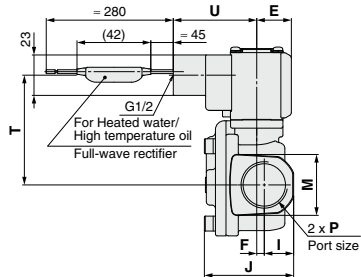
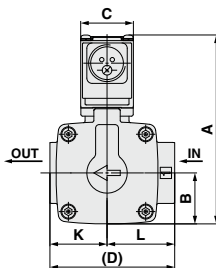
Grommet



Conduit terminal



Conduit



(mm)																					
Model	Port size P	A	B	C	D	E	F	I	J	K	L	M	Electrical entry								
													Grommet			Conduit terminal			Conduit		
													T	U		T	U	V	T	U	
VXD2 _C ⁵	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		
VXD2 _D ⁶	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		

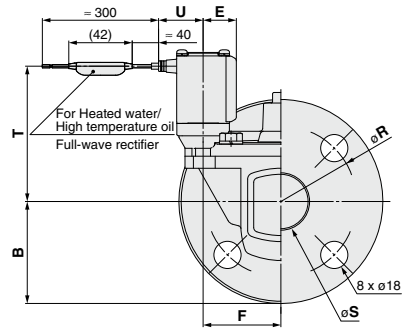
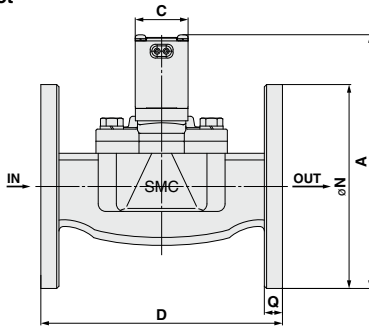
Model	Port size P	Mounting bracket dimensions				
		a	b	d	e	f
VXD _{2C} ⁵	3/4	50.5	77.5	74	51	45.5
VXD _{2D} ⁶	1	55.5	85.5	81	58	49.5

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

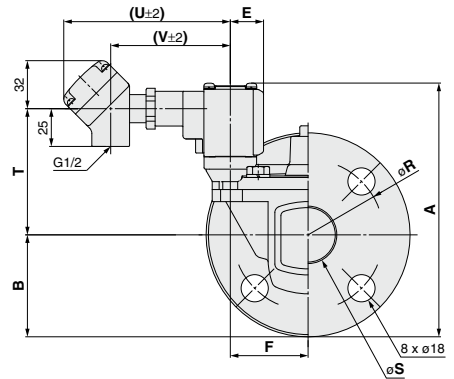
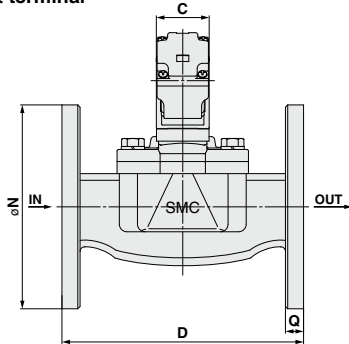


Dimensions/VXD_E⁷/_F⁸/_G⁹ Body Material: CAC407

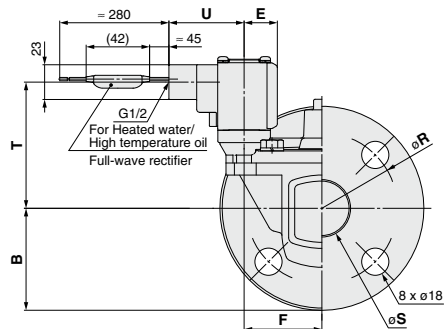
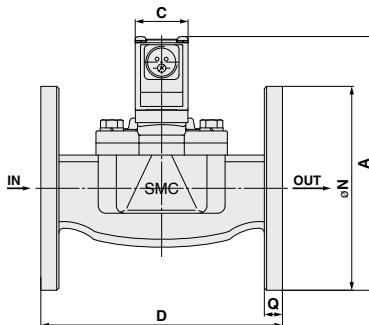
Grommet



Conduit terminal



Conduit

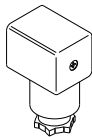


Model	Applicable flange	A	B	C	D	E	F	N	Q	R	S	(mm)					
												Electrical entry					
												Grommet			Conduit terminal		
												T	U		T	U	V
VXD _E ⁷	32A	168 (176)	67.5	35	160	22	51.5	135	12	100	36	90 (98)	29.5	84 (92)	110.5	79.5	84 (92)
VXD _F ⁸	40A	179.5 (187.5)	70	40	170	24.5	54.5	140	14	105	42	98.5 (106.5)	32	92.5 (100.5)	113	82	92.5 (100.5)
VXD _G ⁹	50A	192.5 (200.5)	77.5	40	180	24.5	59	155	14	120	52	104 (112)	32	98 (106)	113	82	98 (106)

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

Replacement Parts

• DIN Connector Part No.



<Coil Insulation Type/Class B>		
Electrical option	Rated voltage	Connector part no.
None	24 VDC	C18312G6GCU
	12 VDC	
	100 VAC	
	110 VAC	
	200 VAC	
	220 VAC	
	230 VAC	
	240 VAC	
	24 VAC	
	48 VAC	
With light	24 VDC	GDM2A-L5
	12 VDC	GDM2A-L6
	100 VAC	GDM2A-L1
	110 VAC	GDM2A-L1
	200 VAC	GDM2A-L2
	220 VAC	GDM2A-L2
	230 VAC	GDM2A-L2
	240 VAC	GDM2A-L2
	24 VAC	GDM2A-L5
	48 VAC	GDM2A-L15

<Coil Insulation Type/Class H>		
Electrical option	Rated voltage	Connector part no.
None	24 VDC	GDM2A-G-S5
	100 VAC	GDM2A-R
	110 VAC	
	200 VAC	
	220 VAC	
	230 VAC	
	240 VAC	
	24 VAC	
	48 VAC	
With light	24 VDC	GDM2A-G-Z5
	100 VAC	GDM2A-R-L1
	110 VAC	GDM2A-R-L1
	200 VAC	GDM2A-R-L2
	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 Flat Terminal
(Set of 2 pcs.)

VX021S-1-16FB

• Bracket Assembly Part No. for the VXD2³_A Metal Body (C37, Stainless steel, Aluminum)

Port size: For 1/4, 3/8

VXD30S-14A-1

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.

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.]

4. 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. $\cos\theta = 0.9$

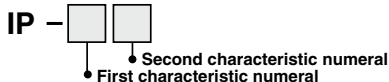
2. Surge voltage

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

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 Characteristics:

Degrees of protection against solid foreign objects

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

Electrical Terminology

● 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	Immersion 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

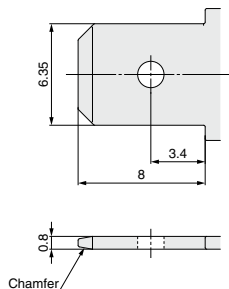
The degreasing and washing of wetted parts

3. Symbol

In the symbol ($\square \square_M$) Port 1 (IN) and Port 2 (OUT) are shown in a blocked condition (\perp), 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.

Flat Terminal

1. Flat terminal/Electrical connection size of molded coil



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
Pneumatic equipment	C, b	—	ISO 6358: 1989 JIS B 8390: 2000
	—	S	JIS B 8390: 2000 Equipment: JIS B 8373, 8374, 8375, 8379, 8381
		Cv	ANSI/(NFPA)T3.21.3: 1990
Process fluid control equipment	Av	—	IEC60534-2-3: 1997 JIS B 2005: 1995
	—	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 **C** : 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** : 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

Standard condition : 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 $\frac{P_2 + 0.1}{P_1 + 0.1} \leq b$, choked flow

$$Q = 600 \times C (P_1 + 0.1) \sqrt{\frac{293}{273 + t}} \dots\dots\dots(1)$$

When $\frac{P_2 + 0.1}{P_1 + 0.1} > b$, subsonic flow

$$Q = 600 \times C (P_1 + 0.1) \sqrt{1 - \left[\frac{P_2 + 0.1}{P_1 + 0.1} - b \right]^2} \sqrt{\frac{293}{273 + t}} \dots\dots\dots(2)$$

Q: Air flow rate [dm³/min (ANR)], dm³ (Cubic decimeter) of SI unit are allowed to be described by L (liter).

1 dm³ = 1 L

C : Sonic conductance [dm³/(s·bar)]

b : Critical pressure ratio [—]

P₁ : Upstream pressure [MPa]

P₂ : 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)

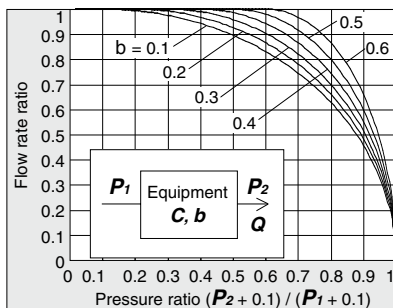
Obtain the air flow rate for **P₁** = 0.4 [MPa], **P₂** = 0.3 [MPa], **t** = 20 [°C] when a solenoid valve is performed in **C** = 2 [dm³/(s·bar)] and **b** = 0.3.

According to formula (1), the maximum flow rate = $600 \times 2 \times (0.4 + 0.1) \times \sqrt{\frac{293}{273 + 20}} = 600$ [dm³/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 x 0.7 = 420 [dm³/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.

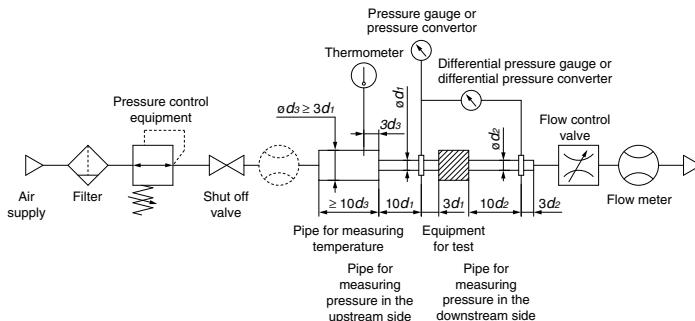


Fig. (1) Test circuit based on ISO 6358, JIS B 8390

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 $\frac{P_2 + 0.1}{P_1 + 0.1} \leq 0.5$, **choked flow**

$$Q = 120 \times S (P_1 + 0.1) \sqrt{\frac{293}{273 + t}} \quad \text{.....(3)}$$

When $\frac{P_2 + 0.1}{P_1 + 0.1} > 0.5$, **subsonic flow**

$$Q = 240 \times S \sqrt{(P_2 + 0.1) (P_1 - P_2)} \sqrt{\frac{293}{273 + t}} \quad \text{.....(4)}$$

Conversion with sonic conductance **C**:

$$S = 5.0 \times C \quad \text{.....(5)}$$

Q : Air flow rate [dm³/min(ANR)], dm³ (cubic decimeter) of SI unit are allowed to be described by L (liter).

1 dm³ = 1 L

S : Effective area [mm²]

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 **b** is unknown for equipment. In the formula (2) by the sonic conductance **C**, it is the same formula as when **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.

$$S = 12.1 \frac{V}{t} \log_{10} \left(\frac{P_s + 0.1}{P + 0.1} \right) \sqrt{\frac{293}{T}} \quad \text{.....(6)}$$

S : Effective area [mm²]

V : Air tank capacity [dm³]

t : Discharging time [s]

P_s : Pressure inside air tank before discharging [MPa]

P : Residual pressure inside air tank after discharging [MPa]

T : Temperature inside air tank before discharging [K]

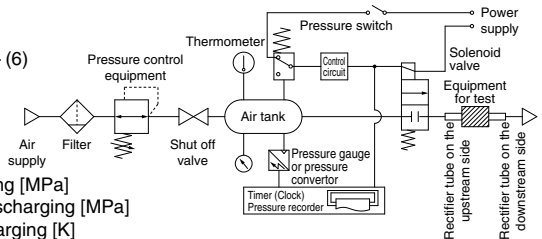


Fig. (2) Test circuit based on JIS B 8390

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.

$$Cv = \frac{Q}{114.5 \sqrt{\frac{\Delta P (P_2 + P_a)}{T_1}}} \dots\dots\dots (7)$$

ΔP : Pressure drop between the static pressure tapping ports [bar]

P_1 : 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 [dm³/s standard condition]

P_a : Atmospheric pressure [bar absolute]

T_1 : Upstream absolute temperature [K]

Test conditions are $P_1 + P_a = 6.5 \pm 0.2$ bar absolute, $T_1 = 297 \pm 5$ K, $0.07 \text{ bar} \leq \Delta P \leq 0.14$ 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 m³/s which runs through a valve (equipment for test) when the pressure differential is 1 Pa. It is calculated using the following formula.

$$Av = Q \sqrt{\frac{\rho}{\Delta P}} \dots\dots\dots (8)$$

Av : Flow coefficient [m²]

Q : Flow rate [m³/s]

ΔP : Pressure differential [Pa]

ρ : Fluid density [kg/m³]

- (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:

$$Q = 1.9 \times 10^6 Av \sqrt{\frac{\Delta P}{G}} \dots\dots\dots (9)$$

Q : Flow rate [L/min]

Av : Flow coefficient [m²]

ΔP : Pressure differential [MPa]

G : Specific gravity [water = 1]

In the case of saturated steam:

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

Q : Flow rate [kg/h]

Av : Flow coefficient [m²]

ΔP : Pressure differential [MPa]

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

P_2 : Downstream pressure [MPa]

Conversion of flow coefficient:

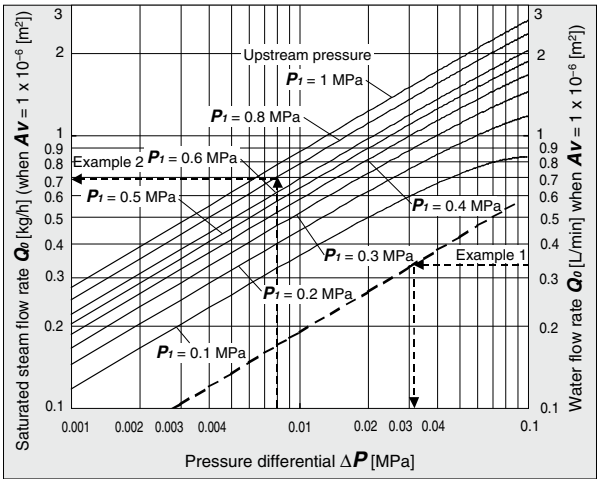
Av = 28 × 10⁻⁶ **Kv** = 24 × 10⁻⁶ **Cv**(11)

Here,

Kv factor : Value of the clean water flow rate represented by m³/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/in² (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 × 10⁻⁶ [m²]. Since **Q0** = 15/45 = 0.33 [L/min], according to Graph (2), if reading **ΔP** when **Q0** is 0.33, it will be 0.031 [MPa].

Example 2)
Obtain the saturated steam flow rate when **Pi** = 0.8 [MPa], **ΔP** = 0.008 [MPa] with a solenoid valve with an **Av** = 1.5 × 10⁻⁶ [m²]. According to Graph (2), if reading **Q0** when **Pi** is 0.8 and **ΔP** is 0.008, it is 0.7 [kg/h]. Therefore, the flow rate **Q** = 0.7 × 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 × 10⁴. By substituting the measurement results for formula (8) to figure out **Av**.

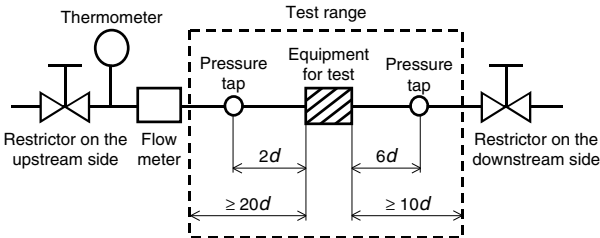
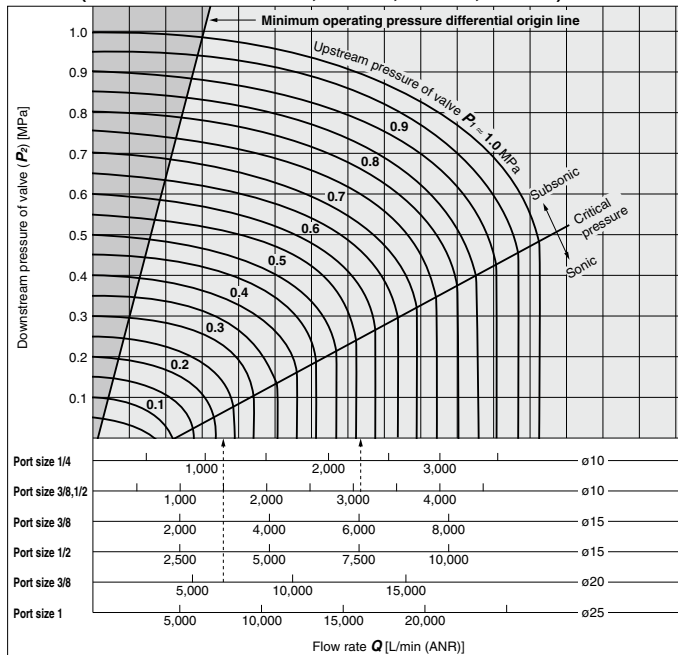


Fig. (3) Test circuit based on IEC60534-2-3, JIS B 2005

Flow-rate Characteristics

Note) Use this graph as a guide. In the case of obtaining an accurate flow rate, refer to pages 689 through to 693.

For Air (Orifice diameter: $\phi 10$ mm, $\phi 15$ mm, $\phi 20$ mm, $\phi 25$ 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 $\phi 15$ orifice (VXD240□□/Port size 3/8),
 $P_1 = 0.57$ MPa,
 for a $\phi 20$ orifice (VXD250□□/Port size 3/4),
 $P_1 = 0.22$ MPa

Warning

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.

Process Valves

VX2

VXD

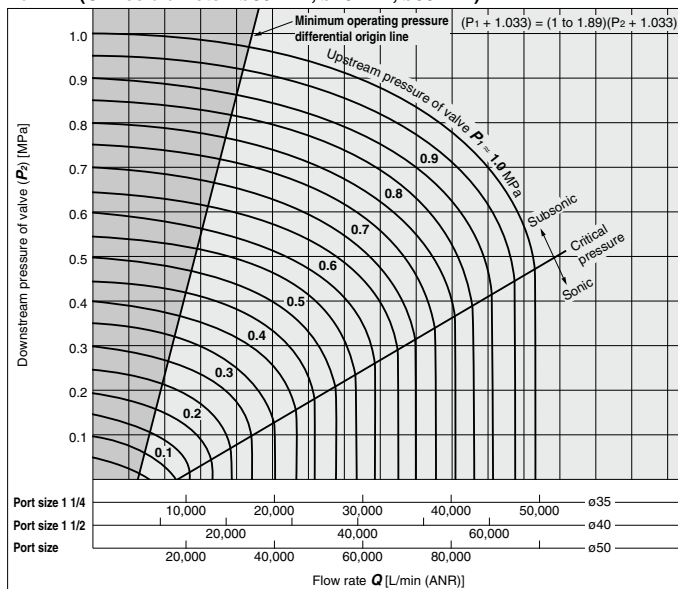
VXZ

VXS

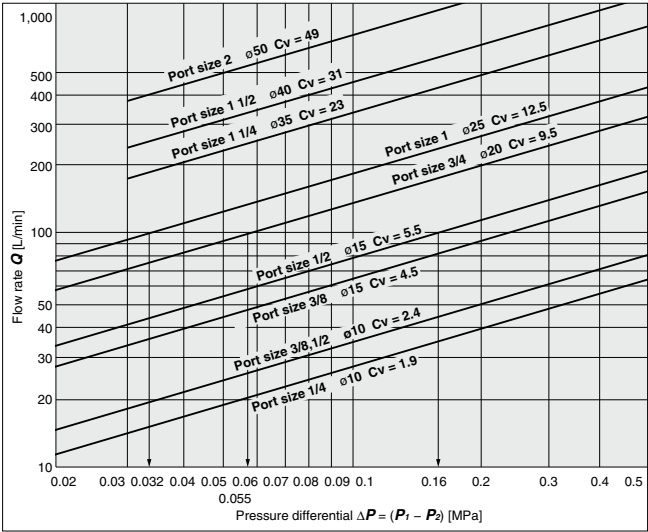
VXF2

SX10

For Air (Orifice diameter: $\phi 35$ mm, $\phi 40$ mm, $\phi 50$ mm)



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 $\phi 15$ orifice (VXD242/Port size 1/2), $\Delta P = 0.16$ MPa,
for a $\phi 20$ orifice (VXD252), $\Delta P = 0.055$ MPa,
for a $\phi 25$ orifice (VXD262), $\Delta P = 0.032$ MPa



Series VXD

Specific Product Precautions 1

Be sure to read before handling. Refer to page 1154 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.smcworld.com>

Design

Design

1. Cannot be used as an emergency shutoff valve etc.

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

2. Extended periods of continuous energization

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

Warning

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 689 through to 695).

Selection

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 catalog. Use a fluid with a kinematic viscosity of 50 mm²/s or less.

If there is something you do not know, please contact SMC.

Applicable fluid

For Air	Air
For Water	Air/Water
For Oil	Air/Water/Oil
For Heated water	Air(up to 99°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 µm or less should be selected.

3) Install an aftercooler or air dryer, etc.

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

4) If excessive carbon powder is generated, eliminate it by installing 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.

Refer to Best Pneumatics No.5 for further details on compressed air quality.



Series VXD

Specific Product Precautions 2

Be sure to read before handling. Refer to page 1154 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.smcworld.com>

Selection

⚠ Warning

<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.

<Oil>

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.

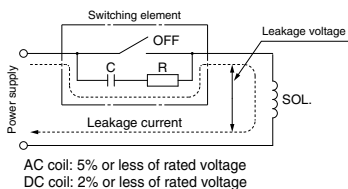
6. Low temperature operation

- 1) 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.

⚠ 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.



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 mm²/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 labeled on the product should not be erased, removed or covered up.



Series VXD

Specific Product Precautions 3

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Disassembly/Assembly Procedures

⚠ Caution

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

Disassembly

<N.C.>

- Loosen the mounting screws.

The coil assembly, stopper, return spring, armature assembly and body can be removed.

<N.O.>

- 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.>

- 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→2→3→4→1→2→3→4".

Proper Tightening Torque N·m

VXD2 ₃ ^A	0.5
VXD2 ₆ ^A	
VXD2 ₅ ^B	
VXD2 ₃ ^B	
VXD2 ₆ ^C	0.7
VXD2 ₅ ^C	
VXD2 ₆ ^D	
VXD2 ₃ ^D	

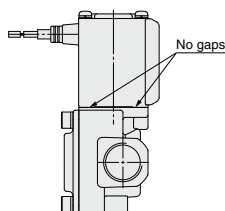


Fig. 1

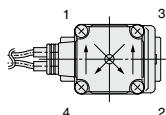
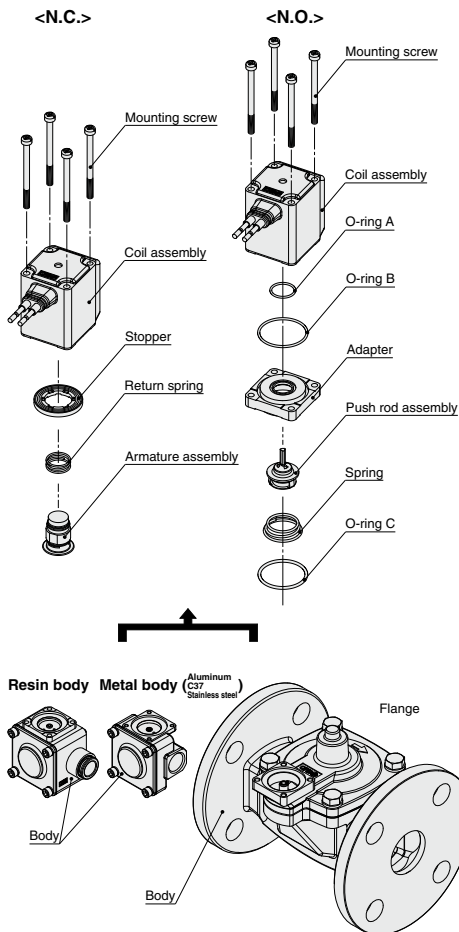


Fig. 2



* 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.

Process Valves

VX2

VXD

VXZ

VXS

VXF2

SX10

INDEX



Series VXD

Specific Product Precautions 4

Be sure to read before handling. Refer to page 1154 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.smcworld.com>

Piping

Warning

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)
Rc1/8	7 to 9
Rc1/4	12 to 14
Rc3/8	22 to 24
Rc1/2	28 to 30
Rc3/4	28 to 30
Rc1	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.)

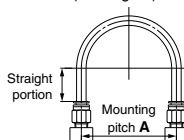


Fig. 1 Recommended piping configuration

Unit: mm

Tube size	Mounting pitch A			Straight portion length
	Nylon tube	Soft nylon tube	Polyurethane tube	
ø1/8"	44 or more	35 or more	25 or more	16 or more
ø6	84 or more	66 or more	39 or more	30 or more
ø1/4"	89 or more	70 or more	57 or more	32 or more
ø8	112 or more	88 or more	52 or more	40 or more
ø10	140 or more	110 or more	69 or more	50 or more
ø12	168 or more	132 or more	88 or more	60 or more

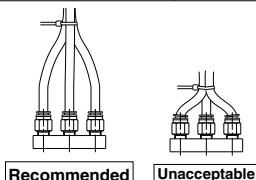


Fig. 2 Binding tubes with bands

Wiring

Warning

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.

Caution

1. As a rule, use electrical wire with a cross sectional area of 0.5 to 1.25 mm² for wiring. Furthermore, do not allow excessive force to be applied to the lines.
2. Use electrical circuits which do not generate chattering in their contacts.
3. Use voltage which is within $\pm 10\%$ 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. For details, please consult with SMC.)



Series VXD

Specific Product Precautions 5

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Operating Environment

⚠ Warning

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

⚠ Warning

1. Removing the product

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

- 1) Shut off the fluid supply and release the fluid pressure in the system.
- 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.

⚠ 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

⚠ 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.

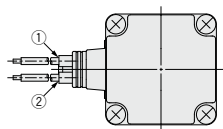
Electrical Connections

⚠ Caution

■ Grommet

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

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

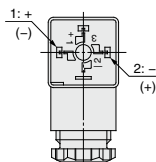


Rated voltage	Lead wire color	
	(1)	(2)
DC	Black	Red
100 VAC	Blue	Blue
200 VAC	Red	Red
Other AC	Gray	Gray

* There is no polarity.

■ DIN terminal

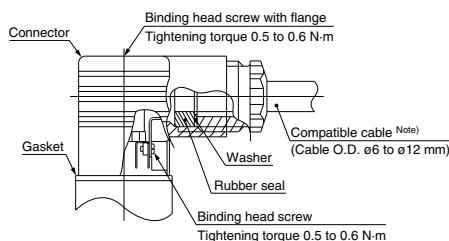
Since internal connections are shown below for the DIN terminal, make connections to the power supply accordingly.



Terminal no.	1	2
DIN terminal	+ (-)	- (+)

* There is no polarity.

- Use a heavy-duty cord with cable O.D. $\phi 6$ to $\phi 12$ mm.
- Use the tightening torques below for each section.



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

Process Valves

VX2

VXD

VXZ

VXS

VXF2

SX10

INDEX



Series VXD Specific Product Precautions 6

Be sure to read before handling. Refer to page 1154 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.smcworld.com>

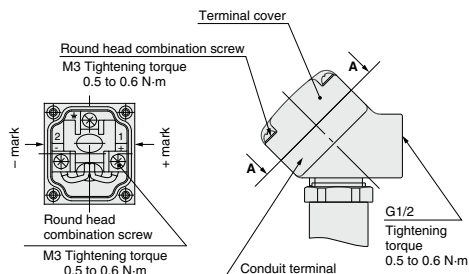
Electrical Connections

⚠ Caution

■ Conduit terminal

In the case of the conduit terminal, make connections according to the marks shown below.

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



View A-A

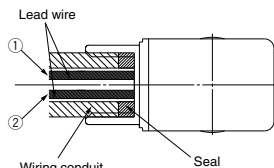
(Internal connection diagram)

■ 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



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

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

* There is no polarity.

(For the power saving type, there is polarity.)

Description	Part no.
Seal	VCW20-15-6

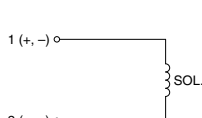
Note) Please order separately.

Electrical Circuits

⚠ Caution

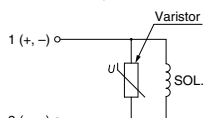
[DC circuit]

Grommet, Flat terminal



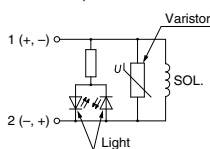
Without electrical option

Grommet, DIN terminal, Conduit terminal, Conduit



With surge voltage suppressor

DIN terminal, Conduit terminal

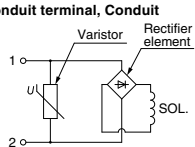


With light/surge voltage suppressor

[AC circuit]

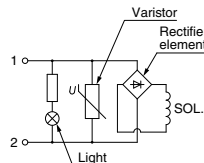
* For AC, the standard product is equipped with surge voltage suppressor.

Grommet, DIN terminal, Conduit terminal, Conduit



Without electrical option

DIN terminal, Conduit terminal



With light/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 687 to order it as an accessory.

One-touch Fitting

⚠ Caution

For information on handling One-touch fittings and appropriate tubing, refer to page 698 and the KQ2 series One-touch fittings in Best Pneumatics No. 6.

The KQ2 series information can be downloaded from the following SMC website, <http://www.smcworld.com>