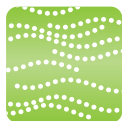


Pilot Operated 2 Port Solenoid Valve

New



Air



Water



Oil



Heated water
210°F (99°C)



High temperature oil
210°F (99°C)



Compact

Height

Approx. **7% Smaller** *
(0.28 in / 7 mm)
(VXD24)

Lightweight

Weight

20% Lighter *
(3.17 oz / 90 g)
(VXD23 Resin body)

Enclosure IP65*

* Electrical entry "Faston" type terminal is IP40.

Power consumption

(DC/N.C. valve)

4.5 W (VXD23 to 25)

7 W (VXD26, 27)

10.5 W (VXD28, 29)

* Comparison with SMC conventional model

-0.28 in
(-7 mm)

Conventional model

New VXD

4.1 in *103.5 mm (Conventional model)

3.8 in (96.5 mm) (New VXD)



Air

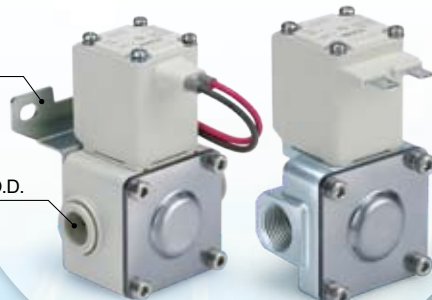
..... **Body material**

Resin (VXD2_A³)

Aluminum (VXD2_A³)

Bracket standard equipment

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



Resin body

Aluminum body



Air



Water



Oil



Heated water
(99°C)



High temperature oil
(99°C)

..... **Body material**

C37, Stainless steel, CAC407

(VXD2_A³ to 2_B⁶)

(VXD2_E⁷ to 2_G⁸)



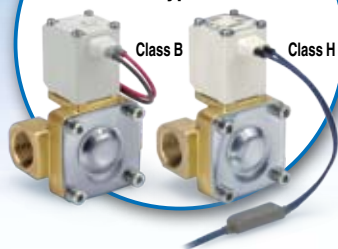
C37 body

Stainless steel body

CAC407 body

Solenoid coil type

Insulation type Class B/H



Class B

Class H

Valve type

N.C.

N.O.



Series VXD

SMC
CAT.NAS70-50A

Pilot Operated 2 Port Solenoid Valve

Series **VXD**



Air



Water



Oil



Heated water



High temperature oil

Enclosure
IP65

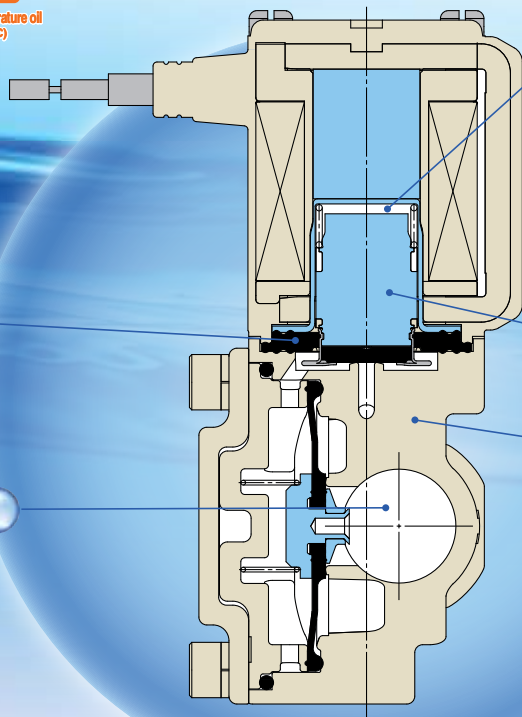
Flame resistance
UL94V-0 conformed

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 (VXD2³_A)

Resin (VXD2³_A)

C37, Stainless steel (VXD2⁴_B to 2⁶_D)

CAC407 (VXD2⁷_E to 2⁹_G)

**Water/Oil/Heated water/
High temperature oil**

C37, Stainless steel (VXD2³_A to 2⁶_D)

CAC407 (VXD2⁷_E to 2⁹_G)

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

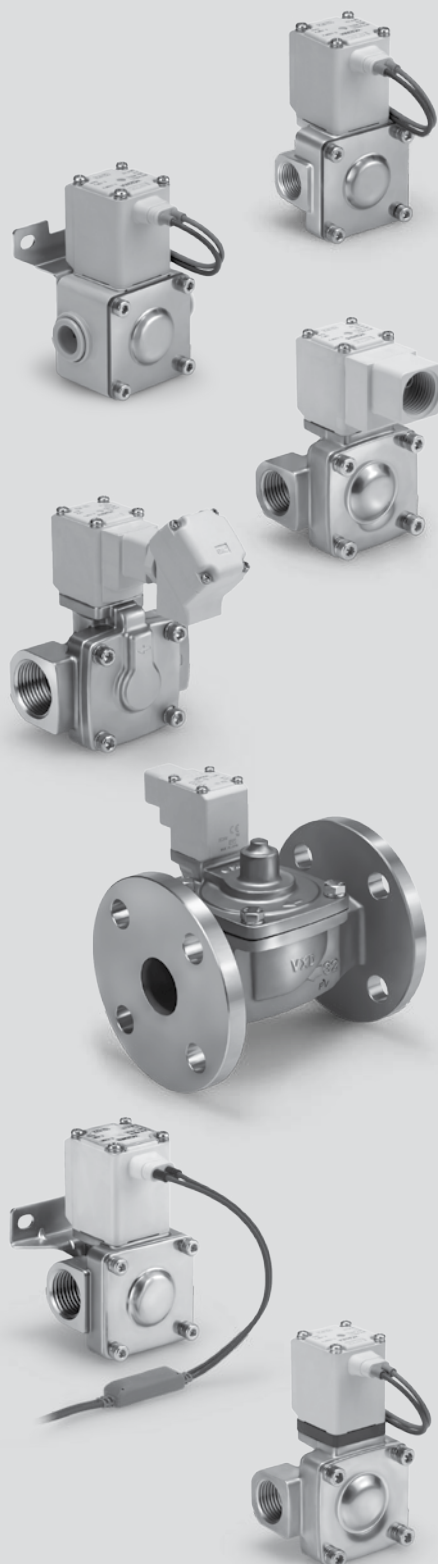
Specially constructed to improve the OFF response when operated with a higher viscosity fluid such as oil.

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 ³ _A	8A 10A 15A	10 mmø	Aluminum	●	●	●	—	—	—	—	—	—	—	—
			Resin	—	—	—	—	—	—	—	—	●	●	●
			C37	●	●	●	—	—	—	—	—	—	—	—
			Stainless steel	●	●	●	—	—	—	—	—	—	—	—
VXD2 ⁴ _B	10A 15A	15 mmø	C37	—	●	●	—	—	—	—	—	—	—	—
			Stainless steel	—	●	●	—	—	—	—	—	—	—	—
VXD2 ⁵ _C	20A	20 mmø	C37	—	—	—	●	—	—	—	—	—	—	—
			Stainless steel	—	—	—	●	—	—	—	—	—	—	—
VXD2 ⁶ _D	25A	25 mmø	C37	—	—	—	—	●	—	—	—	—	—	—
			Stainless steel	—	—	—	—	●	—	—	—	—	—	—
VXD2 ⁷ _E	32A	35 mmø	CAC407	—	—	—	—	—	●	—	—	—	—	—
VXD2 ⁸ _F	40A	40 mmø		—	—	—	—	—	—	●	—	—	—	—
VXD2 ⁹ _G	50A	50 mmø		—	—	—	—	—	—	—	●	—	—	—



Common Specifications	2
Selection Steps	3



For Air

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For Water

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For Oil

Model/Valve Specifications, Fluid and Ambient Temperature, Valve Leakage.	10, 11
How to Order	12



For Heated water

Model/Valve Specifications, Fluid and Ambient Temperature, Valve Leakage.	13, 14
How to Order	15



For High temperature oil

Model/Valve Specifications, Fluid and Ambient Temperature, Valve Leakage.	16, 17
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Construction	20
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Dimensions

For Air/Water/Oil

Body material: Resin	22
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Body material: Aluminum, C37, Stainless steel	24
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Body material: C37, Stainless steel	26
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Body material: CAC407	30
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For Heated water/High temperature oil

Body material: C37, Stainless steel	32
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Body material: CAC407	35
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Solenoid Valve Flow-rate Characteristics	38
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Flow-rate Characteristics	43
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Safety Instructions.....	Back cover
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Common Specifications

Standard Specifications

Valve specifications	Valve construction		Pilot operated 2 port diaphragm type
	Withstand pressure		290 psi (2.0 MPa) (Resin body type 218 psi (1.5 MPa))
	Body material		Aluminum, Resin, C37 (Brass), Stainless steel, CAC407 (Bronze casting)
	Seal material		NBR, FKM, EPDM
	Enclosure		Dust-tight, Water-jet-proof type (IP65) ^{Note 1)}
	Environment		Location without corrosive or explosive gases
Coil specifications	Rated voltage	AC	100 VAC, 200 VAC, 110 VAC, 230 VAC, (220 VAC, 240 VAC, 48 VAC, 24 VAC) ^{Note 2)}
		DC	24 VDC, (12 VDC) ^{Note 2)}
	Allowable voltage fluctuation		±10% of rated voltage
	Allowable leakage voltage	AC	10% or less of rated voltage
		DC	2% or less of rated voltage
	Coil insulation type		Class B, Class H

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

Note 2) Voltage in () indicates special voltage. (Refer to page 19.)

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

Solenoid Coil Specifications

Normally Closed (N.C.)

DC Specification

Model	Power consumption (W) ^{Note 1)}	Temperature rise ^{Note 2)}
VXD23 to 25	4.5	122 °F (50°C)
VXD26, 27	7	131°F (55°C)
VXD28, 29	10.5	149°F (65°C)

Note 1) Power consumption, Apparent power: The value at ambient temperature of 68°F (20°C) and when the rated voltage is applied. (Variation: ±10%)

Note 2) The value at ambient temperature of 68°F (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

Model	Power consumption (W) ^{Note 1)}	Temperature rise ^{Note 2)}
VXD2A to 2C	7.5	140°F (60°C)
VXD2D, 2E	8.5	158°F (70°C)
VXD2F, 2G	12.5	158°F (70°C)

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

Class B

Model	Apparent power (VA) ^{Note 1) 2)}	Temperature rise ^{Note 3)}
VXD23 to 25	7	140°F (60°C)
VXD26, 27	9.5	158°F (70°C)
VXD28, 29	12	158°F (70°C)

Class H

Model	Apparent power (VA) ^{Note 1) 2)}	Temperature rise ^{Note 3)}
VXD23 to 25	9	212°F (100°C)
VXD26, 27	12	212°F (100°C)
VXD28, 29	15	212°F (100°C)

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

Class B

Model	Apparent power (VA)	Temperature rise
VXD2A to 2C	9	140°F (60°C)
VXD2D, 2E	10	158°F (70°C)
VXD2F, 2G	14	158°F (70°C)

Class H

Model	Apparent power (VA) ^{Note 1) 2)}	Temperature rise ^{Note 3)}
VXD2A to 2C	9	212°F (100°C)
VXD2D, 2E	12	212°F (100°C)
VXD2F, 2G	15	212°F (100°C)

Note 1) Power consumption, Apparent power: The value at ambient temperature of 68°F (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 68°F (20°C) and when the rated voltage is applied. The value depends on the ambient environment.
This is for reference.

Series VXD

Selection Steps

Selection Steps

Step 1 Select the fluid.

Item	Selection item	Page	Symbol
Select the fluid.	Air 	Page 4	0
	Water 	Page 7	2
	Oil 	Page 10	3
	Heated water 	Page 13	5
	High temperature oil 	Page 16	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	3
	Valve type	N.C.	
	Body material	Aluminum	
	Port size	1/4	A
	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	A
	Electrical entry	Grommet	

VXD2 3 0 A A

④

Step 4 For other special options, refer to page 19.

Specifications

For Air

For Water

For Oil

For Heated water

For High temperature oil

Options

Construction

Dimensions

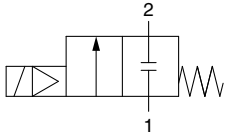


For Air

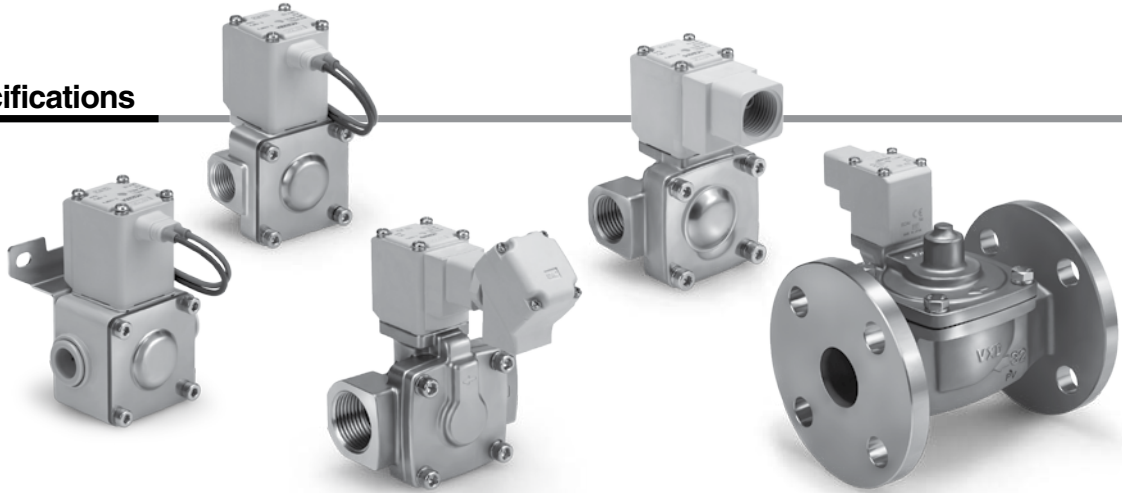
Model/Valve Specifications

N.C.

Symbol



Refer to "Glossary of Terms" on page 37 for symbol.



Normally Closed (N.C.)

Body material	Port size	Orifice diameter (mmø)	Model	Minimum operating pressure differential ^{Note 1)}	Maximum operating pressure differential		Flow-rate characteristics				Maximum system pressure	Weight ^{Note 2)} lb (g)
					AC	DC	C	b	Cv	Effective area (mm ²)		
Aluminum	1/4 (8A)	10	VXD230	2.9 psi (0.02 MPa)	131 psi (0.9 MPa)	131 psi (0.9 MPa)	8.5	0.35	2.0	—	218 psi (1.5 MPa)	0.82 (370)
	3/8 (10A)						9.2		2.4			0.82 (370)
	1/2 (15A)						9.2		2.4			0.82 (370)
Resin	ø10						5.6	0.33	1.3			0.73 (330)
	ø3/8"						4.8	0.33	0.9			0.73 (330)
	ø12						7.2	0.33	1.5			0.73 (330)
Stainless steel, C37	3/8 (10A)	15	VXD240	4.4 psi (0.03 MPa)	145 psi (1.0 MPa)	145 psi (1.0 MPa)	18.0	0.35	5.0			1.59 (720)
	1/2 (15A)	20	VXD250				20.0		5.5			1.59 (720)
	3/4 (20A)		VXD260				38.0	0.30	9.5			1.85 (840)
CAC407	1 (25A)	25	VXD260				—			225		2.88 (1360)
	32A Flange	35	VXD270							415		11.9 (5400)
	40A Flange	40	VXD280							560		15.0 (6800)
	50A Flange	50	VXD290							880		18.5 (8400)

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

Note 2) Weight of grommet type. Add 0.35 oz (10 g) for conduit type, 1.06 oz (30 g) for DIN terminal type, 2.12 oz (60 g) for conduit terminal type respectively.

• Refer to "Glossary of Terms" on page 37 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

Fluid and Ambient Temperature

Fluid temperature °F (°C)	Ambient temperature °F (°C)
14 to 140 (−10 ^{Note} to 60)	−4 to 140 (−20 to 60)

Note) Dew point temperature: 14°F (−10°C) or less

Valve Leakage

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)	10 cm ³ /min or less
	15 cm ³ /min or less (Resin body type)	
	2 cm ³ /min or less (Metal body type)	

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)	1 cm ³ /min or less
	15 cm ³ /min or less (Resin body type)	
	1 cm ³ /min or less (Metal body type)	

Note 1) Leakage is the value at ambient temperature 68°F (20°C).

Note 2) For seal material/FKM, refer to "Other options" on page 19 for the selection.

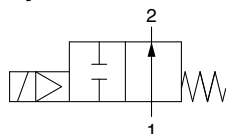


For Air

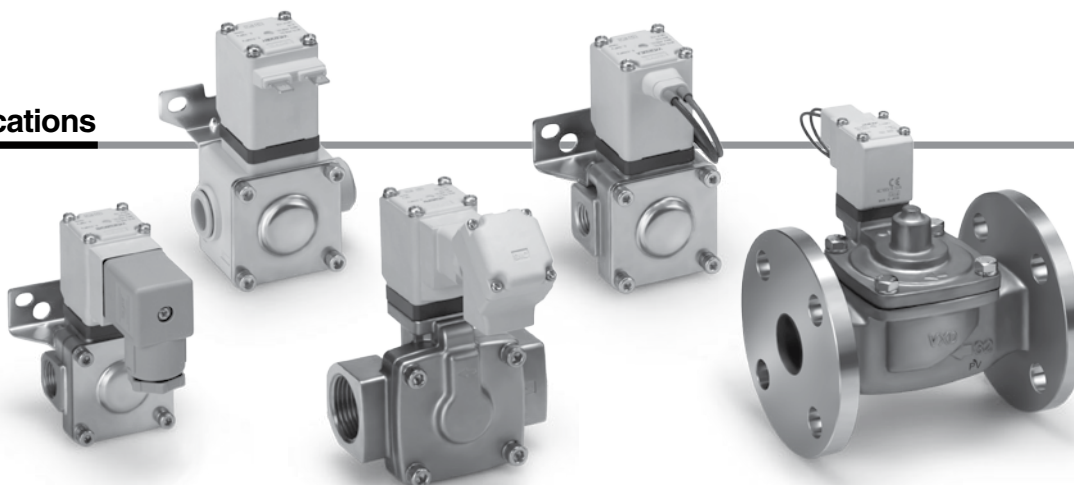
Model/Valve Specifications

N.O.

Symbol



Refer to "Glossary of Terms" on page 37 for symbol.



Normally Open (N.O.)

Body material	Port size	Orifice diameter (mmø)	Model	Minimum operating pressure differential <small>Note 1)</small>	Maximum operating pressure differential		Flow-rate characteristics				Maximum system pressure	<small>Note 2)</small> Weight (g)
					AC	DC	C	b	Cv	Effective area (mm²)		
Aluminum	1/4 (8A)	10	VXD2A0	2.9 psi (0.02 MPa)	87 psi (0.6 MPa)	58 psi (0.4 MPa)	8.5	0.35	2.0	—	218 psi (1.5 MPa)	0.86 (390)
	3/8 (10A)						9.2		2.4			0.86 (390)
	1/2 (15A)						9.2		2.4			0.86 (390)
Resin	ø10						0.33	1.3	0.77 (350)			
	ø3/8"							0.9	0.77 (350)			
	ø12							1.5	0.77 (350)			
Stainless steel, C37	3/8 (10A)	15	VXD2B0	102 psi (0.7 MPa)	102 psi (0.7 MPa)	18.0	0.35	5.0		1.63 (740)		
	1/2 (15A)	20.0	5.5			1.63 (740)						
	3/4 (20A)	20	VXD2C0			38.0	0.30	9.5		1.90 (860)		
	1 (25A)	25	VXD2D0							225	3.06 (1390)	
CAC407	32A Flange	35	VXD2E0	4.4 psi (0.03 MP)			—		415	12.0 (5430)		
	40A Flange	40	VXD2F0						560	15.1 (6840)		
	50A Flange	50	VXD2G0						880	18.6 (8440)		

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

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

- Refer to "Glossary of Terms" on page 37 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

Fluid and Ambient Temperature

Fluid temperature °F (°C)	Ambient temperature °F (°C)
14 to 140 (–10 ^{Note}) to 60)	–4 to 140°F (–20 to 60)

Note) Dew point temperature: 14°F (–10°C) or less

Valve Leakage

Internal Leakage

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

External Leakage

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

Note 1) Leakage is the value at ambient temperature 68°F (20°C).

Note 2) For seal material/FKM, refer to "Other options" on page 19 for the selection.



VXD2 **3** **0** **A** **A**

Fluid

0 Air

Size—Valve type

Symbol	Size	Valve type
3	8A	N.C.
A	10A 15A	N.O.
4	10A	N.C.
B	15A	N.O.
5	20A	N.C.
C		N.O.
6	25A	N.C.
D		N.O.
7	32A	N.C.
E		N.O.
8	40A	N.C.
F		N.O.
9	50A	N.C.
G		N.O.

Body material/Port size/Orifice diameter

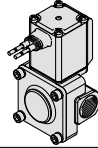
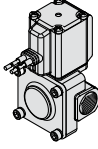
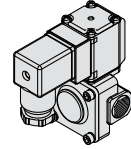
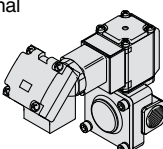
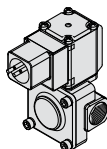
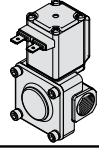
Symbol	Body material	Port size	Orifice diameter
A	Aluminum	1/4	10
B		3/8	
C		1/2	
D		ø10 One-touch fitting	
E	Resin	ø3/8" One-touch fitting	
F		ø12 One-touch fitting	
G	C37	3/8	15
H		1/2	
J	Stainless steel	3/8	
K		1/2	
L	C37	3/4	20
M	Stainless steel		
N	C37	1	25
P	Stainless steel		
Q	CAC407	32A Flange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

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	
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	Faston terminal 
U	110 VAC	
V	200 VAC	
W	230 VAC	
Y	24 VDC	
Z	Other special options	

For other special options, refer to page 19.

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)	
Oil-free	
G thread	
NPT thread	
With bracket	



For Water

Pilot Operated 2 Port Solenoid Valve *Series VXD*

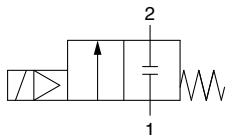
* Possible to use this for air.

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

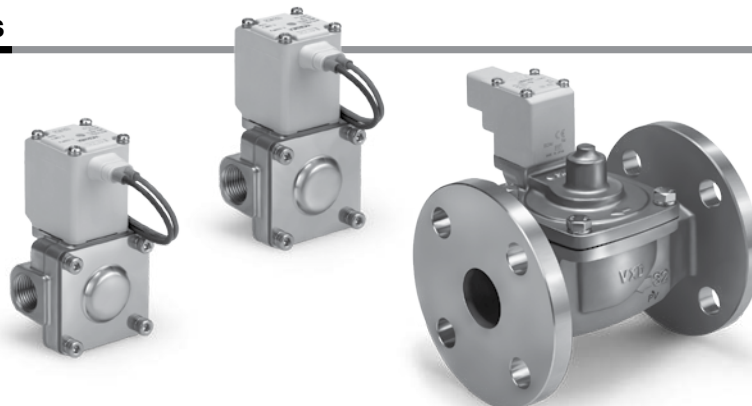
Model/Valve Specifications

N.C.

Symbol



Refer to "Glossary of Terms" on page 37 for symbol.



Normally Closed (N.C.)

Body material	Port size	Orifice diameter (mmø)	Model	Minimum operating pressure differential <small>Note 1)</small>	Maximum operating pressure differential		Flow-rate characteristics		Maximum system pressure	Weight <small>Note 2)</small> lb (g)
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv		
Stainless steel, C37	1/4 (8A)	10	VXD232	2.9 psi (0.02 MPa)	102 psi (0.7 MPa)	73 psi (0.5 MPa)	46	1.9	218 psi (1.5 MPa)	1.06 (480)
	3/8 (10A)						58	2.4		1.06 (480)
	1/2 (15A)						58	2.4		1.06 (480)
	3/8 (10A)	15	VXD242		110	4.5	1.59 (720)			
	1/2 (15A)				130	5.5	1.59 (720)			
	3/4 (20A)				230	9.5	1.85 (840)			
	1 (25A)	25	VXD262		310	13	3.00 (1360)			
CAC407	32A Flange	35	VXD272		550	23	11.9 (5400)			
	40A Flange	40	VXD282		740	31	15.0 (6800)			
	50A Flange	50	VXD292		1200	49	18.5 (8400)			

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

Note 2) Weight of grommet type. Add 0.35 oz (10 g) for conduit type, 1.06 oz (30 g) for DIN terminal type, 2.12 oz (60 g) for conduit terminal type respectively.

• Refer to "Glossary of Terms" on page 37 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

Fluid and Ambient Temperature

Fluid temperature °F (°C)	Ambient temperature °F (°C)
33.8 to 140 (1 to 60 ^{Note)})	−4 to 140 (−20 to 60)

Note) No freezing

Valve Leakage

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 68°F (20°C).

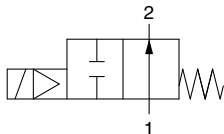
Note 2) For seal material/FKM, refer to "Other options" on page 19 for the selection.



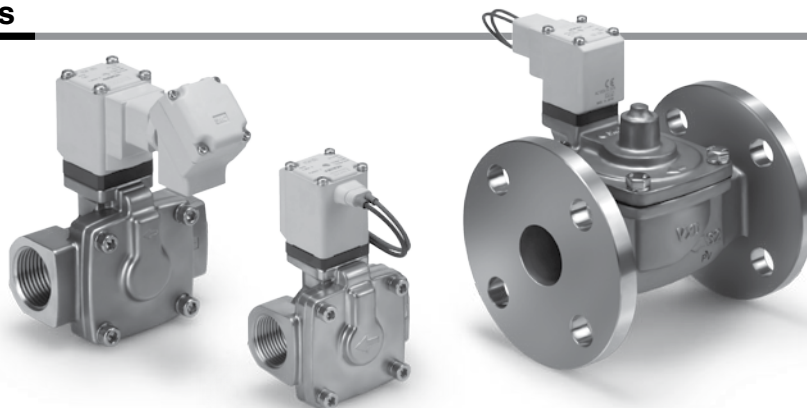
Model/Valve Specifications

N.O.

Symbol



Refer to "Glossary of Terms" on page 37 for symbol.



Normally Open (N.O.)

Body material	Port size	Orifice diameter (mmø)	Model	Minimum operating pressure differential <small>Note 1)</small>	Maximum operating pressure differential		Flow-rate characteristics		Maximum system pressure	Weight lb (g) <small>Note 2)</small>
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv		
Stainless steel, C37	1/4 (8A)	10	VXD2A2	2.9 psi (0.02 MPa)	58 psi (0.4 MPa)	44 psi (0.3 MPa)	46	1.9	218 psi (1.5 MPa)	1.10 (500)
	3/8 (10A)						58	2.4		1.10 (500)
	1/2 (15A)						58	2.4		1.10 (500)
	3/8 (10A)	15	VXD2B2		102 psi (0.7 MPa)	102 psi (0.7 MPa)	110	4.5		1.63 (740)
	1/2 (15A)						130	5.5		1.63 (740)
	3/4 (20A)						230	9.5		1.90 (860)
	1 (25A)	25	VXD2D2				310	13		3.06 (1390)
CAC407	32A Flange	35	VXD2E2				550	23		12.0 (5430)
	40A Flange	40	VXD2F2				740	31		15.1 (6840)
	50A Flange	50	VXD2G2				1200	49		18.6 (8440)

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

Note 2) Weight of grommet type. Add 0.35 oz (10 g) for conduit type, 1.06 oz (30 g) for DIN terminal type, 2.12 oz (60 g) for conduit terminal type respectively.

• Refer to "Glossary of Terms" on page 37 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

Fluid and Ambient Temperature

Fluid temperature °F (°C)	Ambient temperature °F (°C)
33.8 to 140 (1 to 60 ^{Note})	-4 to 140°F (-20 to 60)

Note) No freezing

Valve Leakage

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 68°F (20°C).

Note 2) For seal material/FKM, refer to "Other options" on page 19 for the selection.

Pilot Operated 2 Port Solenoid Valve **Series VXD**



For Water



RoHS

How to Order

VXD2 3 2 A A

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.

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	
A	10A 15A	N.O.	D	Stainless steel	1/4	10
			E		3/8	
			F		1/2	
4	10A 15A	N.C.	G	C37	3/8	15
			H		1/2	
			J		3/8	
B	10A 15A	N.O.	K	Stainless steel	1/2	15
			L		3/4	
			M		3/4	
5	20A	N.C.	N	C37	1	25
			P		1	
			Q		1	
C	20A	N.O.	R	CAC407	40A Flange	40
			S		50A Flange	
			T		50A Flange	
6	25A	N.C.	U	CAC407	50A Flange	50
			V		50A Flange	
			W		50A Flange	
D	25A	N.O.	X	CAC407	50A Flange	50
			Y		50A Flange	
			Z		50A Flange	
7	32A	N.C.	AA	CAC407	50A Flange	50
			AB		50A Flange	
			AC		50A Flange	
E	32A	N.O.	AD	CAC407	50A Flange	50
			AE		50A Flange	
			AF		50A Flange	
8	40A	N.C.	AG	CAC407	50A Flange	50
			AH		50A Flange	
			AI		50A Flange	
F	40A	N.O.	AJ	CAC407	50A Flange	50
			AK		50A Flange	
			AL		50A Flange	
9	50A	N.C.	AM	CAC407	50A Flange	50
			AN		50A Flange	
			AO		50A Flange	
G	50A	N.O.	AP	CAC407	50A Flange	50
			AQ		50A Flange	
			AR		50A Flange	

Body material/Port size/Orifice diameter

Voltage/Electrical entry

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

For other special options, refer to page 19.

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)	
Oil-free	
G thread	
NPT thread	
With bracket	

Dimensions → Page on and after 24 (Single Unit)

Series VXD



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.

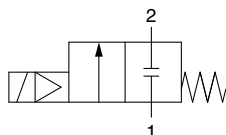
The kinematic viscosity must not exceed 50 mm²/s.

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.

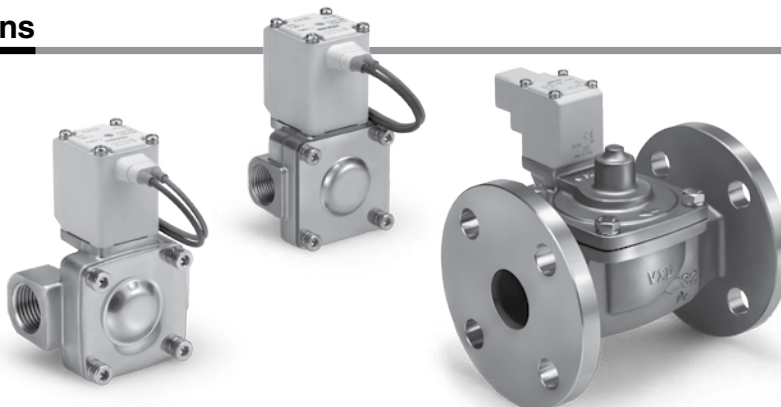
Model/Valve Specifications

N.C.

Symbol



Refer to "Glossary of Terms" on page 37 for symbol.



Normally Closed (N.C.)

Body material	Port size	Orifice diameter (mmø)	Model	Minimum operating pressure differential Note 1)	Maximum operating pressure differential		Flow-rate characteristics		Maximum system pressure	Weight (g) <small>Note 2)</small>		
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv				
Stainless steel, C37	1/4 (8A)	10	VXD233	2.9 psi (0.02 MPa)	73 psi (0.5 MPa)	58 psi (0.4 MPa)	46	1.9	218 psi (1.5 MPa)	1.06 (480)		
	3/8 (10A)		58				2.4	1.06 (480)				
	1/2 (15A)		58				2.4	1.06 (480)				
	3/8 (10A)		110				4.5	1.59 (720)				
	1/2 (15A)	20	VXD243		102 psi (0.7 MPa)	102 psi (0.7 MPa)	130	5.5		1.59 (720)		
	3/4 (20A)		VXD253				230	9.5		1.85 (840)		
	1 (25A)		VXD263				310	13		3.00 (1360)		
CAC407	32A Flange	35	VXD273	4.4 psi (0.03 MPa)			550	23		11.9 (5400)		
	40A Flange	40	VXD283				740	31		15.0 (6800)		
	50A Flange	50	VXD293				1200	49		18.5 (8400)		

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

Note 2) Weight of grommet type. Add 0.35 oz (10 g) for conduit type, 1.06 oz (30 g) for DIN terminal type, 2.12 oz (60 g) for conduit terminal type respectively.

• Refer to "Glossary of Terms" on page 37 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

Fluid and Ambient Temperature

Fluid temperature °F (°C)	Ambient temperature °F (°C)
23 to 140 (−5 <small>Note</small> to 60)	−4 to 140 (−20 to 60)

Note) Kinematic viscosity: 50 mm²/s or less

Valve Leakage

Internal Leakage

Seal material	Leakage rate (Oil) <small>Note</small>	
	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) <small>Note</small>	
	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 68°F (20°C).



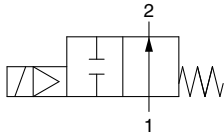
⚠ When the fluid is oil.

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.

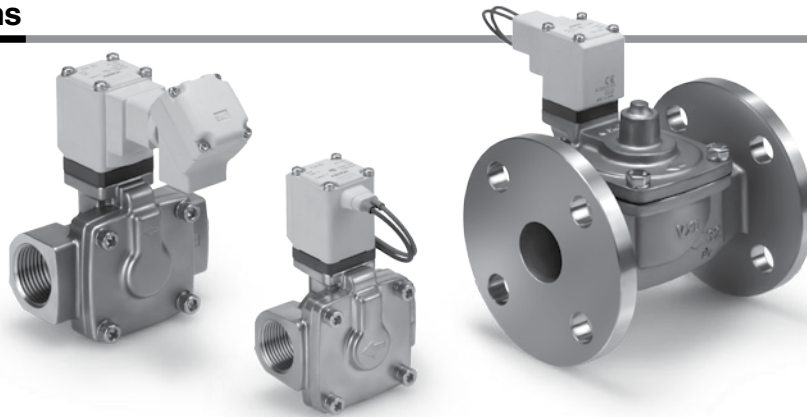
Model/Valve Specifications

N.O.

Symbol



Refer to "Glossary of Terms" on page 37 for symbol.



Normally Open (N.O.)

Body material	Port size	Orifice diameter (mmø)	Model	Minimum operating pressure differential <small>Note 1)</small>	Maximum operating pressure differential		Flow-rate characteristics		Maximum system pressure	<small>Note 2)</small> Weight (g)
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv		
Stainless steel, C37	1/4 (8A)	10	VXD2A3	2.9 psi (0.02 MPa)	58 psi (0.4 MPa)	44 psi (0.3 MPa)	46	1.9	218 psi (1.5 MPa)	1.1 (500)
	3/8 (10A)						58	2.4		1.1 (500)
	1/2 (15A)						58	2.4		1.1 (500)
	3/8 (10A)	15	VXD2B3		110	4.5	1.63 (740)			
	1/2 (15A)				130	5.5	1.63 (740)			
	3/4 (20A)				230	9.5	1.90 (860)			
CAC407	1 (25A)	25	VXD2D3		87 psi (0.6 MPa)	87 psi (0.6 MPa)	310	13		3.06 (1390)
	32A Flange	35	VXD2E3	550			23	12.0 (5430)		
	40A Flange	40	VXD2F3	740			31	15.1 (6840)		
	50A Flange	50	VXD2G3	1200			49	18.6 (8440)		

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

Note 2) Weight of grommet type. Add 0.35 oz (10 g) for conduit type, 1.06 oz (30 g) for DIN terminal type, 2.12 oz (60 g) for conduit terminal type respectively.

• Refer to "Glossary of Terms" on page 37 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

Fluid and Ambient Temperature

Fluid temperature °F (°C)	Ambient temperature °F (°C)
23 to 140 (–5 Note) to 60)	–4 to 140 (–20 to 60)

Note) Kinematic viscosity: 50 mm²/s or less

Valve Leakage

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.



How to Order



VXD2 3 3 A A

Fluid

3 Oil

Size—Valve type

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

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.

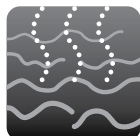
Voltage/Electrical entry

Symbol	Voltage	Electrical entry
A	24 VDC	Grommet
B	100 VAC	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	Faston terminal
U	110 VAC	
V	200 VAC	
W	230 VAC	
Y	24 VDC	Faston terminal
Z	Other voltages and electrical option	

For other special options, refer to page 19.

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	

Dimensions → Page on and after 24 (Single Unit)



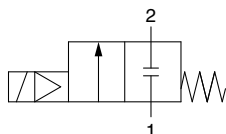
For Heated water

* Possible to use this for air (to 210.2°F (99°C)) and water.
Note that the maximum operating pressure differential and flow-rate characteristics should be within the specifications of the fluid used.

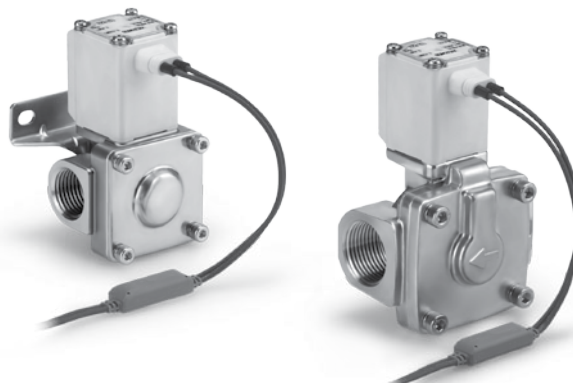
Model/Valve Specifications

N.C.

Symbol



Refer to "Glossary of Terms" on page 37 for symbol.



Normally Closed (N.C.)

Body material	Port size	Orifice diameter (mmø)	Model	Minimum operating pressure differential Note 1)	Maximum operating pressure differential		Flow-rate characteristics		Maximum system pressure	Weight lb (g) <small>Note 2)</small>
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv		
Stainless steel, C37	1/4 (8A)	10	VXD235	2.9 psi (0.02 MPa)	102 psi (0.7 MPa)	73 psi (0.5 MPa)	46	1.9	218 psi (1.5 Mpa)	1.06 (480)
	3/8 (10A)						58	2.4		1.06 (480)
	1/2 (15A)						58	2.4		1.06 (480)
	3/8 (10A)	15	VXD245		145 psi (1.0 MPa)	145 psi (1.0 MPa)	110	4.5		1.59 (720)
	1/2 (15A)						130	5.5		1.59 (720)
	3/4 (20A)						230	9.5		1.85 (840)
	1 (25A)	25	VXD265				310	13		3.00 (1360)
CAC407	32A Flange	35	VXD275	4.4 psi (0.03 MPa)			550	23	11.9 (5400)	
	40A Flange	40	VXD285				740	31	15.0 (6800)	
	50A Flange	50	VXD295				1200	49	18.5 (8400)	

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

Note 2) Weight of grommet type. Add 0.35 oz (10 g) for conduit type, 2.12 oz (60 g) for conduit terminal type respectively.

- Refer to "Glossary of Terms" on page 37 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

Fluid and Ambient Temperature

Fluid temperature °F (°C)	Ambient temperature °F (°C)
33.8 to 210.2 (1 to 99)	−4 to 140°F (−20 to 60)

Note) No freezing

Valve Leakage

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 68°F (20°C).

Specifications

For Air

For Water

For Oil

For Heated water

For High temperature oil

Options

Construction

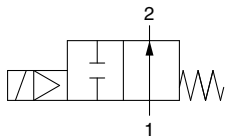
Dimensions



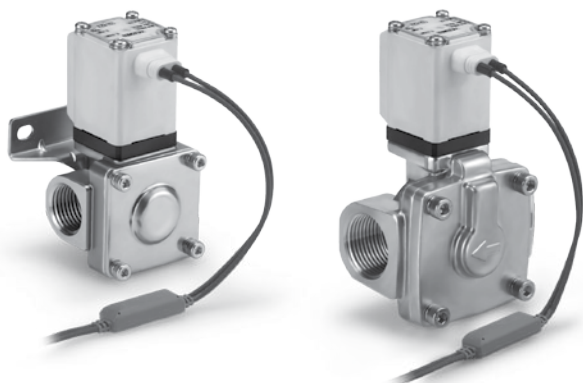
Model/Valve Specifications

N.O.

Symbol



Refer to "Glossary of Terms" on page 37 for symbol.



Normally Open (N.O.)

Body material	Port size	Orifice diameter (mmø)	Model	Minimum operating pressure differential Note 1)	Maximum operating pressure differential		Flow-rate characteristics		Maximum system pressure	Note 2) Weight (g)
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv		
Stainless steel, C37	1/4 (8A)	10	VXD2A5	2.9 psi (0.02 MPa)	58 psi (0.4 MPa)	44 psi (0.3 MPa)	46	1.9	218 psi (1.5 MPa)	1.1 (500)
	3/8 (10A)						58	2.4		1.1 (500)
	1/2 (15A)						58	2.4		1.1 (500)
	3/8 (10A)	15	VXD2B5		110	4.5	1.63 (740)			
	1/2 (15A)				130	5.5	1.63 (740)			
	3/4 (20A)				230	9.5	1.90 (860)			
CAC407	1 (25A)	25	VXD2D5		87 psi (0.7 MPa)	87 psi (0.7 MPa)	310	13		3.06 (1390)
	32A Flange	35	VXD2E5				550	23		12.0 (5430)
	40A Flange	40	VXD2F5	740			31	15.1 (6840)		
	50A Flange	50	VXD2G5	1200			49	18.6 (8440)		

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

Note 2) Weight of grommet type. Add 0.35 oz (10 g) for conduit type, 2.12 oz (60 g) for conduit terminal type respectively.

• Refer to "Glossary of Terms" on page 37 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

Fluid and Ambient Temperature

Fluid temperature °F (°C)	Ambient temperature °F (°C)
33.8 to 210.2 (1 to 99)	-4 to 140 (-20 to 60)

Note) No freezing

Valve Leakage

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 68°F (20°C).



For Heated water



How to Order

VXD2 3 5 A B

Fluid

5 Heated water

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.

Size —Valve type

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

Voltage/Electrical entry

Symbol	Voltage	Electrical entry
B	100 VAC	Grommet (With surge voltage suppressor)
C	110 VAC	
D	200 VAC	
E	230 VAC	Conduit terminal (With surge voltage suppressor)
N	100 VAC	
P	110 VAC	
Q	200 VAC	Conduit (With surge voltage suppressor)
R	230 VAC	
T	100 VAC	
U	110 VAC	
V	200 VAC	
W	230 VAC	
Z	Other voltages and electrical option	

* DIN terminal, Faston terminal or DC specification are not available.

For other special options, refer to page 19.

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

Series VXD



For High temperature oil

* Possible to use this for air (to 210.2°F (99°C) and water.
Note that the maximum operating pressure differential and flow-rate characteristics should be within the specifications of the fluid used.

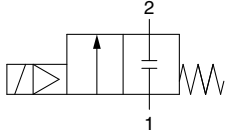
⚠ When the fluid is oil.

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.

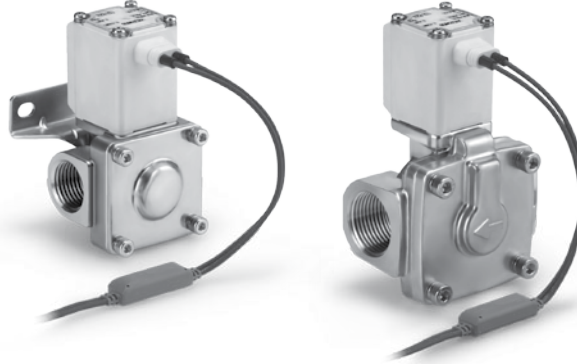
Model/Valve Specifications

N.C.

Symbol



Refer to "Glossary of Terms" on page 37 for symbol.



Normally Closed (N.C.)

Body material	Port size	Orifice diameter (mmø)	Model	Minimum operating pressure differential <small>Note 1)</small>	Maximum operating pressure differential		Flow-rate characteristics		Maximum system pressure	<small>Note 2)</small> Weight lb (g)
					AC	DC	Av (x 10 ⁻⁶ m²)	Conversion Cv		
Stainless steel, C37	1/4 (8A)	10	VXD236	2.9 psi (0.02 MPa)	102 psi (0.5 MPa)	73 psi (0.4 MPa)	46	1.9	218 psi (1.5 MPa)	1.06 (480)
	3/8 (10A)						58	2.4		1.06 (480)
	1/2 (15A)						58	2.4		1.06 (480)
	3/8 (10A)	15	VXD246		110	4.5	1.59 (720)			
	1/2 (15A)				130	5.5	1.59 (720)			
	3/4 (20A)				230	9.5	1.85 (840)			
CAC407	1 (25A)	25	VXD266		102 psi (0.7 MPa)	310	13	3.00 (1360)		
	32A Flange	35	VXD276	4.4 psi (0.03 MPa)		550	23	11.9 (5400)		
	40A Flange	40	VXD286			740	31	15.0 (6800)		
	50A Flange	50	VXD296			1200	49	18.5 (8400)		

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

Note 2) Weight of grommet type. Add 0.35 oz (10 g) for conduit type, 2.12 oz (60 g) for conduit terminal type respectively.

• Refer to "Glossary of Terms" on page 37 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

Fluid and Ambient Temperature

Fluid temperature °F (°C)	Ambient temperature °F (°C)
23 to 212 (-5 Note) to 100)	-4 to 140 (-20 to 60)

Note) Kinematic viscosity: 50 mm²/s or less

Valve Leakage

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 68°F (20°C).



For High temperature oil

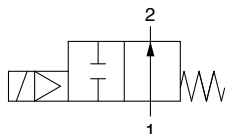
⚠ When the fluid is oil.

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.

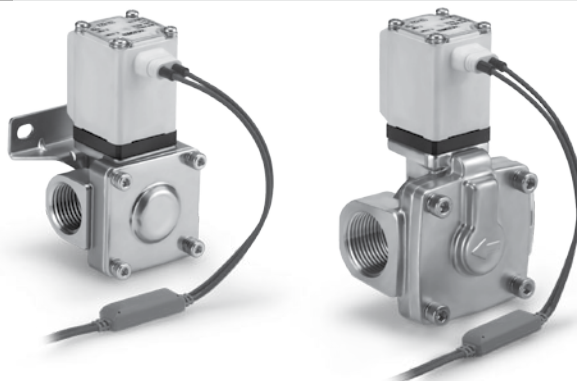
Model/Valve Specifications

N.O.

Symbol



Refer to "Glossary of Terms" on page 37 for symbol.



Normally Open (N.O.)

Body material	Port size	Orifice diameter (mmø)	Model	Minimum operating pressure differential <small>Note 1)</small>	Maximum operating pressure differential		Flow-rate characteristics		Maximum system pressure	<small>Note 2)</small> Weight lb (g)	
					AC	DC	Av (x 10 ⁻⁶ m²)	Conversion Cv			
Stainless steel, C37	1/4 (8A)	10	VXD2A6	2.9 psi (0.02 MPa)	58 psi (0.4 MPa)	44 psi (0.3 MPa)	46	1.9	218 psi (1.5 MPa)	1.1 (500)	
	3/8 (10A)						58	2.4		1.1 (500)	
	1/2 (15A)						58	2.4		1.1 (500)	
	3/8 (10A)	15	VXD2B6		87 psi (0.6 MPa)	87 psi (0.6 MPa)	110	4.5		1.63 (740)	
	1/2 (15A)						130	5.5		1.63 (740)	
	3/4 (20A)						230	9.5		1.90 (860)	
	1 (25A)	25	VXD2D6				310	13		3.06 (1390)	
CAC407	32A Flange	35	VXD2E6	4.4 psi (0.03 MPa)			550	23	12.0 (5430)		
	40A Flange	40	VXD2F6				740	31	15.1 (6840)		
	50A Flange	50	VXD2G6				1200	49	18.6 (8440)		

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

Note 2) Weight of grommet type. Add 0.35 oz (10 g) for conduit type, 2.12 oz (60 g) for conduit terminal type respectively.

- Refer to "Glossary of Terms" on page 37 for details on minimum operating pressure differential, the maximum operating pressure differential, maximum system pressure.

Fluid and Ambient Temperature

Fluid temperature °F (°C)	Ambient temperature °F (°C)
23 to 212 (-5 <small>Note)</small> to 100)	-4 to 140 (-20 to 60)

Note) Kinematic viscosity: 50 mm²/s or less

Valve Leakage

Internal Leakage

Seal material	Leakage rate (Oil) <small>Note)</small>	
	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) <small>Note)</small>	
	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 68°F (20°C).



How to Order



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

Fluid

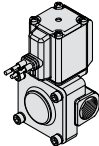
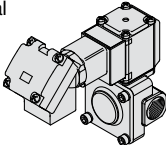
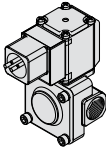
6 High temperature oil

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		
A		N.O.		D	Stainless steel	1/4		
				E		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.						

Body material/Port size/Orifice diameter

Voltage/Electrical entry

Symbol	Voltage	Electrical entry	
B	100 VAC	Grommet (With surge voltage suppressor)	
C	110 VAC		
D	200 VAC		
E	230 VAC		
N	100 VAC	Conduit terminal (With surge voltage suppressor)	
P	110 VAC		
Q	200 VAC		
R	230 VAC		
T	100 VAC	Conduit (With surge voltage suppressor)	
U	110 VAC		
V	200 VAC		
W	230 VAC		
Z	Other voltages and electrical option		

* DIN terminal, Faston terminal or DC specification are not available.

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.

For other special options, refer to page 19.

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

Other Special Options

Electrical options (Special voltage, With light, Without DIN connector)

VXD2 3 0 A Z 1A

Enter standard product number.

Electrical option

Special voltage/With light/Without DIN connector

Specification	Symbol	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
	1E	12 VDC	
	1F	48 VAC	Grommet (With surge voltage suppressor)
	1G	220 VAC	
	1H	240 VAC	
	1V	24 VAC	
	1J	12 VDC	Grommet
	1K	48 VAC	
	1L	220 VAC	DIN terminal (With surge voltage suppressor)
	1M	240 VAC	
	1W	24 VAC	
	1N	12 VDC	
With light	1P	48 VAC	Conduit terminal (With surge voltage suppressor)
	1Q	220 VAC	
	1R	240 VAC	
	1Y	24 VAC	
	1S	12 VDC	Conduit
	1T	12 VDC	
	2A	24 VDC	Faston terminal
	2B	100 VAC	
	2C	110 VAC	
	2D	200 VAC	
	2E	230 VAC	DIN terminal (With surge voltage suppressor)
	2F	48 VAC	
	2G	220 VAC	
	2H	240 VAC	
	2V	24 VAC	DIN terminal
	2J	12 VDC	
	2K	24 VDC	
	2L	100 VAC	
Without DIN connector	2M	110 VAC	Conduit terminal (With surge voltage suppressor)
	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	
	3A	24 VDC	DIN terminal (With surge voltage suppressor)
	3B	100 VAC	
	3C	110 VAC	
	3D	200 VAC	
	3E	230 VAC	DIN terminal
	3F	48 VAC	
	3G	220 VAC	
	3H	240 VAC	
	3V	24 VAC	DIN terminal
	3J	12 VDC	

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 options (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.

With bracket

VXD2 □ □ □ □ XB

Enter standard product number.

With bracket

*1 Applies the VXD2³_A to VXD2⁶_D.

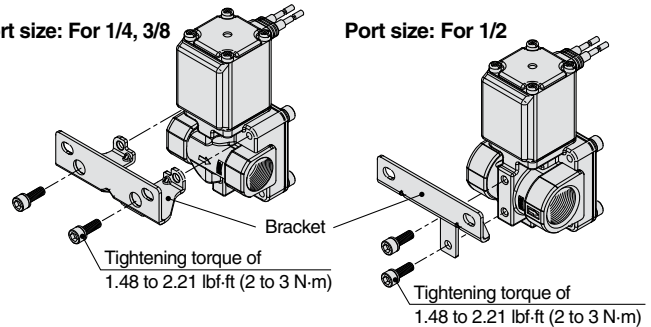
*2 Bracket is standardized with the resin body type (VXD230^D_F□). No need to add "XB".

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

VXD2³_A □ Bracket mounting dimensions

Port size: For 1/4, 3/8

Port size: For 1/2



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

Example) VXD2 3 2 A Z 1A Z XB

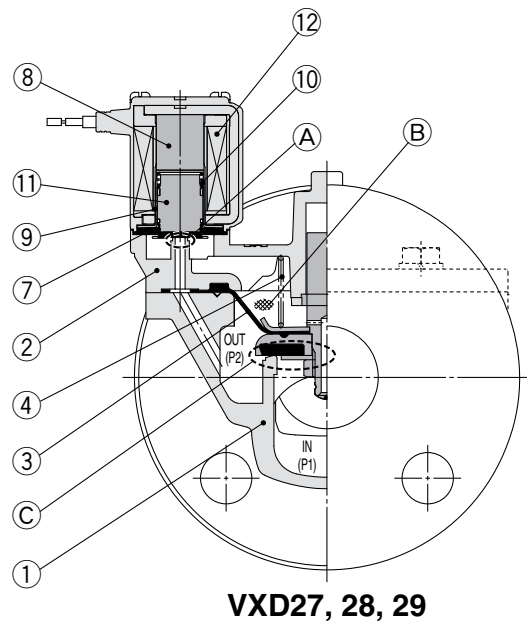
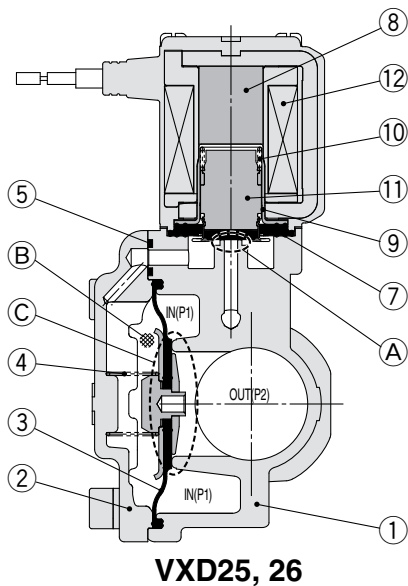
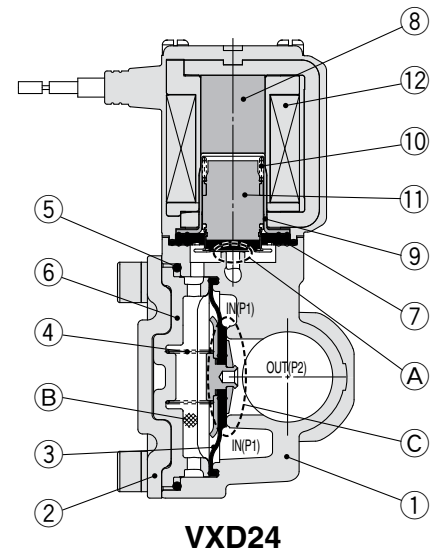
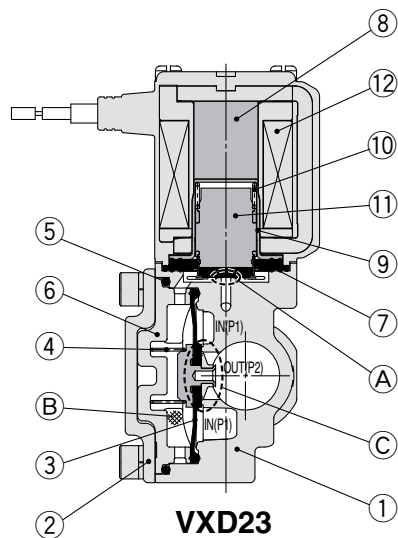
Electrical option

Other option

With bracket

Series VXD Construction

Normally Closed (N.C.)



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	VXD23 to 29	NBR, FKM, EPDM
8	Core		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

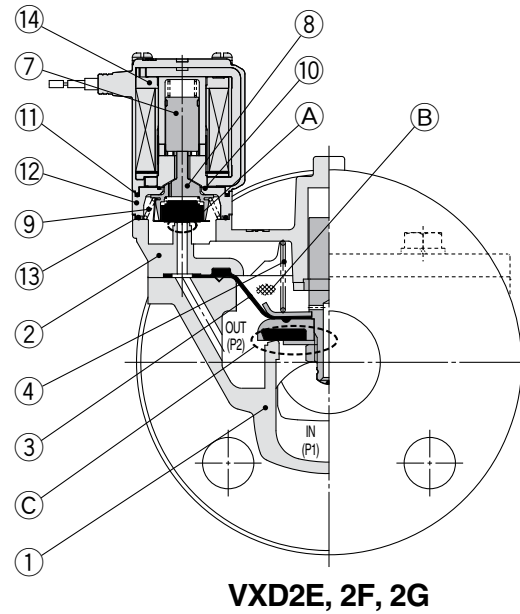
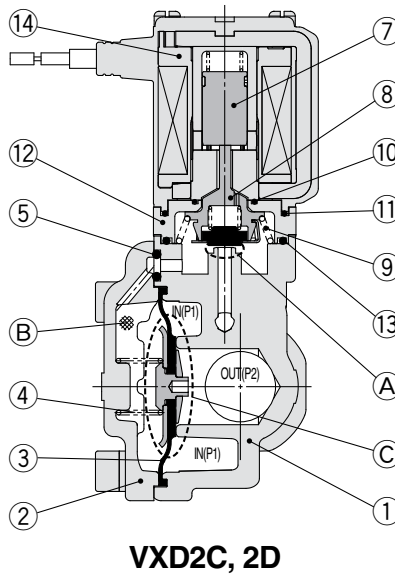
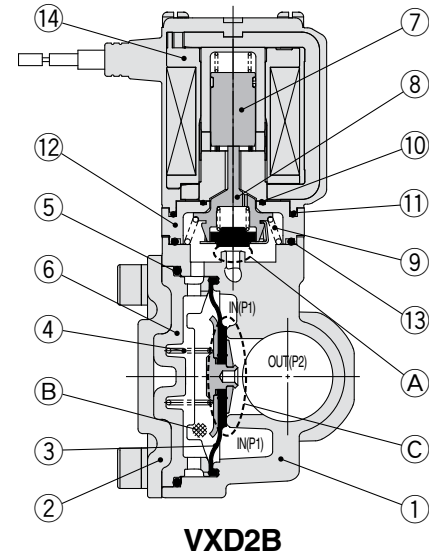
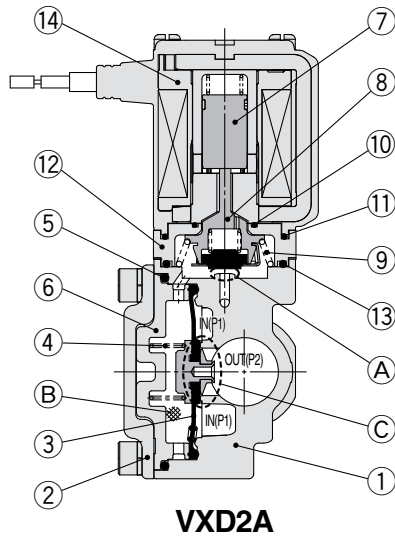
<Valve opened>

When coil ⑫ is energized, armature assembly ⑪ is attracted by core ⑧ and pilot valve (A) is opened. When (A) is opened, the pressure in pressure chamber (B) is reduced and main valve (C) is opened.

<Valve closed>

When coil 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 opened>

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

<Valve closed>

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

Specifications

For Air

For Water

For Oil

For Heated water

For High temperature oil

Options

Construction

Dimensions

Series VXD

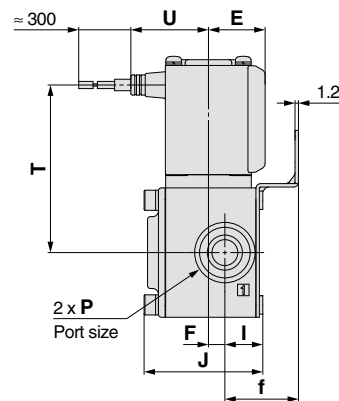
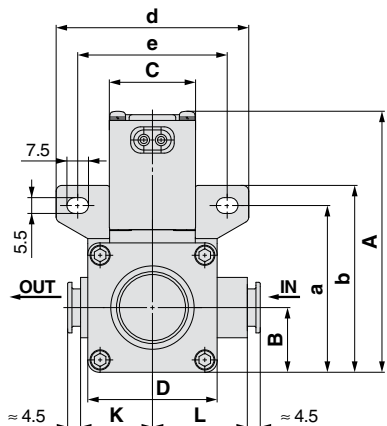


For Air

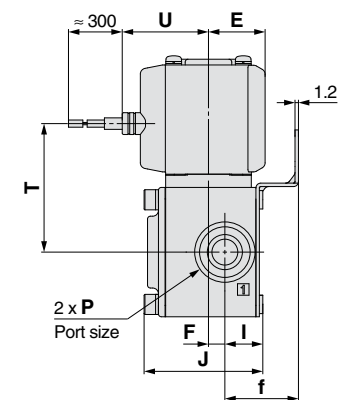
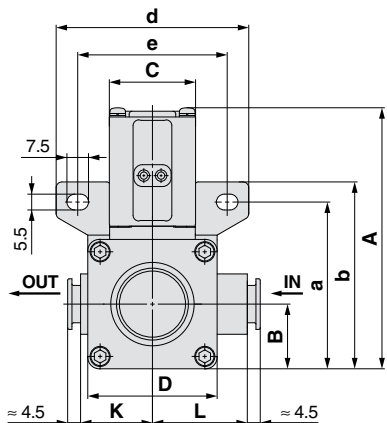
Dimensions/VXD2³_A Body Material: Resin (ø10, ø3/8", ø12)

For information on handling one-touch fittings and appropriate tubing, refer to page 47 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>

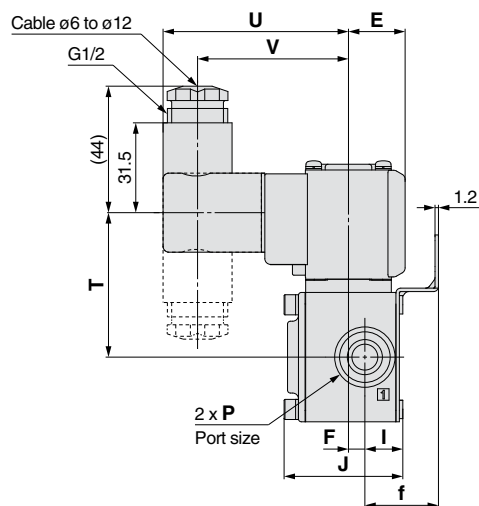
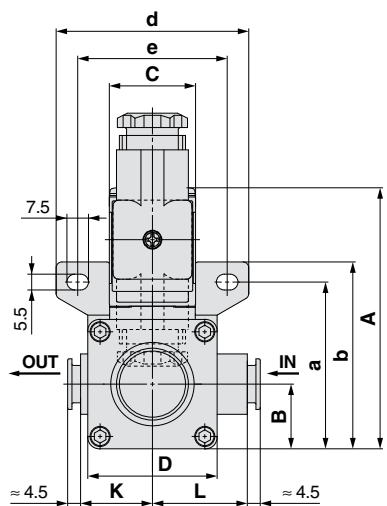
Grommet



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

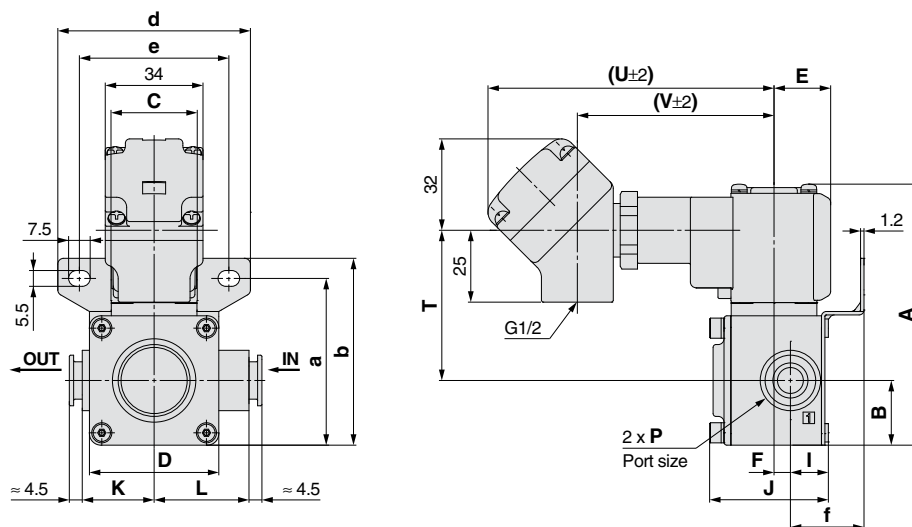
Model	One-touch fitting P	Mounting bracket dimensions				
		a	b	d	e	f
VXD2 ³ _A	ø10, ø3/8", ø12	58	65	67	52	25.5

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

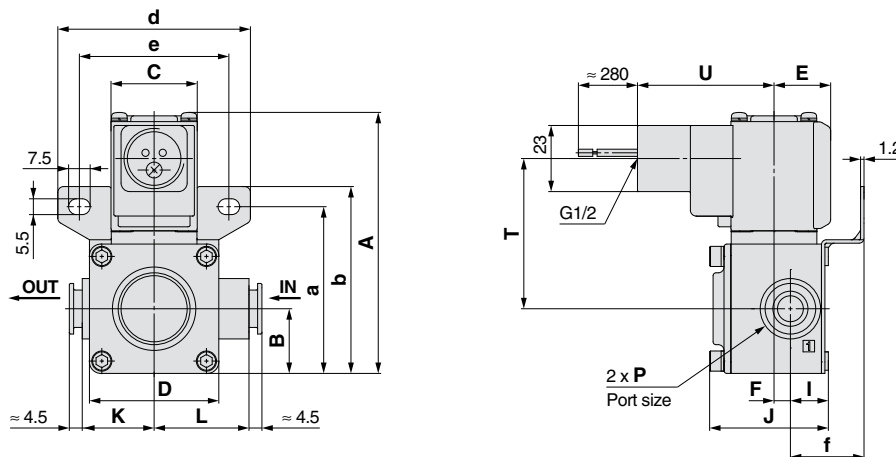


Dimensions/VXD2³_A Body Material: Resin (ø10, ø3/8", ø12)

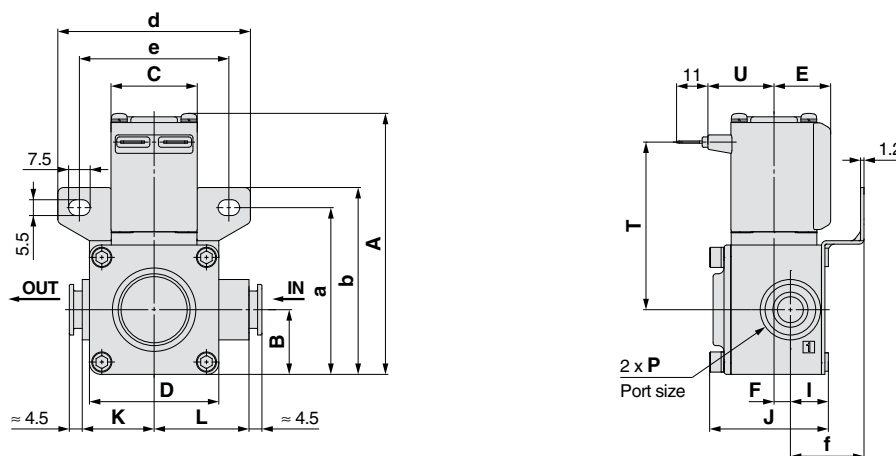
Conduit terminal



Conduit



Faston terminal



(mm)

Model	One-touch fitting P	A	B	C	D	E	F	I	J	K	L	Electrical entry						
												Conduit terminal			Conduit		Faston terminal	
												T	U	V	T	U	T	U
VXD2 ³ _A	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

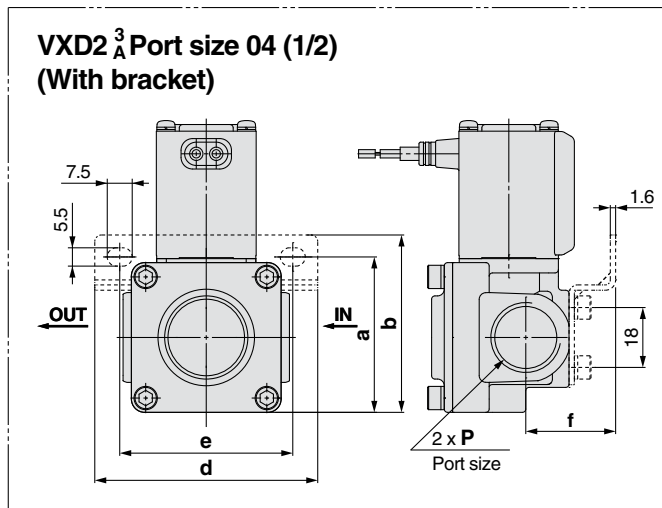
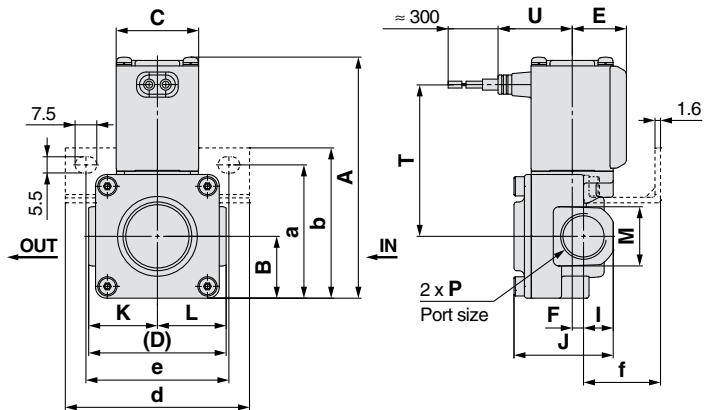
Model	One-touch fitting P	Mounting bracket dimensions				
		a	b	d	e	f
VXD2 ³ _A	ø10, ø3/8", ø12	58	65	67	52	25.5

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

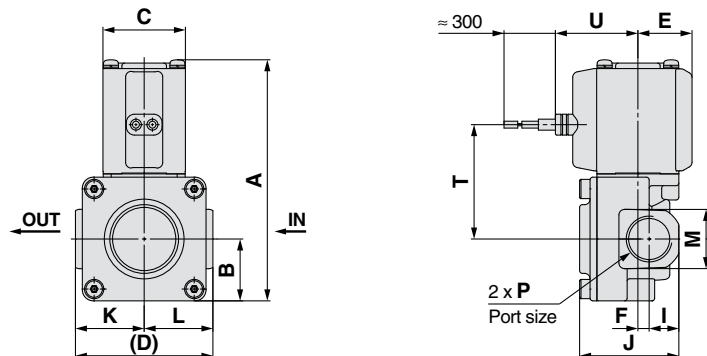


Dimensions/VXD2³_A Body Material: Aluminum, C37, Stainless Steel

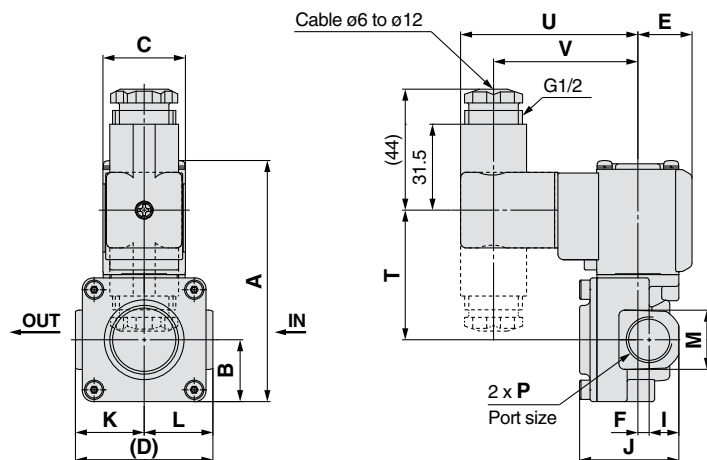
Grommet



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		
														T	U	T	U	T	U	V
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	30	47.5	64.5	52.5
	1/2	(93.5)					5	13	42.5			27	30	(61)	(47.5)	(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

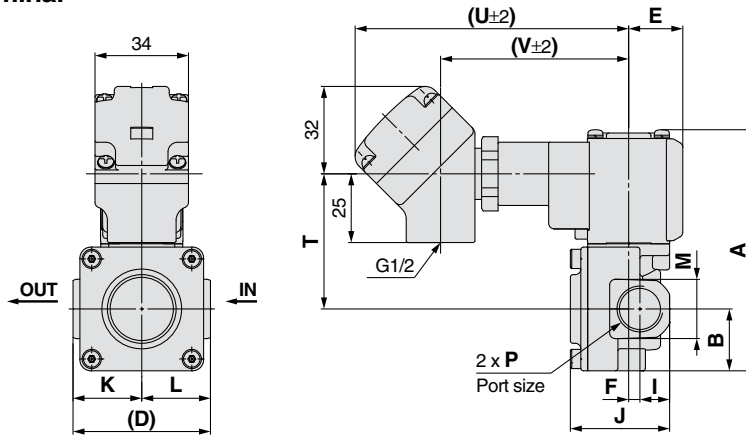
(): Denotes the Normally Open (N.O.) dimensions.
Aluminum body is for air. Refer to page 4 for details.

(): Denotes the Normally Open (N.O.) dimensions.
Aluminum body is for air. Refer to page 4 for details.

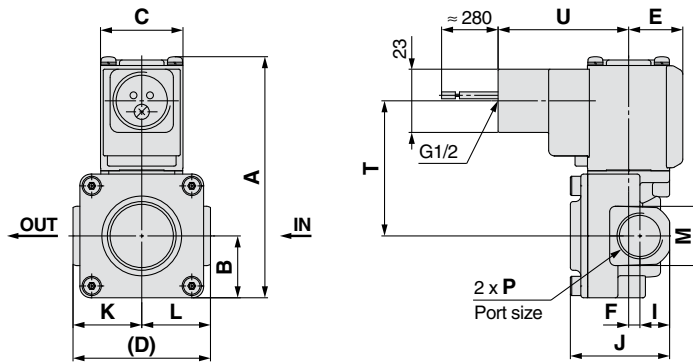


Dimensions/VXD2³_A Body Material: Aluminum, C37, Stainless Steel

Conduit terminal

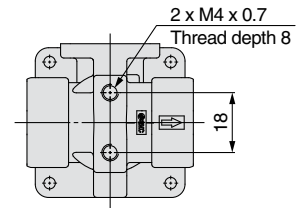


Conduit

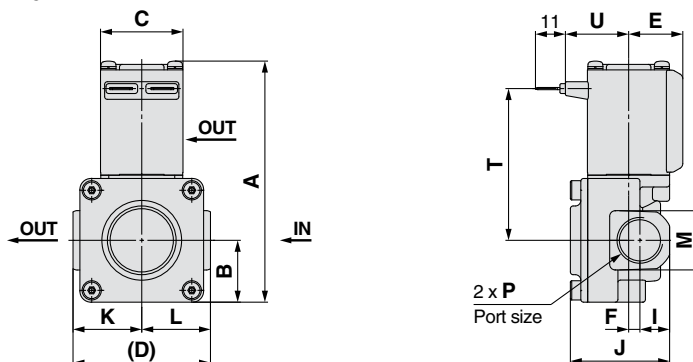


VXD2³_A □ C □ F □

Note) Only the VXD2³_A with port size of 04 (1/2) has threads on the bottom of the body.



Faston terminal



(mm)

Model	Port size P	A	B	C	D	E	F	I	J	K	L	M	Electrical entry						
													Conduit terminal			Conduit		Faston terminal	
													T	U	V	T	U	T	U
VXD2 ³ _A	1/4, 3/8	88	22.5	30	50	20	4.5	11	37.5	25	25	22	49.5 (55)	99.5	68.5	49.5 (55)	47.5	55.5 (61)	23
	1/2	(93.5)					5	13	42.5			27							

(): Denotes the Normally Open (N.O.) dimensions.
Aluminum body is for air. Refer to page 4 for details.

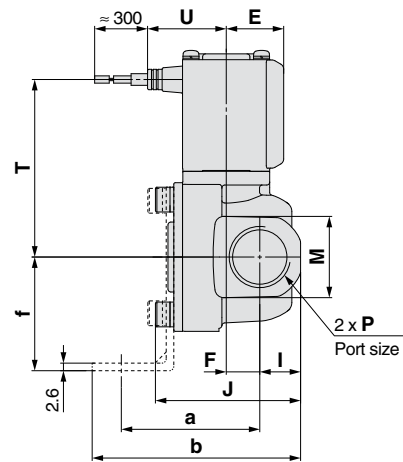
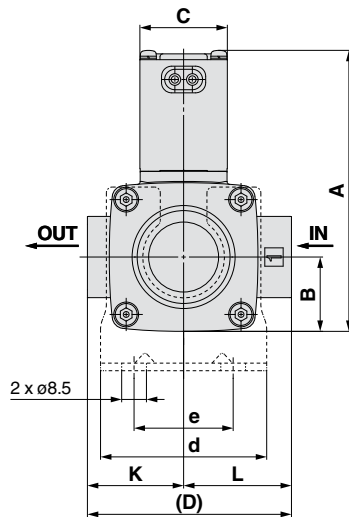
Series VXD



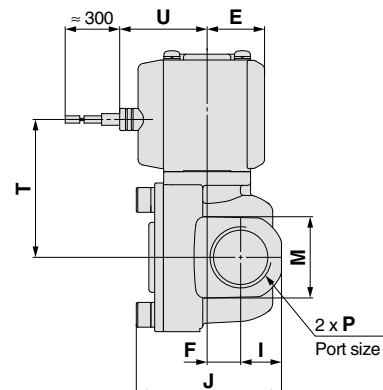
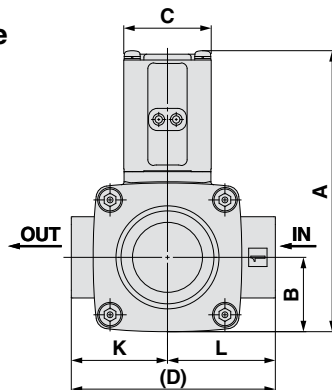
For Air/Water/Oil

Dimensions/VXD2⁴_B Body Material: C37, Stainless Steel

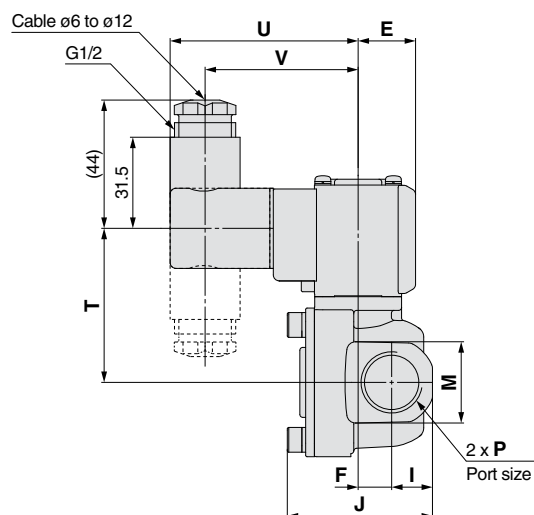
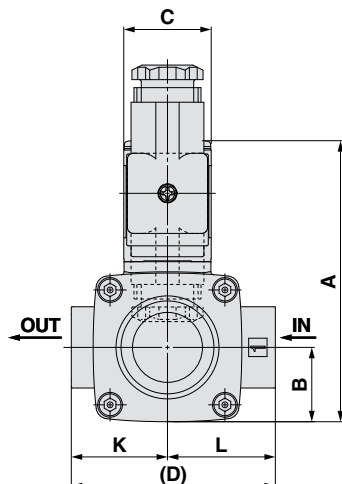
Grommet



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 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

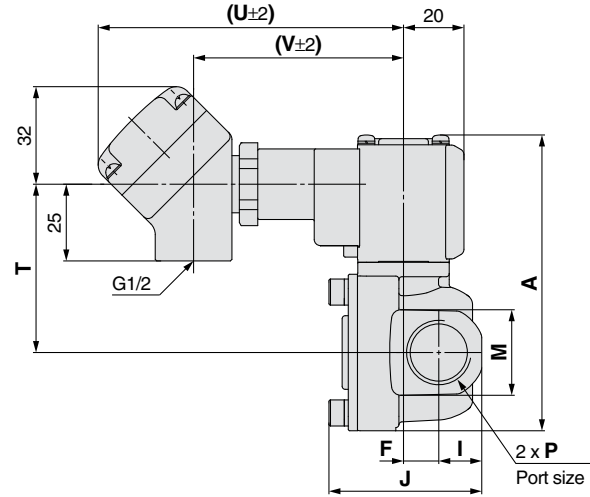
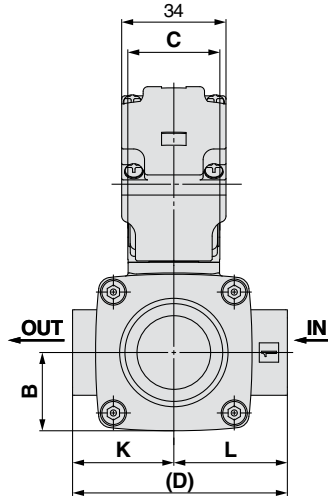
Model	Port size P	Mounting bracket dimensions				
		a	b	d	e	f
VXD2 ⁴ _B	3/8, 1/2	47.5	71.5	57	34	39

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

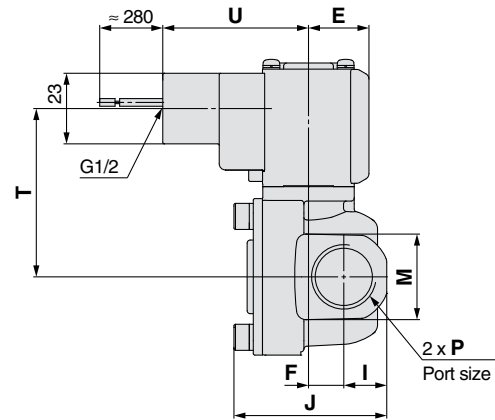
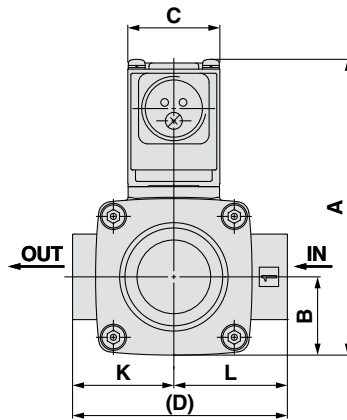


Dimensions/VXD2⁴_B Body Material: C37, Stainless Steel

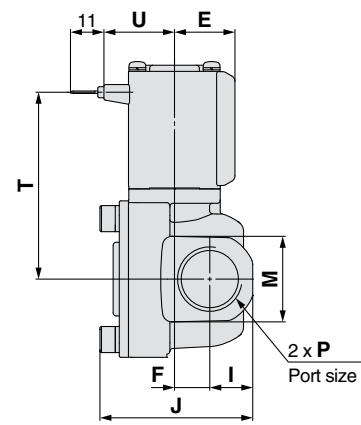
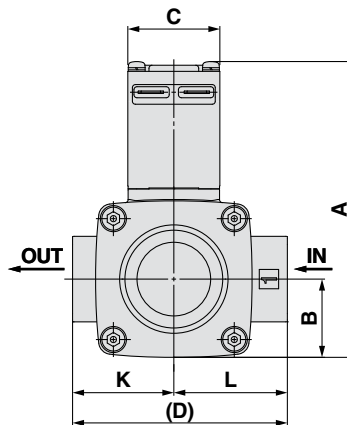
Conduit terminal



Conduit



Faston terminal



(mm)																			
Model	Port size P	A	B	C	D	E	F	I	J	K	L	M	Electrical entry						
													Conduit terminal			Conduit		Faston terminal	
													T	U	V	T	U	T	U
VXD2 ⁴ _B	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.

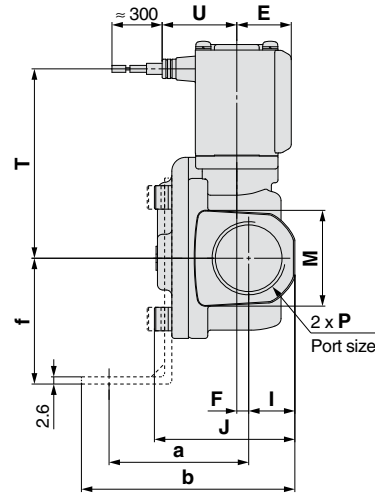
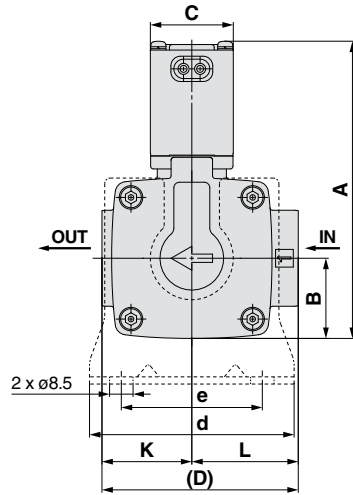
Series VXD



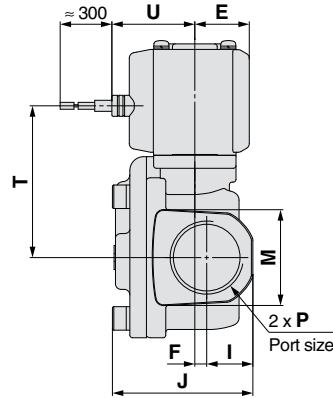
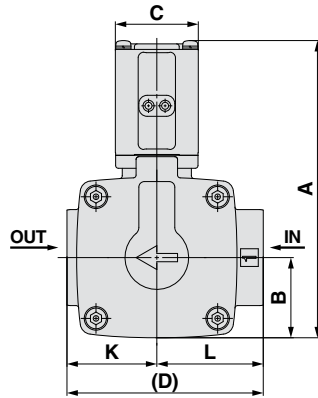
For Air/Water/Oil

Dimensions/VXD $\frac{5}{8}$ C / 2 $\frac{6}{D}$ Body Material: C37, Stainless Steel

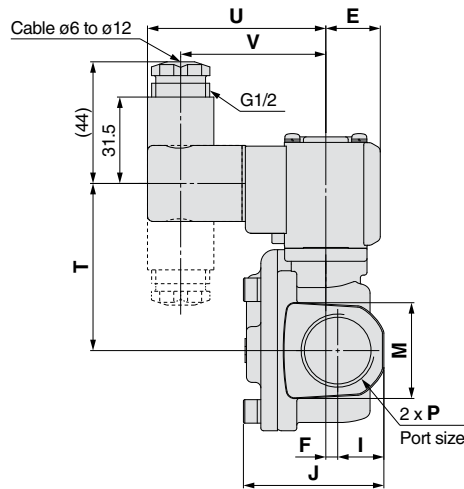
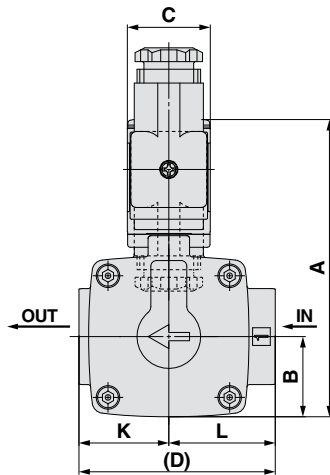
Grommet



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

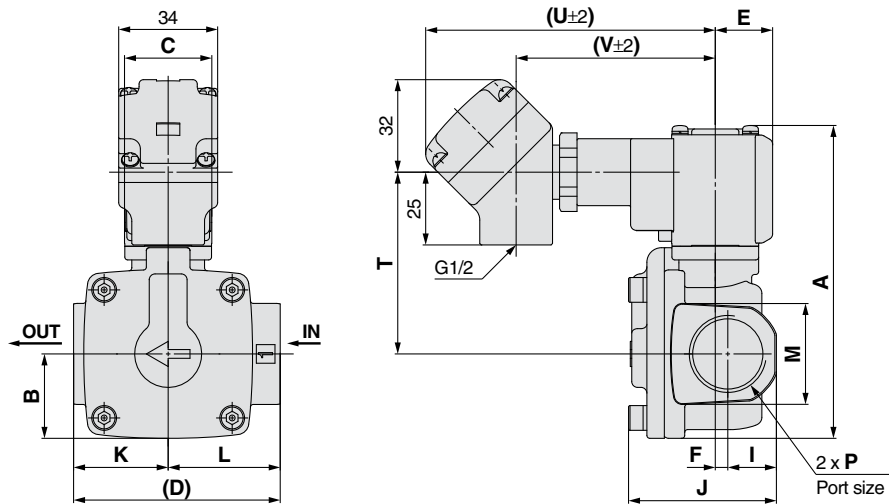
Model	Port size P	Mounting bracket dimensions				
		a	b	d	e	f
VXD $\frac{5}{8}$ C	3/4	50.5	77.5	74	51	45.5
VXD $\frac{6}{D}$	1	55.5	85.5	81	58	49.5

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

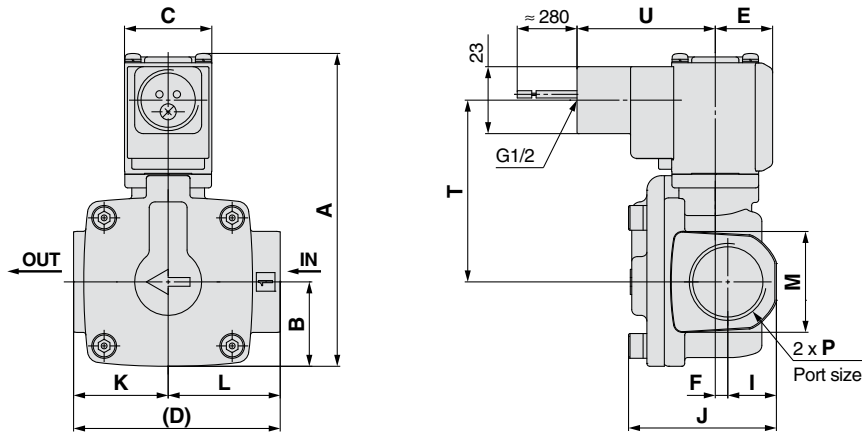


Dimensions/VXD2⁵/_C 2⁶/_D Body Material: C37, Stainless Steel

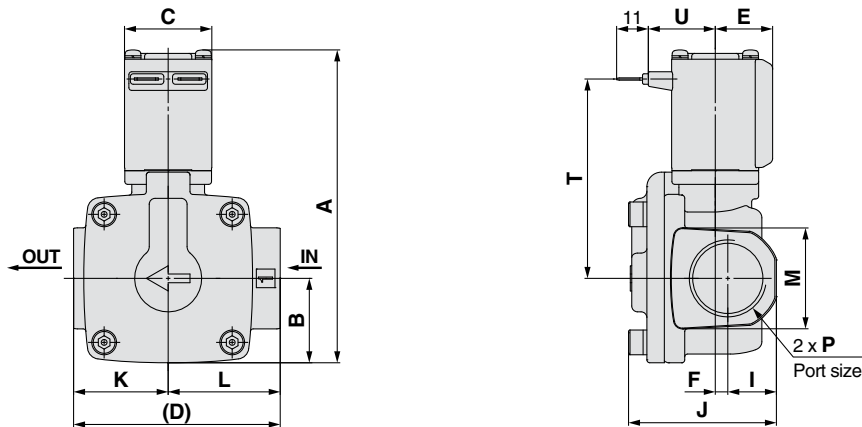
Conduit terminal



Conduit



Faston terminal



(mm)

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



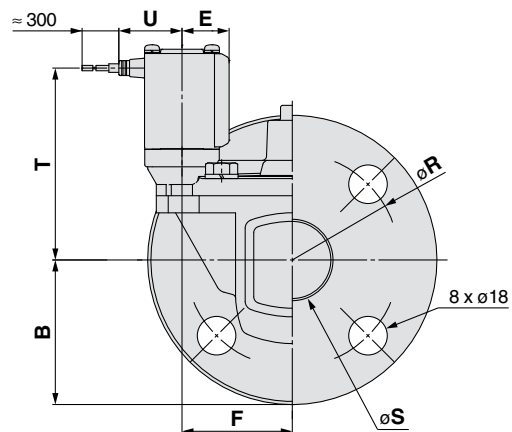
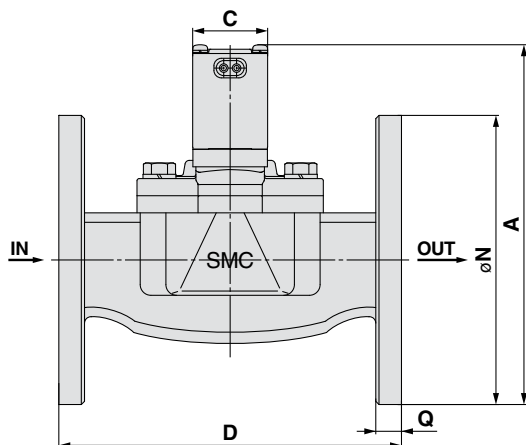
Series VXD



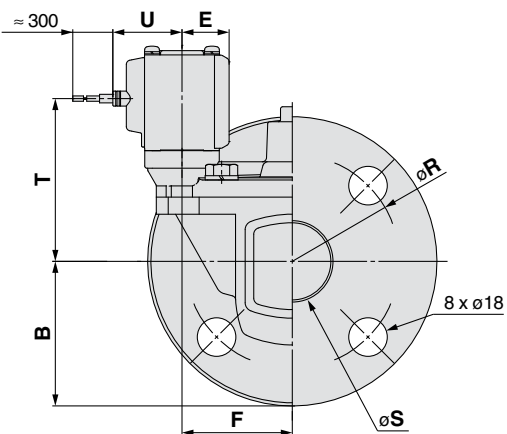
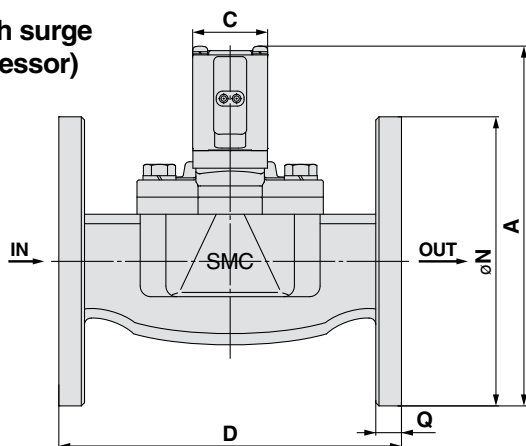
For Air/Water/Oil

Dimensions/VXD2⁷_E/2⁸_F/2⁹_G Body Material: CAC407

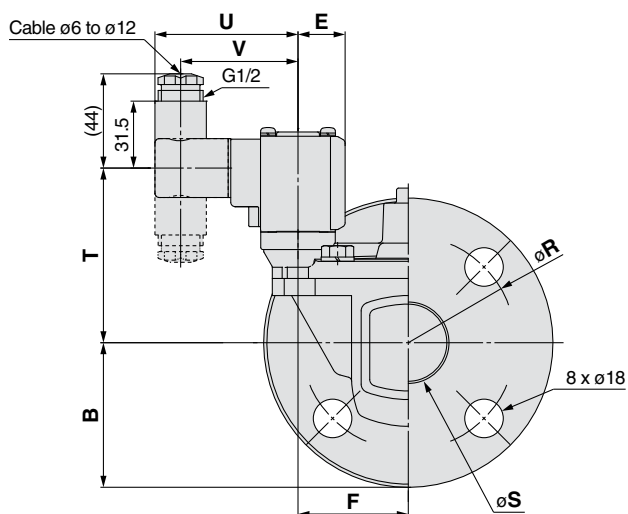
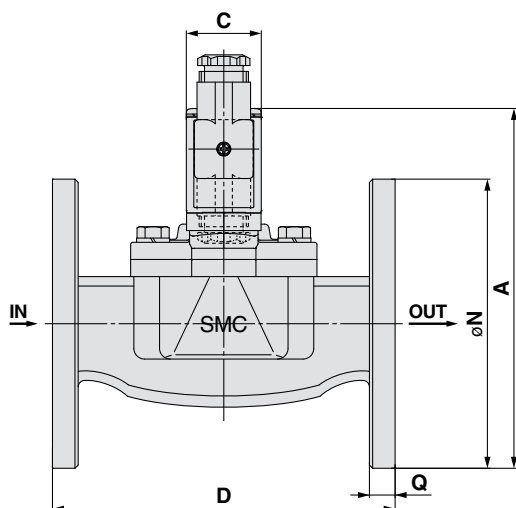
Grommet



Grommet (with surge voltage suppressor)



DIN terminal



(mm)

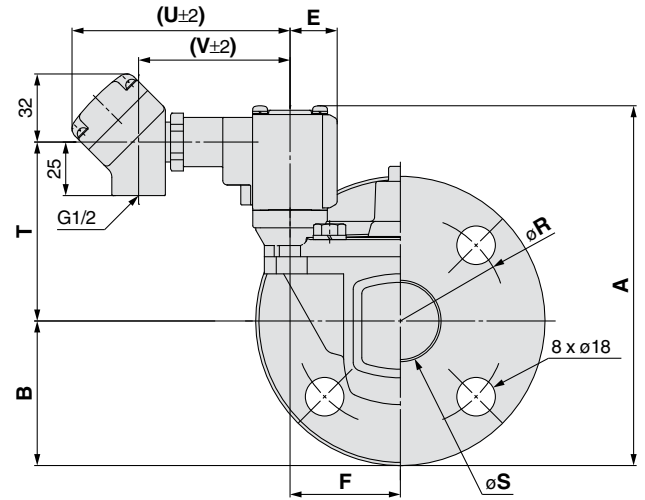
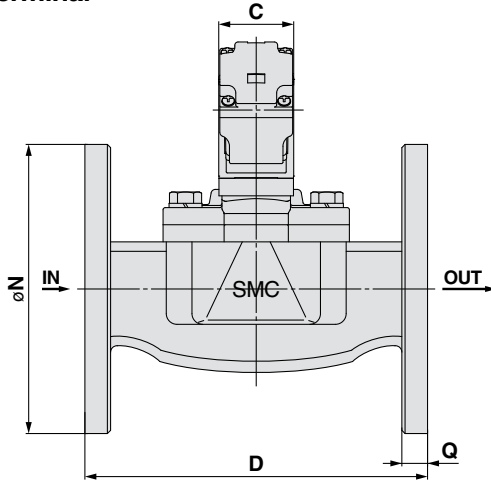
Model	Applicable flange	A	B	C	D	E	F	N	Q	R	S	Electrical entry						
												Grommet		Grommet (with surge voltage suppressor)		DIN terminal		
												T	U	T	U	T	U	V
VXD2 ⁷ _E	32A	168 (176)	67.5	35	160	22	51.5	135	12	100	36	90 (98)	29.5	76 (84)	32.5	82 (90)	67	55
VXD2 ⁸ _F	40A	179.5 (187.5)	70	40	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
VXD2 ⁹ _G	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.

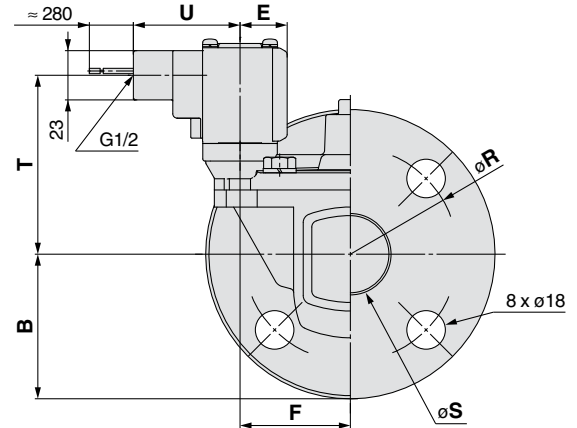
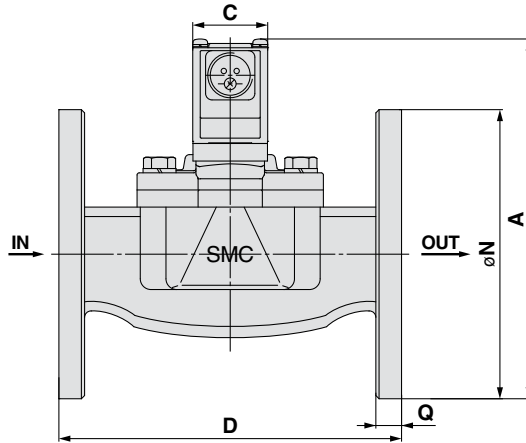


Dimensions/VXD2 $\frac{7}{E}$ $\frac{8}{F}$ $\frac{9}{G}$ Body Material: CAC407

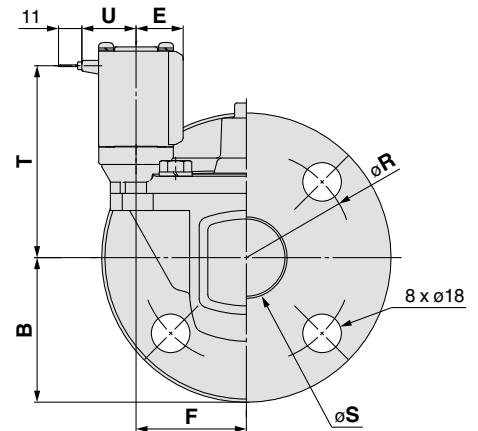
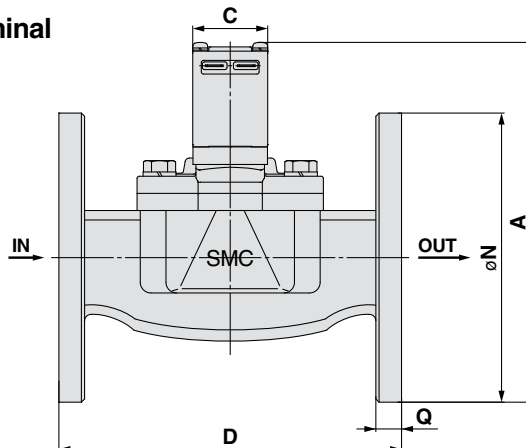
Conduit terminal



Conduit



Faston terminal



Model	Applicable flange	A	B	C	D	E	F	N	Q	R	S	Electrical entry						
												Conduit terminal			Conduit		Faston terminal	
												T	U	V	T	U	T	U
VXD2 $\frac{7}{E}$	32A	168 (176)	67.5	35	160	22	51.5	135	12	100	36	84 (92)	102	71	84 (92)	50	90 (98)	25.5
VXD2 $\frac{8}{F}$	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)	28
VXD2 $\frac{9}{G}$	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)	28

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

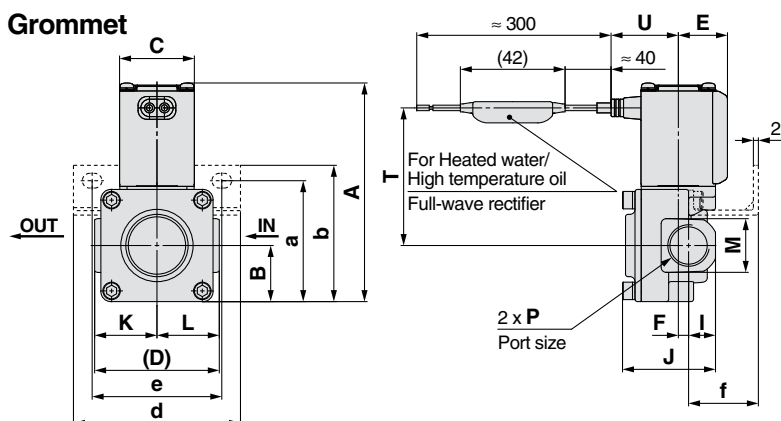
Series VXD



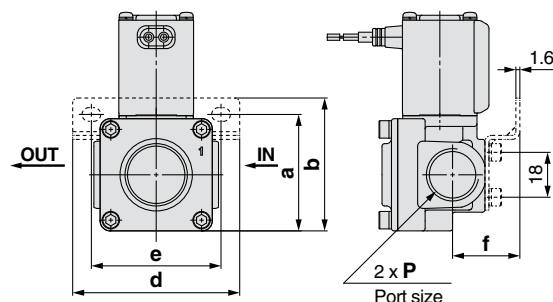
For Heated water/High temperature oil

Dimensions/VXD2³_A Body Material: C37, Stainless Steel (1/4, 3/8, 1/2)

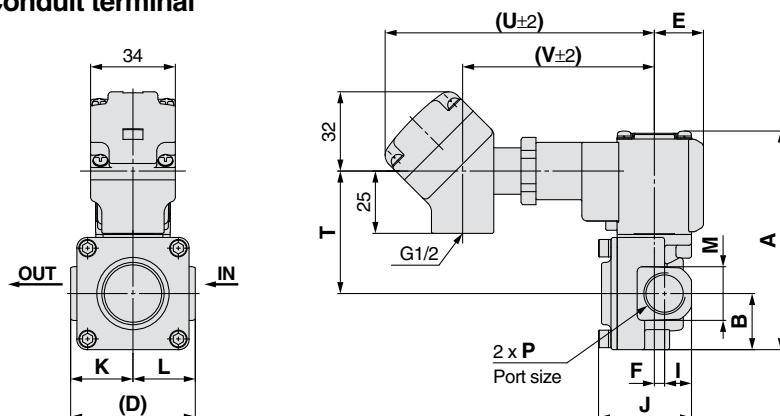
Grommet



VXD2³_A Port size 04 (1/2) (With bracket)

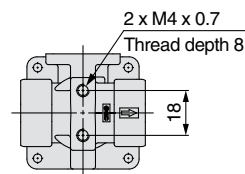


Conduit terminal

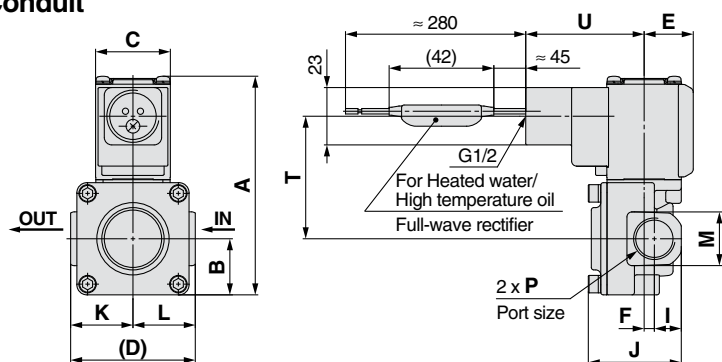


VXD2³_A □ C □ □

Note) Only the VXD2³_A with port size of 04 (1/2) has threads on the bottom of the body.



Conduit

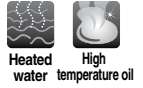


(mm)

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
VXD2 ³ _A	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				(61)		(55)		(55)		

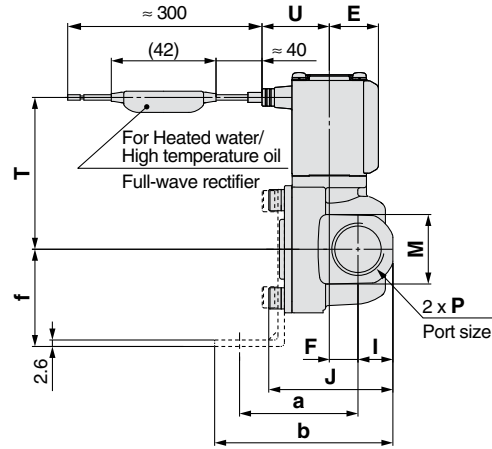
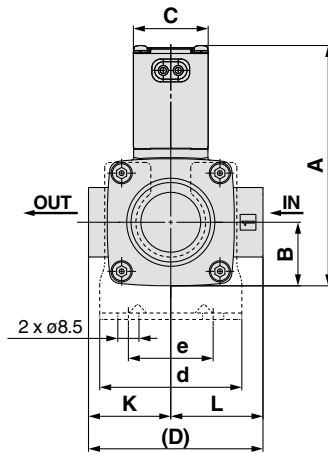
Model	Port size P	Mounting bracket dimensions					
		a	b	d	e	f	
VXD2 ³ _A	1/4, 3/8	48.5	55	67	52	28	
	1/2	47	53.5			27	

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

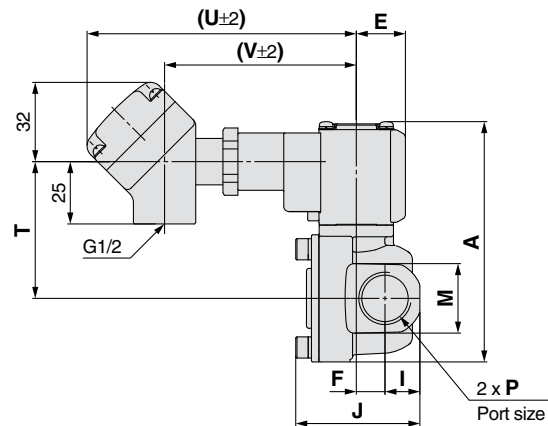
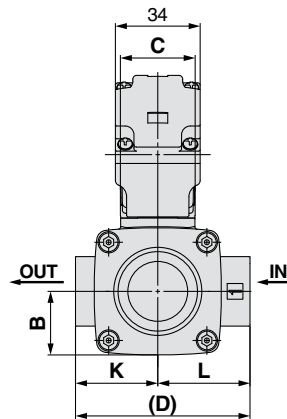


Dimensions/VXD2 ⁴/_B Body Material: C37, Stainless Steel

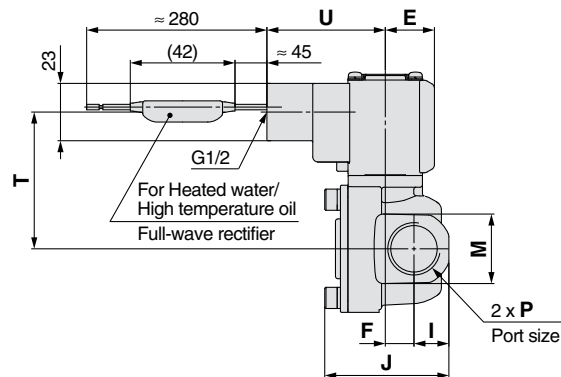
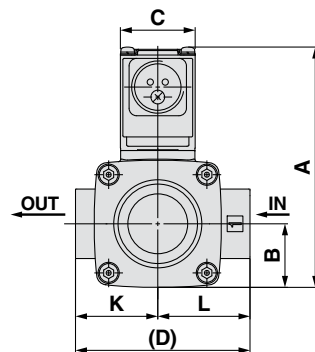
Grommet



Conduit terminal



Conduit



Model	Port size P	A	B	C	D	E	F	I	J	K	L	M	Electrical entry (mm)					
													Grommet		Conduit terminal			Conduit
													T	U	T	U	V	T
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	55 (61)	108	77	55 (61)

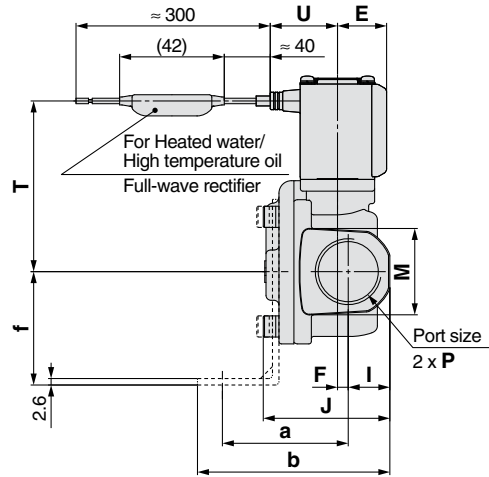
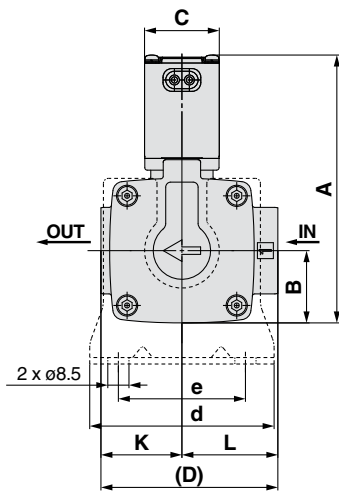
Model	Port size P	Mounting bracket dimensions					
		a	b	d	e	f	
VXD2 ⁴ / _B	3/8, 1/2	47.5	71.5	57	34	39	

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

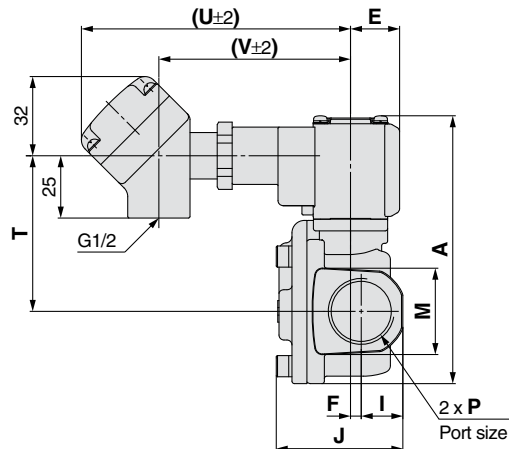
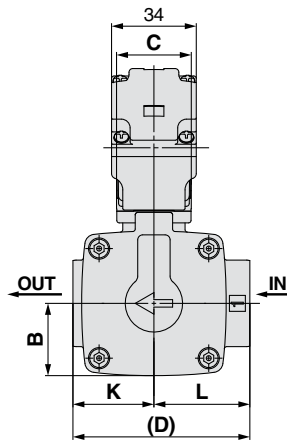


Dimensions/VXD⁵_C/VXD⁶_D Body Material: C37, Stainless Steel

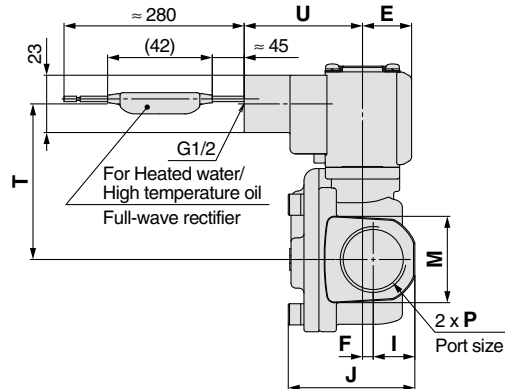
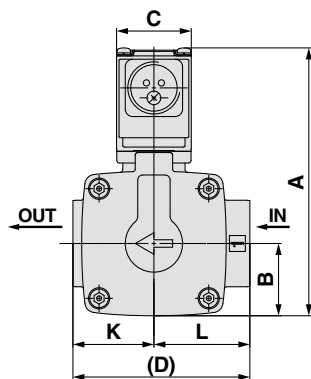
Grommet



Conduit terminal



Conduit

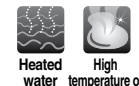


(mm)

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 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	62.5 (68.5)	108	77	62.5 (68.5)	47.5
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	76.5 (84.5)	110.5	79.5	76.5 (84.5)	50

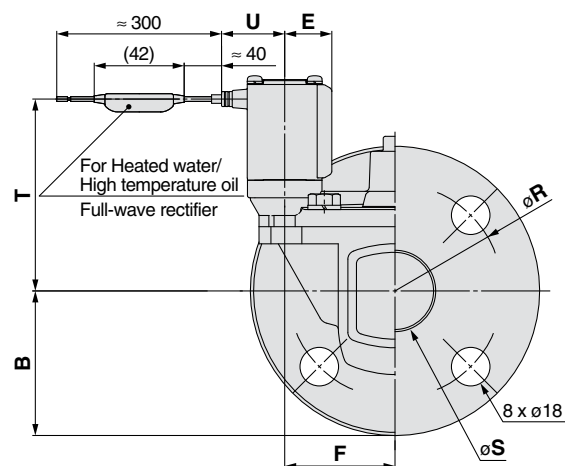
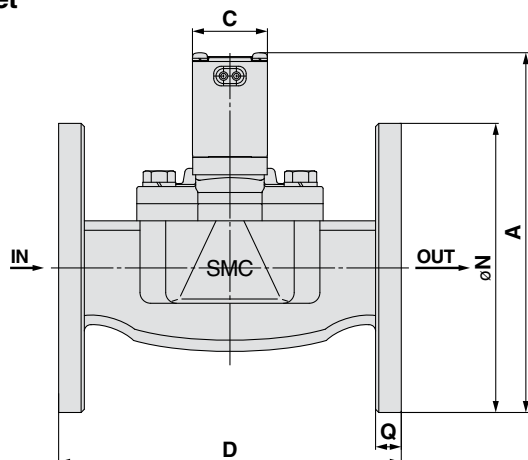
Model	Port size P	Mounting bracket dimensions					
		a	b	d	e	f	
VXD ⁵ _C	3/4	50.5	77.5	74	51	45.5	
VXD ⁶ _D	1	55.5	85.5	81	58	49.5	

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

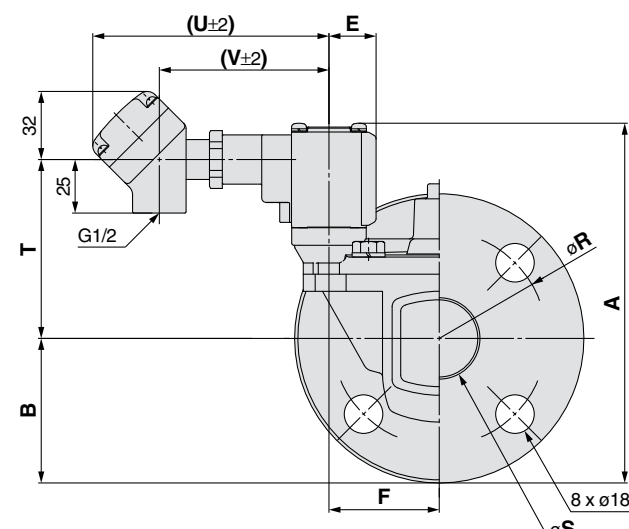
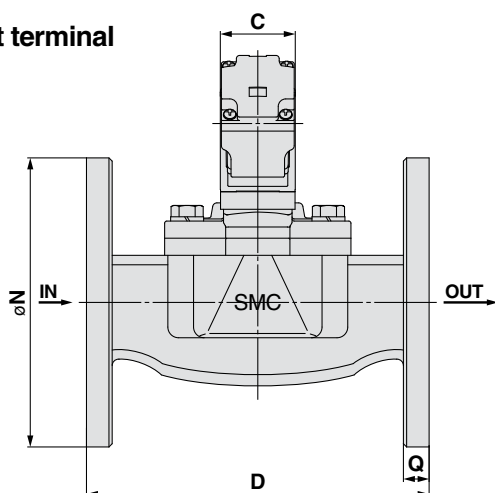


Dimensions/VXD2⁷_E/2⁸_F/2⁹_G Body Material: CAC407

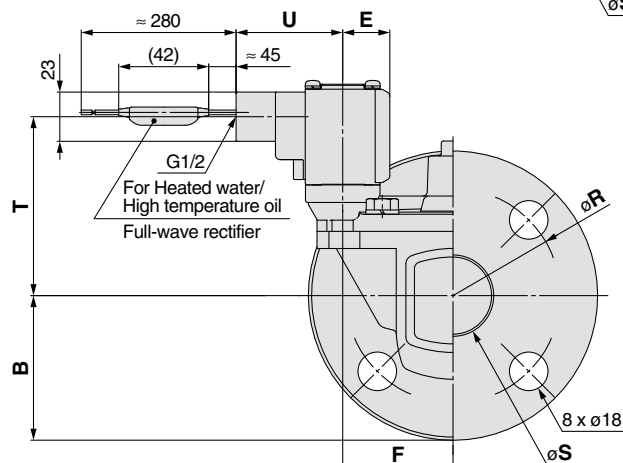
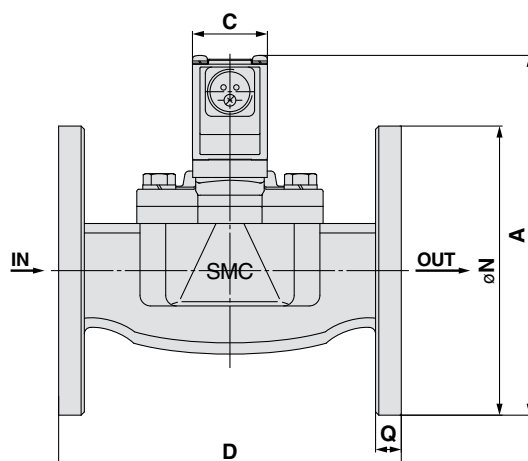
Grommet



Conduit terminal



Conduit



Specifications

For Air

For Water

For Oil

For Heated water

For High temperature oil

Options

Construction

Dimensions

(mm)

Model	Applicable flange	A	B	C	D	E	F	N	Q	R	S	Electrical entry					
												Grommet		Conduit terminal		Conduit	
												T	U	T	U	T	U
VXD2 ⁷ _E	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)
VXD2 ⁸ _F	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)
VXD2 ⁹ _G	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.

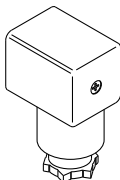


Replacement Parts No.

- DIN Connector

Without electrical option **C18312G6GCU**

With electrical option (light) **GDM2A – L** 



Electrical option •

L	With light
---	------------

• Rated voltage

1	100 VAC, 110 VAC
2	200 VAC, 220 VAC 230 VAC, 240 VAC
5	24 VDC
6	12 VDC
13	24 VAC
15	48 VAC

- Gasket for DIN Connector

VCW20-1-29-1

- Lead Wire Assembly for Faston Terminal
(Set of 2 pcs.)

VX021S-1-16FB

- Bracket Assembly for the VXD2 ³/_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 opened.

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. Surge voltage

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

2. Enclosure

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

Verify the degree of protection for each product.



● First Characteristics:

Degrees of protection against solid foreign objects

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

● Second Characteristics:

Degrees of protection against water

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

Example) IP65: Dust-tight, Water-jet-proof type

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

Others

1. Material

NBR: Nitrile rubber



FKM: Fluoro rubber — Trade names: Viton®, Dai-el®, etc.

EPDM: Ethylene-propylene rubber

2. Oil-free treatment

The degreasing and washing of wetted parts

3. Symbol

In the symbol () Port 1 (IN) and Port 2 (OUT) are shown in a blocked condition (), but it is not possible to use the valve in cases of reverse pressure, where the Port 2 pressure is higher than the Port 1 pressure.

Faston Terminal

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

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

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.

$$\text{When } \frac{P_2 + 0.1}{P_1 + 0.1} \leq b, \text{ choked flow}$$

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

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

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

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)

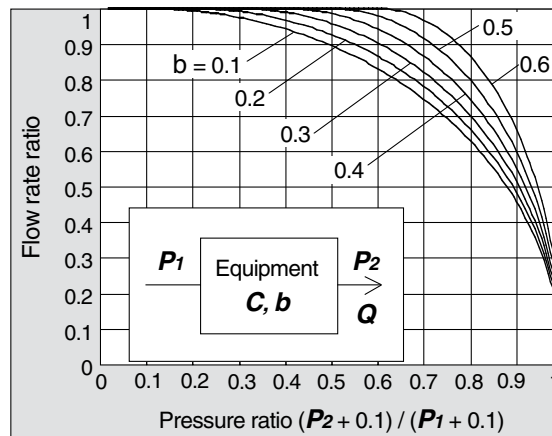
Obtain the air flow rate for **P1** = 0.4 [MPa], **P2** = 0.3 [MPa], **t** = 20 [°C] when a solenoid valve is performed in **C** = 2 [dm³/(s·bar)] and **b** = 0.3.

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)]

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

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.

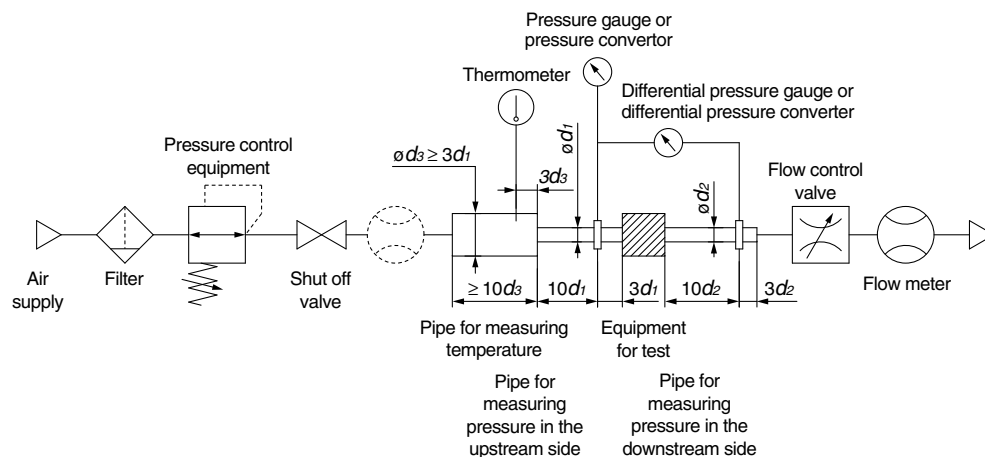


Fig. (1) Test circuit based on ISO 6358, JIS B 8390

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**

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

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

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

Conversion with sonic conductance C :

$$S = 5.0 \times C \quad (5)$$

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]

P_1 : Upstream pressure [MPa]

P_2 : 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.

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

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]

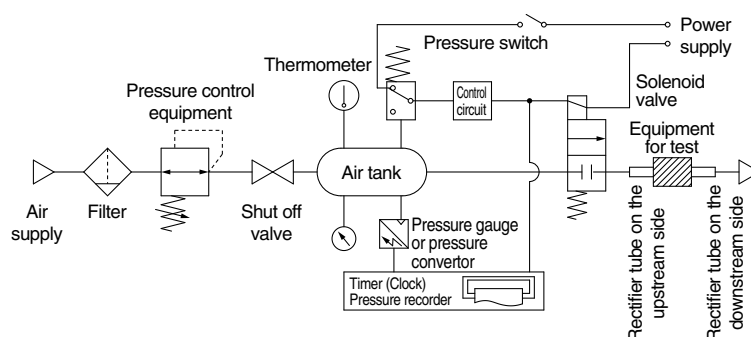


Fig. (2) Test circuit based on JIS B 8390

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]

P1: Pressure of the upstream tapping port [bar gauge]

P2: Pressure of the downstream tapping port [bar gauge]: **P2 = P1 – ΔP**

Q : Flow rate [dm³/s standard condition]

P_a: Atmospheric pressure [bar absolute]

T₁ : Upstream absolute temperature [K]

Test conditions are **P1 + P_a** = 6.5 ± 0.2 bar absolute, **T₁** = 297 ± 5 K, 0.07 bar ≤ **ΔP** ≤ 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]

P1 : Upstream pressure [MPa]: **ΔP = P1 – P2**

P2 : Downstream pressure [MPa]

Conversion of flow coefficient:

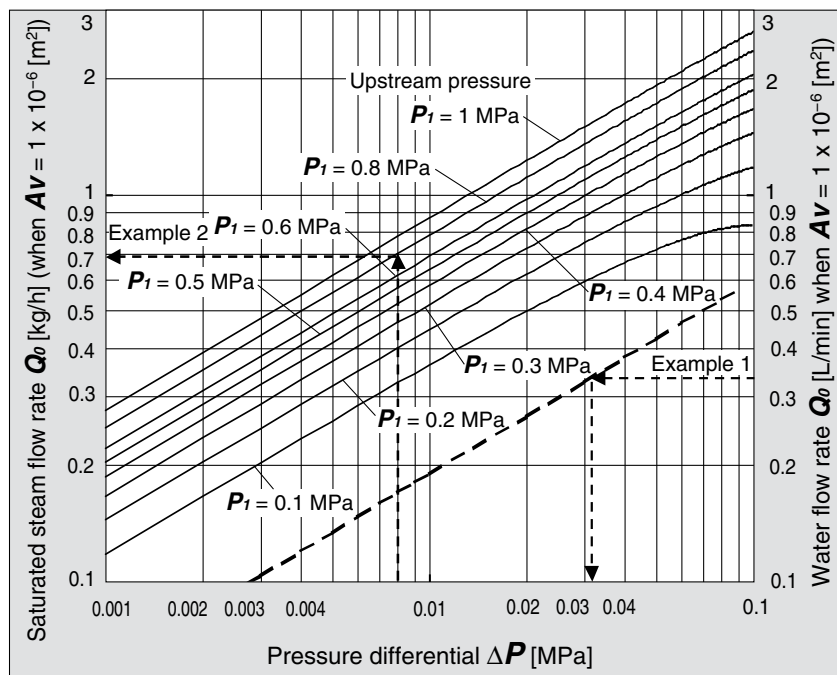
$$Av = 28 \times 10^{-6} Kv = 24 \times 10^{-6} Cv \dots\dots\dots(11)$$

Here,

Kv factor : Value of the clean water flow rate represented by m^3/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 $Av = 45 \times 10^{-6} [m^2]$. 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 $P1 = 0.8 [MPa]$, $\Delta P = 0.008 [MPa]$ with a solenoid valve with an $Av = 1.5 \times 10^{-6} [m^2]$.

According to Graph (2), if reading $Q0$ when $P1$ is 0.8 and ΔP is 0.008, it is 0.7 [kg/h]. Therefore, the flow rate $Q = 0.7 \times 1.5 = 1.05 [kg/h]$.

(4) Test method

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

By substituting the measurement results for formula (8) to figure out Av .

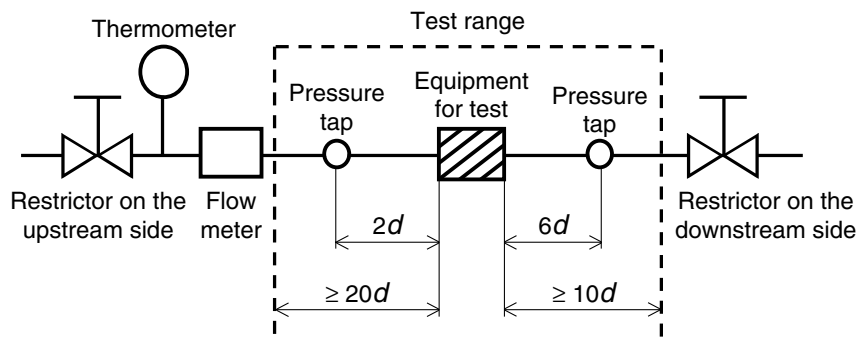
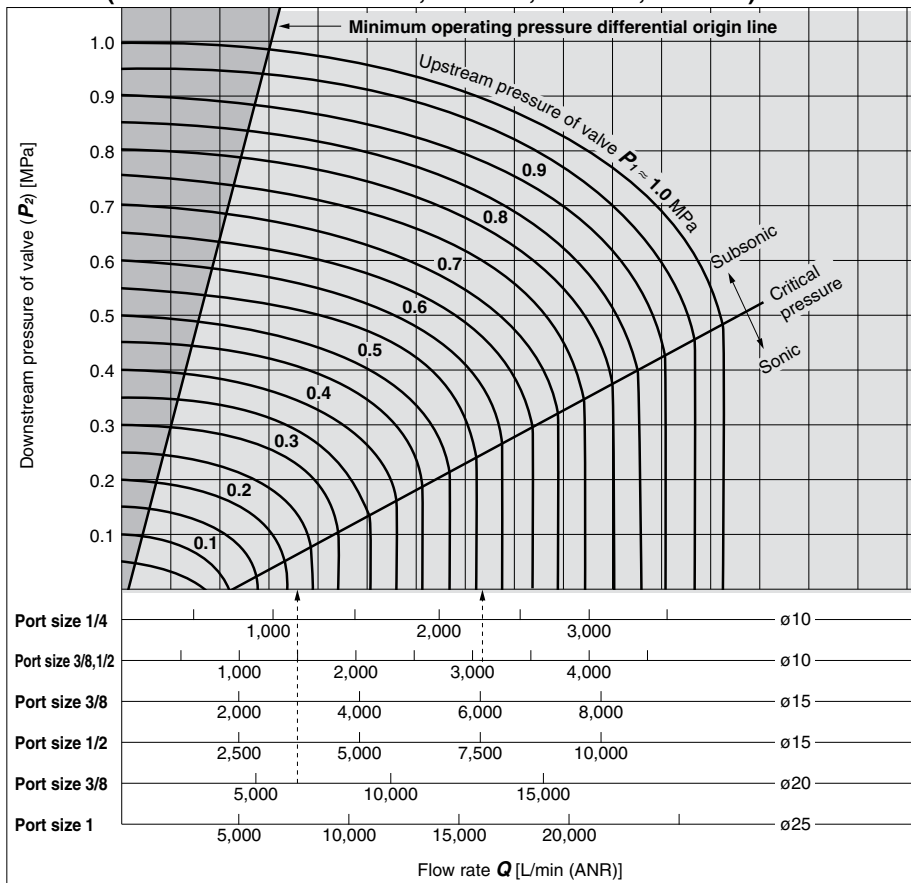


Fig. (3) Test circuit based on IEC60534-2-3, JIS B 2005

Series VXD Flow-rate Characteristics

Note) Use this graph as a guide. In the case of obtaining an accurate flow rate, refer to pages 38 through to 42.

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



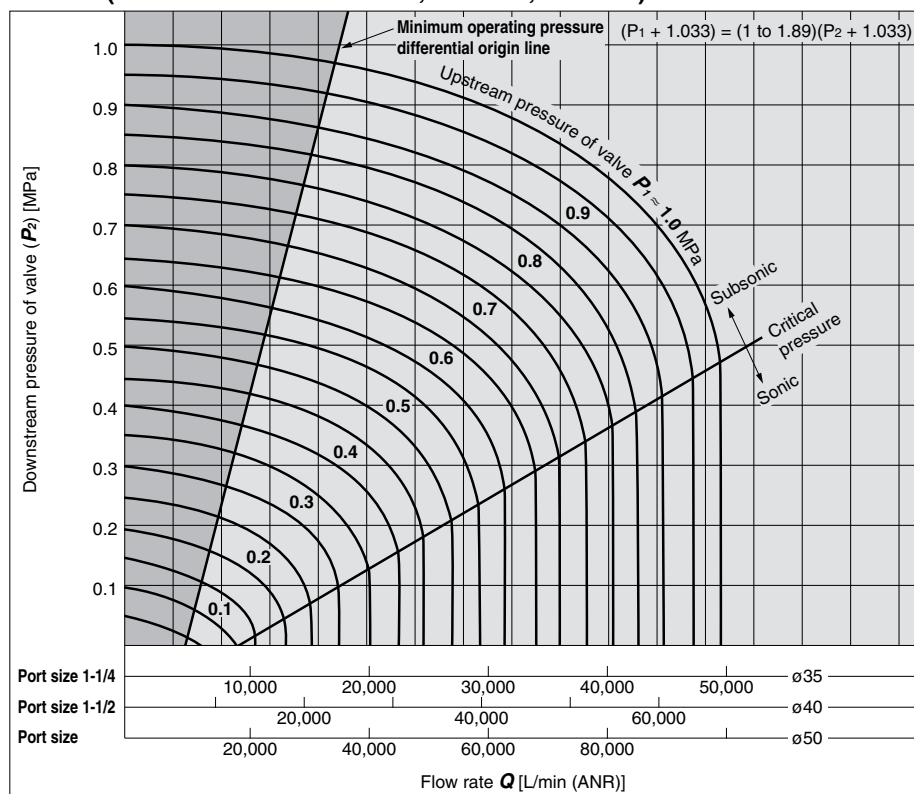
How to read the graph

The sonic range pressure to generate a flow rate of 6000 L/min (ANR) is $P_1 \approx 0.57$ MPa for a $\phi 15$ orifice (VXD240□□/Port size: 3/8) and $P_1 \approx 0.22$ MPa for a $\phi 20$ orifice (VXD250□□/Port size: 3/4).

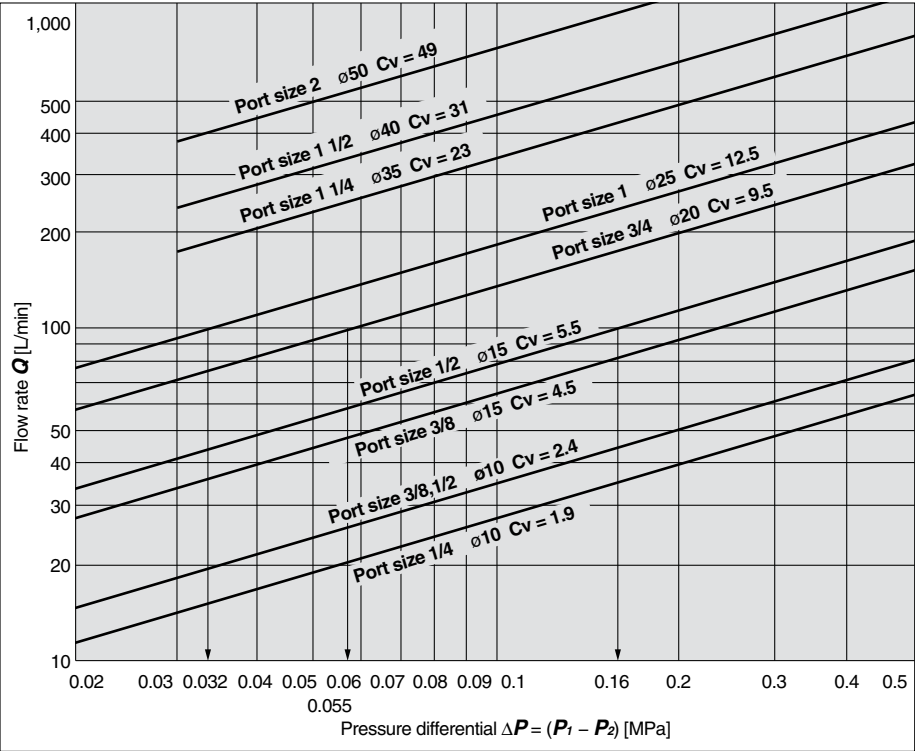
Warning

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.

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



For Water



How to read the graph

The pressure differential when water with flow rate of 100 L/min is applied is as follows.
For a $\phi 15$ orifice (VXD214²₀-04),
 $\Delta P \approx 0.16$ MPa,
for a $\phi 20$ orifice (VXD250),
 $\Delta P \approx 0.055$ MPa,
for a $\phi 25$ orifice (VXD260),
 $\Delta P \approx 0.032$ MPa



Series VXD Specific Product Precautions 1

Be sure to read before handling.

Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) and the Operation Manual for 2 Port Solenoid Valves for Fluid Control Precautions. Please download it via our website, <http://www.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 38 through to 44).

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 210.2°F (99°C))/Water/Heated water
For High temperature oil	Air (up to 210.2°F (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

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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.

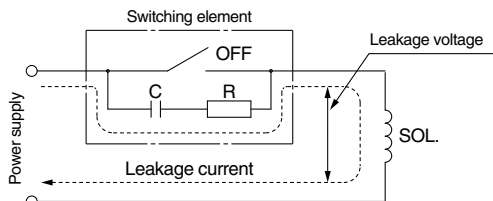
5. Countermeasures against static electricity

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

Caution

1. Leakage voltage

Particularly when using a resistor in parallel with a switching element and using a C-R element (surge voltage suppressor) to protect the switching element, take note that leakage current will flow through the resistor, C-R element, etc., creating a possible danger that the valve may not turn off.



AC/Class B built-in full-wave rectifier coil: 10% or less of rated voltage
DC coil: 2% or less of rated voltage

2. Selecting model

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

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.

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.



Series VXD

Specific Product Precautions 3

Be sure to read before handling.

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Piping

⚠ Caution

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 lbf·ft (N·m)
Rc1/8	5.2 to 6.6 (7 to 9)
Rc1/4	8.9 to 10.3 (12 to 14)
Rc3/8	16.2 to 17.7 (22 to 24)
Rc1/2	20.7 to 22.1 (28 to 30)
Rc3/4	
Rc1	26.6 to 28.0 (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.)

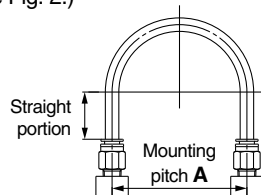


Fig. 1 Recommended piping configuration

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

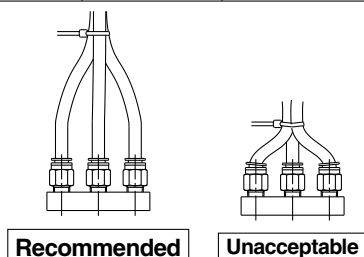


Fig. 2 Binding tubes with bands

Wiring

⚠ 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.)

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.



Series VXD Specific Product Precautions 4

Be sure to read before handling.

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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) Remove the product.

2. Low frequency operation

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

Caution

1. Filters and strainers

- 1) Be careful regarding clogging of filters and strainers.
- 2) Replace filter elements after one year of use, or earlier if the pressure drop reaches 14.5 psi (0.1 MPa).
- 3) Clean strainers when the pressure drop reaches 14.5 psi (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 an 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.
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.

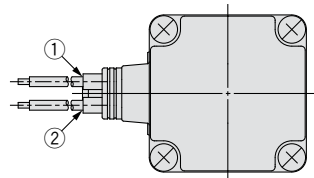
Electrical Connections

Caution

Grommet

Class B coil: AWG20 Outside insulator diameter of 2.5 mm

Class H coil: AWG18 Outside insulator diameter of 2.1 mm

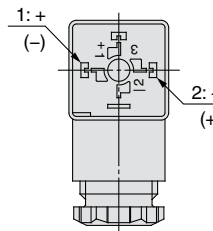


Rated voltage	Lead wire color	
	①	②
DC	Black	Red
100 VAC	Blue	Blue
200 VAC	Red	Red
Other AC	Gray	Gray

* There is no polarity.

DIN terminal

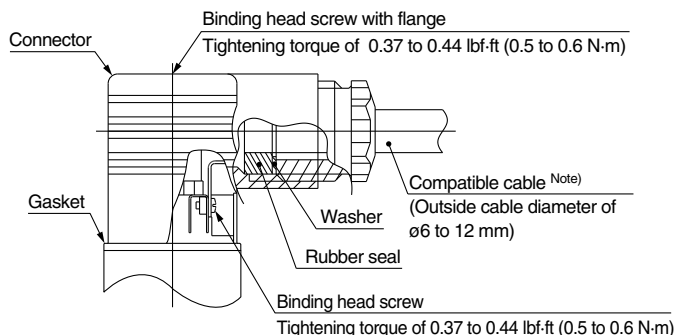
Since internal connections are shown below for the DIN terminal, make connections to the power supply accordingly.



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

* There is no polarity.

- Use a heavy-duty cord with an outside cable diameter of $\phi 6$ to 12 mm.
- Use the tightening torques below for each section.



Note) For an outside cable diameter of $\phi 9$ to 12 mm, remove the internal parts of the rubber seal before using.



Series VXD Specific Product Precautions 5

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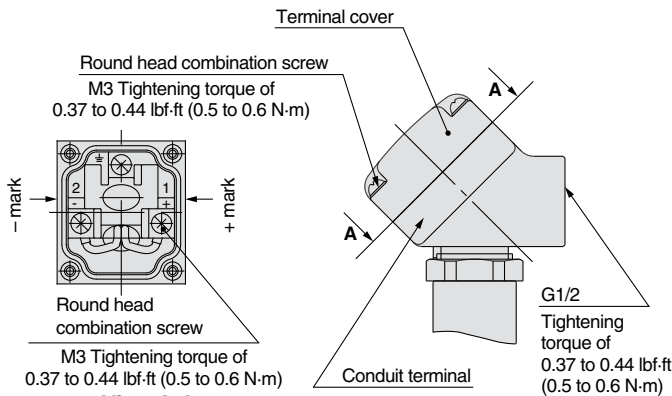
Electrical Connections

⚠ 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

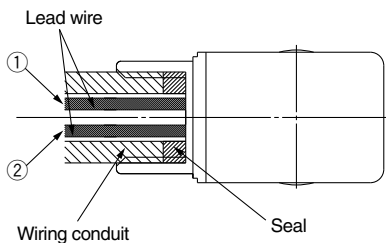
(Internal connection diagram)

■ 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 Outside insulator diameter of 2.5 mm

Class H coil: AWG18 Outside insulator diameter of 2.1 mm



(Connection G1/2 Tightening torque of 0.37 to 0.44 lbf-ft (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.

(There is no polarity, except for the power-saving type.)

Description	Part no.
Seal	VCW20-15-6

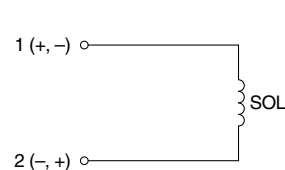
Note) Please order separately.

Electrical Circuits

⚠ Caution

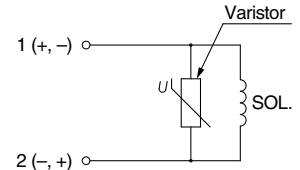
[DC circuit]

Grommet, Faston terminal



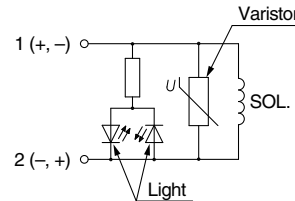
Without electrical option

Grommet, DIN terminal, Conduit terminal, Conduit



With surge voltage suppressor

DIN terminal, Conduit terminal

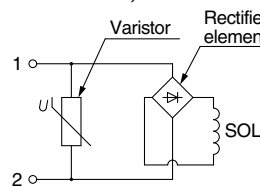


With light/surge voltage suppressor

[AC circuit]

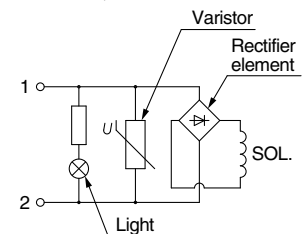
* For AC, the standard product is equipped with surge voltage suppressor.

Grommet, DIN terminal, Conduit terminal, Conduit



Without electrical option

DIN terminal, Conduit terminal



With light/surge voltage suppressor

One-touch Fitting




⚠ Caution

For information on handling one-touch fittings and appropriate tubing, refer to page 47 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>

Safety Instructions

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

-  **Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
-  **Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
-  **Danger:** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots – Safety.
etc.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

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

2. Only personnel with appropriate training should operate machinery and equipment.

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

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)

Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.

This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.**

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Safety Instructions

Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.



SMC Corporation of America
10100 SMC Blvd., Noblesville, IN 46060

www.smcusa.com

SMC Pneumatics (Canada) Ltd.

www.smcpcanada.com

(800) SMC.SMC1 (762-7621)

e-mail: sales@smcusa.com

For International inquiries: www.smcworld.com