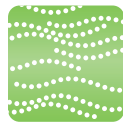


Pilot Operated 2 Port Solenoid Valve New



Air



Water



Oil



Heated water
(99 °C)



High temperature oil
(99 °C)

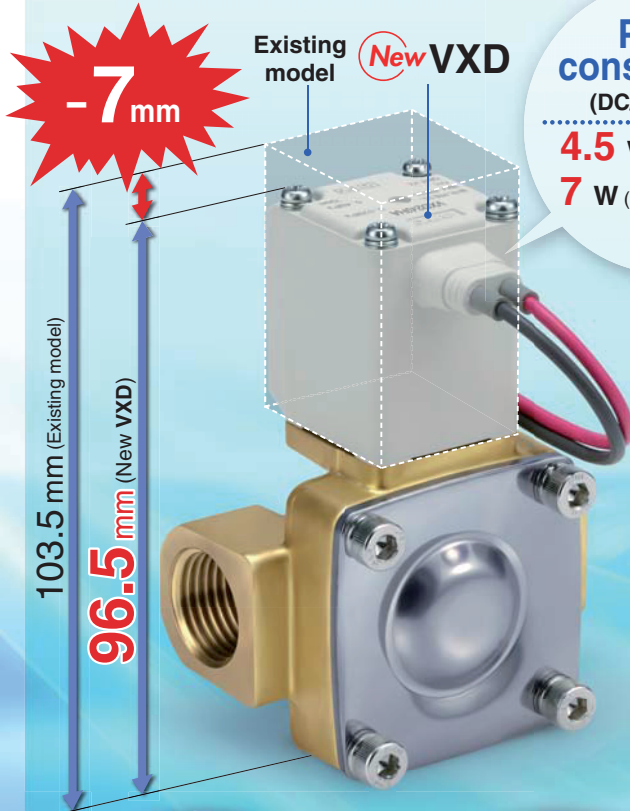


Compact
Height
Approx. **7 % Smaller*** (7 mm)
(VXD24)

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

Options newly added!
Class H/24 VDC
Class H/DIN terminal
Seal material: EPDM

* Comparison with SMC existing model



Power consumption
(DC/N.C. valve)
4.5 W (VXD23 to 25)
7 W (VXD26)

Body material
Resin (VXD2_A³) **Aluminium** (VXD2_A³)

Bracket standard equipment
Applicable tubing O.D.
ø 10, ø 12/mm
ø 3/8"/inch

Body material
C37 (Brass), Stainless steel

C37 (Brass) body Stainless steel body

Solenoid coil type
Insulation type Class B/H

Class B Class H

Valve type
N.C. N.O.

Enclosure IP65*
* Electrical entry "Faston" type terminal is IP40.

Series VXD

Pilot Operated 2 Port Solenoid Valve

Series VXD



Enclosure
IP65

Flame resistance
UL94V-0 conformed

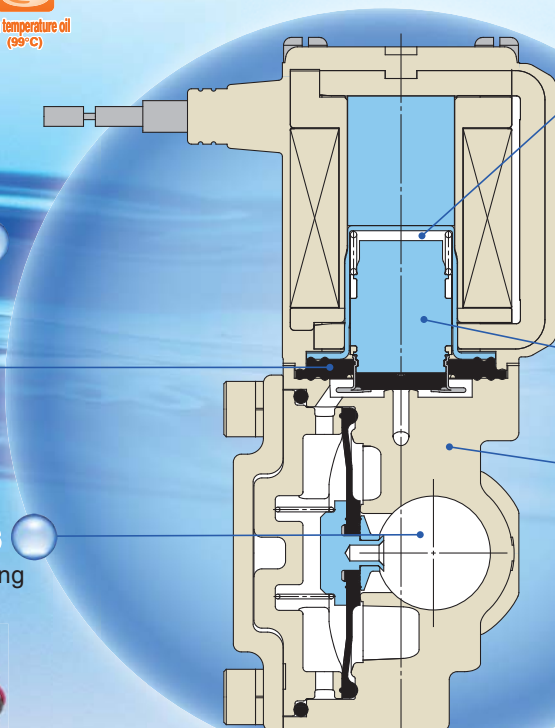
Flame resistant
mold coil material

Low-noise construction

Impact noise reduced
by the rubber buffer

Piping variations

Thread piping, One-touch fitting



Clearance

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

Power consumption:

4.5 W (VXD23 to 25)

7 W (VXD26)

Improved armature durability

Body material

Air

Aluminium (VXD2_A³)

Resin (VXD2_A³)

C37 (Brass) (VXD2_B⁴ to 2_B⁶)

Stainless steel (VXD2_B⁴ to 2_B⁶)

Water/Oil/Heated water/ High temperature oil

C37 (Brass)

Stainless steel








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

- Improved durability**
Service life is extended by special construction. (compared with current shading coil)
- Reduced buzz noise**
Rectified to DC by a full-wave rectifier, resulting in a buzz noise reduction.
- Reduced apparent power** (Class B, N.C. valve)
10 VA → **7 VA** (VXD23 to 25)
20 VA → **9.5 VA** (VXD26)
- Improved OFF response**
Specially constructed to improve the OFF response when operated with a higher viscosity fluid such as oil.
- Low-noise construction**
Specially constructed to reduce impact noise during operation.

Model	Size	Orifice diameter	Body material	Port size								
				Thread					One-touch fitting			
				1/4	3/8	1/2	3/4	1	ø 10	ø 3/8"	ø 12	
VXD2 _A ³	8A 10A 15A	10 mmø	Aluminium	●	●	●	—	—	—	—	—	—
			Resin	—	—	—	—	—	●	●	●	
			C37 (Brass)	●	●	●	—	—	—	—	—	
			Stainless steel	●	●	●	—	—	—	—	—	
VXD2 _B ⁴	10A 15A	15 mmø	C37 (Brass)	—	●	●	—	—	—	—	—	
			Stainless steel	—	●	●	—	—	—	—	—	
VXD2 _C ⁵	20A	20 mmø	C37 (Brass)	—	—	—	●	—	—	—	—	
			Stainless steel	—	—	—	●	—	—	—	—	
VXD2 _D ⁶	25A	25 mmø	C37 (Brass)	—	—	—	—	●	—	—	—	
			Stainless steel	—	—	—	—	●	—	—	—	



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 For Water		
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Dimensions		
For Air/Water/Oil		Construction
Body material: Resin	24	
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Series VXD

Common Specifications

Standard Specifications

Valve specifications	Valve construction		Pilot operated 2 port diaphragm type
	Withstand pressure		2.0 MPa (Resin body type 1.5 MPa)
	Body material		Aluminum, Resin, C37 (Brass), Stainless steel, CAC407 (Bronze casting)
	Seal material		NBR, FKM, EPDM ^{Note 3)}
	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
		DC	24 VDC, 12 VDC
	Allowable voltage fluctuation		±10 % of rated voltage
	Allowable leakage voltage	AC	5 % or less of rated voltage
		DC	2 % or less of rated voltage
	Coil insulation type		Class B, Class H

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

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

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

Solenoid Coil Specifications

Normally Closed (N.C.)

DC Specification

Class B

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

Class H

Model	Power consumption [W] ^{Note 1)}	Temperature rise [°C] ^{Note 2)}
VXD23 to 25	9	100
VXD26	12	100

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

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

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

Class B

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

Class H

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

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

Note 2) There is no difference in the frequency and the inrush and energized apparent power, since a rectifying circuit is used in the AC.

Note 3) The value at ambient temperature of 20 °C and when the rated voltage is applied. The value depends on the ambient environment. This is for reference.

Normally Open (N.O.)

DC Specification

Class B

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

Class H

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

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

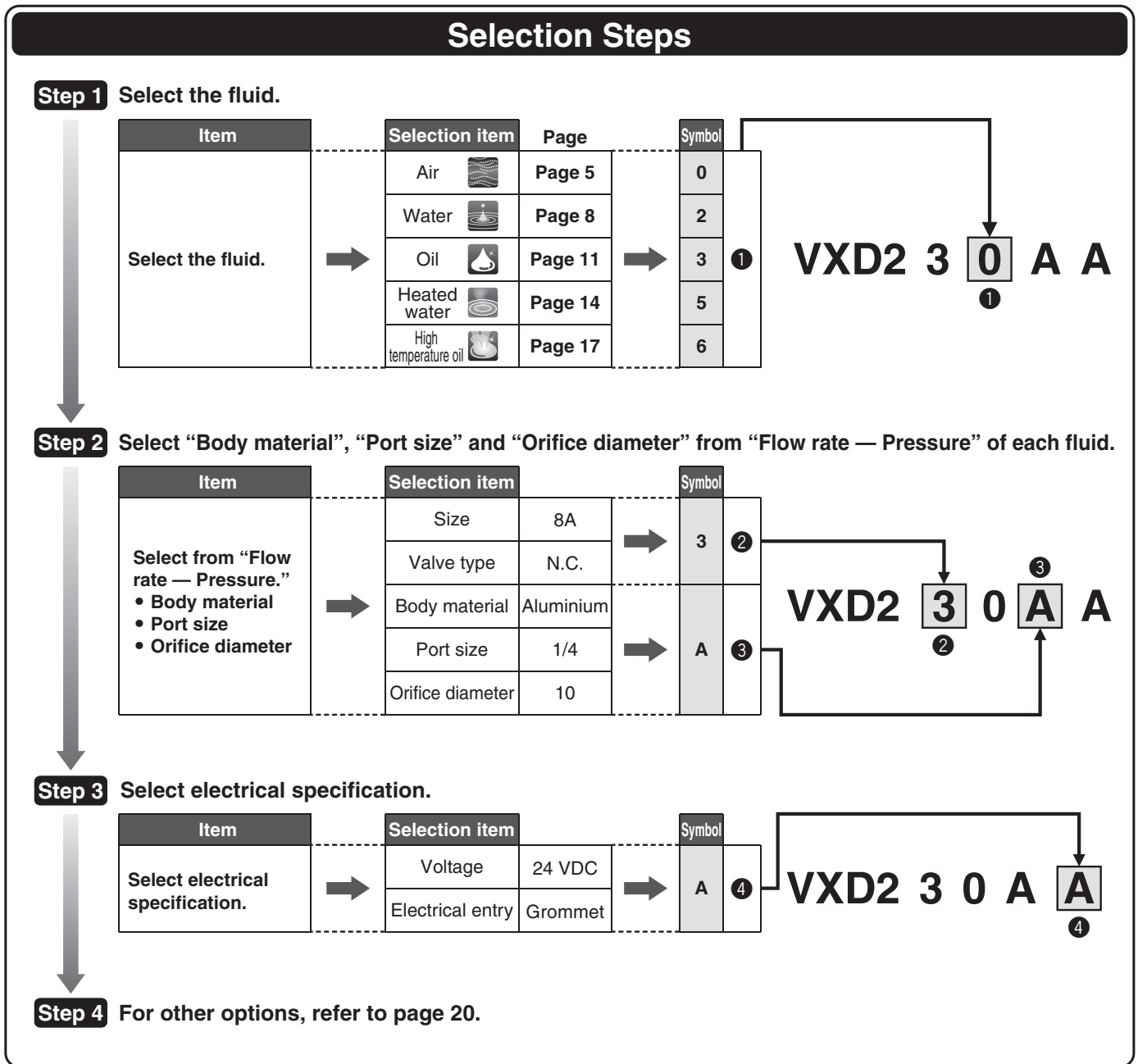
Class B

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

Class H

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

Series VXD Selection Steps



Specifications

For Air

For Water

For Oil

For Heated water

For High temperature oil

Options

Construction

Dimensions

Series VXD

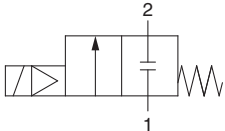


For Air

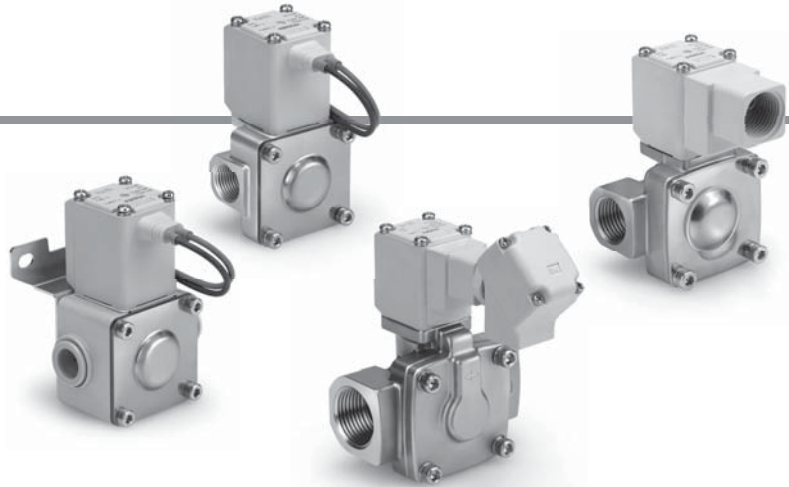
Model/Valve Specifications

N.C.

Symbol



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



Normally Closed (N.C.)

Body material	Port size	Orifice diameter [mm]	Model	Minimum operating pressure differential ^{Note 1)} [MPa]	Maximum operating pressure differential		Flow-rate characteristics				Maximum system pressure [MPa]	Weight ^{Note 2)} [g]	
					AC	DC	C	b	Cv	Effective area [mm ²]			
Aluminium	1/4 (8A)	10	VXD230	0.02	0.9	0.7	8.5	0.35	2.0	—	1.5	370	
	3/8 (10A)						9.2						2.4
	1/2 (15A)						9.2						
Resin	ø 10						5.6	0.33	1.3				
	ø 3/8"						4.8	0.33	0.9				
	ø 12						7.2	0.33	1.5				
Stainless steel, C37	3/8 (10A)	15	VXD240	1.0	1.0	18.0	0.35	5.0					
	1/2 (15A)					20.0		5.5					
(Brass)	3/4 (20A)	20	VXD250	1.0	1.0	38.0	0.30	9.5					
	1 (25A)	25	VXD260			—	225	1360					

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

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

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

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

Fluid and Ambient Temperature

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

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

Valve Leakage

Internal Leakage

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

External Leakage

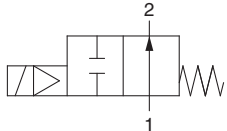
Seal material	Leakage rate (Air) ^{Note)}
	VXD23 to 26 (8A to 25A)
NBR, FKM	15 cm ³ /min or less (Aluminium body type)
	15 cm ³ /min or less (Resin body type)
	1 cm ³ /min or less (Metal body type)

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

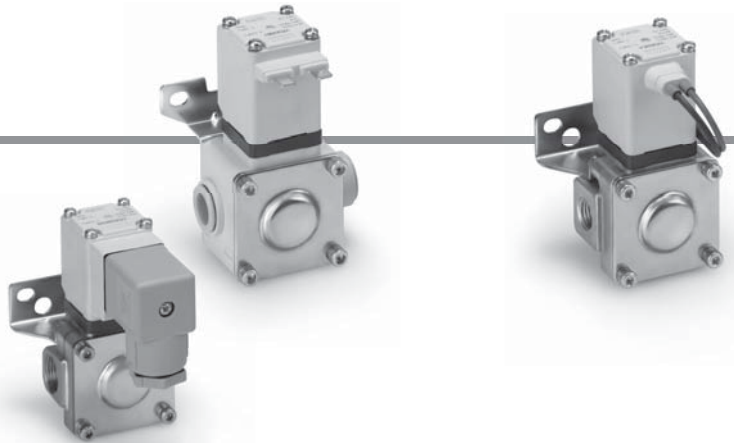
Model/Valve Specifications

N.O.

Symbol



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



Normally Open (N.O.)

Body material	Port size	Orifice diameter [mm]	Model	Minimum operating pressure differential ^{Note 1} [MPa]	Maximum operating pressure differential		Flow-rate characteristics				Maximum system pressure [MPa]	Weight ^{Note 2} [g]	
					AC	DC	C	b	Cv	Effective area [mm ²]			
Aluminium	1/4 (8A)	10	VXD2A0	0.02	0.6	0.4	8.5	0.35	2.0	—	1.5	390	
	3/8 (10A)						9.2					2.4	390
	1/2 (15A)						9.2					2.4	390
Resin	ø 10						0.33	5.6	1.3			350	
	ø 3/8"							4.8				0.9	350
	ø 12							7.2				1.5	350
Stainless steel, C37	3/8 (10A)	15	VXD2B0	0.7	0.7	18.0	0.35	5.0	740				
	1/2 (15A)					20.0			5.5	740			
(Brass)	3/4 (20A)	20	VXD2C0	0.7	0.7	38.0	0.30	9.5	860				
	1 (25A)	25	VXD2D0			—			225	1390			

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

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

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

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

Fluid and Ambient Temperature

Fluid temperature [°C]	Ambient temperature [°C]
-10 ^{Note} to 60	-20 to 60

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

Valve Leakage

Internal Leakage

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

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

VXD2 3 0 A A A

Fluid
0 Air

● **Size—Valve type** ● **Body material/Port size/Orifice diameter**

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

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

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

Symbol	Voltage	Electrical entry	Symbol	Voltage	Electrical entry
A	24 VDC	Grommet	Z1W	24 VAC	Conduit terminal (With surge voltage suppressor)
B	100 VAC	Grommet (With surge voltage suppressor)	Z1N	12 VDC	
C	110 VAC		DIN terminal (With surge voltage suppressor)	Z1P	48 VAC
D	200 VAC				
E	230 VAC				
F	24 VDC				
G	24 VDC				
H	100 VAC	Faston terminal		Z1Q	220 VAC
J	110 VAC				
K	200 VAC	Conduit terminal (With surge voltage suppressor)	Z2A	24 VDC	DIN terminal (With surge voltage suppressor, without DIN connector)
L	230 VAC				
M	24 VDC	Conduit (With surge voltage suppressor)	Z2B	100 VAC	Conduit terminal (With surge voltage suppressor, with light)
N	100 VAC				
P	110 VAC	Faston terminal	Z2C	110 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
Q	200 VAC				
R	230 VAC	Conduit (With surge voltage suppressor)	Z2D	200 VAC	Conduit terminal (With surge voltage suppressor, with light)
S	24 VDC				
T	100 VAC	Faston terminal	Z2E	230 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
U	110 VAC				
V	200 VAC	Conduit (With surge voltage suppressor)	Z2F	48 VAC	Conduit terminal (With surge voltage suppressor, with light)
W	230 VAC				
Y	24 VDC	Faston terminal	Z2G	220 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
Z1A	48 VAC				
Z1B	220 VAC	Grommet (With surge voltage suppressor)	Z2H	240 VAC	Conduit terminal (With surge voltage suppressor, with light)
Z1C	240 VAC				
Z1U	24 VAC	Grommet (With surge voltage suppressor)	Z2V	24 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
Z1D	12 VDC				
Z1E	12 VDC	Grommet (With surge voltage suppressor)	Z2J	12 VDC	Conduit terminal (With surge voltage suppressor, with light)
Z1F	48 VAC				
Z1G	220 VAC	DIN terminal (With surge voltage suppressor)	Z2K	24 VDC	DIN terminal (With surge voltage suppressor, without DIN connector)
Z1H	240 VAC				
Z1V	24 VAC	Conduit terminal (With surge voltage suppressor)	Z2L	100 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
Z1J	12 VDC				
Z1K	48 VAC	Conduit terminal (With surge voltage suppressor)	Z2M	110 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
Z1L	220 VAC				
Z1M	240 VAC	Conduit terminal (With surge voltage suppressor)	Z2N	200 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
			Z2P	230 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
			Z2Q	48 VAC	
			Z2R	220 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
			Z2S	240 VAC	
			Z2W	24 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
			Z2T	12 VDC	
			Z3A	24 VDC	DIN terminal (With surge voltage suppressor, without DIN connector)
			Z3B	100 VAC	
			Z3C	110 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
			Z3D	200 VAC	
			Z3E	230 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
			Z3F	48 VAC	
			Z3G	220 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
			Z3H	240 VAC	
			Z3V	24 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
			Z3J	12 VDC	

● **With bracket**

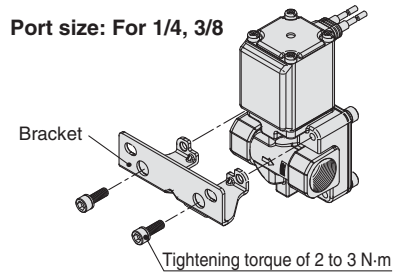
—	No
XB	Yes

Note) Bracket is standardised with the resin body type (VXD230□□). No need to add "XB".

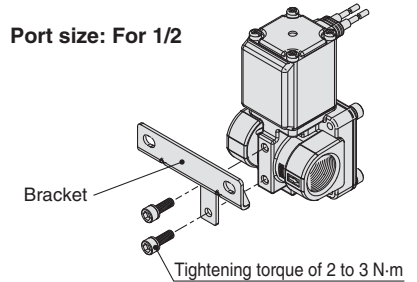
* The bracket for aluminium, C37 (Brass) and stainless steel body type of the VXD23 is shipped together with the product, but not assembled. (Refer to the figure below for mounting.)

VXD23□ Bracket mounting dimensions

Port size: For 1/4, 3/8



Port size: For 1/2



● **Other options**

Symbol	Seal material (Note 1)	Oil-free	Port thread
—	NBR	—	Rc, With one-touch fitting (Note 2)
A	NBR	—	G
B			NPT
C	FKM	—	Rc, With one-touch fitting (Note 2)
D	NBR	○	G
E			NPT
F	FKM	—	G
G			NPT
H	FKM	○	Rc, With one-touch fitting (Note 2)
K			G
L	NBR	○	NPT
Z			Rc, With one-touch fitting (Note 2)

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

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



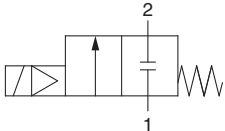
For Water

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

Model/Valve Specifications

N.C.

Symbol



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

Normally Closed (N.C.)

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

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

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

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

Fluid and Ambient Temperature

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

Note) No freezing

Valve Leakage

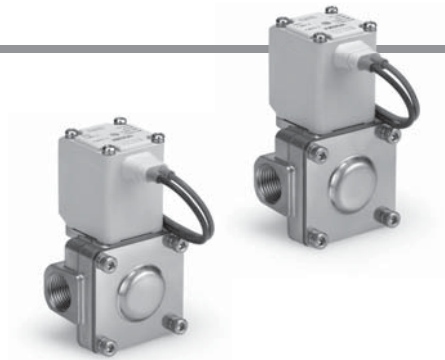
Internal Leakage

Seal material	Leakage rate (Water) ^{Note)}
	VXD23 to 26 (8A to 25A)
NBR, FKM	0.2 cm ³ /min or less

External Leakage

Seal material	Leakage rate (Water) ^{Note)}
	VXD23 to 26 (8A to 25A)
NBR, FKM	0.1 cm ³ /min or less

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



Specifications

For Air

For Water

For Oil

For Heated Water

For High temperature oil

Options

Construction

Dimensions

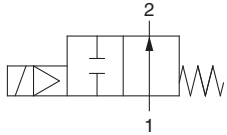
Series VXD



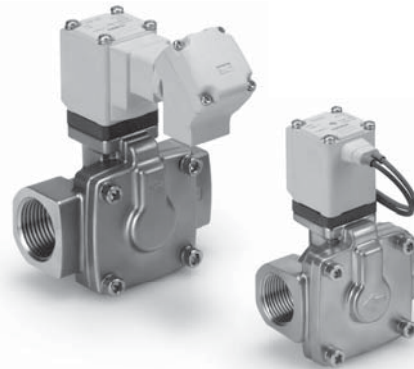
Model/Valve Specifications

N.O.

Symbol



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



Normally Open (N.O.)

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

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

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

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

Fluid and Ambient Temperature

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

Note) No freezing

Valve Leakage

Internal Leakage

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

External Leakage

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

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



How to Order

VXD2 **3** **2** **A** **A** **A** **□**

Fluid

2 Water

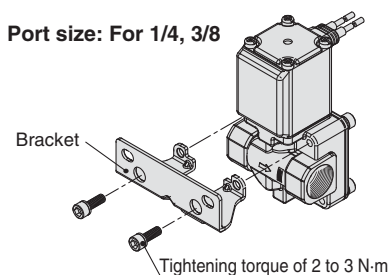
• With bracket

—	No
XB	Yes

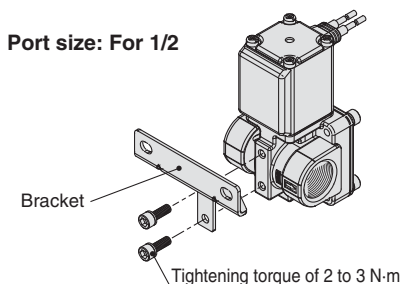
* The bracket for aluminium, C37 (Brass) and stainless steel body type of the VXD23 is shipped together with the product, but not assembled. (Refer to the figure below for mounting.)

VXD2³□ Bracket mounting dimensions

Port size: For 1/4, 3/8



Port size: For 1/2



• Other options

Symbol	Seal material (Note)	Oil-free	Port thread
—	NBR	—	Rc
A	NBR	—	G
B	NBR	—	NPT
C	FKM	—	Rc
D	NBR	○	G
E	NBR	○	NPT
F	FKM	—	G
G	FKM	—	NPT
H	FKM	—	Rc
K	FKM	○	G
L	FKM	○	NPT
Z	NBR	○	Rc

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

Dimensions → Page on and after 26 (Single Unit)

• Size—Valve type

Symbol	Size	Valve type
3	8A	N.C.
	10A	N.O.
	15A	
A	10A	N.C.
	15A	N.O.
4	10A	N.C.
	15A	N.O.
5	20A	N.C.
		N.O.
6	25A	N.C.
		N.O.

• Body material/Port size/Orifice diameter

Symbol	Body material	Port size	Orifice diameter
A	C37 (Brass)	1/4	10
		3/8	
		1/2	
D	Stainless steel	1/4	10
		3/8	
		1/2	
G	C37 (Brass)	3/8	15
		1/2	
		3/8	
J	Stainless steel	3/8	15
		1/2	
L	C37 (Brass)	3/4	20
		Stainless steel	
N	C37 (Brass)	1	25
		Stainless steel	

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

Symbol	Voltage	Electrical entry	Symbol	Voltage	Electrical entry
A	24 VDC	Grommet	Z1W	24 VAC	Conduit terminal (With surge voltage suppressor)
B	100 VAC	Grommet (With surge voltage suppressor)	Z1N	12 VDC	Conduit (With surge voltage suppressor)
C	110 VAC				
D	200 VAC				
E	230 VAC				
F	24 VDC				
G	24 VDC	DIN terminal (With surge voltage suppressor)	Z1Q	220 VAC	Faston terminal
H	100 VAC				
J	110 VAC				
K	200 VAC				
L	230 VAC				
M	24 VDC	Conduit terminal (With surge voltage suppressor)	Z2A	24 VDC	DIN terminal (With surge voltage suppressor, with light)
N	100 VAC				
P	110 VAC				
Q	200 VAC				
R	230 VAC				
S	24 VDC	Conduit (With surge voltage suppressor)	Z2B	100 VAC	Conduit terminal (With surge voltage suppressor, with light)
T	100 VAC				
U	110 VAC				
V	200 VAC				
W	230 VAC				
Y	24 VDC	Faston terminal	Z2C	110 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
Z1A	48 VAC				
Z1B	220 VAC				
Z1C	240 VAC				
Z1U	24 VAC				
Z1D	12 VDC	Grommet (With surge voltage suppressor)	Z2D	200 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
Z1E	12 VDC				
Z1F	48 VAC				
Z1G	220 VAC				
Z1H	240 VAC				
Z1I	24 VAC	DIN terminal (With surge voltage suppressor)	Z2E	230 VAC	DIN terminal (With surge voltage suppressor, without DIN connector)
Z1J	12 VDC				
Z1K	48 VAC				
Z1L	220 VAC				
Z1M	240 VAC				

Specifications

For Air

For Water

For Oil

For Heated water

For High temperature oil

Options

Construction

Dimensions

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.

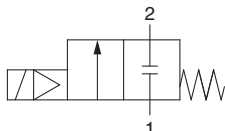
⚠ When the fluid is oil.

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.

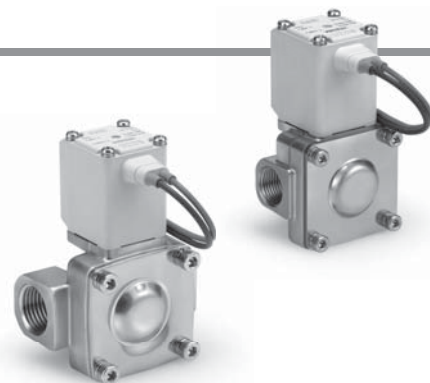
Model/Valve Specifications

N.C.

Symbol



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



Normally Closed (N.C.)

Body material	Port size	Orifice diameter [mm]	Model	Minimum operating pressure differential ^{Note 1)} [MPa]	Maximum operating pressure differential		Flow-rate characteristics		Maximum system pressure [MPa]	Weight ^{Note 2)} [g]
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv		
Stainless steel, C37 (Brass)	1/4 (8A)	10	VXD233	0.02	0.5	0.4	46	1.9	1.5	480
	3/8 (10A)						58	2.4		480
	1/2 (15A)						58	2.4		480
	3/8 (10A)	15	VXD243		0.7	0.7	110	4.5		720
	1/2 (15A)						130	5.5		720
	3/4 (20A)	20	VXD253		0.7	0.7	230	9.5		840
	1 (25A)	25	VXD263				310	13		1360

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

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

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

Fluid and Ambient Temperature

Fluid temperature [°C]	Ambient temperature [°C]
-5 ^{Note)} to 60	-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)
FKM	0.2 cm ³ /min or less

External Leakage

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

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

Pilot Operated 2 Port Solenoid Valve *Series VXD*



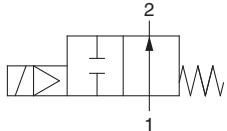
⚠ When the fluid is oil.

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 36 for symbol.

Normally Open (N.O.)

Body material	Port size	Orifice diameter [mm]	Model	Minimum operating pressure differential ^{Note 1)} [MPa]	Maximum operating pressure differential		Flow-rate characteristics		Maximum system pressure [MPa]	Weight ^{Note 2)} [g]
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv		
Stainless steel, C37 (Brass)	1/4 (8A)	10	VXD2A3	0.02	0.4	0.3	46	1.9	1.5	500
	3/8 (10A)						58	2.4		500
	1/2 (15A)						58	2.4		500
	3/8 (10A)	15	VXD2B3		110	4.5	740			
	1/2 (15A)				130	5.5	740			
	3/4 (20A)	20	VXD2C3		0.6	0.6	230	9.5		860
	1 (25A)						25	VXD2D3		310

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

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

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

Fluid and Ambient Temperature

Fluid temperature [°C]	Ambient temperature [°C]
-5 ^{Note)} to 60	-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)
FKM	0.2 cm ³ /min or less

External Leakage

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

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

Specifications

For Air

For Water

For Oil

For Heated Water

For High temperature oil

Options

Construction

Dimensions

How to Order

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

Common Specifications

Seal material	FKM
---------------	-----

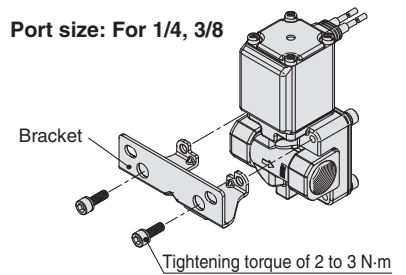
• With bracket

—	No
XB	Yes

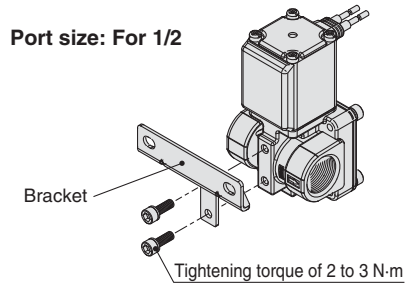
* The bracket for aluminium, C37 (Brass) and stainless steel body type of the VXD23 is shipped together with the product, but not assembled. (Refer to the figure below for mounting.)

VXD2³□ Bracket mounting dimensions

Port size: For 1/4, 3/8



Port size: For 1/2



• Other options

Symbol	Oil-free	Port thread
—	—	Rc
A	—	G
B	—	NPT
D	○	G
E	○	NPT
Z	○	Rc

Dimensions → Page on and after 26 (Single Unit)

• Size—Valve type

Symbol	Size	Valve type
3	8A	N.C.
	10A	N.O.
	15A	
A	10A	N.C.
	15A	N.O.
4	10A	N.C.
	15A	N.O.
5	20A	N.C.
		N.O.
6	25A	N.C.
		N.O.

• Body material/Port size/Orifice diameter

Symbol	Body material	Port size	Orifice diameter
A	C37 (Brass)	1/4	10
		3/8	
		1/2	
D	Stainless steel	1/4	
		3/8	
		1/2	
G	C37 (Brass)	3/8	15
		1/2	
		3/8	
J	Stainless steel	3/8	
		1/2	
L	C37 (Brass)	3/4	
		Stainless steel	
N	C37 (Brass)	1	25
		Stainless steel	

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

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



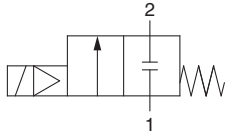
For Heated water

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

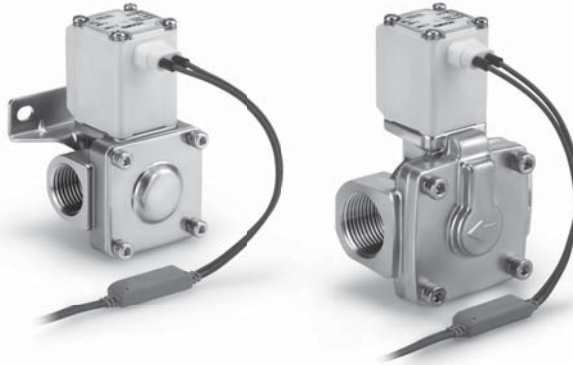
Model/Valve Specifications

N.C.

Symbol



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



Normally Closed (N.C.)

Body material	Port size	Orifice diameter [mm]	Model	Minimum operating pressure differential ^{Note 1)} [MPa]	Maximum operating pressure differential		Flow-rate characteristics		Maximum system pressure [MPa]	Weight ^{Note 2)} [g]
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv		
Stainless steel, C37 (Brass)	1/4 (8A)	10	VXD235	0.02	0.7	0.5	46	1.9	1.5	480
	3/8 (10A)						58	2.4		480
	1/2 (15A)						58	2.4		480
	3/8 (10A)	15	VXD245		110	4.5	720			
	1/2 (15A)				130	5.5	720			
	3/4 (20A)				230	9.5	840			
1 (25A)	25	VXD265	1.0	1.0	310	13	1360			

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

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

• Refer to "Glossary of Terms" on page 36

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

Fluid and Ambient Temperature

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

Note) No freezing

Valve Leakage

Internal Leakage

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

External Leakage

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

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

Specifications

For Air

For Water

For Oil

For Heated Water

For High temperature oil

Options

Construction

Dimensions

Series VXD

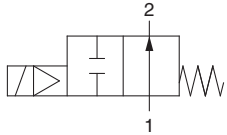


For Heated water

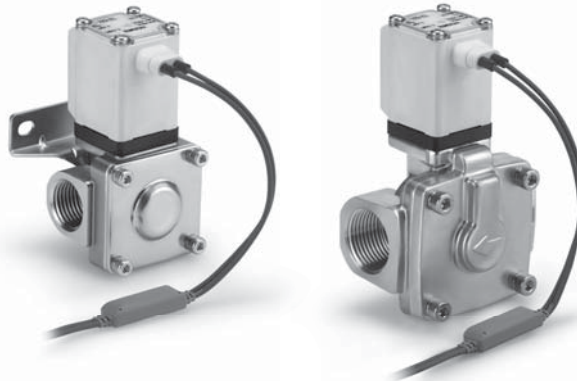
Model/Valve Specifications

N.O.

Symbol



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



Normally Open (N.O.)

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

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

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

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

Fluid and Ambient Temperature

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

Note) No freezing

Valve Leakage

Internal Leakage

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

External Leakage

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

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

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



For Heated water



How to Order

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

Common Specifications

Seal material	EPDM
---------------	------

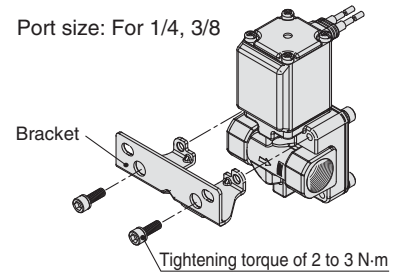
• With bracket

—	No
XB	Yes

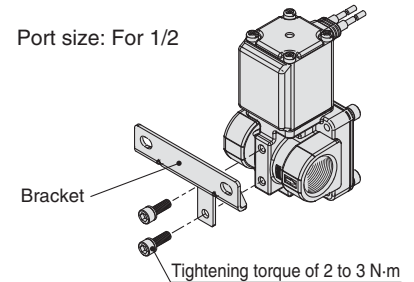
* The bracket for aluminium, C37 (Brass) and stainless steel body type of the VXD23 is shipped together with the product, but not assembled. (Refer to the figure below for mounting.)

VXD2₃^A □ Bracket mounting dimensions

Port size: For 1/4, 3/8



Port size: For 1/2



• Other options

Symbol	Oil-free	Port thread
—	—	Rc
A	—	G
B	—	NPT
D	○	G
E	○	NPT
Z	○	Rc

Dimensions → Page on and after 32 (Single Unit)

• Size—Valve type

Symbol	Size	Valve type
3	8A	N.C.
	10A	N.O.
	15A	
A	10A	N.C.
	15A	N.O.
4	10A	N.C.
	15A	N.O.
5	20A	N.C.
	20A	N.O.
6	25A	N.C.
	25A	N.O.

• Body material/Port size/Orifice diameter

Symbol	Body material	Port size	Orifice diameter
A	C37 (Brass)	1/4	10
		3/8	
		1/2	
D	Stainless steel	1/4	10
		3/8	
		1/2	
G	C37 (Brass)	3/8	15
		1/2	
		3/8	
J	Stainless steel	3/8	15
		1/2	
L	C37 (Brass)	3/4	20
	Stainless steel		
N	C37 (Brass)	1	25
	Stainless steel		

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

Symbol	Voltage	Electrical entry	
A	24 VDC	Grommet	
B	100 VAC	Grommet (With surge voltage suppressor)	
C	110 VAC		
D	200 VAC		
E	230 VAC		
G	24 VDC	DIN terminal (Note 1) 2) (With surge voltage suppressor)	
H	100 VAC		
J	110 VAC		
K	200 VAC		
L	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	Grommet (With surge voltage suppressor)	
Z1A	48 VAC		
Z1B	220 VAC		
Z1C	240 VAC		
Z1U	24 VAC		
Z1F	48 VAC		DIN terminal (Note 1) 2) (With surge voltage suppressor)
Z1G	220 VAC		
Z1H	240 VAC		
Z1V	24 VAC		Conduit terminal (With surge voltage suppressor)
Z1K	48 VAC		
Z1L	220 VAC		
Z1M	240 VAC	Conduit (With surge voltage suppressor)	
Z1W	24 VAC		
Z1P	48 VAC		
Z1Q	220 VAC		
Z1R	240 VAC	Conduit (With surge voltage suppressor)	
Z1Y	24 VAC		

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

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

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

Note 3) Faston terminal is not available.

Specifications

For Air

For Water

For Oil

For Heated water

For High temperature oil

Options

Construction

Dimensions

Series VXD



For High temperature oil

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

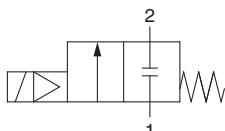
⚠ When the fluid is oil.

The kinematic viscosity must not exceed 50 mm²/s. The special construction of the armature adopted in the built-in full-wave rectifier type gives an improvement in OFF response by providing clearance on the absorbed surface when it is switched ON.

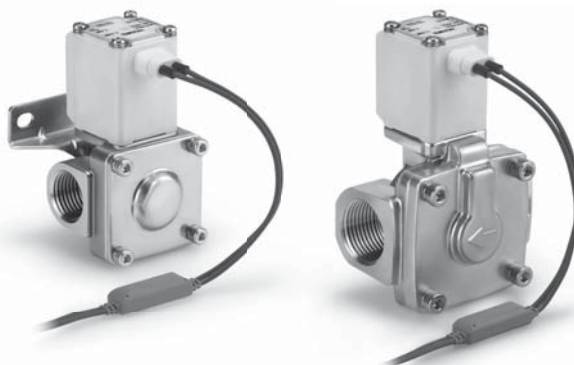
Model/Valve Specifications

N.C.

Symbol



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



Normally Closed (N.C.)

Body material	Port size	Orifice diameter [mm]	Model	Min. operating pressure differential ^{Note 1)} [MPa]	Max. operating pressure differential		Flow-rate characteristics		Max. system pressure [MPa]	Weight ^{Note 2)} [g]
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv		
Stainless steel, C37 (Brass)	1/4 (8A)	10	VXD236		0.5	0.4	46	1.9	1.5	480
	3/8 (10A)						58	2.4		480
	1/2 (15A)						58	2.4		480
	3/8 (10A)	15	VXD246		110	4.5	720			
	1/2 (15A)				130	5.5	720			
	3/4 (20A)				230	9.5	840			
1 (25A)	25	VXD266	0.7	0.7	310	13	1360			

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

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

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

Fluid and Ambient Temperature

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

Note) Kinematic viscosity: 50 mm²/s or less

Valve Leakage Rate

Internal Leakage

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

External Leakage

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

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

Pilot Operated 2 Port Solenoid Valve *Series VXD*



For High temperature oil

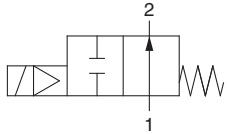
⚠ When the fluid is oil.

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.

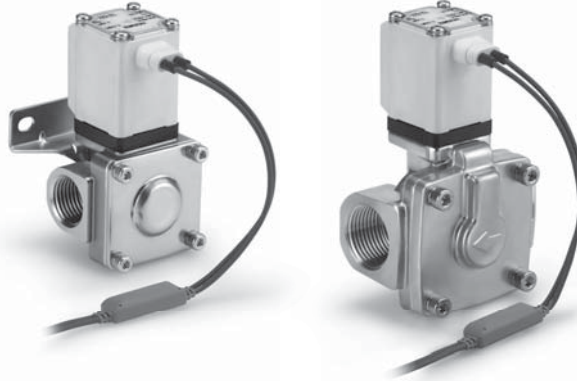
Model/Valve Specifications

N.O.

Symbol



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



Normally Open (N.O.)

Body material	Port size	Orifice diameter [mm]	Model	Minimum operating pressure differential ^{Note 1)} [MPa]	Maximum operating pressure differential		Flow-rate characteristics		Maximum system pressure [MPa]	Weight ^{Note 2)} [g]
					AC	DC	Av (x 10 ⁻⁶ m ²)	Conversion Cv		
Stainless steel, C37 (Brass)	1/4 (8A)	10	VXD2A6	0.02	0.4	0.3	46	1.9	1.5	500
	3/8 (10A)						58	2.4		500
	1/2 (15A)						58	2.4		500
	3/8 (10A)	15	VXD2B6		0.6	0.6	110	4.5		740
	1/2 (15A)						130	5.5		740
	3/4 (20A)						230	9.5		860
1 (25A)	25	VXD2D6			310	13	1390			

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

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

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

Fluid and Ambient Temperature

Fluid temperature [°C]	Ambient temperature [°C]
-5 ^{Note)} to 100	-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)
FKM	0.2 cm ³ /min or less

External Leakage

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

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

Specifications

For Air

For Water

For Oil

For Heated Water

For High temperature oil

Options

Construction

Dimensions

Series VXD

For High temperature oil



How to Order

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

Common Specifications

Seal material	FKM
---------------	-----

Fluid ●

6	High temperature oil
---	----------------------

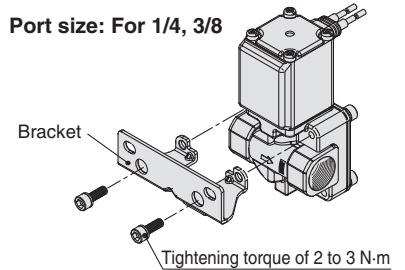
● With bracket

—	No
XB	Yes

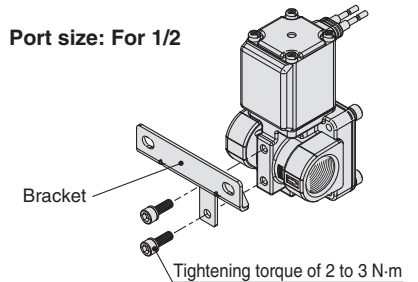
* The bracket for aluminium, C37 (Brass) and stainless steel body type of the VXD23 is shipped together with the product, but not assembled. (Refer to the figure below for mounting.)

VXD2³ Bracket mounting dimensions

Port size: For 1/4, 3/8



Port size: For 1/2



● Other options

Symbol	Oil-free	Port thread
—	—	Rc
A	—	G
B	—	NPT
D	○	G
E	○	NPT
Z	○	Rc

Dimensions → Page on and after 32 (Single Unit)

● Size—Valve type

Symbol	Size	Valve type
3	8A	N.C.
	10A	N.O.
	15A	
A	10A	N.C.
	15A	N.O.
4	10A	N.C.
	15A	N.O.
5	20A	N.C.
		N.O.
6	25A	N.C.
		N.O.

● Body material/Port size/Orifice diameter

Symbol	Body material	Port size	Orifice diameter
A	C37 (Brass)	1/4	10
		3/8	
		1/2	
E	Stainless steel	1/4	
		3/8	
		1/2	
G	C37 (Brass)	3/8	15
		1/2	
		3/4	
J	Stainless steel	3/8	
		1/2	
		3/4	
L	C37 (Brass)	3/4	20
	Stainless steel		
N	C37 (Brass)	1	25
	Stainless steel		

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

Symbol	Voltage	Electrical entry
A	24 VDC	Grommet
B	100 VAC	Grommet (With surge voltage suppressor)
C	110 VAC	
D	200 VAC	
E	230 VAC	
G	24 VDC	
H	100 VAC	DIN terminal (Note 1) 2) (With surge voltage suppressor)
J	110 VAC	
K	200 VAC	
L	230 VAC	
N	100 VAC	Conduit terminal (With surge voltage suppressor)
P	110 VAC	
Q	200 VAC	
R	230 VAC	
T	100 VAC	
U	110 VAC	Conduit (With surge voltage suppressor)
V	200 VAC	
W	230 VAC	
Z1A	48 VAC	
Z1B	220 VAC	
Z1C	240 VAC	Grommet (With surge voltage suppressor)
Z1U	24 VAC	
Z1F	48 VAC	
Z1G	220 VAC	DIN terminal (Note 1) 2) (With surge voltage suppressor)
Z1H	240 VAC	
Z1V	24 VAC	
Z1K	48 VAC	Conduit terminal (With surge voltage suppressor)
Z1L	220 VAC	
Z1M	240 VAC	
Z1W	24 VAC	
Z1P	48 VAC	
Z1Q	220 VAC	Conduit (With surge voltage suppressor)
Z1R	240 VAC	
Z1Y	24 VAC	




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

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

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

Note 3) Faston terminal is not available.

Installation options
(Special Electrical Entry Direction/Mounting Option)

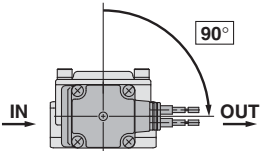
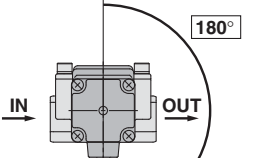
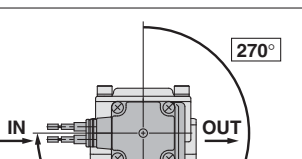
Combinations				
	Symbol	Special electrical entry direction	With bracket	Seal material: EPDM
	XC□	●	●	●
	XB□	●	●	●
X332□	●	●	●	

 **Special Electrical Entry Direction**

VXD2 XC **A**

Enter standard product number. ●

Special electrical entry direction ●

Symbol	VXD2 _A ³ to VXD2 _B ⁶
A	 <p style="text-align: right;">90°</p>
B	 <p style="text-align: right;">180°</p>
C	 <p style="text-align: right;">270°</p>

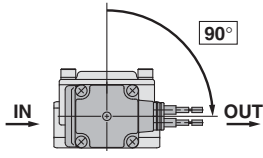
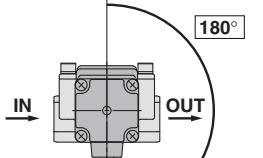
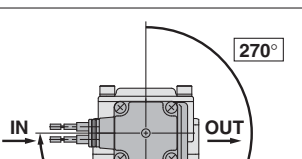
*1 Bracket is attached as standard with the resin body type (VXD2_A³0_E^C□), so it is no necessary to add XB to the part number.
 *2 Bracket is packed in the same container as the main body.

 **With Bracket/Special Electrical Entry Direction**

VXD2 XB **A**

Enter standard product number. ●

With bracket/Special electrical entry direction ●

Symbol	VXD2 _A ³ to VXD2 _B ⁶
A	 <p style="text-align: right;">90°</p>
B	 <p style="text-align: right;">180°</p>
C	 <p style="text-align: right;">270°</p>

*1 Available for the VXD2_A³ to 2_B⁶.
 *2 Bracket is attached as standard with the resin body type (VXD2_A³0_E^C□), so it is no necessary to add XB to the part number.
 *3 Bracket is packed in the same container as the main body.

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

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

● Electrical option	● Special electrical entry direction
● Other option	● With bracket

Specifications

For Air

For Water

For Oil

For Heated Water

For High temperature oil

Options

Construction

Dimensions

Installation options (Special Electrical Entry Direction/Mounting Option)



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

VXD2 **X332**

Enter standard product number.

EPDM specification

With bracket/Special electrical entry direction

Symbol	Specifications	
	Electrical entry direction	Bracket
—	Standard	None
A	90°	
B	180°	
C	270°	
D	Standard	With bracket*1
E	90°	
F	180°	
G	270°	

*1 Not available for the VXD2_A³ (resin body type).

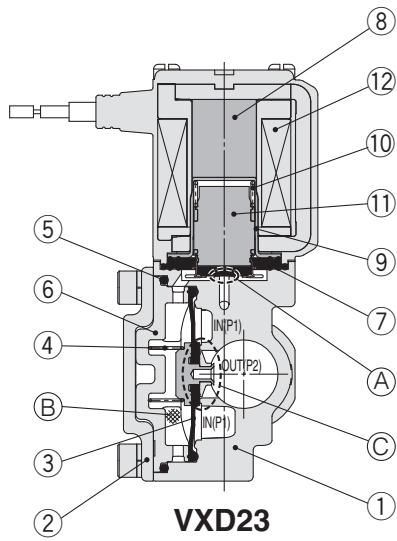
*2 "Other options" (refer to How to Order), which can be combined, are A, B, D, E, Z.

*3 Available for air and water.

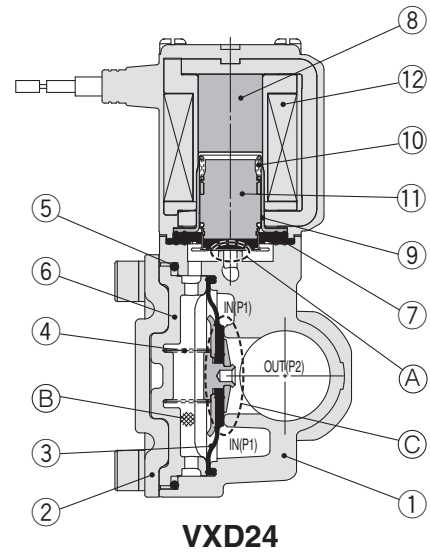
Symbol	VXD2 _A ³ to VXD2 _B ³
—	<p>Standard</p>
A	<p>90°</p>
B	<p>180°</p>
C	<p>270°</p>

Series VXD Construction

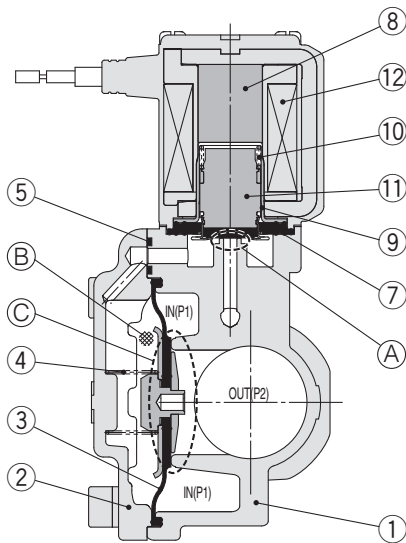
Normally Closed (N.C.)



VXD23



VXD24



VXD25, 26

Component Parts

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

Operation

<Valve opened>

When coil ⑫ is energized, armature assembly ⑪ is attracted by core ⑧ and pilot valve ① is opened. When A is opened, the pressure in pressure chamber ② is reduced and main valve ③ is opened.

<Valve closed>

When coil ⑫ is de-energized, pilot valve ① is closed, pressure in pressure chamber ② increases, and main valve ③ is closed.

Specifications

For Air

For Water

For Oil

For Heated Water

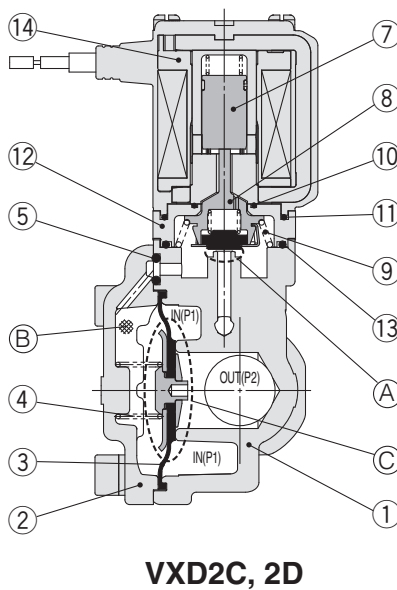
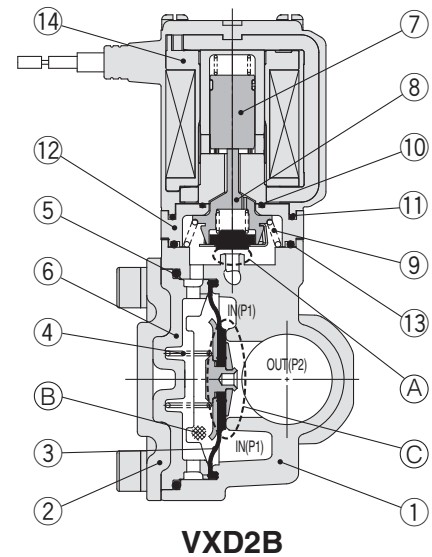
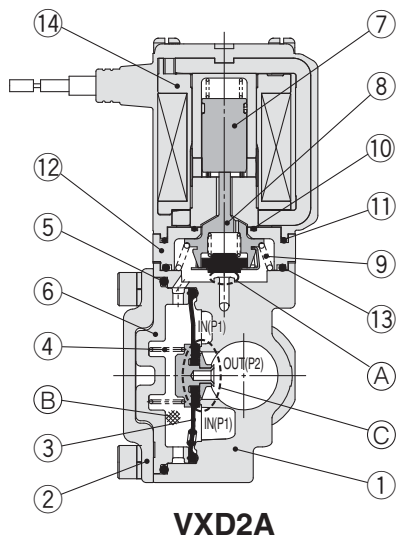
For High Temperature Oil

Option

Construction

Dimensions

Normally Open (N.O.)



Component Parts

No.	Description	Model	Material
1	Body	VXD2A	C37 (Brass), Stainless steel, Aluminum, Resin (PBT)
		VXD2B to 2D	C37 (Brass), Stainless steel
2	Bonnet	VXD2A, 2B	Stainless steel
		VXD2C, 2D	C37 (Brass), Stainless steel
3	Diaphragm assembly	VXD2A to 2D	Stainless steel, NBR, FKM, EPDM
4	Spring	VXD2A to 2D	Stainless steel
5	O-ring	VXD2A to 2D	NBR, FKM, EPDM
6	Buffer	VXD2A, 2B	PPS
7	Sleeve assembly	VXD2A to 2D	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 ① is closed, pressure in pressure chamber ② increases, and main valve ③ is closed.

<Valve closed>

When coil ⑭ is de-energized, (already closed) pilot valve ① is opened, pressure in pressure chamber ② decreases, and main valve ③ is opened.

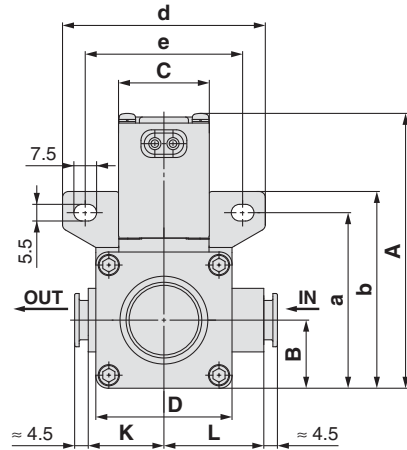
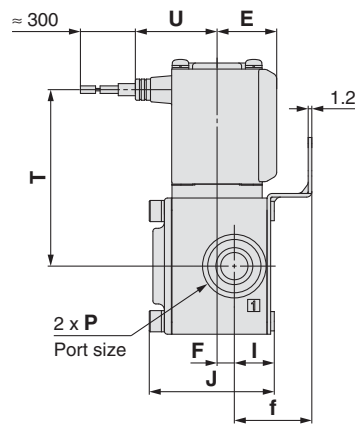
For information on handling one-touch fittings (KQ2 series) and appropriate tubing, refer to SMC website, <http://www.smc.eu>

Pilot Operated 2 Port Solenoid Valve *Series VXD*

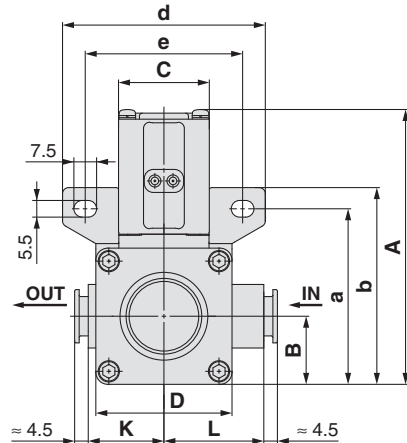
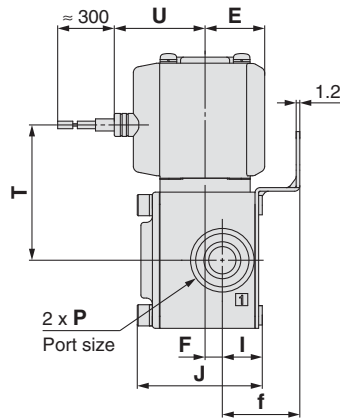


Dimensions/VXD2³_A Body Material: Resin (∅ 10, ∅ 3/8", ∅ 12)

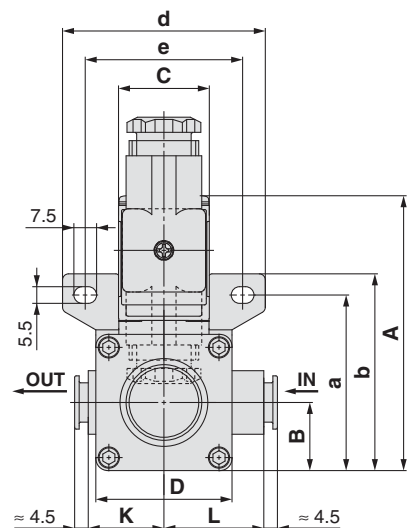
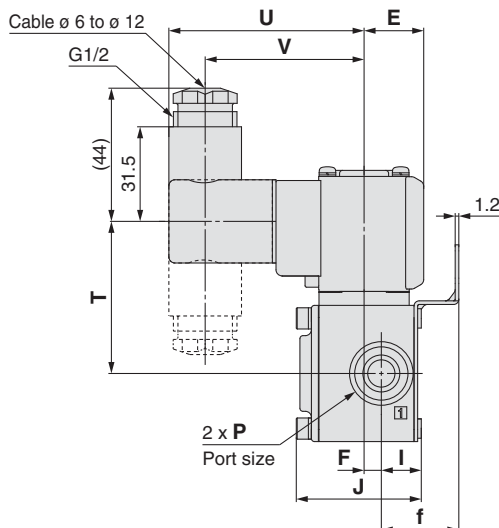
Grommet



Grommet (with surge voltage suppressor)



DIN terminal



Specifications

For Air

For Water

For Oil

For Heated water

For High temperature oil

Options

Construction

Dimensions

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	∅ 10, ∅ 3/8", ∅ 12	91 (97)	22.5	30	45	20	6	13.5	41.5	25	33	58.5 (64.5)	27	45 (50.5)	30	50.5 (56)	64.5	52.5		
Model	One-touch fitting P	Mounting bracket dimensions																		
VXD2 ³ _A	∅ 10, ∅ 3/8", ∅ 12	a	b	d	e	f														
		58	65	67	52	25.5														

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

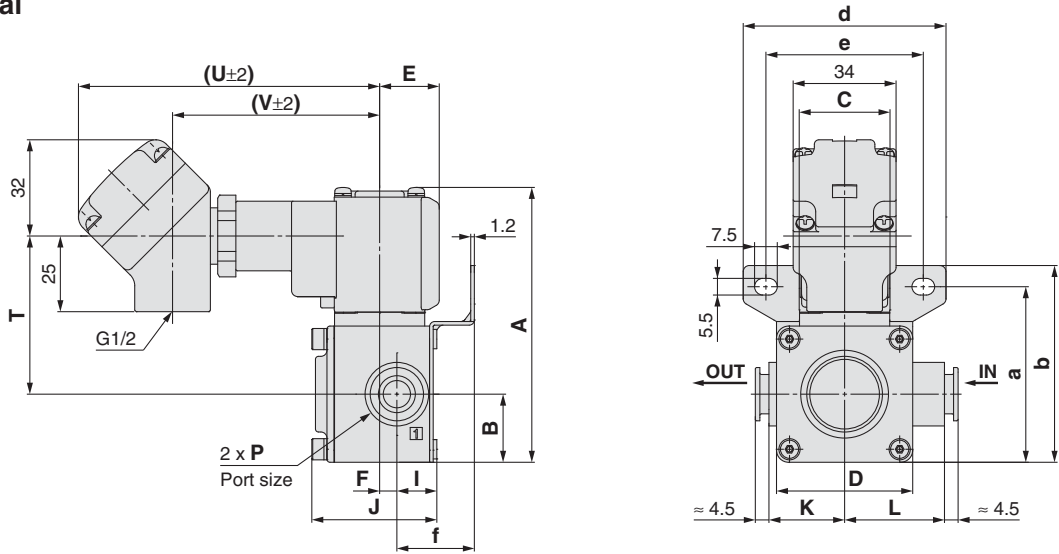
Series VXD



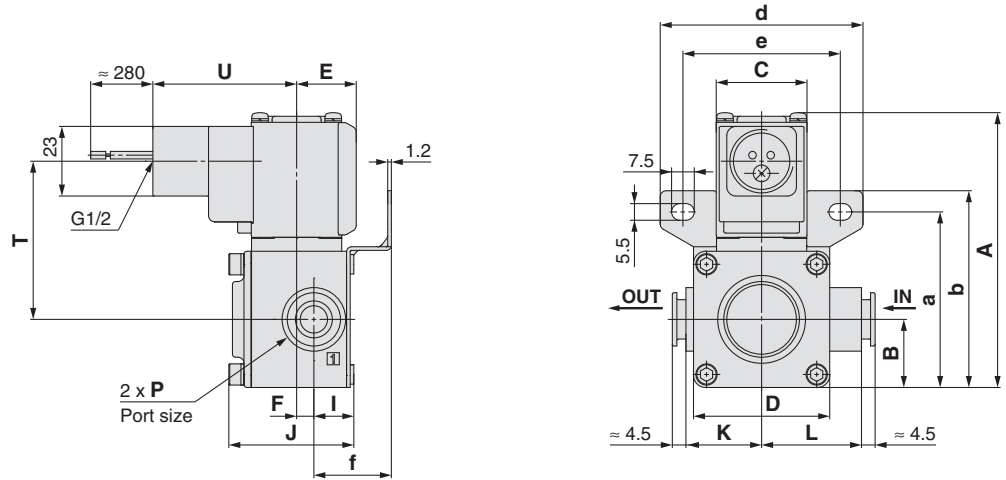
For Air

Dimensions/VXD2³_A Body Material: Resin (∅ 10, ∅ 3/8", ∅ 12)

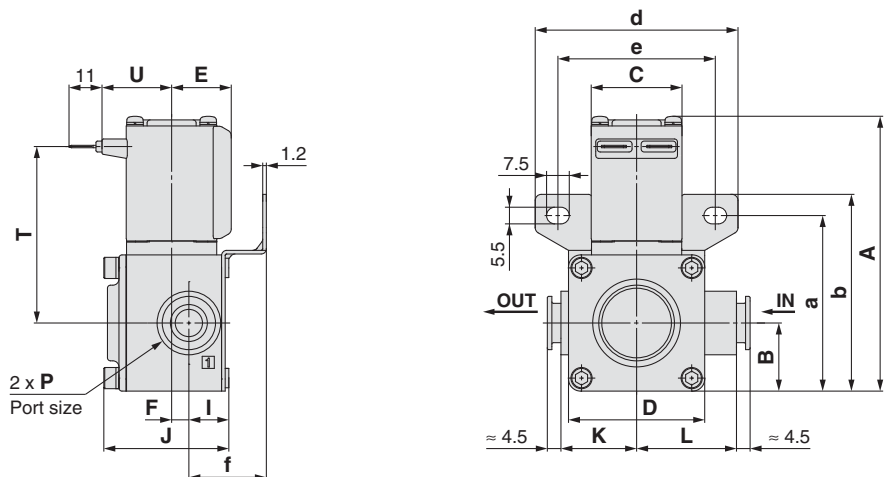
Conduit terminal



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	∅ 10, ∅ 3/8", ∅ 12	91 (97)	22.5	30	45	20	6	13.5	41.5	25	33	52.5 (58)	99.5	68.5	52.5 (58)	47.5	58.5 (64.5)	23
Model	One-touch fitting P	Mounting bracket dimensions																
		a	b	d	e	f												
VXD2 ³ _A	∅ 10, ∅ 3/8", ∅ 12	58	65	67	52	25.5												

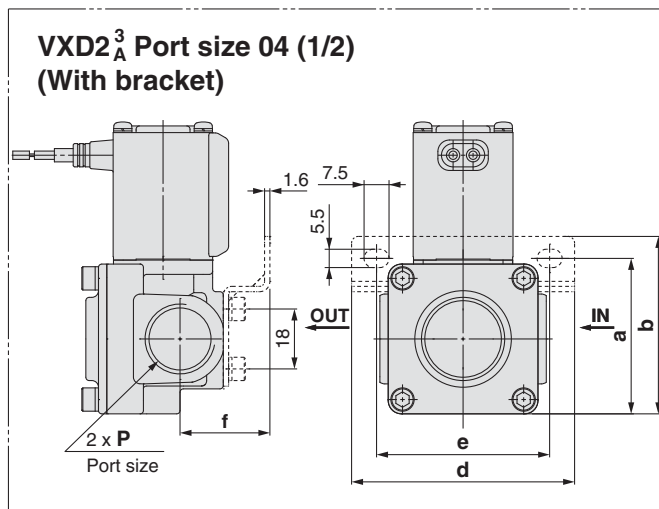
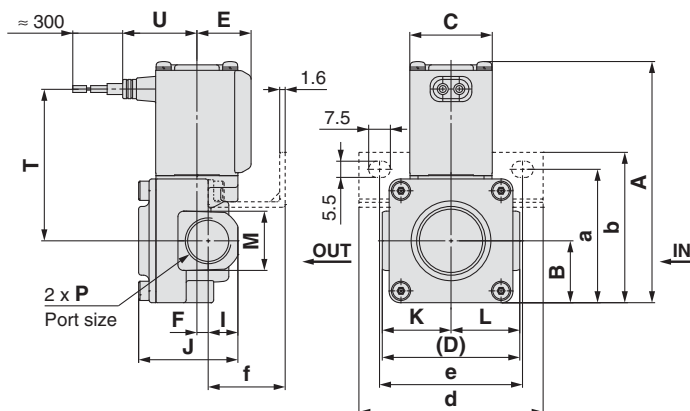
(): Denotes the Normally Open (N.O.) dimensions.



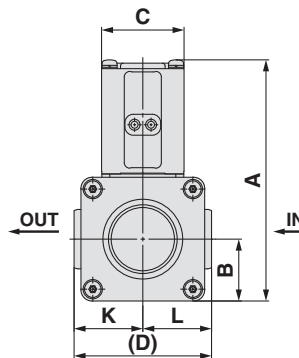
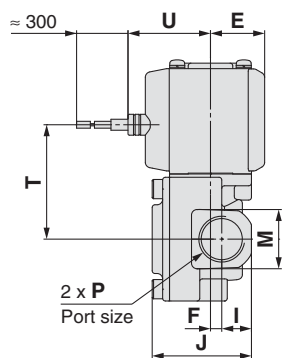
For Air/Water/Oil

Dimensions/VXD2³_A Body Material: Aluminium, C37 (Brass), Stainless Steel

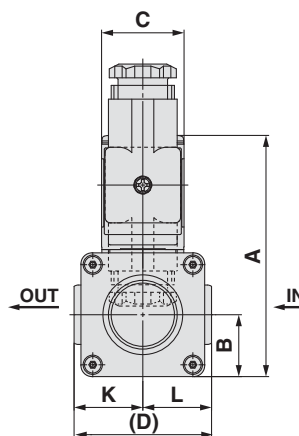
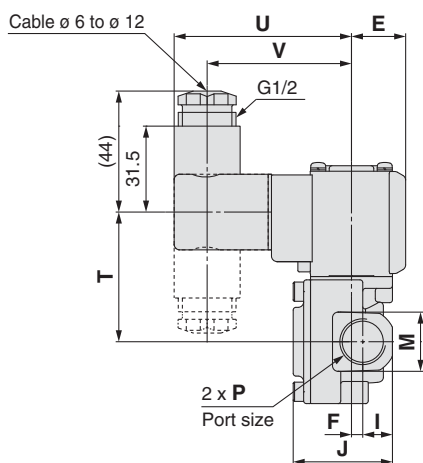
Grommet



Grommet (with surge voltage suppressor)



DIN terminal



Specifications

For Air

For Water

For Oil

For Heated water

For High temperature oil

Options

Construction

Dimensions

Model	Port size P	A	B	C	D	E	F	I	J	K	L	M		Electrical entry						
												C37 (Brass), Stainless steel body	Aluminium 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.
Aluminium body is for air. Refer to page 5 for details.

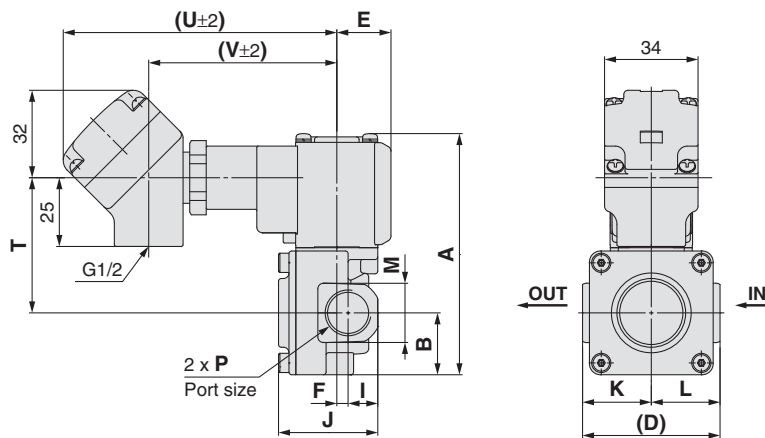
Series VXD



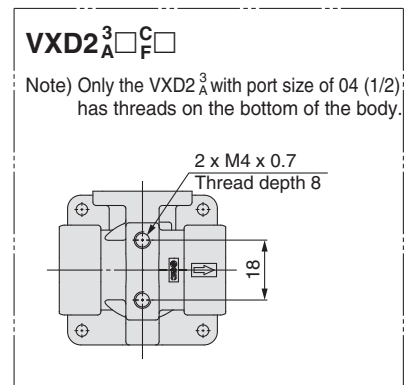
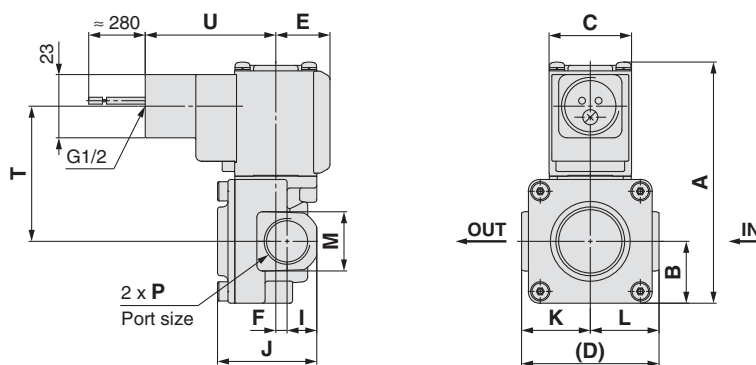
For Air/Water/Oil

Dimensions/VXD2³_A Body Material: Aluminium, C37 (Brass), Stainless Steel

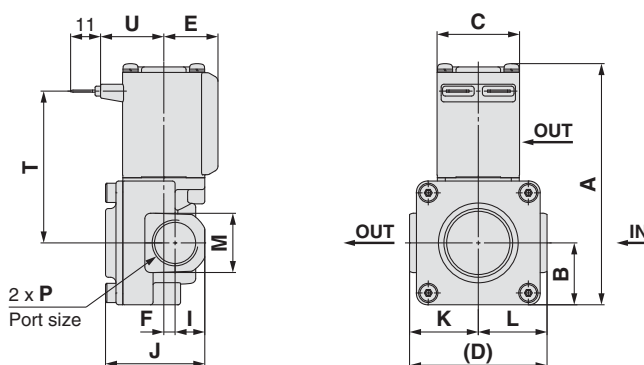
Conduit terminal



Conduit



Faston terminal



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	99.5	68.5	49.5	47.5	55.5	23
	1/2	(93.5)					5	13	42.5				(55)			(55)		(61)	

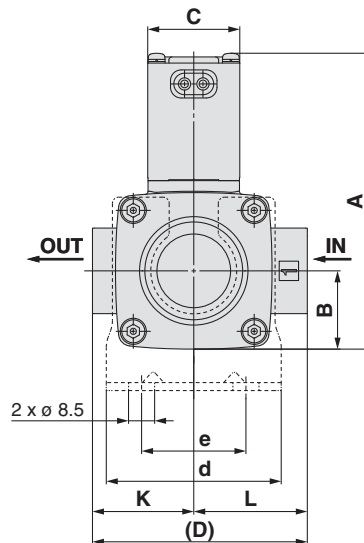
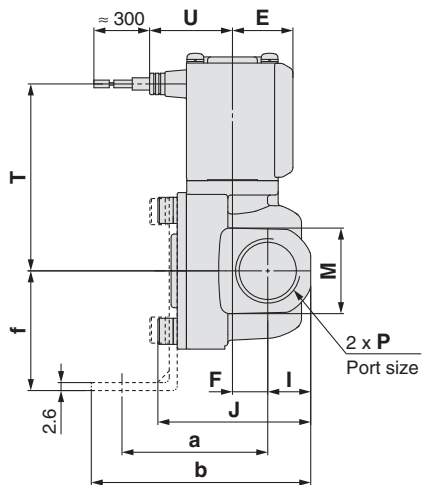
(): Denotes the Normally Open (N.O.) dimensions.
Aluminium body is for air. Refer to page 5 for details.



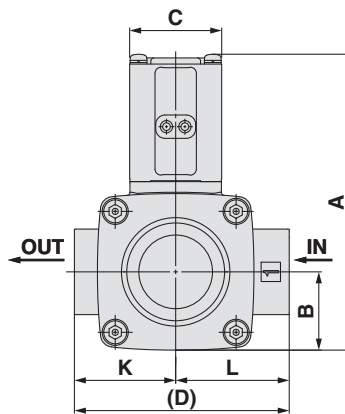
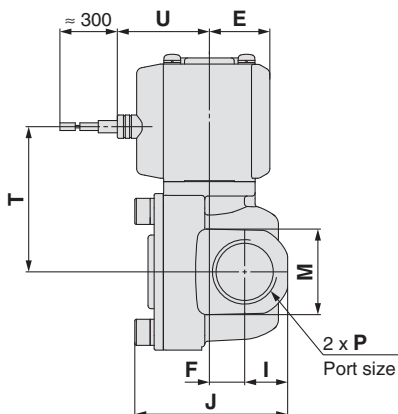
For Air/Water/Oil

Dimensions/VXD2_B⁴ Body Material: C37 (Brass), Stainless Steel

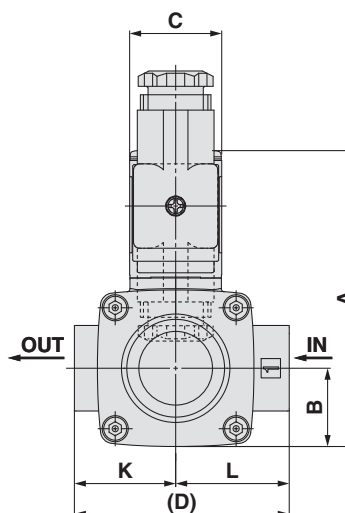
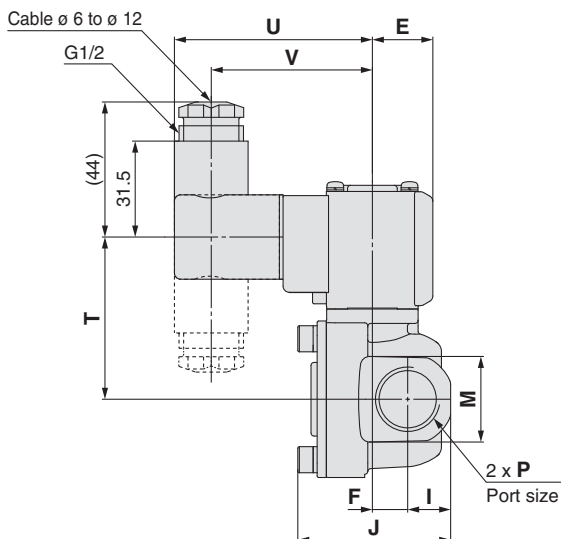
Grommet



Grommet (with surge voltage suppressor)



DIN terminal



Specifications

For Air

For Water

For Oil

For Heated water

For High temperature oil

Options

Construction

Dimensions

Model	Port size P												Electrical entry						
		A	B	C	D	E	F	I	J	K	L	M	Grommet		Grommet (with surge voltage suppressor)		DIN terminal		
													T	U	T	U	T	U	V
VXD2 _B ⁴	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 _B ⁴	3/8, 1/2	47.5	71.5	57	34	39

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

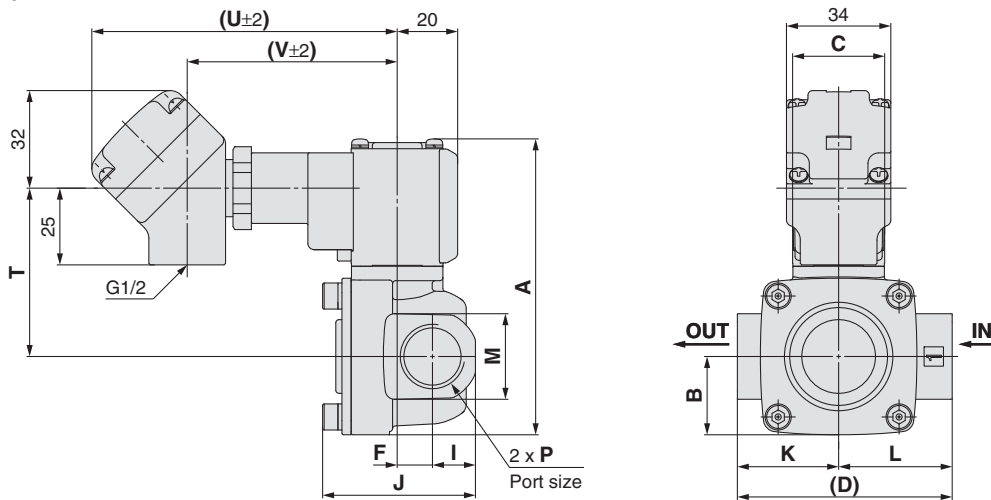
Series VXD



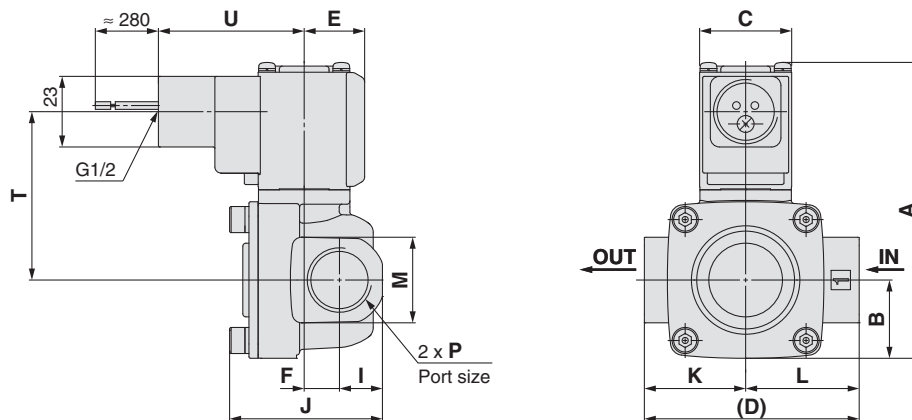
For Air/Water/Oil

Dimensions/VXD2_B⁴ Body Material: C37 (Brass), Stainless Steel

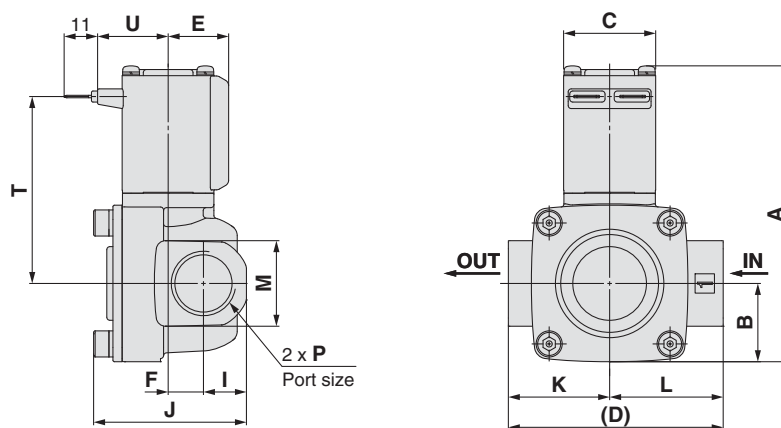
Conduit terminal



Conduit



Faston terminal



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 _B ⁴	3/8, 1/2	96.5 (102.5)	25.5	30	70	20	11.5	14	50	33	37	28	55 (61)	99.5	68.5	55 (61)	47.5	61 (67)	23

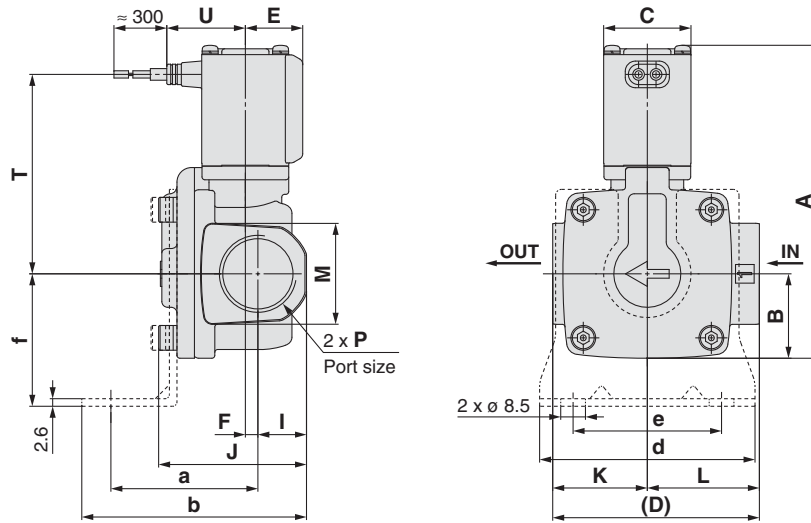
(): Denotes the Normally Open (N.O.) dimensions.

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

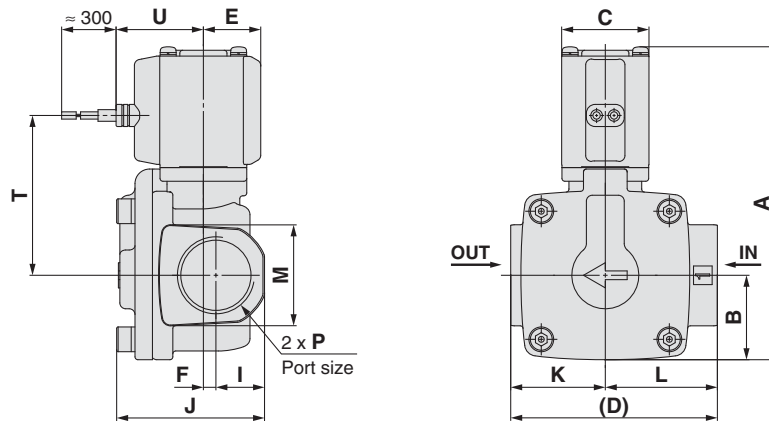


For Air/Water/Oil

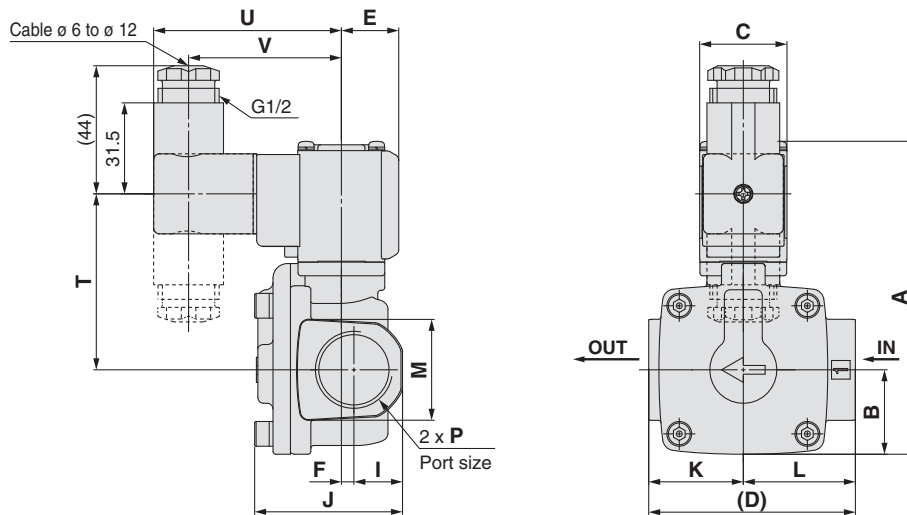
Grommet



Grommet (with surge voltage suppressor)



DIN terminal



Specifications

For Air

For Water

For Oil

For Heated water

For High temperature oil

Options

Construction

Dimensions

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 ^a _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 ^a _B	1	126.5 (134.5)	33	35	95	22	4.5	20	59.5	45.5	49.5	42	82.5 (90.5)	29.5	69 (77)	32.5	74.5 (82.5)	67	55

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

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

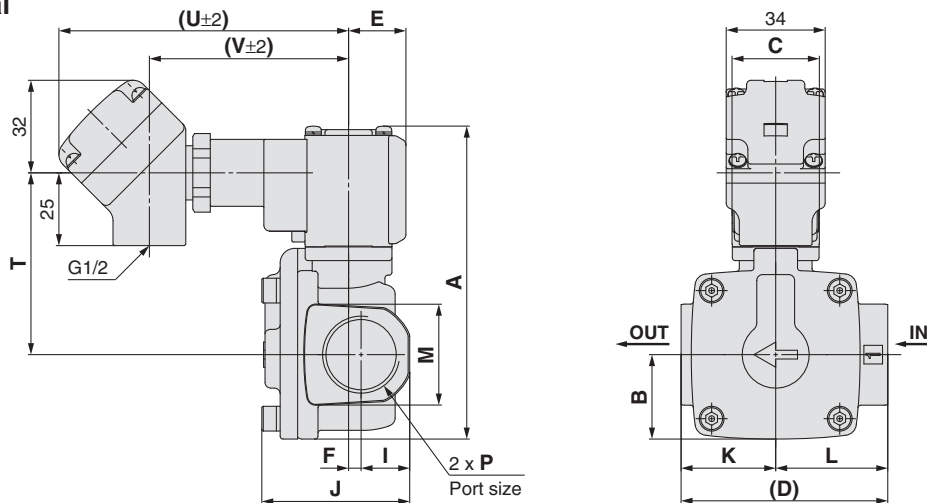
Series VXD



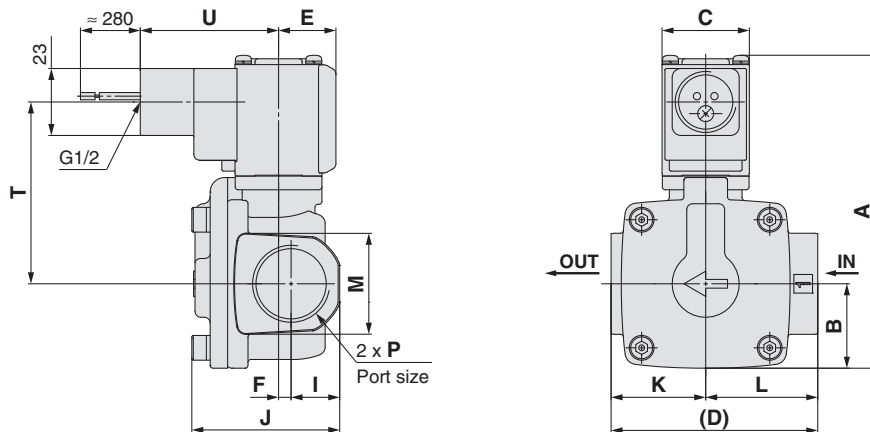
For Air/Water/Oil

Dimensions/VXD2_C⁵/2_D⁶ Body Material: C37 (Brass), Stainless Steel

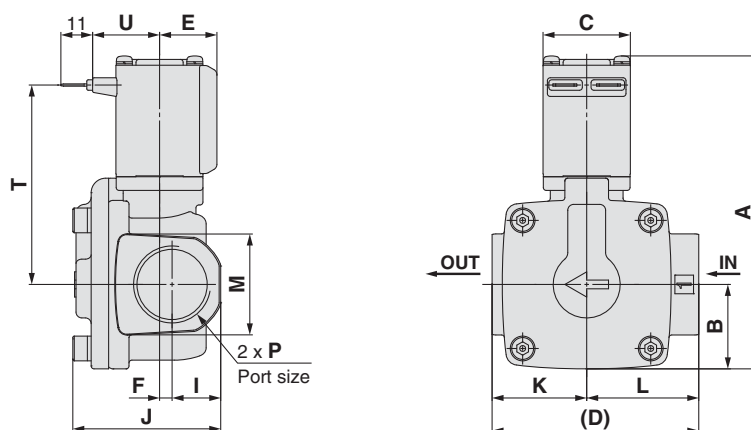
Conduit terminal



Conduit



Faston terminal



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 _C ⁵	3/4	107.5 (113.5)	29	30	71	20	4.5	17	51	32.5	38.5	35	62.5 (68.5)	99.5	68.5	62.5 (68.5)	47.5	68.5 (74.5)	23
VXD2 _D ⁶	1	126.5 (134.5)	33	35	95	22	4.5	20	59.5	45.5	49.5	42	76.5 (84.5)	102	71	76.5 (84.5)	50	82.5 (90.5)	25.5
Model	Port size P	Mounting bracket dimensions																	
		a	b	d	e	f													
		VXD2 _C ⁵	3/4	50.5	77.5	74	51	45.5											
VXD2 _D ⁶	1	55.5	85.5	81	58	49.5													

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

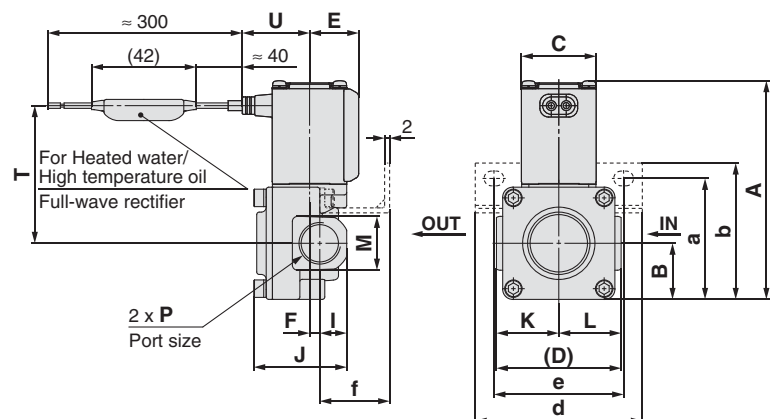
Pilot Operated 2 Port Solenoid Valve *Series VXD*



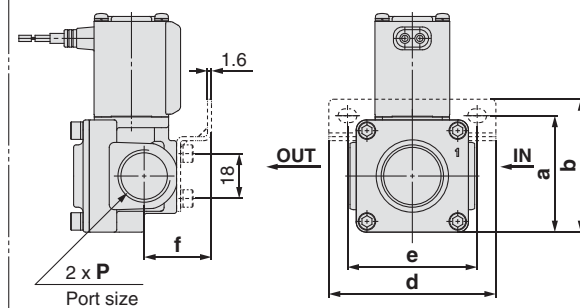
For Heated water/High temperature oil

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

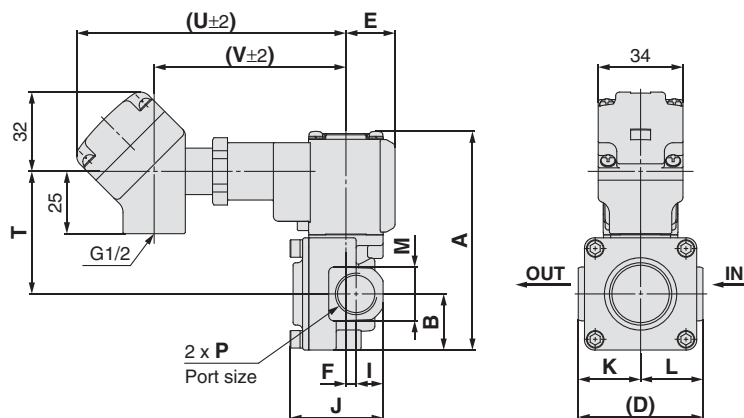
Grommet



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

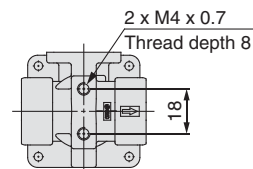


Conduit terminal

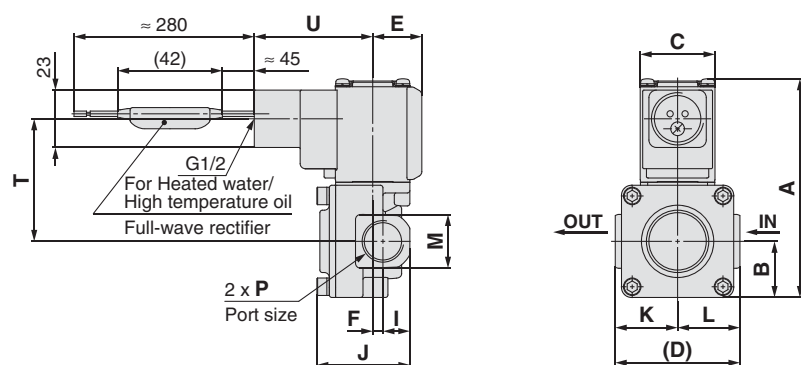


VXD2³_A □ C □ F □

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



Conduit



Specifications

For Air

For Water

For Oil

For Heated water

For High temperature oil

Options

Construction

Dimensions

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)																	
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.

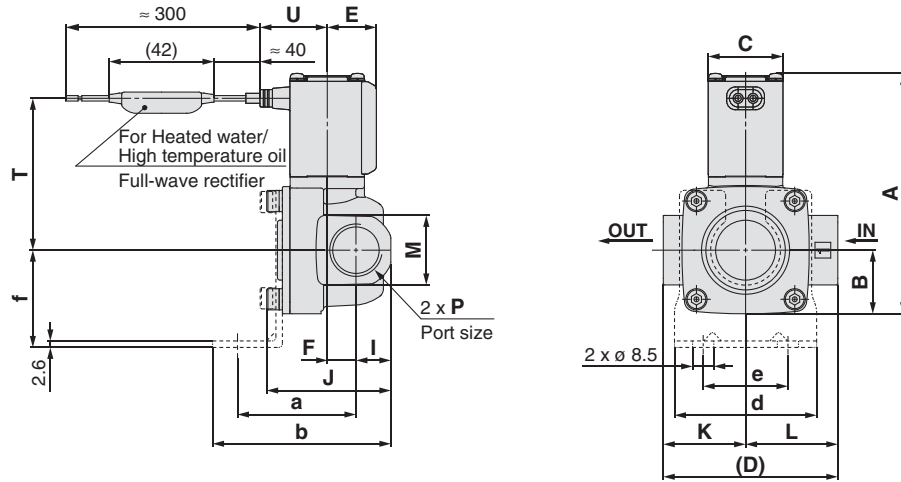
Series VXD



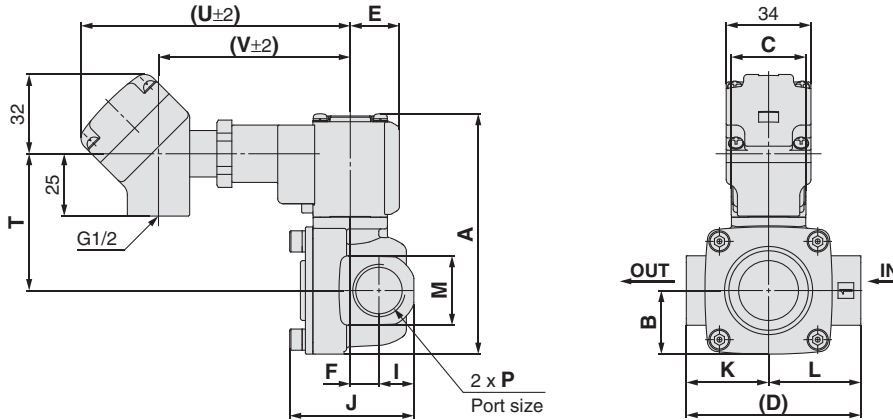
For Heated water/High temperature oil

Dimensions/VXD2_B⁴ Body Material: C37 (Brass), Stainless Steel

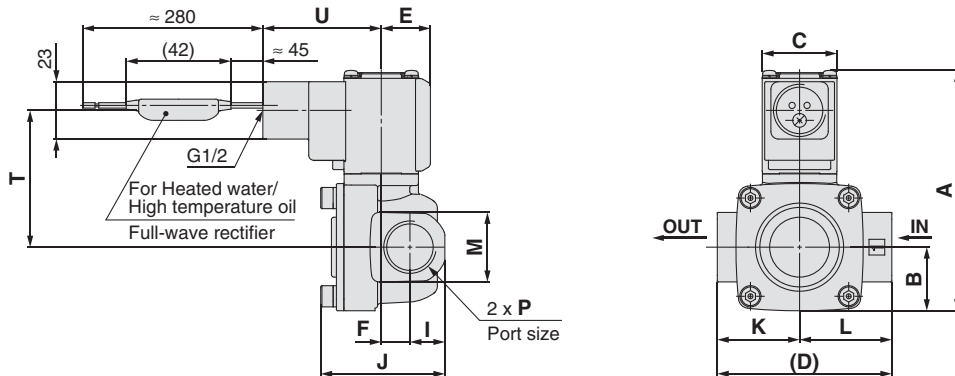
Grommet



Conduit terminal



Conduit



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 _B ⁴	3/8, 1/2	96.5 (102.5)	25.5	30	70	20	11.5	14	50	33	37	28	61 (67)	27	55 (61)	108	77	55 (61)	47.5
Model	Port size P	Mounting bracket dimensions																	
		a	b	d	e	f													
VXD2 _B ⁴	3/8, 1/2	47.5	71.5	57	34	39													

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

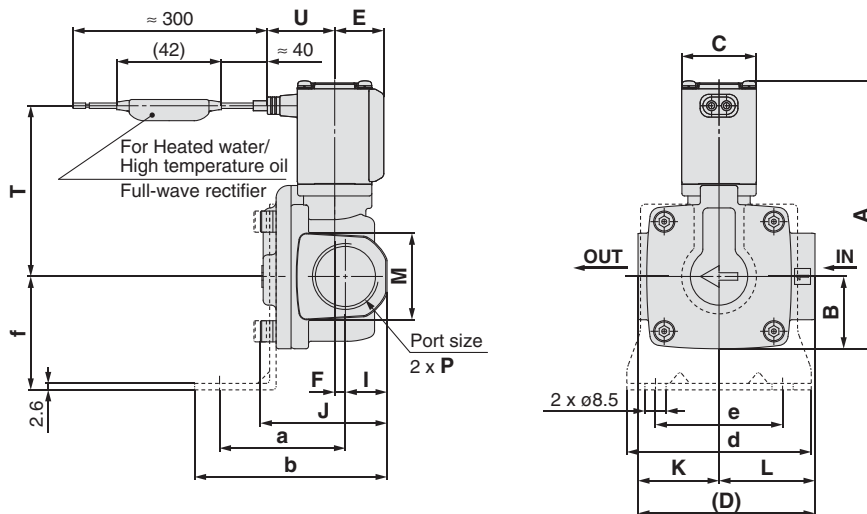
Pilot Operated 2 Port Solenoid Valve *Series VXD*



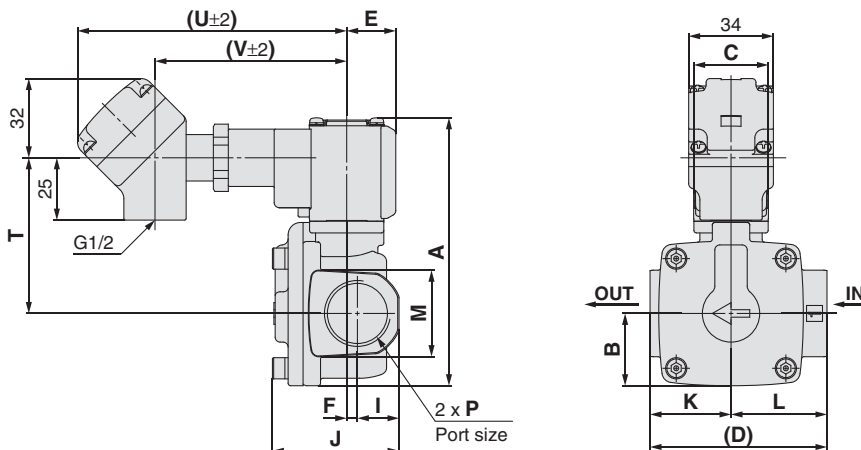
For Heated water/High temperature oil

Dimensions/VXD2_C⁵/2_D⁶ Body Material: C37 (Brass), Stainless Steel

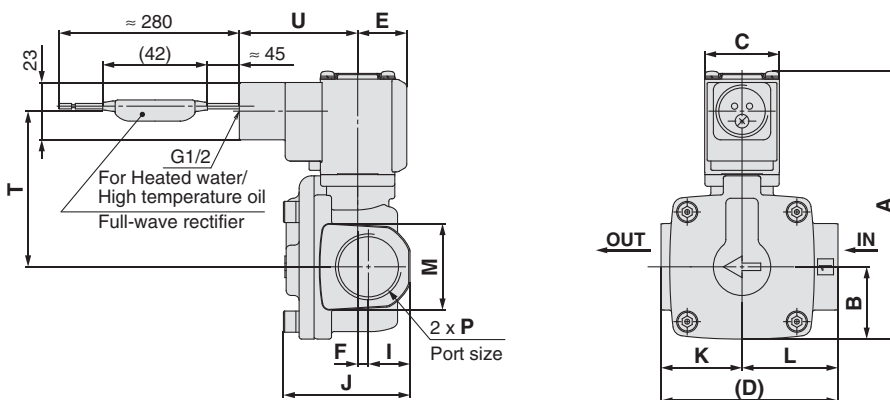
Grommet



Conduit terminal



Conduit



Model	Port size P	A	B	C	D	E	F	I	J	K	L	M	Electrical entry						
													Conduit terminal			Conduit			
													T	U	T	U	V	T	U
VXD2 _C ⁵	3/4	107.5 (113.5)	29	30	71	20	4.5	17	51	32.5	38.5	35	68.5 (74.5)	27	62.5 (68.5)	108	77	62.5 (68.5)	47.5
VXD2 _D ⁶	1	126.5 (134.5)	33	35	95	22	4.5	20	59.5	45.5	49.5	42	82.5 (90.5)	29.5	76.5 (84.5)	110.5	79.5	76.5 (84.5)	50

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

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

Specifications

For Air

For Water

For Oil

For Heated water

For High temperature oil

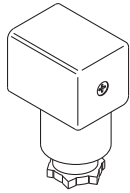
Options

Construction

Dimensions

Replacement Parts

- DIN Connector Part No.



<Coil Insulation Type/Class B>

Electrical option	Rated voltage	Connector part no.
None	24 VDC	C18312G6GCU
	12 VDC	
	100 VAC	
	110 VAC	
	200 VAC	
	220 VAC	
	230 VAC	
	240 VAC	
	24 VAC	
	48 VAC	
	With light	
12 VDC		GDM2A-L6
100 VAC		GDM2A-L1
110 VAC		GDM2A-L1
200 VAC		GDM2A-L2
220 VAC		GDM2A-L2
230 VAC		GDM2A-L2
240 VAC		GDM2A-L2
24 VAC		GDM2A-L5
48 VAC		GDM2A-L15

<Coil Insulation Type/Class H>

Electrical option	Rated voltage	Connector part no.	
None	24 VDC	GDM2A-G-S5	
	100 VAC	GDM2A-R	
	110 VAC		
	200 VAC		
	220 VAC		
	230 VAC		
	240 VAC		
	24 VAC		
	48 VAC		
	With light		24 VDC
100 VAC			GDM2A-R-L1
110 VAC		GDM2A-R-L1	
200 VAC		GDM2A-R-L2	
220 VAC		GDM2A-R-L2	
230 VAC		GDM2A-R-L2	
240 VAC		GDM2A-R-L2	
24 VAC		GDM2A-R-L5	
48 VAC		GDM2A-R-L15	

- Gasket Part No. for DIN Connector

VCW20-1-29-1 (for Class B)

VCW20-1-29-F (for Class H)

- Lead Wire Assembly Part No. for Faston Terminal
(Set of 2 pcs.)

VX021S-1-16FB

- Bracket Assembly Part No. for the VXD2 $\frac{3}{A}$ Metal Body (C37 (Brass), Stainless steel, Aluminium)

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.

Series VXD

Glossary of Terms

Pressure Terminology

1. Maximum operating pressure differential

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

2. Minimum operating pressure differential

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

3. Maximum system pressure

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

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

4. Withstand pressure

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

Electrical Terminology

1. Apparent power (VA)

Volt-ampere is the product of voltage (V) and current (A).

Power consumption (W): For AC, $W = V \cdot A \cdot \cos\theta$.

For DC, $W = V \cdot A$.

Note) $\cos\theta$ shows power factor. $\cos\theta \approx 0.9$

2. Surge voltage

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

Electrical Terminology

3. Enclosure

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

Verify the degree of protection for each product.



● First Characteristics:

Degrees of protection against solid foreign objects

0	Non-protected
1	Protected against solid foreign objects of 50 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: Fluororubber

EPDM: Ethylene-propylene rubber

2. Oil-free treatment

The degreasing and washing of wetted parts

3. Symbol

In the symbol ($\begin{matrix} \text{---} \\ | \\ \text{---} \end{matrix}$) Port 1 (IN) and Port 2 (OUT) are shown in a blocked condition ($\begin{matrix} \text{---} \\ | \\ \text{---} \end{matrix}$), 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.

Specifications

For Air

For Water

For Oil

For Heated Water

For High temperature oil

Options

Construction

Dimensions

Solenoid Valve Flow-rate Characteristics

(How to indicate flow-rate characteristics)

1. Indication of flow-rate characteristics

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

Table (1) Indication of Flow-rate Characteristics

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

2. Pneumatic equipment

2.1 Indication according to the international standards

(1) Conformed standard

ISO 6358: 1989 : Pneumatic fluid power—Components using compressible fluids—Determination of flow-rate characteristics

JIS B 8390: 2000 : Pneumatic fluid power—Components using compressible fluids—How to test flow-rate characteristics

(2) Definition of flow-rate characteristics

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

Sonic conductance **C** : Value which divides the passing mass flow rate of an equipment in a choked flow condition by the product of the upstream absolute pressure and the density in a standard condition.

Critical pressure ratio **b**: Pressure ratio (downstream pressure/upstream pressure) which will turn to a choked flow when the value is smaller than this ratio.

Choked flow : The flow in which the upstream pressure is higher than the downstream pressure and where sonic speed in a certain part of an equipment is reached. Gaseous mass flow rate is in proportion to the upstream pressure and not dependent on the downstream pressure.

Subsonic flow : Flow greater than the critical pressure ratio

Standard condition : Air in a temperature state of 20 °C, absolute pressure 0.1 MPa (= 100 kPa = 1 bar), relative humidity 65 %.

It is stipulated by adding the “(ANR)” after the unit depicting air volume. (standard reference atmosphere)

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

(3) Formula for flow rate

Described by the practical units as following.

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

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

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

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

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

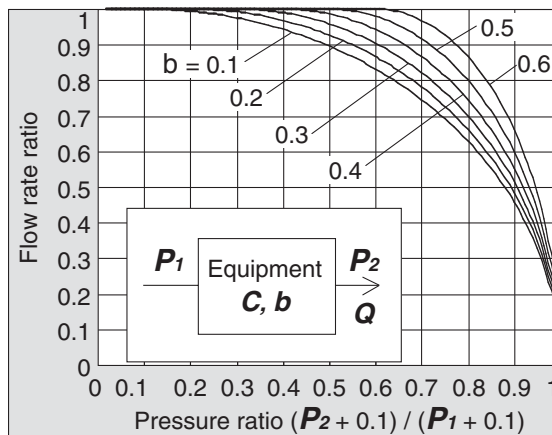
Obtain the air flow rate for **P₁** = 0.4 [MPa], **P₂** = 0.3 [MPa], **t** = 20 [°C] when a solenoid valve is performed in **C** = 2 [dm³/(s·bar)] and **b** = 0.3.

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.

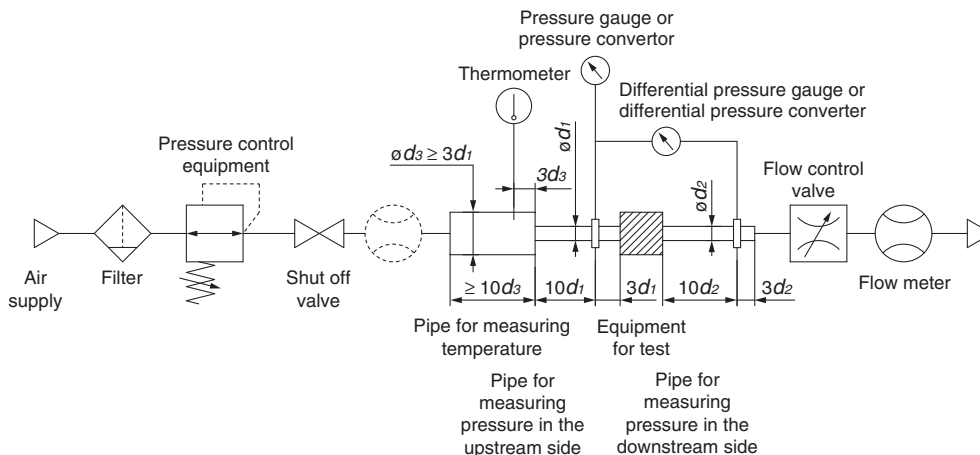


Fig. (1) Test circuit based on ISO 6358, JIS B 8390

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**

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

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

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

Conversion with sonic conductance **C**:

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

Q : Air flow rate [dm³/min(ANR)], dm³ (cubic decimetre) of SI unit are allowed to be described by L (litre).
1 dm³ = 1 L

S : Effective area [mm²]

P₁ : Upstream pressure [MPa]

P₂ : Downstream pressure [MPa]

t : Temperature [°C]

Note) Formula for subsonic flow (4) is only applicable when the critical pressure ratio **b** is unknown for equipment. In the formula (2) by the sonic conductance **C**, it is the same formula as when **b** = 0.5.

(4) Test method

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

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

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]

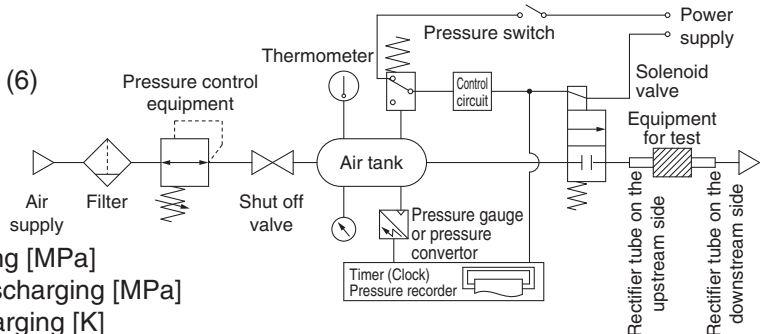


Fig. (2) Test circuit based on JIS B 8390

2.3 Flow coefficient C_v 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, C_v factor by the following formula which is based on the test conducted by the test circuit analogous to ISO 6358.

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

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

P_1 : Pressure of the upstream tapping port [bar gauge]

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

Q : Flow rate [dm³/s standard condition]

P_a : Atmospheric pressure [bar absolute]

T_1 : Upstream absolute temperature [K]

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

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

3. Process fluid control equipment

(1) Conformed standard

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

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

Equipment standards: JIS B 8471: Solenoid valve for water

JIS B 8472: Solenoid valve for steam

JIS B 8473: Solenoid valve for fuel oil

(2) Definition of flow-rate characteristics

A_v 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.

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

A_v : 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:

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

Q : Flow rate [l/min]

A_v : Flow coefficient [m²]

ΔP : Pressure differential [MPa]

G : Specific gravity [water = 1]

In the case of saturated steam:

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

Q : Flow rate [kg/h]

A_v : Flow coefficient [m²]

ΔP : Pressure differential [MPa]

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

P_2 : Downstream pressure [MPa]

Conversion of flow coefficient:

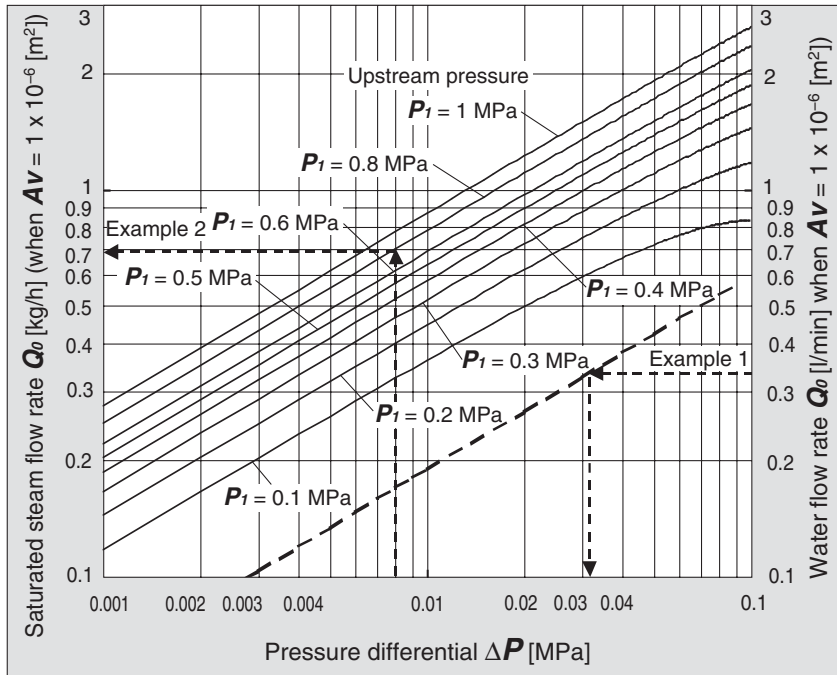
$$Av = 28 \times 10^{-6} Kv = 24 \times 10^{-6} Cv \dots\dots\dots(11)$$

Here,

Kv factor : Value of the clean water flow rate represented by m³/h which runs through a valve at 5 to 40 °C, when the pressure differential is 1 bar.

Cv factor (Reference values): Value of the clean water flow rate represented by US gal/min which runs through a valve at 60 °F, when the pressure differential is 1 lbf/in² (psi).

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



Graph (2) Flow-rate characteristics

Example 1)

Obtain the pressure differential when water 15 [l/min] runs through a solenoid valve with an **Av** = 45 x 10⁻⁶ [m²]. Since **Qo** = 15/45 = 0.33 [l/min], according to Graph (2), if reading **ΔP** when **Qo** is 0.33, it will be 0.031 [MPa].

Example 2)

Obtain the saturated steam flow rate when **P1** = 0.8 [MPa], **ΔP** = 0.008 [MPa] with a solenoid valve with an **Av** = 1.5 x 10⁻⁶ [m²].

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

(4) Test method

Attach a test equipment with the test circuit shown in Fig. (3). Next, pour water at 5 to 40 °C, then measure the flow rate with a pressure differential of 0.075 MPa. However, the pressure differential needs to be set with a large enough difference so that the Reynolds number does not go below a range of 4 x 10⁴.

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

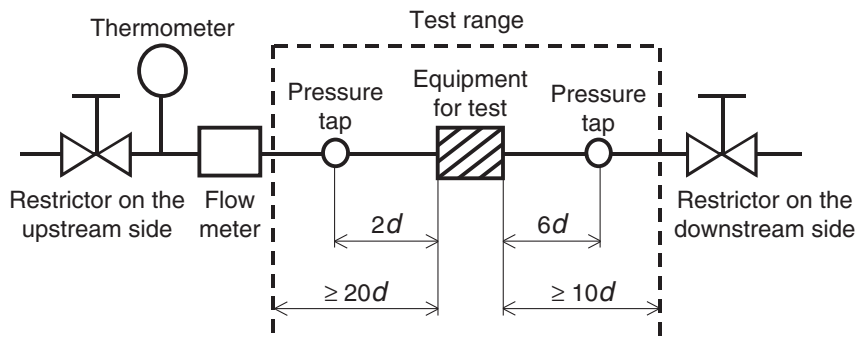


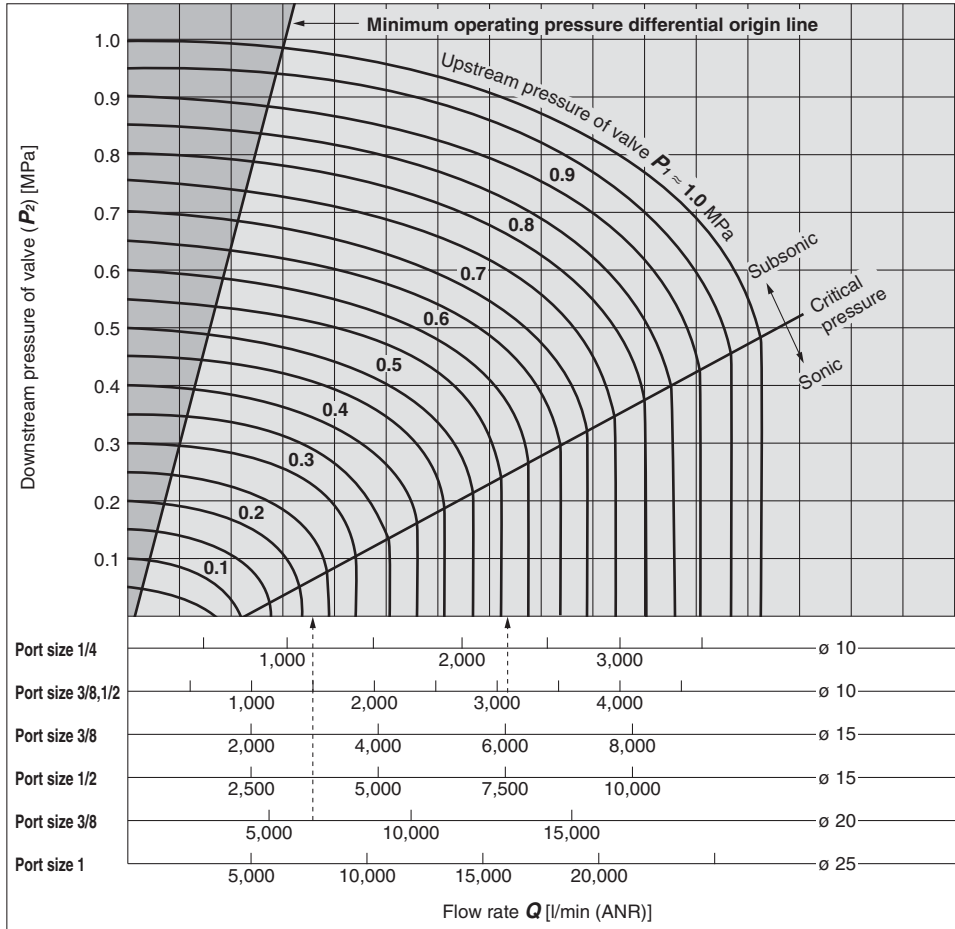
Fig. (3) Test circuit based on IEC60534-2-3, JIS B 2005

Series VXD

Flow-rate Characteristics

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

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



How to read the graph

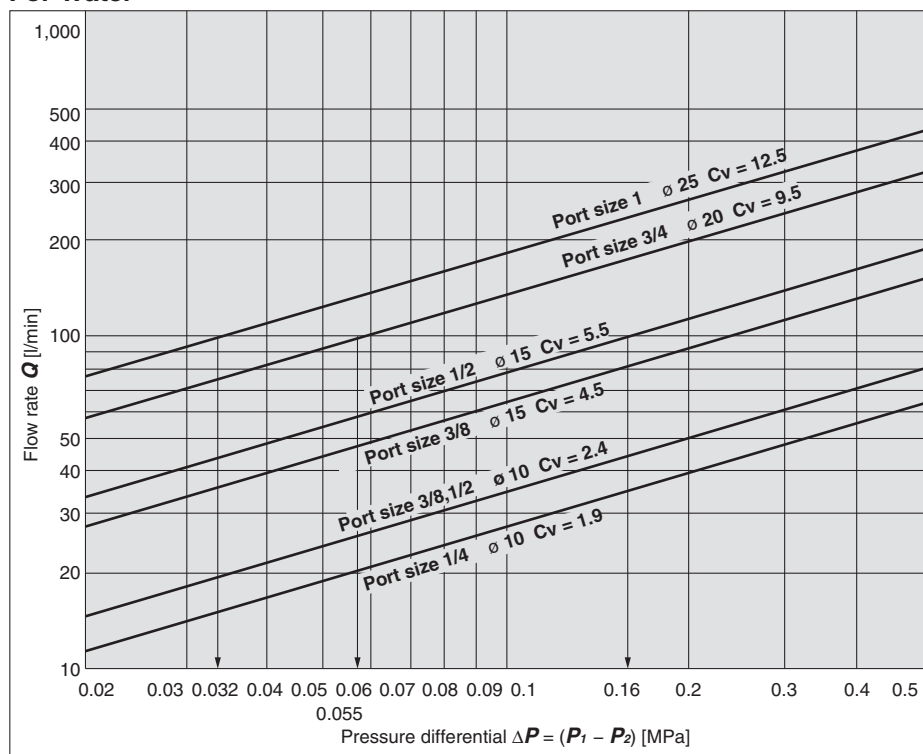
The sonic range pressure to generate a flow rate of 6000 l/min (ANR) is as follows. For a \varnothing 15 orifice (VXD240□□/Port size 3/8), $P_1 \approx 0.57$ MPa, for a \varnothing 20 orifice (VXD250□□/Port size 3/4), $P_1 \approx 0.22$ MPa

Warning

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

Series VXD

For Water



How to read the graph

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



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.smc.eu>

Design

Design

- 1. Cannot be used as an emergency shutoff valve etc.**
The valves presented in this catalogue are not designed for safety applications such as an emergency shutoff valve. If the valves are used in this type of system, other reliable safety assurance measures should also be adopted.
- 2. Extended periods of continuous energization**
The solenoid coil will generate heat when continuously energized. Avoid using in a tightly shut container. Install it in a well-ventilated area. Furthermore, do not touch it while it is being energized or right after it is energized.
- 3. Liquid rings**
In cases with a flowing liquid, provide a bypass valve in the system to prevent the liquid from entering the liquid seal circuit.
- 4. Actuator drive**
When an actuator, such as a cylinder, is to be driven using a valve, take appropriate measures to prevent potential danger caused by actuator operation.
- 5. Pressure (including vacuum) holding**
It is not usable for an application such as holding the pressure (including vacuum) inside of a pressure vessel because air leakage is entailed in a valve.
- 6. When the conduit type is used as equivalent to an IP65 enclosure, install a wiring conduit etc.**
- 7. When an impact, such as water hammer etc., caused by the rapid pressure fluctuation is applied, the solenoid valve may be damaged. Give an attention to it.**

Selection

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 37 through to 43).

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

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

Applicable fluid

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

2) Flammable oil, Gas

Check the specifications for leakage in the interior and/or exterior area.

3) Corrosive gas

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

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

3. Fluid quality

<Air>

1) Use clean air.

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

2) Install an air filter.

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

3) Install an aftercooler or air dryer, etc.

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

4) If excessive carbon powder is generated, eliminate it by installing a mist separator on the upstream side of valves.

If excessive carbon powder is generated by the compressor, it may adhere to the inside of the valves and cause a malfunction.



Series VXD Specific Product Precautions 2

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

Selection

Warning

<Water>

The use of a fluid that contains foreign objects can cause problems such as malfunction and seal failure by promoting wear of the valve seat and armature, and by sticking to the sliding parts of the armature etc. Install a suitable filter (strainer) immediately upstream from the valve. As a general rule, use 80 to 100 mesh.

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

<Oil>

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

4. Ambient environment

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

5. Countermeasures against static electricity

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

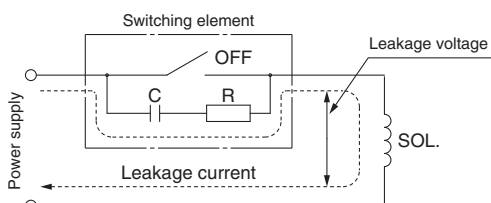
6. Low temperature operation

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

Caution

1. Leakage voltage

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



AC coil: 5 % or less of rated voltage
DC coil: 2 % or less of rated voltage

Selection

Caution

2. Selecting model

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

3. When the fluid is oil.

The kinematic viscosity must not exceed 50 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 labelled on the product should not be erased, removed or covered up.



Series VXD Specific Product Precautions 3

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

Disassembly/Assembly Procedures

Caution

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

Disassembly

<N.C.>

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

<N.O.>

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

Assembly

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

- 1) Mount the components on the body in the reverse order of disassembly.
- 2) Push the coil assembly against the body and tighten the screws two or more rounds diagonally (Fig. 2) in the status that there are no gaps between the coil assembly and body (Fig. 1).
Tighten the screws in the order of "1→2→3→4→1→2→3→4".

Proper Tightening Torque[N·m]

VXD2 _A ³	0.5
VXD2 _B ⁴	
VXD2 _C ⁵	0.7
VXD2 _D ⁶	

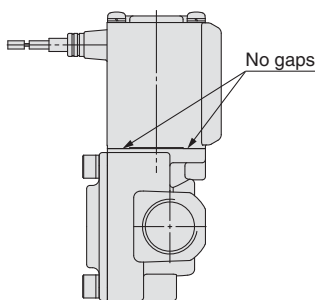


Fig. 1

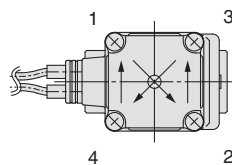
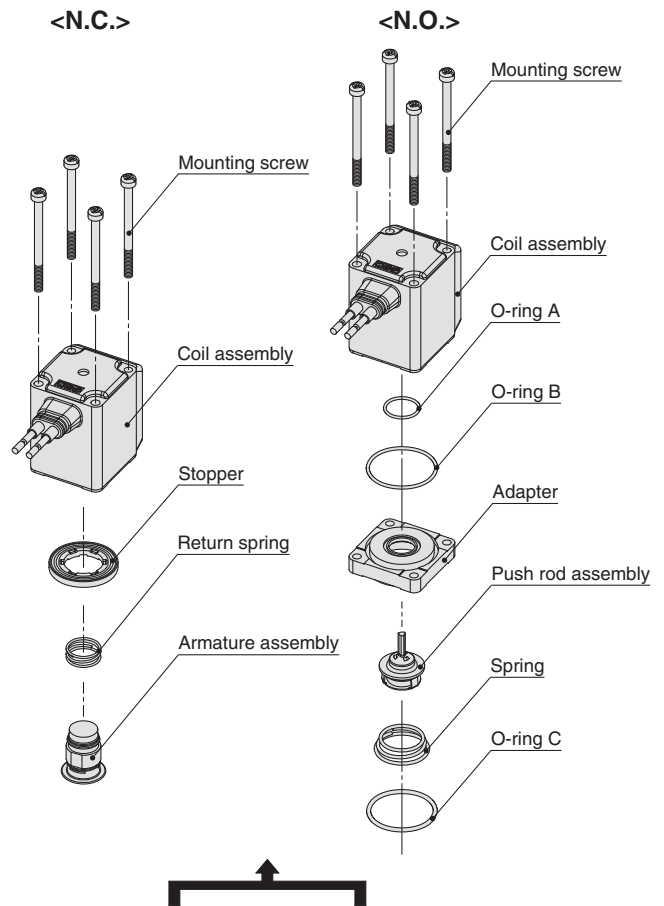
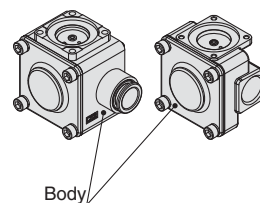


Fig. 2



Resin body Metal body
Aluminium C37 (Brass) Stainless steel



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



Series VXD Specific Product Precautions 4

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

Piping

Warning

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

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

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

Caution

1. Preparation before piping

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

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

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

3. Always tighten threads with the proper tightening torque.

When attaching fittings to valves, tighten with the proper tightening torque shown below.

Tightening Torque for Piping

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

4. When connecting piping to a product

Avoid mistakes regarding the supply port etc.

5. If the regulator and solenoid valve are connected directly, chattering may occur as both of them generate vibration. Do not connect them.

6. If the effective area of piping on the fluid supply side is restricted, the operation may become unstable due to differential pressure fluctuation during valve operation. The piping on the fluid supply side should match the port size of the valve.

Recommended Piping Conditions

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

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

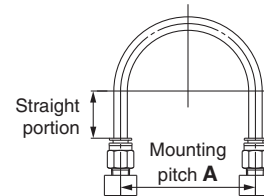


Fig. 1 Recommended piping configuration

Unit: mm

Tube size	Mounting pitch A			Straight portion length
	Nylon tube	Soft nylon tube	Polyurethane tube	
ø 1/8"	44 or more	35 or more	25 or more	16 or more
ø 6	84 or more	66 or more	39 or more	30 or more
ø 1/4"	89 or more	70 or more	57 or more	32 or more
ø 8	112 or more	88 or more	52 or more	40 or more
ø 10	140 or more	110 or more	69 or more	50 or more
ø 12	168 or more	132 or more	88 or more	60 or more

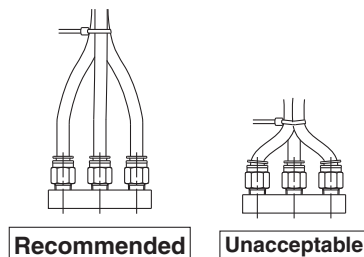


Fig. 2 Binding tubes with bands

Wiring

Warning

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

Caution

1. As a rule, use electrical wire with a cross sectional area of 0.5 to 1.25 mm² for wiring. Furthermore, do not allow excessive force to be applied to the lines.
2. Use electrical circuits which do not generate chattering in their contacts.
3. Use voltage which is within ±10 % of the rated voltage. In cases with a DC power supply where importance is placed on responsiveness, stay within ±5 % of the rated value. The voltage drop is the value in the lead wire section connecting the coil.
4. When a surge from the solenoid affects the electrical circuitry, install a surge voltage suppressor etc., in parallel with the solenoid. Or, adopt an option that comes with the surge voltage protection circuit. (However, a surge voltage occurs even if the surge voltage protection circuit is used. For details, please consult with SMC.)



Series VXD Specific Product Precautions 5

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

Operating Environment

Warning

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

Maintenance

Warning

1. Removing the product

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

- 1) Shut off the fluid supply and release the fluid pressure in the system.
 - 2) Shut off the power supply.
 - 3) Dismount the product.
- #### 2. Low frequency operation
- Switch valves at least once every 30 days to prevent malfunction. Also, in order to use it under the optimum state, conduct a regular inspection once a half year.

Caution

1. Filters and strainers

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

2. Lubrication

When using after lubricating, never forget to lubricate continuously.

3. Storage

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

4. Exhaust the drainage from the air filter periodically.

Operating Precautions

Warning

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

Operating Precautions

Warning

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

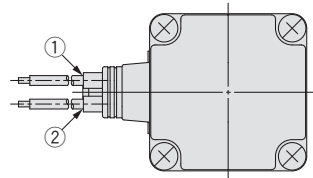
Electrical Connections

Caution

Grommet

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

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

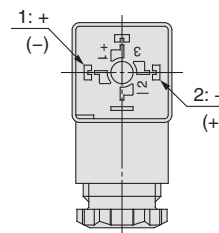


Rated voltage	Lead wire colour	
	①	②
DC	Black	Red
100 VAC	Blue	Blue
200 VAC	Red	Red
Other AC	Grey	Grey

* There is no polarity.

DIN terminal

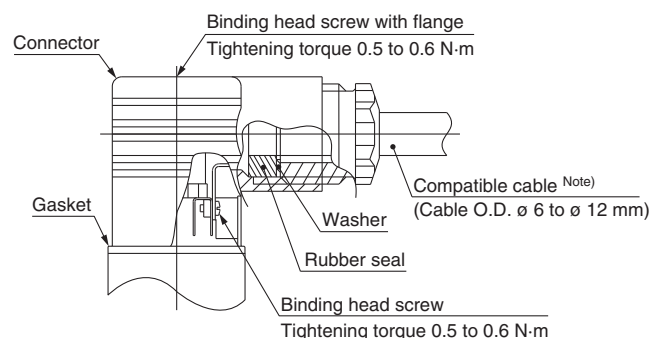
Since internal connections are shown below for the DIN terminal, make connections to the power supply accordingly.



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

* There is no polarity.

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



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



Series VXD Specific Product Precautions 6

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

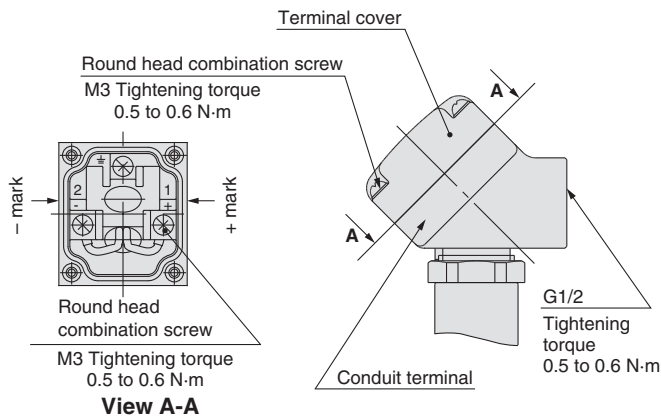
Electrical Connections

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 (G 1/2) with the special wiring conduit etc.



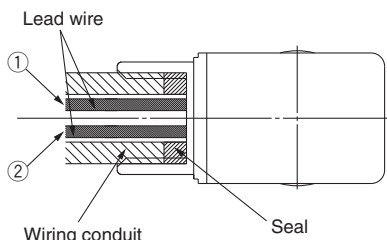
View A-A

(Internal connection diagram)

Conduit

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

Class B coil: AWG20 Insulator O.D. 2.5 mm
Class H coil: AWG18 Insulator O.D. 2.1 mm



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

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

* There is no polarity.
(For the power saving type, there is polarity.)

Description	Part no.
Seal	VCW20-15-6

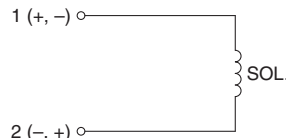
Note) Please order separately.

Electrical Circuits

Caution

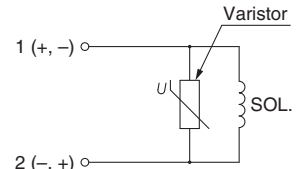
[DC circuit]

Grommet, Faston terminal



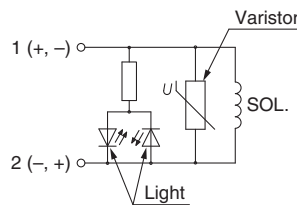
Without electrical option

Grommet, DIN terminal, Conduit terminal, Conduit



With surge voltage suppressor

DIN terminal, Conduit terminal

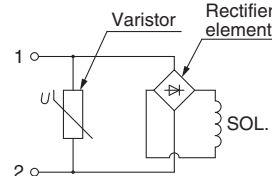


With light/surge voltage suppressor

[AC circuit]

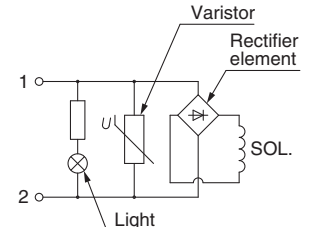
* For AC, the standard product is equipped with surge voltage suppressor.

Grommet, DIN terminal, Conduit terminal, Conduit



Without electrical option

DIN terminal, Conduit terminal



With light/surge voltage suppressor

Note 1) Coil for DIN terminal H type with AC voltage does not have full-wave rectifier. Full-wave rectifier is built in the DIN connector. Refer to page 39 to order it as an accessory.




One-touch Fitting

Caution

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

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

- The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.
- Only personnel with appropriate training should operate machinery and equipment.**
The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.
- Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
 - 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.
 - 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.
 - Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.
- Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
 - Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
 - 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 catalogue.
 - An application which could have negative effects on people, property, or animals requiring special safety analysis.
 - 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.

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

- 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.
- For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
- Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

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

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Caution

- 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.

Caution

- SMC products are not intended for use as instruments for legal metrology.**
Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

Safety Instructions

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

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