

Zero Differential Pressure Type Pilot Operated 2 Port Solenoid Valve

VXZ Series



Air



Water



Oil



Heated water



High temperature oil

Compact

Height

4% Smaller*^(4 mm)

(VXZ24, C37 (Brass) body)

* Comparison with SMC current model

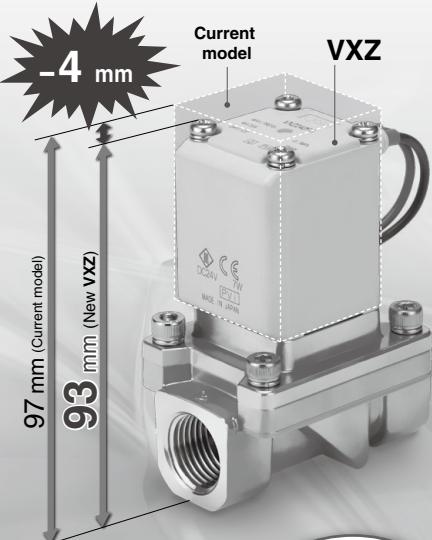
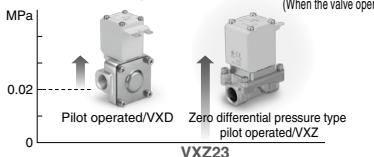
Lightweight

Weight

27% Lighter*^(150 g)

(VXZ23, Resin body)

- Can be used at 0 m hydraulic head!
- Min. operating pressure differential: 0 MPa
(When the valve opens.)



Enclosure

IP65*

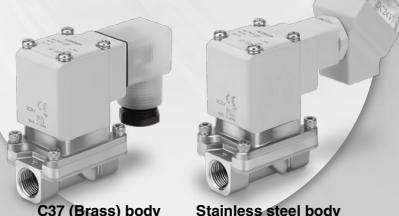
* Electrical entry flat terminal type terminal is IP40.

Valve type



Body material

C37, Stainless steel (VXZ23 to 26)



VX2

VVK

VXD

VXZ

VXS

VXB

VXE

VXP

VXR

VXH

VXF

VX3

VXA

Zero Differential Pressure Type Pilot Operated 2 Port Solenoid Valve **VXZ Series**



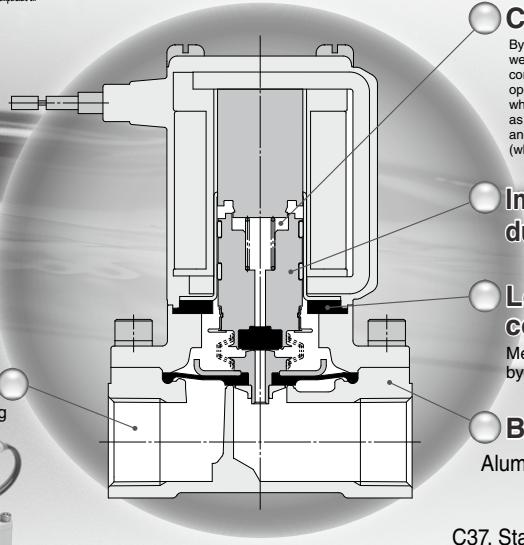
Enclosure
IP65

Flame-resistance
UL94V-0 conformed

Flame resistant mold coil material

Piping variations

Thread piping, One-touch fitting



Clearance

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

Improved armature durability

Low-noise construction

Metal noise reduced by the rubber bumper

Body material

Aluminum, Resin **Air** (VXZ2³)

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

C37, Stainless steel

Built-in full-wave rectifier type (AC specification)

Improved durability

Service life is extended by the special construction. (compared with current AC specification)

Reduced buzz noise

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

Improved OFF response

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

Low-noise construction

Specially constructed to reduce the metal noise during operation.



Variations

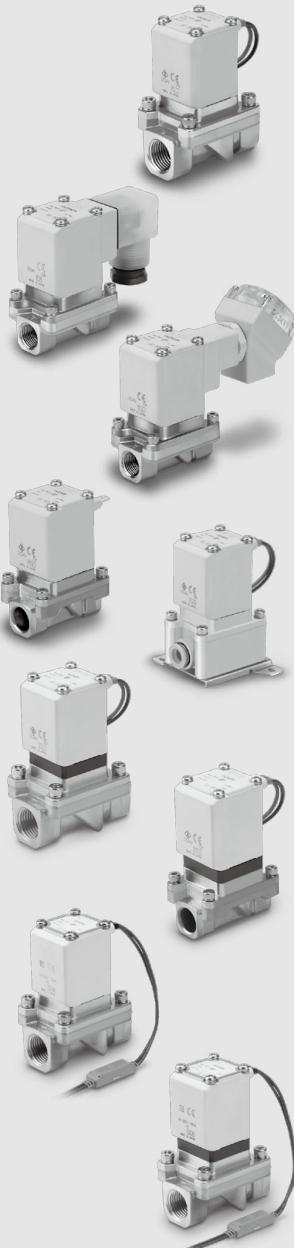
<Fluid>

Model	Applicable fluid ¹				
	Air	Water	Oil	Heated water	High temperature oil
For Air VXZ2⁰ 2 P.176	●				
For Water VXZ2⁰ 2 P.179	●	●			
For Oil VXZ2⁰ 3 P.182	●	●	●		
For Heated water VXZ2⁰ 5 P.185	●	●		●	
For High temperature oil VXZ2⁰ 6 P.188	●	●	●		●

* For details, refer to pages 209 and 210.

<Body Size>

Model	Body size	Orifice diameter mm ϕ	Port size	Body material	Fluid
VXZ2³	10A	10	1/4, 3/8	Aluminum	
			$\phi 10$, $\phi 12$, $\phi 3/8"$	Resin	
			1/4, 3/8	C37	
VXZ2⁴	15A	15	1/2	C37	
				Stainless steel	
VXZ2⁵	20A	20	3/4	C37	
				Stainless steel	
VXZ2⁶	25A	25	1	C37	
				Stainless steel	



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VX2
VXK
VXD
VXZ
VXS
VXB
VXE
VXP
VXR
VXH
VXF
VX3
VXA

VXZ Series

Common Specifications

Standard Specifications

Valve specifications	Valve construction	Zero differential pressure type 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 Note 1)	
	Seal material	NBR, FKM, EPDM	
	Enclosure	Dust-tight, Water-jet-proof type (equivalent to IP65) Note 2) 4)	
Coil specifications	Environment	Location without corrosive or explosive gases	
	Rated voltage	AC	100 VAC, 200 VAC, 110 VAC, 230 VAC, (220 VAC, 240 VAC, 48 VAC, 24 VAC) Note 3)
		DC	24 VDC, (12 VDC) Note 3)
	Allowable voltage fluctuation		±10% of rated voltage
	Allowable leakage voltage	AC (Built-in full-wave rectifier type)	5% or less of rated voltage
		DC	2% or less of rated voltage
	Coil insulation type	Class B (for air, water, oil), Class H (for heated water, high temperature oil)	

Note 1) Body material is aluminum. Resin body is available only for the VXZ2A³.

Note 2) Electrical entry flat terminal type terminal is IP40.

Note 3) Voltage in () indicates special voltage. (Refer to page 192.)

Note 4) For enclosure, refer to "Glossary of Terms" on page 202. When using the product in a place which requires water resistance, please contact SMC.

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

⚠ When pressure differential is less than 0.01 MPa, operation may become unstable. Please contact SMC in case of low flow operation. (Refer to page 195.)

Solenoid Coil Specifications

Normally Closed (N.C.)

DC Specification

Class B

Model	Power consumption (W) Note 1)	Temperature rise (°C) Note 2)
VXZ23, 24	7	55
VXZ25, 26	10.5	65

Class H

Model	Power consumption (W) Note 1)	Temperature rise (°C) Note 2)
VXZ23, 24	12	100
VXZ25, 26	15	100

Note 1) Power consumption, Apparent power: 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.

Normally Closed (N.C.)

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

Class B

Model	Apparent power (VA) Note 1)2)	Temperature rise (°C) Note 3)
VXZ23, 24	9.5	70
VXZ25, 26	12	70

Class H

Model	Apparent power (VA) Note 1)2)	Temperature rise (°C) Note 3)
VXZ23, 24	12	100
VXZ25, 26	15	100

Note 1) Power consumption, 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 (Built-in full-wave rectifier type).

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 (°C) Note 2)
VXZ2A, 2B	8.5	70
VXZ2C, 2D	12.5	70

Class H

Model	Power consumption (W) Note 1)	Temperature rise (°C) Note 2)
VXZ2A, 2B	12	100
VXZ2C, 2D	15	100

Normally Open (N.O.)

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

Class B

Model	Apparent power (VA) Note 1)2)	Temperature rise (°C) Note 3)
VXZ2A, 2B	10	70
VXZ2C, 2D	14	70

Class H

Model	Apparent power (VA) Note 1)2)	Temperature rise (°C) Note 3)
VXZ2A, 2B	12	100
VXZ2C, 2D	15	100

VXZ Series

Selection Steps

VX2
VVK
VXD
VXZ
VXS
VXB
VXE
VXP
VXR
VXH
VXF
VX3
VXA

Selection Steps

Step 1 Select the fluid.

Item	Selection item	Page	Symbol
Select the fluid.	Air	Page 176	0
	Water	Page 179	2
	Oil	Page 182	3
	Heated water	Page 185	5
	High temperature oil	Page 188	6

VXZ2 3 0 A A

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

Item	Selection item	Symbol
Select from "Flow rate — Pressure."	Body size, Valve 10A, N.C.	3
• Body material	Body material Aluminum	2
• Port size	Port size 1/8	A
• Orifice diameter	Orifice diameter 10	3

VXZ2 3 0 A A

Step 3 Select electrical specification.

Item	Selection item	Symbol
Select electrical specification.	Voltage 24 VDC	A
	Electrical entry Grommet	4

VXZ2 3 0 A A

Step 4 For other special options, refer to pages 192 and 193.

VXZ Series



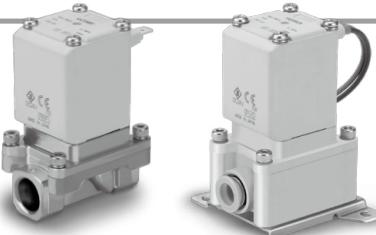
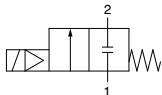
For Air

* Can be used with low vacuum (up to 133 Pa.abs).

Flow Rate Characteristics

N.C.

Symbol



When the valve is closed, flow is blocked from port 1 to port 2. However, if the pressure in port 2 is higher than port 1, the valve will not be able to block the fluid and it will flow from port 2 to port 1.

Normally Closed (N.C.)

Body material	Port size (Nominal diameter)	Orifice diameter (mm ϕ)	Model	Min. operating pressure differential Note 1 (MPa)	Max. operating pressure differential (MPa)	Flow rate characteristics				Max. system pressure (MPa)	Weight (g)							
						AC	DC	C [dm 3 /(s-bar)]	b	Cv								
Resin	ø10	10	VXZ230	0	0.7	6.2	1.0	1.7	—	1.5	400							
	ø3/8"					5.3		0.38	1.2									
	ø12					8.0		2.0										
	1/4 (8A)					8.5		0.44	2.4									
Aluminum	3/8 (10A)	15	VXZ240	0.7	1.0	9.3	1.0	0.43	2.6	1.5	600							
	1/2 (15A)					23.0		0.34	6.0									
C37, Stainless steel	3/4 (20A)	20	VXZ250	1.0	1.0	36.0	1.0	0.26	9.4	1.5	720							
	1 (25A)					—		185										
	1 (25A)					—		—										
Note 1) The operation of the valve may be unstable due to the capacity of the pressure supply source such as pumps and compressors or the pressure loss by the orifice of piping. Please contact SMC to check if the required valve size can be used in the application. Please contact SMC for the compatibility of the circuit flow and valve size. (Refer to page 195.)																		
Note 2) Weight of grommet type. Add 10 g for conduit, 30 g for DIN terminal, and 60 g for conduit terminal type respectively.																		
• Refer to "Glossary of Terms" on page 202 for details on the max. operating pressure differential.																		

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
-10 Note 1) to 60	-20 to 60

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

Valve Leakage Rate

Internal Leakage

Seal material	Leakage rate (Air) Note 1) 2)
NBR (FKM) Note 3)	15 cm 3 /min or less (Aluminum body type)
	15 cm 3 /min or less (Resin body type)
	1 cm 3 /min or less (Metal body type)

External Leakage

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

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

Note 2) Leakage is the value when the pressure differential ranges from 0.01 MPa to the maximum operating pressure differential.

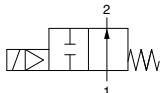
Note 3) For seal material/FKM, refer to "Other options" on page 192 for the selection.

Note 4) When the product is used with low vacuum (to 133 Pa.abs), give caution to the external leakage outlined above.

Flow Rate Characteristics

N.O.

Symbol



When the valve is closed, flow is blocked from port 1 to port 2. However, if the pressure in port 2 is higher than port 1, the valve will not be able to block the fluid and it will flow from port 2 to port 1.



Normally Open (N.O.)

Body material	Port size (Nominal diameter)	Orifice diameter (mm)	Model	Min. operating pressure differential Note 1 (MPa)	Max. operating pressure differential (MPa)	Flow rate characteristics				Max. system pressure (MPa)	Weight (g)								
						AC	DC	C [dm ³ /(s-bar)]	b	Cv									
Resin	ø10	10	VXZ2A0	0	0.7	0.6	6.2	1.7	—	1.5	430								
	ø3/8"						5.3	0.38											
	ø12						8.0	2.0											
	1/4 (8A)						8.5	0.44											
Aluminum	3/8 (10A)	15	VXZ2B0	0	0.7	0.6	9.3	0.43	—	1.5	630								
	1/2 (15A)						23.0	0.34											
C37, Stainless steel	3/4 (20A)	20	VXZ2C0	0	0.7	0.6	36.0	0.26	185	1.5	750								
	1 (25A)						—	—											
	1 (25A)						—	—											
Note 1) The operation of the valve may be unstable due to the capacity of the pressure supply source such as pumps and compressors or the pressure loss by the orifice of piping. Please contact SMC to check if the required valve size can be used in the application. Please contact SMC for the compatibility of the circuit flow and valve size. (Refer to page 195.)																			
Note 2) Weight of grommet type. Add 10 g for conduit, 30 g for DIN terminal, and 60 g for conduit terminal type respectively.																			
• Refer to "Glossary of Terms" on page 202 for details on the max. operating pressure differential.																			

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
-10 Note 1) to 60	-20 to 60

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

Valve Leakage Rate

Internal Leakage

Seal material	Leakage rate (Air) Note 1) 2)
NBR (FKM) Note 3)	15 cm ³ /min or less (Aluminum body type)
NBR (FKM) Note 3)	15 cm ³ /min or less (Resin body type)
NBR (FKM) Note 3)	1 cm ³ /min or less (Metal body type)

External Leakage

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

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

Note 2) Leakage is the value when the pressure differential ranges from 0.01 MPa to the maximum operating pressure differential.

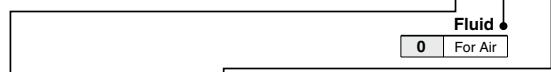
Note 3) For seal material/FKM, refer to "Other options" on page 192 for the selection.

VX2
VXK
VXD
VXZ
VXS
VXB
VXE
VXF
VXR
VXH
VXF
VX3
VXA

How to Order (Single Unit)



VXZ2 3 0 A A



• Size/Valve type

Symbol	Body size	Valve type
3	10A	N.C. N.O.
A		

• Body material/Port size/Orifice diameter

Symbol	Body material	Port size	Orifice diameter
A	Aluminum	1/4	10
B		3/8	
C		ø10 One-touch fitting	
D		ø3/8" One-touch fitting	
E		ø12 One-touch fitting	

Symbol	Body size	Valve type
4	15A	N.C. N.O.
B		

Symbol	Body material	Port size	Orifice diameter
F	C37	1/2	15

Symbol	Body size	Valve type
5	20A	N.C. N.O.
C		

Symbol	Body material	Port size	Orifice diameter
H	C37	3/4	20

Symbol	Body size	Valve type
6	25A	N.C. N.O.

Symbol	Body material	Port size	Orifice diameter
K	C37	1	25

L Stainless steel

Common Specifications

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

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

• Voltage/Electrical entry

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

For other special options,
refer to pages 192 and 193.

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

Dimensions → Page 196 and after



For Water

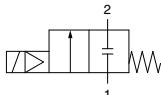
* Can be used with air (Up to 133 Pa.abs for vacuum).

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

Flow Rate Characteristics

N.C.

Symbol



When the valve is closed, flow is blocked from port 1 to port 2. However, if the pressure in port 2 is higher than port 1, the valve will not be able to block the fluid and it will flow from port 2 to port 1.



VX2

VXK

VXD

VXZ

VXS

VXB

VXE

VXP

VXR

VXH

VXF

VX3

VXA

Normally Closed (N.C.)

Body material	Port size (Nominal diameter)	Orifice diameter (mm ²)	Model	Min. operating pressure differential Note 1) (MPa)	Max. operating pressure differential (MPa)	Flow rate characteristics		Max. system pressure (MPa)	Weight Note 2) (g)				
						AC	DC						
C37, Stainless steel	1/4 (8A)	10	VXZ232	0	1.0	0.7	1.6	1.9	600				
	3/8 (10A)	15	VXZ242				2.0	2.4					
	1/2 (15A)	20	VXZ252				4.6	5.3					
	3/4 (20A)	25	VXZ262		1.0	1.0	7.8	9.2	1100				
	1 (25A)						8.7	10.2					
Note 1) The operation of the valve may be unstable due to the capacity of the pressure supply source such as pumps and compressors or the pressure loss by the orifice of piping. Please contact SMC to check if the required valve size can be used in the application. Please contact SMC for the compatibility of the circuit flow and valve size. (Refer to page 195.)								600					
Note 2) Weight of grommet type. Add 10 g for conduit, 30 g for DIN terminal, and 60 g for conduit terminal type respectively.								720					
● Refer to "Glossary of Terms" on page 202 for details on the max. operating pressure differential.								1100					
								1300					

Note 1) The operation of the valve may be unstable due to the capacity of the pressure supply source such as pumps and compressors or the pressure loss by the orifice of piping. Please contact SMC to check if the required valve size can be used in the application. Please contact SMC for the compatibility of the circuit flow and valve size. (Refer to page 195.)

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

● Refer to "Glossary of Terms" on page 202 for details on the max. operating pressure differential.

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
1 to 60	-20 to 60

Note) With no freezing

Valve Leakage Rate

Internal Leakage

Seal material	Leakage rate (Water) Note 1) 2)
NBR (FKM) Note 3)	0.1 cm ³ /min or less

External Leakage

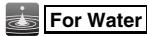
Seal material	Leakage rate (Water) Note 1)
NBR (FKM) Note 3)	0.1 cm ³ /min or less

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

Note 2) Leakage is the value when the pressure differential ranges from 0.01 MPa to the maximum operating pressure differential.

Note 3) For seal material/FKM, refer to "Other options" on page 192 for the selection.

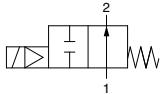
VXZ Series



Flow Rate Characteristics

N.O.

Symbol



When the valve is closed, flow is blocked from port 1 to port 2. However, if the pressure in port 2 is higher than port 1, the valve will not be able to block the fluid and it will flow from port 2 to port 1.



Normally Open (N.O.)

Body material	Port size (Nominal diameter)	Orifice diameter (mm ²)	Model	Min. operating pressure differential ^{Note 1)} (MPa)	Max. operating pressure differential (MPa)	Flow rate characteristics		Max. system pressure (MPa)	Weight ^{Note 2)} (g)	
						AC	DC			
C37, Stainless steel	1/4 (8A)	10	VXZ2A2	0	0.7	0.6	1.6	1.9	1.5	630
	3/8 (10A)						2.0	2.4		
	1/2 (15A)						4.6	5.3		750
	3/4 (20A)						7.8	9.2		1150
	1 (25A)						8.7	10.2		1350

Note 1) The operation of the valve may be unstable due to the capacity of the pressure supply source such as pumps and compressors or the pressure loss by the orifice of piping. Please contact SMC to check if the required valve size can be used in the application. Please contact SMC for the compatibility of the circuit flow and valve size. (Refer to page 195.)

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

• Refer to "Glossary of Terms" on page 202 for details on the max. operating pressure differential.

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
1 to 60	-20 to 60

Note) With no freezing

Valve Leakage Rate

Internal Leakage

Seal material	Leakage rate (Water) ^{Note 1) 2)}
NBR (FKM) ^{Note 3)}	0.1 cm ³ /min or less

External Leakage

Seal material	Leakage rate (Water) ^{Note 1)}
NBR (FKM) ^{Note 3)}	0.1 cm ³ /min or less

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

Note 2) Leakage is the value when the pressure differential ranges from 0.01 MPa to the maximum operating pressure differential.

Note 3) For seal material/FKM, refer to "Other options" on page 192 for the selection.

How to Order (Single Unit)

VXZ2 3 2 A A

Fluid

2 For Water

• Size/Valve type

Symbol	Body size	Valve type	Symbol	Body material	Port size	Orifice diameter
3	10A	N.C.	A	C37	1/4	10
A		N.O.	B		3/8	
			C		1/4	
			D	Stainless steel	3/8	
4	15A	N.C.	F	C37	1/2	15
B		N.O.	G	Stainless steel		
5	20A	N.C.	H	C37	3/4	20
C		N.O.	J	Stainless steel		
6	25A	N.C.	K	C37	1	25
D		N.O.	L	Stainless steel		

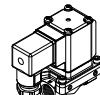
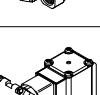
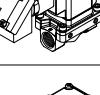
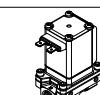
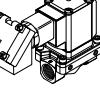
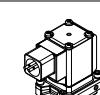
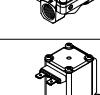
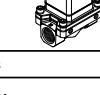
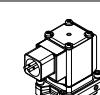
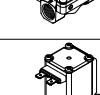
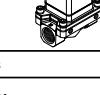
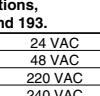
• Body material/Port size/Orifice diameter

Dimensions → Page 198 and after

Common Specifications

Seal material	NBR
Coil insulation type	Class B
Thread type	Rc

• Voltage/Electrical entry

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

For other special options,
refer to pages 192 and 193.

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

VX2
VXK
VXD
VXZ
VXS
VXB
VXE
VXP
VXR
VXH
VXF
VX3
VXA

VXZ Series



For Oil

* Can be used with air and water.

Note that the maximum operating pressure differential and flow rate characteristics should be within the specifications of the fluid used.

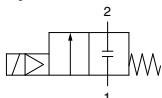
When the fluid is oil.

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.

Flow Rate Characteristics

N.C.

Symbol



When the valve is closed, flow is blocked from port 1 to port 2. However, if the pressure in port 2 is higher than port 1, the valve will not be able to block the fluid and it will flow from port 2 to port 1.



Normally Closed (N.C.)

Body material	Port size (Nominal diameter)	Orifice diameter (mm)	Model	Min. operating pressure differential Note 1) (MPa)	Max. operating pressure differential (MPa)		Flow rate characteristics	Max. system pressure (MPa)	Weight Note 2) (g)
					AC	DC			
C37, Stainless steel	1/4 (8A)	10	VXZ233	0	0.7	1.6	1.9	1.5	600
	3/8 (10A)	15	VXZ243			2.0	2.4		720
	1/2 (15A)	20	VXZ253			4.6	5.3		1100
	3/4 (20A)	25	VXZ263			7.8	9.2		1300
	1 (25A)	25				8.7	10.2		

Note 1) The operation of the valve may be unstable due to the capacity of the pressure supply source such as pumps and compressors or the pressure loss by the orifice of piping. Please contact SMC to check if the required valve size can be used in the application. Please contact SMC for the compatibility of the circuit flow and valve size. (Refer to page 195.)

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

• Refer to "Glossary of Terms" on page 202 for details on the max. operating pressure differential.

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
-5 Note 1) to 60	-20 to 60

Note) Kinematic viscosity: 50 mm²/s or less

Valve Leakage Rate

Internal Leakage

Seal material	Leakage rate (Oil) Note 1) 2)
FKM	0.1 cm ³ /min or less

External Leakage

Seal material	Leakage rate (Oil) Note 1)
FKM	0.1 cm ³ /min or less

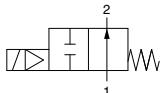
Note 1) Leakage is the value at ambient temperature 20°C.

Note 2) Leakage is the value when the pressure differential ranges from 0.01 MPa to the maximum operating pressure differential.

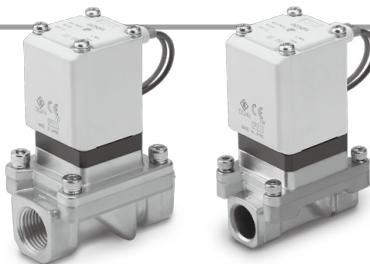
Flow Rate Characteristics

N.O.

Symbol



When the valve is closed, flow is blocked from port 1 to port 2. However, if the pressure in port 2 is higher than port 1, the valve will not be able to block the fluid and it will flow from port 2 to port 1.



Normally Open (N.O.)

Body material	Port size (Nominal diameter)	Orifice diameter (mm)	Model	Min. operating pressure differential Note 1) (MPa)	Max. operating pressure differential (MPa)		Flow rate characteristics	Max. system pressure (MPa)	Weight Note 2) (g)
					AC	DC			
C37, Stainless steel	1/4 (8A)	10	VXZ2A3	0	0.7	0.6	1.6	1.9	630
	3/8 (10A)						2.0	2.4	
	1/2 (15A)						4.6	5.3	
	3/4 (20A)						7.8	9.2	
	1 (25A)						8.7	10.2	

Note 1) The operation of the valve may be unstable due to the capacity of the pressure supply source such as pumps and compressors or the pressure loss by the orifice of piping. Please contact SMC to check if the required valve size can be used in the application. Please contact SMC for the compatibility of the circuit flow and valve size. (Refer to page 195.)

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

• Refer to "Glossary of Terms" on page 202 for details on the max. operating pressure differential.

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
-5 Note 1) to 60	-20 to 60

Note) Kinematic viscosity: 50 mm²/s or less

Valve Leakage Rate

Internal Leakage

Seal material	Leakage rate (Oil) Note 1) 2)
FKM	0.1 cm ³ /min or less

External Leakage

Seal material	Leakage rate (Oil) Note 1)
FKM	0.1 cm ³ /min or less

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

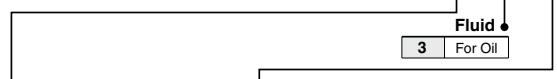
Note 2) Leakage is the value when the pressure differential ranges from 0.01 MPa to the maximum operating pressure differential.

VX2
VXK
VXD
VXZ
VXS
VXB
VXE
VXP
VXR
VXH
VXF
VX3
VXA

How to Order (Single Unit)



VXZ2 3 3 A A



• Size/Valve type

Symbol	Body size	Valve type	Symbol	Body material	Port size	Orifice diameter
3	10A	N.C.	A	C37	1/4	10
A		N.O.	B		3/8	
			C		1/4	
			D	Stainless steel	3/8	
4	15A	N.C.	F	C37	1/2	15
B		N.O.	G	Stainless steel		
5	20A	N.C.	H	C37	3/4	20
C		N.O.	J	Stainless steel		
6	25A	N.C.	K	C37	1	25
D		N.O.	L	Stainless steel		

• Body material/Port size/Orifice diameter

• Voltage/Electrical entry

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

For other special options,
refer to pages 192 and 193.

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

Dimensions → Page 198 and after



For Heated Water

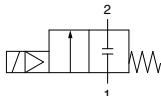
* Can be used with air (up to 99°C) and water.

Note that the maximum operating pressure differential and flow rate characteristics should be within the specifications of the fluid used.

Flow Rate Characteristics

N.C.

Symbol



When the valve is closed, flow is blocked from port 1 to port 2. However, if the pressure in port 2 is higher than port 1, the valve will not be able to block the fluid and it will flow from port 2 to port 1.



Normally Closed (N.C.)

Body material	Port size (Nominal diameter)	Orifice diameter (mm)	Model	Min. operating pressure differential Note 1) (MPa)	Max. operating pressure differential (MPa)		Flow rate characteristics	Max. system pressure (MPa)	Weight Note 2) (g)
					AC	DC			
C37, Stainless steel	1/4 (8A)	10	VXZ235	0	0.7	1.0	1.6 2.0	1.9 2.4	600
	3/8 (10A)	15	VXZ245			1.0	4.6 7.8	5.3 9.2	
	1/2 (15A)	20	VXZ255			1.0	8.7	10.2	
	3/4 (20A)	25	VXZ265						720
	1 (25A)								1100
									1300

Note 1) The operation of the valve may be unstable due to the capacity of the pressure supply source such as pumps and compressors or the pressure loss by the orifice of piping. Please contact SMC to check if the required valve size can be used in the application. Please contact SMC for the compatibility of the circuit flow and valve size. (Refer to page 195.)

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

● Refer to "Glossary of Terms" on page 202 for details on the max. operating pressure differential.

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
1 to 99	-20 to 60

Note) With no freezing

Valve Leakage Rate

Internal Leakage

Seal material	Leakage rate (Water) Note 1) 2)
EPDM	0.1 cm ³ /min or less

External Leakage

Seal material	Leakage rate (Water) Note 1)
EPDM	0.1 cm ³ /min or less

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

Note 2) Leakage is the value when the pressure differential ranges from 0.01 MPa to the maximum operating pressure differential.

VX2
VXK
VXD
VXZ
VXS
VXB
VXE
VXP
VXR
VXH
VXF
VX3
VXA

VXZ Series

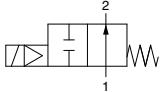


For Heated Water

Flow Rate Characteristics

N.O.

Symbol



When the valve is closed, flow is blocked from port 1 to port 2. However, if the pressure in port 2 is higher than port 1, the valve will not be able to block the fluid and it will flow from port 2 to port 1.

Normally Open (N.O.)

Body material	Port size (Nominal diameter)	Orifice diameter (mm)	Model	Min. operating pressure differential Note 1) (MPa)	Max. operating pressure differential (MPa)		Flow rate characteristics		Max. system pressure (MPa)	Weight Note 2) (g)
					AC	DC	K _v	C _v		
C37, Stainless steel	1/4 (8A)	10	VXZ2A5	0	0.7	0.6	1.6	1.9	1.5	630
	3/8 (10A)						2.0	2.4		
	1/2 (15A)						4.6	5.3		750
	3/4 (20A)						7.8	9.2		1150
	1 (25A)						8.7	10.2		

Note 1) The operation of the valve may be unstable due to the capacity of the pressure supply source such as pumps and compressors or the pressure loss by the orifice of piping. Please contact SMC to check if the required valve size can be used in the application. Please contact SMC for the compatibility of the circuit flow and valve size. (Refer to page 195.)

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

• Refer to "Glossary of Terms" on page 202 for details on the max. operating pressure differential.

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
1 to 99	-20 to 60

Note) With no freezing

Valve Leakage Rate

Internal Leakage

Seal material	Leakage rate (Water) Note 1) 2)
EPDM	0.1 cm ³ /min or less

External Leakage

Seal material	Leakage rate (Water) Note 1)
EPDM	0.1 cm ³ /min or less

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

Note 2) Leakage is the value when the pressure differential ranges from 0.01 MPa to the maximum operating pressure differential.



For Heated Water



RoHS

How to Order (Single Unit)

VXZ2 3 5 A B

Fluid

5 For Heated water

• Size/Valve type

Symbol	Body size	Valve type	Symbol	Body material	Port size	Orifice diameter
3 A	10A	N.C.	A B C D	C37 Stainless steel	1/4	10
		N.O.			3/8	
	15A	N.C.			1/4	
		N.O.			3/8	
4 B	20A	N.C.	F G	C37 Stainless steel	1/2	15
C	N.O.	H J	C37 Stainless steel	3/4	20	
6 D	25A	N.C.	K L	C37 Stainless steel	1	25
	N.O.					

• Body material/Port size/Orifice diameter

• Voltage/Electrical entry

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

Note) For the class H type DIN terminal, use it in combination with the connector provided.

For other special options,
refer to pages 192 and 193.

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

Dimensions → Page 200



For High Temperature Oil

* Can be used with air (up to 99°C), water (up to 99°C) and oil. Note that the maximum operating pressure differential and flow rate characteristics should be within the specifications of the fluid used.

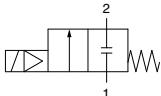
When the fluid is oil.

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.

Flow Rate Characteristics

N.C.

Symbol



When the valve is closed, flow is blocked from port 1 to port 2. However, if the pressure in port 2 is higher than port 1, the valve will not be able to block the fluid and it will flow from port 2 to port 1.



Normally Closed (N.C.)

Body material	Port size (Nominal diameter)	Orifice diameter (mm ²)	Model	Min. operating pressure differential Note 1) (MPa)	Max. operating pressure differential (MPa)	Flow rate characteristics		Max. system pressure (MPa)	Weight Note 2) (g)
						AC	DC		
C37, Stainless steel	1/4 (8A)	10	VXZ236	0	0.7	1.6	1.9	1.5	600
	3/8 (10A)	15	VXZ246			2.0	2.4		720
	1/2 (15A)	20	VXZ256			4.6	5.3		1100
	3/4 (20A)	25	VXZ266			7.8	9.2		1300
	1 (25A)	—	—			8.7	10.2		—

Note 1) The operation of the valve may be unstable due to the capacity of the pressure supply source such as pumps and compressors or the pressure loss by the orifice of piping. Please contact SMC to check if the required valve size can be used in the application. Please contact SMC for the compatibility of the circuit flow and valve size. (Refer to page 195.)

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

• Refer to "Glossary of Terms" on page 202 for details on the max. operating pressure differential.

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
-5 Note 6) to 100	-20 to 60

Note) Kinematic viscosity: 50 mm²/s or less

Valve Leakage Rate

Internal Leakage

Seal material	Leakage rate (Oil) Note 1) 2)
FKM	0.1 cm ³ /min or less

External Leakage

Seal material	Leakage rate (Oil) Note 1)
FKM	0.1 cm ³ /min or less

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

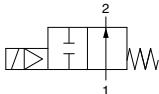
Note 2) Leakage is the value when the pressure differential ranges from 0.01 MPa to the maximum operating pressure differential.



Flow Rate Characteristics

N.O.

Symbol



When the valve is closed, flow is blocked from port 1 to port 2. However, if the pressure in port 2 is higher than port 1, the valve will not be able to block the fluid and it will flow from port 2 to port 1.



Normally Open (N.O.)

Body material	Port size (Nominal diameter)	Orifice diameter (mm)	Model	Min. operating pressure differential Note 1)(MPa)	Max. operating pressure differential (MPa)		Flow rate characteristics	Max. system pressure (MPa)	Weight Note 2) (g)
					AC	DC			
C37, Stainless steel	1/4 (8A)	10	VXZ2A6	0	0.7	0.6	1.6	1.9	630
	3/8 (10A)						2.0	2.4	
	1/2 (15A)	15	VXZ2B6				4.6	5.3	
	3/4 (20A)	20	VXZ2C6				7.8	9.2	
	1 (25A)	25	VXZ2D6				8.7	10.2	

Note 1) The operation of the valve may be unstable due to the capacity of the pressure supply source such as pumps and compressors or the pressure loss by the orifice of piping. Please contact SMC to check if the required valve size can be used in the application. Please contact SMC for the compatibility of the circuit flow and valve size. (Refer to page 195.)

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

• Refer to "Glossary of Terms" on page 202 for details on the max. operating pressure differential.

Fluid and Ambient Temperature

Fluid temperature (°C)	Ambient temperature (°C)
-5 Note 1) to 100	-20 to 60

Note) Kinematic viscosity: 50 mm²/s or less

Valve Leakage Rate

Internal Leakage

Seal material	Leakage rate (Oil) Note 1) 2)
FKM	0.1 cm ³ /min or less

External Leakage

Seal material	Leakage rate (Oil) Note 1)
FKM	0.1 cm ³ /min or less

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

Note 2) Leakage is the value when the pressure differential ranges from 0.01 MPa to the maximum operating pressure differential.

VX2
VXK
VXD
VXZ
VXS
VXB
VXE
VXP
VXR
VXH
VXF
VX3
VXA

VXZ Series



For High Temperature Oil

How to Order (Single Unit)



VXZ2 3 6 A B



• Size/Valve type

Symbol	Body size	Valve type
3 A	10A	N.C.
		N.O.

• Body material/Port size/Orifice diameter

Symbol	Body material	Port size	Orifice diameter
A	C37	1/4	10
		3/8	
		1/4	
		3/8	

Symbol	Body size	Valve type	Symbol	Body material	Port size	Orifice diameter
4 B	15A	N.C.	F G	C37 Stainless steel	1/2	15
		N.O.				

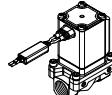
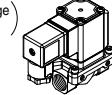
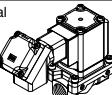
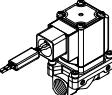
Symbol	Body size	Valve type	Symbol	Body material	Port size	Orifice diameter
5 C	20A	N.C.	H J	C37 Stainless steel	3/4	20
		N.O.				

Symbol	Body size	Valve type	Symbol	Body material	Port size	Orifice diameter
6 D	25A	N.C.	K L	C37 Stainless steel	1	25
		N.O.				

Common Specifications

Seal material	FKM
Coil insulation type	Class H
Thread type	Rc

• Voltage/Electrical entry

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

Note) For the class H type DIN terminal, use it in combination with the connector provided.

For other special options, refer to pages 192 and 193.

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

Dimensions → Page 200

VXZ Series

Other Special Options

Electrical Options

VXZ2 3 0 A Z 1A

Enter standard product number.

Electrical option

Special voltage/Electrical entry/Electrical option

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

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

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

●: Also applicable to Class "H" coil.

Options marked with ● are available for Class "H" coil.

Applicable for all when the coil insulation class is Class "B".

Other Options

Low concentration ozone resistant and applicable to deionized water

Oil-free

Port thread

VXZ2 3 0 A A Z

Enter standard product number.

Other option

Low concentration ozone resistant and applicable to deionized water/Oil-free/Port thread

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

*1 Applicable to air (VXZ2 0) and water (VXZ2 2).

*2 When the body is resin, One-touch fittings are equipped as standard.

*3 When using deionized water or any other fluid that may corrode C37 (brass), select a stainless steel body.

Made to Order

<Special lead wire length>

Produced upon receipt of order. Please contact SMC for lead times.

VXZ [] [] [] XL []

● Lead wire length

XL1	600 mm
XL2	1000 mm
XL3	1500 mm
XL4	3000 mm

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

Example) **VXZ2 3 2 A Z 1A Z XB A**

Electrical option

Other option

Special electrical entry direction
With bracket

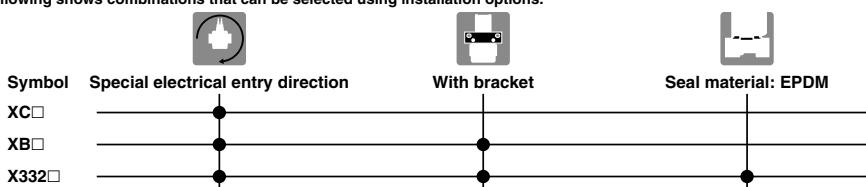
VX2
VXK
VXD
VXZ
VXS
VXB
VXE
VXP
VXR
VXH
VXF
VX3
VXA

Installation Options

(Mounting Option/Special Electrical Entry Direction)

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

Combinations



Special Electrical Entry Direction

VXZ2 **XC A**

Enter standard product number.

Symbol	Rotation angle
A	90°
B	180°
C	270°

* Available for the VXZ2³_A to 2⁶.

VXZ2 **XB A**

Enter standard product number.

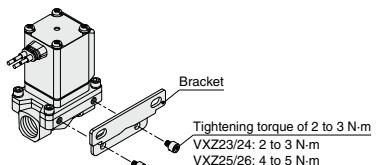
Symbol	Rotation angle
Nil	Standard
A	90°
B	180°
C	270°

*1 Available for the VXZ2³_A to 2⁶.

*2 Bracket is attached as standard with the resin body type (VXZ2³_A to 2⁶), so it is no necessary to add XB to the part number.

*3 Bracket is packed in the same container as the main body.

VXZ Bracket mounting dimensions



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

Example) VXZ2 **3** **2** **A** **Z** **1A** **Z** **XB** **A**

Electrical option
Other option
Special electrical entry direction
With bracket

Installation Options

(Mounting Option/Special Electrical Entry Direction)



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

VXZ2 0 2 X332

Enter standard product number.

Seal material: EPDM

With bracket/Special electrical entry direction

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

*1 Not available for resin body type of the VXZ2³.

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

*3 Available for air and water.

Electrical entry direction

Symbol	VXZ2 ³ _A to VXZ2 ⁶ _B	Symbol	VXZ2 ³ _A to VXZ2 ⁶ _D
Nil	Standard	A	90°
D	IN OUT	E	IN OUT
B	180°	F	270°
F	IN OUT	G	IN OUT

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

Example) **VXZ2 3 2 A Z 1A Z X332 A**

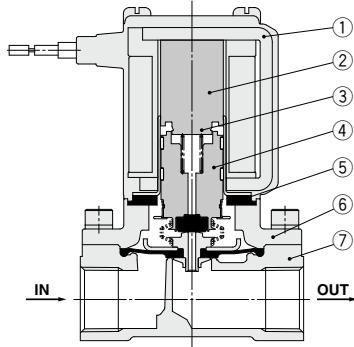
Electrical option
Other option
Seal material: EPDM/
With bracket/
Special electrical
entry direction

VX2
VXK
VXD
VXZ
VXS
VXB
VXE
VXP
VXR
VXH
VXF
VX3
VXA

VXZ Series Construction

Normally Closed (N.C.)

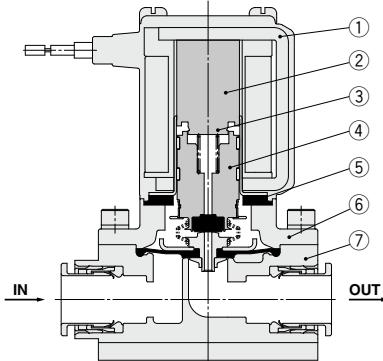
Body material: Aluminum, C37, Stainless steel



Component Parts

No.	Description	Material
1	Solenoid coil	Cu + Fe + Resin
2	Tube assembly	Stainless steel
3	Return spring	Stainless steel
4	Armature/Diaphragm assembly	Stainless steel, NBR, FKM, EPDM
5	Stopper	NBR, FKM, EPDM
6	Bonnet	C37, Stainless steel, Aluminum
7	Body	C37, Stainless steel, Aluminum

Body material: Resin

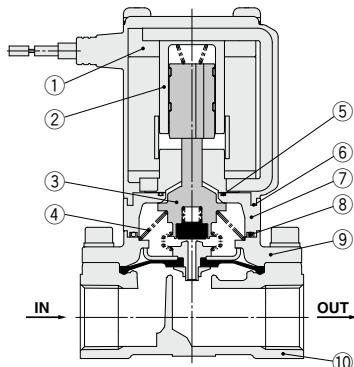


Component Parts

No.	Description	Material
1	Solenoid coil	Cu + Fe + Resin
2	Tube assembly	Stainless steel
3	Return spring	Stainless steel
4	Armature/Diaphragm assembly	Stainless steel, NBR, FKM
5	Stopper	NBR, FKM
6	Bonnet	Aluminum
7	Body	Resin (PBT)

Normally Open (N.O.)

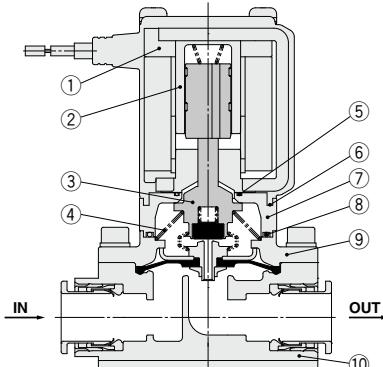
Body material: Aluminum, C37, Stainless steel



Component Parts

No.	Description	Material
1	Solenoid coil	Cu + Fe + Resin
2	Sleeve assembly	Stainless steel, Resin (PPS)
3	Push rod/Diaphragm assembly	Stainless steel, NBR, FKM, EPDM
4	Spring	Stainless steel
5	O-ring A	NBR, FKM, EPDM
6	O-ring B	NBR, FKM, EPDM
7	Adapter	Resin (PPS)
8	O-ring C	NBR, FKM, EPDM
9	Bonnet	Aluminum, C37, Stainless steel
10	Body	Aluminum, C37, Stainless steel

Body material: Resin



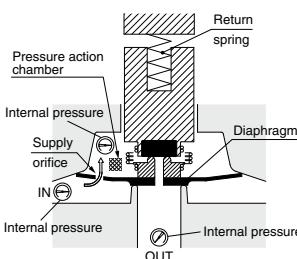
Component Parts

No.	Description	Material
1	Solenoid coil	Cu + Fe + Resin
2	Sleeve assembly	Stainless steel, Resin (PPS)
3	Push rod/Diaphragm assembly	Stainless steel, NBR, FKM
4	Spring	Stainless steel
5	O-ring A	NBR, FKM
6	O-ring B	NBR, FKM
7	Adapter	Resin (PPS)
8	O-ring C	NBR, FKM
9	Bonnet	Aluminum
10	Body	Resin (PBT)

Working Principle

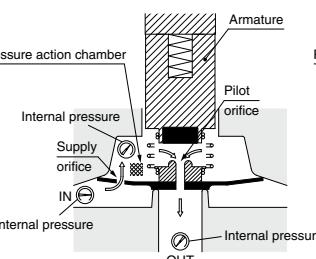
De-energized

The fluid enters from the IN goes through the supply orifice to fill the pressure action chamber. Main valve is closed by the pressure in the pressure action chamber and the reaction force of the return spring.



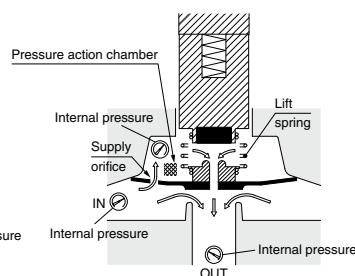
Energized (Pilot valve open)

When the coil is energized, the armature is attracted causing the pilot orifice to open. The fluid filling the pressure action chamber flows to the OUT side through the pilot orifice.



Energized (Main valve open)

The pressure in the pressure action chamber decreases by discharging fluid through the pilot orifice. Because the force which pushes down the valve is reduced by the discharge of the fluid, the force that pushes up the main valve overcomes the push down force and opens the main valve. The main valve opens by the lift spring reaction force even if pressure on the IN side is 0 MPa or very low pressure.



⚠ Warning

Unstable flow may occur with the product under the following conditions: • low flow from the pump or compressor, etc. • use of several elbows or tees in the circuit, or • thin nozzles installed at the end of the piping etc. This can cause valve opening/closing failure, or oscillation, and cause a valve malfunction. If products are used with vacuum, then the vacuum level can be unstable due to these conditions. Please contact SMC to check if the valve can be used in the application by providing the relevant fluid circuit.

VX2
VVK
VXD
VXZ
VXS
VXB
VXE
VXP
VXR
VXH
VXF
VX3
VXA

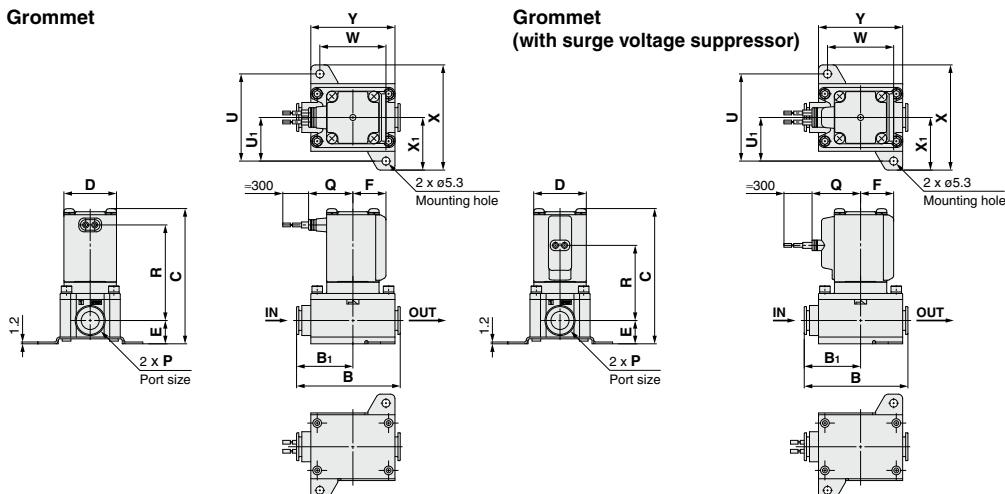
VXZ Series



For Air

Dimensions/Body Material: Resin (One-touch Fitting Type)

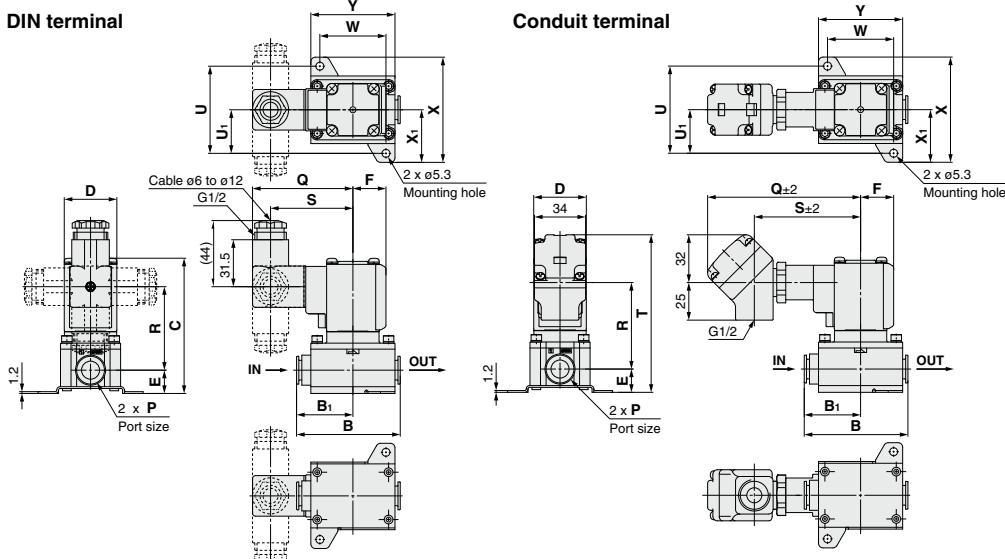
Grommet



Grommet

(with surge voltage suppressor)

DIN terminal



Conduit terminal

For information on handling One-touch fittings and appropriate tubing, refer to page 211 and the KQ2 series One-touch fittings in Best Pneumatics No. 7.

Model	One-touch fitting P	Bracket mounting											
		B	B₁	C	D	E	F	U	U₁	W	X	X₁	Y
VXZ2³A	ø10, ø3/8", ø12	69	37.5	90 (96.5)	35	15.5	22	54	27	44	65	32.5	56

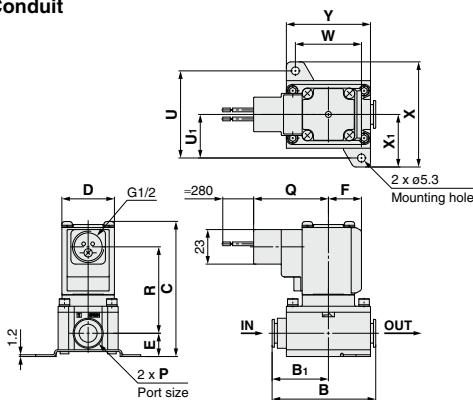
Model	One-touch fitting P	Electrical entry										
		Grommet		Grommet (with surge voltage suppressor)		DIN terminal			Conduit terminal			
Q	R	Q	R	Q	R	S	Q	R	S	T		
VXZ2³A	ø10, ø3/8", ø12	29.5	63.5 (70)	32.5 (56.5)	50	67	55.5 (62)	55	102	57.5 (64)	71	105 (111.5)

() are the dimensions of Normally Open (N.O.).

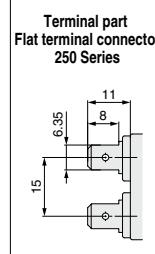
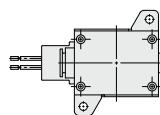
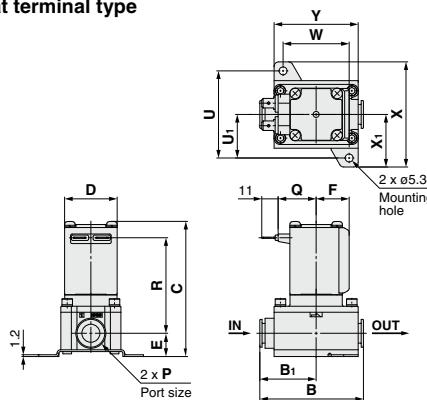


Dimensions/Body Material: Resin (One-touch Fitting Type)

Conduit



Flat terminal type



- VX2
- VXK
- VXD
- VXZ**
- VXS
- VXB
- VXE
- VXP
- VXR
- VXH
- VXF
- VX3
- VXA

Model	One-touch fitting P	B	B₁	C	D	E	F	Bracket mounting						(mm)
								U	U₁	W	X	X₁	Y	
VXZ2A	ø10, ø3/8", ø12	69	37.5	90 (96.5)	35	15.5	22	54	27	44	65	32.5	56	

Model	One-touch fitting P	Electrical entry			
		Conduit	Flat terminal	Q	R
VXZ2A	ø10, ø3/8", ø12	50	57.5 (64)	25.5	63.5 (70)

() are the dimensions of Normally Open (N.O.).

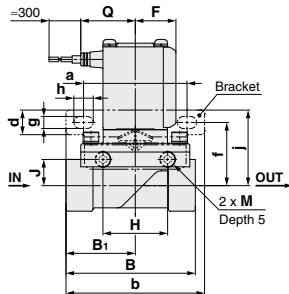
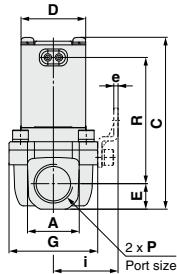
VXZ Series



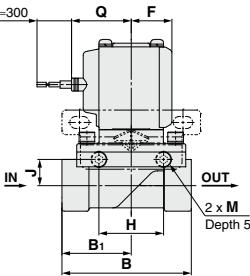
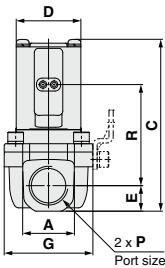
For Air, Water, Oil

Dimensions/Body Material: Aluminum, C37, Stainless Steel

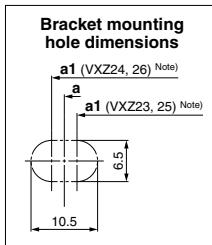
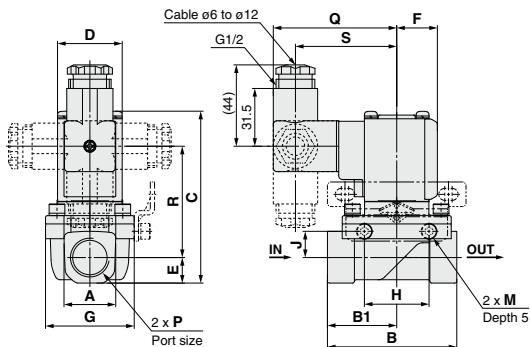
Grommet



Grommet (with surge voltage suppressor)



DIN terminal



Model	Port size P	A	B	B1	(mm)							
					C	D	E	F	G	H	J	M
VXZ2 ^A	1/4, 3/8	21 <22>	57	28.5	85 (91.5)	35	10.5	22	40	35	10	M5
VXZ2 ^B	1/2	28	70	37.5	93 (99.5)	35	14	22	48	35	14.2	M5
VXZ2 ^C	3/4	33.5	71	38.5	104 (110.5)	40	17	24.5	62	33	15.2	M6
VXZ2 ^D	1	42	95	49.5	110 (116)	40	20	24.5	66	37	17.2	M6

Model	Port size P	Bracket mounting									
		a	a1 ^{Note}	b	d	e	f	g	h	i	j
VXZ2 ^A	1/4, 3/8	56	52	75		2.3	30	6.5	10.5	31	37
VXZ2 ^B	1/2	56	60	75	13.5	2.3	34.5	6.5	10.5	35	41
VXZ2 ^C	3/4	70.5	68	92		2.3	39	6.5	10.5	43	46
VXZ2 ^D	1	70.5	73	92		2.3	41	6.5	10.5	45	48

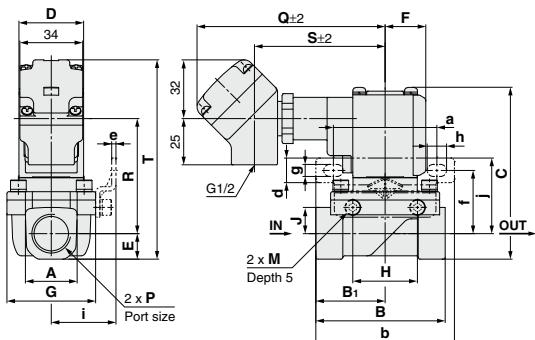
Model	Port size P	Electrical entry									
		Grommet		Grommet (with surge voltage suppressor)		DIN terminal					
		Q	R	Q	R	Q	R	S			
VXZ2 ^A	1/4, 3/8	29.5	63.5 (70)	32.5	50 (56.5)	67	55.5 (62)	55			
VXZ2 ^B	1/2	29.5	68.5 (74.5)	32.5	55 (61)	67	60.5 (66.5)	55			
VXZ2 ^C	3/4	32	76.5 (83)	35	63 (69.5)	69.5	68.5 (75)	57.5			
VXZ2 ^D	1	32	79.5 (85)	35	66 (71.5)	69.5	71.5 (77)	57.5			

() are the dimensions of Normally Open (N.O.). < > are the dimensions of aluminum body.

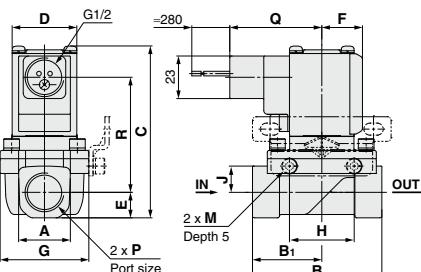
Note) Old VXZ bracket mounting hole center position

Dimensions/Body Material: Aluminum, C37, Stainless Steel

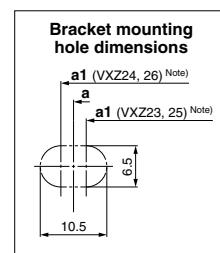
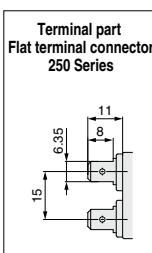
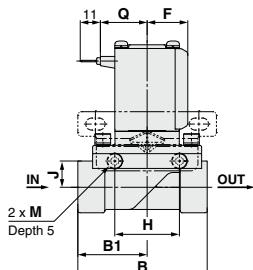
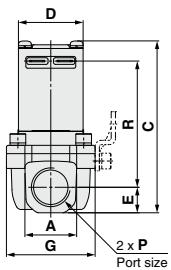
Conduit terminal



Conduit



Flat terminal type



Model	Port size P	(mm)										
		A	B	B1	C	D	E	F	G	H	J	M
VXZ2 ^a	1/4, 3/8	21 <22>	57	28.5	85 (91.5)	35	10.5	22	40	35	10	M5
VXZ2 ^b	1/2	28	70	37.5	93 (99.5)	35	14	22	48	35	14.2	M5
VXZ2 ^c	3/4	33.5	71	38.5	104 (110.5)	40	17	24.5	62	33	15.2	M6
VXZ2 ^d	1	42	95	49.5	110 (116)	40	20	24.5	66	37	17.2	M6

Model	Port size P	Bracket mounting									
		a	a1 Note	b	d	e	f	g	h	i	j
VXZ2 ^a	1/4, 3/8	56	52	75	2.3	30	6.5	10.5	31	37	
VXZ2 ^b	1/2	56	60	75	2.3	34.5	6.5	10.5	35	41	
VXZ2 ^c	3/4	70.5	68	92	2.3	39	6.5	10.5	43	46	
VXZ2 ^d	1	70.5	73	92	2.3	41	6.5	10.5	45	48	

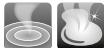
Model	Port size P	Electrical entry									
		Conduit terminal				Conduit			Flat terminal		
Q	R	S	T	Q	R	Q	R				
VXZ2 ^a	1/4, 3/8	102	57.5 (64)	71	100 (106.5)	50	57.5 (64)	25.5	63.5 (70)		
VXZ2 ^b	1/2	102	62.5 (68.5)	71	108 (114.5)	50	62.5 (68.5)	25.5	68.5 (74.5)		
VXZ2 ^c	3/4	104.5	70.5 (77)	73.5	119 (126)	52.5	70.5 (77)	28	76.5 (82.5)		
VXZ2 ^d	1	104.5	73.5 (79)	73.5	125 (131)	52.5	73.5 (79)	28	79.5 (85)		

() are the dimensions of Normally Open (N.O.). < > are the dimensions of aluminum body.

Note) Old VXZ bracket mounting hole center position

VX2
VXK
VXD
VXZ
VXS
VXB
VXE
VXP
VXR
VXH
VXF
VX3
VXA

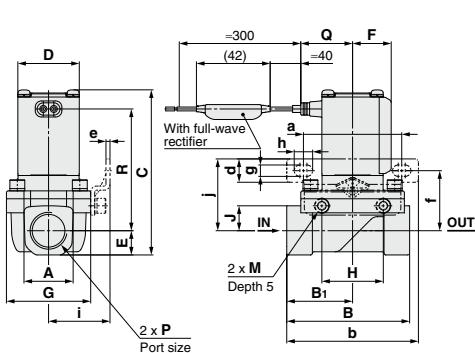
VXZ Series



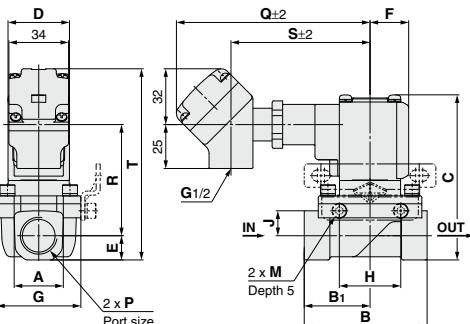
For Heated Water, High Temperature Oil

Dimensions/Body Material: C37, Stainless Steel

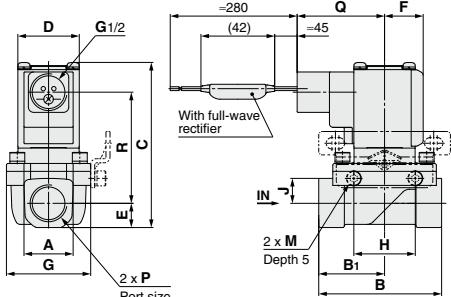
Grommet



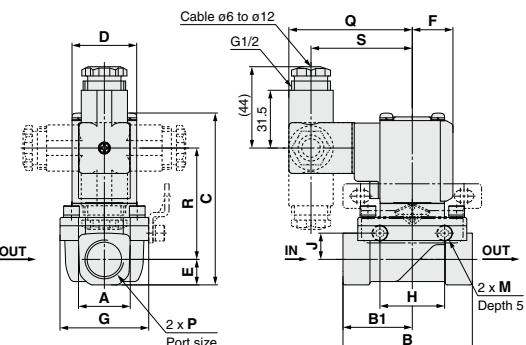
Conduit terminal



Conduit



DIN terminal



Model	Port size P	(mm)											
		A	B	B ₁	C	D	E	F	G	H	J	M	
VXZ2 _A	1/4, 3/8	21	57	28.5	85 (91.5)	35	10.5	22	40	35	10	M5	
VXZ2 _B	1/2	28	70	37.5	93 (99.5)	35	14	22	48	35	14.2	M5	
VXZ2 _C	3/4	33.5	71	38.5	104 (110.5)	40	17	24.5	62	33	15.2	M6	
VXZ2 _D	1	42	95	49.5	110 (116)	40	20	24.5	66	37	17.2	M6	

Model	Port size P	Bracket mounting									
		a	a1 ^{Note}	b	d	e	f	g	h	i	j
VXZ2 _A	1/4, 3/8	56	52	75		2.3	30	6.5	10.5	31	37
VXZ2 _B	1/2	56	60	75	13.5	2.3	34.5	6.5	10.5	35	41
VXZ2 _C	3/4	70.5	68	92		2.3	39	6.5	10.5	43	46
VXZ2 _D	1	70.5	73	92		2.3	41	6.5	10.5	45	48

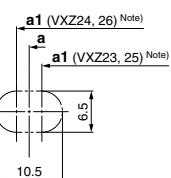
Model	Port size P	Grommet		Conduit terminal				Conduit		DIN terminal		
		Q	R	Q	R	S	T	Q	R	Q	R	S
VXZ2 _A	1/4, 3/8	29.5	63.5 (70)	110.5	57.5 (64)	79.5	100 (106.5)	50	57.5 (64)	67	55.5 (62)	55
VXZ2 _B	1/2	29.5	68.5 (74.5)	110.5	62.5 (68.5)	79.5	108 (114.5)	50	62.5 (68.5)	67	60.5 (66.5)	55
VXZ2 _C	3/4	32	76.5 (83)	113	70.5 (77)	82	119 (126)	52.5	70.5 (77)	69.5	68.5 (75)	57.5
VXZ2 _D	1	32	79.5 (85)	113	73.5 (79)	82	125 (131)	52.5	73.5 (79)	69.5	71.5 (77)	57.5

() are the dimensions of Normally Open (N.O.).

Note) Old VXZ bracket mounting hole center position

200

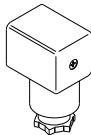
Bracket mounting hole dimensions





Replacement Parts

• DIN Connector Part No.



<Coil Insulation Type/For Class B>

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

<Coil Insulation Type/For 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	
With light	48 VAC	GDM2A-R-L5
	24 VDC	
	100 VAC	
	110 VAC	
	200 VAC	
	220 VAC	
	230 VAC	
	240 VAC	

• Gasket Part No. for DIN Connector

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

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

• Lead Wire Assembly for Flat Terminal (Set of 2 pcs.)

VX021S-1-16FB

• Bracket Assembly Part No. (for Metal Body)

VXZ 3 0S-14A-1

3	For VXZ22 ₃ ₈ ₅ ₀
5	For VXZ22 ₈ ₅ ₀

* 2 mounting screws are shipped together with the bracket assembly.

VX2
VXK
VXD
VXZ
VXS
VXB
VXE
VXP
VXR
VXH
VXF
VX3
VXA

VXZ Series

Glossary of Terms

Pressure Terminology

1. Maximum operating pressure differential

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

2. Minimum operating pressure differential

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

3. Maximum system pressure

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

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

4. Withstand pressure

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

Electrical Terminology

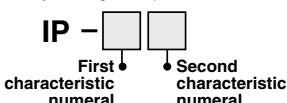
1. Surge voltage

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

2. Degree of protection

A degree 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

Electrical Terminology

●Second Characteristics: Degrees of protection against water

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

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

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

Others

1. Material

NBR: Nitrile rubber

FKM: Fluoro rubber

EPDM: Ethylene propylene rubber

2. Oil-free treatment

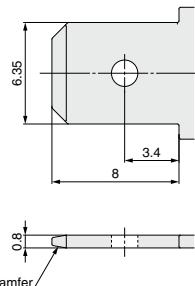
The degreasening and washing of wetted parts

3. Symbol

When the valve is closed, flow is blocked from port 1 to port 2. However, if the pressure in port 2 is higher than port 1, the valve will not be able to block the fluid and it will flow from port 2 to port 1.

Flat Terminal

1. Flat terminal/Electrical connection size of molded coil



Q : Air flow rate [L/min (ANR)]

C : Sonic conductance [$\text{dm}^3/(\text{s}\cdot\text{bar})$], dm^3 (Cubic decimeter) of SI = L (liter).

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 use the calculation software available from SMC website.

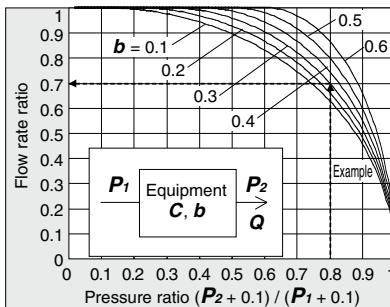
Example)

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 [$\text{dm}^3/(\text{s}\cdot\text{bar})$] and **b** = 0.3.

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

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

Based on Graph (1), it is going to be 0.7 if it is read by the pressure ratio as 0.8 and the flow ratio to be **b** = 0.3. Hence, flow rate = Max. flow x flow ratio = $600 \times 0.7 = 420$ [L/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. In addition, calculate **b** using each data of others and the subsonic flow formula, and then obtain the critical pressure ratio **b** from that average.

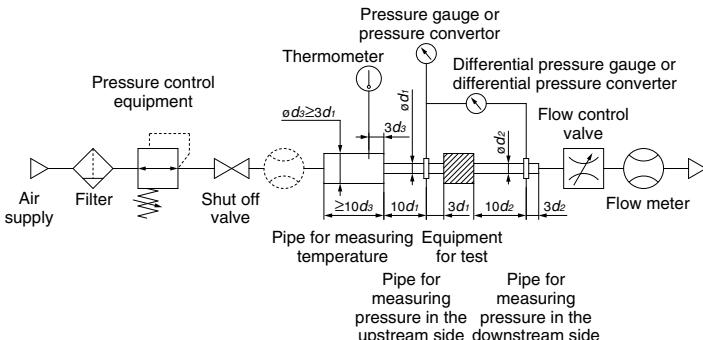


Fig. (1) Test circuit based on ISO 6358: 1989, JIS B 8390: 2000

VX2
VXK
VXD
VXZ
VXS
VXB
VXE
VXP
VXR
VXH
VXF
VX3
VXA

Conversion of flow coefficient:

Here.

Cv factor: Value of the clean water flow rate represented by US gal/min that runs through the valve at 40 to 100°F, when the pressure difference is 1 lbf/in² (psi)

Value is different from **K_V** and **C_V** factors for pneumatic purpose due to different test method.

(4) Test method

Connect the equipment for the test to the test circuit shown in Fig. (3), and run water at 5 to 40°C. Then, measure the flow rate with a pressure difference where vaporization does not occur in a turbulent flow (pressure difference of 0.035 MPa to 0.075 MPa when the inlet pressure is within 0.15 MPa to 0.6 MPa). However, as the turbulent flow is definitely caused, the pressure difference needs to be set with a large enough difference so that the Reynolds number does not fall below 1×10^5 , and the inlet pressure needs to be set slightly higher to prevent vaporization of the liquid. Substitute the measurement results in formula (8) to calculate Kv .

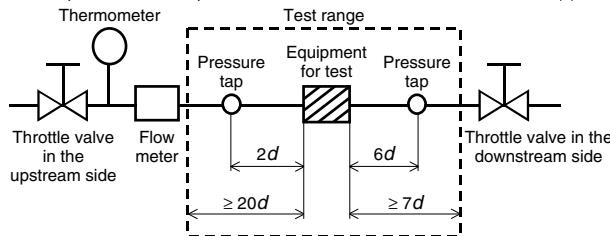
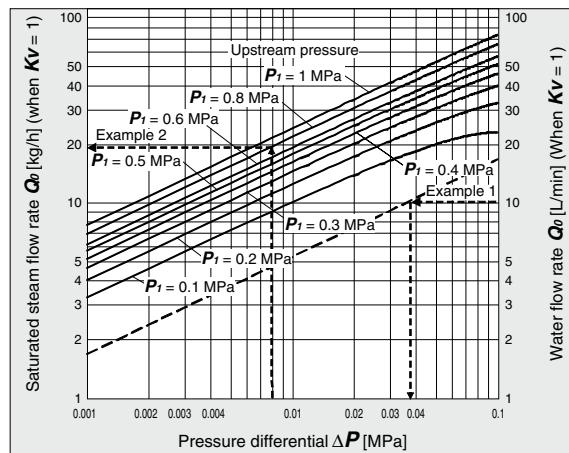


Fig. (3) Test circuit based on IEC60534-2-3, JIS B 2005-2-3



Graph (2) Flow rate characteristics

Example 1)

Obtain the pressure difference when water [15 L/min] runs through the solenoid valve with a $KV = 1.5 \text{ m}^3/\text{h}$. As the flow rate when $KV = 1$ is calculated as the formula: $Q_0 = 15 \times 1/1.5 = 10 \text{ [L/min]}$, read off ΔP when Q_0 is 10 [L/min] in Graph (2). The reading is 0.036 [MPa].

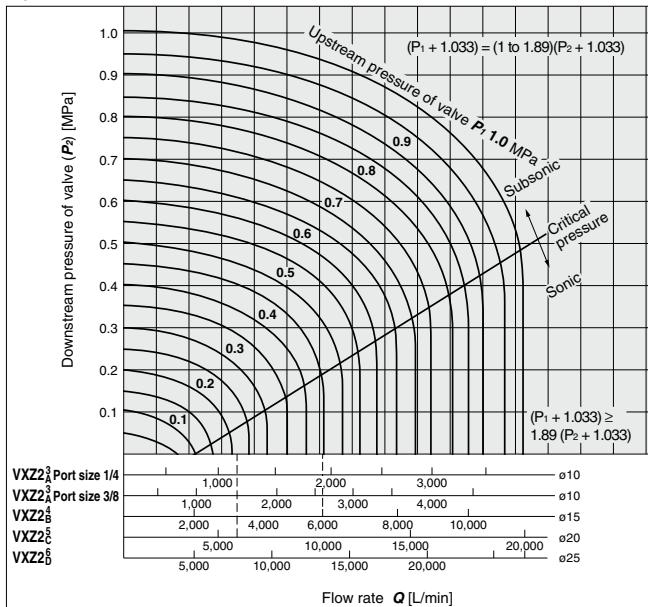
Example 2)

Obtain the saturated steam flow rate when $P_1 = 0.8$ [MPa] and $\Delta P = 0.008$ [MPa] with a solenoid valve with a $Kv = 0.05$ [m^3/h]. Read off Q_0 when P_1 is 0.8 and ΔP is 0.008 in Graph (2), the reading is 20 kg/h . Therefore, the flow rate is calculated as the formula: $Q = 0.05/1 \times 20 = 1$ [kg/h].

Flow Rate Characteristics

Note) Use this graph as a guide. In the case of obtaining an accurate flow rate, refer to pages 203 through to 207.

For Air

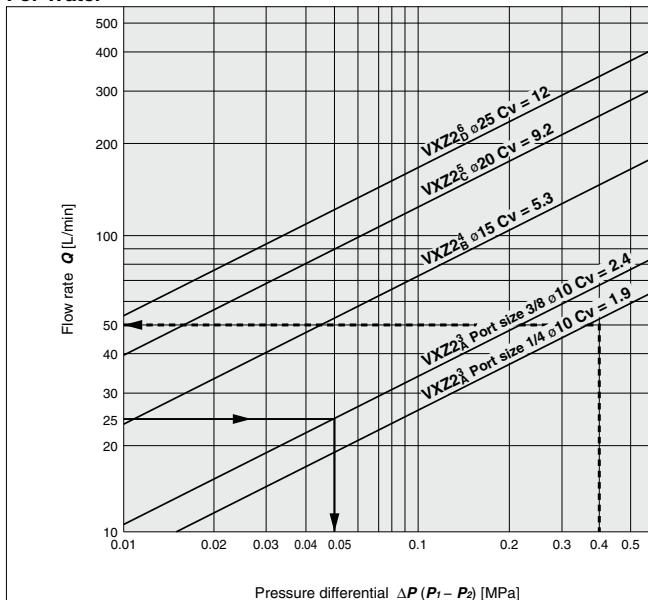


How to read the graph

The sonic range pressure to generate a flow of 6,000 L/min (ANR) is $P_1 \approx 0.47 \text{ MPa}$ for a $\varnothing 15$ orifice (VXZ2⁵_C) and $P_1 \approx 0.23 \text{ MPa}$ for a $\varnothing 20$ orifice (VXZ2⁶_D).

The optimum size for an upstream pressure $P_1 = 0.45 \text{ MPa}$ and a flow of 6,000 L/min will be the VXZ2⁵_C ($\varnothing 15$ orifice, port size 1/2).

For Water



How to read the graph

The pressure differential for a $\varnothing 10$ orifice to supply a flow of 25 L/min (VXZ2³_A, port size 3/8) will be $\Delta P \approx 0.05 \text{ MPa}$.

The optimum size for a pressure differential of $\Delta P \approx 0.4 \text{ MPa}$ and a flow of 50 L/min will be the VXZ2³_A ($\varnothing 10$ orifice, port size 1/4).



VXZ Series

Specific Product Precautions 1

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 17 to 19 for 2 Port Solenoid Valve for Fluid Control Precautions.

Design

⚠ Warning

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

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

2. Extended periods of continuous energization

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

3. Liquid rings

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

4. Actuator drive

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

5. Pressure (including vacuum) holding

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

6. When the conduit type is used as equivalent to an IP65 enclosure, install a wiring conduit etc.

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

Selection

⚠ Warning

2. Fluid

1) Type of fluid

Select an appropriate valve with reference to the table below for the general fluid. Before using a fluid, check whether it is compatible with the materials of each model by referring to the fluids listed in this catalog. Use a fluid with a kinematic viscosity of 50 mm²/s or less.

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

Applicable Fluid

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

2) Flammable oil, Gas

Do not use the product with combustion-supporting or flammable fluids.

3) Corrosive gas

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

4) When a brass body is used, then depending on water quality, 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. Air quality

<Air>

1) Use clean air.

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

2) Install an air filter.

Install air filters close to valves at their upstream side. filtration degree of 5 µm or less should be selected.

3) Install an aftercooler or air dryer, etc.

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

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

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

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

Selection

⚠ Warning

1. Usage with low flow

Unstable flow may occur with the product under the following conditions: • low flow from the pump or compressor, etc. • use of several elbows or tees in the circuit, or • thin nozzles installed at the end of the piping etc. This can cause valve opening/closing failure, or oscillation, and cause a valve malfunction.

Please check the pressure differential and flow to select the appropriate size of the valve referring to the Flow rate Characteristics on page 208. Ensure that pressure differential does not become lower than 0.01 MPa during ON (N.C.: Valve open).

VX2
VXK
VXD
VXZ
VXS
VXB
VXE
VXP
VXR
VXH
VXF
VX3
VXA



VXZ Series

Specific Product Precautions 2

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 17 to 19 for 2 Port Solenoid Valve for Fluid Control Precautions.

Selection

⚠ 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 100 mesh.

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

Tap water pressure:

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

When using water or heated water, poor operation or leaks may be caused by dezincification, erosion, corrosion, etc.

The brass (C37) body of this product uses dezincification resistant material as a standard. We also offer a stainless steel body type with improved corrosion resistance. Please use the one that fits your needs.

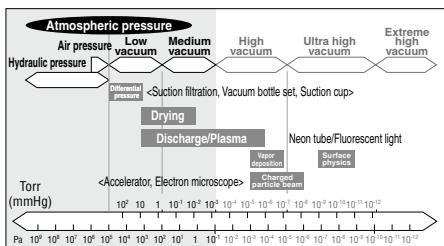
<Oil>

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.

<Vacuum>

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



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

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

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

⚠ Warning

4. Ambient environment

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

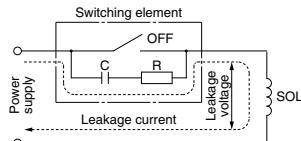
5. Countermeasures against static electricity

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

⚠ Caution

1. Leakage voltage

When the solenoid valve is operated using the controller, etc., the leakage voltage should be the product allowable leakage voltage or less. Particularly when using a resistor in parallel with a switching element and using a C-R element (surge voltage suppressor) to protect the switching element, take note that leakage current will flow through the resistor, C-R element, etc., creating a possible danger that the valve may not turn off.



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

2. Selecting model

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

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.

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.



VXZ Series

Specific Product Precautions 3

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 17 to 19 for 2 Port Solenoid Valve for Fluid Control Precautions.

Mounting

⚠ Warning

6. Avoid sources of vibration, or adjust the arm from the body to the minimum length so that resonance will not occur.

7. Painting and coating

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

Piping

⚠ Warning

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

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

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

⚠ Caution

1. Preparation before piping

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

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.

Lower tightening torque will lead into fluid leakage.

Tightening Torque for Piping

Connection threads	Proper tightening torque N·m
Rc1/8	7 to 9
Rc1/4	12 to 14
Rc3/8	22 to 24
Rc1/2	28 to 32
Rc3/4	
Rc1	36 to 38

4. Connection of piping to products

When connecting piping to a product, avoid mistakes regarding the supply port etc.

5. Winding of sealant tape

When connecting pipes, fittings, etc., be sure that chips from the pipe threads and sealing material do not enter the valve.

Furthermore, when sealant tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



Piping

⚠ Caution

6. If a regulator and valve are connected directly, they may vibrate together and cause chattering. Do not connect directly.

7. If the cross-sectional area of piping for the fluid supply side is restricted, operation will become unstable due to inadequate pressure differential during valve operation. Use piping size for the fluid supply side that is suited to the port size.

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.)

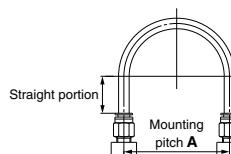


Fig. 1 Recommended piping configuration

Tubing size	Mounting pitch A			Straight portion length
	Nylon tubing	Soft nylon tubing	Polyurethane tubing	
ø1/8"	44 or more	29 or more	25 or more	16 or more
ø6	84 or more	39 or more	39 or more	30 or more
ø1/4"	89 or more	56 or more	57 or more	32 or more
ø8	112 or more	58 or more	52 or more	40 or more
ø10	140 or more	70 or more	69 or more	50 or more
ø12	168 or more	82 or more	88 or more	60 or more

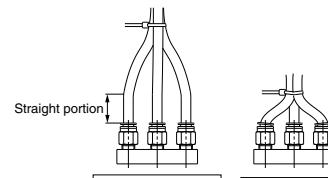


Fig. 2 Binding tubes with bands

VX2
VXK
VXD
VXZ
VXS
VXB
VXE
VXP
VXR
VXH
VXF
VX3
VXA



VXZ Series Specific Product Precautions 4

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 17 to 19 for 2 Port Solenoid Valve for Fluid Control Precautions.

Wiring

⚠ Warning

1. 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.)

Operating Environment

⚠ Warning

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

Maintenance

⚠ Warning

1. Removing the product

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

- 1) Shut off the fluid supply and release the fluid pressure in the system.
- 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 drain from an air filter periodically.

Operating Precautions

⚠ Warning

1. If there is a possibility of reverse pressure being applied to the valve, take countermeasures such as mounting a check valve on the downstream side of the valve.
2. When problems are caused by a water hammer, install water hammer relief equipment (accumulator etc.), or use an SMC water hammer relief valve (VXR series). Please consult with SMC for details.
3. For pilot type 2-port solenoid valves, when the valve is closed, sudden pressure resulting from the startup of the fluid supply source (pump, compressor, etc.) may cause the valve momentarily to open and leakage to occur, so please exercise caution.
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.



VXZ Series

Specific Product Precautions 5

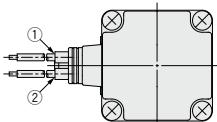
Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 17 to 19 for 2 Port Solenoid Valve for Fluid Control Precautions.

Electrical Connections

⚠ Caution

■ Grommet

Class B coil: AWG20 Insulator O.D. 2.6 mm
Class H coil: AWG18 Insulator O.D. 2.1 mm



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

* There is no polarity.

■ DIN terminal

Disassembly

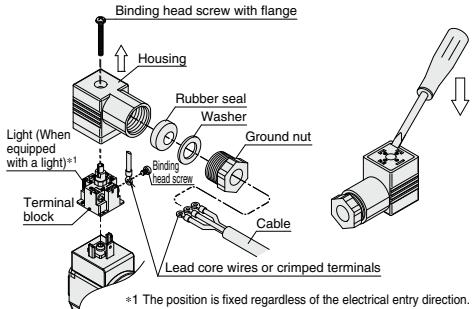
1. After loosening the binding head screw with flange, then if the housing is pulled in the direction of the arrow, the connector will be removed from the solenoid valve.
2. Pull out the binding head screw with flange from the housing.
3. There is a cutout on the bottom of the terminal block. Insert a small flat head screwdriver, etc. into this cutout, and remove the terminal block from the housing. (See figure below.)
4. Remove the ground nut, and pull out the washer and the rubber seal.

Wiring

1. Pass the cable through the ground nut, washer and rubber seal in this order, and insert these parts into the housing.
2. Loosen the binding head screw of the terminal block, then insert the core wire or the crimped terminal of the lead wire into the terminal, and securely fix it with the binding head screw. The binding head screw of the terminal block is M3.
Note 1) Tighten the screw to a torque of between 0.5 and 0.6 N·m.
Note 2) Cable O.D.: ø6 to ø12 mm
Note 3) For an outside cable diameter of ø9 to 12 mm, remove the internal parts of the rubber seal before using.

Assembly

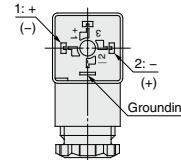
1. Pass the cable through the ground nut, washer, rubber seal and the housing in this order, and connect to the terminal block. Then, set the terminal block inside the housing. (Push in the terminal block until it snaps into position.)
2. Insert the rubber seal and the washer in this order into the cable entry of the housing, and then tighten the ground nut securely.
3. Insert the gasket between the bottom part of the terminal block and the plug attached to the equipment, and then insert the binding head screw with flange from the top of the housing, and tighten it.
Note 1) Tighten the screw to a torque of between 0.5 and 0.6 N·m.
Note 2) The orientation of the connector can be changed in steps of 90° by changing the method of assembling the housing and the terminal block.



⚠ Caution

Internal connections are as shown below.

Make connections to the power supply accordingly.



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

* There is no polarity.

■ Conduit terminal

Disassembly

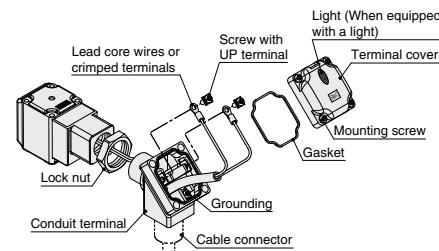
1. Loosen the mounting screw, and remove the terminal cover from the conduit terminal.

Wiring

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

Assembly

1. Insert the gasket into the conduit terminal, and then clamp the terminal cover with the mounting screw.
Note 1) Tighten the screw to a torque of between 0.5 and 0.6 N·m.
Note 2) When changing the orientation of the conduit terminal, carry out the following procedure.
1. Apply a tool (monkey wrench, spanner, etc.) to the width across flats of the conduit terminal, and turn the terminal in the counterclockwise direction.
2. Loosen the lock nut.
3. Turn the conduit terminal in the clamping direction (clockwise direction) to about 15° ahead of the desired position.
4. Turn the lock nut by hand to the coil side until it is lightly tightened.
5. Apply a tool to the width across flats of the conduit terminal, and turn it to the desired position (through an angle of about 15°) so as to clamp the conduit terminal.
Note) When changing the orientation by applying additional tightening force to the conduit terminal from the factory-set position, turn no more than one half a turn.



VX2
VXK
VXD
VXZ
VXS
VXB
VXE
VXP
VXR
VXF
VX3
VXA



VXZ Series

Specific Product Precautions 6

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 17 to 19 for 2 Port Solenoid Valve for Fluid Control Precautions.

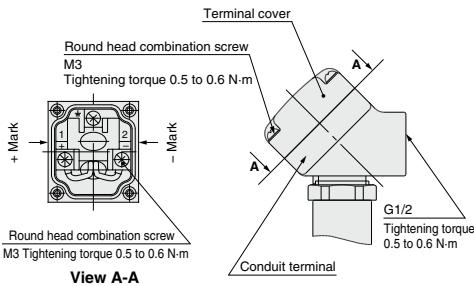
Electrical Connections

⚠ Caution

■ Conduit terminal

Make connections according to the marks shown below.

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

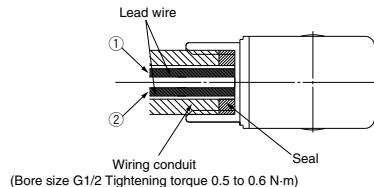


■ Conduit

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



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

* There is no polarity.

Description	Part no.
Seal	VCW20-15-6

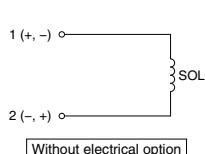
Note) Please order separately.

Electrical Circuits

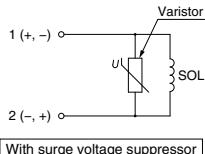
⚠ Caution

[DC circuit]

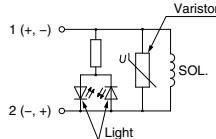
Grommet, Flat terminal



Grommet, DIN terminal, Conduit terminal, Conduit

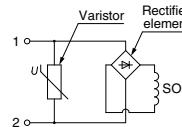


DIN terminal, Conduit terminal

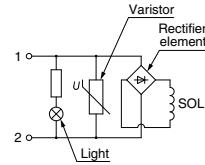


[AC circuit]

Grommet, DIN terminal, Conduit terminal, Conduit



DIN terminal, Conduit terminal



One-touch Fitting

⚠ Caution

For information on handling One-touch fittings and appropriate tubing, refer to page 211 and the KQ2 series One-touch fittings in Best Pneumatics No. 7.