2/3 Port Valve for Various Fluids Control

■ 2/3 Port Solenoid/Air Operaed Valve for Various Fluids Control
(For Water/Air/Oil/Gas/Vacuum/Steam)

The models VX21/22/23 have been revised. For details, please refer to catalog no. ES70-23A.
The models VX31/32/33 have been revised. For details, please refer to catalog no. ES70-26A.
Similar updating for other VX∗ series are scheduled to follow shortly.

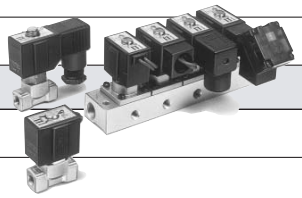
For Fluid Control
2/3 Port Valve
Solenoid Valve/Air Operated Valve
For Water, Air, Oil, Gas, Vacuum and Steam

2 Port, Direct Operated

Series VX21/22/23

N.C., N.O./ Single unit, Manifold

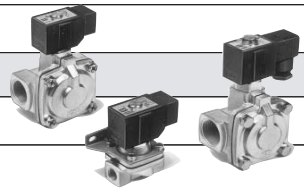
Refer to our catalog “ES70-23A”.

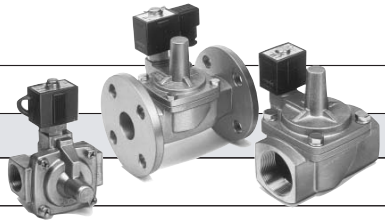


2 Port, Pilot Operated (Diaphragm type)

Series VXD21/22/23

N.C., N.O.





2 Port, Pilot Operated (Disk type)

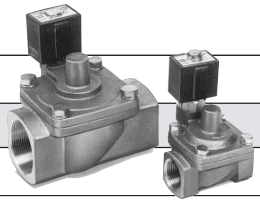
Series VXP21/22/23

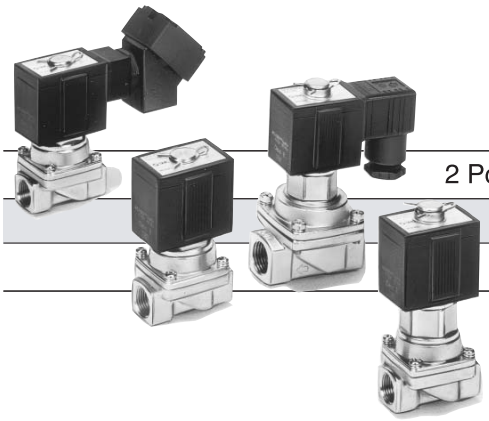
N.C., N.O.

2 Port, Pilot Operated

Series VXR21/22/23

< Water hammer relief > N.C., N.O.





2 Port, Pilot Operated (Diaphragm type, zero pressure differential operation)

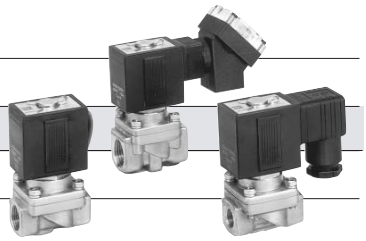
Series VXZ22/23

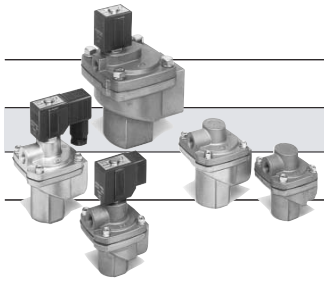
N.C., N.O./ Single unit

2 Port, Pilot Operated

Series *VXH22*

For high pressure control N.C./Single unit

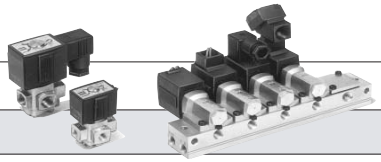




2 Port, Pilot Operated

Series *VXF21/22*

Quick response, Control of instantaneous large flow N.C./Single unit

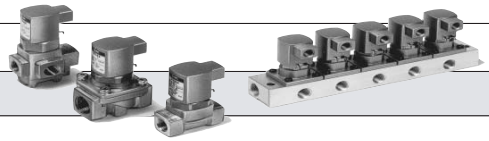


3 Port, Direct Operated

Series *VX31/32/33*

C.O./Single unit, Manifold

Refer to our catalog “ES70-26A”.



Air Operated Valve

2/3 Port, Direct Operated

Series *VXA21/22*

Series *VXA31/32*

Selection Procedure for 2/3 Port Valve for Fluid Control

1. Selection of the series

Select series by referring to the number of ports, valve type (N.C., N.O., C.O.), port size and applied fluid.

2. Check by the applicable fluids check list

Use the tables on pages 17-3-6 to -14 to check the compatibility of the applicable fluid with the solenoid valve.

3. Confirmation of the working pressure differential

There are two types of pressure differentials. The high pressure differential is the highest pressure difference allowable between the inlet side and the outlet side in an open and closed state. The minimum pressure differential is the lowest pressure required to hold the main valve fully open. Refer to the following pages for each series as the pressure differential varies with the orifice size, power supply, pressure and fluid.

4. Reference to the flow characteristic table

To obtain the flow rate of fluid, refer to the flow characteristic table.

5. Choice of the power supply voltage and electrical entry

Select the AC/DC power source and choose the electrical entry.

The models VX21/22/23 have been revised. For details, please refer to catalog no. ES70-23A.
The models VX31/32/33 have been revised. For details, please refer to catalog no. ES70-26A.
Similar updating for other VX∗ series are scheduled to follow shortly.

Solenoid Valves List

Number of ports			2 port										
Action			Direct operated				Pilot operated Diaphragm type		Pilot operated Disk type		Pilot operated <Water hammer relief>		
Series			VX21/22/23				VXD21/22/23		VXP21/22/23		VXR21/22/23		
Body type			Single unit		Manifold		Single unit		Single unit		Single unit		
Valve type			N.C.	N.O.	N.C.	N.O.	N.C.	N.O.	N.C.	N.O.	N.C.	N.O.	
Applicable fluids	Standard	Water	●		–		●		●		●		
		Air	●		●		●		●		–		
		Oil	●		●		●		●		●		
		Low vacuum (1 Torr)	●		●		–		–		–		
	Option	Steam	●		–		–		●		–		
		Medium vacuum (10^{-3} Torr) Non-leak (10^{-5}atm cc/sec)	●		●		–		–		–		
		High temperature water, High temperature oil	●		–		●		●		●		
Port size	Rc	1/8 (6A)	●	●	–		–	–	–	–	–	–	
		1/4 (8A)	●	●			●	–	●	–	–	–	
		3/8 (10A)	●	●			●	–	●	–	–	–	
		1/2 (15A)	●	–			●	●	●	●	●	●	
		3/4 (20A)	–	–			●	●	●	●	●	●	
		1 (25A)	–	–			●	●	●	●	●	●	
	Flange Rc	11/4 (32A)	–	–			● Flange	● Flange	● Flange Rc	● Flange Rc	● Rc	● Rc	
		11/2 (40A)	–	–			● Flange	● Flange	● Flange Rc	● Flange Rc	● Rc	● Rc	
		2 (50A)	–	–			● Flange	● Flange	● Flange Rc	● Flange Rc	● Rc	● Rc	
Page			Catalog ES70-23A				17-3-17		17-3-27		17-3-37		

∗ An option is available that sets the orifice in the vacuum side to the maximum bore for exclusive use when used in a vacuum pad application. Refer to page 17-3-86 for details.

Air Operated Valves List

Number of ports			2 port				3 port	
Action			Direct operated				Direct operated	
Series			VXA21/22				VXA31/32	
Body type			Single unit		Manifold		Single unit	Manifold
Valve type			N.C.	N.O.	N.C.	N.O.	C.O.	C.O.
Applicable fluids	Standard	Water	●		–		●	–
		Air	●		●		●	●
		Oil	●		●		●	●
		Low vacuum (1 Torr)	●		●		●	●
	Option	Medium vacuum (10^{-3} Torr) Non-leak (10^{-5}atm cc/sec)	●		●		●	●
Port size	Rc	1/8 (6A)	●	●	–		●	–
		1/4 (8A)	●	●			●	
		3/8 (10A)	●	●			●	
		1/2 (15A)	●	●			–	
Page			17-3-45		17-3-49		17-3-53	17-3-57

	2 port				3 port	
	Pilot operated <Zero pressure differential operation>		Pilot operated <High pressure control>	Pilot operated <Quick response, Instantaneous large flow>	Direct operated	
	VXZ22/23		**VXH22**	**VXF21/22**	**VX31/32/33**	
	Single unit		Single unit	Single unit	Single unit	Manifold
	N.C.	N.O.	N.C.	N.C.	N.C. /N.O. /C.O.	N.C. /N.O. /C.O.
	●		●	–	●	–
	●		●	●	●	●
	●		●	–	●	●
	●		–	–	● *	●
	–		–	–	●	–
	–		–	–	●	●
	●		–	–	●	–
	–	–	–	–	●	–
	●	●	●	–	●	
	●	●	●	–	●	
	●	●	●	–	–	
	●	●	–	●	–	
	●	●	–	●	–	
	–	–	–	–	–	
	–	–	–	● Rc	–	
	–	–	–	–	–	
	17-3-61		17-3-69	17-3-71	Catalog ES70-26A	

Applicable fluids check list 17-3-6 to 17-3-14

Glossary 17-3-15

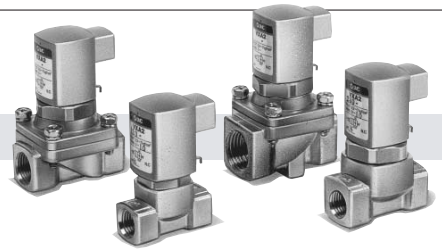
How to order Solenoid coil assembly 17-3-16

⚠ Caution

Be sure to read before handling. Refer to pages 17-6-3 to 17-6-10 for Safety Instructions and Solenoid Valve Precautions.

Applicable Fluids Check List

2 Port Direct Air Operated Series VXA21/22



Normally Closed (N.C.), Normally Open (N.O.)

Refer to pages 17-3-46 and 17-3-47 for specifications and models.

Option Symbol and Composition

Option symbol	Seal material	Body material	Holder material (Driving parts)
Standard	NBR	Brass	Polyacetal
A	FKM		
B	EPDM		
G	NBR	Stainless steel	
H	FKM		
J	EPDM		
M[Note 1] **(Non-leak)**	FKM		
N	FKM		Stainless steel
P	EPDM		
V[Note 1] **(Non-leak)**	FKM	Brass	Polyacetal

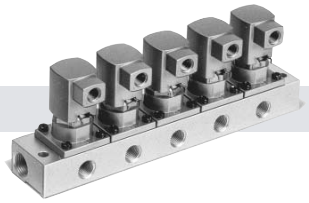
Note 1) Grease for vacuum has been applied to the sliding part, silicon grease to the other options.

Fluid Name and Option

Fluid (Application)	Option symbol and body material	
	Brass	Stainless steel
Silicon oil	A	H
Vacuum (up to 1.3 x 10^{-1} Pa)	V[Note 1]	M[Note 1]
Fuel oil (up to 60°C)	A	H
Insulation oil	A	H
Non-leak (10^{-6} Pa·m³/s)	V[Note 1]	M[Note 1]
Brake oil	B	P
Water (up to 60°C)	A	H

∗ If using for other fluids, please contact SMC.
Note 1) The leakage amount (10^{-6} Pa·m³/s) is value when differential pressure is 0.1 MPa.

Manifold Series VVXA21/22



Normally Closed (N.C.), Normally Open (N.O.)

Refer to pages 17-3-50 and 17-3-51 for specifications and models.

Option Symbol and Composition

Option symbol	Seal material	Body material	Holder material (Driving parts)
Standard	NBR	Aluminum	Polyacetal
A	FKM		
B	EPDM		
V[Note 1] **(Non-leak)**	FKM		

Note 1) Grease for vacuum has been applied to the sliding part, silicon grease to the other options.

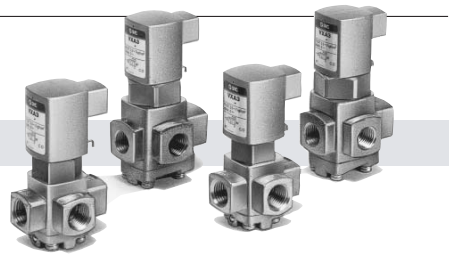
Fluid Name and Option

Fluid (Application)	Option symbol
Silicon oil	A
Vacuum (up to 1.3 x 10^{-1} Pa)	V[Note 1]
Fuel oil (up to 60°C)	A
Insulation oil	A
Brake oil	B
Non-leak (10^{-6} Pa·m³/s)	V[Note 1]

∗ If using for other fluids, please contact SMC.
Note 1) The leakage amount (10^{-6} Pa·m³/s) is value when differential pressure is 0.1 MPa.

Applicable Fluids Check List

3 Port Direct Air Operated Series VXA31/32



Common (C.O.)

Refer to pages 17-3-54 and 17-3-55 for specifications and models.

Option Symbol and Composition

Option symbol	Seal material	Body material	Support material (Driving parts)
Standard	NBR	Brass	Polyacetal
A	FKM		
B	EPDM		
G	NBR	Stainless steel	
H	FKM		
J	EPDM		
M[Note 1] **(Non-leak)**	FKM		
N	FKM		Stainless steel
P	EPDM		
V[Note 1] **(Non-leak)**	FKM	Brass	Polyacetal

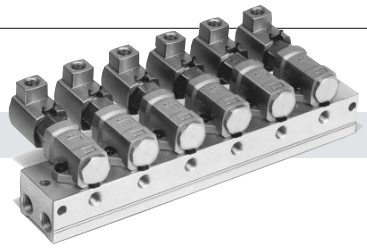
Note 1) Grease for vacuum has been applied to the sliding part, silicon grease to the other options.

Fluid Name and Option

Fluid (Application)	Option symbol and body material	
	Brass	Stainless steel
Silicon oil	A	H
Vacuum (up to 1.3 x 10^{-1} Pa)	V[Note 1]	M[Note 1]
Fuel oil (up to 60°C)	A	H
Insulation oil	A	H
Non-leak (10^{-6} Pa·m³/s)	V[Note 1]	M[Note 1]
Brake oil	B	P
Water (up to 60°C)	A	H

∗ If using for other fluids, please contact SMC.
Note 1) The leakage amount (10^{-6} Pa·m³/s) is value when differential pressure is 0.1 MPa.

Manifold Series VVXA31/32



Common (C.O.)

Refer to pages 17-3-58 and 17-3-59 for specifications and models.

Option Symbol and Composition

Option symbol	Seal material	Body material	Support material (Driving parts)
Standard	NBR	Aluminum	Polyacetal
A	FKM		
B	EPDM		
V[Note 1] **(Non-leak)**(1)	FKM	Brass (1)	

Note 1) Grease for vacuum has been applied to the sliding part, silicon grease to the other options.
Note 2) Manifold base material: Aluminum

Fluid Name and Option

Fluid (Application)	Option symbol
Vacuum (up to 1.3 x 10^{-1} Pa)	V[Note 1]
Vacuum pad	Standard
Non-leak (10^{-6} Pa·m³/s)	V[Note 1]
Brake oil	B

∗ If using for other fluids, please contact SMC.
Note 1) The leakage amount (10^{-6} Pa·m³/s) is value when differential pressure is 0.1 MPa.

Glossary

Pressure

1. Max. operating pressure differential
This pressure difference is the highest pressure difference allowable to operate (a difference between the pressures in the inlet slide and the outlet side) in an open state and the closed state of valve. A case of 0 kgf/cm^2 in the outlet side results in the highest operating pressure.

2. Min. operating pressure differential
This pressure difference is the lowest pressure difference (a difference between the pressures in the inlet slide and the outlet side) required to hold the main valve fully open.

3. Max. system presure
This pressure is the limit of pressure that can be applied to pipe line. (Line pressure)
[The pressure difference in a solenoid valve must be maintained less than the highest operating pressure difference.]

4. Proof pressure
This is the pressure that can be withstood without deterioration of the performance when valve returns within the range of the operating pressure. (A value under a specified condition.)

Electricity

1. Apparent power (VA)
Volt-ampere is the product of voltage (V) and current (A). Power dissipation (W): For AC , W = V/A cosθ. For DC, W = V/A (Note) cosθ shows power factor.

2. Surge voltage
The surge voltage is a high voltage generated momentarily when cutting the power supply.

3. Hum sound
The hum sound is a noise generated through repeated adsorption and releasing on an armature adsorption surface.
For an AC solenoid, no shading coil releases the spring reaction because of the existance of a 0 point (twice per frequency) of the suction force.

Others

1. Material
NBR: Nitrile rubber
FKM: Fluoro rubber—Trade names: Vitron®, Dai-el®, etc.
EPDM: Ethylene propylene rubber
PTFE: Polytetrafluoroethylene resin—Trade names: Teflon®, Polyflon®, etc.
Polyacetal (POM)—Trade names: Duracon®, Derlin®, etc.

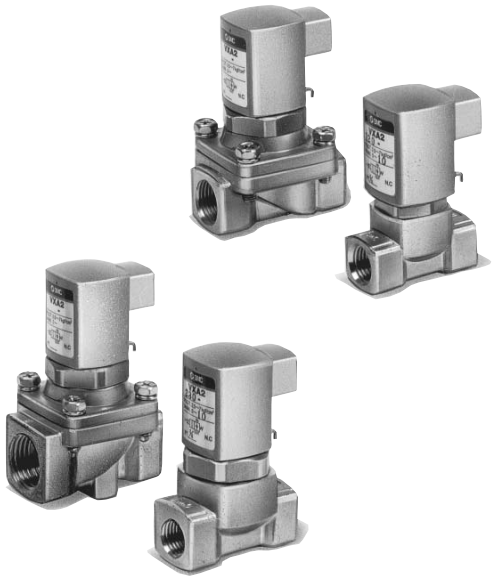
2. Oil preserve treatment
After assembly, valve is put through a parts washer to remove any oil used during assembly.

3. Symbol
The JIS symbol is ( ): this designates the valve to be normally closed.
However, in situations where the secondary pressure exceeds the primary side pressure, the resulting back pressure will cause back flow through the valve.

⚠ Caution

Refer to page 17-6-3 for Safety Instructions and Solenoid Valve Precautions.

Direct Air Operated 2 Port Valve
For Air, Gas, Vacuum, Water and Oil
Series VXA21/22



■ **Wide variations of combination.**
Able to control a wide variety of fluids.
Application can be matched by simply choosing body material (Brass or Stainless steel) and seal material (NBR, FKM, EPDM).

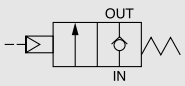
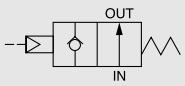
■ **Easy to disassemble and reassemble in a shorttime.**

■ **High viscosity fluids (500 cSt).**

VC□
VDW
VQ
VX2
VX□
VX3
VXA
VN□
LVC
LVA
LVH
LVD
LVQ
LQ
LVN
TI/TIL
PA
PAX
PB

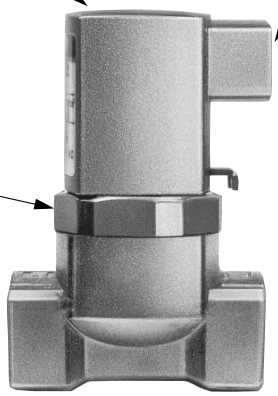
Variations

Valve

Normally closed (N.C.)	
Normally open (N.O.)	

Material

Body	Brass, Stainless steel
Seal	NBR, FKM, EPDM



Pilot port (Free take off direction)

Port size	Rc 1/8
Pilot pressure	0.25 to 0.7 MPa

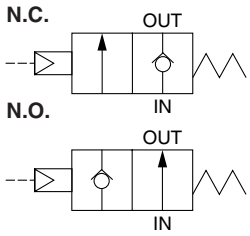
Model

Model	Port size Rc	Orifice size (mmø)
VXA212$^{2}_{0}$	1/8, 1/4	3
VXA213$^{2}_{0}$	1/8, 1/4	4.5
VXA223$^{2}_{0}$	1/4, 3/8	4.5
VXA224$^{2}_{0}$	1/4, 3/8	6
VXA225$^{2}_{0}$	1/4, 3/8	8
VXA226$^{2}_{0}$	1/4, 3/8, 1/2	10

The VX∗ series will be revised shortly.

Normally Closed (N.C.), Normally Open (N.O.)

JIS Symbol



Fluid

Standard specification	Option Note)
Water (Standard, up to 40°C) Air (Standard, Dry) Turbine oil Vacuum (up to 1.3 x10^{2} Pa) Carbon dioxide (CO_2), Nitrogen gas (N_2)	Vacuum (up to 1.3 x10^{-1} Pa) ..... (V, M) Non-leak (10^{-6} Pa· m^3/s or less) ..... (V, M)

Note 1) Refer to page 17-3-13 “Applicable Fluids Check List” for details of special fluids outside of the standard options and specifications.

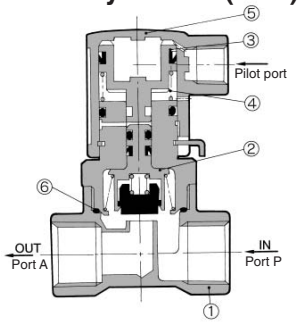
Model/Valve Specifications

Port size	Orifice size (mmø)	Model	Max. operating pressure differential (MPa)	Flow characteristics					Max. system pressure (MPa)	Proof pressure (MPa)	Weight (g)
				Water, Oil		Air					
				Av x 10^{-6}m^2	Cv converted	C [dm^3/ (s· bar)]	b	Cv			
1/8 (6A)	3	**VXA212**	1.0	7.9	0.33	1.3	0.50	0.38	1.0	1.5	170
	4.5	**VXA213**	0.5	15	0.61	2.3	0.45	0.70			
1/4 (8A)	3	**VXA212**	1.0	7.9	0.33	1.3	0.50	0.38			
	4.5	**VXA213**	0.5	15	0.61	2.5	10.45	0.75			250
		VXA223	1.0								
	6	**VXA224**	0.6	26	1.1	3.3	0.50	1.1			
	8	**VXA225**	0.2	41	1.7	6.4	0.40	1.8	0.4		340
	10	**VXA226**	0.1	46	1.9	8.8	0.40	2.3			
3/8 (10A)	4.5	**VXA223**	1.0	15	0.61	2.5	0.45	0.75	1.0		250
	6	**VXA224**	0.6	26	1.1	3.3	0.50	1.1			
	8	**VXA225**	0.2	41	1.7	6.4	0.40	1.8	0.4		340
	10	**VXA226**	0.1	58	2.4	11	0.38	2.8			
1/2 (15A)	10	**VXA226**	0.1	58	2.4	11	0.38	2.8			420

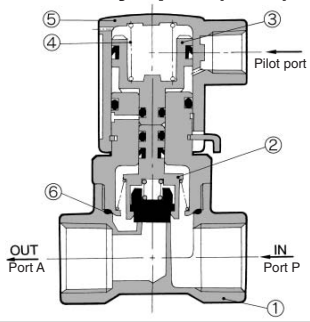
Note) Refer to “Glossary” on page 17-3-15 for details of max. operating pressure differential and max. system pressure.

Construction/ Principal Parts Material

Normally closed (N.C.)



Normally open (N.O.)



No.	Description	Material	
		Standard	Option
①	Body	Brass	Stainless steel
②	Valve assembly	Stainless steel, Brass NBR,Polyacetal	Stainless steel FKM/EPDM
③	Piston assembly	Polyacetal, NBR	—
④	Piston spring	Stainless steel	—
⑤	Pilot cover	Aluminum	—
⑥	O-ring	NBR	FKM/EPDM

Operating Fluid and Ambient Temperature

Temperature conditions	Operating fluid temperature (°C)				Ambient temperature (°C)
	Water (Standard)	Air (Standard)	Oil (Standard)	Vacuum (3) (V, M)	
Maximum	40	60	40	40	40
Minimum	1	–5(1)	–5(2)	–5	–5

Note 1) Dew point: –5°C or less Note 2) 500 cSt or less
Note 3) “V”, “M” in parentheses are option symbols.

Tightness of Valve (Leak rate)

Fluid / Seal material	Air	Liquid	Non-leak, Vacuum V, M (2)
NBR, FKM, EPDM	1 cm^3/min or less	0.1 cm^3/min or less(1)	10^{-6}Pa·m^3/s

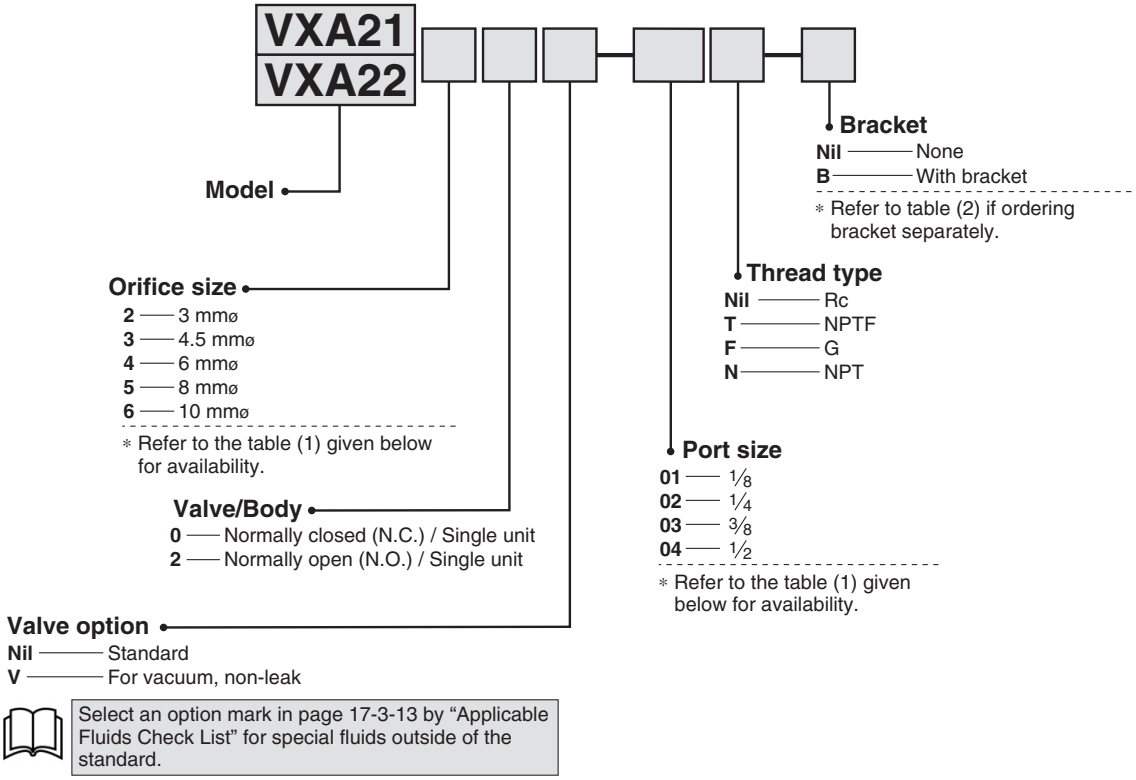
Note 1) Differs depending on the operating conditions such as pressure, etc.
Note 2) Value on option “V”, “M” (Non-leak, Vacuum).

Pilot Pressure

Model	Pressure (MPa)
VXA21□□ **VXA22□□**	0.25 to 0.7

The VX∗ series will be revised shortly.

How to Order



Select an option mark in page 17-3-13 by "Applicable Fluids Check List" for special fluids outside of the standard.

Table (1) Port/Orifice Size

Model		Orifice size (No.)				
VXA21	VXA22	2 (3 mmø)	3 (4.5 mmø)	4 (6 mmø)	5 (8 mmø)	6 (10 mmø)
01 (1/8)	—	●	●	—	—	—
02 (1/4)	—	●	●	—	—	—
—	02 (1/4)	—	●	●	●	●
—	03 (3/8)	—	●	●	●	●
—	04 (1/2)	—	—	—	—	●

Table (2) Bracket Part No.

Model	Part no.
VXA212□ VXA213□	VX070-020
VXA223□ VXA224□	VX070-022
VXA225□ VXA226□	VX070-029

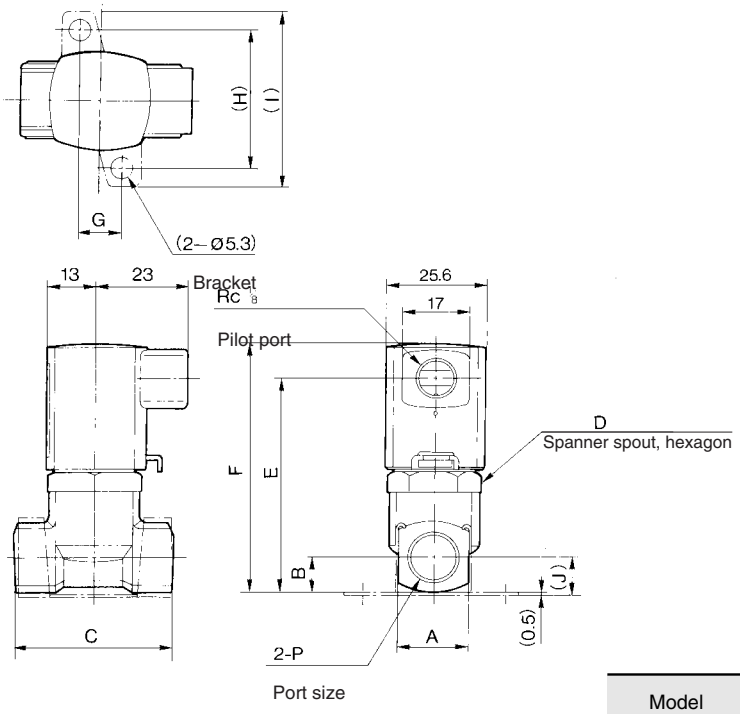
Ordering example

(Example) Series VXA21, Orifice size 4.5 mmø, Normally closed, Rc 1/4
(Part no.) **VXA2130-02**

The VX∗ series will be revised shortly.

Dimensions (Orifice Size: 3 mmø, 4.5 mmø, 6 mmø)

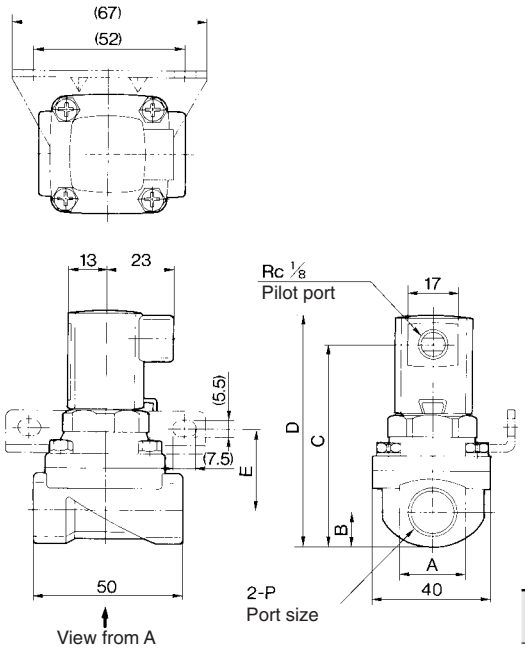
VXA212□/VXA213□/VXA223□/VXA224□



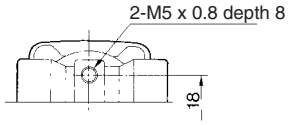
Model	Port size P Rc	A	B	C	D	E	F	With bracket G	H	I	J
VXA21	1/8, 1/4	18	9	40	21	55	64	11	36	46	10
VXA22	1/4, 3/8	21	10.5	45	27	62	71	13	46	56	11.5

Dimensions (Orifice Size: 8 mmø, 10 mmø)

VXA225□/VXA226□



Thread fixed:
(VXA226$^{2}_{0}$-04 only)



Dimension of view from A

Model	Port size P Rc	A	B	C	D	With bracket E
VXA22$^{52}_{60}$-$^{02}_{03}$	1/4, 3/8	22	11	67	77	27
VXA226$^{2}_{0}$-04∗	1/2	28	14.5	73	83	30

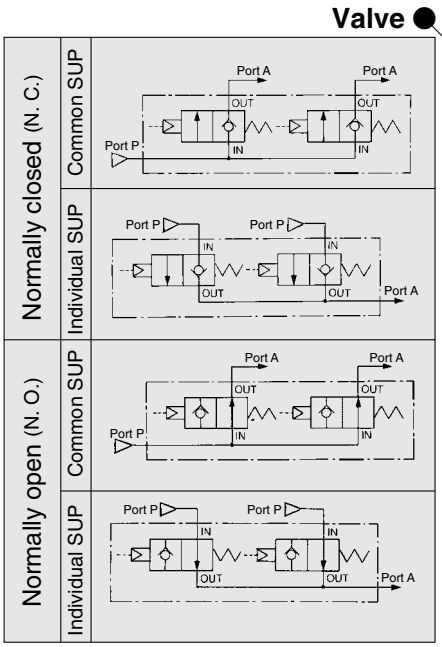
∗ Fixing with thread is also possible.

Direct Air Operated 2 Port Valve/Manifold
For Air, Gas, Vacuum and Oil
Series VVXA21/22

- **Common SUP type and individual SUP type (for vacuum use) standard models**
  Compatible with a wide variety of fluids.
- **A wide variety of applicable fluids.**
  Combination of seal materials (NBR, FKM or EPDM) can be selected freely, depending on the purpose.
- **Able to replace valves with the piping remained uchanged.**
- **Weight-saving aluminum base and body.**
- **Brass base and stainless steel base are available.**
  Please contact SMC for details.

VC□
VDW
VQ
VX2
VX□
VX3
VXA
VN□
LVC
LVA
LVH
LVD
LVQ
LQ
LVN
TI/TIL
PA
PAX
PB

Variations



Valve

Material

Base, Body	Aluminum
Seal	NBR, FKM, EPDM

Manifold

Manifold	B mount
Stations	2 to 10 stations

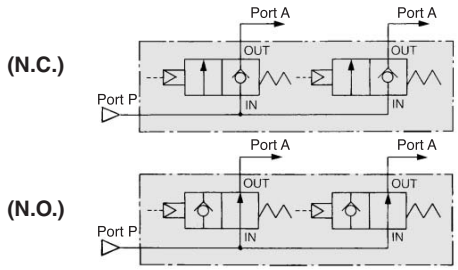
Model

Manifold base model	Individual port Rc	Common port Rc
VVXA211-stations	1/8	3/8
VVXA212-stations	1/4	
VVXA221-stations	1/8	
VVXA222-stations	1/4	

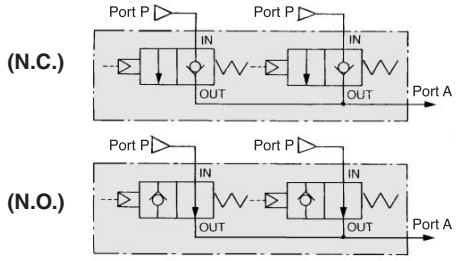
The VX∗ series will be revised shortly.

Normally Closed (N.C.), Normally Open (N.O.)

JIS Symbol
Common SUP type

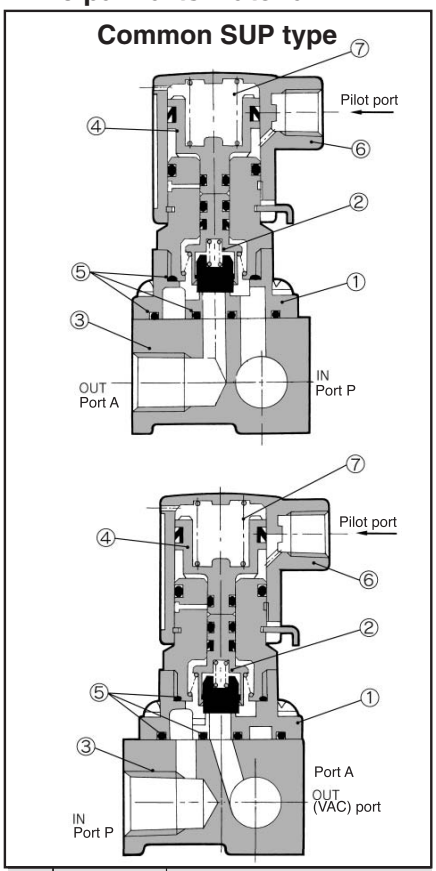


Indivisual SUP type



Construction/ Principal Parts Material

Common SUP type



No.	Description	Material	
		Standard	Option
①	Body	Aluminum	—
②	Valve assembly	NBR, Stainless steel Brass, Polyacetal	FKM/EPDM
③	Base	Aluminum	—
④	Piston assembly	Polyacetal, NBR	—
⑤	O-ring	NBR	FKM/EPDM
⑥	Pilot cover	Aluminum	—
⑦	Piston spring	Stainless steel	—

Fluid

Standard specifications	Option
Air (Standard, Dry) Vacuum (up to 1.3 x10^2 Pa) Turbine oil Carbon dioxide (CO_2), Nitrogen gas (N_2)	Vacuum (up to 1.3 x10^2 Pa) ····· (V) Non-leak (10^{-6} Pa·m^3/s or less) ····· (V)

Note) Refer to page 17-3-13 “Applicable Fluids Check List” for details of special fluids outside of the standard options and specifications.

Manifold Specifications

Manifold	B Mount	
Manifold type	Common pressure supply, individual pressure supply (For vacuum)	
Number of valves	2 to 10 stations	
Blanking plate (With O-rings, screws)	VVXA21	VX011-001
	VVXA22	VX011-006

Note) Common port is placed on vacuum side.

Manifold Base and Applicable Valve Part No.

Manifold base	Individual port Rc	Applicable valve	Weight per one station (g)
VVXA211-stations	1/8	**VXA21□$^3_1$-00**	n x 70 + 50
VVXA212-stations	1/4		
VVXA221-stations	1/8	**VXA22□$^3_1$-00**	n x 130 + 110
VVXA222-stations	1/4		

Solenoid Valve for Manifold

Orifice size (mmø)	Model	Max.operating pressure differential (MPa)	Flow characteristics					Max. system pressure (MPa)	Proof pressure (MPa)	Weight (g)
			Oil		Air					
			Av x 10^{-6}m^2	Cv converted	C [dm^3/(s·bar)]	b	Cv			
3	**VXA212-00**	1.0	7.9	0.33	1.3	0.50	0.38	1.0	1.5	120
4.5	**VXA213-00**	0.5	15	0.61	2.3	0.45	0.70			
	VXA223-00	1.0								160
6	**VXA224-00**	0.6	26	1.1	3.3	0.50	1.1			

Note) Refer to “Glossary” on page 17-3-15 for details of max. operating pressure differential

Operating Fluid and Ambient Temperature

Temperature conditions	Operating fluid temperature (°C)			Ambient temperature (°C)
	Air (Standard)	Oil (Standard)	Vacuum (3) (V)	
Maximum	60	40	40	40
Minimum	–5(1)	–5 (2)	–5	–5

Note 1) Dew point: –5°C or less Note 2) 500 cSt or less
Note 3) “V” in parentheses is option symbol.

Tightness of Valve (Leak rate)

Fluid / Seal material	Air	Liquid	Non-leak, Vacuum (2)
NBR, FKM, EPDM	1 cm^3/min or less	0.1 cm^3/min or less (1)	10^{-6}Pa·m^3/s or less

Note 1) Differs depending on the operating conditions such as pressure, etc.
Note 2) Value on option “V” (Non-leak, Vacuum).

Pilot Pressure

Model	Pressure (MPa)
VXA21□□ **VXA22□□**	0.25 to 0.7

The VX∗ series will be revised shortly.

How to Order

VXA21
VXA22

Model

Orifice size
2 — 3 mmø
3 — 4.5 mmø
4 — 6 mmø
∗ Refer to the table (1) given below for availability.

Valve/Body
1 — Normally closed (N.C.)/Manifold
3 — Normally open (N.O.)/Manifold

Valve option
Select an option mark in page 17-3-13 by "Applicable Fluids Check List" for special fluids outside of the standard.

00

Connection
00 — (No connection screw)

Table (1) Orifice Size

Model	Orifice size (No.)		
	2 (3 mmø)	**3 (4.5 mmø)**	**4 (6 mmø)**
VXA21	●	●	—
VXA22	—	●	●

How to Order Manifold Base

VVXA21
VVXA22

Manifold base

Symbol	Applicable valve
VVXA21	VXA21□[3]-00
VVXA22	VXA22□[3]-00

Port size (Individual port)
1 — Rc 1/8
2 — Rc 1/4
∗ All common ports are Rc 3/8
Common SUP model has the indication of "P" and individual SUP has the indication of "VAC". at the common port.

Manifold type
Nil — Common SUP
V — Individual pressure

Number of stations
02 — 2 stations
⋮
10 — 10 stations

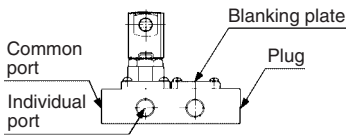
How to Order Manifold

■ **Write both the base part number and the solenoid valve to be mounted or blanking plate part number.**

(Example) 7 stations of VXA21 common pressure, individual port Rc 1/8.

(Base) VVXA211-07····· 1 pc.
(Valve) VXA2121-00····· 6 pcs.
(Blanking plate) VX011-001····· 1 pc.

■ **Arrangement of solenoid valves**

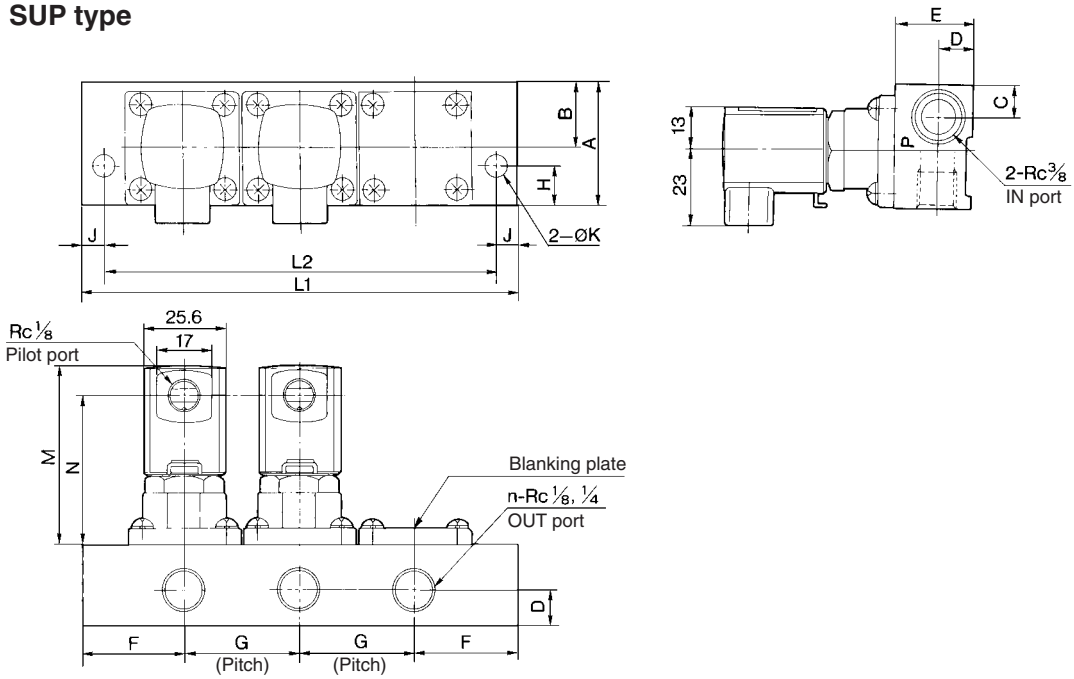


The standard arrangement of manifolds should be placed on an individual port on this side, each solenoid valve from the left side and a blank plate in the right side. The right side of the common port provides plug.

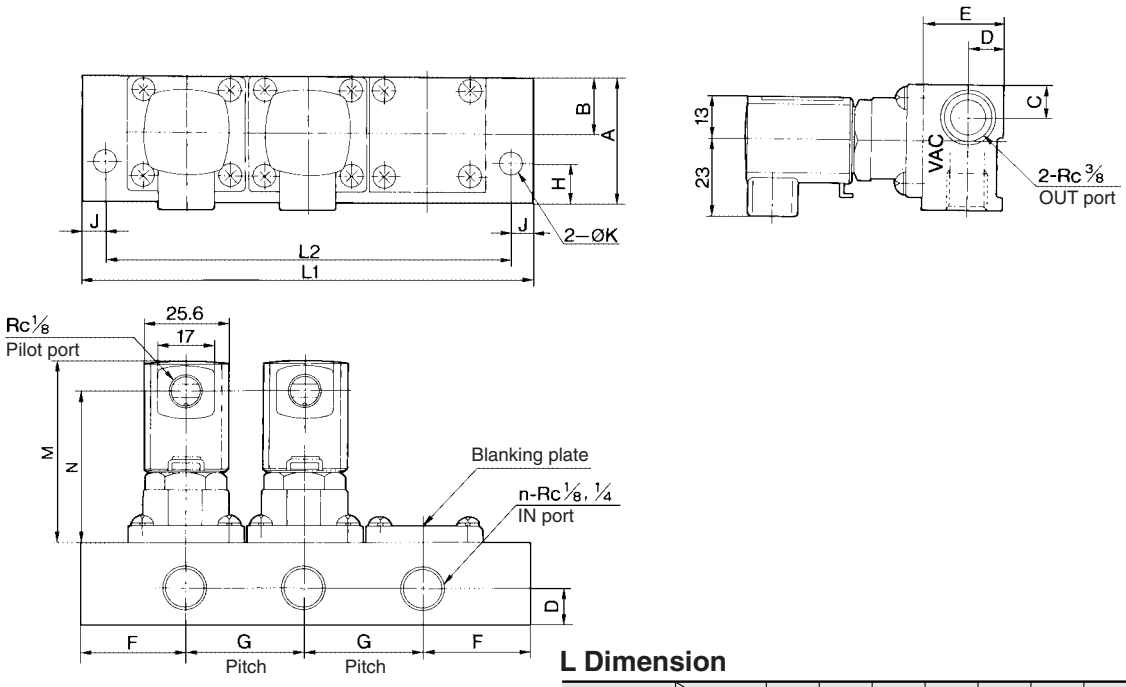
The VX∗ series will be revised shortly.

Dimensions/Manifold

Common SUP type



Individual SUP type



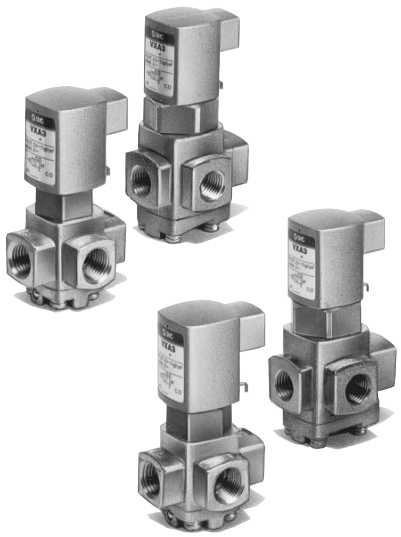
L Dimension

Model	Stations / Symbol	2	3	4	5	6	7	8	9	10
VVXA21□	L_1	100	136	172	208	244	280	316	352	388
	L_2	86	122	158	194	230	266	302	338	374
VVXA22□	L_1	126	172	218	264	310	356	402	448	494
	L_2	108	154	200	246	292	338	384	430	476

Model	A	B	C	D	E	F	G	H	J	K	M	N
VVXA21□	38	20.5 [17.5]	10.5	11	25	32	36	12	7	6.5	54	45
VVXA22□	49	26.5 [22.5]	13	13	30	40	46	15	9	8.5	58	49

[ ]: Individual pressure type

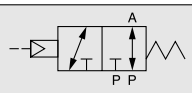
Direct Air Operated 3 Port Valve
For Air, Gas, Vacuum, Water and Oil
Series VXA31/32

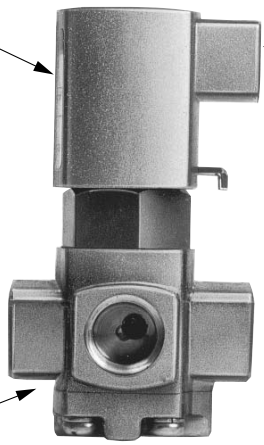


- **Able to control a wide variety of fluids. Wide variations of combination.**
  Application can be matched by simply choosing body material (Brass or Stainless steel) and seal material (NBR, FKM or EPDM).
- **C.O. type easy to use; operatable as either N.C. or N.O.**
- **Easy to disassemble and reassemble in a short time.**
- **High viscosity fluids (500 cSt).**

Variations

Valve ●

Common (C.O.) 



● **Pilot port** (Free take off direction)

Port size ——— Rc 1/8
Pilot pressure —— 0.25 to 0.7 MPa

Material ●

Body —— Brass, Stainless steel
Seal —— NBR, FKM, EPDM

Model

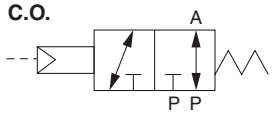
Model	Port size Rc	Orifice size (mmø)
VXA3114	1/8, 1/4	1.5
VXA3124	1/8, 1/4	2.2
VXA3134	1/8, 1/4	3
VXA3224	1/4, 3/8	2.2
VXA3234	1/4, 3/8	3
VXA3244	1/4, 3/8	4

The VX∗ series will be revised shortly.

Common (C.O.)

JIS Symbol

C.O.



Fluid

Standard specifications	Option Note)
Water (Standard, up to 40°C) Air (Standard, Dry) Turbine oil Vacuum (up to 1.3 x 10^2 Pa) Carbon dioxide (CO_2), Nitrogen gas (N_2)	Vacuum (up to 1.3 x 10^{-1} Pa) ····· (V, M) Non-leak (10^{-6} Pa·m^3/s or less) ····· (V, M)

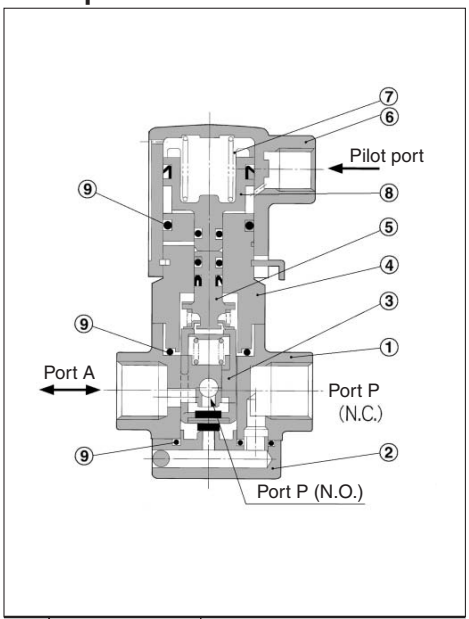
Note) Refer to page 17-3-14 “Applicable Fluids Check List” for details of special fluids outside of the standard options and specifications.

Model/Valve Specifications

Port size	Orifice size (mmø)	Model	Max. operating pressure differential (MPa)	Flow characteristics					Max. system pressure (MPa)	Proof pressure (MPa)	Weight (g)
				Water, Oil		Air					
				Av x 10^{-6} (m^2)	Cv converted	C [dm^3/(s·bar)]	b	Cv			
1/8 (6A)	1.5	**VXA3114**	1.0	1.9	0.08	0.29	0.32	0.08	1.0	1.5	280
	2.2	**VXA3124**	0.5	3.8	0.16	0.60	0.25	0.15			
	3	**VXA3134**	0.3	8.0	0.24	0.82	0.20	0.20			
1/4 (8A)	1.5	**VXA3114**	1.0	1.9	0.08	0.29	0.32	0.08			
	2.2	**VXA3124**	0.5	3.8	0.16	0.60	0.25	0.15			
		VXA3224	1.0	4.6	0.19	0.64	0.40	0.17			410
	3	**VXA3134**	0.3	8.0	0.24	0.82	0.20	0.20			280
		VXA3234	0.6	9.0	0.33	1.1	0.25	0.27			410
	4	**VXA3244**	0.3	12	0.50	1.6	0.20	0.38			
3/8 (10A)	2.2	**VXA3224**	1.0	4.6	0.19	0.64	0.40	0.17			
	3	**VXA3234**	0.6	9.0	0.33	1.1	0.25	0.27			
	4	**VXA3244**	0.3	12	0.50	1.6	0.20	0.38			

Note) Refer to “Glossary” on page 17-3-15 for details of max. operating pressure differential and max. system pressure.

Construction/ Principal Parts Material



No.	Description	Material	
		Standard	Option
①	Body assembly	Brass	Stainless steel
②	Retainer assembly	Brass	Stainless steel
③	Valve assembly	NBR, Polyacetal	FKM/EPDM Stainless steel
④	Adapter	Brass	Stainless steel
⑤	Travel assembly	Stainless steel, NBR, Polyacetal	FKM/EPDM Stainless steel
⑥	Pilot cover	Aluminum	—
⑦	Piston spring	Stainless steel	—
⑧	Piston assembly	Polyacetal, NBR	—
⑨	O-ring	NBR	FKM/EPDM

Operating Fluid and Ambient Temperature

Temperature conditions	Operating fluid temperature (°C)				Ambient temperature (°C)
	Water (Standard)	Air (Standard)	Oil (Standard)	Vacuum (3) (V, M)	
Maximum	40	60	40	40	40
Minimum	1	–5 (1)	–5 (2)	–5	–5

Note 1) Dew point: –5°C or less Note 2) 500 cSt or less
Note 3) “V”, “M” in parentheses are option symbols.

Tightness of Valve (Leak rate)

Seal material \ Fluid	Air	Liquid	Non-leak, Vacuum (2)
NBR, FKM, EPDM	1 cm^3/min or less	0.1 cm^3/min or less (1)	10^{-6}Pa·m^3/s or less

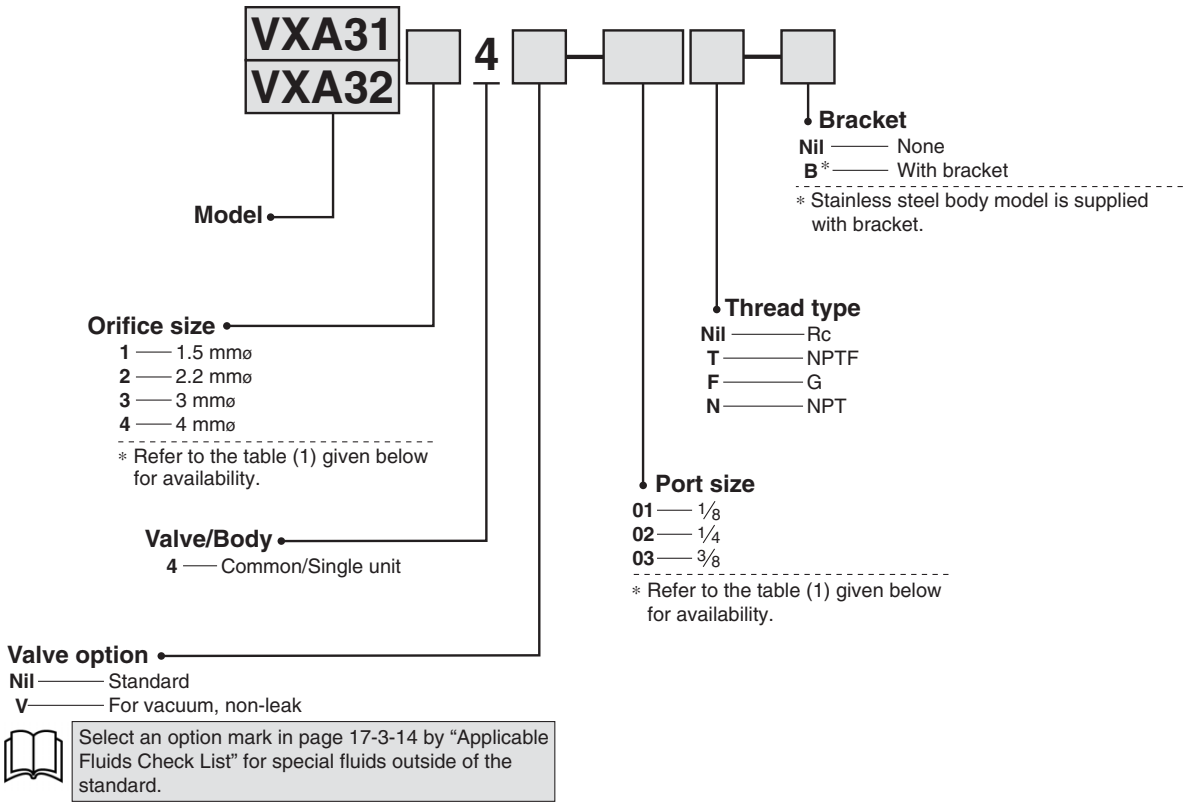
Note 1) Differs depending on the operating conditions such as pressure, etc.
Note 2) Value on option “V”, “M” (Non-leak, Vacuum).

Pilot Pressure

Model	Pressure (MPa)
VXA31□4 **VXA32□4**	0.25 to 0.7

The VX∗ series will be revised shortly.

How to Order



Select an option mark in page 17-3-14 by "Applicable Fluids Check List" for special fluids outside of the standard.

Table (1) Port/Orifice Size

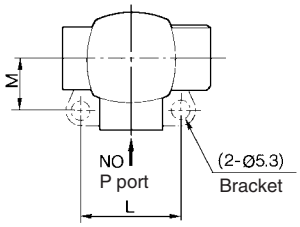
Valve (Port size)		Orifice size (No.)			
VXA31	**VXA32**	**1 (1.5 mmø)**	**2 (2.2 mmø)**	**3 (3 mmø)**	**4 (4 mmø)**
01 (1/8)	—	●	●	●	—
02 (1/4)	—	●	●	●	—
—	02 (1/4)	—	●	●	●
—	03 (3/8)	—	●	●	●

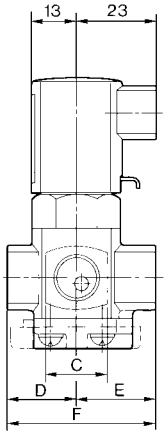
Ordering example

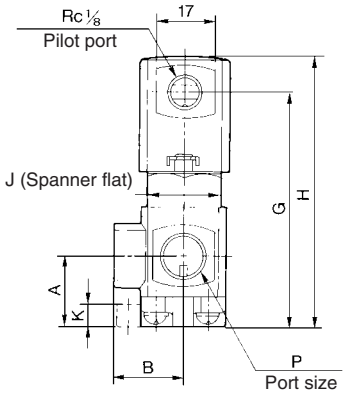
(Example) Series VXA31, Orifice size 1.5 mmø, Rc 1/8
(Part no.) **VXA3114-01**

The VX∗ series will be revised shortly.

Dimensions

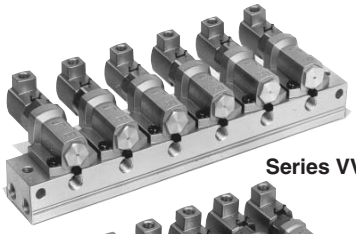






Model \ Symbol	P Port size Rc	A	B	C	D	E	F	G	H	J	With bracket K	With bracket L	With bracket M
VXA31	1/8, 1/4	19	20	18	20	22.5	42.5	71	81	21	6	29	14.5
VXA32	1/4, 3/8	25	20	21	20	27.5	47.5	80	90	27	7.5	32	17

Direct Air Operated 3 Port Valve/Manifold
For Air, Gas, Vacuum and Oil
Series VVXA31/32



Series VVXA32

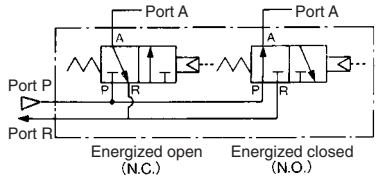
Series VVXA31

- **A wide variety of applicable fluids.**
  Combination of seal materials (NBR, FKM, or EPDM) can be selected freely, depending on the purpose.
- **Able to replace valves with the piping remained unchanged.**
- **N.C./N.O. switchover is easy.**
- **Weight-saving aluminum base and body.**
  (Not applicable to water or steam.)

Variations

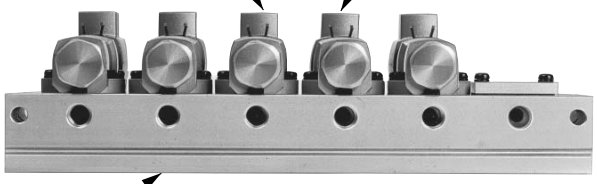
Valve

Common (C.O.)



Material

Base, Body — Aluminum
Seal material — NBR, FKM, EPDM



Manifold

Manifold — B mount
Manifold stations — 2 to 10 stations

Model

Manifold base model	Port A Rc	Port P Rc	Port R Rc
VVXA311-stations	1/8	1/4	1/4
VVXA312-stations	1/4		
VVXA321-stations	1/8		
VVXA322-stations	1/4		

The VX∗ series will be revised shortly.

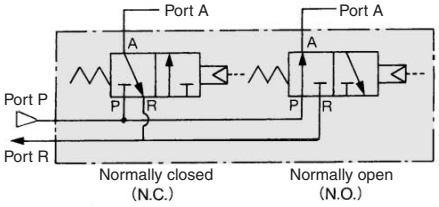
Common (C.O.)

Fluid

Standard specifications	Option Note)
Air (Standard, Dry) Vacuum (up to 1.3 x 10^2 Pa) Turbine oil Carbon dioxide (CO_2), Nitrogen gas (N_2)	Vacuum (up to 1.3 x 10^{-1} Pa)·····(V) Non-leak (10^{-6} Pa·m^3/s or less)····· (V) ⋮ Other

Note) Refer to page 17-3-14 "Applicable Fluids Check List" for details of special fluids outside of the standard options and specifications.

JIS Symbol



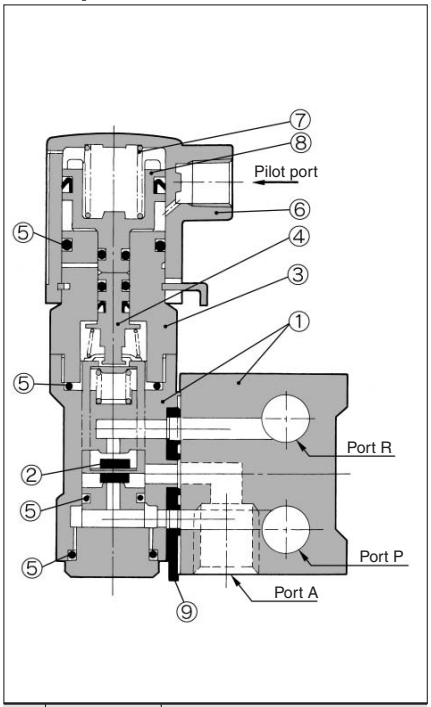
Manifold Specifications

Manifold	B Mount	
Manifold type	Common supply, Common exhaust, Individual out	
Number of valves	2 to 10 stations	
Blanking plate (with gasket, screws)	VVXA31	VX011-004
	VVXA32	VX011-005

Manifold Base And Applicable Valve Part No.

Manifold base	Individual port Rc	Applicable valve	Base weight (g)
VVXA311-stations	1/8	VXA31□5-00	n x 100 + 50
VVXA312-stations	1/4		
VVXA321-stations	1/8	VXA32□5-00	n x 160 + 70
VVXA322-stations	1/4		

Construction/ Principal Parts Material



No.	Description	Material	
		Standard	Option
①	Manifold body, Base	Aluminum	Brass (Base is made of aluminum.)
②	Valve assembly	NBR, Polyacetal	FKM/EPDM
③	Adapter	Aluminum	FKM/EPDM
④	Travel assembly	NBR, Polyacetal	FKM/EPDM
⑤	O-ring	NBR	FKM/EPDM
⑥	Pilot cover	Aluminum	—
⑦	Piston spring	Stainless steel	—
⑧	Piston	NBR, Polyacetal	—
⑨	Gasket	NBR	FKM/EPDM

Model/Valve Specifications

Orifice size (mmø)	Model	Max. operating pressure differential (MPa)	Flow characteristics					Max system pressure (MPa)	Proof pressure (MPa)	Weight (g)
			Oil		Air					
			Av x 10^{-6} (m^2)	Cv converted	C [dm^3/(s·bar)]	b	Cv			
1.5	**VXA3115-00**	1.0	1.9	0.08	0.29	0.32	0.08	1.0	1.5	150
2.2	**VXA3125-00**	0.5	3.8	0.16	0.60	0.25	0.15			
	VXA3225-00	1.0	4.6	0.19	0.64	0.40	0.17			230
3	**VXA3135-00**	0.3	8.0	0.24	0.82	0.20	0.20			150
	VXA3235-00	0.6	9.0	0.33	1.10	0.25	0.27			230
4	**VXA3245-00**	0.3	12	0.60	1.66	0.20	0.38			

Note) • Add the V type (VXA31) 80 g, (VXA32) 130 g
• Refer to "Glossary" on page 17-3-15 for details of max. operating pressure differential and max. system pressure.

Operating Fluid and Ambient Temperature

Temperature conditions	Operating fluid temperature (°C)			Ambient temperature (°C)
	Air (Standard)	Oil (Standard)	Vacuum (3) (V)	
Maximum	60	40	40	40
Minimum	–5 (1)	–5 (2)	–5	–5

Note 1) Dew point: –5°C or less
Note 2) 500 cSt or less
Note 3) "V" in parentheses is option symbol.

Tightness of Valve (Leak rate)

Fluid / Seal material	Air	Liquid	Non-leak, Vacuum (2)
NBR, FKM, EPDM	1 cm^3/min or less	0.1 cm^3/min or less (1)	10^{-6} Pa·m^3/s or less

Note 1) Differs depending on the operating conditions such as pressure, etc.
Note 2) Value on option "V" (Non-leak, Vacuum).

Pilot Pressure

Model	Pressure (MPa)
VXA31□5 **VXA32□5**	0.25 to 0.7

The VX∗ series will be revised shortly.

How to Order

VXA31
VXA32 □ **5** □ — **00**

Model

Orifice size
1 — 1.5 mmø
2 — 2.2 mmø
3 — 3 mmø
4 — 4 mmø
∗ Refer to the table (1) given below for availability.

Valve/Body
5 — Common/For manifold

Valve option
Nil — Standard specifications
V — For vacuum, non-leak

Select an option mark in page 17-3-14 by "Applicable Fluids Check List" for special fluids outside of the standard.

Connection
00 — No connection screw/For manifold

Table (1) Orifice Size

Model	Orifice size (No)			
	1 (1.5 mmø)	2 (2.2 mmø)	3 (3 mmø)	4 (4 mmø)
VXA31	●	●	●	—
VXA32	—	●	●	●

How to Order Manifold Base

VVXA31
VVXA32 □ □

Manifold base

Symbol	Applicable valve
VVXA31	VXA31□5-00
VVXA32	VXA32□5-00

Number of stations
02 — 2 stations
:
10 — 10 stations

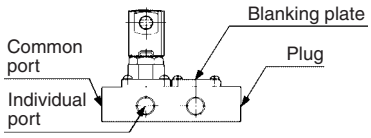
Port size (Individual port)
1 — Rc 1/8
2 — Rc 1/4
∗ All common ports are Rc 1/4.
The common SUP is indicated as "P" on the common port and the individual SUP is indicated as "R".

How to Order Manifold

■ **Write both the base part number and the solenoid valve to be mounted or blanking plate part number.**
(Example)
7 stations of VXA31, Individual port Rc 1/8

(Base P/N) VXA311-07····· 1 pc
(Valve P/N) VXA3115-00····· 6 pcs
(Blanking plate P/N) VX011-004·····1 pc

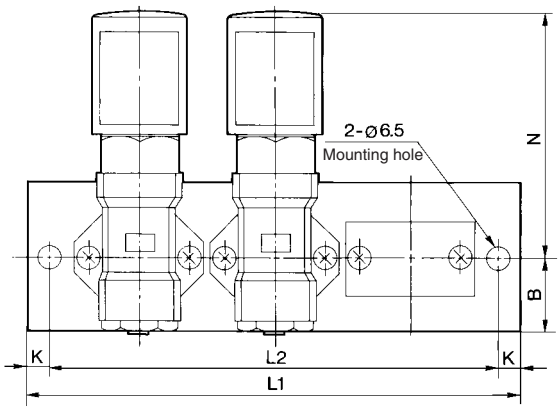
■ **Arrangement of solenoid valves**

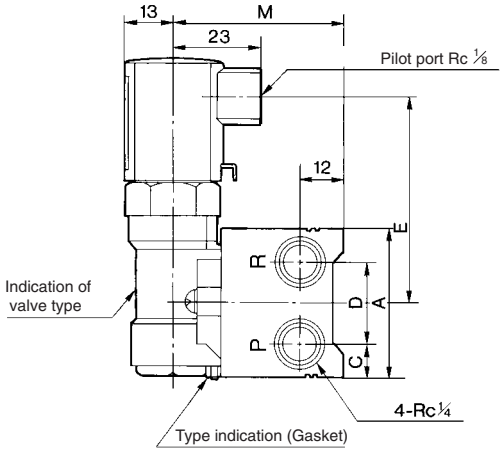


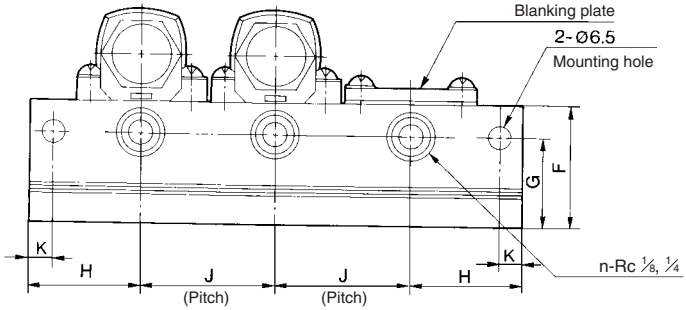
The standard arrangement of manifolds should be placed on an individual port on this side, each solenoid valve from the left side and a blank plate in the right side. The right side of the common port provides plug.

The VX∗ series will be revised shortly.

Dimensions







Model \ Stations / Symbol		2	3	4	5	6	7	8	9	10
VVXA31	L1	96	132	168	204	240	276	312	348	384
	L2	84	120	156	192	228	264	300	336	372
VVXA32	L1	126	172	218	264	310	356	402	448	494
	L2	108	154	200	246	292	338	384	430	476

Model \ Symbol	A	B	C	D	E	F	G	H	J	K	M	N
VVXA31	40	20	9	22	59	33	24	30	36	6	45.5	69
VVXA32	44	22	10	24	66	34	25	40	46	9	50.5	76