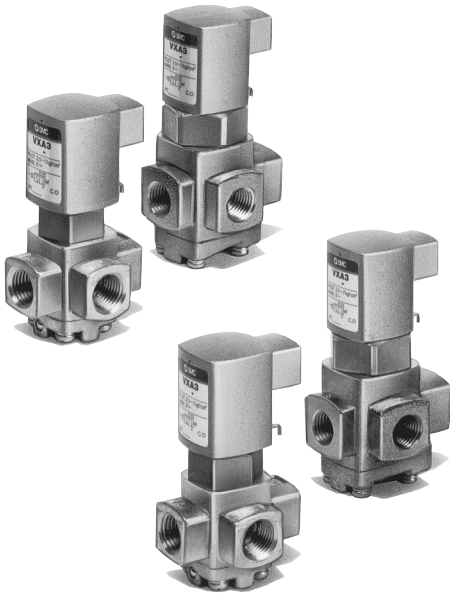


Direct Air Operated 3 Port Valve

# Series VXA31/32

For Air, Gas, Vacuum, Water and Oil



- Proper selection of body and sealing materials permits application of a wide variety of fluids.

Application can be matched by simply choosing body material (Brass or Stainless steel) and seal material (NBR, FPM or EPR).

- C.O. style easy to use; operatable as either N.C. or N.O.
- Easy to disassemble and reassemble in a short time.
- Compatible with high viscosity fluids (500cSt).

VX  
VN□  
VQ

## Variations

Common (C.O.)

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

Connecting port size — Rc(PT) 1/8  
Pilot pressure — 0.25 to 0.7 (MPa)

● **Material**

Body	— Brass, Stainless steel
Seal	— NBR, FPM, EPR

**Model**

Model	Connecting port size Rc(PT)	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

## Common (C.O.)

### Applicable Fluids

Standard	Option (1)
Water (Standard, Up to 40°C) Air (Standard, Dry), Turbine oil, Vacuum (Up to 1 Torr), Carbon dioxide (CO <sub>2</sub> ), Nitrogen gas (N <sub>2</sub> ), Freon11, 113, 114	Vacuum (Up to 10 <sup>-3</sup> Torr) ..... (V, M) Non-leak (10 <sup>-5</sup> atm cc/sec or less)..... (V, M)



Note 1) Refer to p.4.0-13 "Applicable Fluid Check List" for detail of a special fluid out of the standard and the option specifications.

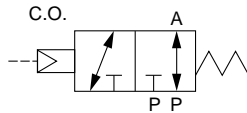
### Model/Valve Specifications

Port size Rc(PT)	Orifice size (mmø)	Flow rate		Model	Max. operating pressure differential (MPa)	Max. system pressure (MPa)	Proof pressure (MPa)	Weight (g)		
		Cv	Effective orifice (mm <sup>2</sup> )							
1/8 (6A)	1.5	0.08	1.4	VXA3114	1.0	1.0	1.5	280		
	2.2	0.16	2.8	VXA3124	0.5					
	3	0.24	4.3	VXA3134	0.3					
1/4 (8A)	1.5	0.08	1.4	VXA3114	1.0			1.0	1.5	410
	2.2	0.16	2.8	VXA3124	0.5					
		0.19	3.4	VXA3224	1.0					
	3	0.24	4.3	VXA3134	0.3					
		0.33	6	VXA3234	0.6					
4	0.5	9	VXA3244	0.3						
3/8 (10A)	2.2	0.19	3.4	VXA3224	1.0	1.0	1.5			410
	3	0.33	6	VXA3234	0.6					
		4	0.5	9	VXA3244					

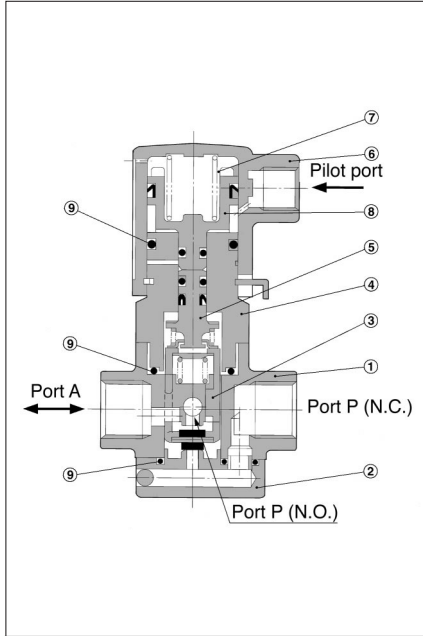


Note 1) Refer to p.4.0-14 the glossary for detail of max.operating pressure differential and max. system pressure.

### Symbol



### Construction/Components



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

### Ambient and Fluid Temperature

Temperature	Fluid temperature °C				Ambient temperature °C
	Water (Standard)	Air (Standard)	Oil (Standard)	Vacuum <sup>(3)</sup> (V, M)	
Max.	40	60	40	40	40
Min.	1	-5 <sup>(1)</sup>	-5 <sup>(2)</sup>	-5	-5

Note 1) Dew point: -10°C or less. Note 2) 500cSt or less.  
Note 3) "V", "M" in the parenthesis are option symbols.

### Tightness of Valve(Leakage)

Seal	Fluid	Air	Liquid	Non-leak, Vacuum <sup>(2)</sup>
	NBR, FPM, EPR		≤1cm <sup>3</sup> /min	≤0.1cm <sup>3</sup> /min <sup>(1)</sup>

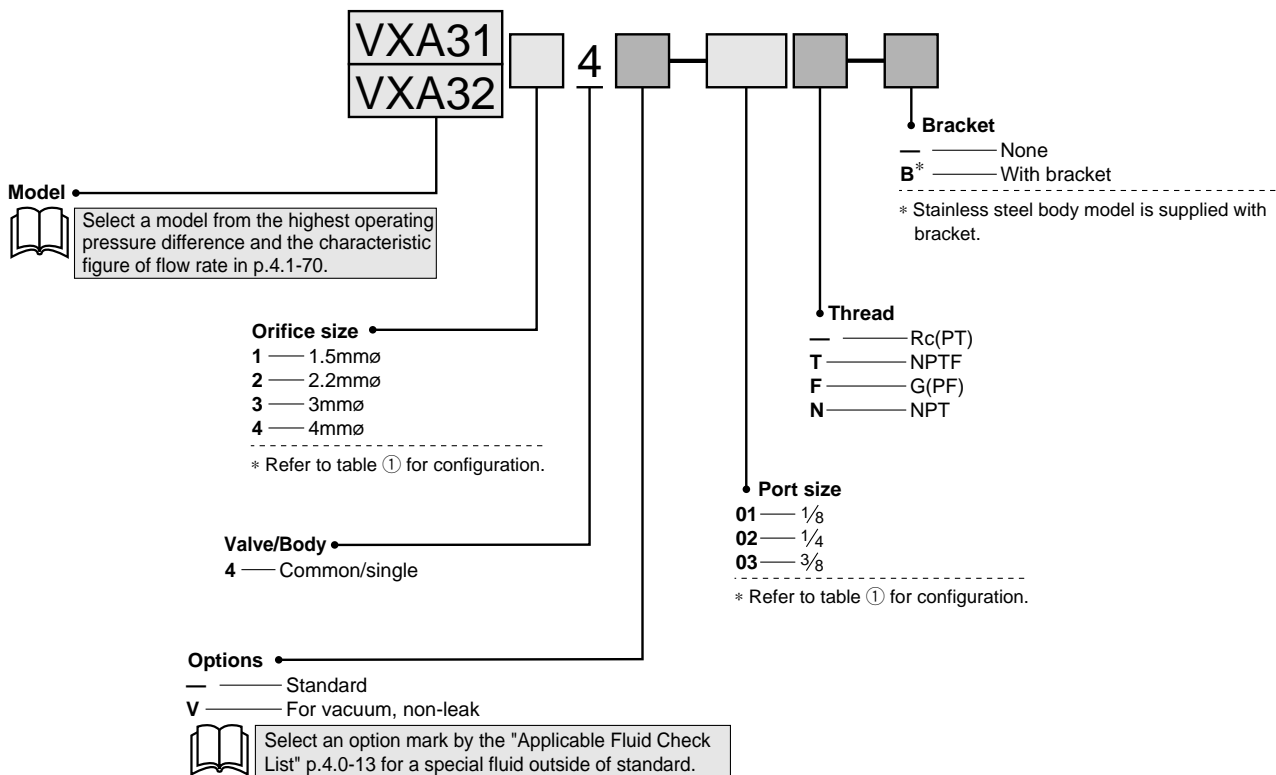


Note 1) Differ from the operating condition of pressure.  
Note 2) Value on option "V", "M" (Non-leak, Vacuum).

### Pilot Pressure

Model	Pressure MPa
VXA31□4 VXA32□4	0.25 to 0.7

## How to Order



**Table ① Port/Orifice Size**

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

### Ordering Example

(Example) Series VXA31, Orifice size 1.5mmø, Rc(PT)1/8  
 (Part number) **VXA3114-01**

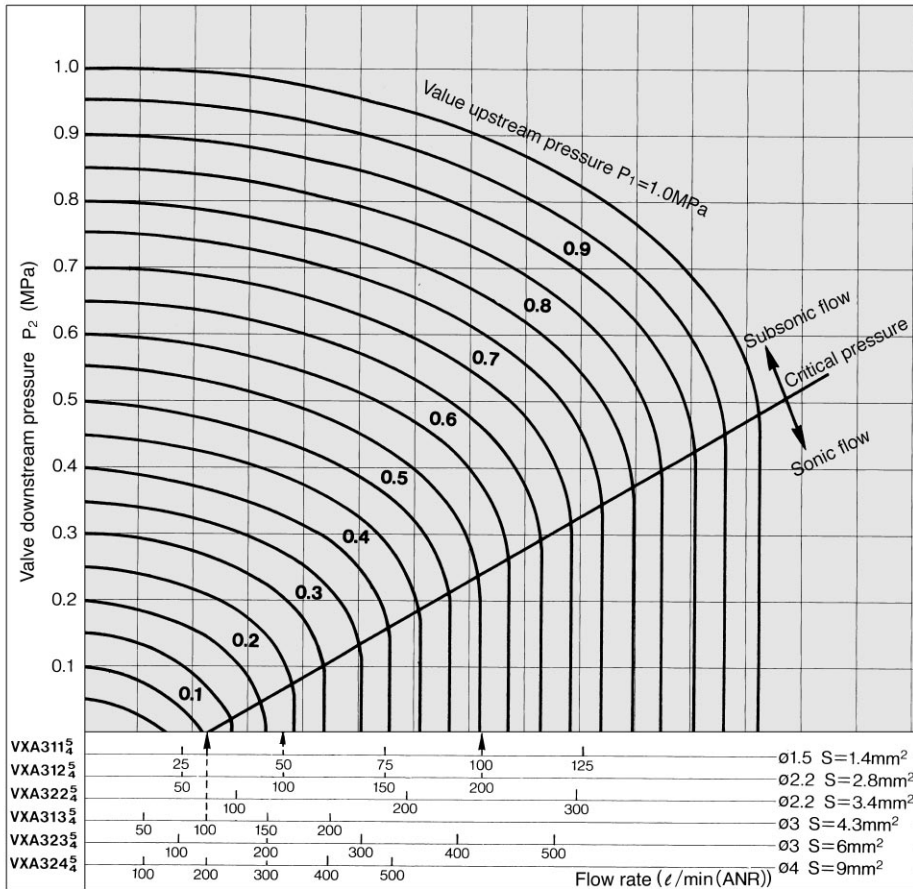
**VX**

VN□

VQ

# VXA31/32

## Air



### How to Read the Graph

In the sonic flow region:

For a flow of 100 l/min.(ANR)

Orifice  $\varnothing 3$  (VXA313 $\frac{5}{4}$ )..... $P_1 \cong 0.1 \text{ MPa}$

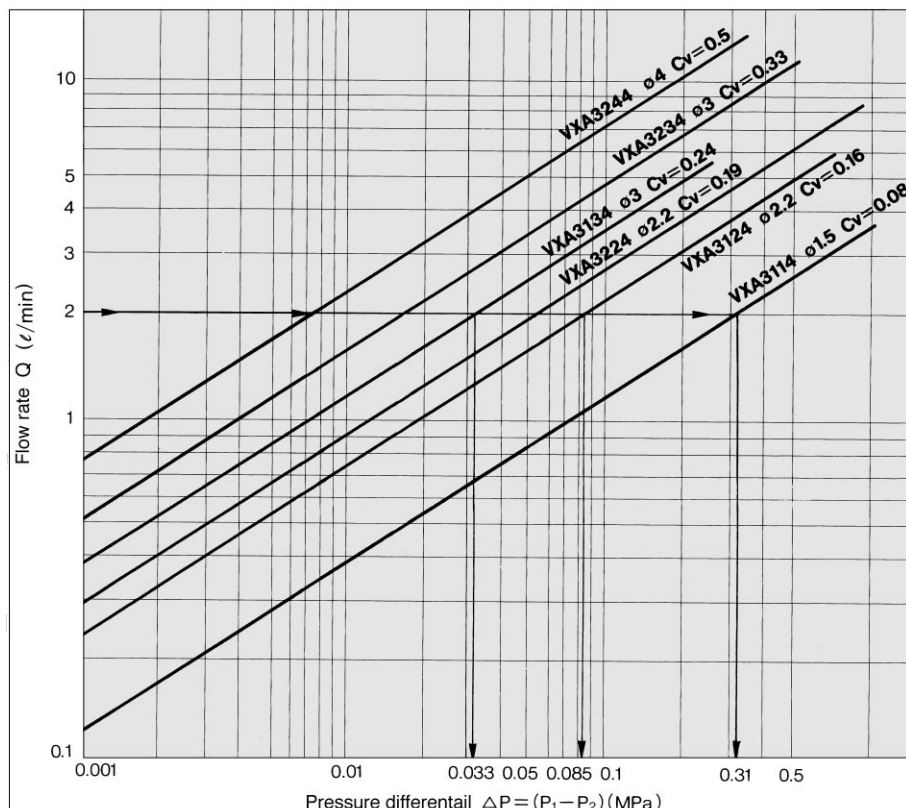
Orifice  $\varnothing 2.2$  (VXA312 $\frac{5}{4}$ )..... $P_1 \cong 0.23 \text{ MPa}$

Orifice  $\varnothing 1.5$  (VXA311 $\frac{5}{4}$ )..... $P_1 \cong 0.55 \text{ MPa}$

### How to Calculate Flow/Air

- Equation in the domain of subsonic flow  
 $P_1 + 0.1013 = (1 \text{ to } 1.8941)(P_2 + 0.1013)$ 
  - Calculation by Cv factor  
 $Q = 4073.4 \cdot C_v \cdot \sqrt{\Delta P (P_2 + 0.1013)}$  ..... l/min(ANR)
  - Calculation by effective area  
 $Q = 226.3 \cdot S \cdot \sqrt{\Delta P (P_2 + 0.1013)}$  ..... l/min(ANR)
- Equation in the domain of sonic flow  
 $P_1 + 0.1013 \geq 1.8941(P_2 + 0.1013)$ 
  - Calculation by Cv factor  
 $Q = 1972.8 \cdot C_v \cdot (P_1 + 0.1013)$  ..... l/min(ANR)
  - Calculation by effective area  
 $Q = 109.6 \cdot S \cdot (P_1 + 0.1013)$  ..... l/min(ANR)

## Water



### How to Read the Graph

In case of a flow of 2 l/min.

Orifice  $\varnothing 3$  valve (VXA3134).... $\Delta P \cong 0.033 \text{ MPa}$

Orifice  $\varnothing 2.2$  valve (VXA3124).... $\Delta P \cong 0.085 \text{ MPa}$

Orifice  $\varnothing 1.5$  valve (VXA3114).... $\Delta P \cong 0.31 \text{ MPa}$

### How to Calculate Flow/Water

- Calculation by Cv factor  
 $Q = 14.2 \cdot C_v \cdot \sqrt{10.2 \cdot \Delta P}$  ..... l/min
- Calculation by effective area [Smm<sup>2</sup>]  
 $Q = 0.8 \cdot S \cdot \sqrt{10.2 \cdot \Delta P}$  ..... l/min

Q : Flow (Air l/min(ANR)), (Steam kg/h), (Water l/min)

$\Delta P$ : Pressure differential ( $P_1 - P_2$ )

$P_1$  : Upstream pressure (MPa)

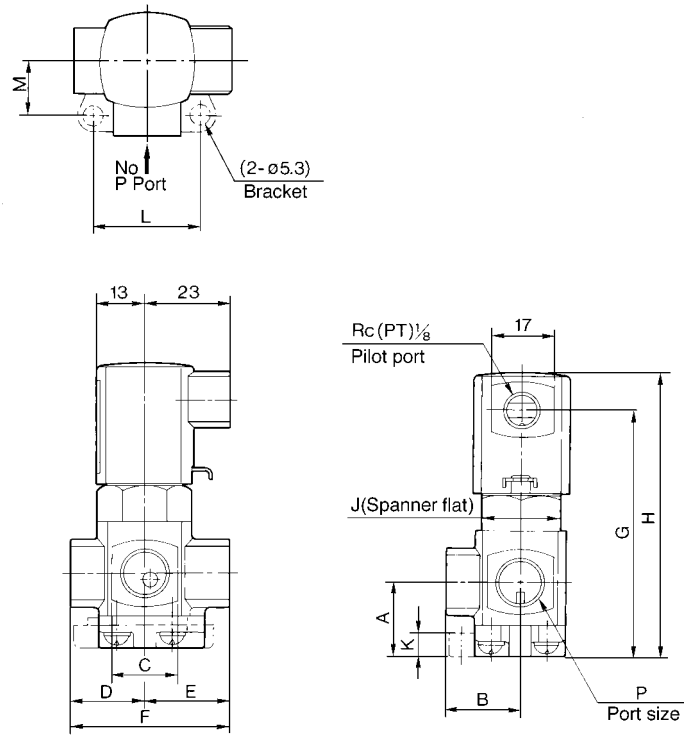
$P_2$  : Downstream pressure (MPa)

$\theta$  : Fluid temperature ( $^{\circ}\text{C}$ )

S : Effective area (mm<sup>2</sup>)

Cv : Cv factor (l)

## Dimensions



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

VX  
VN□  
VQ

Direct Air Operated  
3 Port Valve/Manifold

# Series VVXA31/32

For Air, Gas, Vacuum and Oil



Compatible with a wide variety of fluids.

Application can be matched by simply choosing the correct seal material (NBR, FPM or EPR).

It is possible to replace valve without changing existing piping.

Configuration can be changed from N.C. to N.O., and from N.O. to N.C. easily.

Weight-saving aluminum base and body.

(Not applicable to water or steam.)

## Variations

**Valve**

**Manifold**

Manifold style — B mount  
Manifold stations — 2 to 10 stations

**Material**

Base, Body — Aluminum  
Seal — NBR, FPM, EPR

**Model**

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

VX  
VN□  
VQ

# VVXA31/32

## Common (C.O.)

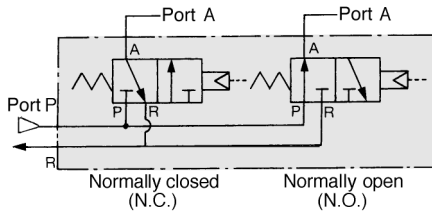
### Applicable Fluids

Standard	Option <sup>(1)</sup>
Air (Standard, Dry), Vacuum (Up to 1 Torr), Turbine oil, Carbon dioxide (CO <sub>2</sub> ), Nitrogen gas (N <sub>2</sub> ) Freon 11, 113, 114	Vacuum (Up to 10 <sup>-3</sup> Torr) ..... (V) Non-leak or less (10 <sup>-5</sup> atm cc/sec or less) ..... (V) ..... Others

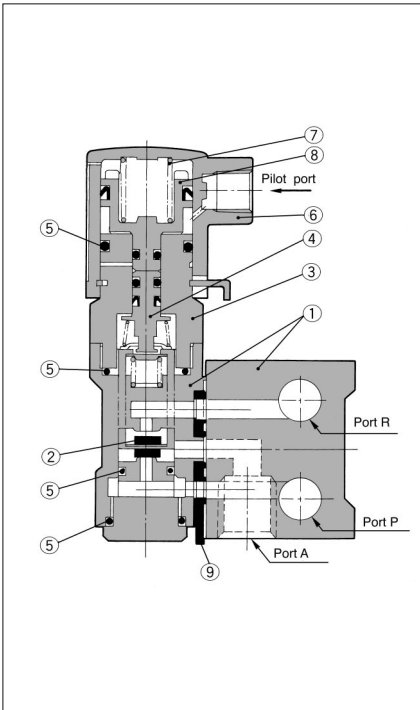


Note 1) Refer to p.4.0-13 "Applicable Fluid Check List" for detail of a special fluid out of the standard and the option specifications.

### Symbol



### Construction/Components



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

### Manifold Specifications

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

### Manifold Base and Applicable Valve

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

### Model/Valve Specifications

Orifice size (mmø)	Flow rate		Model	Max. operating pressure differential (MPa)	Max. system pressure (MPa)	Proof pressure (MPa)	Weight <sup>(1)</sup> (g)
	Cv	Effective area (mm <sup>2</sup> )					
1.5	0.08	1.4	<b>VXA3115-00</b>	1.0	1.0	1.5	150
	0.16	2.8	<b>VXA3125-00</b>	0.5			
2.2	0.19	3.4	<b>VXA3225-00</b>	1.0			
	0.24	4.3	<b>VXA3135-00</b>	0.3			
3	0.33	6	<b>VXA3235-00</b>	0.6			
	0.5	9	<b>VXA3245-00</b>	0.3			



Note 1) •Add the V type (VXA31) 80g, (VXA32)130g.  
•Refer to p.4.0-14 the glossary for detail of max. operating pressure and max. system.

### Ambient and Fluid Temperature

Temperature	Fluid temperature °C			Ambient temperature °C
	Air (Standard)	Oil (Standard)	Vacuum <sup>(3)</sup> (V)	
Max.	60	40	40	40
Min.	-5 <sup>(1)</sup>	-5 <sup>(2)</sup>	-5	-5



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

### Tightness of Valve(Leakage)

Seal	Fluid	Air	Liquid	Non-leak, Vacuum <sup>(2)</sup>
	NBR, FPM, EPR		≤1 cm <sup>3</sup> /min	≤0.1 cm <sup>3</sup> /min <sup>(1)</sup>



Note 1) Differ from the operating condition of pressure.  
Note 2) Value on option "V" (Non-leak, Vacuum).

### Pilot Pressure

Model	Pressure MPa
<b>VXA31□5</b> <b>VXA32□5</b>	0.25 to 0.7

## How to Order/Manifold

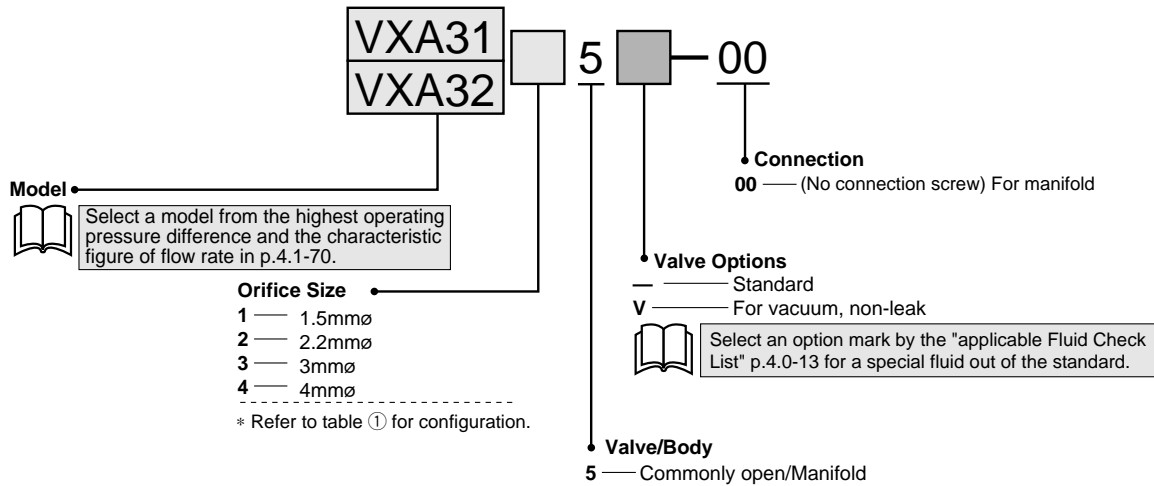
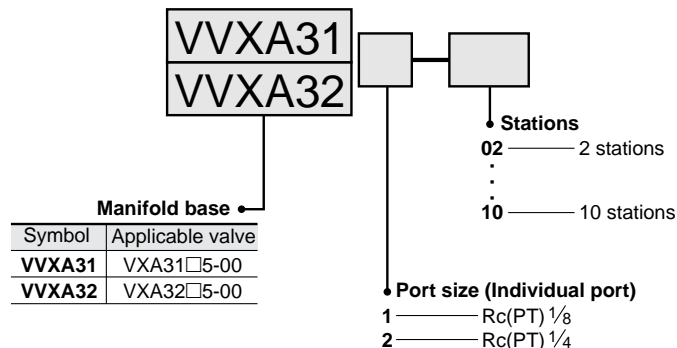


Table ① Orifice Size

Model	Orifice size (No.)			
	1 (1.5mm $\varnothing$ )	2 (2.2mm $\varnothing$ )	3 (3mm $\varnothing$ )	4 (4mm $\varnothing$ )
VXA31	●	●	●	—
VXA32	—	●	●	●

## How to Order Manifold Base



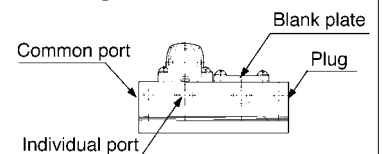
\* All common ports are Rc(PT) 1/4.  
The common SUP is indicated as "P" on the common port and the individual SUP is indicated as "VAC".

### Write both the base style and the style of valve or blank plate manifold.

(Example) 7stations of VXA31, Individual port Rc(PT)1/8

(Base) VXA311-07..... 1 pc  
(Valve) VXA3115-00..... 6 pcs.  
(Blank plate) 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.

VX

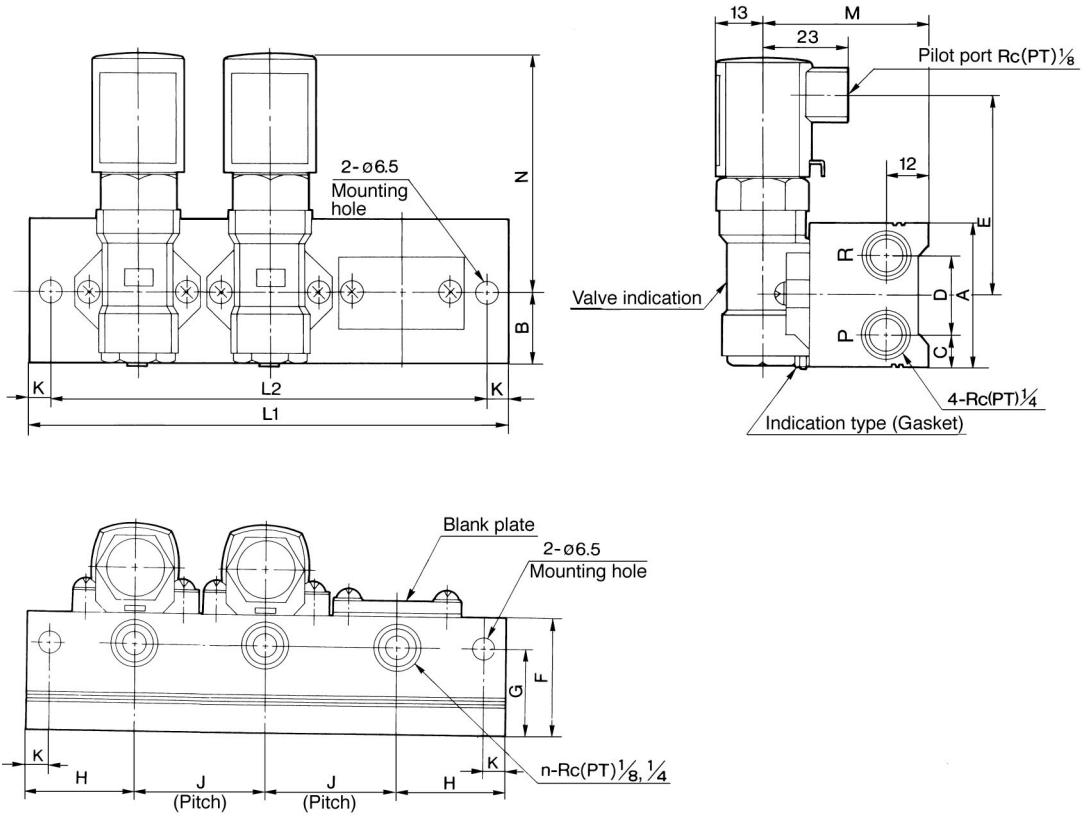
VN□

VQ



# VVXA31/32

## Dimensions



Model	L	Stations									
		2	3	4	5	6	7	8	9	10	
<b>VVXA31</b>	L1	96	132	168	204	240	276	312	348	384	
	L2	84	120	156	192	228	264	300	336	372	
<b>VVXA32</b>	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
		<b>VVXA31</b>	40	20	9	22	59	33	24	30	36	6	45.5
<b>VVXA32</b>	44	22	10	24	66	34	25	40	46	9	50.5	76	