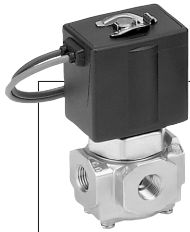


Direct Operated 3 Port Solenoid Valve Series VX31/32/33

For Air, Water, Oil, Steam

Specifications



Single Unit

Valve

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

Solenoid Coil

Coil: Class B, Class H

Rated Voltage

100 VAC, 200 VAC, 110 VAC,
220 VAC, 240 VAC, 230 VAC,
48 VAC, 24 VDC, 12 VDC

Material

Body — C37, Stainless steel
Seal — NBR, FKM, EPDM, PTFE, FFKM

Electrical Entry

- Grommet
- Conduit
- DIN terminal
- Conduit terminal



Normally Closed (N.C.) /
Normally Open (N.O.) /
Common (COM.)

Model	VX31	VX32	VX33
Orifice dia.			
1.5 mmø	●	—	—
2.2 mmø	●	●	●
3 mmø	●	●	●
4 mmø	—	●	●
Port size	1/8 1/4	1/4 3/8	1/4 3/8

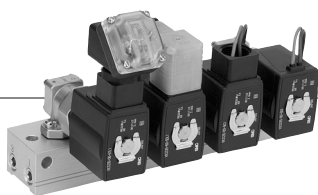
For Air

For Water

For Oil

For Steam

For Vacuum Pad



Manifold

Valve

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

Base

Common SUP/EXH type

Solenoid Coil

Coil: Class B, Class H

Rated Voltage

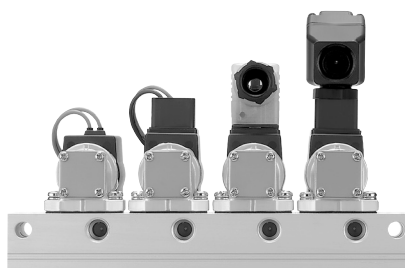
100 VAC, 200 VAC, 110 VAC,
220 VAC, 240 VAC, 230 VAC,
48 VAC, 24 VDC, 12 VDC

Material

Body — C37
Base — Aluminum
Seal — NBR, FKM, EPDM

Electrical Entry

- Grommet
- Conduit
- DIN terminal
- Conduit terminal



Normally Closed (N.C.) /
Normally Open (N.O.) /
Common (COM.)

Model	VX31	VX32	VX33
Orifice dia.			
1.5 mmø	●	—	—
2.2 mmø	●	●	●
3 mmø	●	●	●
4 mmø	—	●	●
(Common SUP/EXH type) Port size	IN port	1/4	
	OUT port	1/8, 1/4	
	EXH port	1/4	

Construction

Dimensions

Common Specifications

Standard Specifications

Valve specifications	Valve construction		Direct operated poppet
	Withstand pressure (MPa)		3.0
	Body material		C37, Stainless steel
	Seal material		NBR, FKM, EPDM, PTFE, FFKM
	Enclosure		Dusttight, Low jetproof (equivalent to IP65)*
	Environment		Location without corrosive or explosive gases
Coil specifications	Rated voltage	AC (Class B coil, Built-in full-wave rectifier type)	100 VAC, 200 VAC, 110 VAC, 220 VAC, 230 VAC, 240 VAC, 48 VAC
		AC (Class H coil)	
		DC	
	Allowable voltage fluctuation		24 VDC, 12 VDC ±10% of rated voltage
	Allowable leakage voltage	AC (Class B coil, Built-in full-wave rectifier type)	5% or less of rated voltage
		AC (Class H coil)	20% or less of rated voltage
		DC	2% or less of rated voltage
Coil insulation type		Class B, Class H	

* Electrical entry, Grommet with surge voltage suppressor (GS) has a rating of IP40.

Solenoid Coil Specifications

DC Specification

Model	Power consumption (W)	Temperature rise (C) ^{Note)}
VX31	4.5	45
VX32	7	45
VX33	10.5	60

Note) The values are for an ambient temperature of 20°C and at the rated voltage.

AC Specification (Class B coil, Built-in full-wave rectifier type)

Model	Apparent power (VA)*	Temperature rise (C) ^{Note)}
VX31	7	55
VX32	9.5	60
VX33	12	65

* There is no difference in the frequency and the inrush and energized apparent power, since a rectifying circuit is used in the AC (Class B).

Note) The values are for an ambient temperature of 20°C and at the rated voltage.

AC Specification (Class H coil)

Model	Frequency (Hz)	Apparent power (VA)		Temperature rise (C) ^{Note)}
		Inrush	Energized	
VX31	50	33	14	65
	60	28	12	60
VX32	50	65	33	100
	60	55	27	95
VX33	50	94	50	120
	60	79	41	115

Note) The values are for an ambient temperature of 20°C and at the rated voltage.

Applicable Fluid Check List

All Options (Single Unit)

VX3 ⁰
 ₂ - - ¹ -
 ₄

Option symbol

Fluid and application	Option symbol	Seal material		Body material/ Shading coil material ^{Note 6)}	Guide pin material	Coil insulation type ^{Note 4)}	Note
		Main valve poppet	Fixed sealant				
Air	Nil	NBR	NBR	C37	PPS	B	
	G			Stainless steel			
Medium vacuum, Non-leak, Oil-free	M ^{Note 1, 2)}	FKM	FKM	Stainless steel	PPS	B	
	V ^{Note 1, 2)}			C37			
Water	Nil	NBR	NBR	C37	PPS	B	
	G			Stainless steel			
Heated water	E	EPDM	EPDM	C37/Cu	Stainless steel	H	—
	P			Stainless steel/Ag			
Oil ^{Note 3)}	A	FKM	FKM	C37	PPS	B	
	H			Stainless steel			
	D			C37/Cu	Stainless steel	H	
	N			Stainless steel/Ag			
Steam (Max.183°C)	S	FFKM	PTFE	C37/Cu	Stainless steel	H	COM. only
	Q			Stainless steel/Ag			
Copper-free, Fluoro-free ^{Note 5)}	J	EPDM	EPDM	Stainless steel	PPS	B	—
	P			Stainless steel/Ag			
Others	B	EPDM	EPDM	C37	PPS	B	COM. only
	C			Stainless steel			
	K ^{Note 1, 2)}	FFKM	PTFE	Stainless steel	Stainless steel	B	COM. only, Oil-free

* If using for other fluids, please consult with SMC.

All Options (Manifold)*

VX3 ¹
 ₃ - 00 - ¹
 ₅

Option symbol

Fluid and application	Option symbol	Seal material		Body material/ Shading coil material ^{Note 6)}	Guide pin material	Coil insulation type ^{Note 4)}
		Main valve poppet	Fixed sealant			
Air	Nil	NBR	NBR	C37	PPS	B
Medium vacuum, Non-leak, Oil-free	V ^{Note 1, 2)}	FKM	FKM	C37	PPS	B
Oil ^{Note 3)}	A	FKM	FKM	C37	PPS	B
	D			C37/Cu		
Others	B	EPDM	EPDM	C37	PPS	B
	E			C37/Cu		

* Aluminum is only available with the material for a manifold base.

* If using for other fluids, please consult with SMC.

Note 1) The leakage amount (10⁻⁶ Pa·m³/s) of "V", "M" options are values when differential pressure is 0.1 MPa.

Note 2) "V", "M" and "K" options are for oil-free treatment.

Note 3) The dynamic viscosity of the fluid must not exceed 50 mm²/s or less.

Note 4) Coil insulation type Class H: AC spec. only, Class B/AC spec.: built-in full-wave rectifier type only

Note 5) The nuts (non-welded parts) are nickel plated on the C37 material.

Note 6) There is no shading coil attached to DC spec. or Class B/AC spec.

Specifications

For Air

For Water

For Oil

For Steam

For Vacuum Pad

Construction

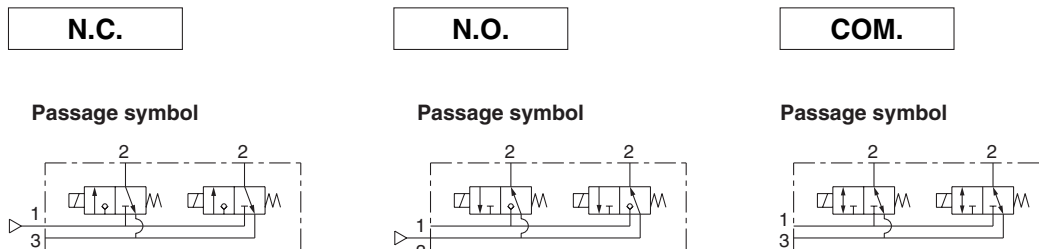
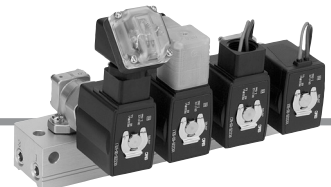
Dimensions

Series VVX31/32/33

For Air /Manifold

(Inert gas, Non-leak, Medium vacuum)

Solenoid Valve for Manifold / Valve Specifications



Orifice diameter (mmø)	Model	Max. operating pressure differential (MPa)			Flow characteristics			Max. system pressure (MPa)
		N.C.	N.O.	COM.	C[dm ³ /(s·bar)]	b	Cv	
1.5	VX311□-00	1	1	0.7	0.29	0.32	0.08	2.0
2.2	VX312□-00	0.7	0.5	0.4	0.60	0.25	0.15	
	VX322□-00	1.2	1	0.7				
3	VX332□-00	1.6	1.6	1	0.64	0.40	0.17	
	VX313□-00	0.3	0.3	0.2				
	VX323□-00	0.6	0.5	0.3				
4	VX333□-00	1	0.9	0.6	1.1	0.25	0.27	
	VX324□-00	0.3	0.25	0.2	1.6	0.20	0.38	
VX334□-00	0.5	0.4	0.3					

Refer to "Glossary" on page 31 for details on the max. operating pressure differential and the max. system pressure.

Fluid and Ambient Temperature

Power source	Fluid temperature (°C)		Ambient temperature (°C)
	Solenoid valve option (symbol)		
	Nil	V	
AC	-10 ^{Note)} to 60	-10 ^{Note)} to 40	-20 to 60
DC	-10 ^{Note)} to 60	-10 ^{Note)} to 40	-20 to 40

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

Valve Leakage

Internal Leakage / External Leakage

Seal material	Max. operating pressure differential	Leakage rate	
		Air	Non-leak, Medium vacuum ^{Note)}
NBR, FKM	From 0 to less than 1 MPa	1 cm ³ /min or less	10 ⁻⁶ Pa·m ³ /sec or less
	1 MPa or more	2 cm ³ /min or less	

Note) The leakage amount (10⁻⁶ Pa·m³/sec) for the "V" option are values when the differential pressure is 0.1 MPa.

How to Order (Solenoid Valve for Manifold)

DC

AC/Class B coil (Built-in full-wave rectifier type)

Model
Refer to Table (1) shown below for availability.

Valve / Body type

1	N.C. / Manifold
3	N.O. / Manifold
5	COM. / Manifold

Rated voltage

1	100 VAC 50/60 Hz	6	12 VDC
2	200 VAC 50/60 Hz	7	240 VAC 50/60 Hz
3	110 VAC 50/60 Hz	8	48 VAC 50/60 Hz
4	220 VAC 50/60 Hz	J	230 VAC 50/60 Hz
5	24 VDC		

* Refer to Table (3) shown below for availability.

Refer to page 23 for ordering coil only.

VX 31 1 1 □ □ - 00 - 5 G 1

VX 31 1 1 □ □ - 00 - 1 GR1

Orifice diameter
Refer to Table (1) shown below for availability.

Solenoid valve option
Refer to Table (2) shown below for availability.

Suffix

Nil	—
Z	Oil-free spec.

Built-in full-wave rectifier type

Electrical entry (AC/DC)

G -Grommet
GS-With grommet surge voltage suppressor

C -Conduit

T -With conduit terminal
TS-With conduit terminal and surge voltage suppressor
TL -With conduit terminal and light
TZ -With conduit terminal, surge voltage suppressor and light

D -DIN terminal
DS -DIN terminal with surge voltage suppressor
DL -DIN terminal with light
DZ -DIN terminal with surge voltage suppressor and light
DO -For DIN terminal (without connector, gasket is included.)

* DIN type is available with class B only.

Specifications

For Air

For Water

For Oil

For Steam

For Vacuum Pad

How to Order Manifold Bases

VVX31
VVX32 1 □ - 07 1
VVX33

Number of manifolds

02	2 stations
⋮	⋮
10	10 stations

Port size (Individual port)

1	Rc 1/8
2	Rc 1/4

* Common port sizes are all Rc 1/4.
* Indicating numbers shown below are for common ports.

Type	SUP port	EXH port
N.C.	1	3
N.O.	3	1

Suffix

Nil	—
Z	Oil-free spec.

Manifold base

Blanking plate part no.

For VX31 VVX31-4A-□
For VX32/33: VVX32-4A-□

Seal material

Nil	NBR
F	FKM

How to Order Manifold Assemblies (Example)

Enter the valve and blanking plate to be mounted under the manifold base part number.

Example
VVX311-05-1 1 set “*” is the symbol for mounting.
* VX3111-00-1GR1 ... 4 sets Add an “*” in front of the part numbers for solenoid valves, etc. to be mounted.
* VVX31-4A 1 set

Enter the product's part number in order, counting the 1st station from the left in the manifold arrangement, when viewing the individual port in front. The common port on the

* Refer to Table (3) for available combinations between each electrical option (S, L, Z) and rated voltage.
* Surge voltage suppressor is integrated into the AC/Class B coil, as a standard.

Table (1) Model Orifice Diameter

Solenoid valve model	Orifice symbol (diameter)			
	1 (1.5 mmø)	2 (2.2 mmø)	3 (3 mmø)	4 (4 mmø)
VX31	●	●	●	—
VX32	—	●	●	●
VX33	—	●	●	●

Table (2) Solenoid Valve Option

Option symbol	Seal material		Body material	Guide pin material	Coil insulation type	Note (Note)
	Main valve poppet	Fixed sealant				
Nil	NBR	NBR	C37	PPS	B	—
V	FKM	FKM				Non-leak (10 ⁻⁶ Pa·m ³ /sec), Medium vacuum (0.1 Pa.abs), Oil-free

* Aluminum is only available as a material for the manifold base.

Note) The leakage amount (10⁻⁶ Pa·m³/sec) for the “V” option are values when the differential pressure is 0.1 MPa.

Table (3) Rated Voltage Electrical Option

Rated voltage			Class B		
AC/DC	Voltage symbol	Voltage	S With surge voltage suppressor	L With light	Z With light and surge voltage suppressor
AC	1	100 V	— (Note)	●	— (Note)
	2	200 V			
	3	110 V			
	4	220 V			
	7	240 V			
	8	48 V			
DC	J	230 V	—	—	—
	5	24 V	●	●	●
	6	12 V	●	—	—

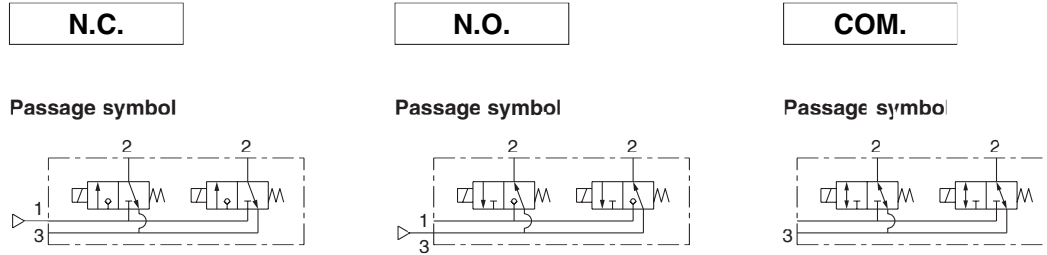
* Class H coil is not available.

Note) Option S, Z are not available as surge voltage suppressor is integrated into the AC/Class B coil, as a standard.

Series VVX31/32/33

For Oil / Manifold

Solenoid Valve for Manifold / Valve Specifications



Orifice diameter (mmø)	Model	Max. operating pressure differential (MPa)			Flow characteristics		Max. system pressure (MPa)
		N.C.	N.O.	COM.	Av x 10 ⁻⁶ m ²	Cv converted	
1.5	VX311□-00	1	1	0.7	1.9	0.08	2.0
2.2	VX312□-00	0.7	0.5	0.4	3.8	0.16	
	VX322□-00	1.2	1	0.7	4.6	0.19	
	VX332□-00	1.6	1.6	1			
3	VX313□-00	0.3	0.3	0.2	5.8	0.24	
	VX323□-00	0.6	0.5	0.3	7.9	0.33	
	VX333□-00	1	0.9	0.6			
4	VX324□-00	0.3	0.25	0.2	12	0.50	
	VX334□-00	0.5	0.4	0.3			

Refer to "Glossary" on page 31 for details on the max. operating pressure differential and the max. system pressure

Fluid and Ambient Temperature

Power source	Fluid temperature (°C)		Ambient temperature (°C)
	Solenoid valve option (symbol)		
	A	D	
AC	-5 ^{Note)} to 60	-5 ^{Note)} to 120	-20 to 60
DC	-5 ^{Note)} to 40	—	-20 to 40

Note) Dynamic viscosity: 50 mm²/s or less

Valve Leakage

Internal Leakage / External Leakage

Seal material	Max. operating pressure differential	Leakage rate (Oil)
FKM	From 0 to less than 1 MPa	0.1 cm ³ /min or less
	1 MPa or more	0.2 cm ³ /min or less

How to Order (Solenoid Valve for Manifold)

DC, AC/Class H coil VX 31 1 1 A □ -00- 1 G 1

AC/Class B coil (Built-in full-wave rectifier type) VX 31 1 1 A □ -00- 1 G R1

Model Refer to Table (1) shown below for availability.

Orifice diameter Refer to Table (1) shown below for availability.

Valve / Body type

1	N.C. / Manifold
3	N.O. / Manifold
5	COM. / Manifold

Solenoid valve option Refer to Table (2) shown below for availability.

Rated voltage

1	100 VAC 50/60 Hz	6	12 VDC
2	200 VAC 50/60 Hz	7	240 VAC 50/60 Hz
3	110 VAC 50/60 Hz	8	48 VAC 50/60 Hz
4	220 VAC 50/60 Hz	J	230 VAC 50/60 Hz
5	24 VDC		

Suffix

Nil	—
Z	Oil-free spec.

* Refer to Table (3) shown below for availability.

Refer to page 23 for ordering coil only.

Electrical entry

G -Grommet
GS-With grommet surge voltage suppressor

C -Conduit

D -DIN terminal
DS-DIN terminal with surge voltage suppressor
DL -DIN terminal with light
DZ -DIN terminal with surge voltage suppressor and light
DO -For DIN terminal (without connector, gasket is included.)

T -With conduit terminal
TS -With conduit terminal and surge voltage suppressor
TL -With conduit terminal and light
TZ -With conduit terminal, surge voltage suppressor and light

* DIN type is available with class B only.

How to Order Manifold Bases

VVX31
VVX32
VVX33

1 □ -07 1

Manifold base

Suffix

Nil	—
Z	Oil-free spec.

Number of manifolds

02	2 stations
⋮	⋮
10	10 stations

Port size (Individual port)

1	Rc 1/8
2	Rc 1/4

* Common port sizes are all Rc 1/4.
* Indicating numbers shown below are for common ports.

Type	SUP port	EXH port
N.C.	1	3
N.O.	3	1

Blanking plate part no.

For VX31 VVX31-4A-F

For VX32/33: VVX32-4A-F

Seal material: FKM

How to Order Manifold Assemblies (Example)

Enter the valve and blanking plate to be mounted under the manifold base part number.

Example
VVX311-05-1 1 set "*" is the symbol for mounting.
* VX3111A-00-1GR1.. 4 sets Add an "*" in front of the part numbers
* VVX31-4A-F..... 1 set for solenoid valves, etc. to be mounted.

Enter the product's part number in order, counting the 1st station from the left in the manifold arrangement, when viewing the individual port in front. The common port on the right side is plugged.

* Refer to Table (3) for available combinations between each electrical option (S, L, Z) and rated voltage.
* Surge voltage suppressor is integrated into the AC/Class B coil, as a standard.

Table (1) Model Orifice Diameter

Solenoid valve model	Orifice symbol (diameter)			
	1 (1.5 mmø)	2 (2.2 mmø)	3 (3 mmø)	4 (4 mmø)
VX31	●	●	●	—
VX32	—	●	●	●
VX33	—	●	●	●

Table (2) Solenoid Valve Option

Option symbol	Seal material		Body material/ Shading coil material	Guide pin material	Coil insulation type
	Main valve poppet	Fixed sealant			
A	FKM	FKM	C37	PPS	B
D	FKM	FKM	C37/Cu	Stainless steel	H

* Aluminum is only available as a material for the manifold base.
* The additives contained in oil are different depending on the type and manufacturers, so the durability of the seal materials will vary. For details, please consult with SMC.

Table (3) Rated Voltage Electrical Entry Electrical Option

Rated voltage	Class B	Class H								
		S	L	Z						
AC/DC	Voltage symbol	Voltage	With surge voltage suppressor	With light	With light and surge voltage suppressor					
						1	100 V	●	●	●
						2	200 V	●	●	●
						3	110 V	●	●	●
						4	220 V	— (Note)	— (Note)	●
						7	240 V	—	—	—
AC	Voltage symbol	Voltage	With surge voltage suppressor	With light	With light and surge voltage suppressor					
						8	48 V	●	—	—
						J	230 V	—	—	—
DC	Voltage symbol	Voltage	With surge voltage suppressor	With light	With light and surge voltage suppressor					
						5	24 V	●	—	—
6	12 V	●	—	—	—					

Note) Option S, Z are not available as surge voltage suppressor is integrated into the AC/Class B coil, as a standard.

Specifications

For Air

For Water

For Oil

For Steam

For Vacuum Pad

Construction

Dimensions

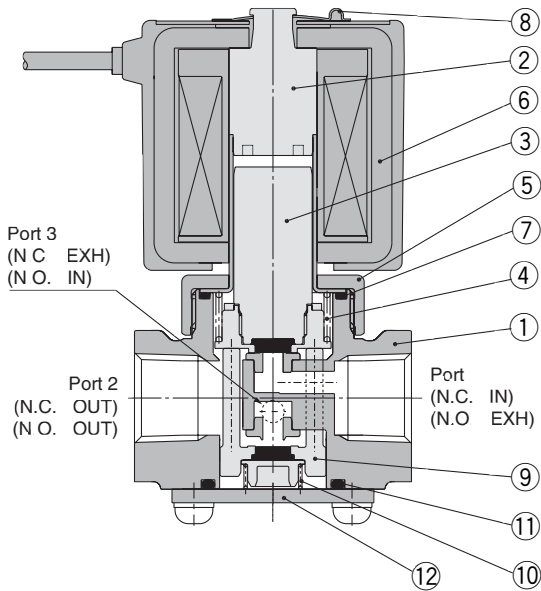
Series VX31/32/33

For Air, Water, Oil, Steam

Construction

Single unit

Body material C37 Stainless steel



Component Parts

No.	Description	Material	
		Standard	Option
1	Body	C37	Stainless steel
2	Tube assembly ^{Note)}	Stainless steel, Cu	Stainless steel, Ag
3	Armature assembly	Stainless steel, C36, PTFE (NBR)	Stainless steel, PTFE (FKM, EPDM, FFKM)
4	Return spring	Stainless steel	
5	Nut	C37	C37/Ni plated
6	Solenoid coil	Class B molded	Class H molded
7	O-ring	(NBR)	(FKM, EPDM, PTFE)
8	Clip	SK	
9	Guide pin assembly	PPS, C36 (NBR)	Stainless steel (FKM, EPDM, FFKM)
10	Support spring	Stainless steel	
11	O-ring	(NBR)	(FKM, EPDM, PTFE)
12	Plate	Stainless steel	

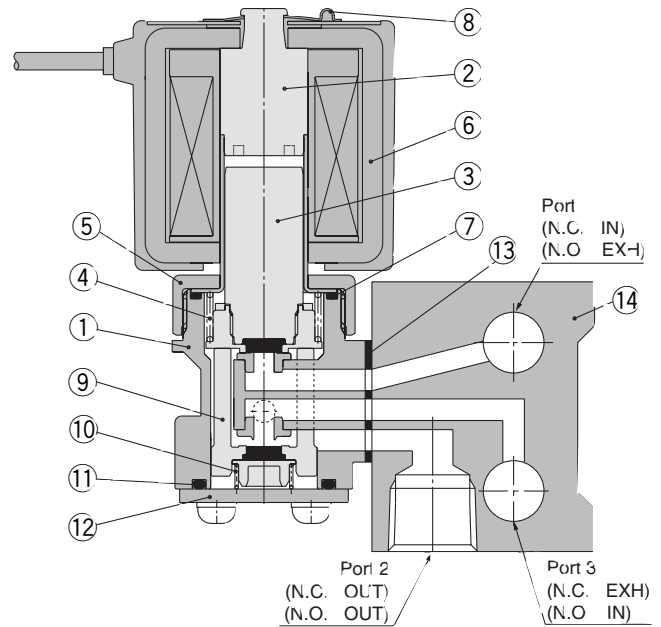
The materials in parentheses are the seal materials.

Note) Cu and Ag are not applicable to the DC spec and to the AC spec with built-in full-wave rectifier.

Manifold

Base material: Aluminum

Manifold body material: C37



Component Parts

No.	Description	Material	
		Standard	Option
	Manifold body	C37	
2	Tube assembly ^{Note)}	Stainless steel, Cu	
3	Armature assembly	Stainless steel, C36, PTFE (NBR)	Stainless steel, PTFE (FKM, EPDM, FFKM)
4	Return spring	Stainless steel	
5	Nut	C37	C37/Ni plated
6	Solenoid coil	Class B molded	Class H molded
7	O-ring	(NBR)	(FKM, EPDM, PTFE)
8	Clip	SK	
9	Guide pin assembly	PPS, C36 (NBR)	Stainless steel (FKM, EPDM, FFKM)
10	Support spring	Stainless steel	
11	O-ring	(NBR)	(FKM, EPDM, PTFE)
12	Plate	Stainless steel	
13	Gasket	(NBR)	(FKM, EPDM, PTFE)
14	Base	Aluminum	

The materials in parentheses are the seal materials.

Note) Cu is not applicable to the DC spec and to the AC spec with built-in full-wave rectifier.

Series VVX31/32/33

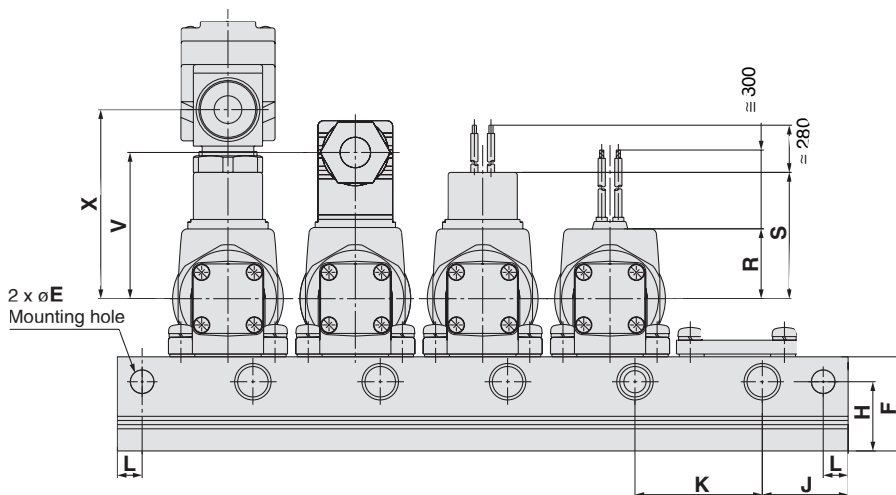
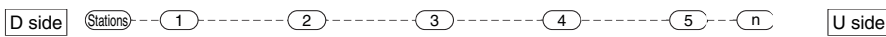
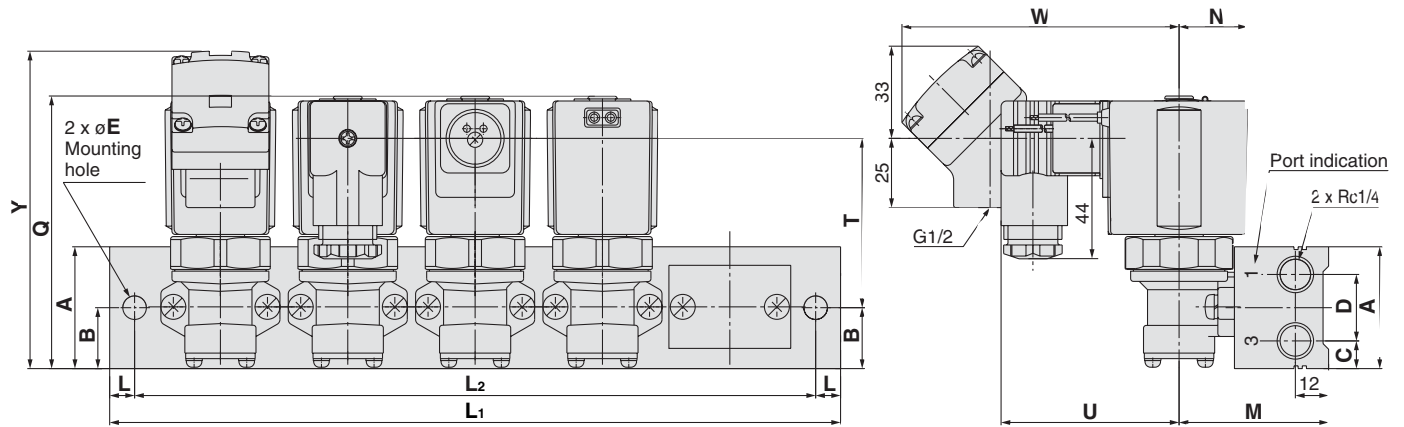
For Air, Oil / Manifold

Dimensions Manifold / Base Material Aluminum

Normally closed (N.C.)

Normally open (N.O.) VVX31/VVX32/VVX33

Common (COM.)



Model	Dimension	n (stations)								
		2	3	4	5	6	7	8	9	10
VVX31	L1	96	132	168	204	240	276	312	348	384
	L2	84	120	156	192	228	264	300	336	372
VVX32	L1	126	172	218	264	310	356	402	448	494
VVX33	L2	108	154	200	246	292	338	384	430	476

Model	A	B	C	D	E	F	H	J	K	L	M	N	Q	Electrical entry (DC, AC/Class H)												
														Grommet			Conduit				DIN terminal			Conduit terminal		
														R	S	T	T	U	V	W	X	Y				
VVX31	40	20	9	22	6.5	33	24	26	36	6	49	19.5	80.5	19.5	40	45.5	45	58.5	46.5	92	61	97				
VVX32	44	22	10	24	8.5	34	25	31	46	9	55	22.5	91	22.5	43	54	53.5	61.5	49.5	95	64	107.5				
VVX33	44	22	10	24	8.5	34	25	31	46	9	55	25	99.5	25.5	46	62	61.5	64	52	98	66.5	116				

Model	Electrical entry (AC/Class B)												
	Grommet			Conduit				DIN terminal			Conduit terminal		
	R	S	T	T	U	V	W	X	Y				
VVX31	30	48.5	44	45	65.5	53.5	100.5	69.5	95.5				
VVX32	33	51.5	52.5	53.5	68.5	56.5	103.5	72.5	106				
VVX33	36	54	60.5	61.5	71	59	106	75	114.5				