

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
Crifice 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

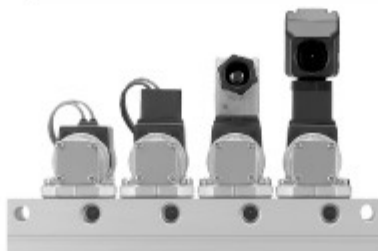
100 VAC, 200 VAC, 110 VAC,
220 VAC, 240 VAC, 230 VAC,
48 VAC, 24 VDC, 12 VDC

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 - - 1 -

0
2
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							FFKM	PTFE
	K (Note 1, 2)								

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

Specifications

For Air

For Water

For Oil

For Steam

For Vacuum Pad

All Options (Manifold)*

VX3 - 00 - 1

1
3
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^{-4} 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.

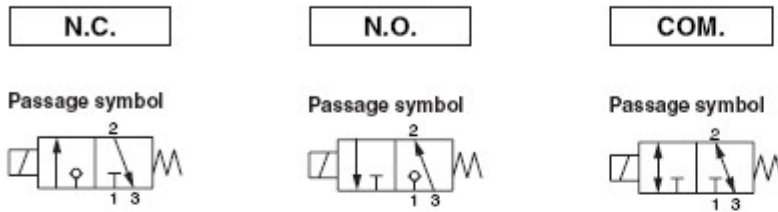
Construction

Dimensions

For Air/Single Unit

(Inert gas, Non-leak, Medium vacuum)

Model / Valve Specifications



Port size	Orifice diameter (mm)	Model	Max. operating pressure differential (MPa)			Flow characteristics			Max. system pressure (MPa)	Weight (g) ^{Note)}
			N.C.	N.O.	COM.	C[dm ³ /(s·bar)]	b	Cv		
1/8 (6A)	1.5	VX311□-01	1	1	0.7	0.29	0.32	0.08	2.0	380
	2.2	VX312□-01	0.7	0.5	0.4	0.60	0.25	0.15		
	3	VX313□-01	0.3	0.3	0.2	0.82	0.20	0.20		
1/4 (8A)	1.5	VX311□-02	1	1	0.7	0.29	0.32	0.08		
	2.2	VX312□-02	0.7	0.5	0.4	0.60	0.25	0.15		
		VX322□-02	1.2	1	0.7	0.64	0.40	0.17		
		VX332□-02	1.6	1.6	1					
	3	VX313□-02	0.3	0.3	0.2	0.82	0.20	0.20		
		VX323□-02	0.6	0.5	0.3	1.1	0.25	0.27		
VX333□-02		1	0.9	0.6						
4	VX324□-02	0.3	0.25	0.2	1.6					0.20
	VX334□-02	0.5	0.4	0.3						
3/8 (10A)	2.2	VX322□-03	1.2	1	0.7	0.64	0.40	0.17	530	
		VX332□-03	1.6	1.6	1				730	
	3	VX323□-03	0.6	0.5	0.3	1.1	0.25	0.27	530	
		VX333□-03	1	0.9	0.6				730	
		VX324□-03	0.3	0.25	0.2				530	
	4	VX334□-03	0.5	0.4	0.3	1.6	0.20	0.38	730	

Note) Weight of grommet type. Add 10 g for conduit, 30 g for DIN terminal, and 60 g for conduit terminal type respectively.
 Also, add 60 g for VX31□□, 80 g for VX32□□ and VX33□□ respectively for bracket option.
 • 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)		
	NII, G	V, M	
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 ⁻⁴ Pa·m ³ /sec or less
	1 MPa or more	2 cm ³ /min or less	

Note) The leakage amount (10⁻⁴ Pa·m³/sec) for the "V" and "M" option are values when the differential pressure is 0.1 MPa.

How to Order (Single Unit)

DC

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

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

Valve / Body type

0	N.C. / Single unit
2	N.O. / Single unit
4	COM. / Single unit

Suffix

Nil	—
Z	Oil-free spec.

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 4 [] [] - 01 [] - 5 G 1 - []

VX 31 1 4 [] [] - 01 [] - 1 G R1 - []

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

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

Port size
Refer to Table (1) shown below for availability.

Thread type

Nil	Rc
T	NPTF
F	G
N	NPT

Bracket

Nil	None
B	With bracket

* Bracket is neither mountable nor removable.

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.) <small>+ DIN type is available with class B only.</small>

+ 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.

Specifications

For Air

For Water

For Oil

For Steam

For Vacuum Pad

Construction

Dimensions

Table (1) Model – Orifice Diameter – Port Size

Model	Solenoid valve model			Orifice symbol (diameter)			
	VX31	VX32	VX33	1 (1.5 mm)	2 (2.2 mm)	3 (3 mm)	4 (4 mm)
Port symbol (Port size)	01 (1/8)	—	—	●	●	●	—
	02 (1/4)	—	—	●	●	●	—
	—	02 (1/4)	02 (1/4)	—	●	●	●
	—	03 (3/8)	03 (3/8)	—	●	●	●

Table (2) Solenoid Valve Option

Option symbol	Seal material		Body material/ Shading coil material	Guide pin material	Coil insulation type	Note Note)
	Main valve poppet	Fixed sealant				
Nil			C37	PPS	B	—
G	NBR	NBR	Stainless steel			
M	FKM	FKM	Stainless steel			
V			C37			

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

Table (3) Rated Voltage – Electrical Option

Rated voltage	Class B				
	S	L	Z		
AC/DC	With surge voltage suppressor	With light	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	●	—	—	

Note 1) Option S, Z are not available as surge voltage suppressor is integrated into the AC/Class B coil, as a standard.

* Class H coil is not available.