Direct Operated 3 Port Solenoid Valve

Series VX31/32/33

For Air, Water, Oil, Steam

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

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		

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	24 VDC, 12 VDC
	Allowable voltage fluctuation		±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		Apparent power (VA)		Temperature rise (C) Note)
	Frequency (Hz)	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 4 □□ – □□ – □□□ 1 – □

• 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	Stainless steel	H	
Others	B	EPDM	EPDM	C37	PPS	B	
	C	FFKM	PTFE		Stainless steel		COM. only
	K Note 1, 2)			Stainless steel			COM. only, Oil-free

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

All Options (Manifold)*

VX3 □□ 1 3 5 □□ – 00 – □□□ 1

• 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	Stainless steel	H
Others	B	EPDM	EPDM	C37	PPS	B
	E			C37/Cu	Stainless steel	H

* 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.

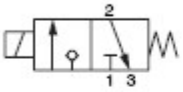
For Air /Single Unit

(Inert gas, Non-leak, Medium vacuum)

Model / Valve Specifications

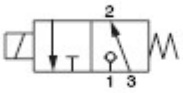
N.C.

Passage symbol



N.O.

Passage symbol



COM.

Passage symbol

Port size	Orifice diameter (mmø)	Model	Max. operating pressure differential (MPa)			Flow characteristics			Max. system pressure (MPa)	Weight (g) Note)
			N.C.	N.O.	COM.	C[dm³/(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		530
		VX332□-02	1.6	1.6	1					730
	3	VX313□-02	0.3	0.3	0.2	0.82	0.20	0.20		380
		VX323□-02	0.6	0.5	0.3	1.1	0.25	0.27		530
		VX333□-02	1	0.9	0.6					730
	4	VX324□-02	0.3	0.25	0.2	1.6	0.20	0.38		530
		VX334□-02	0.5	0.4	0.3					730
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
	4	VX324□-03	0.3	0.25	0.2	1.6	0.20	0.38		530
		VX334□-03	0.5	0.4	0.3					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)		
	Nil, 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 cm³/min or less	10^{-6} Pa·m³/sec or less
	1 MPa or more	2 cm³/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

VX 31 1 4 □ □ – 01 □ – 5 G 1 – □

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

VX 31 1 4 □ □ – 01 □ – 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

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

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

Bracket

Nil	None
B	With bracket

* Bracket is neither mountable nor removable.

Built-in full-wave rectifier type

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

Suffix

Nil	—
Z	Oil-free spec.

Thread type

Nil	Rc
T	NPTF
F	G
N	NPT

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.

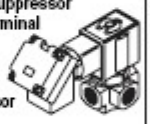
Refer to page 23 for ordering coil only.

Electrical entry (AC/DC)

G -Grommet
GS-With grommet surge voltage suppressor

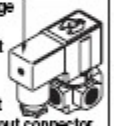
C -Conduit

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.)

Connector



* DIN type is available with class B only.

* 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 – Port Size

Solenoid valve model				Orifice symbol (diameter)			
Model	VX31	VX32	VX33	1 (1.5 mmø)	2 (2.2 mmø)	3 (3 mmø)	4 (4 mmø)
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	NBR	NBR	C37	PPS	B	—
G			Stainless steel			
M	FKM	FKM	Stainless steel			Non-leak (10^{-6} Pa·m³/sec), Medium vacuum (0.1 Pa.abs), Oil-free
V			C37			

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.

Table (3) Rated Voltage – Electrical Option

Rated voltage			Class B		
			S	L	Z
AC/ DC	Voltage symbol	Voltage	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		—	
	J	230 V		—	
DC	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.