Series XSA

Normally Closed Type High Vacuum Straight Solenoid Valve

CE [Option]

How to Order

XSA 1 – 1 2 S – 5 G □ – □ – □

Normally closed high vacuum straight solenoid valve

Solenoid size

1	No.1
2	No.2
3	No.3

Orifice symbol

1	ø2
2	ø3
3	ø4.5
4	ø6

∗ Refer to table ① below for applications.

Fitting size

2	1/4 B
3	3/8 B

∗ Refer to table ① below for applications.

Fitting Type

V	VCR®
S	Swagelok®

∗ VCR® Fitting and Swagelok® Fitting are registered trademarks of the Swagelok Company.

Voltage

		CE-compliant
1	100 VAC (With rectifier)	—
5	24 VDC	●
6	12 VDC	●
9	Other (6 VDC, 48 VDC)	●

∗ Refer to Table ② below for applications.

Electrical entry

G	Grommet
C	Conduit
T	Terminal
D	DIN terminal

∗ Refer to Table ② below for applications.

Electrical options

Nil	None
S	With surge voltage suppressor
L	With light
Z	With light/Surge voltage suppressor

∗ Refer to Table ② below for applications.

Spacer

Nil	None
A	With spacer

∗ Refer to Table ③ below in case spacers only are required separately.

CE-compliant

Nil	—
Q	CE-compliant

Table ①: Model, Fitting size, Orifice

Solenoid valve model (Fitting size)			Orifice symbol (Diameter)			
XSA1	XSA2	XSA3	1 (ø2)	2 (ø3)	3 (ø4.5)	4 (ø6)
2 (1/4)	—	—	●	●	—	—
—	2 (1/4)	—	—	●	●	—
—	—	2 (1/4)	—	—	●	—
—	—	3 (3/8)	—	—	—	●

Table ③: Spacer part nos.

Model	Part No.
XSA1	XSA122-8-4
XSA2	XSA232-8-4
XSA3	

Table ②: Voltage, Electrical entry, Electrical options

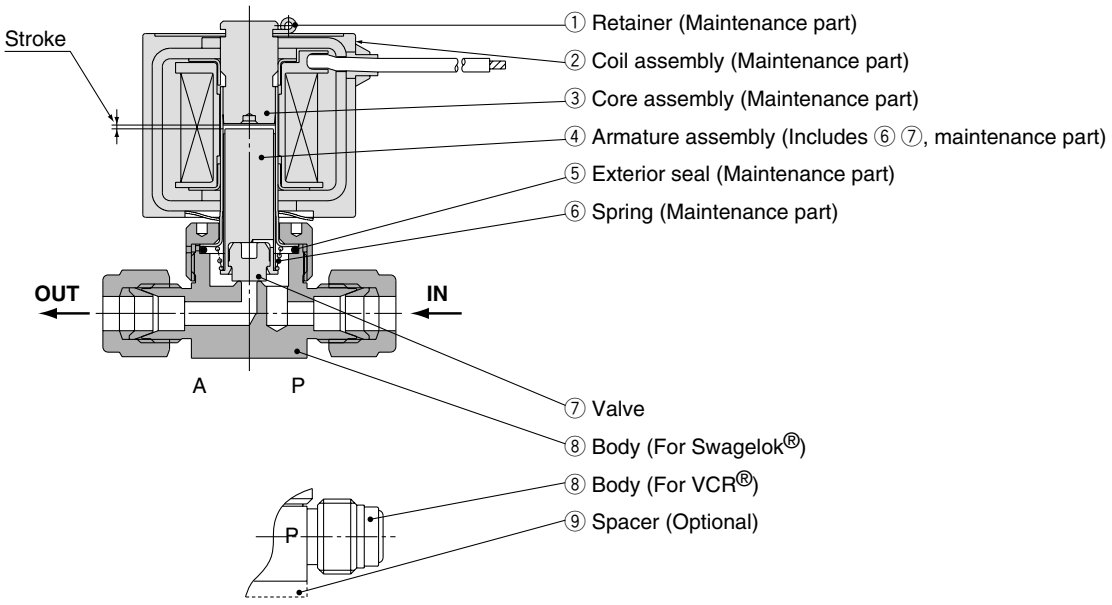
Electrical entry		G	G	C	D, T		
Electrical options		—	S	—	—	S	L, Z
AC	1 (100 V)	●	—	—	—	—	—
DC	5 (24 V)	●	●	●	●	●	●
	6 (12 V)	●	●	●	●	●	—

Specifications

Model			XSA1-12	XSA1-22	XSA2-22	XSA2-32	XSA3-32	XSA3-43
Action			Normally closed direct acting 2 port solenoid valve					
Fluid			Inert gas					
Orifice diameter mmø			2	3		4.5		6
Cv factor			0.17	0.33		0.6		1.05
Actuation pressure difference MPa Note 1)			0.8	0.3	1.0	0.3	0.8	0.3
Reverse pressure potential MPa Note 2)			0.5	0.25	0.4	0.2	0.2	0.15
Port A pressure Pa			1×10^{-6}					
Leakage Pa m³/s {Torr ℓ/s}	Internal		1.3×10^{-9} {1×10^{-8}} at ordinary temperatures, excluding gas permeation					
	External		1.3×10^{-11} {1×10^{-10}} at ordinary temperatures, excluding gas permeation					
	Fitting	VCR®	1.3×10^{-11} {1×10^{-10}}					
		Swagelok®	1.3×10^{-10} {1×10^{-9}}					
Piping connection system			VCR®/SWJ (Swagelok)®					
Connection size			1/4B					3/8B
Operating temperature °C			5 to 40					
Rated voltage			100 VAC (with full wave rectifier) 6/12/24/48/100 VDC					
Power consumption W			6		8		11.5	
Allowable voltage fluctuation %			±10					
Weight kg Note 3)			0.3		0.5		0.6	
Service life (Million cycles)			200					

Note 1) The actuation pressure difference indicates the difference between Port P (high pressure side) and Port A (low pressure side).
Example) In the case of 0.3 MPa, Port A is a vacuum (1 Torr or less), while Port P can be pressurized to 0.2 MPa {2 kgf/cm²}.
Note 2) Reverse pressure potential indicates the pressure which can be applied from Port A when Port P is at atmospheric pressure.
Note 3) Indicates case of grommet type electrical entry.

Construction/Operation



<<Options>>

⑨ Spacer: A spacer used to raise the body when fastening it onto a flat area.

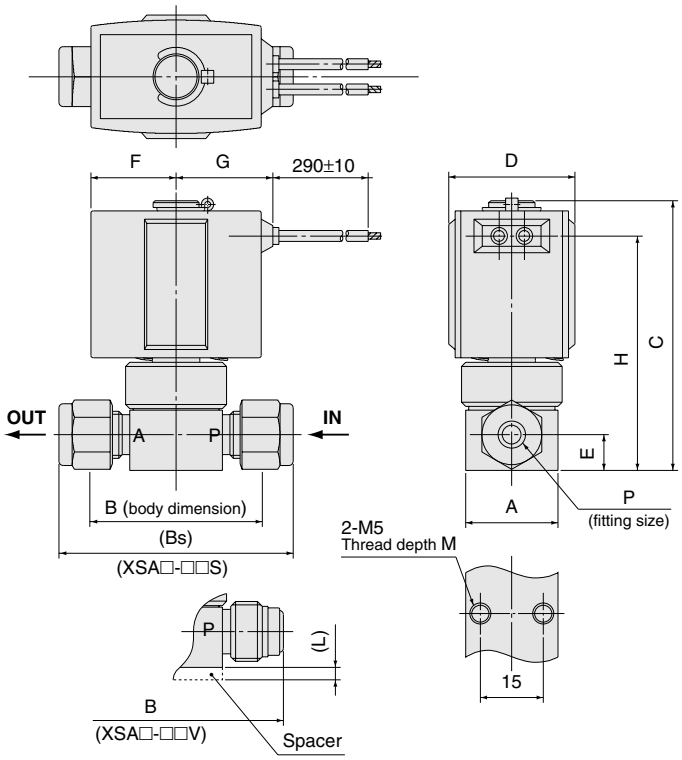
<<Operating principle>>

By energizing the coil assembly ②, the armature assembly ④ overcomes the composite force, consisting of the force acting on the valve ⑦ due to differential pressure and the reactive force of the spring ⑥, and is adsorbed to the core assembly ③, opening the valve ⑦.

When energizing of the coil assembly ② is canceled, the armature assembly ④ is separated from the core assembly ③ by the reactive force of the spring ⑥, closing the valve ⑦.

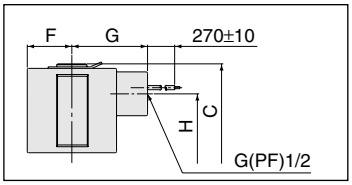
Dimensions

Electrical entry
Grommet (G)

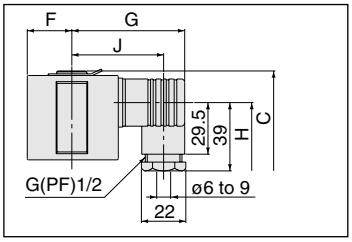


Electrical entry

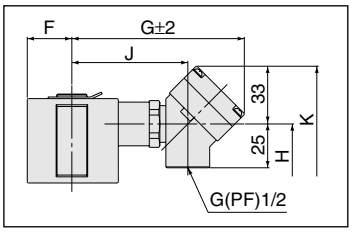
Conduit (C)



DIN terminal (D)



Terminal (T)



(mm)

Model	A	B	Bs	C	D	E	F	Grommet		Conduit		Terminal			
		( ) are VCR® type	Swagelok® type					G	H	G	H	G	H	J	K
XSA1-□2S(V)	22	41(51)	56	64	30	8.5	20	23	56	39	48	92	48	59	81
XSA2-□2S(V)	25	46.5(57)	61	75.5	35	11.5	23	25.5	66	41	58.5	95	58.5	62	91.5
XSA3-32S(V)	25	46.5(57)	61	82	40	11.5	25.5	28	72	43	64	97	64	66	97
XSA3-43S(V)	25	50(66)	65	82	40	11.5	25.5	28	72	43	64	97	64	66	97

Model	DIN terminal			L	M	P
	G	H	J			(Unit: inch)
XSA1-□2S(V)	59	48	47	3	8	1/4
XSA2-□2S(V)	60	58.5	48	5	10	1/4
XSA3-32S(V)	63	64	51	5	10	1/4
XSA3-43S(V)	63	64	51	5	10	3/8

Specific Product Precautions 4

Be sure to read before handling.

Angle Solenoid Valve/Series XLS

Precautions on Design

⚠ Warning

1. The body material is A6063, the bellows and other parts are SUS316L and 13Cr stainless steel, and the seal material is fluoro rubber (Viton®). Use fluids which are compatible with these materials.
2. In cases without an operating power supply, the starting voltage is applied for only 0.15 to 0.2s, and after this, a holding voltage (25% of the starting voltage) must be applied. If not performed properly, this can cause burning of the coil and fire, etc.
3. Be certain to install a fuse or short circuit breaker in the power supply circuit.

Selection

⚠ Caution

1. Use within the limits of the operating pressure range. There will be a marked decrease in durability at pressures above specification.

Mounting

⚠ Caution

1. In high humidity environments, keep valves packaged until the time of installation.
2. Secure the lead wires so that they have sufficient slack, without any unreasonable force applied to them.

Piping

⚠ Caution

1. Before mounting, clean the surface of the flange seal and the O-ring with ethanol, etc.
2. Be sure that the flange O-ring is compressed by 15% or more.
3. There is an indentation of 0.1 to 0.2mm in order to protect the flange seal surface, and it should be handled so that the seal surface is not damaged in any way. When using an outer ring, be sure that the O-ring is compressed sufficiently. (There is basically no problem with the outer ring.)

Maintenance

⚠ Caution

1. Replace the core and armature assemblies when the end of their service life is approached.
2. If damage is suspected prior to the end of the service life, perform early maintenance.
3. SMC specified parts should be used for service parts. Refer to Replacement parts on page 43 for further details.

Straight Solenoid Valve/Series XSA

Precautions on Design

⚠ Warning

1. The body material is SUS304, the electromagnet is 13Cr stainless steel, and the seal material is fluoro rubber (Viton®). Use fluids which are compatible with these materials.
2. Be certain to install a fuse or short circuit breaker in the power supply circuit.

Mounting

⚠ Caution

1. In high humidity environments, keep valves packaged until the time of installation.
2. Secure the lead wires so that they have sufficient slack, without any unreasonable force applied to them.

Piping

⚠ Caution

1. Before mounting, clean the sealing surface with ethanol, etc.
2. Fasten the VCR® and SWJ (Swagelok)® properly, in accordance with the specified torque and methods prescribed by both companies.

   Reference VCR: 1/8 turn after tightening by hand SWJ: 1 1/4 turns after tightening by hand
3. Attach the valve using body bottom mounting screws (2-M5 P=15).

* VCR® Fitting is a registered trade mark of the Cajon Company, and Swagelok ® Fitting is a registered trade mark of the Crawford Fitting Company Inc..

Maintenance

⚠ Caution

1. Replace the armature and core assemblies when the end of their service life is approached.
2. If damage is suspected prior to the end of the service life, perform early maintenance.
3. SMC specified parts should be used for service parts.

Specific Product Precautions 6

Be sure to read before handling.

Maintenance Parts

Straight solenoid valve (normally closed)

Construction No.	Description		XSA1	XSA2	XSA3
①	Retainer		VX070-010-1	VX070-011	VX070-012
②	Coil assembly	100VAC	VX021-001GB-X44	VX021-002GB-X44	VX021-003GB-X44
		DC	(Refer to the section "How to Order Coil Assembly")		
③	Core assembly		XSA122-30-1	XSA232-30-1	XSA343-30-1
④	Armature assembly		XSA122-30-4	XSA232-30-4	XSA343-30-4
⑤	Exterior seal		AS568-016V	AS568-019V	

∗ Refer to the Construction/Operation sections for construction numbers.

How to Order Coil Assembly (DC for XSA)

VX021 — 001 C B □ □ — 05

Coil assembly

Applications

Size part no.		Applicable Series
001	No.1 Solenoid	XSA1
002	No.2 Solenoid	XSA2
003	No.3 Solenoid	XSA3

Electrical entry

G	Grommet
C	Conduit
D	DIN terminal

Coil insulation type

B	Class B insulation

Terminal box

Nil	None
T	With terminal box

Electrical options

Nil	None
S	With Surge voltage suppressor
L	With light
Z	With light/surge voltage suppressor

Rated voltage Note1)

05	24VDC
06	12VDC
51	6VDC
53	48VDC
55	100VDC

Note 1) If the leading "0" is removed from voltage symbols 05, 06, these are the same as the solenoid valve symbols.

• How to Order

(Example) Series XSA1 with 12VDC grommet.
Mode: VX021-001GB-06
(Example) Series XSA2 with 24VDC DIN terminal (terminal box).
Mode: VX021-002DBT-05
(Example) Series XSA3 with 24VDC terminal, surge voltage suppressor and light.
Mode: VX021-003CBTZ-05

Coil combinations

(Electrical entry, Coil insulation type, Electrical options)

Electrical entry	Without electrical options	With electrical options		
		With surge voltage suppressor	With light	With light/surge voltage suppressor
Grommet	GB	GBS	–	–
Conduit	CB	–	–	–
	CBT	CBTS	CBTL	CBTZ
DIN terminal	DB	–	–	–
	DBT	DBTS	DBTL	DBTZ

∗ The applicable voltage with light, and with light/surge voltage suppressor, is 24VDC only.