

# Normal Close High Vacuum Solenoid Valve



\*1 Excluding grommet/AC

Minimum operating pressure

**$1 \times 10^{-6}$  Pa(abs)**<sup>\*1</sup>

\*1 OUT side

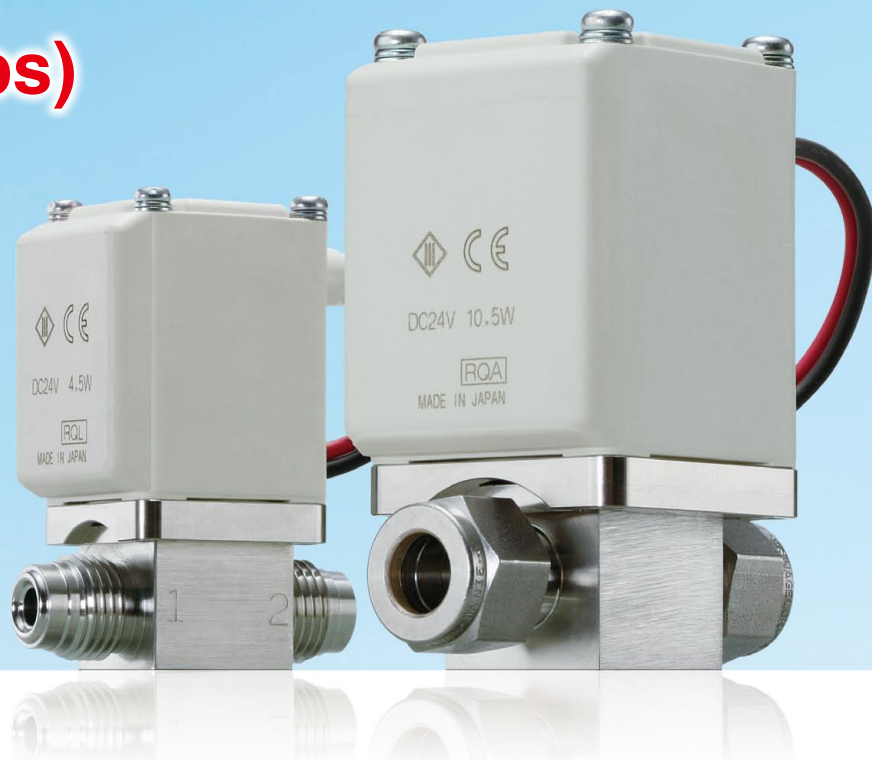
Leakage

Internal

**$1.3 \times 10^{-9}$  Pa·m<sup>3</sup>/s**

External

**$1.3 \times 10^{-11}$  Pa·m<sup>3</sup>/s**



Power consumption

**Max. 25%** reduction

Size	XSA [W]	Previous model [W]
XSA1	4.5	6
XSA2	7	8
XSA3	10.5	11.5

Weight

**Max. 18%**<sup>\*1</sup> lighter

\*1 XSA2-2

0.5 kg → **0.41 kg** <sup>New</sup>

Reverse pressure potential

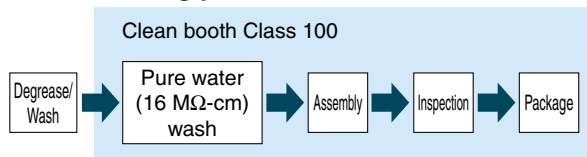
**0.5 MPa(G)**<sup>\*1</sup>

\*1 XSA1-12 (Refer to the Specifications on page 3.)

Consistent clean room production

Washed, assembled and inspected in a Class 100 environment, and sealed in double bags

Manufacturing process

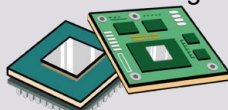


Applications

Photovoltaic cell manufacturing



Semiconductor manufacturing



LCD manufacturing



Medical



Food



**New**

**Female thread type (Rc, NPT) added**



**XSA Series**



CAT.ES140-7B <sup>A</sup>

**Flame resistance**  
UL94V-0 compliant

**Power consumption:**

\* DC/Class B

**4.5 W** (Size 1)

**7 W** (Size 2)

**10.5 W** (Size 3)

**Electrical entry**

	DC	AC
Grommet	●	●
DIN terminal	●	●
Terminal	●	●
Conduit	●	●
Flat terminal	●	●

**Rated voltage**

<b>AC</b>	100 V, 200 V, 110 V, 220 V, 240 V, 48 V, 24 V, 230 V
<b>DC</b>	24 V, 12 V

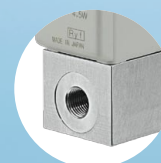
**2 types of fittings and female threads available**



Face seal fitting



Compression fitting



Female thread (Rc, NPT)

**Reduced particle generation**

Moving the spring from the sliding part of the armature to the body reduces contact with the spring, thus reducing particle generation.

**Improved sealing performance**

The larger spring creates a firm seal!  
Leakage (Internal):  $1.3 \times 10^{-9} \text{ Pa} \cdot \text{m}^3/\text{s}$

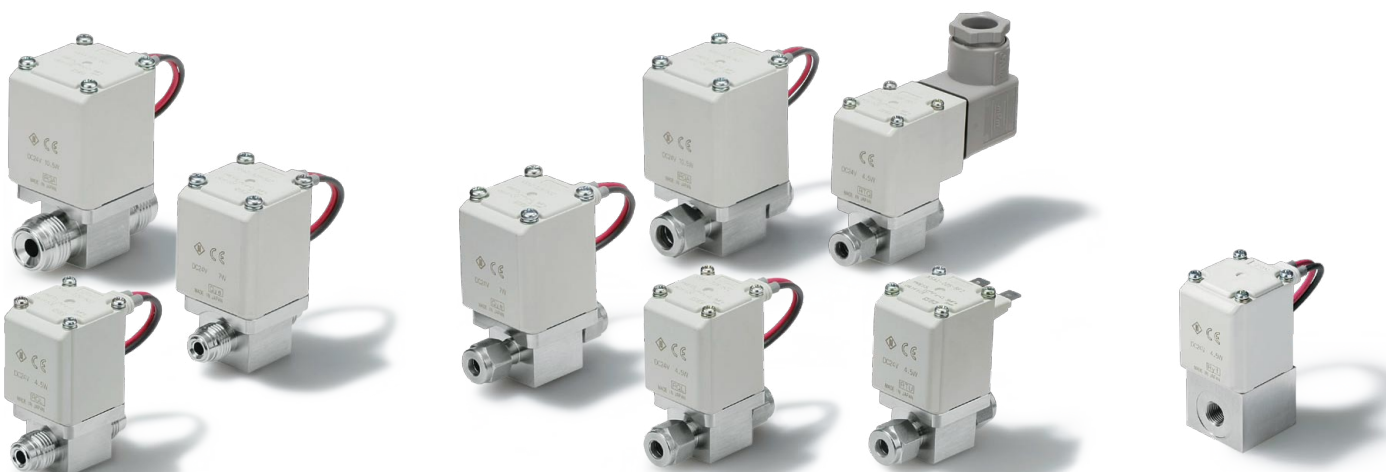
**Fluid temperature**

**5 to 60°C**

## Variations

Face seal fitting	Model	Orifice diameter				Fitting/Port size (inch)		Minimum operating pressure Pa(abs)	Leakage Pa·m³/s	
		ø2	ø3	ø4.5	ø6	1/4	3/8		Internal	External
Compression fitting	XSA1	●	●	—	—	●	—	1 x 10 <sup>-6</sup>	1.3 x 10 <sup>-9</sup>	1.3 x 10 <sup>-11</sup>
	XSA2	—	●	●	●	●	●			
	XSA3	—	—	●	●	●	●			

Female thread (Rc, NPT)	Model	Orifice diameter				Female thread (Rc, NPT)			Minimum operating pressure Pa(abs)	Leakage Pa·m³/s	
		ø2	ø3	ø4.5	ø6	1/8	1/4	3/8		Internal	External
	XSA1	●	●	—	—	●	—	—	1 x 10 <sup>-6</sup>	1.3 x 10 <sup>-9</sup>	1.3 x 10 <sup>-11</sup>
	XSA2	—	●	●	—	—	●	—			
	XSA3	—	—	●	●	—	—	●			



Face seal fitting

Compression fitting

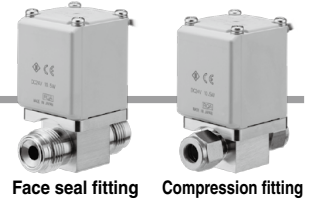
Female thread (Rc, NPT)

# Normal Close High Vacuum Solenoid Valve XSA Series



\*1 Excluding grommet/AC

## How to Order



Face seal fitting      Compression fitting



Female thread type

### • Spacer

Nil	None
A	With spacer

\* The spacer is used to raise the body when fastening it onto a flat area. Refer to the table below if spacers are required separately.

### • Electrical entry

			DC	AC
G	Grommet		●	—
GS	Grommet (With surge voltage suppressor)		●	● <sup>*1</sup>
D	DIN terminal (With surge voltage suppressor)		●	●
DL	DIN terminal with light (With surge voltage suppressor)		●	●
DO	DIN terminal without connector (With surge voltage suppressor)		●	●
T	Terminal (With surge voltage suppressor)		●	●
TL	Terminal with light (With surge voltage suppressor)		●	●
C	Conduit (With surge voltage suppressor)		●	●
F	Flat terminal		●	—

\*1 Not CE-compliant

For the special option below, refer to page 7.

Special electrical entry direction

Face seal fitting  
Compression fitting

XSA 1 - 1 2 S - 5 G 2 -

Female thread type

XSA 1 - 1 1 P - 5 G 2

Valve size      Orifice diameter      Fitting size

Face seal fitting/Compression fitting

1	Size 1	1	ø2	2	1/4
		2	ø3		
2	Size 2	2	ø3	2	1/4
		3	ø4.5		
		4	ø6		
3	Size 3	3	ø4.5	2	1/4
		4	ø6		

Female thread type

1	Size 1	1	ø2	1	1/8
		2	ø3		
2	Size 2	2	ø3	2	1/4
		3	ø4.5		
3	Size 3	3	ø4.5	3	3/8
		4	ø6		

### • Fitting type

Face seal fitting/Compression fitting

V	Face seal fitting
S	Compression fitting

Female thread type

P	Rc female thread
N	NPT female thread

### • Voltage

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

Table: Spacer Part No.  
(Applicable to the face seal fitting/compression fitting)

Model	Part no.
XSA1	XSA1R-8-1
XSA2	XSA2R-8-1
XSA3	

# XSA Series

## Specifications

Model		XSA1-1½	XSA1-2½	XSA2-22	XSA2-32	XSA2-43*3	XSA3-3½	XSA3-43
Action		Normally closed						
Fluid		Air, Inert gas						
Orifice diameter mmø		2	3		4.5	6	4.5	6
Withstand pressure MPa(G)		1.5						
Minimum operating pressure Pa(abs)/OUT side		1 x 10 <sup>-6</sup>						
Maximum operating pressure MPa(G)/IN side		1.0						
Maximum operating pressure differential MPa *1		0.8	0.3	1.0	0.3	0.1	0.8	0.3
Reverse pressure potential MPa(G) *2		0.5	0.25	0.4	0.2	0.05	0.2	0.15
Leakage Pa·m³/s *4	Internal	1.3 x 10 <sup>-9</sup>						
	External	1.3 x 10 <sup>-11</sup>						
Piping connection system		Face seal fitting/Compression fitting/(Rc, NPT) Female thread						
Connection size	Face seal fitting (inch)	1/4				3/8	1/4	3/8
	Compression fitting (inch)							
	(Rc, NPT) Female thread	1/8	1/4		—	3/8		
Ambient and fluid temperature °C		5 to 60						
Rated voltage *5		100/110/200/220/230/240/24/48 VAC 12/24 VDC						
Power consumption W *6	DC	4.5		7		10.5		
Apparent power VA *6	AC	7		9.5		12		
Coil temperature rise °C *7	DC	50		55		65		
	AC	60		70		70		
Allowable voltage fluctuation		±10% or less of the rated voltage						
Allowable leakage voltage	DC	2% or less of the rated voltage						
	AC	5% or less of the rated voltage						
Coil insulation type		Class B						
Weight kg *8	Face seal fitting	0.28		0.41	0.42	0.53	0.62	
	Compression fitting	0.28		0.41	0.42	0.53	0.55	
	(Rc, NPT) Female thread	0.33		0.53	—	0.74	0.74	

- \*1 The operating pressure differential indicates the difference between Port 1 (high pressure side) and Port 2 (low pressure side).  
Example) In the case of 0.3 MPa, Port 2 is a vacuum (1 Torr or less), while Port 1 can be pressurized to 0.2 MPa(G).
- \*2 The reverse pressure potential indicates the pressure which can be applied from Port 2 when Port 1 is at atmospheric pressure.
- \*3 Face seal fitting/compression fitting only
- \*4 Leakage when the ambient temperature is at 20°C and there is 0.1 MPa of differential pressure. Gas permeation is not included.
- \*5 AC type is equipped with full-wave rectifier.
- \*6 Power consumption/Apparent power: The value when there is an ambient temperature of 20°C and when the rated voltage is applied. (Variation: ±10%)
- \*7 The value when there is an ambient temperature of 20°C and when the rated voltage is applied. The value depends on the ambient environment. This is for reference.
- \*8 Indicates case of grommet type

## Flow Rate Characteristics

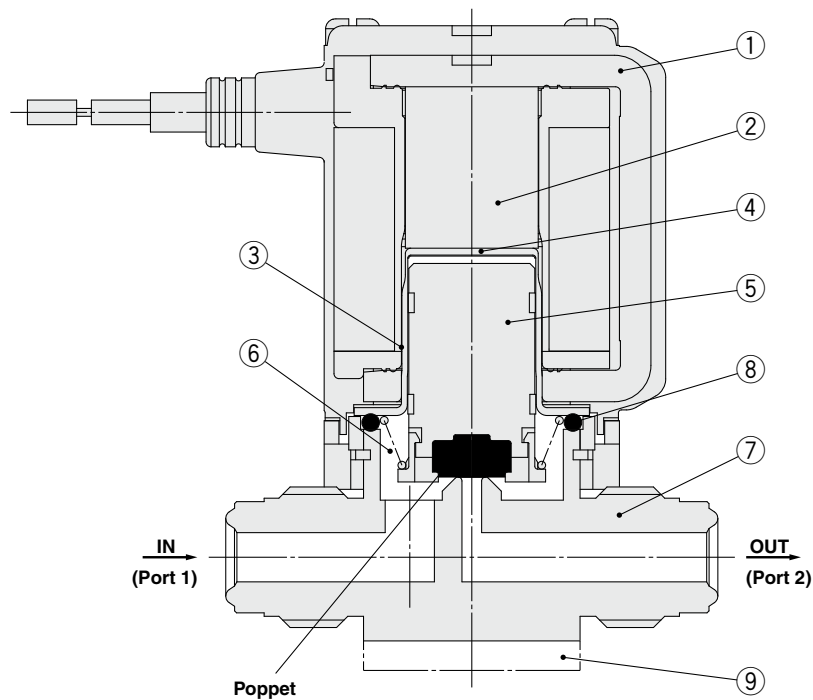
### Face seal fitting/Compression fitting

		XSA1-12	XSA1-22	XSA2-22	XSA2-32	XSA2-43	XSA3-32	XSA3-43
Flow rate characteristics	C[dm <sup>3</sup> /(s·bar)]	0.55	1.07	1.07	1.51	2.78	1.54	2.89
	b	0.41	0.36	0.34	0.24	0.21	0.24	0.21

### (Rc, NPT) Female thread

		XSA1-11	XSA1-21	XSA2-22	XSA2-32	XSA3-33	XSA3-43
Flow rate characteristics	C[dm <sup>3</sup> /(s·bar)]	0.54	1.14	1.14	2.23	2.37	3.50
	b	0.36	0.39	0.42	0.38	0.40	0.15

## Construction/Operation



### Component Parts

No.	Description	Material
1	Solenoid coil	Cu + Fe + Resin
2	Core	Fe
3	Tube	Stainless steel
4	Seat (PET seat to shut the residual magnetism)	PET
5	Armature assembly	FKM, Stainless steel, Resin (PPS)
6	Spring	Stainless steel
7	Body	Stainless steel
8	O-ring	FKM
9	Spacer	Al

■: Parts in contact with gas

### <Option>

⑨ Spacer (Face seal fitting/compression fitting only): The spacer is used to raise the body when fastening it onto a flat area.

### <Operating principle>

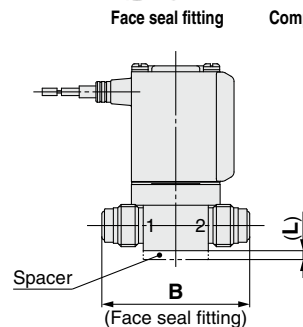
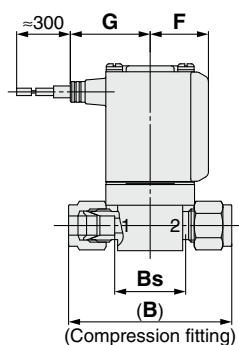
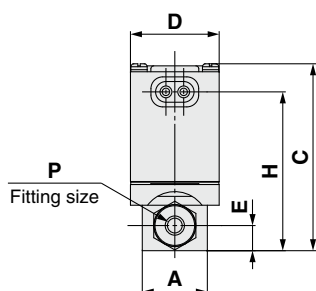
By energizing the solenoid coil ①, the armature assembly ⑤ overcomes the composite force, which consists of the force acting on the poppet due to differential pressure and the reactive force of the spring ⑥, and is adsorbed to the core ② side, thus opening the poppet.

When the energizing of the solenoid coil ① is canceled, the armature assembly ⑤ is separated from the core ② side by the reactive force of the spring ⑥, thus closing the poppet.

# XSA Series

## Dimensions: Face Seal Fitting, Compression Fitting

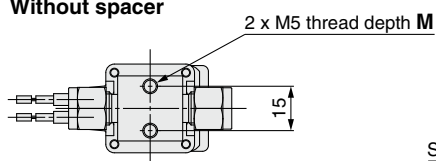
Grommet: G



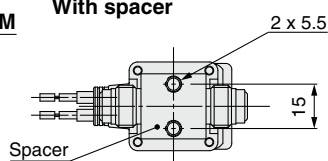
Face seal fitting

Compression fitting

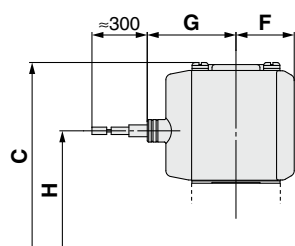
Without spacer



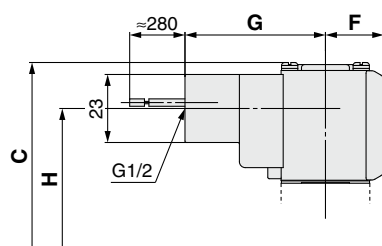
With spacer



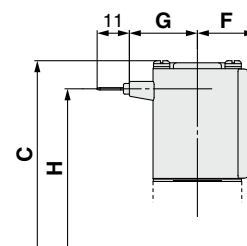
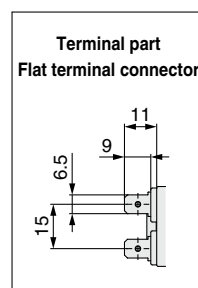
Grommet: GS



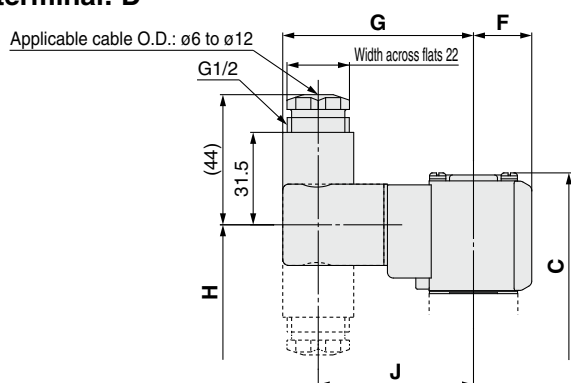
Conduit: C



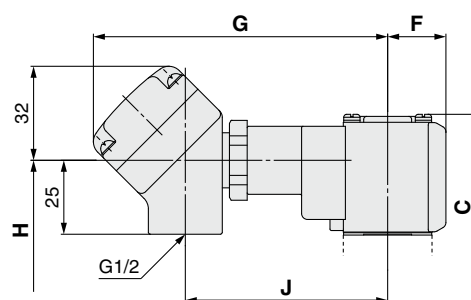
Flat terminal: F



DIN terminal: D



Terminal: T



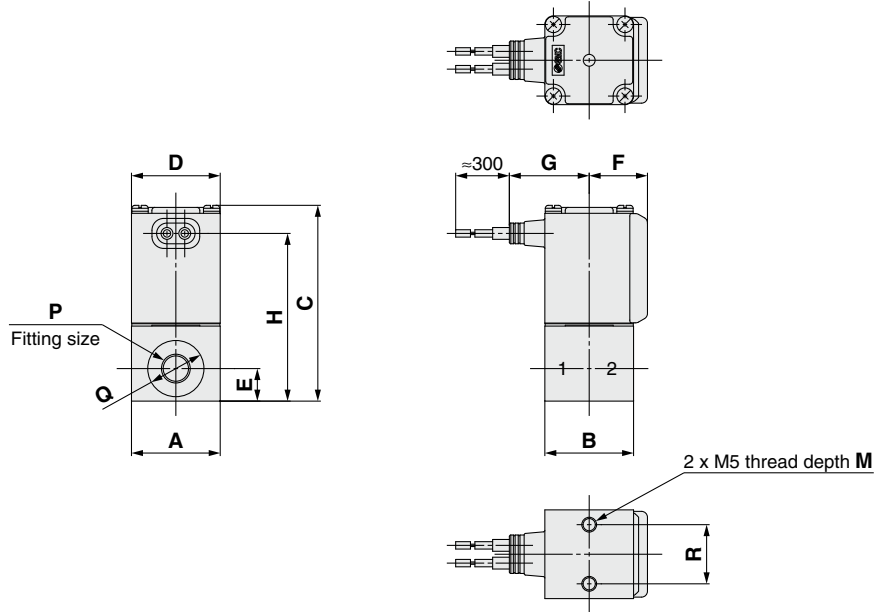
## Dimensions

Model	A	B	Bs	C	D	E	F	L	M	P [inch]	[mm]											
XSA1-□2S	22	55	24	63	30	8.5	20	3	8	1/4	G	H	G	H	G	H	G	H	G	H	G	H
XSA1-□2V		50	—								27	53.5	30	40	47.5	47.5	23	53.5	64.5	45.5	52.5	99.5
XSA2-□2S	25	63	31.5	73.5	35	11.5	22	5	10	3/8	29.5	63	32.5	49.5	50	57	25.5	63	67	55	55	102
XSA2-□2V		56	—								29.5	63	32.5	49.5	50	57	25.5	63	67	55	55	102
XSA2-43S		64.5	31	78	40	24.5	24.5	5	10	1/4	32	67.5	35	54	52.5	61.5	28	67.5	69.5	59.5	57.5	104.5
XSA2-43V		67	—								32	67.5	35	54	52.5	61.5	28	67.5	69.5	59.5	57.5	104.5
XSA3-32S		63	31.5	82.5	40	24.5	24.5	5	10	3/8	32	67.5	35	54	52.5	61.5	28	67.5	69.5	59.5	57.5	104.5
XSA3-32V		56	—								32	67.5	35	54	52.5	61.5	28	67.5	69.5	59.5	57.5	104.5
XSA3-43S		64.5	31	82.5	40	24.5	24.5	5	10	3/8	32	67.5	35	54	52.5	61.5	28	67.5	69.5	59.5	57.5	104.5
XSA3-43V		67	—								32	67.5	35	54	52.5	61.5	28	67.5	69.5	59.5	57.5	104.5



## Dimensions: (Rc, NPT) Female Thread

Grommet: G



<p><b>Grommet: GS</b></p>	<p><b>Conduit: C</b></p>	<p><b>Flat terminal: F</b></p>
<p><b>DIN terminal: D</b></p>		<p><b>Terminal: T</b></p>

## Dimensions

Dimensions											[mm]													
Model	A	B	C	D	E	F	M	P	Q	R	Grommet: G		Grommet: GS		Conduit: C		Flat terminal: F		DIN terminal: D			Terminal: T		
											G	H	G	H	G	H	G	H	G	H	J	G	H	J
XSA1-□1P(N)	30	30	66	30	11	20	8	1/8	ø19	20	27	56.5	30	43	47.5	50.5	23	56.5	64.5	48.5	52.5	99.5	50.5	68.5
XSA2-□2P(N)	36	36	79	35	14	22		1/4	ø24	20	29.5	68.5	32.5	55	50	62.5	25.5	68.5	67	60.5	55	102	62.5	71
XSA3-□3P(N)	40	40	88	40	16.5	24.5		3/8	ø29	22	32	77.5	35	64	52.5	71.5	28	77.5	69.5	69.5	57.5	104.5	71.5	73.5

## Special Option



### Special Electrical Entry Direction

XSA **1** - **1** **2** **S** - **5** **G** **2**   -  

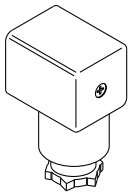
Enter standard product number.

#### Special electrical entry direction

Symbol	Electrical entry direction
A	<div>90°</div>
B	<div>180°</div>
C	<div>270°</div>

## Replacement Parts

### • DIN Connector Part No.



#### <For Class B Coil>

Electrical option	Rated voltage	Connector part no.
None	24 VDC	GDM2A-G
	12 VDC	
	100 VAC	
	110 VAC	
	200 VAC	
	220 VAC	
	230 VAC	
	240 VAC	
	24 VAC	
	48 VAC	
With light	24 VDC	GDM2A-L5
	12 VDC	GDM2A-L6
	100 VAC	GDM2A-L1
	110 VAC	GDM2A-L1
	200 VAC	GDM2A-L2
	220 VAC	GDM2A-L2
	230 VAC	GDM2A-L2
	240 VAC	GDM2A-L2
	24 VAC	GDM2A-L5
	48 VAC	GDM2A-L15

\* Select an appropriate DIN connector suitable for the coil insulation type.

### • Gasket Part No. for DIN Connector

**VCW20-1-29-1 (For Class B Coil)**

### • Lead Wire Assembly for Flat Terminal (Set of 2 pcs.)

**VX021S-1-16FB**