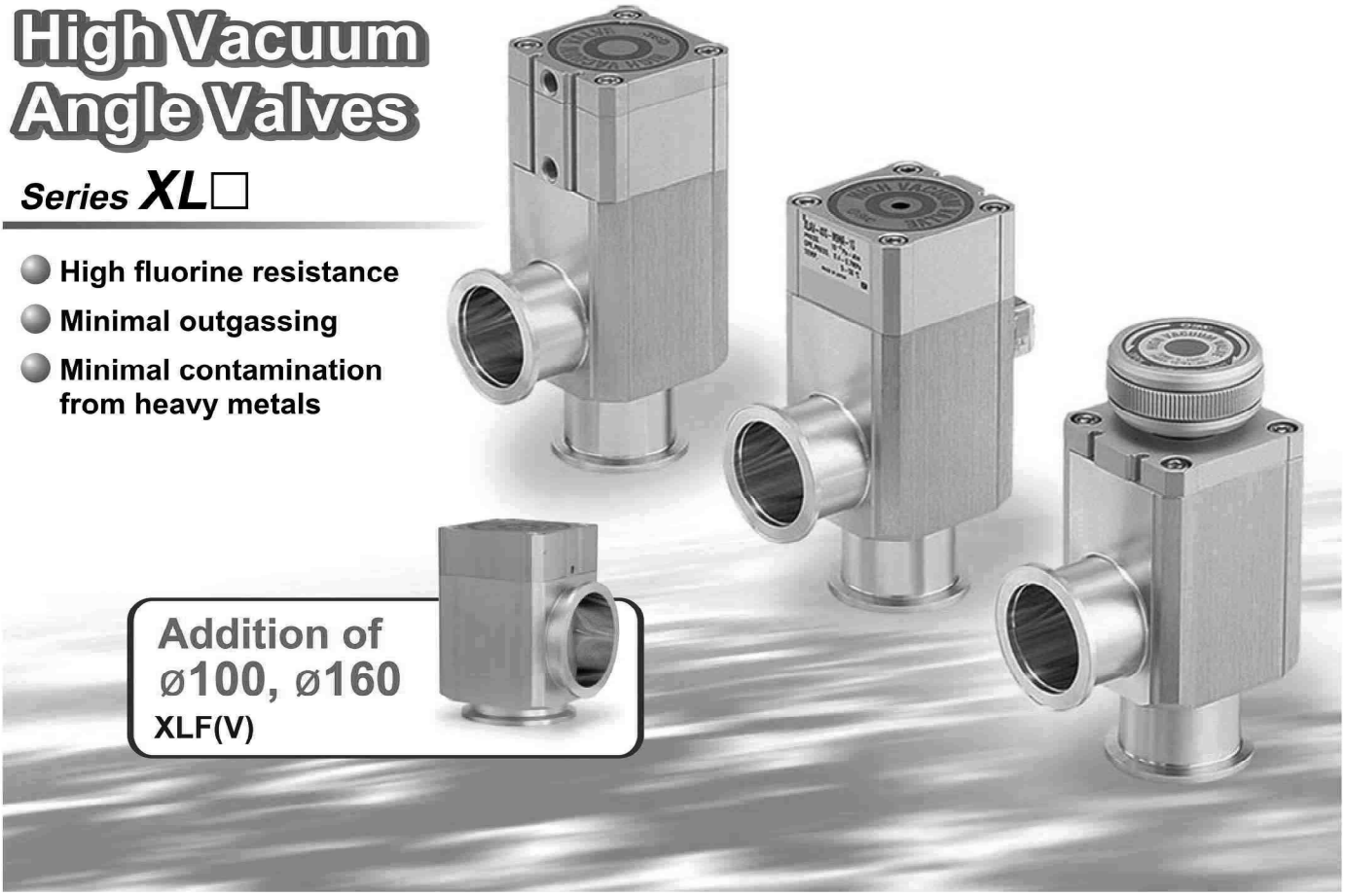
Aluminum

High Vacuum Angle Valves

Series XL□

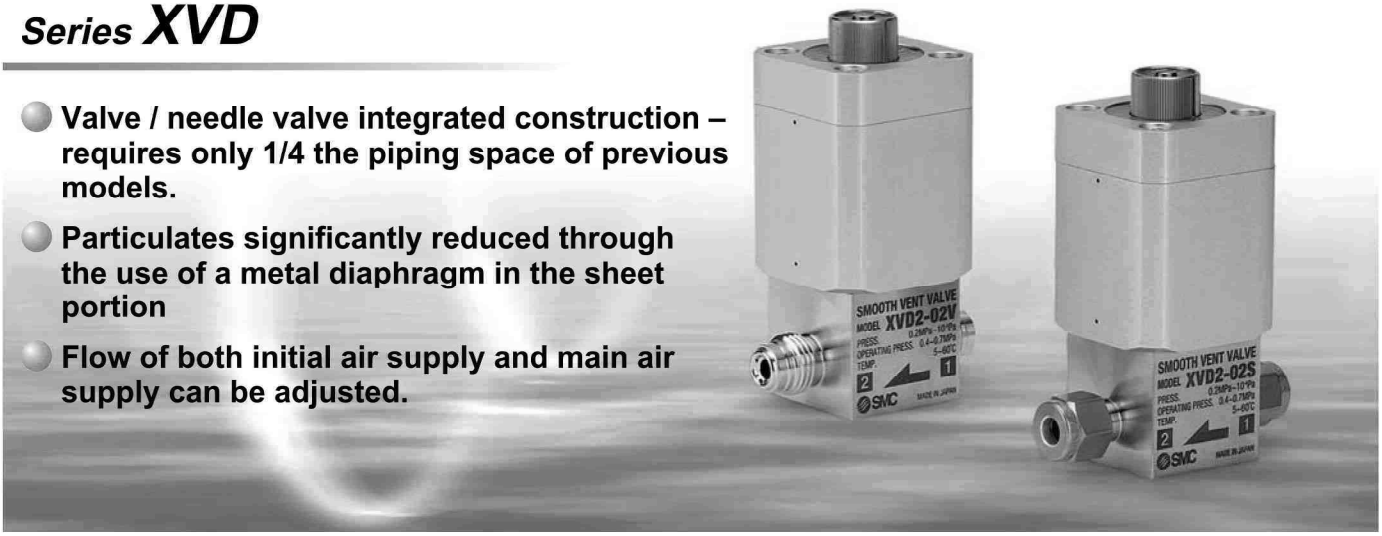
- High fluorine resistance
- Minimal outgassing
- Minimal contamination from heavy metals



Smooth Vent Valve

Series XVD

- Valve / needle valve integrated construction – requires only 1/4 the piping space of previous models.
- Particulates significantly reduced through the use of a metal diaphragm in the sheet portion
- Flow of both initial air supply and main air supply can be adjusted.



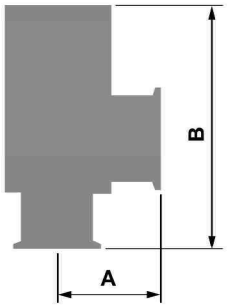
SMC

Aluminum High Vacuum Angle Valves

Series XL

Lightweight, Compact

Large conductance, small body



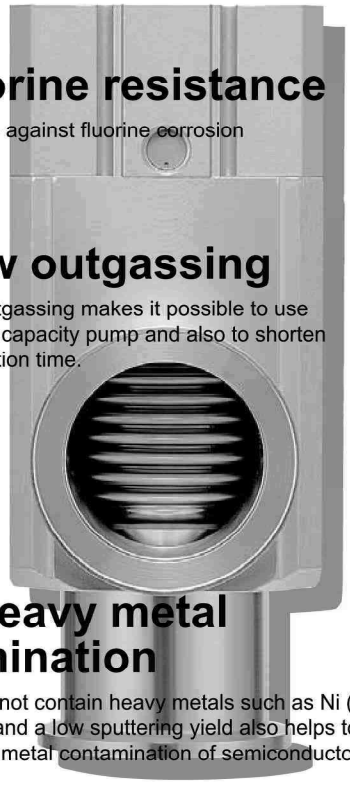
XL* Series Case

Model	A* (mm)	B (mm)	Weight (kg)	Conductance* (ℓ/s)
XLA-16	40	103	0.25	5
XLA-25	50	113	0.45	14
XLA-40	65	158	1.1	45
XLA-50	70	170	1.6	80
XLA-63	88	196	2.9	160
XLA-80	90	235	5.0	200
XLF-100	108	154	10.6	300
XLF-160	138	200	18.5	800

* Common to all series.

High fluorine resistance

Excellent resistance against fluorine corrosion



Low outgassing

Low outgassing makes it possible to use a lower capacity pump and also to shorten evacuation time.

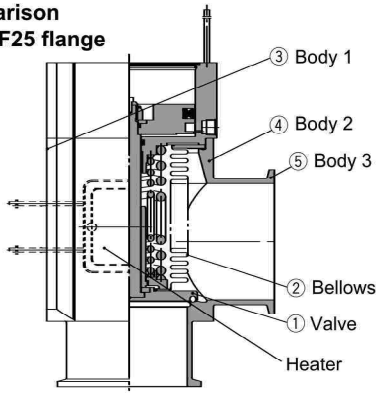
Little heavy metal contamination

The valve does not contain heavy metals such as Ni (nickel) or Cr (chrome) and a low sputtering yield also helps to minimize heavy metal contamination of semiconductor wafers.

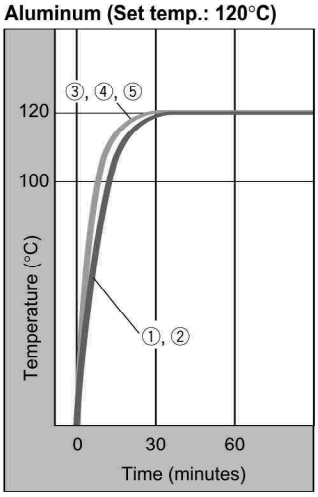
Uniform baking temperature

Excellent thermal conductivity results in a uniform temperature for the entire valve body and a marked decrease in the condensation of gases inside the valve.

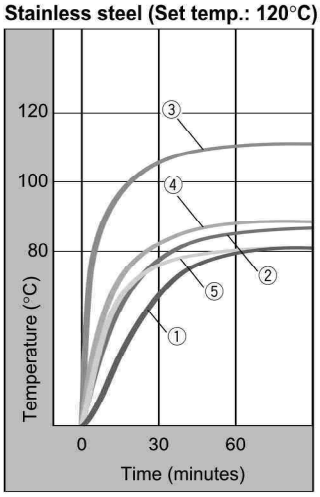
Comparison with KF25 flange



Aluminum (Set temp.: 120°C)



Stainless steel (Set temp.: 120°C)



High Vacuum Angle Valves XL□ Series Features

XLA/XLAV (Bellows seal, Single acting)
- Particulate-free and clean room compatible bellows type
- Pressure-balance mechanism

XLC/XLCV (Bellows seal, Double acting)
- Particulate-free and clean room compatible bellows type
- Pressure-balance mechanism

XLF/XLFV (O-ring seal, Single acting)
- Low gas entrainment with employment of O-ring seal system
- High speed response
- Particulates are reduced through special surface treatment of shaft seal.

XLG/XLGV (O-ring seal, Double acting)
- Low gas entrainment with employment of O-ring seal system
- High speed response
- Particulates are reduced through special surface treatment of shaft seal.

XLD/XLDV (2-Step control, Single acting)
- Initial stage exhaust valve and main exhaust valve are combined. (flow rate 2-step control valve)
- Designed with a compact system and reduced piping
- Prevents particulate turbulence inside the chamber during exhaustion.
- Prevents pumps from running while overloaded.
- Initial exhaust valve flow is adjustable.

XLH (Bellows seal, Manual)
- Bellows type is particulate free and cleaned.
- Pressure balance mechanism allows unrestricted exhaust direction.
- Low actuation torque (0.5 N·m or less)
- Spring provides standard sealing load.
- Handle height is the same when valve is open or closed.
- Indicator to confirm opening and closing of valve is standard equipment.

XLS (Bellows pressure balance, Normally closed electromagnetic)
- Particulates are reduced because there are no sliding metal parts.
- Pressure balance mechanism allows unrestricted exhaust direction.
- A control power supply circuit for solenoid valve drive has been made standard.
- Can be used in portable equipment since air for drive is not necessary.

XVD (Supply line)
- Valve / needle valve integrated construction – requires only 1/4 the piping space of previous models.
- Particulates significantly reduced through the use of a metal diaphragm in the sheet portion
- Flow of both initial air supply and main air supply can be adjusted.

High Vacuum Angle Valves

Actuation	Application	Shaft seal system	Model	Valve type	Operating pressure	Leakage (Pa·m³/s) Note) Internal	Leakage (Pa·m³/s) Note 1) External	Flange size 16	25	40	50	63	80	100	160	Option Switch	Heater	Indicator	High temperature spec.	Page
Air operated	Particle free completely cleaned	Bellows seal	XLA	Single acting (N.C.)	Atmospheric pressure to 10^{-6}	10^{-10}	10^{-11}	●	●	●	●	●	●			(Size 16: None)		●	●	P.1 to 4
			XLAV (With solenoid valves)					●	●	●	●	●	●					●		
			XLC	Double acting				●	●	●	●	●	●			(Size 16: None)		●	●	P.5 to 8
			XLCV (With solenoid valves)					●	●	●	●	●	●					●		
	High speed operation High volume operation	O-ring seal	XLF	Single acting (N.C.)	Atmospheric pressure to 10^{-5}	10^{-10}	10^{-10}	●	●	●	●	●	●	●	●	(Size 16: None)		●	●	P.9 to 18
			XLFV (With solenoid valves)					●	●	●	●	●	●	●	●			●		
			XLG	Double acting				●	●	●	●	●	●	Note 2)	Note 2)	(Size 16: None)		●	●	P.19 to 32
			XLGV (With solenoid valves)					●	●	●	●	●	●					●		
	Prevents turbulence of particulates. Prevents a pump from running overloaded.	Bellows seal O-ring seal	XLD	Single acting (N.C.)	Atmospheric pressure to 10^{-6}	10^{-10}	10^{-11}	●	●	●	●	●	●			Standard		●	●	P.33 to 38
			XLDV (With solenoid valves)					●	●	●	●	●	●			Standard		●		
Manual	Particle free completely cleaned	Bellows seal	XLH	Manual	Atmospheric pressure to 10^{-6}	10^{-10}	10^{-11}	●	●	●	●					Standard	Standard	●	●	P.39, 40
																(Size 16: None)				
Electromagnetic	For portable equipment not requiring air	(Bellows balance)	XLS	Single acting (N.C.)	0.1 MPa (G) to 10^{-6}	10^{-8}	10^{-11}	●	●									●		P.41 to 43

Note 1) In case of standard seal material (FKM)
Note 2) Made to Order

∗ Heater and high temperature specifications are not available with switches.

Smooth Vent Valve

Model	Valve type	Piping size	Orifice (mmø)	Effective area (mm²)	Operating pressure (Pa)	Leakage (Pa·m³/s) Internal	Leakage (Pa·m³/s) External	Leakage (Pa·m³/s) Fitting	Service life cycles (10 thousand)	Page
XVD2-02V	Single acting (N.C.)	1/4	3	Main air supply: 4.6 Initial air supply: 0.2 to 4.6	0.2 MPa (G) to 1 x 10^{-6}	5 x 10^{-9}	1.3 x 10^{-11}	For VCR® 1.3 x 10^{-11}	50	P.44 to 46
XVD2-02S						Values at normal temperature, excluding gas permeation		For Swagelok® 1.3 x 10^{-10}		

Aluminum
High Vacuum Angle Valve
Series XLA/XLAV
Normally Closed/Bellows Seal

XLA

How to Order

XLA – 16 ① ② ③ ④ – M9N ⑤ A ⑥ – ⑦

① Flange size

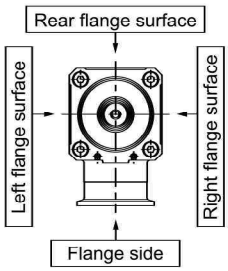
Size
16
25
40
50
63
80

② Flange type

Symbol	Type	Applicable flange
Nil	KF (NW)	16, 25, 40, 50, 63, 80
D	K (DN)	63, 80

③ Indicator/Pilot port direction

Symbol	Indicator	Pilot port direction
Nil	Without indicator	Flange side
A	With indicator	Flange side
F		Left flange surface
G		Rear flange surface
J		Right flange surface
K	Without indicator	Left flange surface
L		Rear flange surface
M		Right flange surface



④ Temperature specifications/Heater

Symbol		Temperature	Heater
Nil		5 to 60°C	—
High temperature type	H0	5 to 150°C	—
	H2		With 100°C heater
	H3		With 120°C heater

Note) Size 16 is not applicable for H2, H3, Size 25 not for H2.

⑤ Auto switch type

Symbol	Auto switch model	Remarks
Nil	—	Without auto switch (without built-in magnet)
M9N(L)	D-M9N(L)	Solid state switch
M9P(L)	D-M9P(L)	
M9B(L)	D-M9B(L)	
A90(L)	D-A90(L)	Reed switch (Not applicable to flange size 16)
A93(L)	D-A93(L)	
M9//	—	Without auto switch (with built-in magnet)

Auto switches are not applicable for high temperature specifications (Temperature specifications H0, H2, H3). Standard lead wire length is 0.5 m.
Add "L" to the end of the part number when 3 m is desired.
Example) -M9NL

⑥ Switch quantity/Mounting position

Symbol	Qty	Mounting position
Nil	Without auto switch	—
A	2 pcs.	Valve open/closed
B	1 pc.	Valve open
C	1 pc.	Valve closed

⑦ Body surface treatment/Seal material and its changed part

• Body surface treatment

Symbol	Surface treatment
Nil	External: Hard anodized Internal: Raw material
A	External: Hard anodized Internal: Oxalic acid anodized

• Seal material

Symbol	Seal material	Compound No.
Nil	FKM	1349-80*
N1	EPDM	2101-80*
P1	Barrel Perfluoro®	70W
Q1	Kalrez®	4079
R1	Chemraz®	SS592
R2		SS630
R3		SSE38
S1	VMQ	1232-70*
T1	FKM for Plasma	3310-75*
U1	ULTIC ARMOR®	UA4640

* Produced by Mitsubishi Cable Industries, Ltd.

• Seal material changed part and leakage

Symbol	Changed part Note 2)	Leakage (Pa·m³/s or less) Note 1)	
		Internal	External
Nil	None	1.3×10^{-10} (FKM)	1.3×10^{-11} (FKM)
A	②, ③	1.3×10^{-8}	1.3×10^{-9}
B	②	1.3×10^{-8}	1.3×10^{-11} (FKM)
C	③	1.3×10^{-10} (FKM)	1.3×10^{-9}

Note 1) Values at normal temperature, excluding gas permeation.
Note 2) Refer to parts number of "Construction" on page 3 for changed part. Number indicates parts number of "Construction" accordingly.

To order something other than "Nil" (standard), list the symbols starting with "X," followed by each symbol for "body surface treatment," "seal material" and then "changed part".

Example) XLA-16-M9NA-XAN1A

Barrel Perfluoro® is a registered trademark of Matsumura Oil Co., Ltd.
Kalrez® is a registered trademark of DuPont Performance Elastomers.
Chemraz® is a registered trademark of Greene, Tweed & Co.
ULTIC ARMOR® is a registered trademark of Nippon Valqua Industries, Ltd.

Air Operated/with Solenoid Valve

XLAV

How to Order

XLAV – 16 ① ② G ③ – M9N ④ A ⑤ – 1 ⑥ G ⑦ ⑧ – ⑨

● Air operated/with solenoid valve

① Flange size

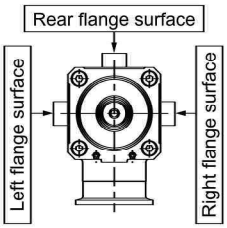
Size
16
25
40
50
63
80

② Flange type

Symbol	Type	Applicable flange
Nil	KF (NW)	16, 25, 40, 50, 63, 80
D	K (DN)	63, 80

③ Indicator/Pilot port direction

Symbol	Indicator	Pilot port direction
F	With indicator	Left flange surface
G		Rear flange surface
J		Right flange surface
K	Without indicator	Left flange surface
L		Rear flange surface
M		Right flange surface



∗ M type plug connector (AC power supply) not attached for J, M of sizes 16 and 25.

④ Auto switch type

Symbol	Auto switch model	Remarks
Nil	—	Without auto switch (without built-in magnet)
M9N(L)	D-M9N(L)	Solid state switch
M9P(L)	D-M9P(L)	
M9B(L)	D-M9B(L)	
A90(L)	D-A90(L)	Reed switch (Not applicable to flange size 16)
A93(L)	D-A93(L)	
M9//	—	Without auto switch (with built-in magnet)

Standard lead wire length is 0.5 m. Add "L" to the end of the part number when 3 m is desired.
Example) -M9NL

⑤ Switch quantity/Mounting position

Symbol	Qty	Mounting position
Nil	Without auto switch	—
A	2 pcs.	Valve open/closed
B	1 pc.	Valve open
C	1 pc.	Valve closed

⑥ Rated voltage

1	100 VAC, 50/60 Hz
2	200 VAC, 50/60 Hz
3	110 VAC, 50/60 Hz
4	220 VAC, 50/60 Hz
5	24 VDC
6	12 VDC

⑦ Electrical entry

G	Grommet (Lead wire length 300 mm)
H	Grommet (Lead wire length 600 mm)
L	L type plug connector
M	M type plug connector

⑧ Light/Surge voltage suppressor

Nil	None
S	With surge voltage suppressor
Z	With light/surge voltage suppressor
U	With light/surge voltage suppressor (Non-polar type)

∗ S type: Not available for AC.
∗ U type: DC only.

⑨ Body surface treatment/Seal material and its changed part

• Body surface treatment

Symbol	Surface treatment
Nil	External: Hard anodized Internal: Raw material
A	External: Hard anodized Internal: Oxalic acid anodized

• Seal material

Symbol	Seal material	Compound No.
Nil	FKM	1349-80*
N1	EPDM	2101-80*
P1	Barrel Perfluoro®	70W
Q1	Kalrez®	4079
R1	Chemraz®	SS592
R2		SS630
R3		SSE38
S1	VMQ	1232-70*
T1	FKM for Plasma	3310-75*
U1	ULTIC ARMOR®	UA4640

∗ Produced by Mitsubishi Cable Industries, Ltd.

• Seal material changed part and leakage

Symbol	Changed part Note 2)	Leakage (Pa·m³/s or less) Note 1)	
		Internal	External
Nil	None	1.3×10^{-10} (FKM)	1.3×10^{-11} (FKM)
A	②, ③	1.3×10^{-8}	1.3×10^{-9}
B	②	1.3×10^{-8}	1.3×10^{-11} (FKM)
C	③	1.3×10^{-10} (FKM)	1.3×10^{-9}

Note 1) Values at normal temperature, excluding gas permeation.
Note 2) Refer to parts number of "Construction" on page 3 for changed part. Number indicates parts number of "Construction" accordingly.

To order something other than "Nil" (standard), list the symbols starting with "X," followed by each symbol for "body surface treatment," "seal material" and then "changed part".

Example) XLAV-16-M9NA-1G-XAN1A

Note 1) Option specifications/Combinations
This model has indicator, auto switch and K(DN) flange options, but high temperature/heater options are not available.
Note 2) Solenoid valves
XLAV-16, 25, 40, 50: SYJ319, XLAV-63, 80: SYJ519
Example) SYJ319-1GS, etc.
For further details on solenoid valves, refer to the SMC solenoid valve catalog "SYJ300/500/700" (ES11-86).