

Aluminum

High Vacuum Angle Valve

RoHS



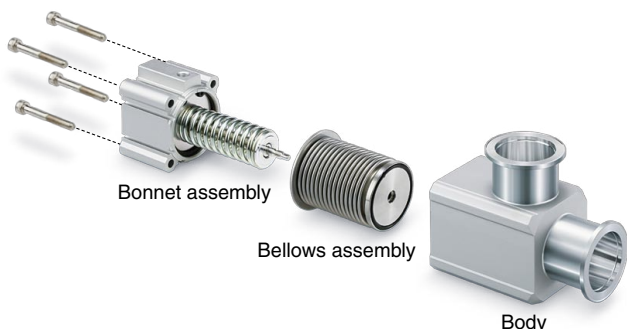
Aluminum bodied

- Uniform baking temperature
- Lightweight, Compact
- Minimal outgassing
- Minimal contamination from heavy metals
- High corrosion resistance to fluorine gas

Bellows are replaceable

(Bellows seal type)

The bellows assembly can be replaced, which reduces maintenance costs and waste materials.



XL□ Series

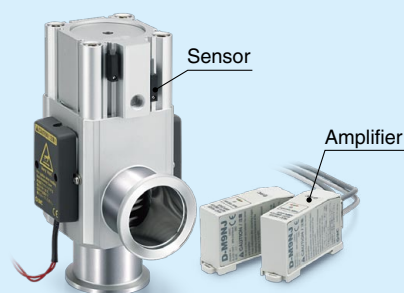
New

A model with a solenoid valve has been added.



New

A heat-resistant 2-color indicator solid state auto switch has been added to the high-temperature type. (Made to order on page 18)



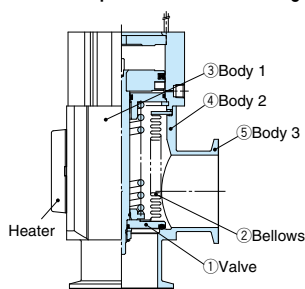
SVC

CAT.ES140-8C

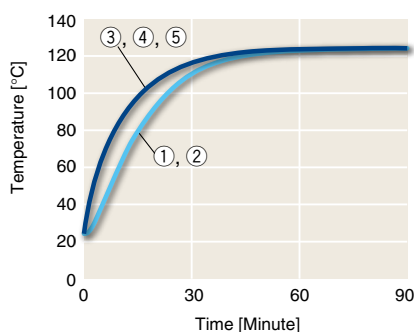
Uniform baking temperature

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 a KF25 flange



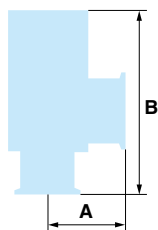
Temperature distribution of the 120°C specification



Lightweight, Compact

Large conductance, small body, excellent resistance against fluorine corrosion (body)

XLA series



Model	A*1 [mm]	B [mm]	Weight [kg]	Conductance*1 [L/s]
XLA-16-2	40	108	0.28	5
XLA-25-2	50	121	0.47	14
XLA-40-2	65	171	1.1	45
XLA-50-2	70	185	1.8	80
XLA-63-2	88	212	3.1	160
XLA-80-2	90	257	5.1	200

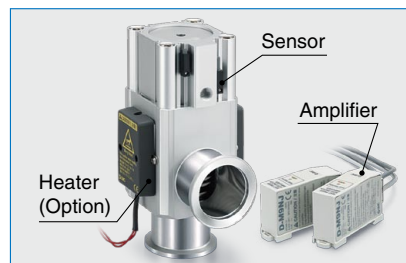
*1 The same for all series

Minimal outgassing

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

Minimal contamination from heavy metals

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



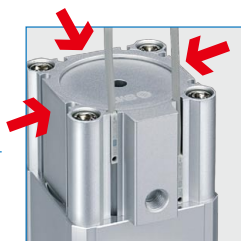
New

A heat-resistant 2-color indicator solid state auto switch is available for models with a heater.
(Option)

- Ambient temperature: Max. 150°C (Sensor)
- 2-color indicator



An optional heater is available.
For 100/120°C



Auto switches are mountable from 4 directions.



Aluminum High Vacuum Angle Valve Normally Closed, O-ring Seal **XLF/XL FV Series**

RoHS



XLF

How to Order

XLF-16 **□** **□** **□** **-2** **M9N** **A** **-** **□**

① ② ③ ④ ⑤ ⑥ ⑦

① Flange size

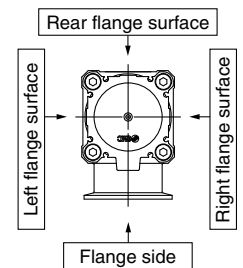
Size
16
25
40
50
63
80

② Flange type

Symbol	Type	Applicable flange size
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	—
	H4	5 to 150°C
	H5	With 100°C heater

* Size 16 is not applicable to H4, H5. Size 25 is not applicable to H4.
* Heater cannot be retrofitted for the H0 type.

⑤ Auto switch type

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

* For the high-temperature type, select the heat-resistant auto switch. (Refer to page 18.)
* Standard lead wire length is 0.5 m. Add M to the end of the part number for 1 m, L for 3 m, and Z for 5 m.
Example) -2M9NL

⑥ Number of auto switches/Mounting position

Symbol	Quantity	Mounting position
Nil	Without auto switch	—
A	2	Valve open/closed
B	1	Valve open
C	1	Valve closed

⑦ Body surface treatment/Seal material and changed parts

• 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*1
N1	EPDM	2101-80*1
P1	Barrel Perfluoro®	70W
Q1	Kalrez®	4079
R1	Chemraz®	SS592
R2		SS630
R3		SSE38
S1	VMQ	1232-70*1
T1	FKM for Plasma	3310-75*1

*1 Produced by Mitsubishi Cable Industries, Ltd.

Barrel Perfluoro® is a registered trademark of Matsumura Oil Co., Ltd.
Kalrez® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.
Chemraz® is a registered trademark of Greene, Tweed Technologies, Inc.

• Part with changed seal material and leakage

Symbol	Changed part*2	Leakage [Pa · m³/s or less] *1	
		Internal	External
Nil	None	1.3 x 10 ⁻¹⁰ (FKM)	1.3 x 10 ⁻¹⁰ (FKM)
A	(2), (3), (4)	1.3 x 10 ⁻⁸	1.3 x 10 ⁻⁸
B	(2), (3)	1.3 x 10 ⁻⁸	1.3 x 10 ⁻¹⁰ (FKM)
C	(4)	1.3 x 10 ⁻¹⁰ (FKM)	1.3 x 10 ⁻⁸
D	(2)	1.3 x 10 ⁻⁸	1.3 x 10 ⁻¹⁰ (FKM)
E	(2), (4)	1.3 x 10 ⁻⁸	1.3 x 10 ⁻⁸

*1 Values at normal temperature, excluding gas permeation
*2 Refer to Construction on page 12 for changed part. Number corresponds with the parts number on the construction drawing.

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) XLF-16-2M9NA-XAN1A

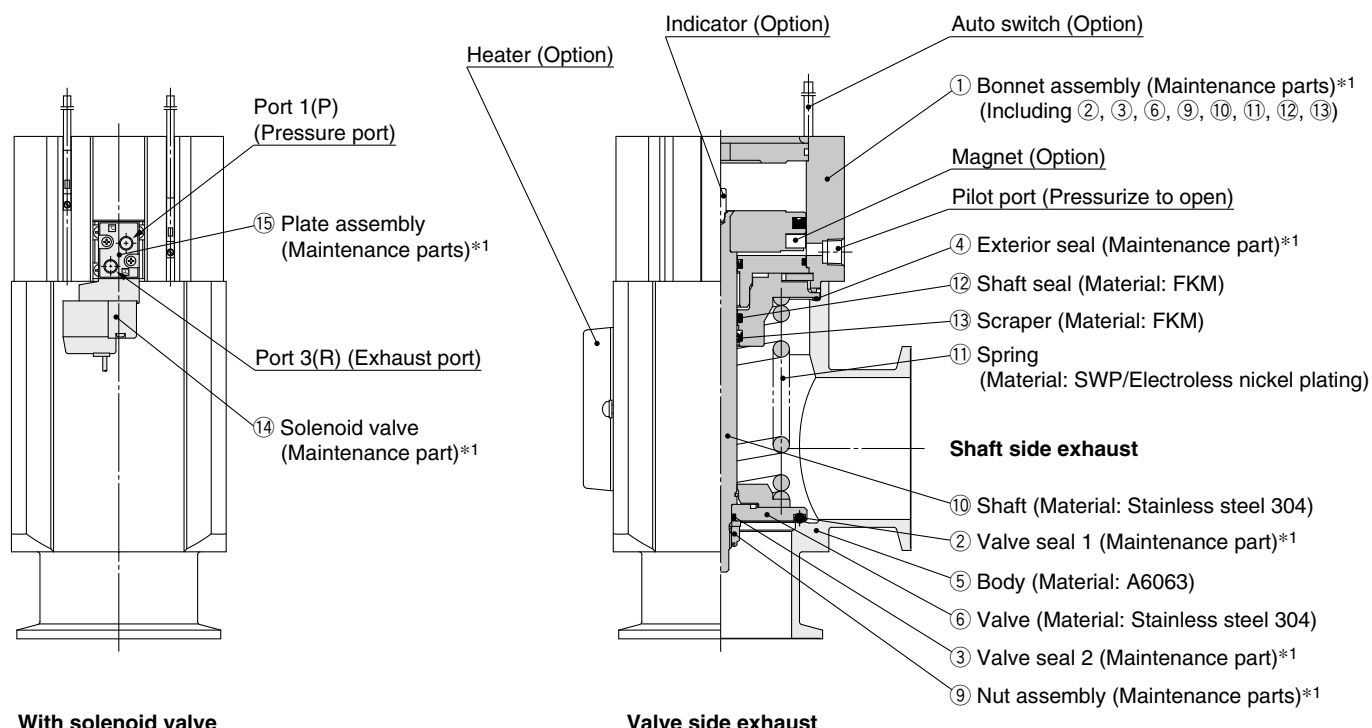
Specifications

Model		XLF(V)-16-2	XLF(V)-25-2	XLF(V)-40-2	XLF(V)-50-2	XLF(V)-63-2	XLF(V)-80-2
Valve type		Normally closed (Pressurize to open, Spring seal)					
Fluid		Inert gas under vacuum					
Operating temperature [°C]	XLF	5 to 60 (High-temperature type: 5 to 150)					
	XLFV	5 to 50					
Operating pressure [Pa(abs)]		1 x 10 ⁻⁵ to atmospheric pressure					
Conductance [L/s]*1		5	14	45	80	160	200
Leakage [Pa·m³/s]	Internal	For standard seal material (FKM): 1.3 x 10 ⁻¹⁰ at normal temperature, excluding gas permeation					
	External	For standard seal material (FKM): 1.3 x 10 ⁻¹⁰ at normal temperature, excluding gas permeation					
Flange type		KF (NW)				KF (NW), K (DN)	
Principal materials*2		Body: Aluminum alloy, Chief part: Stainless steel, FKM (Standard seal material)					
Surface treatment		External: Hard anodized Internal: Raw material					
Pilot pressure [MPa(G)]		0.4 to 0.7					
Pilot port size	XLF	M5		Rc1/8			
	XLFV	M5: Port 1(P), 3(R)			Rc1/8: Port 1(P), M5: Port 3(R)		
Weight [kg]	XLF	0.29	0.49	1.2	1.9	3.3	5.7
	XLFV	0.34	0.54	1.3	2.0	3.4	5.8

*1 Conductance is the value for the elbow with the same dimensions.

*2 A coating of vacuum grease [Y-VAC2] is applied to the seal-material sliding portion of the vacuum part.

Construction/Operation



*1 Refer to Maintenance Parts on page 24.

<Working principle>

By applying pilot pressure from the pilot port, the piston-coupled valve overcomes the force of the spring or operating force by pressure, and the valve opens.

In the case of the XLFV, port 1(P) is normally pressurized, and the valve opens when the solenoid valve is turned ON and closes when it is turned OFF.

<Option>

Auto switch: The magnet activates the auto switch. With 2 auto switches, the open and closed positions are detected, and with 1 auto switch, either the open or closed position is detected. The temperature range is only available for general use (5 to 60°C).

Heater: Heating is performed simply using thermistors. The valve body can be heated to approximately 100 or 120°C, depending on the size of the product. The type and number of thermistors to be used will vary depending on the size and setting temperature. For the high-temperature type, the bonnet assembly is a heat-resistant structure.

Indicator: When the valve is open, a marker appears in the center of the upper surface of the bonnet.

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

 **Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

 **Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

 **Danger:** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots – Safety.
etc.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.**

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

Revision History

Edition B	* The XLC/F/G series has been added. * Number of pages increased from 12 to 24.	UR
Edition C	* The XLAV-2/FV-2 has been added. * Heat-resistant 2-color indicator solid state auto switch has been added to the high-temperature type. * Number of pages increased from 24 to 28.	VO

Safety Instructions

Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.

Series Variations

The production of flange sizes 16, 25, 40, 50, 63, and 80 for the XLA(V)/XLC(V)/XLF(V)/XLG(V) series has been discontinued. Please select the new XL□-2 type. See [here](#) for details.

High Vacuum Angle Valves

Actuation	Application	Shaft seal system	Model	Valve type	Operating pressure (Pa) (abs)	Leakage (Pa · m³/s)		Flange size								Option				Page											
						(Note)	(Note)	16	25	40	50	63	80	100	160	Switch	Heater	Indicator	High temperature spec.												
						Internal	External																								
Air operated	Particle free cleaned	Bellows seal		Single acting (N.C.)	10 ⁻⁶ to atmospheric pressure	10 ⁻¹⁰	10 ⁻¹¹	Production discontinued								●	●		●			P.416 to P.419									
			(Size 16: None)																												
				●												●	●	●	●	●	●	●	●	●	●	●	●				P.420 to P.424
				(Size 16: None)																											
		●	●	●	●	●	●									●	●	●	●	●	●	●	●	●	●	P.426 to P.435					
	High speed operation High volume operation	O-ring seal		Single acting (N.C.)	10 ⁻⁵ to atmospheric pressure	10 ⁻¹⁰	●									●	●	●	●	●	●	●	●	●	●		●	P.436 to P.447			
							(Size 16: None)																								
				Double acting			●									●	●	●	●	●	●	●	●	●	●	●	●	●	●	P.448 to P.453	
							●									●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	Prevents turbulence of particulates. Prevents a pump from running overloaded.	Bellows seal O-ring seal		Single acting (N.C.)	10 ⁻⁶ to atmospheric pressure	10 ⁻¹⁰	10 ⁻¹¹									●	●	●	●	●	●	●	●	●	●	●	Standard	●	P.454 P.455		
			Standard																												
Manual	Particle free cleaned	Bellows seal		Manual	10 ⁻⁶ to atmospheric pressure	10 ⁻¹⁰	10 ⁻¹¹	●	●	●	●							Standard	Standard	P.456 to P.458											
Electromagnetic	For portable equipment not requiring air	(Bellows balance)		Single acting (N.C.)	10 ⁻⁶ to 0.1 MPa (G)	10 ⁻⁸	10 ⁻¹¹	●	●																						

Note) In case of standard seal material (FKM) * Heater and high temperature specifications are not available with switches.

XLA

XL□

XL□Q

XM□

XY□

D-□

XSA

XVD

XGT

CYV