

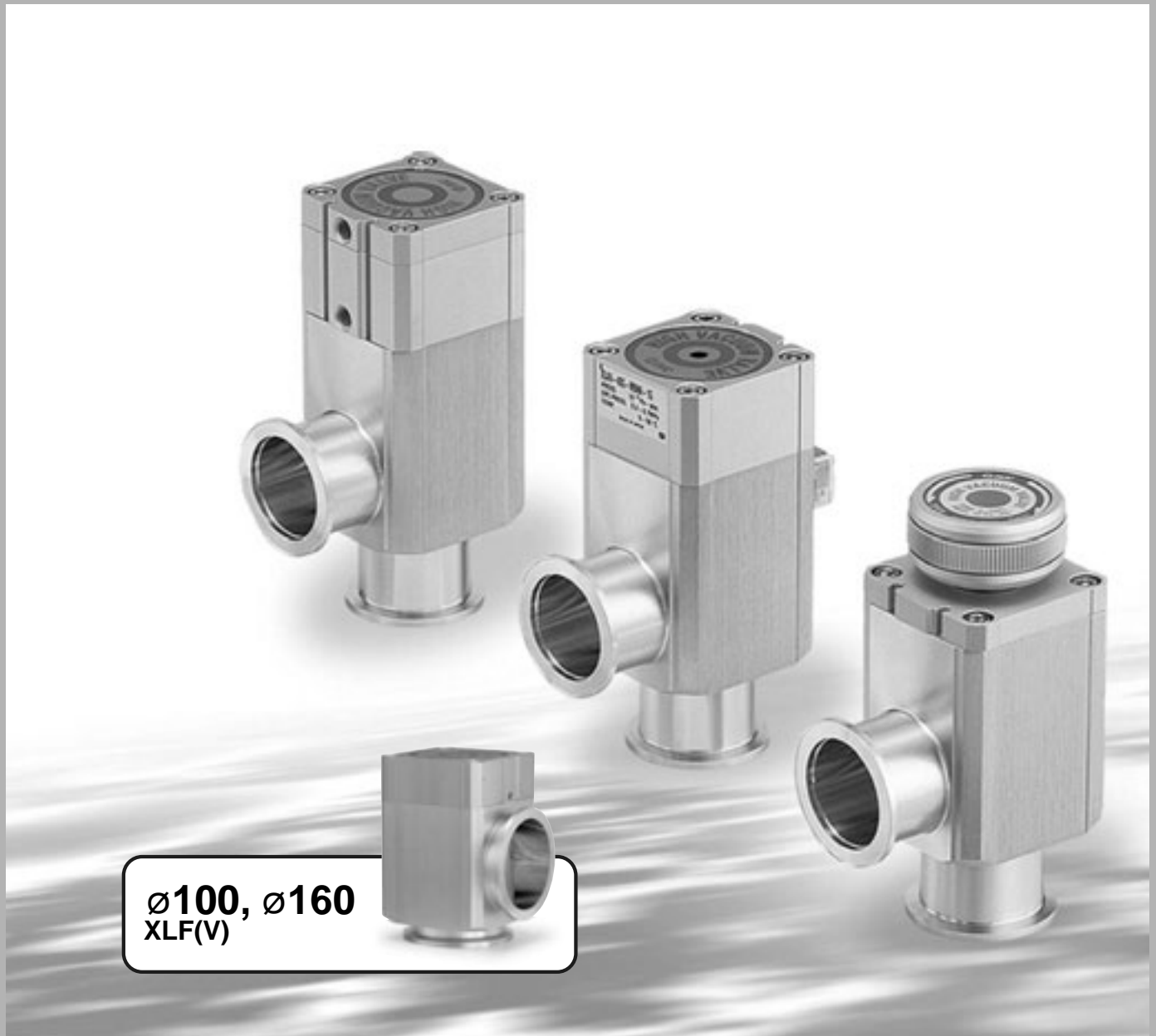
# Aluminum High Vacuum Angle Valve

## Series XL□

● High fluorine resistance

● Minimal outgassing

● Minimal contamination from heavy metals



**XL□**

**XL□Q**

**XM□**  
**XY□**

**D-□**

**XVD**

**XGT**

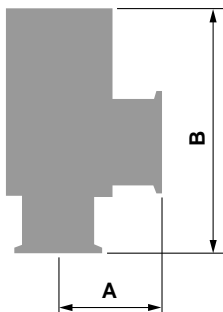
**CYV**

# Aluminum High Vacuum Angle Valve

## Series XL

### Lightweight, Compact

Large conductance, small body



XL\* Series Case

Model	A* (mm)	B (mm)	Mass (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.

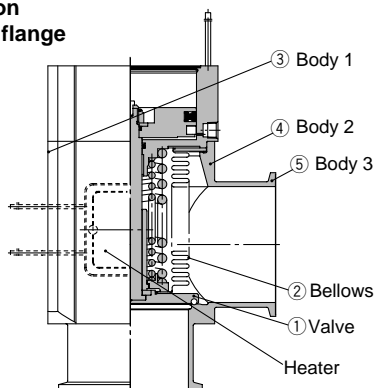
### Little heavy metal contamination

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.

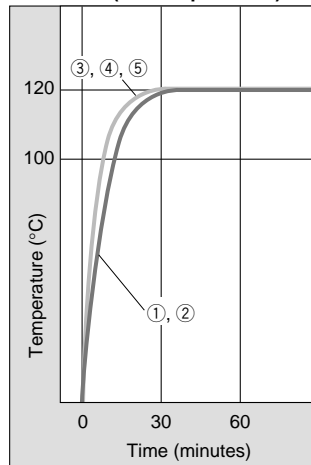
### Uniform baking temperature

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.

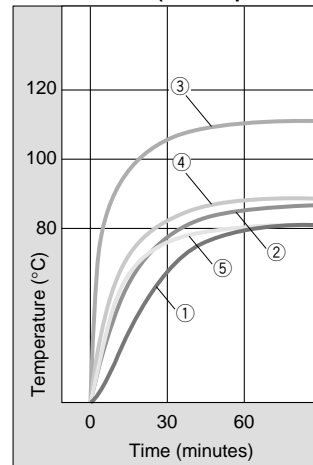
#### Comparison with KF25 flange



Aluminum (Set temp.: 120°C)



Stainless steel (Set temp.: 120°C)



### High Vacuum Angle Valves Series XL □ 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.

# Series Variations

## High Vacuum Angle Valves

Actuation	Application	Shaft seal system	Model	Valve type	Operating pressure (Pa)	Leakage (Pa·m³/s)		Flange size								Option				Page														
						Note 1) Internal	Note 1) External	16	25	40	50	63	80	100	160	Switch	Heater	Indicator	High temperature spec.															
Air operated	Particle free cleaned	Bellows seal		Single acting (N.C.)	Atmospheric pressure to 10 <sup>-5</sup>	10 <sup>-10</sup>	10 <sup>-11</sup>	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	P.12 to P.15							
			XLAV (With solenoid valves)					(Size 16: None)																										
				Double acting				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	P.16 to P.19		
			XLCV (With solenoid valves)					(Size 16: None)																										
								Single acting (N.C.)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●		●	P.20 to P.29
			XLFV (With solenoid valves)						(Size 16: None)																									
	High speed operation High volume operation	O-ring seal		Double acting	Atmospheric pressure to 10 <sup>-5</sup>	10 <sup>-10</sup>	10 <sup>-10</sup>	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	P.30 to P.43							
			XLGV (With solenoid valves)					Note 2) Note 2) (Size 16: None)																										
	Prevents turbulence of particulates. Prevents a pump from running overloaded.	Bellows seal O-ring seal		Single acting (N.C.)	Atmospheric pressure to 10 <sup>-5</sup>	10 <sup>-10</sup>	10 <sup>-11</sup>	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	P.44 to P.49							
			XLDV (With solenoid valves)					Standard																										
	Manual	Particle free cleaned	Bellows seal		Manual	Atmospheric pressure to 10 <sup>-5</sup>	10 <sup>-10</sup>	10 <sup>-11</sup>	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	P.50 P.51							
	Electromagnetic	For portable equipment not requiring air	(Bellows balance)		Single acting (N.C.)	0.1 MPa (G) to 10 <sup>-6</sup>	10 <sup>-8</sup>	10 <sup>-11</sup>	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	P.52 to P.54							

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

\* Heater and high temperature specifications are not available with switches.

- XL
- XLQ
- XM
- XY
- D-
- XVD
- XGT
- CYV

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



XLA

## How to Order

XLA - **16** **□** **□** **□** - **M9N** **A** - **□**

①    ②    ③    ④                    ⑤    ⑥                    ⑦

### ① Flange size

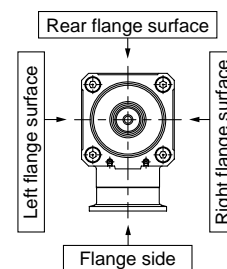
Size
16
25
40
50
63
80

### ② Flange type

Symbol	Type	Applicable flange
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	—	
	H2	5 to 150°C	With 100°C heater
	H3		With 120°C heater

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

### ⑥ Number of auto switches/Mounting position

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

### ⑤ Auto switch type

Symbol	Auto switch model	Remarks
Nil	—	Without auto switch (without built-in magnet)
M9N(L)(M)(Z)	D-M9N(L)(M)(Z)	Solid state auto switch
M9P(L)(M)(Z)	D-M9P(L)(M)(Z)	
M9B(L)(M)(Z)	D-M9B(L)(M)(Z)	
A90(L)	D-A90(L)	Reed auto 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, "M" when 1 m, and "Z" when 5 m.  
Example) -M9NL

### 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 <sup>Note 2)</sup>	Leakage (Pa·m <sup>3</sup> /s or less) <sup>Note 1)</sup>	
		Internal	External
Nil	None	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-11</sup> (FKM)
A	②, ③	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-9</sup>
B	②	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-11</sup> (FKM)
C	③	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-9</sup>

Note 1) Values at normal temperature, excluding gas permeation.

Note 2) Refer to parts number of "Construction" on page 14 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

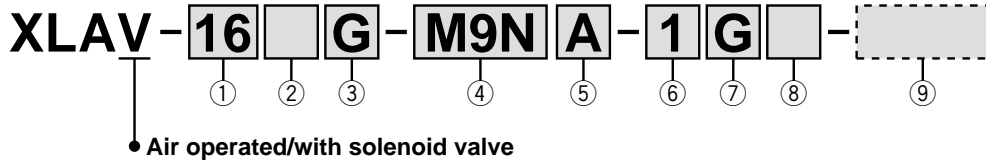
Barrel Perfluoro® is a registered trademark of Matsumura Oil Co., Ltd.  
Kalrez® is a registered trademark of DuPont Performance Elastomers.  
Chemraz® is a registered trademark of Greene, Tweed & Co.  
ULTIC ARMOR® is a registered trademark of Nippon Valqua Industries, Ltd.

## Air Operated/with Solenoid Valve



XLAV

### How to Order



#### ① Flange size

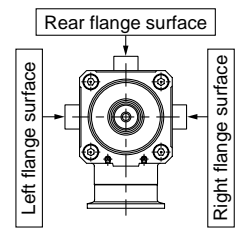
Size
16
25
40
50
63
80

#### 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)(M)(Z)	D-M9N(L)(M)(Z)	Solid state auto switch
M9P(L)(M)(Z)	D-M9P(L)(M)(Z)	
M9B(L)(M)(Z)	D-M9B(L)(M)(Z)	
A90(L)	D-A90(L)	Reed auto 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, "M" when 1 m, and "Z" when 5 m.

Example) -M9NL

#### 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

#### ⑤ Number of auto switches/Mounting position

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

#### 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	Leakage (Pa · m <sup>3</sup> /s or less) Note 1)	
		Internal	External
Nil	None	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-11</sup> (FKM)
A	②, ③	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-9</sup>
B	②	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-11</sup> (FKM)
C	③	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-9</sup>

Note 1) Values at normal temperature, excluding gas permeation.

Note 2) Refer to parts number of "Construction" on page 14 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 catalog Best Pneumatics No. 1 for series SYJ300/500/700.

# Series XLA/XLAV

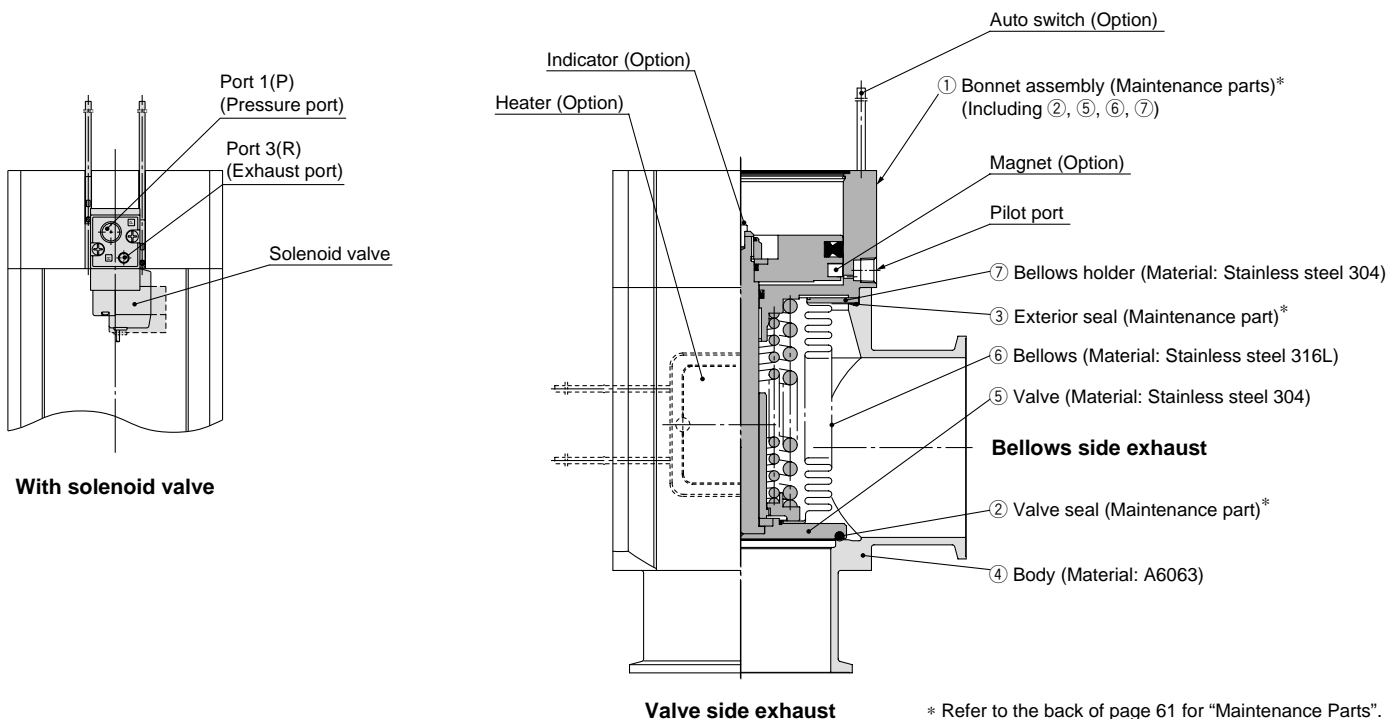
## Specifications

Model	XLA(V)-16	XLA(V)-25	XLA(V)-40	XLA(V)-50	XLA(V)-63	XLA(V)-80	
Valve type	Normally closed (Pressurize to open, Spring seal)						
Fluid	Inert gas under vacuum						
Operating temperature (°C)	XLA	5 to 60 (High temperature type: 5 to 150)					
	XLAV	5 to 50					
Operating pressure (Pa)	Atmospheric pressure to $1 \times 10^{-6}$						
Conductance (ℓ/s) <sup>Note 1)</sup>	5	14	45	80	160	200	
Leakage (Pa·m <sup>3</sup> /s)	Internal	In case of standard material FKM: $1.3 \times 10^{-10}$ at normal temperature, excluding gas permeation					
	External	In case of standard material FKM: $1.3 \times 10^{-11}$ at normal temperature, excluding gas permeation					
Flange type	KF (NW)				KF (NW), K (DN)		
Principal materials	Body: Aluminum alloy, Bellows: Stainless steel 316L, Main part: Stainless steel, FKM (Standard seal material)						
Surface treatment	External: Hard anodized Internal: Raw material						
Pilot pressure (MPa)	0.4 to 0.7						
Pilot port size	XLA	M5		Rc1/8			
	XLAV	M5: Port 1(P), Port 3(R)			Rc1/8: Port 1(P), M5: Port 3(R)		
Mass (kg)	XLA	0.25	0.45	1.1	1.6	2.9	5.0
	XLAV	0.29	0.49	1.14	1.64	2.96	5.06

Note 1) Conductance is the value for an elbow with the same dimensions.

Note 2) For valve heater specifications, refer to "Common Option [1] Heater" on page 55.

## Construction/Operation



### <Working principle>

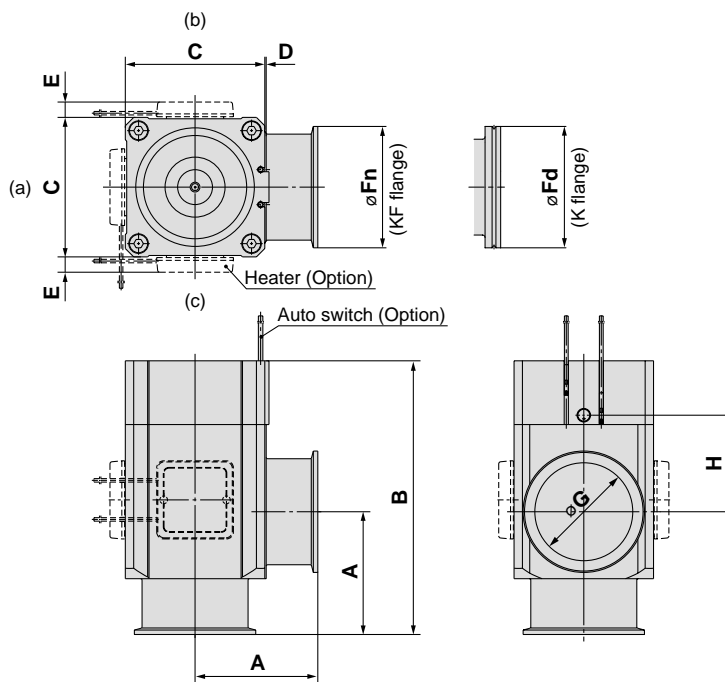
By applying pressure from the pilot port, the piston-coupled valve overcomes the force of the spring or operating force by pressure, and the valve opens. In the case of the XLAV, port 1(P) is normally pressurized, and the valve opens when the solenoid valve is turned ON and closes when it is turned OFF.

### <Options>

- 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. Auto switches are applicable at ordinary temperatures only (5 to 60°C).
- Heater:** Simple heating is performed using thermistors. The valve body can be heated to approximately 100 or 120°C, depending on the heater option and the valve size. The type and number of thermistors to be used will vary depending upon size and setting temperature. In the case of high temperature specifications, the bonnet assembly is a heat resistant structure. This does not apply in cases where a solenoid valve is attached.
- Indicator:** When the valve is open, an orange marker appears in the center of the name plate.

## Dimensions

### XLA/Air operated



Model	A	B	C	D	E Note 1)	F <sub>n</sub>	F <sub>d</sub>	G	H
<b>XLA-16</b>	40	103	38	1	—	30	—	17	40
<b>XLA-25</b>	50	113	48	1	12	40	—	26	39
<b>XLA-40</b>	65	158	66	2	11	55	—	41	63
<b>XLA-50</b>	70	170	79	2	11	75	—	52	68
<b>XLA-63</b>	88	196	100	3	11	87	95	70	69
<b>XLA-80</b>	90	235	117	3	11	114	110	83	96

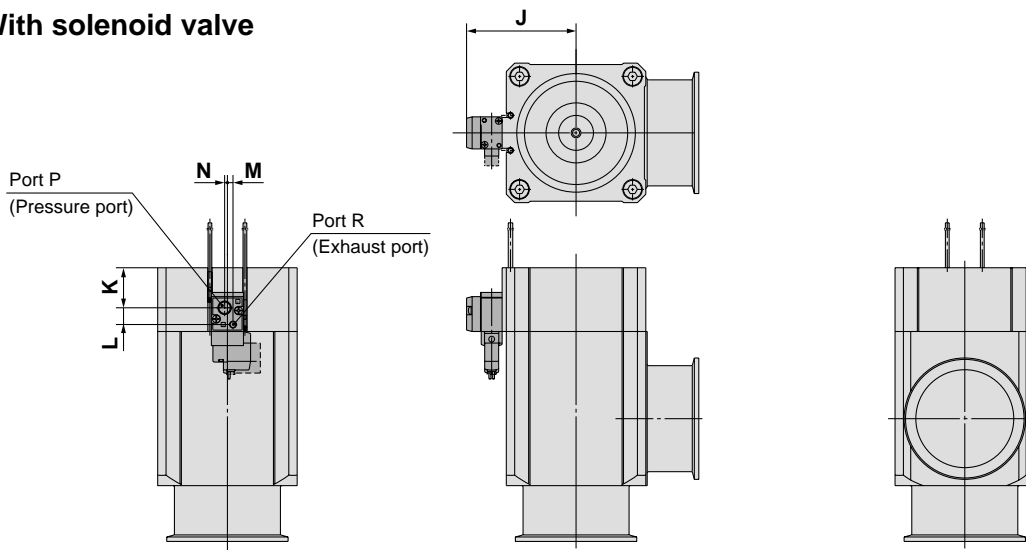
Note 1) Dimension E applies when heater option is included. (Lead wire length: approx. 1 m)

Note 2) (a), (b) and (c) in the above drawing indicate heater mounting positions.

Moreover, heater mounting positions will differ depending on the type of heater.

For further details, refer to mounting positions under "Replacement Heaters" on page 61.

### XLAV/With solenoid valve



Model	J	K	L	M	N
<b>XLAV-16</b>	35.5	13.4	8.5	2.7	3
<b>XLAV-25</b>	40.5	14.9	8.5	2.7	3
<b>XLAV-40</b>	50.5	22.7	8.5	2.7	3

Model	J	K	L	M	N
<b>XLAV-50</b>	57	25.7	8.5	2.7	3
<b>XLAV-63</b>	78.5	28.7	12	4	2
<b>XLAV-80</b>	87	38.7	12	4	2

\* Other dimensions are the same as the XLA.

\* Other dimensions are the same as the XLA.

Note) For further details on solenoid valves, refer to the catalog Best Pneumatics No. 1 for series SYJ300/500/700.

# Aluminum High Vacuum Angle Valve Double Acting/Bellows Seal Series **XLC/XLCV**



XLC

## How to Order

XLC - **16** - **M9N** **A** -   

①
②
③
④
⑤
⑥
⑦

### ① Flange size

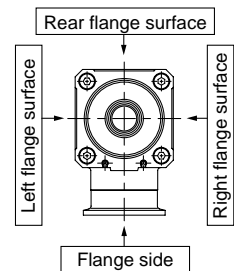
Size
16
25
40
50
63
80

### ② Flange type

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

### ③ Pilot port direction

Symbol	Pilot port direction
Nil	Flange side
K	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	—	
	H2	5 to 150°C	With 100°C heater
	H3	—	With 120°C heater

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

### ⑥ Number of auto switches/Mounting position

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

### ⑤ Auto switch type

Symbol	Auto switch model	Remarks
Nil	—	Without auto switch (without built-in magnet)
M9N(L)(M)(Z)	D-M9N(L)(M)(Z)	Solid state auto switch
M9P(L)(M)(Z)	D-M9P(L)(M)(Z)	
M9B(L)(M)(Z)	D-M9B(L)(M)(Z)	
A90(L)	D-A90(L)	Reed auto 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). Add "L" to the end of the part number when 3 m is desired, "M" when 1 m, and "Z" when 5 m.  
Example) -M9NL

### 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 <sup>Note 2)</sup>	Leakage (Pa·m <sup>3</sup> /s or less) <sup>Note 1)</sup>	
		Internal	External
Nil	None	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-11</sup> (FKM)
A	②, ③	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-9</sup>
B	②	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-11</sup> (FKM)
C	③	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-9</sup>

Note 1) Values at normal temperature, excluding gas permeation.

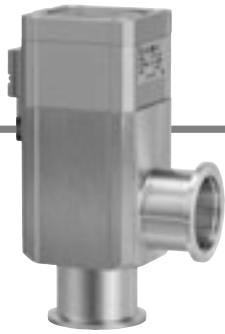
Note 2) Refer to parts number of "Construction" on page 18 for changed part. Number indicates parts number of "Construction" accordingly.

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) XLC-16-M9NA-XAN1A

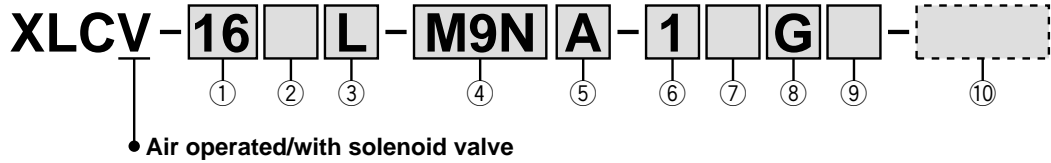


## Air Operated/with Solenoid Valve



XLCV

### How to Order



#### ① Flange size

Size
16
25
40
50
63
80

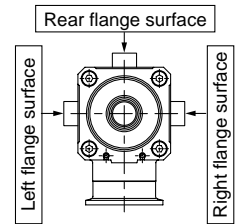
#### ② Flange type

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

#### ③ Solenoid valve direction

Symbol	Solenoid valve direction
K	Left flange surface
L	Rear flange surface
M	Right flange surface

\* M type plug connector (AC power supply) not attached for 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)(M)(Z)	D-M9N(L)(M)(Z)	Solid state auto switch
M9P(L)(M)(Z)	D-M9P(L)(M)(Z)	
M9B(L)(M)(Z)	D-M9B(L)(M)(Z)	
A90(L)	D-A90(L)	Reed auto switch (Not applicable to flange size 16)
A93(L)	D-A93(L)	Reed auto switch (Not applicable to flange size 16)
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, "M" when 1 m, and "Z" when 5 m.

Example) -M9NL

#### ⑤ Number of auto switches/Mounting position

Symbol	Quantity	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 Type of actuation

Nil	2 position single
W	2 position double

#### ⑧ 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

#### ⑨ 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.

#### ⑩ 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 <sup>Note 2)</sup>	Leakage (Pa·m <sup>3</sup> /s or less) <sup>Note 1)</sup>	
		Internal	External
Nil	None	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-11</sup> (FKM)
A	②, ③	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-9</sup>
B	②	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-11</sup> (FKM)
C	③	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-9</sup>

Note 1) Values at normal temperature, excluding gas permeation.

Note 2) Refer to parts number of "Construction" on page 18 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) XLCV-16-M9NA-1G-XAN1A**

Note 1) Option specifications/Combinations

This model has auto switch and K(DN) flange options, but high temperature/heater options are not available.

Note 2) Solenoid valves

2 position single: XLCV-16, 25, 40, 50: SYJ3190, XLCV-63, 80: SYJ5190  
2 position double: XLCV-16, 25, 40, 50: SYJ3290, XLCV-63, 80: SYJ5290  
Example) SYJ3190-1GS, SYJ3290-1GS

For further details on solenoid valves, refer to the catalog Best Pneumatics No. 1 for series SYJ3000/5000/7000.

# Series XLC/XLCV

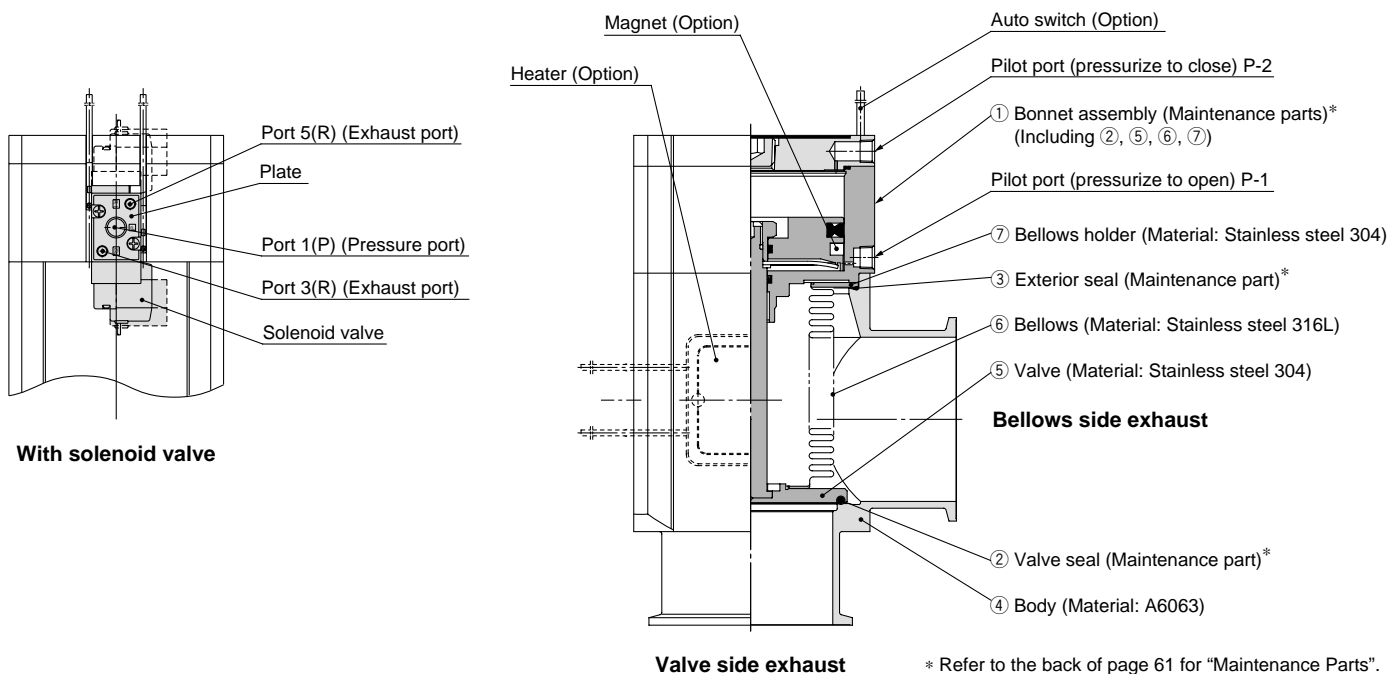
## Specifications

Model	XLC(V)-16	XLC(V)-25	XLC(V)-40	XLC(V)-50	XLC(V)-63	XLC(V)-80	
Valve type	Double acting (Dual operation), Pressurize to open/close						
Fluid	Inert gas under vacuum						
Operating temperature (°C)	XLC	5 to 60 (High temperature type: 5 to 150)					
	XLCV	5 to 50					
Operating pressure (Pa)	Atmospheric pressure to $1 \times 10^{-6}$						
Conductance (l/s) <small>Note 1)</small>	5	14	45	80	160	200	
Leakage (Pa·m <sup>3</sup> /s)	Internal	In case of standard material FKM: $1.3 \times 10^{-10}$ at normal temperature, excluding gas permeation					
	External	In case of standard material FKM: $1.3 \times 10^{-11}$ at normal temperature, excluding gas permeation					
Flange type	KF (NW)				KF (NW), K (DN)		
Principal materials	Body: Aluminum alloy, Bellows: Stainless steel 316L, Main part: Stainless steel, FKM (Standard seal material)						
Surface treatment	External: Hard anodized Internal: Raw material						
Pilot pressure (MPa)	0.3 to 0.6						
Pilot port size	XLC	M5		Rc1/8			
	XLCV	M5: Port 1(P), Port 3(R), Port 5(R)			Rc1/8: Port 1(P), M5: Port 3(R), Port 5(R)		
Mass (kg)	XLC	0.28	0.46	1.1	1.7	3.1	5.1
	XLCV	0.32	0.5	1.15	1.74	3.16	5.16

Note 1) Conductance is the value for an elbow with the same dimensions.

Note 2) For valve heater specifications, refer to "Common Option [1] Heater" on page 55.

## Construction/Operation



\* Refer to the back of page 61 for "Maintenance Parts".

### <Working principle>

By applying pressure from the pilot port P-1, the piston-coupled valve overcomes the operating force by the pressure, and the valve opens. (Pilot port P-2 is open) Alternatively, by applying pressure to actuation port P-2, the valve closes. (Pilot port P-1 is open) In the case of the XLCV, port 1(P) is normally pressurized, and the valve opens when the solenoid valve is turned ON and closes when it is turned OFF. In the case of a double solenoid, the valve moves to the opposite side from that in which the solenoid valve is turned ON.

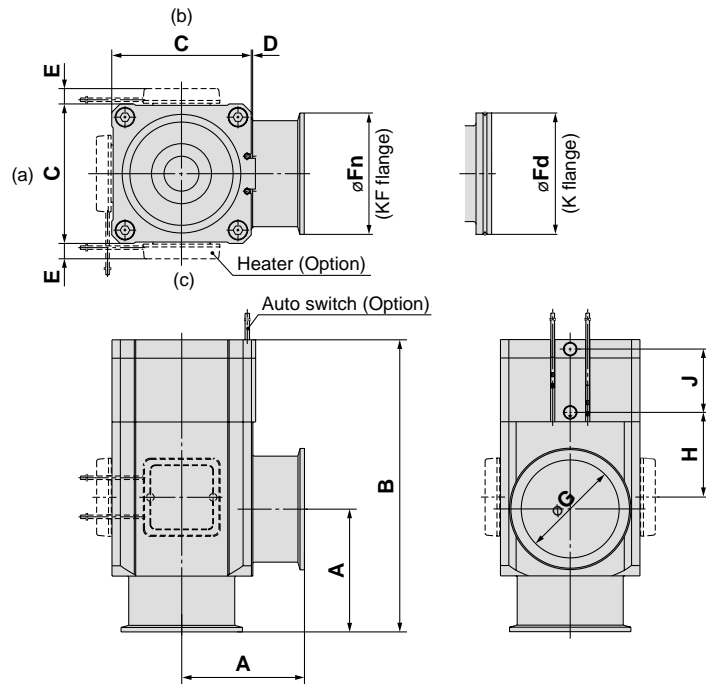
### <Options>

**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. Auto switches are applicable at ordinary temperatures only (5 to 60°C).

**Heater:** Simple heating is performed using thermistors. The valve body can be heated to approximately 100 or 120°C, depending on the heater option and the valve size. The type and number of thermistors to be used will vary depending upon size and setting temperature. In the case of high temperature specifications, the bonnet assembly is a heat resistant structure. This does not apply in cases where a solenoid valve is attached.

## Dimensions

### XLC/Air operated

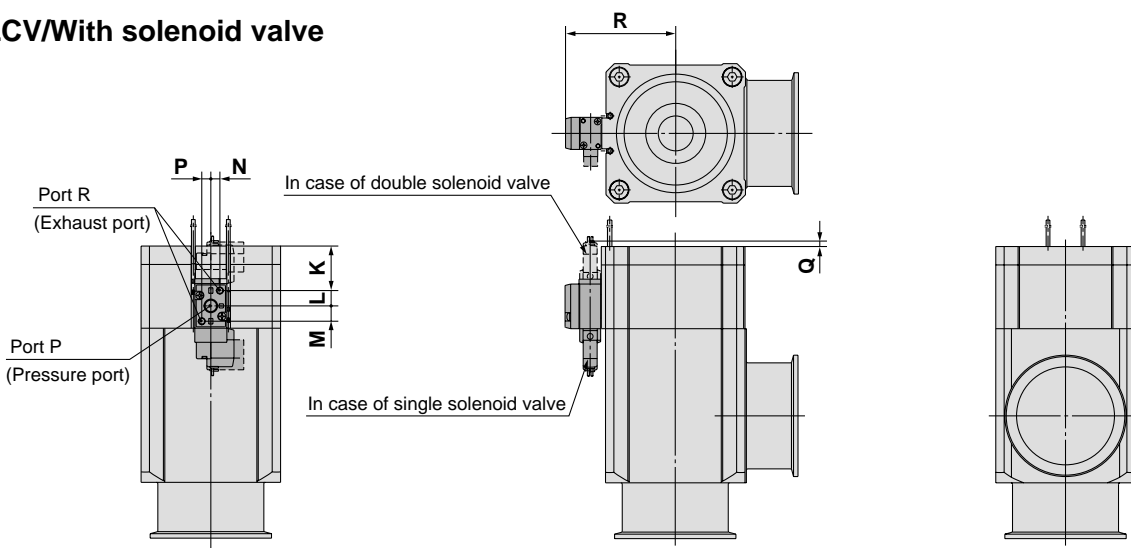


Model	A	B	C	D	E Note 1)	Fn	Fd	G	H	J
<b>XLC-16</b>	40	110	38	1	—	30	—	17	40	26
<b>XLC-25</b>	50	121	48	1	12	40	—	26	39	28
<b>XLC-40</b>	65	171	66	2	11	55	—	41	63	36
<b>XLC-50</b>	70	183	79	2	11	75	—	52	68	38
<b>XLC-63</b>	88	209	100	3	11	87	95	70	69	45
<b>XLC-80</b>	90	250	117	3	11	114	110	83	96	56

Note 1) Dimension E applies when heater option is included. (Lead wire length: approx. 1 m)

Note 2) (a), (b) and (c) in the above drawing indicate heater mounting positions. Moreover, heater mounting positions will differ depending on the type of heater. For further details, refer to mounting positions under "Replacement Heaters" on page 61.

### XLCV/With solenoid valve



Model	K	L	M	N	P	Q	R
<b>XLCV-16</b>	14.3	9.2	6.4	3.5	2.7	17.3	36
<b>XLCV-25</b>	15.8	9.2	6.4	3.5	2.7	15.8	41
<b>XLCV-40</b>	29	9.2	6.4	3.5	2.7	2.6	51

Model	K	L	M	N	P	Q	R
<b>XLCV-50</b>	32.3	9.2	6.4	3.5	2.7	—	57.5
<b>XLCV-63</b>	32	11	11	6.5	6.5	—	79
<b>XLCV-80</b>	43.7	11	11	6.5	6.5	—	87.5

\* Other dimensions are the same as the XLC.

\* Other dimensions are the same as the XLC.

Note) For further details on solenoid valves, refer to the catalog Best Pneumatics No. 1 for series SYJ3000/5000/7000.

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



XLF



Made to order specifications  
(For details, refer to page 24 to 29)

## How to Order

XLF - **16** - **M9N** **A** -

① ② ③ ④ ⑤ ⑥ ⑦

### ① Flange size

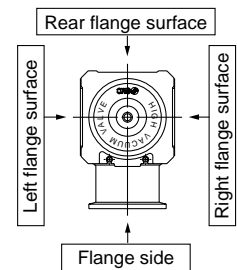
Size
16
25
40
50
63
80
100
160

### ② Flange type

Symbol	Type	Applicable flange
Nil	KF (NW)	16, 25, 40, 50, 63 80, 100, 160
D	K (DN)	63, 80, 100, 160

### 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 H2 H3	5 to 150°C
		With 100°C heater
		With 120°C heater

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

### ⑥ Number of auto switches/Mounting position

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

### ⑤ Auto switch type

Symbol	Auto switch model	Remarks
Nil	—	Without auto switch (without built-in magnet)
M9N(L)(M)(Z)	D-M9N(L)(M)(Z)	Solid state auto switch
M9P(L)(M)(Z)	D-M9P(L)(M)(Z)	
M9B(L)(M)(Z)	D-M9B(L)(M)(Z)	
A90(L)	D-A90(L)	Reed auto 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, "M" when 1 m, and "Z" when 5 m.

Example) -M9NL

### 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 <sup>Note 2)</sup>	Leakage (Pa·m <sup>3</sup> /s or less) <sup>Note 1)</sup>	
		Internal	External
Nil	None	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-10</sup> (FKM)
A	②, ③	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-8</sup>
B	②	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-10</sup> (FKM)
C	③	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-8</sup>

Note 1) Values at normal temperature, excluding gas permeation.

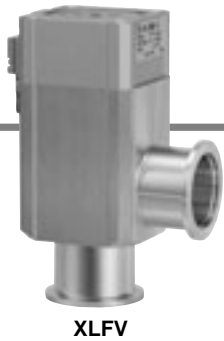
Note 2) Refer to parts number of "Construction" on page 22 for changed part. Number indicates parts number of "Construction" accordingly.

Note 3) Part ③ (exterior seal) is not changeable for sizes 16 and 25.

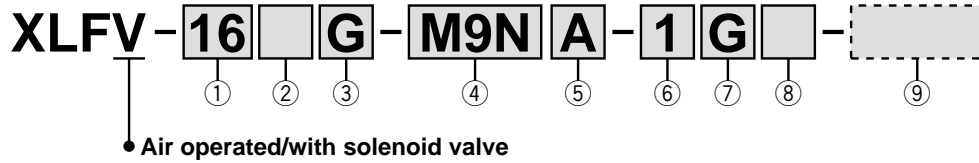
To order something other than "Nil" (standard), list the symbols starting with "X," followed by each symbol for "body surface treatment," "seal material" and then "changed part".

Example) XLF-40-M9NA-XAN1A

# Air Operated/with Solenoid Valve



## How to Order



### ① Flange size

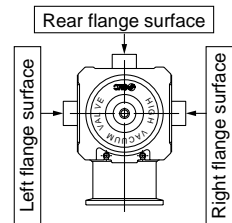
Size
16
25
40
50
63
80
100
160

### ② Flange type

Symbol	Type	Applicable flange
Nil	KF (NW)	16, 25, 40, 50, 63
D	K (DN)	63, 80, 100, 160

### 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)(M)(Z)	D-M9N(L)(M)(Z)	Solid state auto switch
M9P(L)(M)(Z)	D-M9P(L)(M)(Z)	
M9B(L)(M)(Z)	D-M9B(L)(M)(Z)	
A90(L)	D-A90(L)	Reed auto 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, "M" when 1 m, and "Z" when 5 m.

Example) -M9NL

### 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

### ⑤ Number of auto switches/Mounting position

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

### 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	Leakage (Pa·m <sup>3</sup> /s or less) <sup>Note 1)</sup>	
		Internal	External
Nil	None	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-10</sup> (FKM)
A	②, ③	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-8</sup>
B	②	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-10</sup> (FKM)
C	③	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-8</sup>

Note 1) Values at normal temperature, excluding gas permeation.

Note 2) Refer to parts number of "Construction" on page 22 for changed part.

Number indicates parts number of "Construction" accordingly.

Note 3) Part ③ (exterior seal) is not changeable for sizes 16 and 25.

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) XLFV-40-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

XLFV-16, 25, 40: SYJ319, XLFV-50, 63, 80, 100, 160: SYJ519

Example) SYJ319-1GS.

For further details on solenoid valves, refer to the catalog Best Pneumatics No. 1 for series SYJ300/500/700.

# Series XLF/XLFV

## Specifications

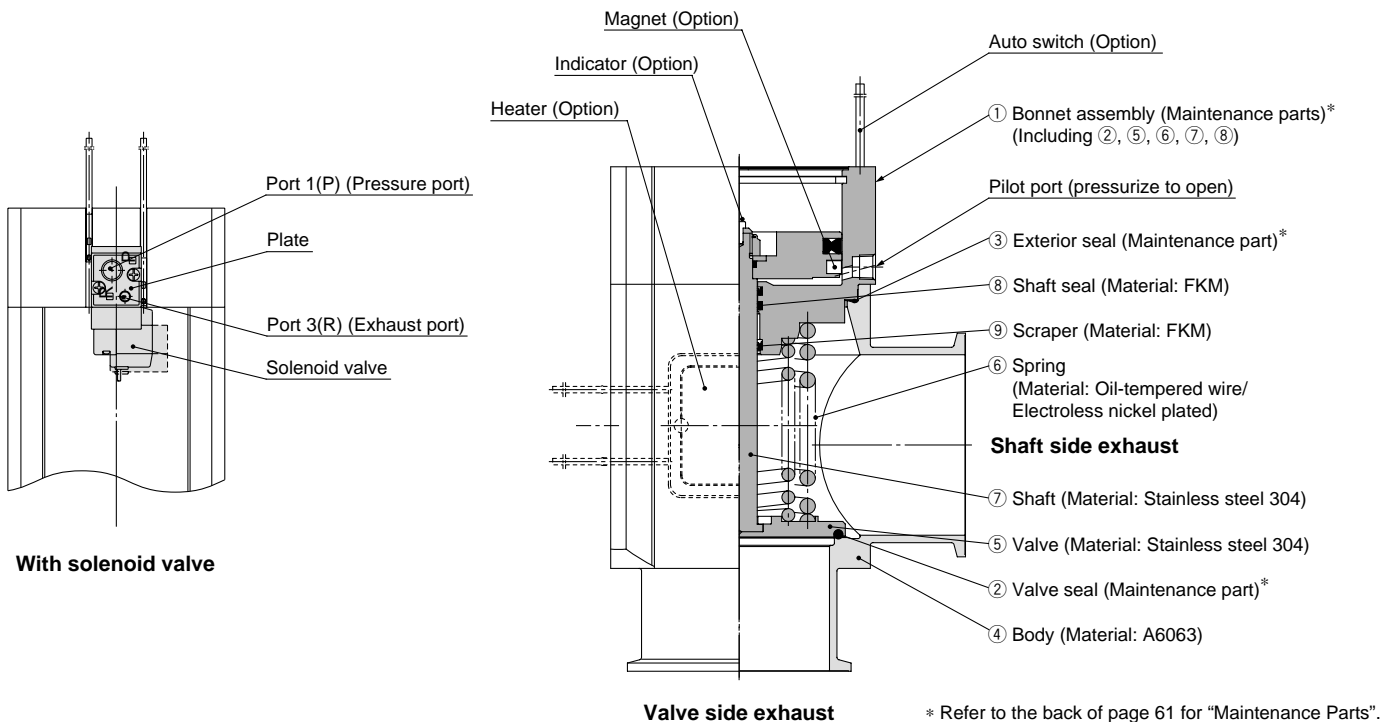
Model	XLF(V)-16	XLF(V)-25	XLF(V)-40	XLF(V)-50	XLF(V)-63	XLF(V)-80	XLF(V)-100	XLF(V)-160	
Valve type	Normally closed (Pressurize to open, Spring seal)								
Fluid	Inert gas under vacuum								
Operating temperature (°C)	XLF	5 to 60 (High temperature type: 5 to 150)							
	XLFV	5 to 50							
Operating pressure (Pa) {Torr}	Atmospheric pressure to $1 \times 10^{-5}$ {760 to $7.5 \times 10^{-8}$ }								
Conductance (l/s) <sup>Note 1)</sup>	5	14	45	80	160	200	300	800	
Leakage (Pa·m <sup>3</sup> /s)	Internal	In case of standard material FKM: $1.3 \times 10^{-10}$ at normal temperature, excluding gas permeation							
	External	In case of standard material FKM: $1.3 \times 10^{-10}$ at normal temperature, excluding gas permeation							
Flange type	KF (NW)				KF (NW), K (DN)				
Principal materials <sup>Note 3)</sup>	Body: Aluminum alloy, Main part: Stainless steel, FKM (Standard seal material)								
Surface treatment	External: Hard anodized				Internal: Raw material				
Pilot pressure (MPa)	0.4 to 0.7								
Pilot port size	XLF	M5		Rc1/8				Rc1/4	
	XLFV	M5: Port 1(P), Port 3(R)			Rc1/8: Port 1(P), M5: Port 3(R)				
Mass (kg)	XLF	0.25	0.45	1.1	1.6	3.0	4.8	10	18
	XLFV	0.29	0.49	1.14	1.66	3.06	4.86	10.1	18.1

Note 1) Conductance is the value for an elbow with the same dimensions.

Note 2) For valve heater specifications, refer to "Common Option [1] Heater" on page 55.

Note 3) A coating of vacuum grease [Y-VAC2] is applied to the seal-material sliding portion of the vacuum part.

## Construction/Operation



### <Working principle>

By applying 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.

### <Options>

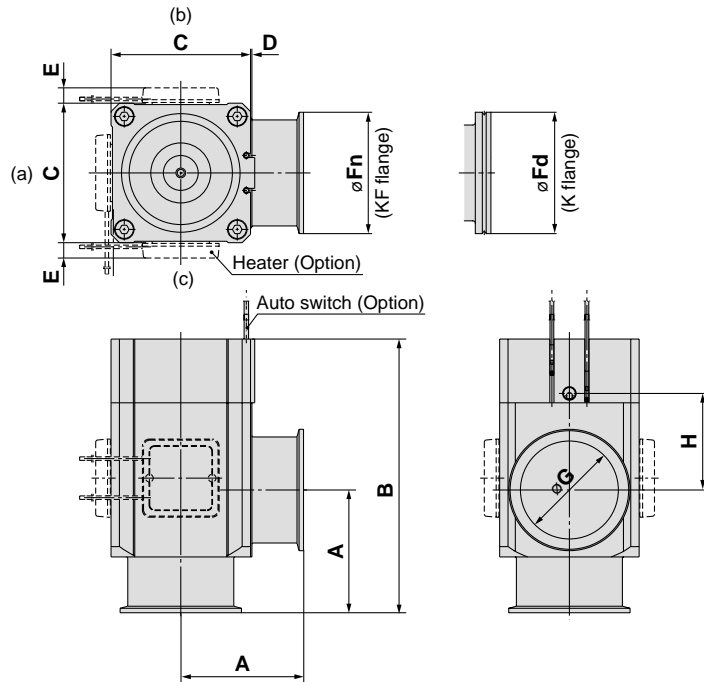
**Auto switch:** The magnet activates the auto switch. With 2 auto switches, the open and closed positions are detected, and with 1 auto switch, either the open or closed position is detected. Auto switches are applicable at ordinary temperatures only (5 to 60°C).

**Heater:** Simple heating is performed using thermistors. The valve body can be heated to approximately 100 or 120°C, depending on the heater option and the valve size. The type and number of thermistors to be used will vary depending upon size and setting temperature. In the case of high temperature specifications, the bonnet assembly is a heat resistant structure. This does not apply in cases where a solenoid valve is attached.

**Indicator:** When the valve is open, an orange marker appears in the center of the name plate.

## Dimensions

### XLF/Air operated



(mm)

Model	A	B	C	D	E <sup>Note 1)</sup>	F <sub>n</sub>	F <sub>d</sub>	G	H
<b>XLF-16</b>	40	103	38	1	—	30	—	17	40
<b>XLF-25</b>	50	113	48	1	12	40	—	26	39
<b>XLF-40</b>	65	158	66	2	11	55	—	41	63
<b>XLF-50</b>	70	170	79	2	11	75	—	52	68
<b>XLF-63</b>	88	196	100	3	11	87	95	70	69
<b>XLF-80</b>	90	235	117	3	11	114	110	83	96
<b>XLF-100</b>	108	300	154	3	11	134	130	102	131
<b>XLF-160</b>	138	315	200	3	11	190	180	153	112

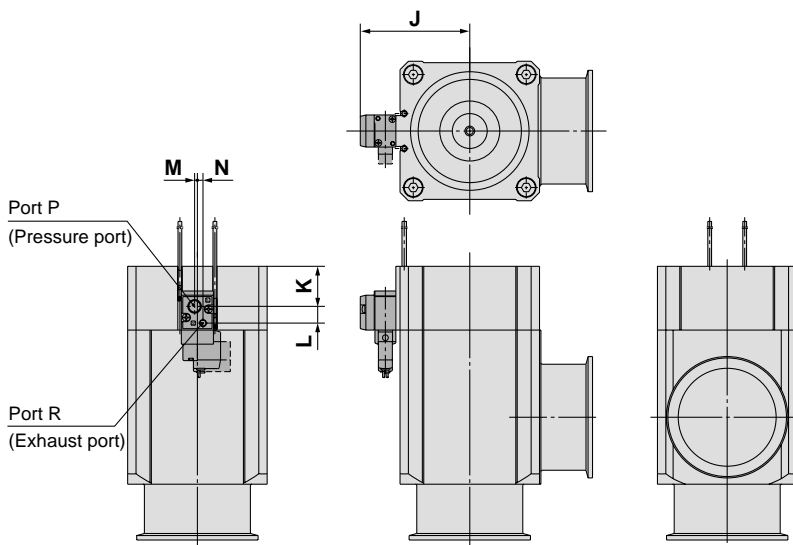
Note 1) Dimension E applies when heater option is included. (Lead wire length: approx. 1 m)

Note 2) (a), (b) and (c) in the above drawing indicate heater mounting positions.

Moreover, heater mounting positions will differ depending on the type of heater.

For further details, refer to mounting positions under "Replacement Heaters" on page 61.

### XLFFV/With solenoid valve



(mm)

Model	J	K	L	M	N
<b>XLFFV-16</b>	35.5	13.4	8.5	3	2.7
<b>XLFFV-25</b>	40.5	15	8.5	3	2.7
<b>XLFFV-40</b>	50.5	22.7	8.5	3	2.7
<b>XLFFV-50</b>	67	21.7	12	4	2
<b>XLFFV-63</b>	78.5	28.7	12	4	2
<b>XLFFV-80</b>	87	38.7	12	4	2
<b>XLFFV-100</b>	105.5	49.7	12	4	2
<b>XLFFV-160</b>	128.5	58	12	4	2

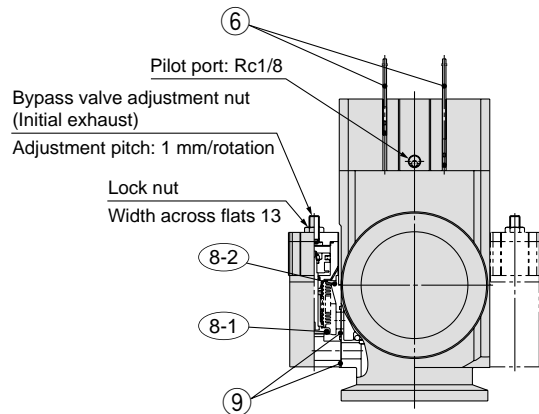
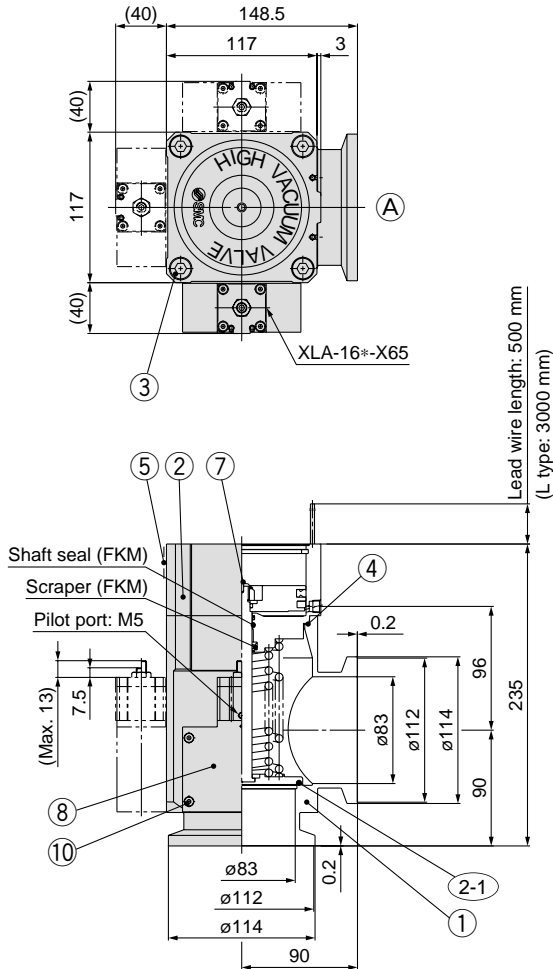
\* Other dimensions are the same as the XLF.

Note) For further details on solenoid valves, refer to the catalog Best Pneumatics No. 1 for series SYJ300/500/700.

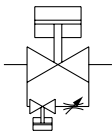


Please consult with SMC for detailed dimensions, specifications and delivery.

**With Bypass Valve (Flange size: 80)**



**Symbol**



**O-ring Part No.**

Seal material symbol	Internal seal (2-1)	External seal (4)
<b>Nil</b>	B2401-V85V	AS568-045V
<b>N1</b>	B2401-V85-XN1	AS568-045-XN1
<b>P1</b>	B2401-V85-XP1	AS568-045-XP1
<b>Q1</b>	B2401-V85-XQ1	AS568-045-XQ1
<b>R1</b>	B2401-V85-XR1	AS568-045-XR1
<b>R2</b>	B2401-V85-XR2	AS568-045-XR2
<b>R3</b>	B2401-V85-XR3	AS568-045-XR3
<b>S1</b>	B2401-V85-XS1	AS568-045-XS1
<b>T1</b>	B2401-V85-XT1	AS568-045-XT1
<b>U1</b>	B2401-V85-XU1	AS568-045-XU1

**Component Parts**

No.	Description	Material	Remarks
1	<b>Body</b>	A6063	Refer to part no.
2	<b>Bonnet assembly</b>		Refer to part no.
2-1	<b>O-ring</b>		Refer to part no.
3	<b>Hexagon socket head cap screw</b>	Stainless steel	M10, ℓ = 60
4	<b>O-ring</b>		Refer to part no.
5	<b>Computer name plate</b>		
6	<b>Auto switch</b>		Option
7	<b>Indicator</b>		Option
8	<b>Bypass valve</b>		Refer to part no.
8-1	<b>O-ring</b>		Refer to part no.
8-2	<b>O-ring</b>		Refer to part no.
9	<b>O-ring</b>		Refer to part no.
10	<b>Hexagon socket head cap screw</b>	Stainless steel	M4, ℓ = 40

**O-ring Part No.**

Seal material symbol	Internal seal (8-1)	External seal (8-2)	External seal (9)
<b>Nil</b>	B2401-V15V	AS568-025V	AS568-017V
<b>N1</b>	B2401-V15-XN1	AS568-025-XN1	AS568-017-XN1
<b>P1</b>	B2401-V15-XP1	AS568-025-XP1	AS568-017-XP1
<b>Q1</b>	B2401-V15-XQ1	AS568-025-XQ1	AS568-017-XQ1
<b>R1</b>	B2401-V15-XR1	AS568-025-XR1	AS568-017-XR1
<b>R2</b>	B2401-V15-XR2	AS568-025-XR2	AS568-017-XR2
<b>R3</b>	B2401-V15-XR3	AS568-025-XR3	AS568-017-XR3
<b>S1</b>	B2401-V15-XS1	AS568-025-XS1	AS568-017-XS1
<b>T1</b>	B2401-V15-XT1	AS568-025-XT1	AS568-017-XT1
<b>U1</b>	B2401-V15-XU1	AS568-025-XU1	AS568-017-XU1

Note) A coating of vacuum grease (fluorinated grease: Y-VAC2) is applied to the shaft seal, scraper and O-ring (9).



### How to Order Valve

**XLFR-80**   - **M9N** **A** - **1K** - X

Main valve: 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

Temperature specifications

Symbol	Temperature
Nil	5 to 60°C
H0	5 to 150°C

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

\* Flange: (A)

Auto switch type  
(Operating temperature 5 to 60°C)

Symbol	Auto switch model	Switch type
Nil	—	Without auto switch (without built-in magnet)
M9N(L)	D-M9N(L)	Solid state auto switch
M9P(L)	D-M9P(L)	
M9B(L)	D-M9B(L)	
A90(L)	D-A90(L)	Reed auto switch
A93(L)	D-A93(L)	
M9//	Without auto switch (with built-in magnet)	

Note) Types with auto switches are not available in case of high temperature types.  
L type: Lead wire length 3000 mm

Bypass valve mounting position/  
Pilot port direction

Symbol	Mounting position	Symbol	Pilot port direction
1	Left flange surface	Nil	Flange side
		K	Left flange surface
		L	Rear flange surface
2	Right flange surface	Nil	Flange side
		L	Rear flange surface
		M	Right flange surface
3	Rear flange surface	K	Left flange surface
		L	Rear flange surface
		M	Right flange surface

\* Flange: (A)

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Chemraz® is a registered trademark of Greene, Tweed & Co.  
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Number of auto switches/Mounting position

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

Seal material changed part

Symbol	Changed part	Leakage (Pa·m <sup>3</sup> /s or less) <sup>Note</sup>	
		Internal	External
Nil	None	1.3 x 10 <sup>-9</sup> (FKM)	1.3 x 10 <sup>-9</sup> (FKM)
A	(2-1) (8-1) (4) (8-2) (9)	1.3 x 10 <sup>-7</sup>	1.3 x 10 <sup>-7</sup>
B	(2-1) (8-1)	1.3 x 10 <sup>-7</sup>	1.3 x 10 <sup>-9</sup> (FKM)
C	(4) (8-2) (9)	1.3 x 10 <sup>-9</sup> (FKM)	1.3 x 10 <sup>-7</sup>

Note) Values at normal temperature, excluding gas permeation.

### Maintenance Parts

① Body Part No.

**XLAR80-1S-1**

Bypass valve mounting position

Symbol	Mounting position
1	Left flange surface
2	Right flange surface
3	Rear flange surface

\* Flange: (A)

⑧ Bypass Valve Part No.

**XLA-16**   -   - **X65**

Pilot port direction

Symbol	Pilot port direction
Nil	Rear (as seen from body connection point)
K	Left (as seen from body connection point)
M	Right (as seen from body connection point)

Temperature specifications

Symbol	Temperature
Nil	5 to 60°C
H0	5 to 150°C

Seal material changed part

Symbol	Changed part
Nil	None
A	(8-1) (8-2)
B	(8-1)
C	(8-2)

Seal material: Same as the seal materials of How to Order Valve.

② Bonnet Assembly Part No.

**XLF80A-30-1H** - **M9NA-XN1**

Bonnet assembly

Temperature	Indicator	Part no.
5 to 60°C	Without indicator	XLF80-30-1
	With indicator	XLF80A-30-1
5 to 150°C	Without indicator	XLF80-30-1H
	With indicator	XLF80A-30-1H

Same as How to Order.

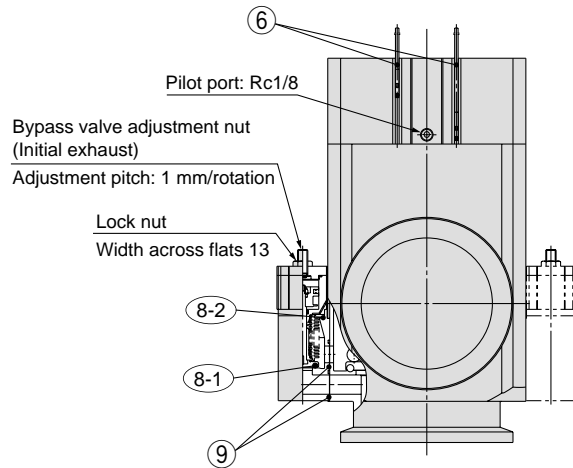
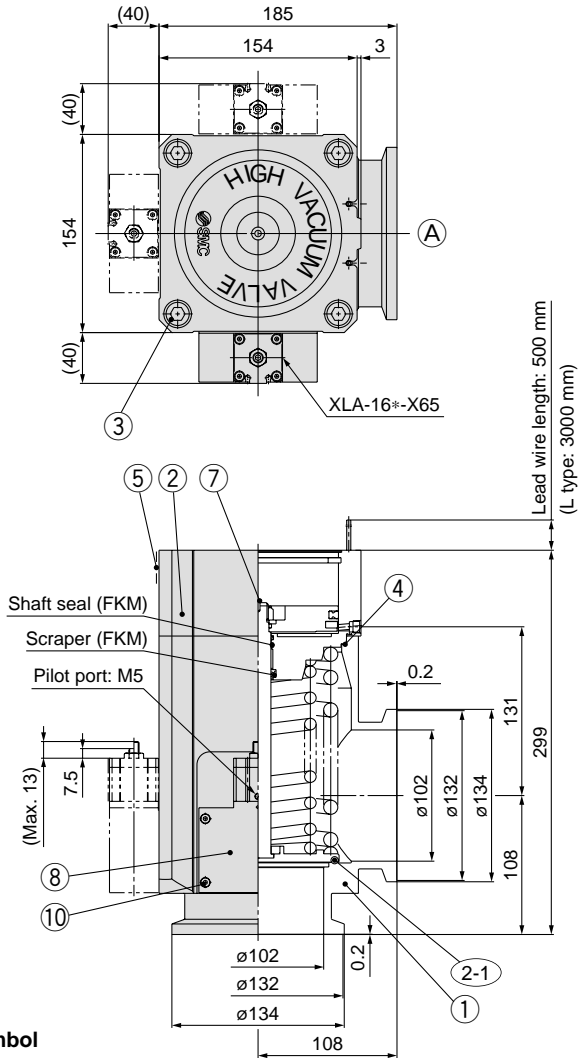
Specifications

Valve type	Main valve: Normally closed	Bypass valve: Normally closed
Shaft seal type	O-ring seal	Bellows seal
Operating pressure range	Atmospheric pressure to 1 x 10 <sup>-5</sup> Pa	
Fluid	Inert gas under vacuum	
Operating temperature	5 to 60°C (Option: 5 to 150°C)	
Conductance	200 l/s	Max. 25 l/s (Calculated value)
Operating pressure	0.4 to 0.7 MPa	
Flange	KF80	

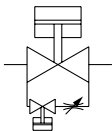


Please consult with SMC for detailed dimensions, specifications and delivery.

**With Bypass Valve (Flange size: 100)**



**Symbol**



**O-ring Part No.**

Seal material symbol	Internal seal (2-1)	External seal (4)
Nil	AS568-349V	AS568-050V
N1	AS568-349-XN1	AS568-050-XN1
P1	AS568-349-XP1	AS568-050-XP1
Q1	AS568-349-XQ1	AS568-050-XQ1
R1	AS568-349-XR1	AS568-050-XR1
R2	AS568-349-XR2	AS568-050-XR2
R3	AS568-349-XR3	AS568-050-XR3
S1	AS568-349-XS1	AS568-050-XS1
T1	AS568-349-XT1	AS568-050-XT1
U1	AS568-349-XU1	AS568-050-XU1

**Component Parts**

No.	Description	Material	Remarks
1	Body	A6063	Refer to part no.
2	Bonnet assembly		Refer to part no.
2-1	O-ring		Refer to part no.
3	Hexagon socket head cap screw	Stainless steel	M12, ℓ = 70
4	O-ring		Refer to part no.
5	Computer name plate		
6	Auto switch		Option
7	Indicator		Option
8	Bypass valve		Refer to part no.
8-1	O-ring		Refer to part no.
8-2	O-ring		Refer to part no.
9	O-ring		Refer to part no.
10	Hexagon socket head cap screw	Stainless steel	M4, ℓ = 40

**O-ring Part No.**

Seal material symbol	Internal seal (8-1)	External seal (8-2)	External seal (9)
Nil	B2401-V15V	AS568-025V	AS568-017V
N1	B2401-V15-XN1	AS568-025-XN1	AS568-017-XN1
P1	B2401-V15-XP1	AS568-025-XP1	AS568-017-XP1
Q1	B2401-V15-XQ1	AS568-025-XQ1	AS568-017-XQ1
R1	B2401-V15-XR1	AS568-025-XR1	AS568-017-XR1
R2	B2401-V15-XR2	AS568-025-XR2	AS568-017-XR2
R3	B2401-V15-XR3	AS568-025-XR3	AS568-017-XR3
S1	B2401-V15-XS1	AS568-025-XS1	AS568-017-XS1
T1	B2401-V15-XT1	AS568-025-XT1	AS568-017-XT1
U1	B2401-V15-XU1	AS568-025-XU1	AS568-017-XU1

Note) A coating of vacuum grease (fluorinated grease: Y-VAC2) is applied to the shaft seal, scraper and O-ring (9).

### How to Order Valve

**XLFR-100**   - **M9N** **A** - **1K** - X

Main valve: Indicator/  
Pilot port direction

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

\* Flange: (A)

Temperature specifications

Symbol	Temperature
Nil	5 to 60°C
<b>H0</b>	5 to 150°C

Number of auto switches/Mounting position

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

Auto switch type

Symbol	Auto switch model	Switch type
Nil	—	Without auto switch (without built-in magnet)
<b>M9N(L)(M)(Z)</b>	D-M9N(L)(M)(Z)	Solid state auto switch
<b>M9P(L)(M)(Z)</b>	D-M9P(L)(M)(Z)	
<b>M9B(L)(M)(Z)</b>	D-M9B(L)(M)(Z)	
<b>A90(L)</b>	D-A90(L)	Reed auto switch
<b>A93(L)</b>	D-A93(L)	
<b>M9//</b>	Without auto switch (with built-in magnet)	

Note 1) Standard lead wire length is 0.5 m. Add "L" to the end of the part number when 3 m is desired, "M" when 1 m, and "Z" when 5 m.

Note 2) Types with auto switches are not available in case of high temperature types.

Bypass valve mounting position/Pilot port direction

Symbol	Mounting position	Symbol	Pilot port direction
<b>1</b>	Left flange surface	Nil	Flange side
		<b>K</b>	Left flange surface
		<b>L</b>	Rear flange surface
<b>2</b>	Right flange surface	Nil	Flange side
		<b>L</b>	Rear flange surface
		<b>M</b>	Right flange surface
<b>3</b>	Rear flange surface	<b>K</b>	Left flange surface
		<b>L</b>	Rear flange surface
		<b>M</b>	Right flange surface

\* Flange: (A)

Seal material

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

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Chemraz® is a registered trademark of Greene, Tweed & Co.  
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Seal material changed part

Symbol	Changed part	Leakage (Pa·m <sup>3</sup> /s or less) <sup>Note</sup>	
		Internal	External
Nil	None	1.3 x 10 <sup>-9</sup> (FKM)	1.3 x 10 <sup>-9</sup> (FKM)
<b>A</b>	(2-1) (8-1) (4) (8-2) (9)	1.3 x 10 <sup>-7</sup>	1.3 x 10 <sup>-7</sup>
<b>B</b>	(2-1) (8-1)	1.3 x 10 <sup>-7</sup>	1.3 x 10 <sup>-9</sup> (FKM)
<b>C</b>	(4) (8-2) (9)	1.3 x 10 <sup>-9</sup> (FKM)	1.3 x 10 <sup>-7</sup>

Note) Values at normal temperature, excluding gas permeation.

### Maintenance Parts

① Body Part No.

**XLAR100-1S-1**

Bypass valve mounting position

Symbol	Mounting position
<b>1</b>	Left flange surface
<b>2</b>	Right flange surface
<b>3</b>	Rear flange surface

⑧ Bypass Valve Part No.

**XLA-16**   -   - **X65**

Pilot port direction

Symbol	Pilot port direction
Nil	Rear (as seen from body connection point)
<b>K</b>	Left (as seen from body connection point)
<b>M</b>	Right (as seen from body connection point)

Seal material changed part

Symbol	Changed part
Nil	None
<b>A</b>	(8-1) (8-2)
<b>B</b>	(8-1)
<b>C</b>	(8-2)

② Bonnet Assembly Part No.

**XLF100A-30-1** - **M9NA-XN1**

Temperature specifications

Symbol	Temperature
Nil	5 to 60°C
<b>H0</b>	5 to 150°C

Bonnet assembly

Temperature	Indicator	Part no.
5 to 60°C	Without indicator	XLF100-30-1
	With indicator	XLF100A-30-1
5 to 150°C	Without indicator	XLF100-30-1H
	With indicator	XLF100A-30-1H

Same as How to Order.

Seal material: Same as the seal materials of How to Order Valve.

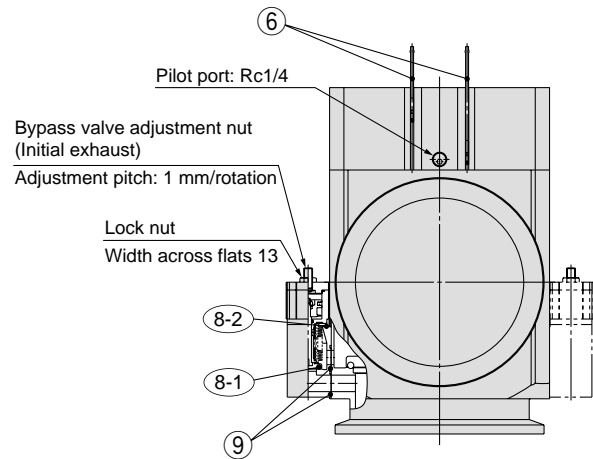
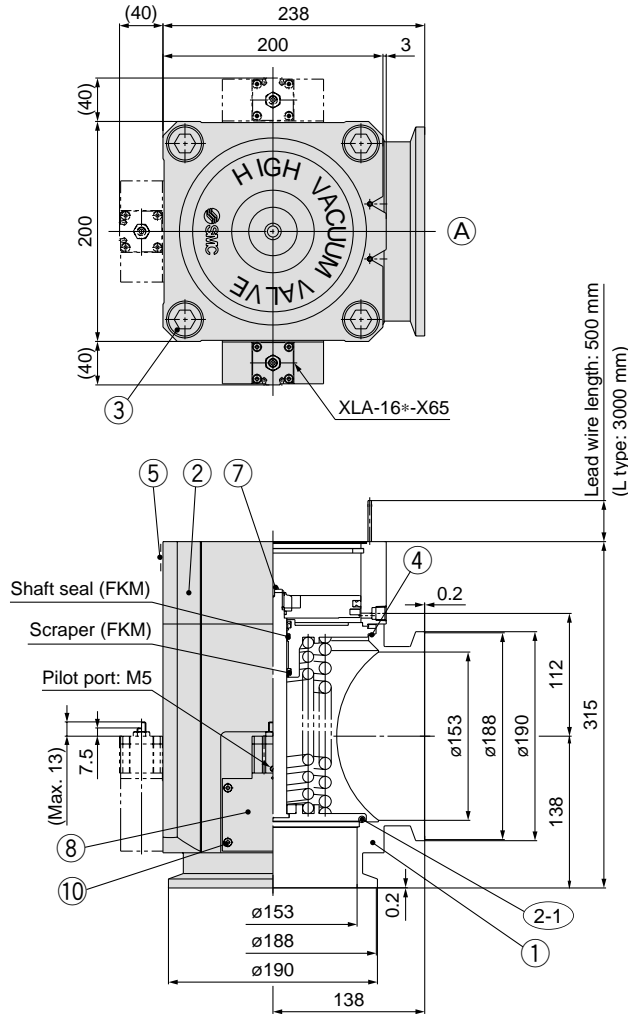
### Specifications

Valve type	Main valve: Normally closed	Bypass valve: Normally closed
Shaft seal type	O-ring seal	Bellows seal
Operating pressure range	Atmospheric pressure to 1 x 10 <sup>-5</sup> Pa	
Fluid	Inert gas under vacuum	
Operating temperature	5 to 60°C (Option: 5 to 150°C)	
Conductance	300 $\mu$ /s	Max. 31.5 $\mu$ /s (Calculated value)
Operating pressure	0.4 to 0.7 MPa	
Flange	KF100	

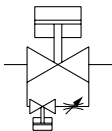


Please consult with SMC for detailed dimensions, specifications and delivery.

**With Bypass Valve (Flange size: 160)**



**Symbol**



**O-ring Part No.**

Seal material symbol	Internal seal (2-1)	External seal (4)
Nil	B2401-G155V	AS568-167V
N1	B2401-G155-XN1	AS568-167-XN1
P1	B2401-G155-XP1	AS568-167-XP1
Q1	B2401-G155-XQ1	AS568-167-XQ1
R1	B2401-G155-XR1	AS568-167-XR1
R2	B2401-G155-XR2	AS568-167-XR2
R3	B2401-G155-XR3	AS568-167-XR3
S1	B2401-G155-XS1	AS568-167-XS1
T1	B2401-G155-XT1	AS568-167-XT1
U1	B2401-G155-XU1	AS568-167-XU1

**Component Parts**

No.	Description	Material	Remarks
1	Body	A6063	Refer to part no.
2	Bonnet assembly		Refer to part no.
2-1	O-ring		Refer to part no.
3	Hexagon socket head cap screw	Stainless steel	M20, ℓ = 70
4	O-ring		Refer to part no.
5	Computer name plate		
6	Auto switch		Option
7	Indicator		Option
8	Bypass valve		Refer to part no.
8-1	O-ring		Refer to part no.
8-2	O-ring		Refer to part no.
9	O-ring		Refer to part no.
10	Hexagon socket head cap screw	Stainless steel	M4, ℓ = 40

**O-ring Part No.**

Seal material symbol	Internal seal (8-1)	External seal (8-2)	External seal (9)
Nil	B2401-V15V	AS568-025V	AS568-017V
N1	B2401-V15-XN1	AS568-025-XN1	AS568-017-XN1
P1	B2401-V15-XP1	AS568-025-XP1	AS568-017-XP1
Q1	B2401-V15-XQ1	AS568-025-XQ1	AS568-017-XQ1
R1	B2401-V15-XR1	AS568-025-XR1	AS568-017-XR1
R2	B2401-V15-XR2	AS568-025-XR2	AS568-017-XR2
R3	B2401-V15-XR3	AS568-025-XR3	AS568-017-XR3
S1	B2401-V15-XS1	AS568-025-XS1	AS568-017-XS1
T1	B2401-V15-XT1	AS568-025-XT1	AS568-017-XT1
U1	B2401-V15-XU1	AS568-025-XU1	AS568-017-XU1

Note) A coating of vacuum grease (fluorinated grease: Y-VAC2) is applied to the shaft seal, scraper and O-ring (9).

### How to Order Valve

**XLFR-160**   - **M9N** **A** - **1K** - **X**

Main valve: Indicator/  
Pilot port direction

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

\* Flange: (A)

Temperature specifications

Symbol	Temperature
Nil	5 to 60°C
<b>H0</b>	5 to 150°C

Number of auto switches/Mounting position

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

Auto switch type

Symbol	Auto switch model	Switch type
Nil	—	Without auto switch (without built-in magnet)
<b>M9N(L)(M)(Z)</b>	D-M9N(L)(M)(Z)	Solid state auto switch
<b>M9P(L)(M)(Z)</b>	D-M9P(L)(M)(Z)	
<b>M9B(L)(M)(Z)</b>	D-M9B(L)(M)(Z)	
<b>A90(L)</b>	D-A90(L)	Reed auto switch
<b>A93(L)</b>	D-A93(L)	
<b>M9//</b>	Without auto switch (with built-in magnet)	

Note 1) Standard lead wire length is 0.5 m. Add "L" to the end of the part number when 3 m is desired, "M" when 1 m, and "Z" when 5 m.

Note 2) Types with auto switches are not available in case of high temperature types.

Bypass valve mounting position/Pilot port direction

Symbol	Mounting position	Symbol	Pilot port direction
<b>1</b>	Left flange surface	Nil	Flange side
		<b>K</b>	Left flange surface
		<b>L</b>	Rear flange surface
<b>2</b>	Right flange surface	Nil	Flange side
		<b>L</b>	Rear flange surface
		<b>M</b>	Right flange surface
<b>3</b>	Rear flange surface	<b>K</b>	Left flange surface
		<b>L</b>	Rear flange surface
		<b>M</b>	Right flange surface

\* Flange: (A)

Seal material

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

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Seal material changed part

Symbol	Changed part	Leakage (Pa·m <sup>3</sup> /s or less) <sup>Note</sup>	
		Internal	External
Nil	None	1.3 x 10 <sup>-9</sup> (FKM)	1.3 x 10 <sup>-9</sup> (FKM)
<b>A</b>	(2-1) (8-1) (4) (8-2) (9)	1.3 x 10 <sup>-7</sup>	1.3 x 10 <sup>-7</sup>
<b>B</b>	(2-1) (8-1)	1.3 x 10 <sup>-7</sup>	1.3 x 10 <sup>-9</sup> (FKM)
<b>C</b>	(4) (8-2) (9)	1.3 x 10 <sup>-9</sup> (FKM)	1.3 x 10 <sup>-7</sup>

Note) Values at normal temperature, excluding gas permeation.

### Maintenance Parts

① Body Part No.

**XLAR160-1S-1**

Bypass valve mounting position

Symbol	Mounting position
<b>1</b>	Left flange surface
<b>2</b>	Right flange surface
<b>3</b>	Rear flange surface

⑧ Bypass Valve Part No.

**XLA-16**   -   - **X65**

Pilot port direction

Symbol	Pilot port direction
Nil	Rear (as seen from body connection point)
<b>K</b>	Left (as seen from body connection point)
<b>M</b>	Right (as seen from body connection point)

Seal material changed part

Symbol	Changed part
Nil	None
<b>A</b>	(8-1) (8-2)
<b>B</b>	(8-1)
<b>C</b>	(8-2)

② Bonnet Assembly Part No.

**XLF160A-30-1** - **M9NA-XN1**

Temperature specifications

Symbol	Temperature
Nil	5 to 60°C
<b>H0</b>	5 to 150°C

Bonnet assembly

Temperature	Indicator	Part no.
5 to 60°C	Without indicator	XLF160-30-1
	With indicator	XLF160A-30-1
5 to 150°C	Without indicator	XLF160-30-1H
	With indicator	XLF160A-30-1H

Same as  
How to Order.

Seal material: Same as the seal materials of How to Order Valve.

### Specifications

Valve type	Main valve: Normally closed	Bypass valve: Normally closed
Shaft seal type	O-ring seal	Bellows seal
Operating pressure range	Atmospheric pressure to 1 x 10 <sup>-5</sup> Pa	
Fluid	Inert gas under vacuum	
Operating temperature	5 to 60°C (Option: 5 to 150°C)	
Conductance	800 $\mu$ /s	Max. 31.5 $\mu$ /s (Calculated value)
Operating pressure	0.4 to 0.7 MPa	
Flange	KF160	

# Aluminum High Vacuum Angle Valve Double Acting/O-ring Seal Series **XLG/XLGV**



XLG



Made to order specifications  
(For details, refer to page 34 to 43)

## How to Order

XLG - **16** **M9N** **A** -

① ② ③ ④ ⑤ ⑥ ⑦

### ① Flange size

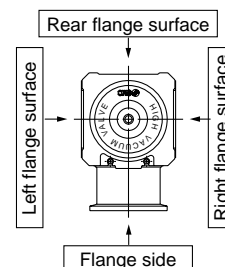
Size
16
25
40
50
63
80

### ② Flange type

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

### ③ Pilot port direction

Symbol	Pilot port direction
Nil	Flange side
K	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	—	
	H2	5 to 150°C	With 100°C heater
	H3	5 to 150°C	With 120°C heater

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

### ⑥ Number of auto switches/Mounting position

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

### ⑤ Auto switch type

Symbol	Auto switch model	Remarks
Nil	—	Without auto switch (without built-in magnet)
M9N(L)(M)(Z)	D-M9N(L)(M)(Z)	Solid state auto switch
M9P(L)(M)(Z)	D-M9P(L)(M)(Z)	
M9B(L)(M)(Z)	D-M9B(L)(M)(Z)	
A90(L)	D-A90(L)	Reed auto 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, "M" when 1 m, and "Z" when 5 m.  
Example) -M9NL

### 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 <sup>Note 2)</sup>	Leakage (Pa·m <sup>3</sup> /s or less) <sup>Note 1)</sup>	
		Internal	External
Nil	None	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-10</sup> (FKM)
A	②, ③	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-8</sup>
B	②	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-10</sup> (FKM)
C	③	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-8</sup>

Note 1) Values at normal temperature, excluding gas permeation.

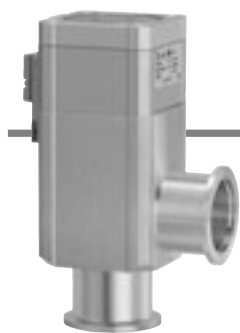
Note 2) Refer to parts number of "Construction" on page 32 for changed part. Number indicates parts number of "Construction" accordingly.

Note 3) Part ③ (exterior seal) is not changeable for sizes 16 and 25.

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".

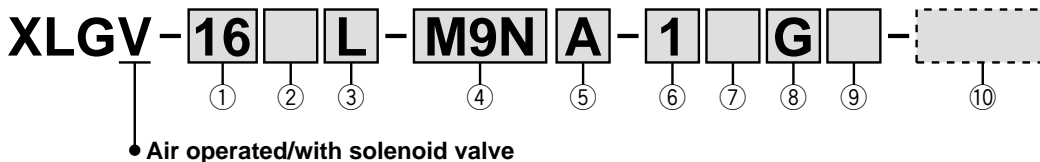
Example) XLG-40-M9NA-XAN1A

## Air Operated/with Solenoid Valve



XLGV

### How to Order



#### ① Flange size

Size
16
25
40
50
63
80

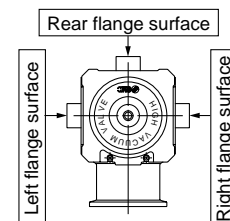
#### ② Flange type

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

#### ③ Solenoid valve direction

Symbol	Solenoid valve direction
K	Left flange surface
L	Rear flange surface
M	Right flange surface

\* M type plug connector (AC power supply) not attached for 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)(M)(Z)	D-M9N(L)(M)(Z)	Solid state auto switch
M9P(L)(M)(Z)	D-M9P(L)(M)(Z)	
M9B(L)(M)(Z)	D-M9B(L)(M)(Z)	
A90(L)	D-A90(L)	Reed auto 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, "M" when 1 m, and "Z" when 5 m.

Example) -M9NL

#### ⑤ Number of auto switches/Mounting position

Symbol	Quantity	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 Type of actuation

Nil	2 position single
W	2 position double

#### ⑧ 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

#### ⑨ 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.

#### ⑩ 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 <sup>Note 2)</sup>	Leakage (Pa·m <sup>3</sup> /s or less) <sup>Note 1)</sup>	
		Internal	External
Nil	None	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-10</sup> (FKM)
A	②, ③	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-8</sup>
B	②	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-10</sup> (FKM)
C	③	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-8</sup>

Note 1) Values at normal temperature, excluding gas permeation.

Note 2) Refer to parts number of "Construction" on page 32 for changed part. Number indicates parts number of "Construction" accordingly.

Note 3) Part ③ (exterior seal) is not changeable for sizes 16 and 25.

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) XLGV-40-M9NA-1G-XAN1A**

Note 1) Option specifications/Combinations

This model has auto switch and K(DN) flange options, but high temperature/heater options are not available.

Note 2) Solenoid valves

2 position single: XLGV-16, 25, 40: SYJ3190, XLGV-50, 63, 80: SYJ5190

2 position double: XLGV-16, 25, 40: SYJ3290, XLGV-50, 63, 80: SYJ5290

Example) SYJ3190-1GS, SYJ3290-1GS

For further details on solenoid valves, refer to the catalog Best Pneumatics No. 1 for series SYJ3000/5000/7000.

# Series XLG/XLGV

## Specifications

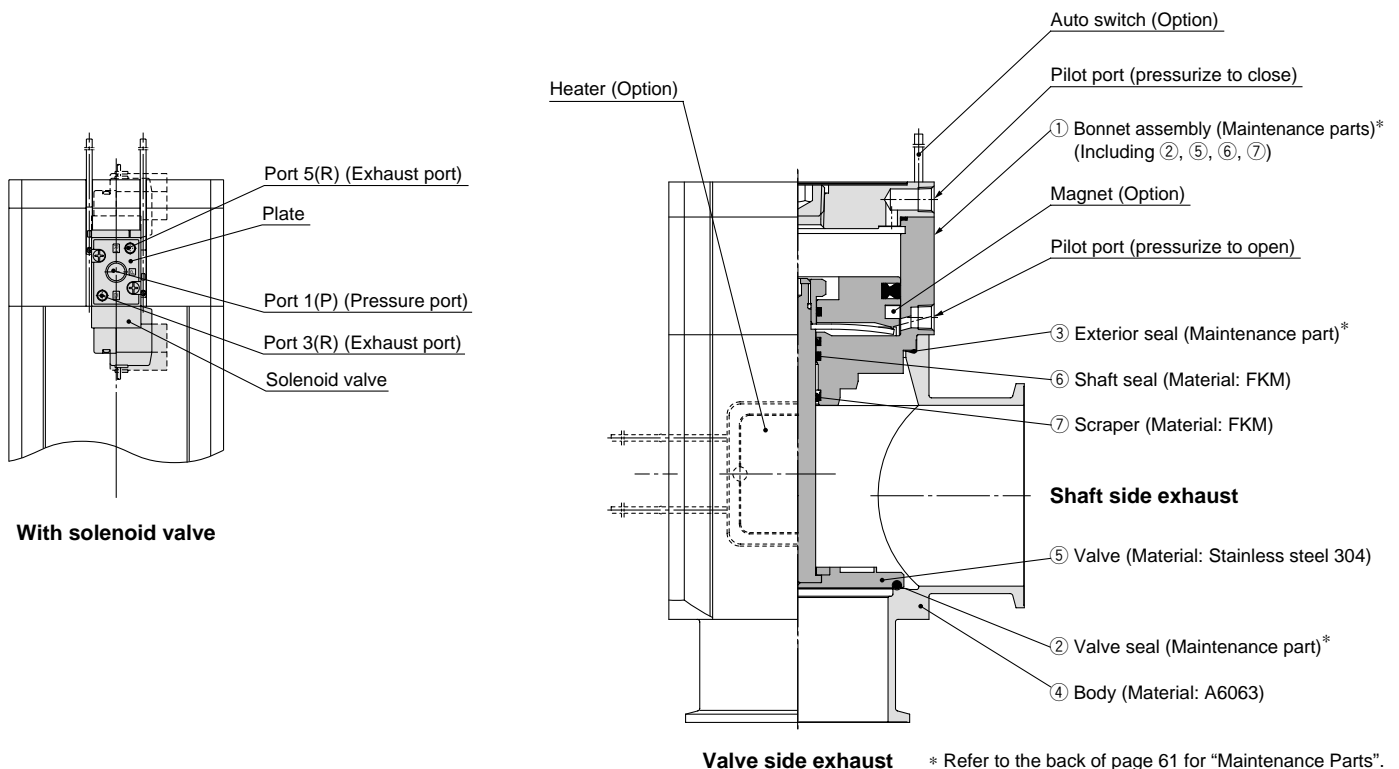
Model		XLG(V)-16	XLG(V)-25	XLG(V)-40	XLG(V)-50	XLG(V)-63	XLG(V)-80
Valve type		Double acting (Dual operation), Pressurize to open/close					
Fluid		Inert gas under vacuum					
Operating temperature (°C)	XLG	5 to 60 (High temperature type: 5 to 150)					
	XLGV	5 to 50					
Operating pressure (Pa)		Atmospheric pressure to $1 \times 10^{-5}$					
Conductance (ℓ/s) <small>Note 1)</small>		5	14	45	80	160	200
Leakage (Pa·m <sup>3</sup> /s)	Internal	In case of standard material FKM: $1.3 \times 10^{-10}$ at normal temperature, excluding gas permeation					
	External	In case of standard material FKM: $1.3 \times 10^{-10}$ at normal temperature, excluding gas permeation					
Flange type		KF (NW)			KF (NW), K (DN)		
Principal materials		Body: Aluminum alloy, Main part: Stainless steel, FKM (Standard seal material)					
Surface treatment		External: Hard anodized Internal: Raw material					
Pilot pressure (MPa)		0.3 to 0.6					
Pilot port size	XLG	M5			Rc1/8		
	XLGV	M5: Port 1(P), Port 3(R), Port 5(R)			Rc1/8: Port 1(P), M5: Port 3(R), Port 5(R)		
Mass (kg)	XLG	0.28	0.46	1.1	1.7	3.1	5.1
	XLGV	0.32	0.5	1.14	1.76	3.16	5.16

Note 1) Conductance is the value for an elbow with the same dimensions.

Note 2) For valve heater specifications, refer to "Common Option [1] Heater" on page 55.

Note 3) A coating of vacuum grease [Y-VAC2] is applied to the seal-material sliding portion of the vacuum part.

## Construction/Operation



### <Working principle>

By applying pressure from the pilot port P-1, the piston-coupled valve overcomes the operating force by the pressure, and the valve opens. (Pilot port P-2 is open)  
Alternatively, by applying pressure to pilot port P-2, the valve closes. (Pilot port P-1 is open)  
In the case of the XLGV, port 1(P) is normally pressurized, and the valve opens when the solenoid valve is turned ON and closes when it is turned OFF. In the case of a double solenoid, the valve moves to the opposite side from that in which the solenoid valve is turned ON.

### <Options>

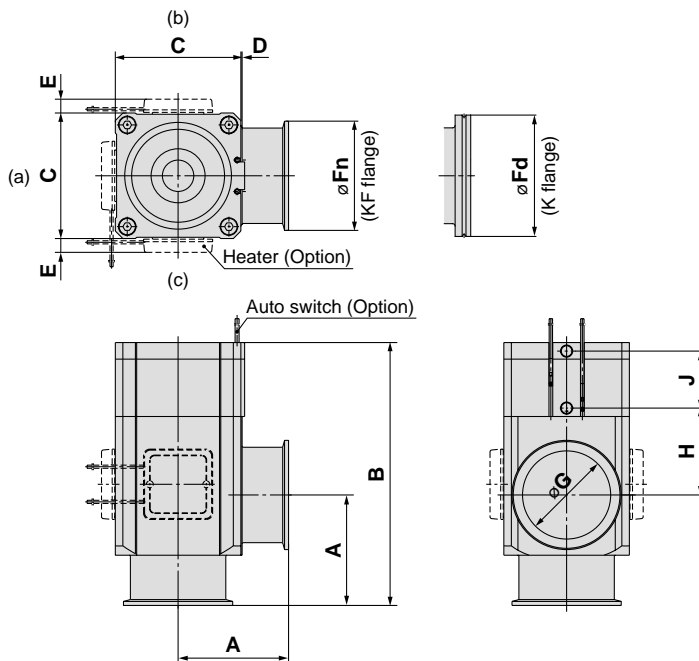
**Auto switch:** The magnet activates the auto switch. With 2 auto switches, the open and closed positions are detected, and with 1 auto switch, either the open or closed position is detected. Auto switches are applicable at ordinary temperatures only (5 to 60°C).

**Heater:** Simple heating is performed using thermistors. The valve body can be heated to approximately 100 or 120°C, depending on the heater option and the valve size. The type and number of thermistors to be used will vary depending upon size and setting temperature. In the case of high temperature specifications, the bonnet assembly is a heat resistant structure. This does not apply in cases where a solenoid valve is attached.



## Dimensions

### XLG/Air operated



Model	A	B	C	D	E <sup>Note 1)</sup>	Fn	Fd	G	H	J
<b>XLG-16</b>	40	110	38	1	—	30	—	17	40	26
<b>XLG-25</b>	50	121	48	1	12	40	—	26	39	28
<b>XLG-40</b>	65	171	66	2	11	55	—	41	63	36
<b>XLG-50</b>	70	183	79	2	11	75	—	52	68	38
<b>XLG-63</b>	88	209	100	3	11	87	95	70	69	45
<b>XLG-80</b>	90	250	117	3	11	114	110	83	96	56

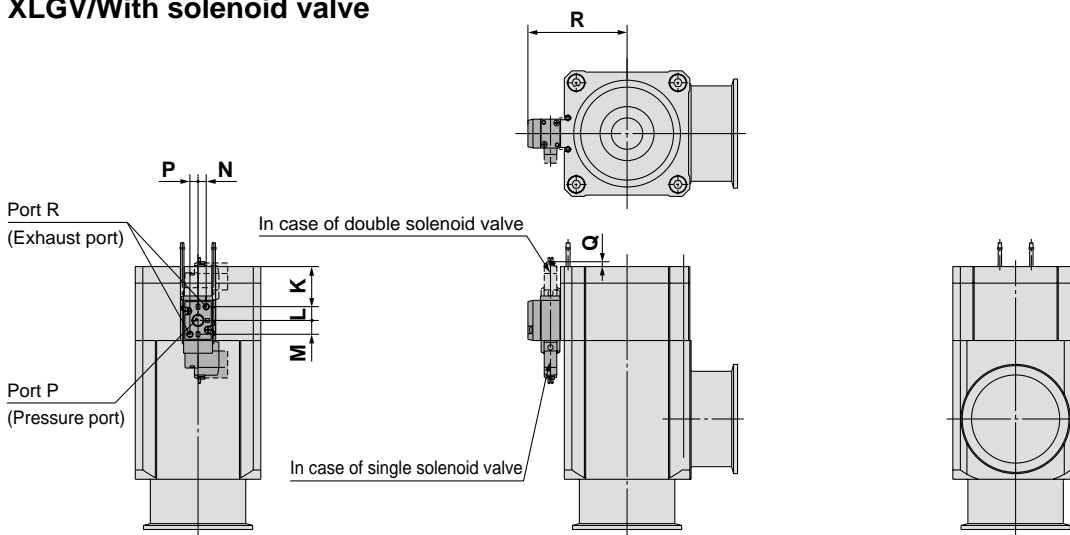
Note 1) Dimension E applies when heater option is included. (Lead wire length: approx. 1 m)

Note 2) (a), (b) and (c) in the above drawing indicate heater mounting positions.

Moreover, heater mounting positions will differ depending on the type of heater.

For further details, refer to mounting positions under "Replacement Heaters" on page 61.

### XLGV/With solenoid valve



Model	K	L	M	N	P	Q	R
<b>XLGV-16</b>	14.3	9.2	6.4	3.5	2.7	17.3	36
<b>XLGV-25</b>	15.8	9.2	6.4	3.5	2.7	15.8	41
<b>XLGV-40</b>	29	9.2	6.4	3.5	2.7	2.6	51
<b>XLGV-50</b>	25	11	11	6.5	6.5	7.7	67.5
<b>XLGV-63</b>	32.3	11	11	6.5	6.5	0.3	79
<b>XLGV-80</b>	43.7	11	11	6.5	6.5	—	87.5

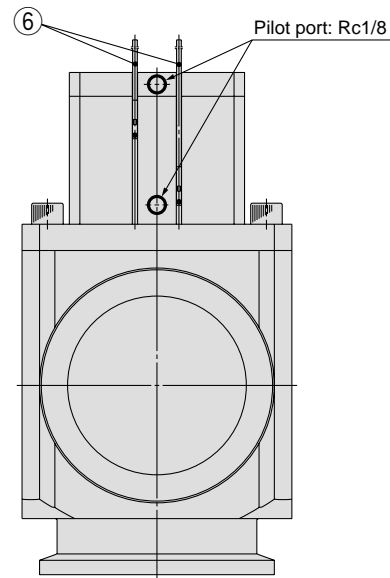
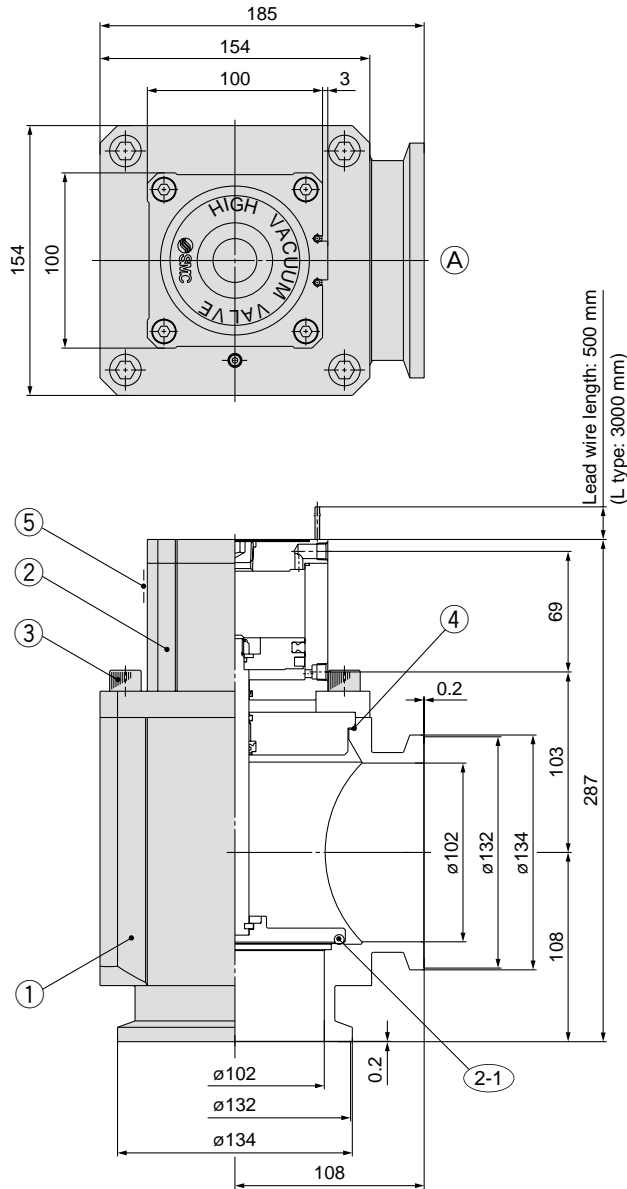
\* Other dimensions are the same as the XLG.

Note) For further details on solenoid valves, refer to the catalog Best Pneumatics No. 1 for series SYJ3000/5000/7000.



Please consult with SMC for detailed dimensions, specifications and delivery.

**Flange size: 100**



**Symbol**



JISB0125



JISZ8207

**Component Parts**

No.	Description	Material	Remarks
1	Body	A6063	XLA100-1S-X898
2	Bonnet assembly		Refer to part no.
2-1	O-ring	FKM	AS568-349V
3	Hexagon socket head cap screw	Stainless steel	M12, $l = 30$
4	O-ring	FKM	AS568-050V
5	Computer name plate		
6	Auto switch		Refer to part no.

### How to Order Valve

**XLG-100**   - **M9N** **A** - **X30**

● **Pilot port direction**

Symbol	Pilot port direction
Nil	Flange side
K	Left flange surface
L	Rear flange surface
M	Right flange surface

\* Flange: (A)

● **Temperature specifications**

Symbol	Temperature
Nil	5 to 60°C
H0	5 to 150°C

● **Number of auto switches/Mounting position**

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

● **Auto switch type (Operating temperature 5 to 60°C)**

Symbol	Auto switch model	Switch type
Nil	—	Without auto switch (without built-in magnet)
M9N(L)(M)(Z)	D-M9N(L)(M)(Z)	Solid state auto switch
M9P(L)(M)(Z)	D-M9P(L)(M)(Z)	
M9B(L)(M)(Z)	D-M9B(L)(M)(Z)	
A90(L)	D-A90(L)	Reed auto switch
A93(L)	D-A93(L)	
M9//	Without auto switch (with built-in magnet)	

Note) Types with auto switches are not available in case of high temperature types.

Standard lead wire length is 0.5 m. Add "L" to the end of the part number when 3 m is desired, "M" when 1 m, and "Z" when 5 m.

### Maintenance Parts

② **Bonnet Assembly Part No.**

**XLG100-30-1H** - **M9NA** - **X30**

● **Bonnet assembly**

Temperature	Part no.
5 to 60°C	XLG100-30-1
5 to 150°C	XLG100-30-1H

● Same as How to Order.

### Specifications

Valve type	Double acting
Shaft seal type	O-ring seal
Operating pressure range	Atmospheric pressure to $1 \times 10^{-5}$ Pa
Fluid	Inert gas under vacuum
Internal leakage	$1.3 \times 10^{-9}$ Pa·m <sup>3</sup> /s or less*
External leakage	$1.3 \times 10^{-9}$ Pa·m <sup>3</sup> /s or less*
Operating temperature	5 to 60°C (Option: 5 to 150°C)
Conductance	300 l/s
Operating pressure	0.4 to 0.6 MPa
Flange	KF100

\* Values at normal temperature, excluding gas permeation.

XL□

XL□Q

XM□

XY□

D-□

XVD

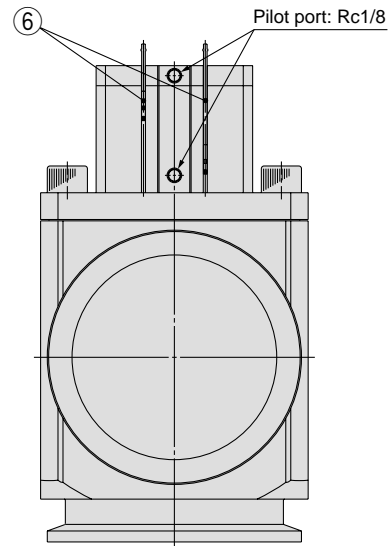
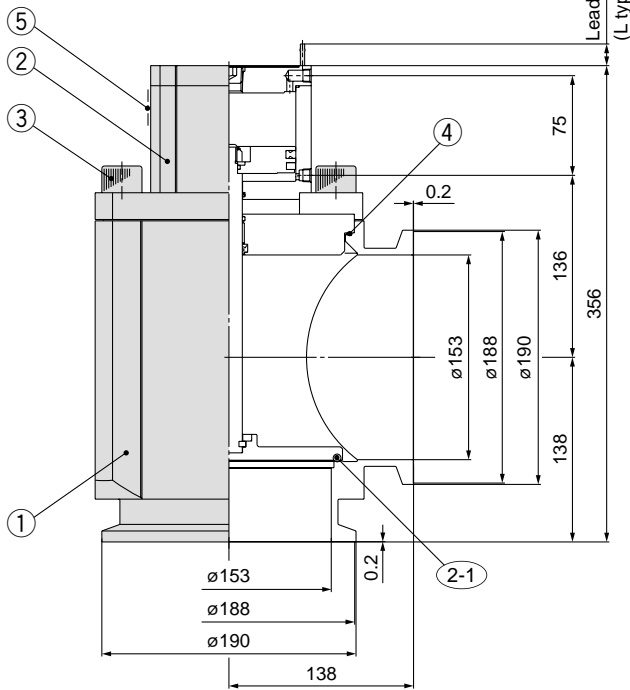
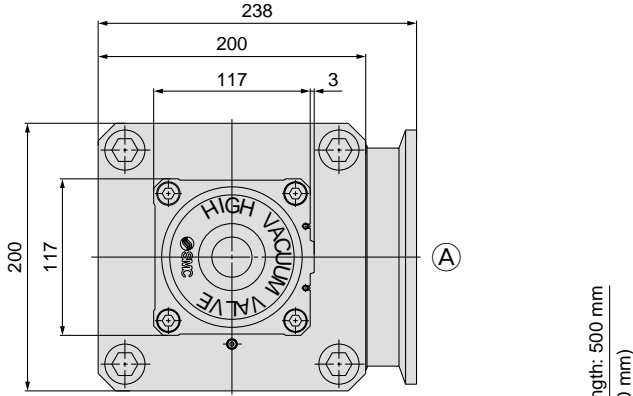
XGT

CYV



Please consult with SMC for detailed dimensions, specifications and delivery.

**Flange size: 160**



**Symbol**



JISB0125



JISZ8207

**Component Parts**

No.	Description	Material	Remarks
1	Body	A6063	XLA160-1S
2	Bonnet assembly		Refer to part no.
2-1	O-ring	FKM	B2401-G155V
3	Hexagon socket head cap screw	Stainless steel	M20, ℓ = 40
4	O-ring	FKM	AS568-167V
5	Computer name plate		
6	Auto switch		Refer to part no.

### How to Order Valve

**XLG-160**     - **M9N**   **A** - **X30**

**Pilot port direction**

Symbol	Pilot port direction
Nil	Flange side
K	Left flange surface
L	Rear flange surface
M	Right flange surface

\* Flange: (A)

**Temperature specifications**

Symbol	Temperature
Nil	5 to 60°C
H0	5 to 150°C

**Number of auto switches/Mounting position**

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

**Auto switch type (Operating temperature 5 to 60°C)**

Symbol	Auto switch model	Switch type
Nil	—	Without auto switch (without built-in magnet)
M9N(L)(M)(Z)	D-M9N(L)(M)(Z)	Solid state auto switch
M9P(L)(M)(Z)	D-M9P(L)(M)(Z)	
M9B(L)(M)(Z)	D-M9B(L)(M)(Z)	
A90(L)	D-A90(L)	Reed auto switch
A93(L)	D-A93(L)	
M9//	Without auto switch (with built-in magnet)	

Note) Types with auto switches are not available in case of high temperature types.  
Standard lead wire length is 0.5 m. Add "L" to the end of the part number when 3 m is desired, "M" when 1 m, and "Z" when 5 m.

### Maintenance Parts

② **Bonnet Assembly Part No.**

**XLG160-30-1H** - **M9NA** - **X30**

**Bonnet assembly**

Temperature	Part no.
5 to 60°C	XLG160-30-1
5 to 150°C	XLG160-30-1H

• Same as How to Order.

### Specifications

Valve type	Double acting
Shaft seal type	O-ring seal
Operating pressure range	Atmospheric pressure to $1 \times 10^{-5}$ Pa
Fluid	Inert gas under vacuum
Internal leakage	$1.3 \times 10^{-9}$ Pa·m <sup>3</sup> /s or less*
External leakage	$1.3 \times 10^{-9}$ Pa·m <sup>3</sup> /s or less*
Operating temperature	5 to 60°C (Option: 5 to 150°C)
Conductance	800 l/s
Operating pressure	0.4 to 0.6 MPa
Flange	KF160

Note) Values at normal temperature, excluding gas permeation.

- XL□
- XL□Q
- XM□
- XY□
- D-□
- XVD
- XGT
- CYV

# Aluminum High Vacuum Angle Valve/Double Acting/O-ring Seal

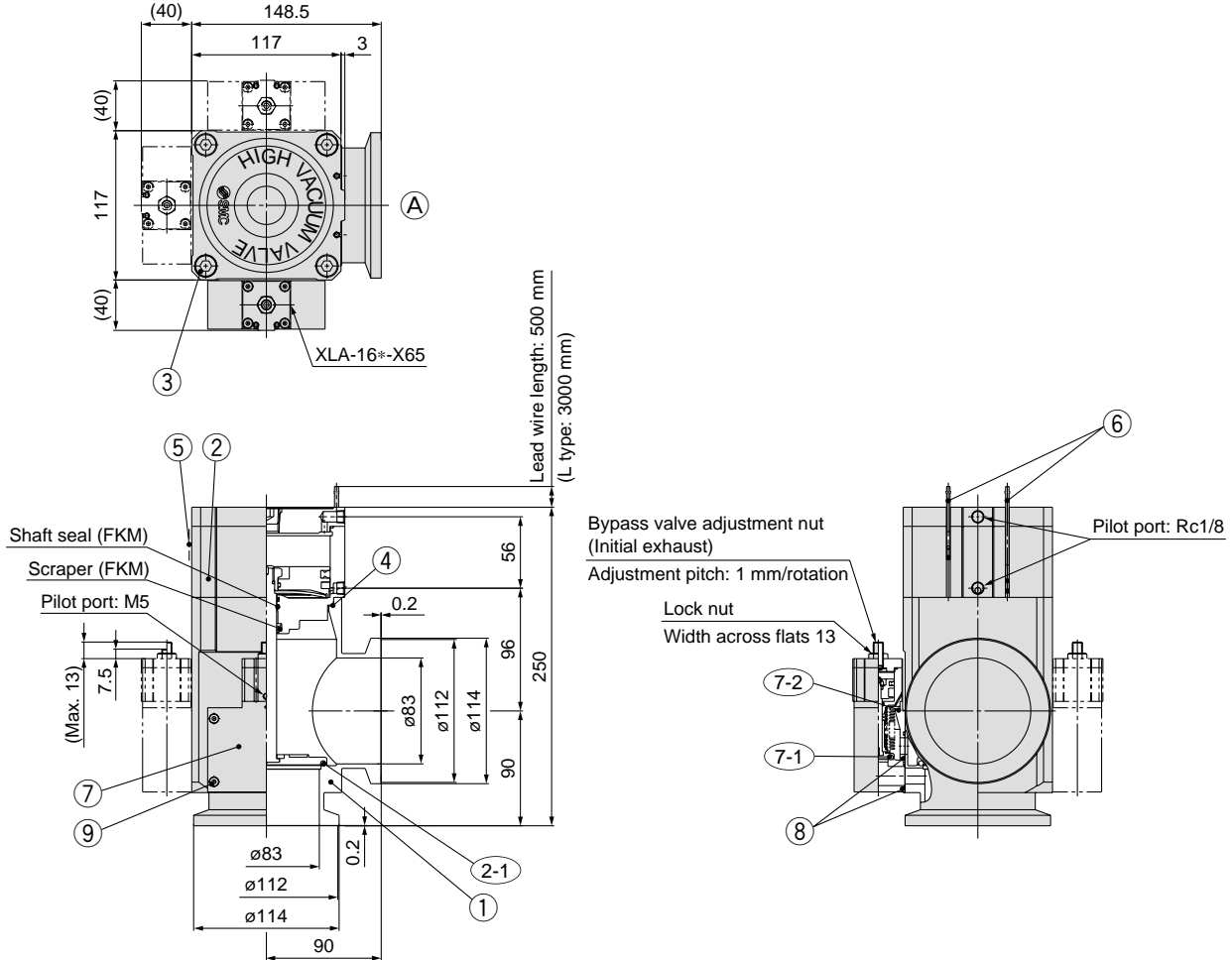
## Series XLG

# Made to Order Specifications 3

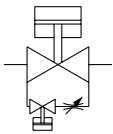


Please consult with SMC for detailed dimensions, specifications and delivery.

**With Bypass Valve (Flange size: 80)**



### Symbol



### Component Parts

No.	Description	Material	Remarks
1	Body	A6063	Refer to part no.
2	Bonnet assembly		Refer to part no.
2-1	O-ring		Refer to part no.
3	Hexagon socket head cap screw	Stainless steel	M10, $l = 75$
4	O-ring		Refer to part no.
5	Computer name plate		
6	Auto switch		Option
7	High vacuum angle valve (Bypass valve)		Refer to part no.
7-1	O-ring		Refer to part no.
7-2	O-ring		Refer to part no.
8	O-ring		Refer to part no.
9	Hexagon socket head cap screw	Stainless steel	M4, $l = 40$

### O-ring Part No.

Seal material symbol	Internal seal (2-1)	External seal (4)
Nil	B2401-V85V	AS568-045V
N1	B2401-V85-XN1	AS568-045-XN1
P1	B2401-V85-XP1	AS568-045-XP1
Q1	B2401-V85-XQ1	AS568-045-XQ1
R1	B2401-V85-XR1	AS568-045-XR1
R2	B2401-V85-XR2	AS568-045-XR2
R3	B2401-V85-XR3	AS568-045-XR3
S1	B2401-V85-XS1	AS568-045-XS1
T1	B2401-V85-XT1	AS568-045-XT1
U1	B2401-V85-XU1	AS568-045-XU1

### O-ring Part No.

Seal material symbol	Internal seal (7-1)	External seal (7-2)	External seal (8)
Nil	B2401-V15V	AS568-025V	AS568-017V
N1	B2401-V15-XN1	AS568-025-XN1	AS568-017-XN1
P1	B2401-V15-XP1	AS568-025-XP1	AS568-017-XP1
Q1	B2401-V15-XQ1	AS568-025-XQ1	AS568-017-XQ1
R1	B2401-V15-XR1	AS568-025-XR1	AS568-017-XR1
R2	B2401-V15-XR2	AS568-025-XR2	AS568-017-XR2
R3	B2401-V15-XR3	AS568-025-XR3	AS568-017-XR3
S1	B2401-V15-XS1	AS568-025-XS1	AS568-017-XS1
T1	B2401-V15-XT1	AS568-025-XT1	AS568-017-XT1
U1	B2401-V15-XU1	AS568-025-XU1	AS568-017-XU1

Note) A coating of vacuum grease (fluorinated grease: Y-VAC2) is applied to the shaft seal, scraper and O-ring (8).

### How to Order Valve

**XLGR-80** [ ] [ ] - [ ] [ ] - **1K** - X [ ] [ ]

Main valve: Pilot port direction

Symbol	Pilot port direction
Nil	Flange side
K	Left flange surface
L	Rear flange surface
M	Right flange surface

\* Flange: (A)

Temperature specifications

Symbol	Temperature	Heater
Nil	5 to 60°C	—
HO	5 to 150°C	—

Auto switch type

(Operating temperature 5 to 60°C)

Symbol	Auto switch model	Switch type
Nil	—	Without auto switch (without built-in magnet)
M9N(L)(M)(Z)	D-M9N(L)(M)(Z)	Solid state auto switch
M9P(L)(M)(Z)	D-M9P(L)(M)(Z)	
M9B(L)(M)(Z)	D-M9B(L)(M)(Z)	
A90(L)	D-A90(L)	Reed auto switch
A93(L)	D-A93(L)	
M9//	—	Without auto switch (with built-in magnet)

Note) Types with auto switches are not available in case of high temperature types.

Standard lead wire length is 0.5 m. Add "L" to the end of the part number when 3 m is desired, "M" when 1 m, and "Z" when 5 m.

Number of auto switches/Mounting position

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

Bypass valve mounting position/  
Pilot port direction

Symbol	Mounting position	Symbol	Pilot port direction
1	Left flange surface	Nil	Flange side
		K	Left flange surface
		L	Rear flange surface
2	Right flange surface	Nil	Flange side
		L	Rear flange surface
		M	Right flange surface
3	Rear flange surface	K	Left flange surface
		L	Rear flange surface
		M	Right flange surface

\* Flange: (A)

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

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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.

Seal material changed part

Symbol	Changed part	Leakage (Pa·m³/s or less) Note)	
		Internal	External
Nil	None	1.3 x 10 <sup>-9</sup> (FKM)	1.3 x 10 <sup>-9</sup> (FKM)
A	(2-1) (7-1) (4) (7-2) (8)	1.3 x 10 <sup>-7</sup>	1.3 x 10 <sup>-7</sup>
B	(2-1) (7-1)	1.3 x 10 <sup>-7</sup>	1.3 x 10 <sup>-9</sup> (FKM)
C	(4) (7-2) (8)	1.3 x 10 <sup>-9</sup> (FKM)	1.3 x 10 <sup>-7</sup>

Note) Values at normal temperature, excluding gas permeation.

### Maintenance Parts

① Body Part No.

**XLAR80-1S-1**

Bypass valve mounting position

Symbol	Mounting position
1	Left flange surface
2	Right flange surface
3	Rear flange surface

\* Flange: (A)

⑧ Bypass Valve Part No.

**XLA-16** [ ] [ ] - [ ] [ ] - X65

Pilot port direction

Symbol	Pilot port direction
Nil	Rear (as seen from body connection point)
K	Left (as seen from body connection point)
M	Right (as seen from body connection point)

Temperature specifications

Symbol	Temperature
Nil	5 to 60°C
HO	5 to 150°C

Seal material changed part

Symbol	Changed part
Nil	None
A	(7-1) (7-2)
B	(7-1)
C	(7-2)

Seal material: Same as the seal materials of How to Order Valve.

② Bonnet Assembly Part No.

**XLG80-30-1H** - **M9NA-XN1**

Bonnet assembly

Temperature	Part no.
5 to 60°C	XLG80-30-1
5 to 150°C	XLG80-30-1H

Same as How to Order.

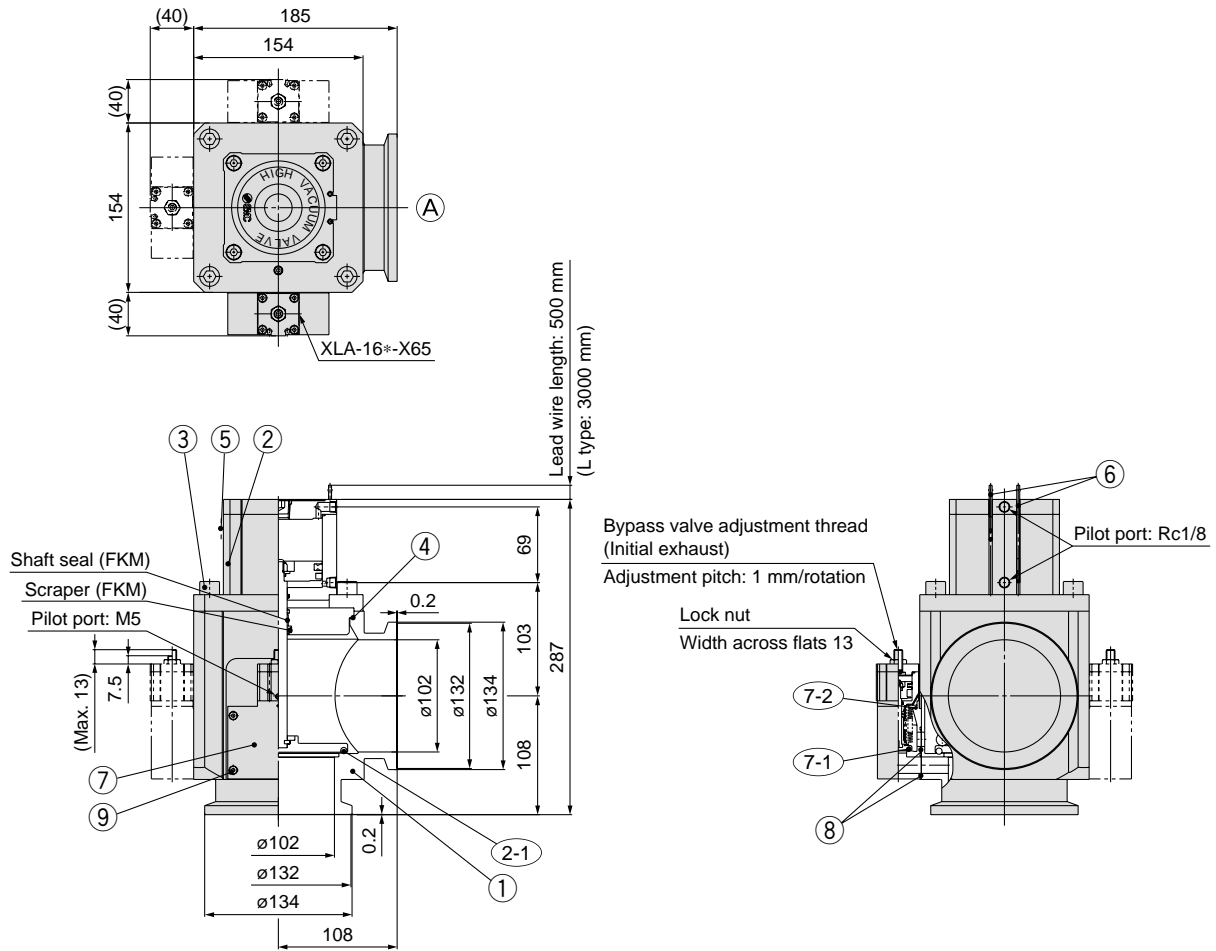
Specifications

Valve type	Main valve: Double acting	Bypass valve: Normally closed
Shaft seal type	O-ring seal	Bellows seal
Operating pressure range	Atmospheric pressure to 1 x 10 <sup>-5</sup> Pa	
Fluid	Inert gas under vacuum	
Operating temperature	5 to 60°C (Option: 5 to 150°C)	
Conductance	200 $\mu$ /s	Max. 25 $\mu$ /s (Calculated value)
Operating pressure	0.3 to 0.6 MPa	
Flange	KF80	

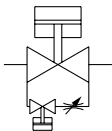


Please consult with SMC for detailed dimensions, specifications and delivery.

**With Bypass Valve (Flange size: 100)**



**Symbol**



**O-ring Part No.**

Seal material symbol	Internal seal (2-1)	External seal (4)
Nil	AS568-349V	AS568-050V
N1	AS568-349-XN1	AS568-050-XN1
P1	AS568-349-XP1	AS568-050-XP1
Q1	AS568-349-XQ1	AS568-050-XQ1
R1	AS568-349-XR1	AS568-050-XR1
R2	AS568-349-XR2	AS568-050-XR2
R3	AS568-349-XR3	AS568-050-XR3
S1	AS568-349-XS1	AS568-050-XS1
T1	AS568-349-XT1	AS568-050-XT1
U1	AS568-349-XU1	AS568-050-XU1

**Component Parts**

No.	Description	Material	Remarks
1	Body	A6063	Refer to part no.
2	Bonnet assembly		Refer to part no.
2-1	O-ring		Refer to part no.
3	Hexagon socket head cap screw	Stainless steel	M12, ℓ = 30
4	O-ring		Refer to part no.
5	Computer name plate		
6	Auto switch		Option
7	High vacuum angle valve (Bypass valve)		Refer to part no.
7-1	O-ring		Refer to part no.
7-2	O-ring		Refer to part no.
8	O-ring		Refer to part no.
9	Hexagon socket head cap screw	Stainless steel	M4, ℓ = 40

**O-ring Part No.**

Seal material symbol	Internal seal (7-1)	External seal (7-2)	External seal (8)
Nil	B2401-V15V	AS568-025V	AS568-017V
N1	B2401-V15-XN1	AS568-025-XN1	AS568-017-XN1
P1	B2401-V15-XP1	AS568-025-XP1	AS568-017-XP1
Q1	B2401-V15-XQ1	AS568-025-XQ1	AS568-017-XQ1
R1	B2401-V15-XR1	AS568-025-XR1	AS568-017-XR1
R2	B2401-V15-XR2	AS568-025-XR2	AS568-017-XR2
R3	B2401-V15-XR3	AS568-025-XR3	AS568-017-XR3
S1	B2401-V15-XS1	AS568-025-XS1	AS568-017-XS1
T1	B2401-V15-XT1	AS568-025-XT1	AS568-017-XT1
U1	B2401-V15-XU1	AS568-025-XU1	AS568-017-XU1

Note) A coating of vacuum grease (fluorinated grease: Y-VAC2) is applied to the shaft seal, scraper and O-ring (8).



### How to Order Valve

**XLGR-100** [ ] [ ] - [ ] [ ] - **1K** - X [ ] [ ]

Main valve: Pilot port direction

Symbol	Pilot port direction
Nil	Flange side
K	Left flange surface
L	Rear flange surface
M	Right flange surface

\* Flange: (A)

Temperature specifications

Symbol	Temperature	Heater
Nil	5 to 60°C	—
H0	5 to 150°C	—

Auto switch type

(Operating temperature 5 to 60°C)

Symbol	Auto switch model	Switch type
Nil	—	Without auto switch (without built-in magnet)
M9N(L)(M)(Z)	D-M9N(L)(M)(Z)	Solid state auto switch
M9P(L)(M)(Z)	D-M9P(L)(M)(Z)	
M9B(L)(M)(Z)	D-M9B(L)(M)(Z)	
A90(L)	D-A90(L)	Reed auto switch
A93(L)	D-A93(L)	
M9//	Without auto switch (with built-in magnet)	

Note) Types with auto switches are not available in case of high temperature types.

Standard lead wire length is 0.5 m. Add "L" to the end of the part number when 3 m is desired, "M" when 1 m, and "Z" when 5 m.

Number of auto switches/Mounting position

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

\* Flange: (A)

Bypass valve mounting position/  
Pilot port direction

Symbol	Mounting position	Symbol	Pilot port direction
1	Left flange surface	Nil	Flange side
		K	Left flange surface
		L	Rear flange surface
2	Right flange surface	Nil	Flange side
		L	Rear flange surface
		M	Right flange surface
3	Rear flange surface	K	Left flange surface
		L	Rear flange surface
		M	Right flange surface

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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.

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

Seal material changed part

Symbol	Changed part	Leakage (Pa·m <sup>3</sup> /s or less) Note	
		Internal	External
Nil	None	1.3 x 10 <sup>-9</sup> (FKM)	1.3 x 10 <sup>-9</sup> (FKM)
A	(2-1) (7-1) (4) (7-2) (8)	1.3 x 10 <sup>-7</sup>	1.3 x 10 <sup>-7</sup>
B	(2-1) (7-1)	1.3 x 10 <sup>-7</sup>	1.3 x 10 <sup>-9</sup> (FKM)
C	(4) (7-2) (8)	1.3 x 10 <sup>-9</sup> (FKM)	1.3 x 10 <sup>-7</sup>

Note) Values at normal temperature, excluding gas permeation.

### Maintenance Parts

① Body Part No.

**XLGR100-1S-1**

Bypass valve mounting position

Symbol	Mounting position
1	Left flange surface
2	Right flange surface
3	Rear flange surface

\* Flange: (A)

⑧ Bypass Valve Part No.

**XLA-16** [ ] [ ] - [ ] [ ] - **X65**

Pilot port direction

Symbol	Pilot port direction
Nil	Rear (as seen from body connection point)
K	Left (as seen from body connection point)
M	Right (as seen from body connection point)

Seal material changed part

Symbol	Changed part
Nil	None
A	(7-1) (7-2)
B	(7-1)
C	(7-2)

Temperature specifications

Symbol	Temperature
Nil	5 to 60°C
H0	5 to 150°C

Seal material: Same as the seal materials of How to Order Valve.

② Bonnet Assembly Part No.

**XLGR100-30-1H** - **M9NA-XN1**

Bonnet assembly

Temperature	Part no.
5 to 60°C	XLGR100-30-1
5 to 150°C	XLGR100-30-1H

Same as How to Order.

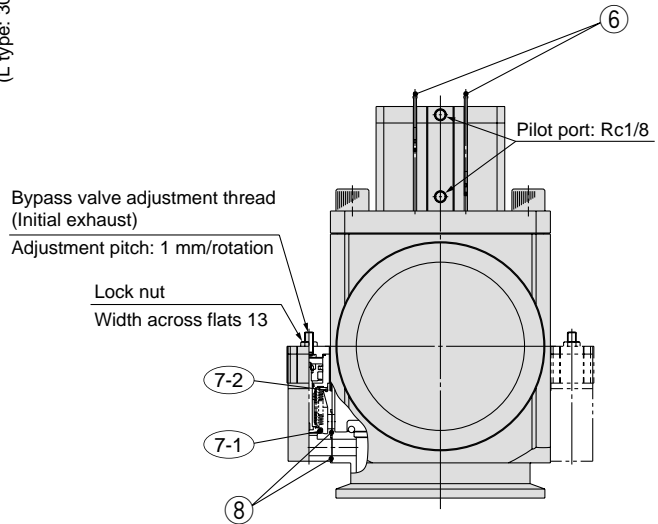
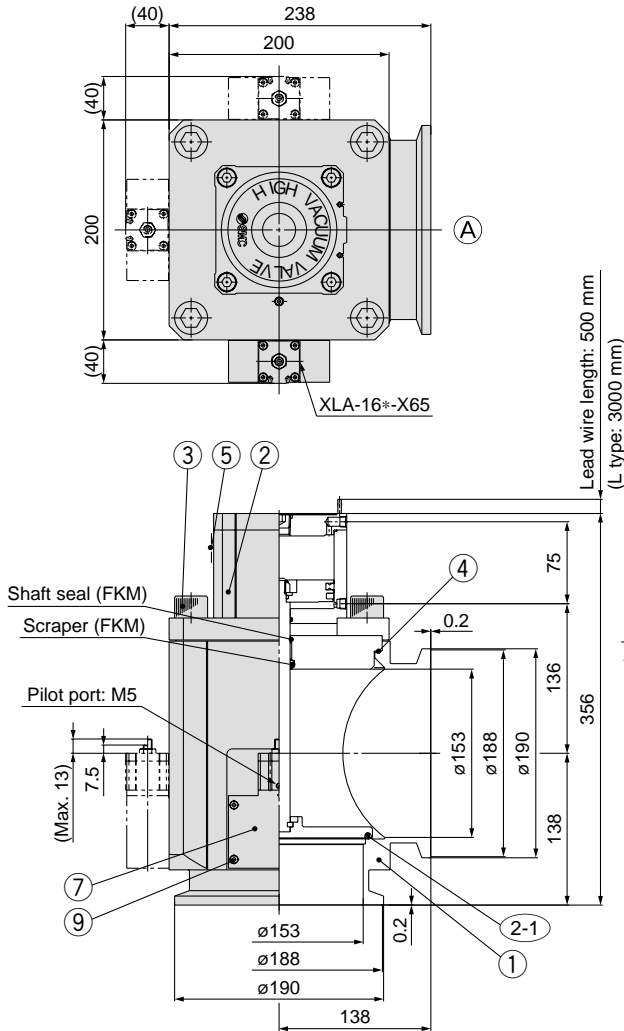
Specifications

Valve type	Main valve: Double acting	Bypass valve: Normally closed
Shaft seal type	O-ring seal	Bellows seal
Operating pressure range	Atmospheric pressure to 1 x 10 <sup>-5</sup> Pa	
Fluid	Inert gas under vacuum	
Operating temperature	5 to 60°C (Option: 5 to 150°C)	
Conductance	300 $\mu$ /s	Max. 31.5 $\mu$ /s (Calculated value)
Operating pressure	0.3 to 0.6 MPa	
Flange	KF100	

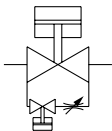


Please consult with SMC for detailed dimensions, specifications and delivery.

**With Bypass Valve (Flange size: 160)**



**Symbol**



**O-ring Part No.**

Seal material symbol	Internal seal (2-1)	External seal (4)
Nil	B2401-G155V	AS568-167V
N1	B2401-G155-XN1	AS568-167-XN1
P1	B2401-G155-XP1	AS568-167-XP1
Q1	B2401-G155-XQ1	AS568-167-XQ1
R1	B2401-G155-XR1	AS568-167-XR1
R2	B2401-G155-XR2	AS568-167-XR2
R3	B2401-G155-XR3	AS568-167-XR3
S1	B2401-G155-XS1	AS568-167-XS1
T1	B2401-G155-XT1	AS568-167-XT1
U1	B2401-G155-XU1	AS568-167-XU1

**Component Parts**

No.	Description	Material	Remarks
1	Body	A6063	Refer to part no.
2	Bonnet assembly		Refer to part no.
2-1	O-ring		Refer to part no.
3	Hexagon socket head cap screw	Stainless steel	M20, ℓ = 40
4	O-ring		Refer to part no.
5	Computer name plate		
6	Auto switch		Option
7	High vacuum angle valve (Bypass valve)		Refer to part no.
7-1	O-ring		Refer to part no.
7-2	O-ring		Refer to part no.
8	O-ring		Refer to part no.
9	Hexagon socket head cap screw	Stainless steel	M4, ℓ = 40

**O-ring Part No.**

Seal material symbol	Internal seal (7-1)	External seal (7-2)	External seal (8)
Nil	B2401-V15V	AS568-025V	AS568-017V
N1	B2401-V15-XN1	AS568-025-XN1	AS568-017-XN1
P1	B2401-V15-XP1	AS568-025-XP1	AS568-017-XP1
Q1	B2401-V15-XQ1	AS568-025-XQ1	AS568-017-XQ1
R1	B2401-V15-XR1	AS568-025-XR1	AS568-017-XR1
R2	B2401-V15-XR2	AS568-025-XR2	AS568-017-XR2
R3	B2401-V15-XR3	AS568-025-XR3	AS568-017-XR3
S1	B2401-V15-XS1	AS568-025-XS1	AS568-017-XS1
T1	B2401-V15-XT1	AS568-025-XT1	AS568-017-XT1
U1	B2401-V15-XU1	AS568-025-XU1	AS568-017-XU1

Note) A coating of vacuum grease (fluorinated grease: Y-VAC2) is applied to the shaft seal, scraper and O-ring (8).

### How to Order Valve

**XLGR-160** [ ] [ ] - [ ] [ ] - **1K** - X [ ] [ ]

Main valve: Pilot port direction

Symbol	Pilot port direction
Nil	Flange side
K	Left flange surface
L	Rear flange surface
M	Right flange surface

\* Flange: (A)

Temperature specifications

Symbol	Temperature	Heater
Nil	5 to 60°C	—
H0	5 to 150°C	—

Auto switch type

(Operating temperature 5 to 60°C)

Symbol	Auto switch model	Switch type
Nil	—	Without auto switch (without built-in magnet)
M9N(L)(M)(Z)	D-M9N(L)(M)(Z)	Solid state auto switch
M9P(L)(M)(Z)	D-M9P(L)(M)(Z)	
M9B(L)(M)(Z)	D-M9B(L)(M)(Z)	
A90(L)	D-A90(L)	Reed auto switch
A93(L)	D-A93(L)	
M9//	—	Without auto switch (with built-in magnet)

Note) Types with auto switches are not available in case of high temperature types.  
Standard lead wire length is 0.5 m. Add "L" to the end of the part number when 3 m is desired, "M" when 1 m, and "Z" when 5 m.

Number of auto switches/Mounting position

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

Bypass valve mounting position/  
Pilot port direction

Symbol	Mounting position	Symbol	Pilot port direction
1	Left flange surface	Nil	Flange side
		K	Left flange surface
		L	Rear flange surface
2	Right flange surface	Nil	Flange side
		L	Rear flange surface
		M	Right flange surface
3	Rear flange surface	K	Left flange surface
		L	Rear flange surface
		M	Right flange surface

\* Flange: (A)

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

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Chemraz® is a registered trademark of Greene, Tweed & Co.  
ULTIC ARMOR® is a registered trademark of Nippon Valqua Industries, Ltd.

Seal material changed part

Symbol	Changed part	Leakage (Pa·m <sup>3</sup> /s or less) <sup>Note</sup>	
		Internal	External
Nil	None	1.3 x 10 <sup>-9</sup> (FKM)	1.3 x 10 <sup>-9</sup> (FKM)
A	(2-1) (7-1) (4) (7-2) (8)	1.3 x 10 <sup>-7</sup>	1.3 x 10 <sup>-7</sup>
B	(2-1) (7-1)	1.3 x 10 <sup>-7</sup>	1.3 x 10 <sup>-9</sup> (FKM)
C	(4) (7-2) (8)	1.3 x 10 <sup>-9</sup> (FKM)	1.3 x 10 <sup>-7</sup>

Note) Values at normal temperature, excluding gas permeation.

### Maintenance Parts

① Body Part No.

**XLAR160-1S-1**

Bypass valve mounting position

Symbol	Mounting position
1	Left flange surface
2	Right flange surface
3	Rear flange surface

\* Flange: (A)

⑧ Bypass Valve Part No.

**XLA-16** [ ] [ ] - [ ] [ ] - **X65**

Pilot port direction

Symbol	Pilot port direction
Nil	Rear (as seen from body connection point)
K	Left (as seen from body connection point)
M	Right (as seen from body connection point)

Seal material changed part

Symbol	Changed part
Nil	None
A	(7-1) (7-2)
B	(7-1)
C	(7-2)

Temperature specifications

Symbol	Temperature
Nil	5 to 60°C
H0	5 to 150°C

Seal material: Same as the seal materials of How to Order Valve.

② Bonnet Assembly Part No.

**XLGR160-30-1H** - **M9NA-XN1**

Bonnet assembly

Temperature	Part no.
5 to 60°C	XLGR160-30-1
5 to 150°C	XLGR160-30-1H

Same as How to Order.

Specifications

Valve type	Main valve: Double acting	Bypass valve: Normally closed
Shaft seal type	O-ring seal	Bellows seal
Operating pressure range	Atmospheric pressure to 1 x 10 <sup>-5</sup> Pa	
Fluid	Inert gas under vacuum	
Operating temperature	5 to 60°C (Option: 5 to 150°C)	
Conductance	800 $\mu$ /s	Max. 31.5 $\mu$ /s (Calculated value)
Operating pressure	0.3 to 0.6 MPa	
Flange	KF160	

# Aluminum High Vacuum Angle Valve

## 2-Step Control, Single Acting/Bellows Seal, O-ring Seal

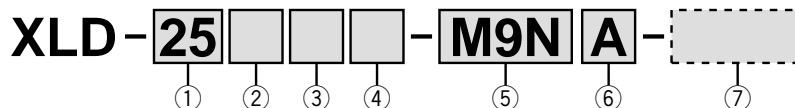
# Series XLD/XL DV

PAT.



XLD

### How to Order



#### ① Flange size

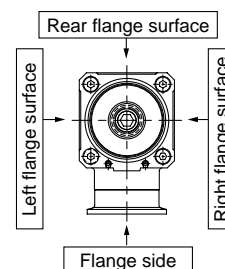
Size
25
40
50
63
80

#### ② Flange type

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

#### ③ Pilot port direction

Symbol	Pilot port direction
Nil	Flange side
K	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	—	
	H2	5 to 150°C	With 100°C heater
	H3	5 to 150°C	With 120°C heater

Note) Size 25 is not applicable for H2.

#### ⑤ Auto switch type

Symbol	Auto switch model	Remarks
Nil	—	Without auto switch (without built-in magnet)
M9N(L)(M)(Z)	D-M9N(L)(M)(Z)	Solid state auto switch
M9P(L)(M)(Z)	D-M9P(L)(M)(Z)	
M9B(L)(M)(Z)	D-M9B(L)(M)(Z)	
A90(L)	D-A90(L)	Reed auto switch
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, "M" when 1 m, and "Z" when 5 m.

Example) -M9NL

#### ⑥ Number of auto switches/Mounting position

Symbol	Quantity	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 <sup>Note 2), 3)</sup>	Leakage (Pa·m <sup>3</sup> /s or less) <sup>Note 1)</sup>	
		Internal	External
Nil	None	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-11</sup> (FKM)
A	②, ③, ④, ⑤	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-9</sup>
B	②, ④, ⑤	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-11</sup> (FKM)
C	③	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-9</sup>

Note 1) Values at normal temperature, excluding gas permeation.

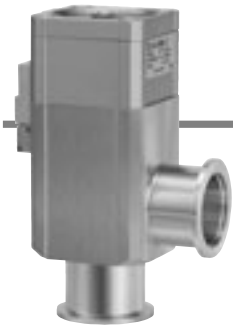
Note 2) Refer to parts number of "Construction" on page 47 for changed part. Number indicates parts number of "Construction" accordingly.

Note 3) Changes to seal material for part no. ④ S valve seal assembly are only applicable for sizes 25, 40 and 50.

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".

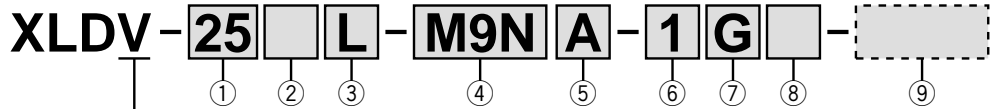
Example) XLD-25-M9NA-XAN1A

## Air Operated/with Solenoid Valve



XLDV

### How to Order



• Air operated/with solenoid valve

#### ① Flange size

Size
25
40
50
63
80

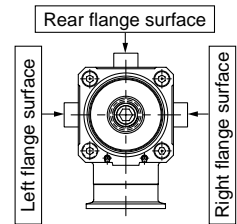
#### ② Flange type

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

#### ③ Solenoid valve direction

Symbol	Solenoid valve direction
K	Left flange surface
L	Rear flange surface
M	Right flange surface

\* M type is not available for size 25.



#### ④ Auto switch type

Symbol	Auto switch model	Remarks
Nil	—	Without auto switch (without built-in magnet)
M9N(L)(M)(Z)	D-M9N(L)(M)(Z)	Solid state auto switch
M9P(L)(M)(Z)	D-M9P(L)(M)(Z)	
M9B(L)(M)(Z)	D-M9B(L)(M)(Z)	
A90(L)	D-A90(L)	Reed auto switch
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, "M" when 1 m, and "Z" when 5 m.

Example) -M9NL

#### ⑤ Number of auto switches/Mounting position

Symbol	Quantity	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	Note 2), 3) Changed part	Leakage (Pa·m <sup>3</sup> /s or less) Note 1)	
		Internal	External
Nil	None	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-11</sup> (FKM)
A	②, ③, ④, ⑤	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-9</sup>
B	②, ④, ⑤	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-11</sup> (FKM)
C	③	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-9</sup>

Note 1) Values at normal temperature, excluding gas permeation.

Note 2) Refer to parts number of "Construction" on page 47 for changed part.

Number indicates parts number of "Construction" accordingly.

Note 3) Changes to seal material for part no. ④ S valve seal assembly are only applicable for sizes 25, 40 and 50.

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) XLDV-25-M9NA-1G-XAN1A**

Note 1) Option specifications/Combinations

This model has auto switch and K(DN) flange options, but high temperature/heater options are not available.

Note 2) Solenoid valves

Model	Initial exhaust valve	Main exhaust valve	Example
XLDV-25	SY114 will be changed to V114 after the		SY114-1GS
XLDV-40/50/63/80	stock of SY114 runs out.	SYJ314	SYJ314-1GS

For further details on solenoid valves, refer to "SY100" in the SMC individual product catalog or on the SMC website and "SYJ300/500/700" in Best Pneumatics No. 1.

# Series XLD/XLDV

## Specifications

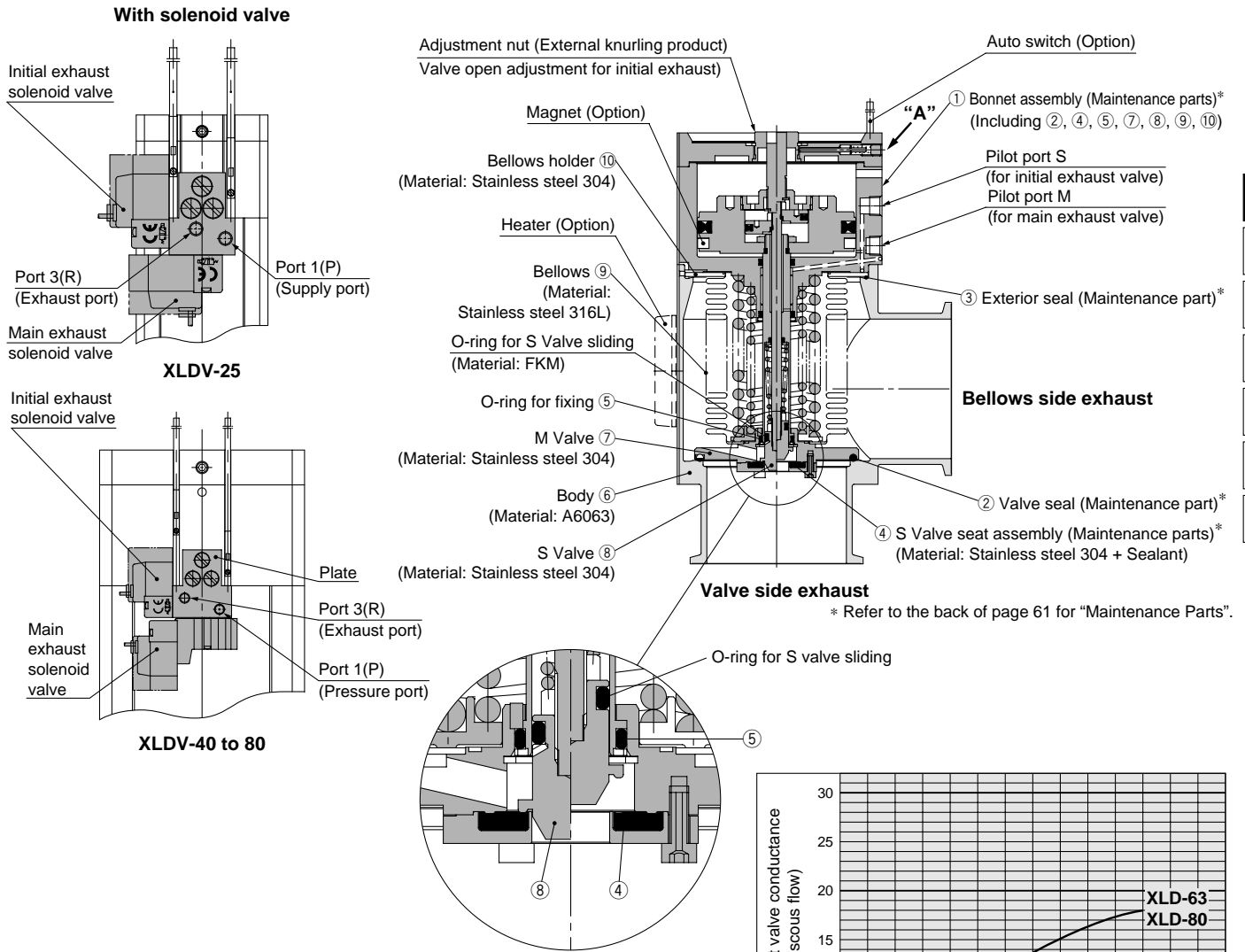
Model		XLD(V)-25	XLD(V)-40	XLD(V)-50	XLD(V)-63	XLD(V)-80
<b>Valve type</b>		Normally closed (Spring Return and seal) [Both main & initial exhaust valves]				
<b>Fluid</b>		Inert gas under vacuum				
<b>Operating temperature (°C)</b>	<b>XLD</b>	5 to 60 (High temperature type: 5 to 150)				
	<b>XLDV</b>	5 to 50				
<b>Operating pressure (Pa)</b>		Atmospheric pressure to $1 \times 10^{-6}$				
<b>Conductance (l/s)</b> <small>Note 1)</small>	<b>Main exhaust valve</b>	14	45	80	160	200
	<b>Initial exhaust valve</b>	0.5 to 3	2 to 8	2.5 to 11	4 to 18	4 to 18
<b>Leakage (Pa·m<sup>3</sup>/s)</b>	<b>Internal</b>	In case of standard material FKM: $1.3 \times 10^{-10}$ at normal temperature, excluding gas permeation				
	<b>External</b>	In case of standard material FKM: $1.3 \times 10^{-11}$ at normal temperature, excluding gas permeation				
<b>Flange type</b>		KF (NW)			KF (NW), K (DN)	
<b>Principal materials</b> <small>Note 3)</small>		Body: Aluminum alloy, Bellows: Stainless steel 316L, Main part: Stainless steel, FKM (Standard seal material)				
<b>Surface treatment</b>		External: Hard anodized Internal: Raw material				
<b>Pilot pressure (MPa)</b>		0.4 to 0.7 [Both main & initial exhaust valves]				
<b>Pilot port size</b>	<b>XLD</b>	M5	Rc1/8			
	<b>XLDV</b>	M5: Port 1(P), Port 3(R)				
<b>Mass (kg)</b>	<b>XLD</b>	0.5	1.2	1.8	3.4	5.6
	<b>XLDV</b>	0.57	1.3	1.9	3.5	5.7

Note 1) The main exhaust valve conductance is the valve for the "molecular flow" of an elbow with the same dimensions. The initial exhaust valve conductance is the value for the "viscous flow".

Note 2) For valve heater specifications, refer to "Common Option [1] Heater" on page 55.

Note 3) A coating of vacuum grease [Y-VAC2] is applied to the seal-material sliding portion (initial exhaust valves sliding parts) of the vacuum part.

## Construction/Operation



### <Working principle>

- 1 Initial exhaust valve opening adjustment**  
The initial exhaust rate should be adjusted before operation, with the pilot port S in an unpressurized state. The initial exhaust rate is set to zero by gently turning the adjustment nut to the right until it stops. (Do not use any tools.) The initial exhaust rate is adjusted by turning the nut to the left.
- 2 Opening of the initial exhaust valve (valve S)**  
When pressure is applied to the pilot port S, the valve S is removed from the valve S seal assembly, and the valve opens the adjusted amount. When the initial exhaust solenoid valve is turned ON and pressure is constantly applied to port 1(P) on model XLDV, the valve opens the adjusted amount.
- 3 Opening of the main exhaust valve (valve M)**  
When pressure is applied to the pilot port M, the valve M is removed from the body sheet portion, and the valve fully opens. When the initial exhaust solenoid valve is turned ON and pressure is constantly applied to port 1(P) on model XLDV, the valve fully opens.
- 4 Closing of the initial exhaust / main exhaust valves**  
By removing pressure from pilot port S and pilot port M, both S and M valves revert to their previous positions and are sealed. By turning OFF the initial exhaust valve and main exhaust valve on model XLDV, both valves revert to their previous position and are sealed.

### <Options>

- Auto switch:** The magnet actuates the auto switch. With two auto switches, the open and closed positions are detected, and with one auto switch, either the open or closed position is detected. Auto switches are applicable at ordinary temperatures only (5 to 60°C).
- Heater:** Simple heating is performed using thermistors. The valve body can be heated to approximately 100 or 120°C, depending on the heater option and valve size. The type and number of thermistors to be used will vary depending upon size and setting temperature. In the case of high temperature specifications, the bonnet assembly is a heat resistant structure. This is not available with solenoid valve.

Note) After the opening adjustment of the initial exhaust valve, it will be lightly locked in place and will not rotate. To fix it in place, please tighten with the tightening torque shown in the below table. (Tightening with excessive torque can result in damaged components or the generation of abnormal noise.)

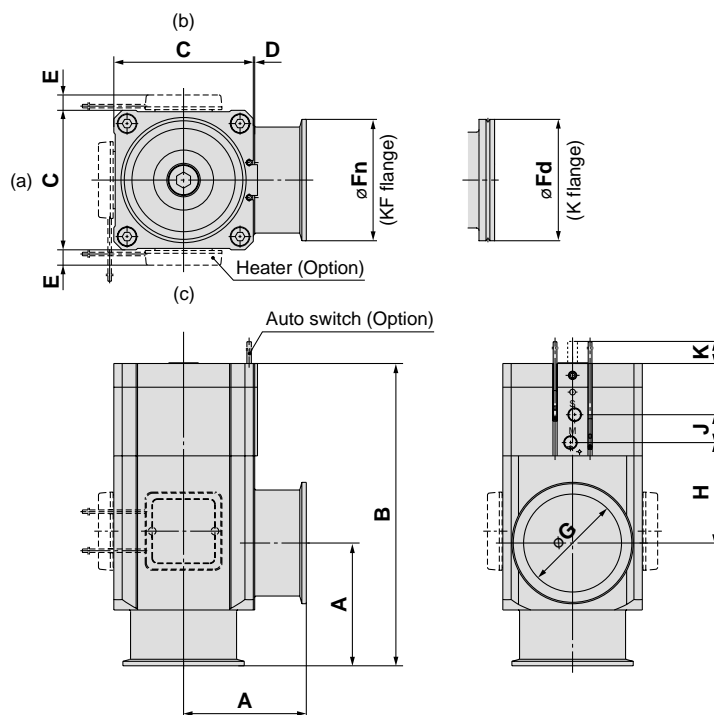
### “A” Section Thread Tightening Torque

Model	XLD(V)-25	XLD(V)-40	XLD(V)-50	XLD(V)-63	XLD(V)-80
Tightening torque	0.08 N·m (0.8 kgf·cm) or less			0.3 N·m (3 kgf·cm) or less	

# Series XLD/XLDV

## Dimensions

### XLD/Air operated



Model	A	B	C	D	E	Fn	Fd	G	H	J	K
<b>XLD-25</b>	50	123	48	1	12	40	—	26	41	16	7.5
<b>XLD-40</b>	65	170	66	2	11	55	—	41	63	20	15
<b>XLD-50</b>	70	183	79	2	11	75	—	52	68	20	17.5
<b>XLD-63</b>	88	217	100	3	11	87	95	70	72	20	20
<b>XLD-80</b>	90	256	117	3	11	114	110	83	98	20	26.5

Note 1) Dimension E applies when heater option is included. (Lead wire length: approx. 1 m)

Note 2) (a), (b) and (c) in the above drawing indicate heater mounting positions.

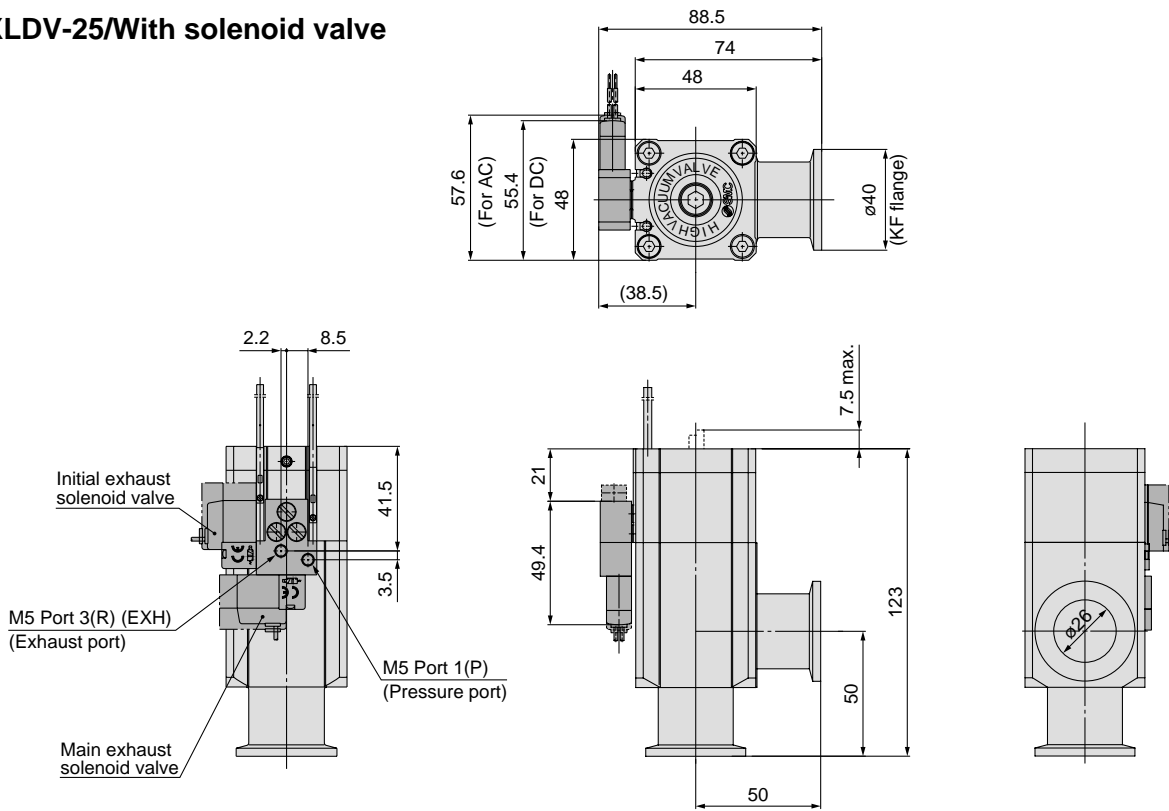
Moreover, heater mounting positions will differ depending on the type of heater.

For further details, refer to mounting positions under "Replacement Heaters" on page 61.

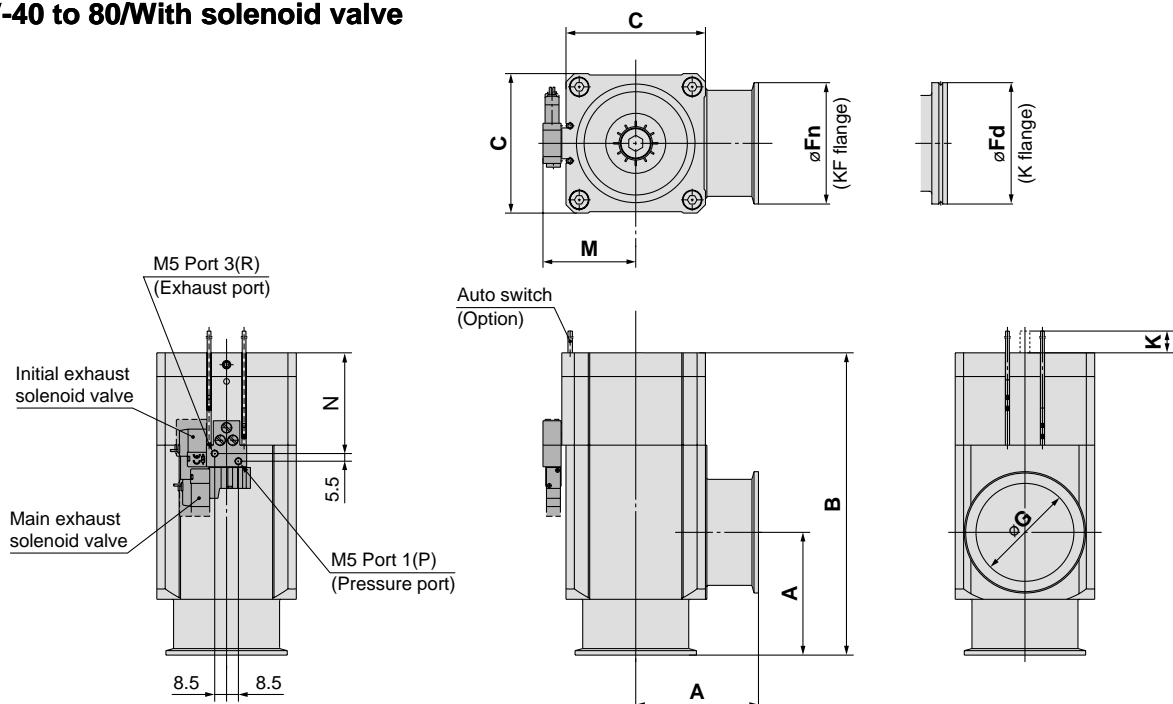


**Dimensions**

**XLDV-25/With solenoid valve**



**XLDV-40 to 80/With solenoid valve**



	(mm)									
Model	A	B	C	F <sub>n</sub>	F <sub>d</sub>	G	M	N	K	
<b>XLDV-40</b>	65	170	66	55	—	41	48.5	53.5	15	
<b>XLDV-50</b>	70	183	79	75	—	52	55	57.5	17.5	
<b>XLDV-63</b>	88	217	100	87	95	70	66.5	72.2	20	
<b>XLDV-80</b>	90	256	117	114	110	83	75	82.6	26.5	

Note) For further details on solenoid valves, refer to "SY100" on the SMC web site and "SYJ300/500/700" in Best Pneumatics No. 1.

XL□

XL□Q

XM□  
XY□

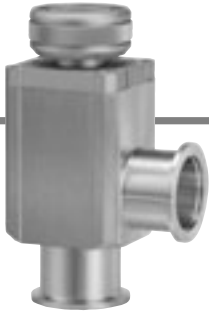
D-□

XVD

XGT

CYV

# Aluminum High Vacuum Angle Valve Manual/Bellows Seal Series *XLH*



XLH

## How to Order

XLH - 16 - [ ] - [ ]

High vacuum manual angle valve (Bellows seal)

① Flange size      ② Heater      ③ Body surface treatment/Seal material and its changed part

### ① Flange size

Size
16
25
40
50

### ② Heater

Symbol	Heater	Applicable flange size			
		16	25	40	50
Nil	—	●	●	●	●
H2	With 100°C heater	—	—	●	●
H3	With 120°C heater	—	●	●	●

### ③ 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 <sup>Note 2)</sup>	Leakage (Pa·m <sup>3</sup> /s or less) <sup>Note 1)</sup>	
		Internal	External
Nil	None	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-11</sup> (FKM)
A	②, ③	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-9</sup>
B	②	1.3 x 10 <sup>-8</sup>	1.3 x 10 <sup>-11</sup> (FKM)
C	③	1.3 x 10 <sup>-10</sup> (FKM)	1.3 x 10 <sup>-9</sup>

Note 1) Values at normal temperature, excluding gas permeation.

Note 2) Refer to parts number of "Construction" on page 51 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) XLH-16-XAN1A**

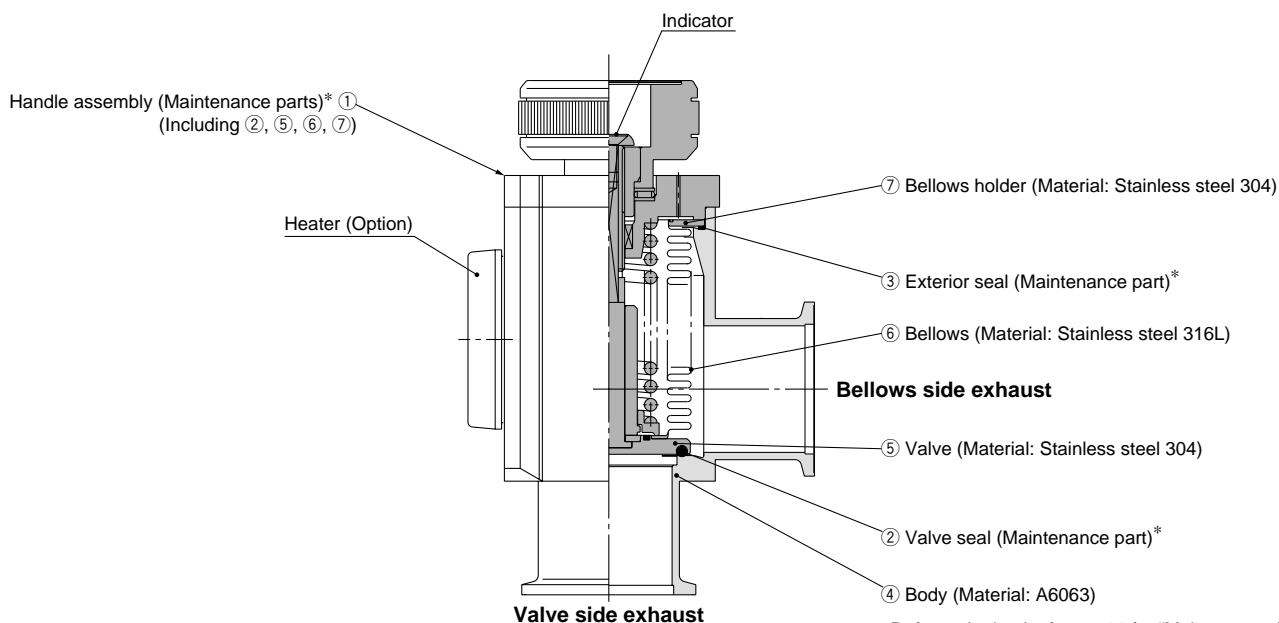
## Specifications

Model	XLH-16	XLH-25	XLH-40	XLH-50
Valve type	Inert gas under vacuum			
Fluid (°C)	5 to 150			
Operating pressure (Pa)	Atmospheric pressure to 10 <sup>-6</sup>			
Conductance (ℓ/s) <sup>Note 1)</sup>	5	14	45	80
Leakage (Pa·m <sup>3</sup> /s)	Internal	In case of standard material FKM: 1.3 x 10 <sup>-10</sup> at normal temperature, excluding gas permeation		
	External	In case of standard material FKM: 1.3 x 10 <sup>-11</sup> at normal temperature, excluding gas permeation		
Flange type	KF (NW)			
Principal materials	Body: Aluminum alloy, Bellows: Stainless steel 316L, Main part: Stainless steel, FKM (Standard seal material)			
Surface treatment	External: Hard anodized		Internal: Raw material	
Actuation torque (N·m)	0.1≤	0.15≤	0.35≤	0.5≤
Handle revolutions	5	7	10	13
Mass (kg)	0.23	0.41	1.05	1.62

Note 1) The conductance is the same as that of an elbow of the same dimensions.

Note 2) For valve heater specifications, refer to "Common Option [1] Heater" on page 55.

**Construction/Operation**



\* Refer to the back of page 61 for "Maintenance Parts".

- XL
- XLQ
- XM
- XY
- D
- VVD
- XGT
- CYV

**<Working principle>**

By turning the handle to the left, the valve opens. The handle does not move up and down, but the indicator shows the open or closed position of the valve. As the handle is turned to the right, the valve closes, and when the turning force of the handle suddenly ceases to be felt, the valve is sealed. The sealing force for the valve comes from the spring, and is constant.

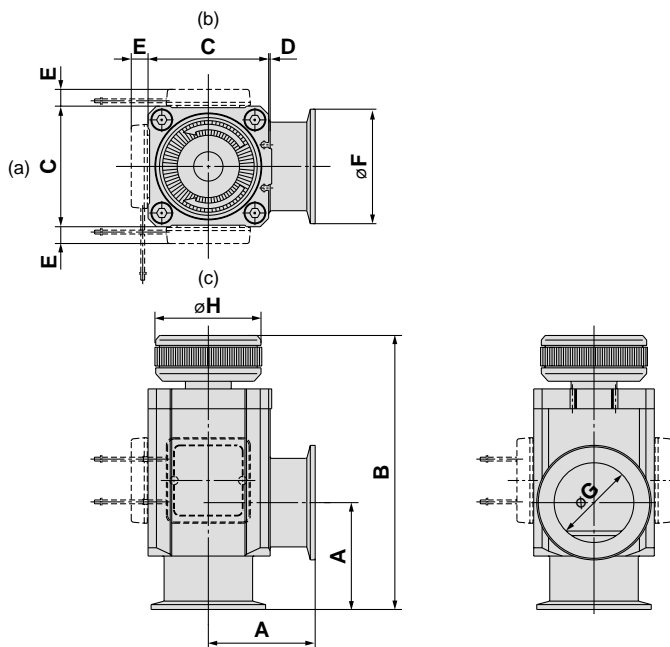
**<Options>**

**Heater:** Simple heating is performed using thermistors. The valve body can be heated to approximately 100 or 120°C, depending on the valve size.

The type and number of thermistors to be used will vary depending upon size and setting temperature.

**Indicator:** When the valve is open, an orange marker appears in the center of the name plate.

**Dimensions**



Model	A	B	C	D	E (Note 1)	F	G	H
XLH-16	40	100.5	38	1	—	30	17	35
XLH-25	50	114	48	1	12	40	26	41
XLH-40	65	162.5	66	2	11	55	41	57
XLH-50	70	179.5	79	2	11	75	52	70

Note 1) Dimension E applies when heater option is included. (Lead wire length: approx. 1 m)

Note 2) (a), (b) and (c) in the above drawing indicate heater mounting positions.

Moreover, heater mounting positions will differ depending on the type of heater.

For further details, refer to mounting positions under "Replacement Heaters" on page 61.

# Aluminum High Vacuum Angle Valve Electromagnetic/Bellows Pressure Balance Series *XLS*

## How to Order



Without control power supply

**XLS** — **25** — **5** **G**

With control power supply

**XLS** — **25** — **P** **1** **G**

**High vacuum angle valve**  
(Bellows pressure balance,  
2-stage voltage switching type)

**Valve size**

16	KF16
25	KF25

**Control power supply**

<b>P</b>	With control power supply
----------	---------------------------

**Starting voltage**

<b>5</b>	24 VDC
<b>9</b>	Others (48, 100 VDC)

Note) Holding voltage is 25% of starting voltage.

**Electrical entry**

<b>G</b>	Grommet
<b>C</b>	Conduit
<b>T</b>	Terminal
<b>D</b>	DIN terminal

**Electrical entry**

<b>G</b>	Grommet
----------	---------

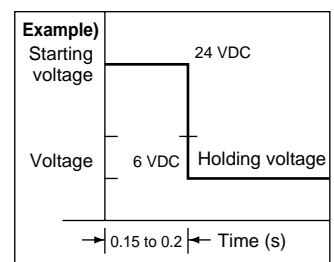
**Voltage**

<b>1</b>	100 VAC
<b>2</b>	200 VAC
<b>5</b>	24 VDC



## ⚠ Warning

(1) In case there is no control power supply (XLS-25-□□: 24/48/100 VDC), starting voltage should be applied for only 0.15 to 0.2 s, in accordance with the prescribed method (indicated on the back of the coil). Continuously applying starting voltage can cause overheating of the coil and fire. Holding voltage is 25% of the starting voltage (the application method is shown on the back of the solenoid coil).



## Specifications

Model	XLS-16	XLS-25	XLS-16-P□G	XLS-25-P□G
Valve type	Normally closed (N.C.)			
Fluid	Inert gas under vacuum			
Operating temperature (°C)	5 to 40			
Operating pressure (Pa)	0.1 MPa (G) to 1 x 10 <sup>-6</sup> (abs)			
Conductance (ℓ/s) <small>Note 1)</small>	5	8	5	8
Leakage (Pa·m <sup>3</sup> /s)	Internal	1.3 x 10 <sup>-8</sup> at normal temperature, excluding gas permeation		
	External	1.3 x 10 <sup>-11</sup> at normal temperature, excluding gas permeation		
Flange type/size	KF16	KF25	KF16	KF25
Principal materials <small>Note 2)</small>	Body: Aluminum alloy, Main part: Stainless steel, PFA, FKM (Standard seal material)			
Surface treatment	External: Hard anodized		Internal: Raw material	
Control power supply	No		Yes	
Operating power supply voltage	24/6, 48/12, 100/24 VDC		24 VDC, 100/200 VAC	
Allowable voltage fluctuation (%)			±10	
Electrical entry	G, C, D, T type		G type only	
Coil insulation	Class B			
Maximum operating frequency (Hz)	0.17			
Mass (kg)	0.4	0.7	0.7	1.0

Note 1) Conductance is the value for an elbow with the same dimensions.

Note 2) A coating of vacuum grease [Y-VAC3] is applied to the valve seat of the vacuum part.

XL□

XL□Q

XM□  
XY□

D-□

XVD

XGT

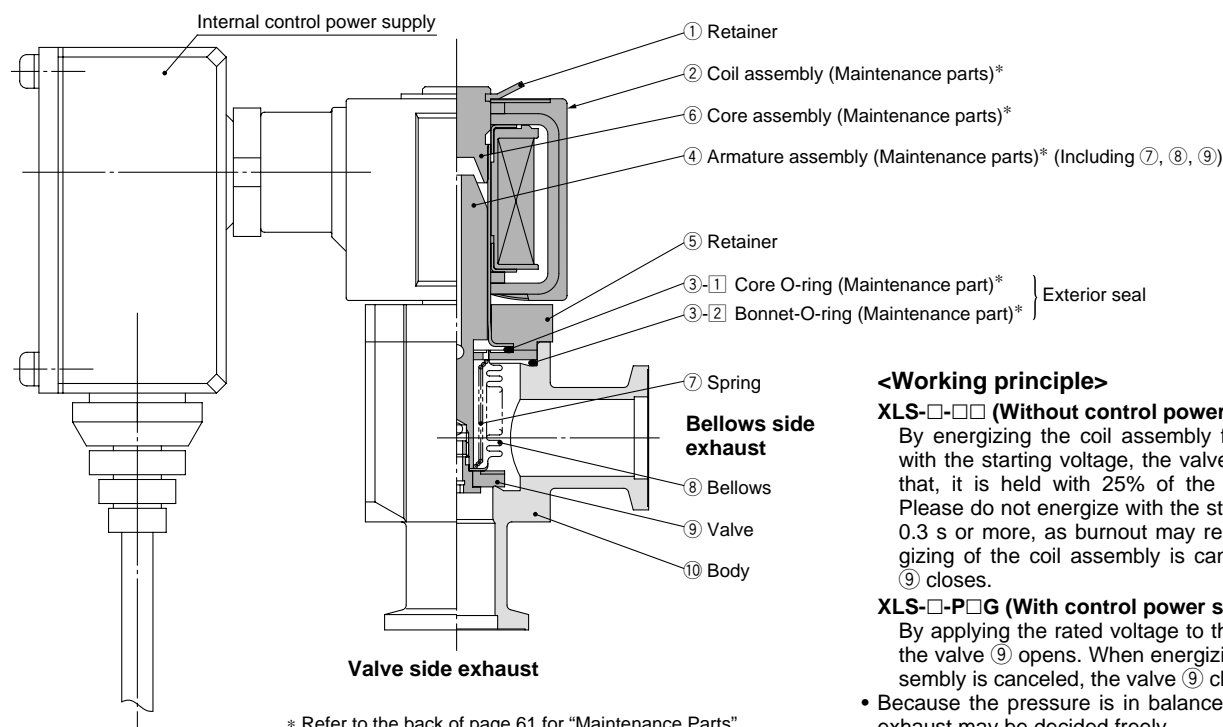
CYV

## Power/Voltage

### At the Rated Voltage

Model		Starting		Holding		
		Power (W)	Current (A)	Power (W)	Current (A)	
XLS-16-	□G/C/D/T, P5G	36	1.5	4.8	0.38	
	P1G	50 Hz	30.5	0.47	14.8	0.35
		60 Hz			10	0.27
	P2G	50 Hz	30	0.24	4.9	0.11
		60 Hz			2.3	0.10
	XLS-25-	□G/C/D/T, P5G	47	2.0	5.3	0.5
P1G		50 Hz	42	0.62	20	0.46
		60 Hz			13.5	0.36
P2G		50 Hz	45	0.35	6.7	0.15
		60 Hz			3.0	0.12

## Construction/Operation



### <Working principle>

#### XLS-□-□□ (Without control power supply)

By energizing the coil assembly for 0.15 to 0.2 s with the starting voltage, the valve ⑨ opens. After that, it is held with 25% of the starting voltage. Please do not energize with the starting voltage for 0.3 s or more, as burnout may result. When energizing of the coil assembly is canceled, the valve ⑨ closes.

#### XLS-□-□□G (With control power supply)

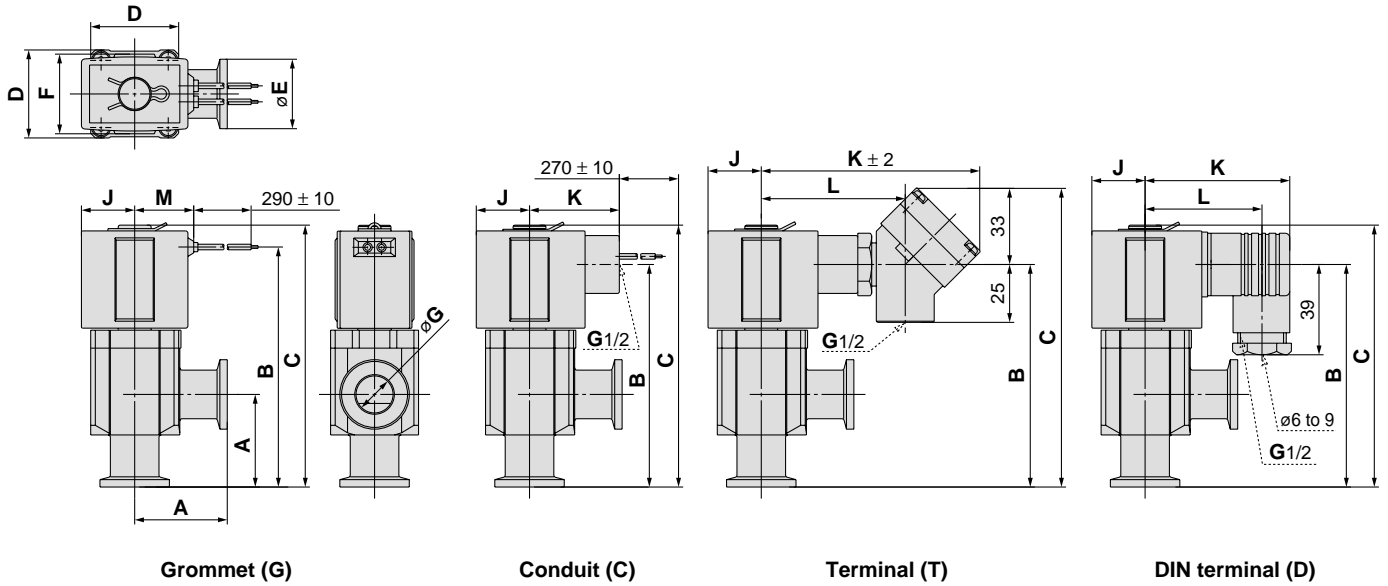
By applying the rated voltage to the coil assembly, the valve ⑨ opens. When energizing of the coil assembly is canceled, the valve ⑨ closes.

- Because the pressure is in balance, the direction of exhaust may be decided freely.

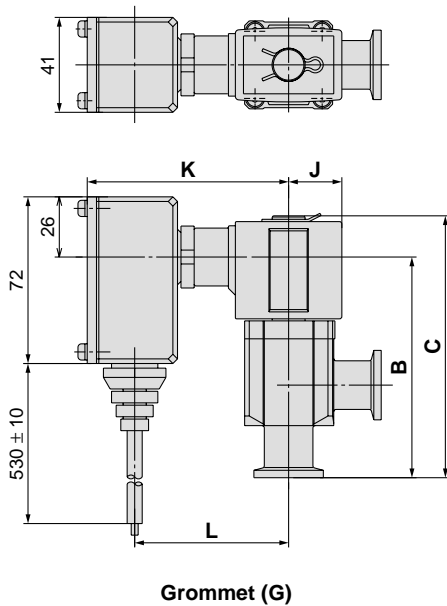
# Series XLS

## Dimensions

### XLS/Without control power supply



### XLS/With control power supply



Model	A	B	C	D	E	F	G	J	K	L	M
<b>XLS-16-□G</b>	40	104	113	38	30	35	17	23	—	—	25.5
<b>XLS-16-□C</b>		96							129	41	—
<b>XLS-16-□D</b>			60							48	—
<b>XLS-16-□T</b>		95	62						—		
<b>XLS-25-□G</b>	50	128.5	138.5	48	40	40	26	25.5	—	—	28
<b>XLS-25-□C</b>		121.5							154.5	43	—
<b>XLS-25-□D</b>			120.5							63	51
<b>XLS-25-□T</b>		121.5	97						66	—	
<b>XLS-16-P□G</b>	40	96	113	38	30	35	17	23	87	66.5	—
<b>XLS-25-P□G</b>	50	121.5	138.5	48	40	40	26	25.5	89.5	69	—

# Common Option

## 1 Heater

Valve heaters are common for models **XLA, XLC, XLD, XLF, XLG** and **XLH**. Power consumption specifications are shown in the below table.

Item		XL□-25	XL□-40	XL□-50	XL□-63	XL□-80	XL□-100	XL□-160
Rated heater voltage		90 to 125 VAC						
Heater power W (Nominal value) In-rush/Power consumption (Option symbol)	<b>H2</b> 100°C	—	200/40	200/60	400/100	600/150	800/220	1200/350
	<b>H3</b> 120°C	200/30	400/70	400/80	600/130	800/180	1200/300	1600/400

Note) In-rush current will flow to the heater for a few dozen seconds and will then subside.  
Refer to "Maintenance Parts" on page 61 for further details regarding quantity and type.

XL□

XL□Q

XM□

XY□

D-□

XVD

XGT

CYV

# Glossary

## 1 Seal Materials

Please note that the following are general features and subject to change depending on processing conditions. For details, please contact sealing component manufacturerers.

### FKM (Fluororubber)

With low outgassing, low permanent-setting and low gas permeation rates, this is the most popular seal material for high vacuums. Standard material used by SMC's high vacuum angle valve is Mitsubishi Cable Industries, Ltd. (Compound No. 1349-80).

It is advisable to choose a model depending on its application, because an improved material compound (3310-75) which reduces the weight reduction ratio with O<sub>2</sub> plasma is also available.

**Kalrez®** \* Kalrez® is a registered trademark of DuPont Performance Elastomers. This material, perfluoroelastomer (FFKM), has excellent heat and chemical resistance, but its permanent-setting is large, and special caution is required. Variations are available with improved plasma (O<sub>2</sub>, CF<sub>4</sub>) and particulate resistance; therefore it is advisable to select types based upon the application. Compound No. 4079: Standard Kalrez®, excellent in gas and heat resistance.

**Chemraz®** \* Chemraz® is a registered trademark of Greene, Tweed & Co. This material, perfluoroelastomer (FFKM), has excellent chemical and plasma resistance and has slightly higher heat resistance than FKM. Several variations of Chemraz® are available and it is advisable to choose based upon the particular plasma being used and other conditions, etc.

Compound No. SS592: Excellent physical properties and especially effective for moving parts.

Compound No. SS630: Applicable to both fixed and moving parts and compatible with a wide variety of applications.

Compound No. SSE38: The cleanest material among Chemraz®, developed for high-density plasma instruments.

**Barrel Perfluoro®** \* Barrel Perfluoro® is a registered trademark of Matsumura Oil Co.,Ltd. Compound No. 70W: Perfluoroelastomer (FFKM) which does not contain a metal filler. Resistant against NF<sub>3</sub>, NH<sub>3</sub>. Low particle generation under dry process conditions.

**ULTIC ARMOR®** \* ULTIC ARMOR® is a registered trademark of Nippon Valqua Industries, Ltd. Fluoro-based rubber which does not contain a metal filler. Seal material which is plasma-resistant and has low gas emittance and heat resistance.

### Silicone (Silicone rubber, VMQ)

This material is relatively inexpensive, has good plasma resistance, but its gas permeation rate is high.

Optional seal material used by SMC's high vacuum angle valve is Mitsubishi Cable Industries, Ltd. (Compound No. 1232-70, White)

It has a low weight-reduction ratio and low particle generation within O<sub>2</sub> plasma and NH<sub>3</sub> gas environments.

### EPDM (Ethylenepropylene rubber)

Relatively lower priced and excellent in weatherability, chemical and heat resistance, but with no resistance at all to general mineral oil. Optional seal material used by SMC's high vacuum angle valve is Mitsubishi Cable Industries, Ltd. (Compound No. 2101-80)

Resistant to NH<sub>3</sub> gas, etc.

## 2 Shaft Sealing Method

### Bellows

Bellows offer cleaner sealing with reduced particle generation and less outgassing. The two major bellow types are: Formed-bellows and Welded-bellows. Formed-bellows produce less dusts and offer higher dust resistance. Welded-bellows allow longer strokes, but generate more dust particles and offer less dust resistance. Please note, the endurance depends on length and speed of the strokes.

### O-ring, etc.

Due to entrainment of gases and generation of particulates, vacuum performance is somewhat inferior to the bellows type. However, high speed operation is possible and durability is comparatively high. In general, fluorinated grease is affixed to the shaft seal portion.

## 3 Response Time/Operation Time

### Valve opening

The time from the application of voltage to the actuation solenoid valve (XL□) until 90% of the valve stroke has been completed is the valve opening response time. Valve opening operation time indicates the time from the start of the stroke until 90% of movement has been completed. Both of these become faster as the operating pressure is increased.

### Valve closing

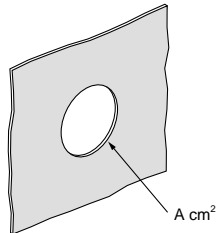
The time from the cut off of power to the actuation solenoid valve (XL□) until 90% of the valve return stroke has been completed is the valve closing response time. Valve closing operation time indicates the time from valve opening until 90% of return movement has been completed. Both of these become slower as the operating pressure is increased.



## 4 Molecular Flow Conductance

### Orifice conductance

In the case of a  $\phi A$  (cm<sup>2</sup>) hole in an ultra-thin plate, conductance "C" results from "V", the average velocity of the gas; "R", the gas constant; "M", the molecular weight; and "T", the absolute temperature. From the formula  $C=11.6A \text{ l/sec}$ , at an air temperature of 20°C.

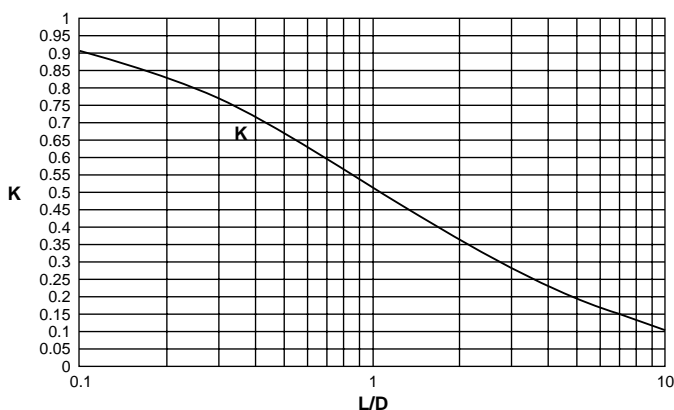


### Cylinder conductance

With length "L" (cm) and diameter "D" (cm) where  $L \gg D$ , from the formula  $C=(2\pi RT/M)^{0.5}D^3/6L$ , the conductance  $C=12.1 D^3/L \text{ l/sec}$ , at an air temperature of 20°C.

### Short pipe conductance

From the Clausing's factor "K" and hole conductance "C" in Graph 1. (Clausing's factor drawing), the short pipe conductance  $C_k$  is easily found as  $C_k=KC$ .



Graph 1. Clausing's factor

### Conductances combined

When each of the separate conductances are given as  $C_1$ ,  $C_2$  and  $C_n$ , the composite conductance  $\Sigma C$  is expressed as:  
 $\Sigma C=1/(1/C_1+1/C_2+\dots+1/C_n)$  when in series, and  
 $\Sigma C=C_1+C_2+\dots+C_n$ , when in parallel.

## 5 He Leakage

### Surface leakage

This leakage occurs between surfaces of the sealing and the seal material. In the case of elastic body seal (elastomer), leakage values are confirmed within minutes of operation. Leakage rate is measured at room temperature (20 to 30°C).

### Gas permeation

This is leakage caused by diffusion through the elastic body seal material. As temperature increases, the diffusion rate increases, and in many cases, becomes greater than surface leakage. The diffusion rate is proportional to the cross-sectional area (cm<sup>2</sup>) of the seal, and inversely proportional to the seal width (distance between the atmosphere and the vacuum side). In the case of metal gaskets, only hydrogen diffusion should be considered.

## 6 Outgassing

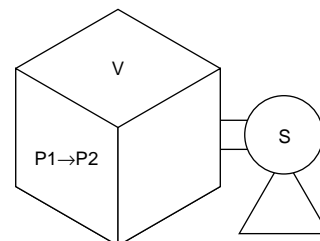
This is a phenomenon where gases adhered or adsorbed to the metallic surface or its inside parts are released from the surface and drawn into the vacuum according to the pressure decrease. The smoothness of the surface and closeness of the oxidized layer can effect (increase/decrease) this.

## 7 Ultimate Pressure

Ultimate pressure P (Pa) is  $P=Q/S$ , where the sum of mass flow rates for outgassing ( $Q_g$ ) and leakage ( $Q_l$ ) is  $Q(\text{Pa}\cdot\text{m}^3/\text{s})$ , and the exhaust speed is  $S(\text{m}^3/\text{s})$ . The ultimate pressure is measured with  $Q_g$ ,  $Q_l/S$  shown as above, and the ultimate pressure of the pump itself. In the case of very low pressure, the exhaust characteristics of the actual pump can be the limiting factor. In particular, a deterioration of exhaust characteristics due to an unclean pump and invasion of the atmospheric moisture can be the major factor.

## 8 Exhaust Time (Low/Medium Vacuum)

The time ( $\Delta t$ ) required to exhaust a chamber at low vacuum with volume V (l), from pressure P1 to P2, using a pump with pumping speed S (l/sec) is  $\Delta t=2.3(V/S)\log(P1/P2)$ . In high vacuum, this is subject to the ultimate pressure limit imposed by outgassing and leakage as characterized above.



## 9 Baking

Gases such as oxygen and nitrogen, which have a small adsorption activation energy (E) and a short adsorption residence time ( $\tau$ ), are evacuated quickly. However, in the case of water, which has a high activation energy, evacuation does not progress quickly unless the temperature (T: absolute temperature) is raised to shorten residence time. This time is characterized as  $\tau=\tau_0 \exp(E/RT)$  where R is the ideal gas constant and  $\tau_0=(\text{approx.}) 10^{-13} \text{ sec}$ .

Residence time of water at 20°C is  $5.5 \times 10^{-6} \text{ sec}$ , whereas at 150°C, it is  $2.8 \times 10^{-8} \text{ sec}$ , or about 200 times shorter. The objective of baking is to exhaust water with long adsorption residence time more quickly.

XL

XLQ

XM

XY

D-

XVD

XGT

CYV



# Series XL Specific Product Precautions 1

Be sure to read before handling.

## Air Operated Angle Valves/Series XLA(V), XLC(V), XLD(V), XLF(V), XLG(V)

### Design

#### ⚠ Warning

- **All models**

1. The body material is A6063, the bellows are stainless steel 316L, and other metal seal material is stainless steel 304. Standard seal material in the vacuum section is FKM that can be changed to the other materials (please refer to "How to Order"). Use fluids which are compatible with materials after confirming.
2. Select materials for the actuation pressure piping, and heat resistance for fittings that are suitable for the applicable operating temperatures.

- **Model with auto switch/XLA(V), XLC(V), XLD(V), XLF(V), XLG(V)**

1. The switch section should be kept at a temperature no greater than 60°C.

- **Model with heater/XLA, XLC, XLD, XLF, XLG**

1. When using a model with a heater (thermistor), a device should be installed to prevent overheating.

- **Model with solenoid valve/XLAV, XLCV, XLDV, XLFV, XLGV**

1. For models with a solenoid valve, the temperature of the solenoid valve section should be no greater than 50°C.

### Selection

#### ⚠ Caution

- **All models**

1. For high vacuum valves used in the main exhaust lines of flat panel display manufacturing equipment and other large manufacturing equipment, the XLF(V) or XLG(V) series, employing O-ring seal type for improved durability, is recommended.
2. When controlling valve responsiveness, take note of the size and length of piping, as well as the flow rate characteristics of the actuating solenoid valve.
3. Actuating pressure should be kept within the specified range. 0.4 to 0.5 MPa is recommended.
4. Use within the limits of the operating pressure range.
5. The actuating piston chamber and the bellows chamber [except for XLF(V)/XLG(V)] are directly connected to atmosphere. Please use in an environment in which dust emissions will not cause problems. (Please consult SMC if the release of dust must be avoided.)

- **High temperature type/XLA, XLC, XLD, XLF, XLG**

1. In the case of gases which cause a large amount of deposits, heat the valve body to prevent deposits in the valve.

### Mounting

#### ⚠ Caution

- **All models**

1. In high humidity environments, keep valves packaged until the time of installation.
2. In case with switches and solenoid valves, secure the lead wires so that they have sufficient slack, without any unreasonable force applied to them.
3. Perform piping so that excessive force is not applied to the flange sections. In case there is vibration of heavy objects or attachments, etc., secure them so that torque is not applied directly to the flanges.

### Mounting

#### ⚠ Caution

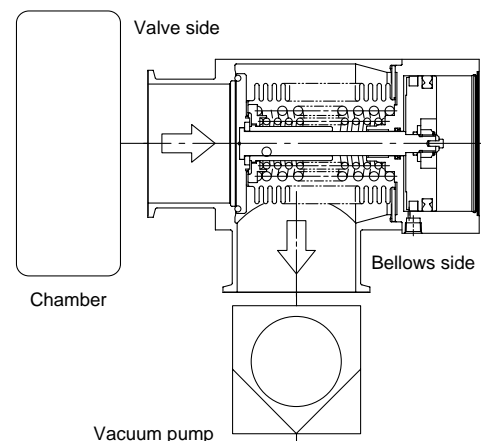
4. Vibration resistance allows for normal operation up to 30 m/s<sup>2</sup> (45 to 250 Hz), but continuous vibration may cause a decline in durability. Arrange piping to avoid excessive vibrations or shocks.
- **High temperature type (Model/XLA, XLC, XLD, XLF, XLG; Temperature specifications/H0, H2, H3)**
1. In models with heater (thermistor), take care not to damage the insulation components of the lead wires and connector section.
  2. The setting temperature for models with heater should be established without a draft or heat insulation. It will change depending on conditions such as heat retaining measures and the heating of other piping. Fine adjustment is not possible.
  3. When installing heater accessories or mounting a heater, check insulation resistance at the actual operating temperature. A short circuit breaker or fuse should be installed.
  4. When a valve is to be heated, only the body section should be heated, excluding the bonnet section.
  5. When a heater is in operation, the entire valve becomes hot. Be careful not to touch it with bare hands, as burns will result.

### Piping

#### ⚠ Caution

1. Before mounting, clean the surface of the flange seal and the O-ring with ethanol, etc.
2. There is an indentation of 0.1 to 0.2 mm in order to protect the flange seal surface, and it should be handled so that the seal surface is not damaged in any way.
3. Exhaust direction  
During operation, the direction of the exhaust may be determined freely, but in cases where a flow is generated by the exhaust, a decline in durability may result. The exhaust direction shown in the figure below (bellows side exhaust) is recommended. Please take all available precautions, as the life of the equipment is affected by conditions of usage.

#### Recommended exhaust direction [Vacuum pump connected on bellows side]





# Series XL Specific Product Precautions 2

Be sure to read before handling.

## Air Operated Angle Valves/Series XLA(V), XLC(V), XLD(V), XLF(V), XLG(V)

### Maintenance

#### ⚠ Caution

1. When removing deposits from a valve, take care not to damage any of its parts.
2. Replace the bonnet assembly when the end of its service life is approached.
3. If damage is suspected prior to the end of the service life, perform early maintenance.

### Maintenance

#### ⚠ Caution

4. SMC specified parts should be used for service. Refer to "Construction", "Replacement Parts," or "Maintenance Parts."
5. When removing valve or exterior seals, take care not to damage the sealing surfaces. When installing the valve seal, be sure that the O-ring is not twisted.

XL□

XL□Q

XM□  
XY□

D-□

XVD

XGT

CYV

## Manual Angle Valve/Series XLH

### Design

#### ⚠ Warning

1. The body material is A6063, the bellows are stainless steel 316L, other vacuum parts are stainless steel 304.  
FKM is the standard seal material for the vacuum part, but other materials may be selected (please refer to How to Order). Please check the material used, and use only fluids that will not interfere with the material.
2. When using a model with a heater (thermistor), a device should be installed to prevent over heating.

### Piping

#### ⚠ Caution

1. Before mounting, clean the surface of the flange seal and the O-ring with ethanol, etc.
2. There is an indentation of 0.1 to 0.2 mm 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.)

### Selection

#### ⚠ Caution

1. Use within the limits of the operating pressure range.
2. In the case of gases which cause a large amount of deposits, heat the valve body or use a model with heater to prevent deposits in the valve.

### Maintenance

#### ⚠ Caution

1. When removing deposits from a valve, take care not to damage any of its parts.
2. Replace the handle assembly when the end of its service life is approached.
3. If damage is suspected prior to the end of the service life, perform early maintenance.
4. SMC specified parts should be used for service. Refer to "Construction", "Replacement Parts," or "Maintenance Parts."
5. When removing valve or exterior seals, take care not to damage the sealing surfaces. When installing the valve seal, be sure that the O-ring is not twisted.

### Mounting

#### ⚠ Caution

1. In models with heater (thermistor), take care not to damage the insulation components of the lead wires and connector section.
2. The setting temperature for models with heater should be established without a draft or heat insulation. It will change depending on conditions such as heat retaining measures and the heating of other piping. Fine adjustment is not possible.
3. When installing heater accessories or mounting a heater, check insulation resistance at the actual operating temperature. A short circuit breaker or fuse should be installed.
4. When a valve is to be heated, only the body section (excluding handle part) should be heated.
5. In high humidity environments, keep valves packaged until the time of installation.
6. When a heater is in operation, the entire valve becomes hot. Be careful not to touch it with bare hands, as burns will result.
7. Perform piping so that excessive force is not applied to the flange sections. In case there is vibration of heavy objects or attachments, etc., secure them so that torque is not applied directly to the flanges.



# Series XL Specific Product Precautions 3

Be sure to read before handling.

## Angle Solenoid Valve/Series XLS

### Design

#### Warning

1. The body material is A6063, the bellows are stainless steel 316L, the other metal materials used in the vacuum part are 13Cr stainless steel, stainless steel 304, and A2017, and the seal material is FKM. In addition, a fluorinated resin (PFA) is used in the armature assembly of the vacuum part. The valve of the vacuum part has a fluorinated grease coating. Please check the material used, and in the course of maintenance, use only liquids that will not interfere with the material.
2. In cases without an operating power supply, the starting voltage is applied for only 0.15 to 0.2 s, 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.

### Mounting

#### Caution

1. In high humidity environments, keep valves packaged until the time of installation.
2. Please secure in such a way that the lead wire has sufficient curvature, and that no excessive force is applied to it.

### Piping

#### Caution

1. Before mounting, clean the surface of the flange seal and the O-ring with ethanol, etc.
2. There is an indentation of 0.1 to 0.2 mm 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 back of page 61 for further details.



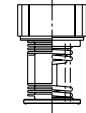
# Series XL Specific Product Precautions 4

Be sure to read before handling.

## Maintenance Parts

### Air operated angle valve/Manual valve

**Caution** 1. When replacing seal materials, please replace bonnet assembly or handle assembly. This may not be applicable in cases where the seal material differs from that used in the products.



Bonnet assembly

Handle assembly

### Bonnet Assembly, Handle Assembly Component Parts No.: (1)

Model	Temperature specifications	Indicator	Valve size							
			16	25	40	50	63	80	100	160
XLA	General use	None	XLA16-30-1	XLA25-30-1	XLA40-30-1	XLA50-30-1	XLA63-30-1	XLA80-30-1	—	—
		Yes	XLA16A-30-1	XLA25A-30-1	XLA40A-30-1	XLA50A-30-1	XLA63A-30-1	XLA80A-30-1	—	—
	High temperature	None	XLA16-30-1H	XLA25-30-1H	XLA40-30-1H	XLA50-30-1H	XLA63-30-1H	XLA80-30-1H	—	—
		Yes	XLA16A-30-1H	XLA25A-30-1H	XLA40A-30-1H	XLA50A-30-1H	XLA63A-30-1H	XLA80A-30-1H	—	—
XLAV	General use	None	XLAV16-30-1	XLAV25-30-1	XLAV40-30-1	XLAV50-30-1	XLAV63-30-1	XLAV80-30-1	—	—
		Yes	XLAV16A-30-1	XLAV25A-30-1	XLAV40A-30-1	XLAV50A-30-1	XLAV63A-30-1	XLAV80A-30-1	—	—
	High temperature	None	XLC16-30-1	XLC25-30-1	XLC40-30-1	XLC50-30-1	XLC63-30-1	XLC80-30-1	—	—
		Yes	XLC16-30-1H	XLC25-30-1H	XLC40-30-1H	XLC50-30-1H	XLC63-30-1H	XLC80-30-1H	—	—
XLCV	General use	None	XLCV16-30-1	XLCV25-30-1	XLCV40-30-1	XLCV50-30-1	XLCV63-30-1	XLCV80-30-1	—	—
		Yes	XLCV16A-30-1	XLCV25A-30-1	XLCV40A-30-1	XLCV50A-30-1	XLCV63A-30-1	XLCV80A-30-1	—	—
	High temperature	None	XLF16-30-1	XLF25-30-1	XLF40-30-1	XLF50-30-1	XLF63-30-1	XLF80-30-1	XLF100-30-1	XLF160-30-1
		Yes	XLF16A-30-1	XLF25A-30-1	XLF40A-30-1	XLF50A-30-1	XLF63A-30-1	XLF80A-30-1	XLF100A-30-1	XLF160A-30-1
XLFV	General use	None	XLFV16-30-1	XLFV25-30-1	XLFV40-30-1	XLFV50-30-1	XLFV63-30-1	XLFV80-30-1	XLFV100-30-1	XLFV160-30-1
		Yes	XLFV16A-30-1	XLFV25A-30-1	XLFV40A-30-1	XLFV50A-30-1	XLFV63A-30-1	XLFV80A-30-1	XLFV100A-30-1	XLFV160A-30-1
	High temperature	Standard	—	XLD25-30-1	XLD40-30-1	XLD50-30-1	XLD63-30-1	XLD80-30-1	—	—
		—	XLD25-30-1H	XLD40-30-1H	XLD50-30-1H	XLD63-30-1H	XLD80-30-1H	—	—	
XLDV	General use	Standard	—	XLDV25-30-1	XLDV40-30-1	XLDV50-30-1	XLDV63-30-1	XLDV80-30-1	—	—
		—	XLDV25-30-1H	XLDV40-30-1H	XLDV50-30-1H	XLDV63-30-1H	XLDV80-30-1H	—	—	
	High temperature	None	XLG16-30-1	XLG25-30-1	XLG40-30-1	XLG50-30-1	XLG63-30-1	XLG80-30-1	—	—
		Yes	XLG16-30-1H	XLG25-30-1H	XLG40-30-1H	XLG50-30-1H	XLG63-30-1H	XLG80-30-1H	—	—
XLGV	General use	None	XLGV16-30-1	XLGV25-30-1	XLGV40-30-1	XLGV50-30-1	XLGV63-30-1	XLGV80-30-1	—	—
		Yes	XLGV16A-30-1	XLGV25A-30-1	XLGV40A-30-1	XLGV50A-30-1	XLGV63A-30-1	XLGV80A-30-1	—	—
	High temperature	None	XLH16-30-1	XLH25-30-1	XLH40-30-1	XLH50-30-1	—	—	—	—
		Yes	XLH16A-30-1	XLH25A-30-1	XLH40A-30-1	XLH50A-30-1	—	—	—	—

Note 1) In cases where the valve seal material is other than the standard (FKM: includes Compound no. 1349-80: made by Mitsubishi Cable Industries, Inc.), please add suffix symbol for seal material (shown in the below table) at the end of the part number.

Note 2) An auto switch magnet is not attached. In cases where an auto switch magnet is attached, please add "M9/" at the end of the part number. (Not available for high temperature models)

Note 3) Auto switch and solenoid valve are not attached. When a set including auto switch and solenoid valve is required, please add the symbols after the auto switch in "How to Order" at the end of the part number.

### Exterior Seal, (M) Valve Seal, S Valve Seal Assembly

Model	Description Construction No.	Material	Valve size							
			16	25	40	50	63	80	100	160
XLA(V) XLC(V) XLD(V) XLH	Exterior seal ③	Standard	AS568-025V	AS568-030V	AS568-035V	AS568-039V	AS568-043V	AS568-045V	—	—
		Special	AS568-025□	AS568-030□	AS568-035□	AS568-039□	AS568-043□	AS568-045□	—	—
XLF(V) XLG(V)	Exterior seal ③	Standard	XLF16-6	XLF25-6	AS568-035V	AS568-039V	AS568-043V	AS568-045V	AS568-050V	AS568-167V
		Special	—	—	AS568-035□	AS568-039□	AS568-043□	AS568-045□	AS568-050□	AS568-167□
Common	Valve seal ②	Standard	B2401-V15V	B2401-V24V	B2401-P42V	AS568-227V	AS568-233V	B2401-V85V	AS568-349V	B2401-G155V
		Special	B2401-V15□	B2401-V24□	B2401-P42□	AS568-227□	AS568-233□	B2401-V85□	AS568-349□	B2401-G155□
XLD(V)	S valve seal assembly ④	Standard	—	AS568-009V	XLD40-2-9-1A	XLD50-2-9-1A	XLD80-2-9-3A	XLD80-2-9-3A	—	—
		Special	—	AS568-009□	XLD40-2-9-1A□	XLD50-2-9-1A□	—	—	—	—

Note 3) In cases where the seal material is other than the standard (FKM: includes Compound no. 1349-80: made by Mitsubishi Cable Industries, Inc.), please add suffix symbol for seal material (shown in the below table) at the end of the part number (the place of □).

Note 4) Refer to "Construction" of each series for component parts numbers.

Table 1: Seal Material Symbol

Symbol	-XN1	-XP1	-XQ1	-XR1	-XR2	-XR3	-XS1	-XT1	-XU1
Seal material	EPDM	Barrel Perfluoro®	Kalrez®	Chemraz®			VMQ	FKM for Plasma	ULTIC ARMOR®
Compound no.	2101-80*	70W	4079	SS592	SS630	SSE38	1232-70*	3310-75*	UA4640

Note 5) This may not be applicable in cases where the seal material differs from that used in the products, although the seal material is changed.

\* Produced by Mitsubishi Cable Industries, Ltd.

### Replacement Heaters

Temperature specification	Valve size						
	25	40	50	63	80	100	160
H2 (100°C heater)	—	XLA25-60M-1	XLA25-60M-1	XLA25-60M-2	XLA25-60M-3	XLA25-60M-2 (2 sets)	XLA25-60M-2 (3 sets)
H3 (120°C heater)	XLA25-60M-1	XLA25-60M-2	XLA25-60M-2	XLA25-60M-3	XLA25-60M-2 (2 sets)	XLA25-60M-2 (3 sets)	XLA25-60M-2 (4 sets)

Example) In the case of a replacement heater for XLC□-80-H3, two sets of XLA25-80M-2 (including two M type heaters) are required.

### Angle Solenoid Valve

Construction No.	Description	XLS-16-□□	XLS-16-P□□	XLS-25-□□	XLS-25-P□□
②	Coil assembly	XLS16-20-□G, C, T, D	XLS16-20-P□G	XLS25-20-□G, C, T, D	XLS16-20-P□G
⑥	Core assembly	XLS16-30-1		XLS25-30-1	
④	Armature assembly	XLS16-30-2		XLS25-30-2	
③-1	O-ring	AS568-018V		AS568-018V	
③-2	O-ring	AS568-025V		AS568-030V	

Note 1) In case of coil assembly, please enter voltage symbol in □. "G" after □ is grommet, "C" for conduit, "T" for terminal, and "D" for DIN.

Note 2) Refer to "Construction" for component parts numbers.