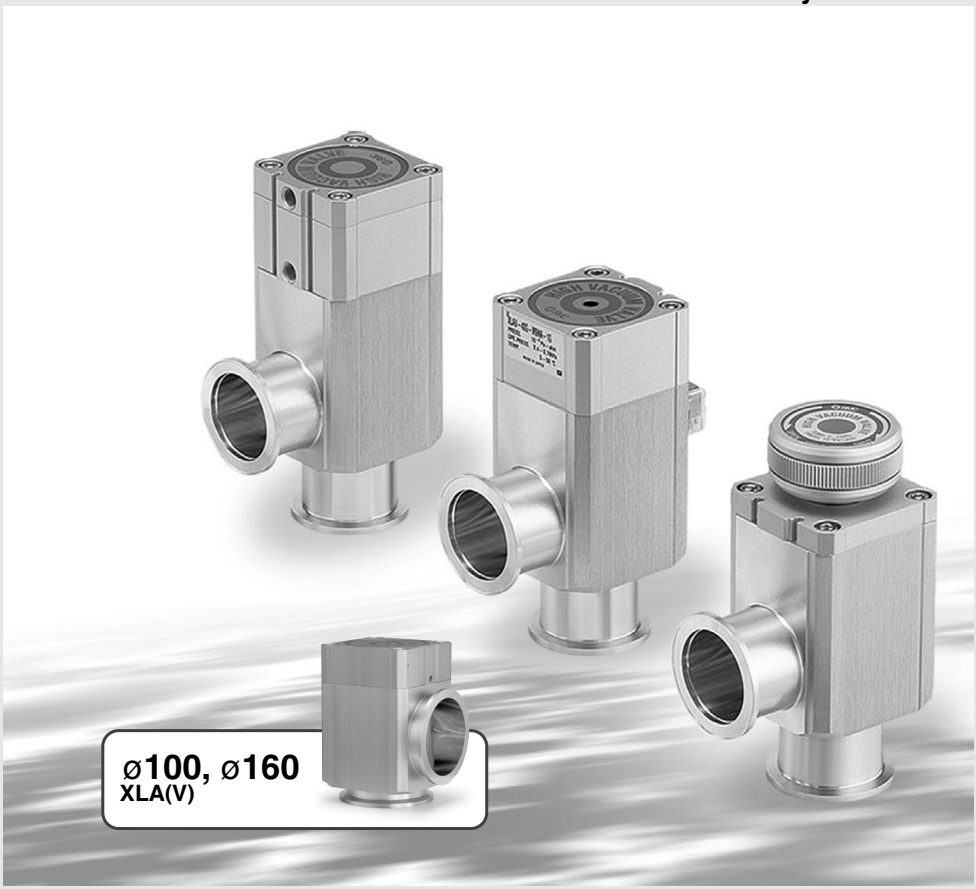
Aluminum High Vacuum Angle Valve

XL□ Series

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

RoHS

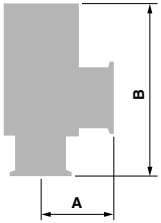
- High fluorine resistance
- Minimal outgassing
- Minimal contamination from heavy metals



Aluminum
High Vacuum Angle Valve
XL Series

Lightweight, Compact

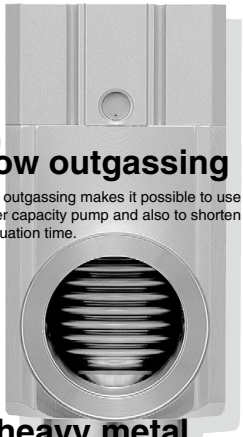
Large conductance, small body
Excellent resistance against fluorine corrosion (body)



XL* Series Case

Model	A* (mm)	B (mm)	Weight (kg)	Conductance* (L/s)
XLA-16	40	103	0.25	5
XLA-25	50	113	0.45	14
XLA-40	65	158	1.1	45
XLA-50	70	170	1.6	80
XLA-63	88	196	2.9	160
XLA-80	90	235	5.0	200
XLA-100	108	300	10.6	300
XLA-160	138	315	18.5	800

* Common to all series.



Low outgassing

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

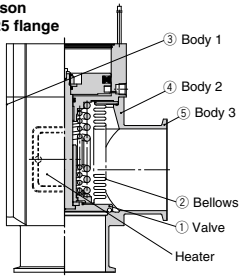
Little heavy metal contamination

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.

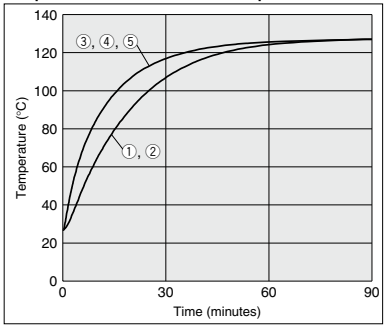
Uniform baking temperature

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



Temperature distribution of 120°C specifications



High Vacuum Angle Valves XL□ Series Features

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

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

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

XLG/XLGV (O-ring seal, Double acting)
- 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.

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

High Vacuum Angle Valves

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

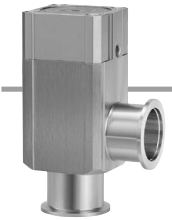
Note) In case of standard seal material (FKM)

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

Aluminum
High Vacuum Angle Valve
Normally Closed/Bellows Seal

RoHS

XLA/XLAV Series



XLA

The production of flange sizes 16, 25, 40, 50, 63, and 80 for the XLA(V) series has been discontinued. Please select the new XLA(V)-2 type. See here for details.

How to Order

XLA – 16 ☐ ☐ ☐ – M9N A – ☐

① ② ③ ④ ⑤ ⑥ ⑦

① Flange size

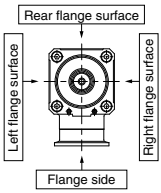
Size
16
25
40
50
63
80
100
160

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	5 to 150°C	—
	H4		With 100°C heater
	H5		With 120°C heater

Note) Size 16 is not applicable for H4, H5, Size 25 not for H4.

⑤ Auto switch type

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

Note 1) Auto switches shown above cannot be mounted on the high temperature type. For the high temperature type, a semi-standard product that uses the heat resistant auto switch D-F7NJ* is available. For details, please contact SMC.

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

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

Note 2) Refer to parts number of "Construction" on page 418 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 E. I. du Pont de Nemours and Company or its affiliates.
Chemraz® is a registered trademark of Greene, Tweed Technologies, Inc.
ULTIC ARMOR® is a registered trademark of Nippon Valqua Industries, Ltd.

SMC

Air Operated/with Solenoid Valve

The production of flange sizes 16, 25, 40, 50, 63, and 80 for the XLA(V) series has been discontinued. Please select the new XLA(V)-2 type. See here for details.

XLAV

CE [Option]

How to Order

XLAV – 16 ☐ G – M9N A – 1 G ☐ – ☐ – ☐

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

• Air operated/with solenoid valve

① Flange size

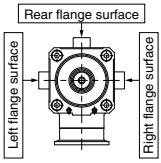
Size
16
25
40
50
63
80
100
160

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
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(M)(L)(Z)	D-M9N(M)(L)(Z)	Solid state auto switch
M9P(M)(L)(Z)	D-M9P(M)(L)(Z)	
M9B(M)(L)(Z)	D-M9B(M)(L)(Z)	
A90(L)	D-A90(L)	Reed auto switch (Not applicable to flange size 16)
A93(M)(L)(Z)	D-A93(M)(L)(Z)	
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

		CE-compliant
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.

⑩ CE-compliant

Nil	—
Q	CE-compliant

⑨ Body surface treatment/Seal material and its changed part

• Body surface treatment

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

• Seal material

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

∗ Produced by Mitsubishi Cable Industries, Ltd.

• Seal material changed part and leakage

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

Note 1) Values at normal temperature, excluding gas permeation.
Note 2) Refer to parts number of "Construction" on page 418 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

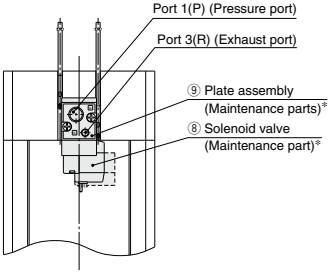
Note 1) Option specifications/Combinations
This model has indicator, auto switch and K(DN) flange options, but high temperature/heater options are not available.
Note 2) Solenoid valves
XLAV-16, 25, 40, 50: SYJ319, XLAV-63, 80, 100, 160: SYJ519
Example) SYJ319-1GS, etc.
∗ For details, consult your SMC sales representative.
∗ For option "Q", the solenoid valve should be a CE-compliant product.

Specifications

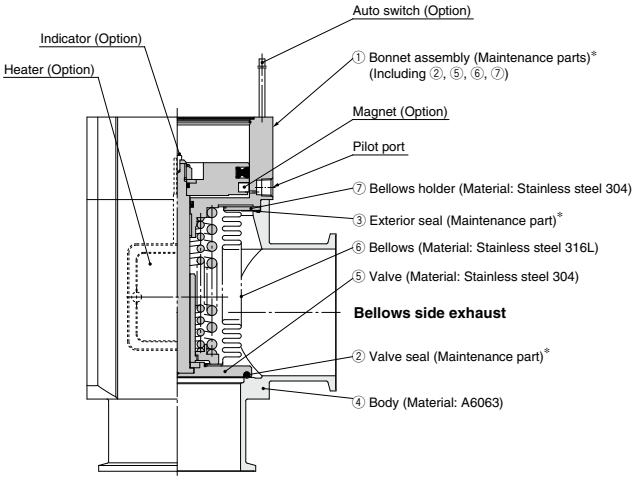
Model		XLA(V)-16	XLA(V)-25	XLA(V)-40	XLA(V)-50	XLA(V)-63	XLA(V)-80	XLA(V)-100	XLA(V)-160
Valve type		Normally closed (Pressurize to open, Spring seal)							
Fluid		Inert gas under vacuum							
Operating temperature (°C)	**XLA**	5 to 60 (High temperature type: 5 to 150)							
	XLAV	5 to 50							
Operating pressure (Pa) (abs)		1×10^{-6} to atmospheric pressure							
Conductance (L/s) Note 1)		5	14	45	80	160	200	300	800
Leakage ($Pa \cdot m^3/s$)	**Internal**	In case of standard material FKM: 1.3×10^{-10} at normal temperature, excluding gas permeation							
	External	In case of standard material FKM: 1.3×10^{-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) (G)		0.4 to 0.7							
Pilot port size	**XLA**	M5		Rc1/8					Rc1/4
	XLAV	M5: Port 1(P), Port 3(R)				Rc1/8: Port 1(P), M5: Port 3(R)			
Weight (kg)	**XLA**	0.25	0.45	1.1	1.6	2.9	5.0	10.6	18.5
	XLAV	0.29	0.49	1.14	1.64	2.96	5.06	10.7	18.6

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 459.

Construction/Operation



With solenoid valve



Valve side exhaust

∗ Refer to the back of page 465 for "Maintenance Parts".

<Working principle>

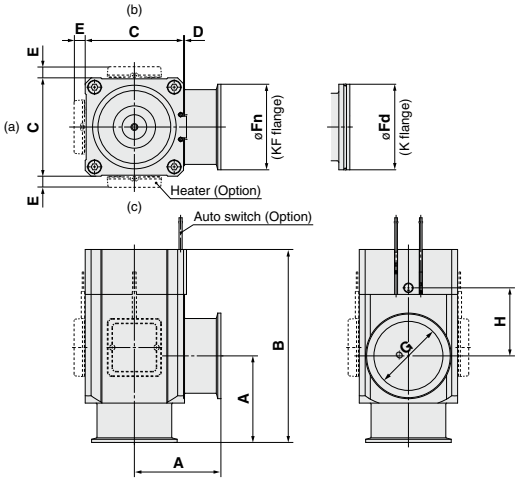
By applying the pilot pressure from the pilot port, the piston-coupled valve overcomes the spring force or operating force by pressure, and the valve opens.
For the XLAV, the pilot pressure is always applied to the port 1(P), and the valve opens when the solenoid valve is turned ON and closes when it 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

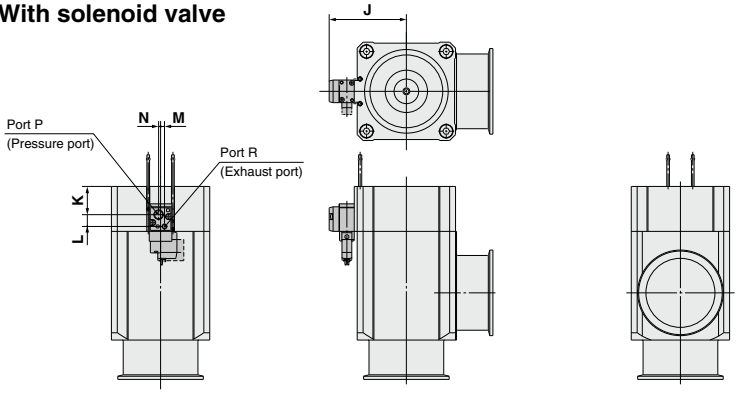


(mm)

Model	A	B	C	D	E Note 1)	Fn	Fd	G	H
XLA-16	40	103	38	1	–	30	–	17	40
XLA-25	50	113	48	1	12	40	–	26	39
XLA-40	65	158	66	2	11	55	–	41	63
XLA-50	70	170	79	2	11	75	–	52	68
XLA-63	88	196	100	3	11	87	95	70	69
XLA-80	90	235	117	3	11	114	110	83	96
XLA-100	108	300	154	3	11	134	130	102	131
XLA-160	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 465.

XLAV/With solenoid valve



(mm)

Model	J	K	L	M	N
XLAV-16	35.5	12.3	10.2	3.6	3.6
XLAV-25	40.5	13.8	10.2	3.6	3.6
XLAV-40	50.5	21.6	10.2	3.6	3.6
XLAV-50	57	24.6	10.2	3.6	3.6

∗ Other dimensions are the same as the XLA.
∗ For details, consult your SMC sales representative.

(mm)

Model	J	K	L	M	N
XLAV-63	78.5	28.7	12	4	2
XLAV-80	87	38.7	12	4	2
XLAV-100	105.5	50.7	12	4	2
XLAV-160	128.5	57.7	12	4	2

∗ Other dimensions are the same as the XLA.
∗ For details, consult your SMC sales representative.