

### How to Order

**XLD** — **25**       — **F9N**  

High vacuum angle valve  
(Smooth exhaust valve,  
normally closed, air operated type)

Flange size

25
40
50
63
80

Flange type

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

Actuation port direction

Nil	Flange side
K	Left flange surface
L	Rear flange surface
M	Right flange surface

Note) Actuation port direction  
(Example) Left flange surface:  
Indicates that the direction of the actuation port is to the left side when the flange surface is viewed from the front.

Switch quantity/Mounting position

Symbol	Quantity	Mounting position
Nil	—	—
A	2pcs.	Both sides
B	1pc.	Valve open
C	1pc.	Valve closed

Auto switch type

Nil	Without auto switch (without built-in magnet)
F9N	D-F9N
F9P	D-F9P
F9B	D-F9B

Note 1) The standard lead wire length is 0.5m.  
For 3m, "L" is added at the end of the part number.  
(Example) F9NL: D-F9NL  
Note 2) An auto switch should be secured against a stopper in the auto switch groove for detection of valve opening, or secured against a stopper or the valve body (depending on the valve size) for detection of valve closing.

Temperature specifications/Heater

Symbol	Temp. range	Heater
Nil	5 to 60°C (41 to 140°F)	None
High temp. type	H0	None
	H1	With heater for 80°C (176°F)
	H2	With heater for 100°C (212°F)
	H3	With heater for 120°C (248°F)

### High temperature type combination table

High temp. specifications	Symbol	Model				
		XLD-25	XLD-40	XLD-50	XLD-63	XLD-80
Without heater	H0	•	•	•	•	•
With heater for 80°C (176°F)	H1	•	•	•	•	•
With heater for 100°C (212°F)	H2	—	•	•	•	•
With heater for 120°C (248°F)	H3	•	•	•	•	•

Note) Auto switches cannot be mounted in the case of high temperature types.



XLD

## How to Order

**XLDV — 25 — K — F9N — 1 G**

**High vacuum angle valve**  
(Smooth exhaust valve, normally closed, air operated type with solenoid valve)

**Flange size**

25
40
50
63
80

**Flange type**

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

**Solenoid valve direction**

K	Left flange surface
L	Rear flange surface
M	Right flange surface

Note) Solenoid valve direction (Example) Left flange surface: Indicates that the direction of the solenoid valve is to the left side when the flange surface is viewed from the front.

**Auto switch type (for main exhaust valve)**

Nil	Without auto switch (without built-in magnet)
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**Solid state auto switches**

F9N	D-F9N
F9P	D-F9P
F9B	D-F9B

**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)

\* The S type is not available for AC.  
\* The U type is DC only.

**Electrical entry**

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

**Rated voltage**

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

**Switch quantity/Mounting position**

Symbol	Quantity	Mounting position
Nil	—	—
A	2pcs.	Valve open/closed
B	1pc.	Valve open
C	1pc.	Valve closed

Note 1) The standard lead wire length is 0.5m.  
For 3m, "L" is added at the end of the part number.  
(Example) F9NL: D-F9NL

Note 2) An auto switch should be secured against a stopper in the auto switch groove for detection of valve opening, or secured against a stopper or the valve body (depending on the valve size) for detection of valve closing.

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

Model	Initial exhaust valve	Main exhaust valve	Example
XLDV-25		SY114	SY114-1GS
XLDV-40, 50, 63, 80	SY114	SYJ314	SYJ314-1GS

For further details on solenoid valves, refer to the SMC solenoid valve catalogs "SY100" (N219) and "SYJ 300, 500, 700" (N220)



XLDV

## Specifications

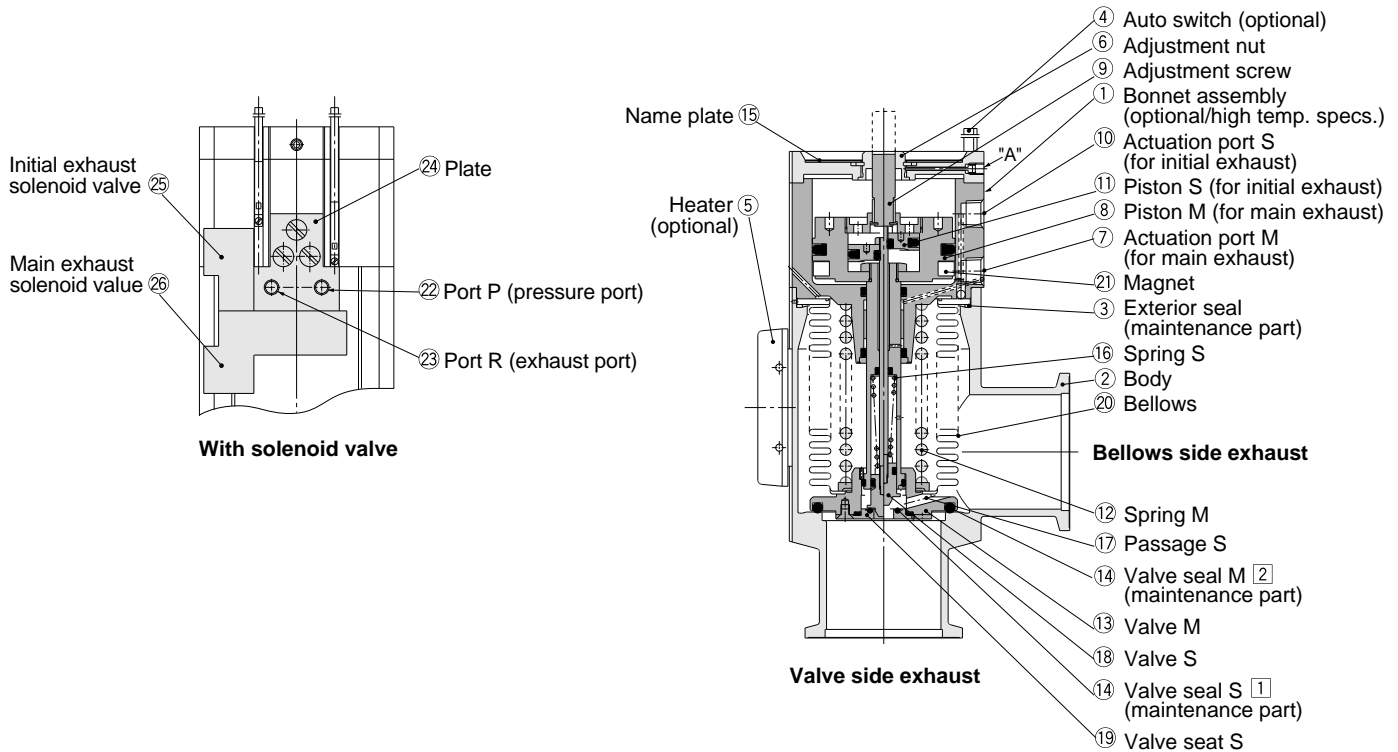
Model		XLD(V)-25	XLD(V)-40	XLD(V)-50	XLD(V)-63	XLD(V)-80
Valve type		Normally closed (spring return & seal) [both main & initial exhaust valves]				
Fluid		Non-corrosive gas for aluminum alloy (A6063) and SUS304/316				
Operating temperature °C	XLD	5 to 60°C (41 to 140°F) [high temperature type: 5 to 150°C (41 to 302°F)]				
	XLDV	5 to 50°C (41 to 122°F)				
Operating pressure Pa {Torr}		Atmospheric pressure to $1 \times 10^{-6}$ {760 to $7.5 \times 10^{-9}$ }				
Conductance $l/s$ <sup>Note 1)</sup>	Main exhaust valve	14	45	80	160	200
	Initial exhaust valve	0.5 to 3	2 to 8	2.5 to 11	4 to 18	4 to 18
Leakage $Pa\ m^3/s$ {Torr $l/s$ }	Internal	$1.3 \times 10^{-10}$ { $1 \times 10^{-9}$ } at ordinary temperatures, excluding gas permeation				
	External	$1.3 \times 10^{-11}$ { $1 \times 10^{-10}$ } at ordinary temperatures, excluding gas permeation				
Operating time s <sup>Note 2)</sup>	Main exhaust valve	0.10	0.21	0.24	0.26	0.28
	Initial exhaust valve	0.07	0.08	0.09	0.23	0.27
Flange type		KF (NW)			KF (NW), K (DN)	
Principle materials		Body: Aluminum alloy Bellows: Stainless steel Seal: FKM (fluoro rubber)				
Surface treatment		Exterior: Hard anodized		Interior: Machined for clean environment		
Actuation pressure MPa		0.4 to 0.7 (58 to 101.50psi) [both main & initial exhaust valves]				
Actuation port size	XLD	M5(10-32 nominal)	Rc(PT) 1/8			
	XLDV	M5(10-32 nominal) Ports P, R				
Actuating solenoid valve recommended Cv factor (XLD)	Main exhaust valve	$0.06 \leq$	$0.09 \leq$	$0.11 \leq$	$0.3 \leq$	$0.35 \leq$
	Initial exhaust valve	$0.01 \leq$	$0.01 \leq$	$0.02 \leq$	$0.02 \leq$	$0.03 \leq$
Service life (Million cycles)		2				
Weight kg (lb)	XLD	0.5 (1.10)	1.2 (2.65)	1.8 (3.97)	3.4 (7.50)	5.6 (12.35)
	XLDV	0.57 (1.26)	1.3 (2.87)	1.9 (4.19)	3.5 (7.72)	5.7 (12.57)

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

Note 2) The time required for 90% valve movement when an actuation pressure of 0.5MPa (72psi) is applied. There is a difference of about 20% in this value at the upper and lower pressure limits.

Note 3) For valve heater specifications, refer to "Common Option Specifications, [1]Heaters" on page 37.

## Construction/Operation



### Operating principle

#### 1 Initial exhaust valve opening adjustment

The initial exhaust rate should be adjusted before operation. With actuation port S (10) in an unpressurized state on model XLD, or with initial exhaust solenoid valve (25) in the OFF state on model XLDV, the initial exhaust rate is set to zero by gently turning the adjustment nut (6) to the right until it stops. After confirming the position of the angle adjustment scale on the name plate (15) and the angle adjustment mark on the adjustment nut (6), the initial exhaust rate is adjusted by turning the nut to the left. The pitch of the adjustment screw (9) is 1mm. The number of turns and initial exhaust conductance should be confirmed referring to the figure on the right.

A space is established between the end of the adjustment screw (9) and the shaft of valve S (18), which regulates the amount of movement of the piston S (11). The initial exhaust conductance is determined by the amount of opening between valve S (18) and the valve seal S [1]- (14). Further turning is prevented by locking after adjustment. When the initial exhaust rate will not be adjusted, or when it will be set at a fixed rate, it can be locked by tightening the Section "A" screw with a torque of approximately 5kgf.cm.

#### 2 Operation of the initial exhaust valve

The left section in the drawing shows the initial exhaust valve in a closed condition.

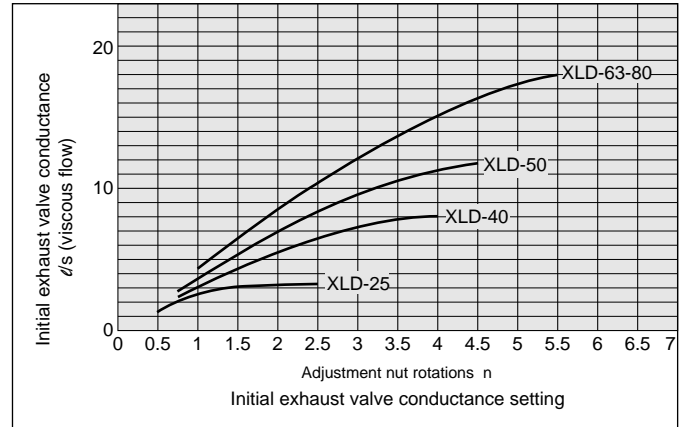
When pressure is applied to the actuation port S (10) on model XLD, or the initial exhaust solenoid valve (25) is turned ON with port P (22) in a pressurized state on model XLDV, air follows the dotted line passing through the space by the shaft and fills the area below the piston S (11). Piston S (11) is stopped when it strikes the adjustment screw (9). Through the movement of piston S (11), the valve S (18) is removed from the valve S seal assembly [1]- (14), and initial exhaust takes place through the passage S (17).

#### 3 Operation of the main exhaust

When pressure is applied to the actuation port M (7) on model XLD, or the main exhaust solenoid valve (26) is turned ON with port P in a pressurized state on model XLDV, the piston M (8) moves upward opening valve M (13). Port S (10) remains pressurized and valve S (18) remains open.

#### 4 Closing of both valves

By removing pressure from actuation port S (10) and actuation port M (7) on model XLD, or turning OFF initial exhaust solenoid valve (25) and main exhaust solenoid valve (26) on model XLDV, the force of spring S (16) and spring M (12) cause valve S (18) and valve M (13) to contact their respective valve seats and seals, thereby sealing them.



### Options

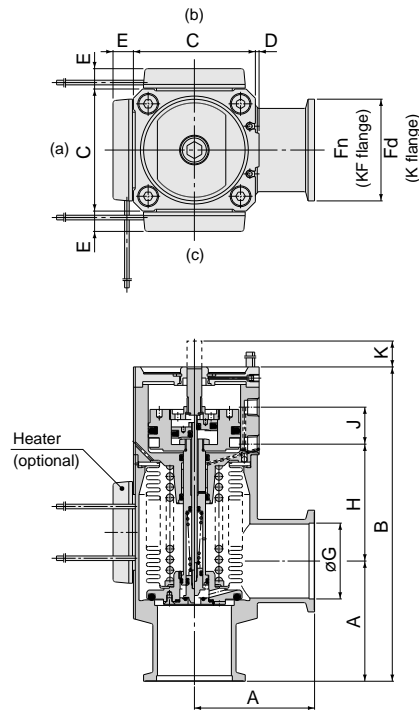
4 Auto switch: The magnet (21) actuates the auto switch (4) indicating the position of the integrated valve M (13) and the piston M (8). With two auto switches, the open and closed positions are detected, and with one auto switch, either the open or closed position is detected. Auto switches are applicable at ordinary temperatures only 5 to 60°C (41 to 140°F).

5 Heater: Simple heating is performed using thermistors. The valve body can be heated to approximately 80, 100 or 120°C (176, 212, or 248°F), 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 (1) is a heat resistant structure. This is not available with solenoid valve.

## Dimensions (mm)

1in=25.4mm

### XLD/Air operated type



	(mm)										
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	6.5
<b>XLD-40</b>	65	170	66	2	11	55	—	41	63	20	14
<b>XLD-50</b>	70	183	79	2	11	75	—	52	68	20	16.5
<b>XLD-63</b>	88	217	100	3	11	87	95	70	72	20	18.5
<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. 1m)

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

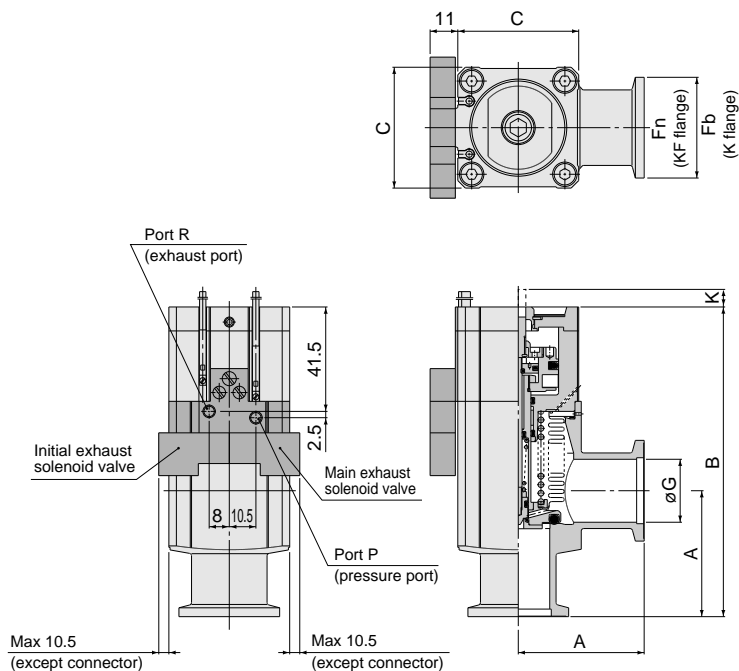
Moreover, heater mounting positions will differ depending on the type of heater.

For further details, refer to mounting positions under Replacement heaters/Part Nos. on page 46.

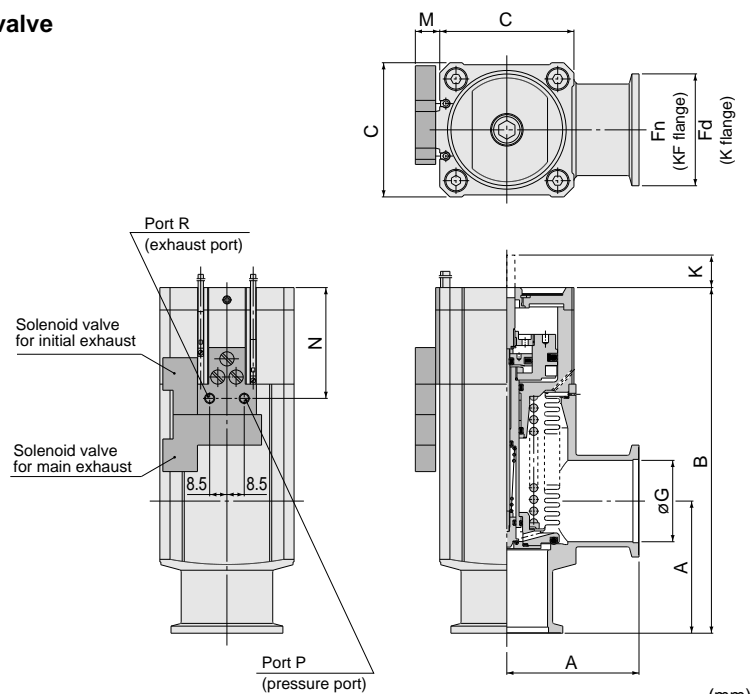
## Dimensions (mm)

1 in=25.4mm

### XLDV-25/With solenoid valve



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



Model	A	B	C	Fn	Fd	G	M	N	K
XLDV-25	50	123	48	40	-	26	-	-	6.5
XLDV-40	65	170	66	55	-	41	12	54.5	14
XLDV-50	70	183	79	75	-	52	12	58.5	16.5
XLDV-63	88	217	100	87	95	70	13	73.2	18.5
XLDV-80	90	256	117	114	110	83	13	83.6	25.5