Compact Type High Purity Air Operated Chemical Liquid Valve RoHS

LVD Series

Clean Wet Series

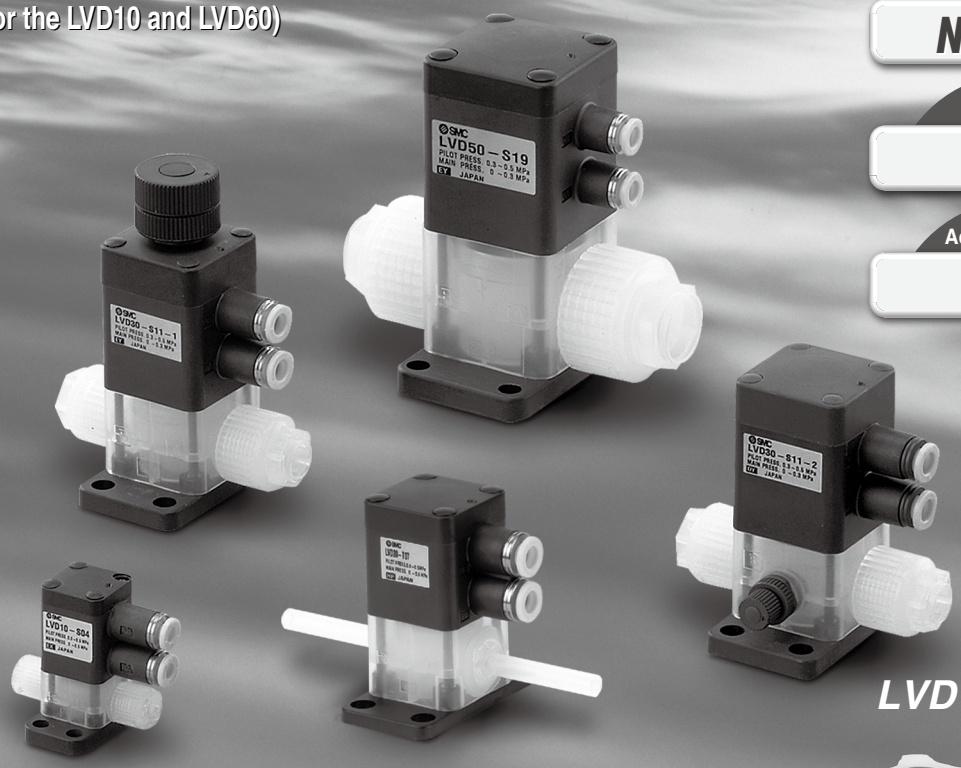
Space saving, compact model available

Compact type model is introduced as a new series to complement current LVC series with integrated fittings.
Select a series according to the flow rate and installation requirements.
Mounting base dimensions conform to SEMI Standard, F65-1101.
(Except for the LVD10 and LVD60)

Body
New PFA

Diaphragm
PTFE

Actuator section
PPS



LVD Series Page 31

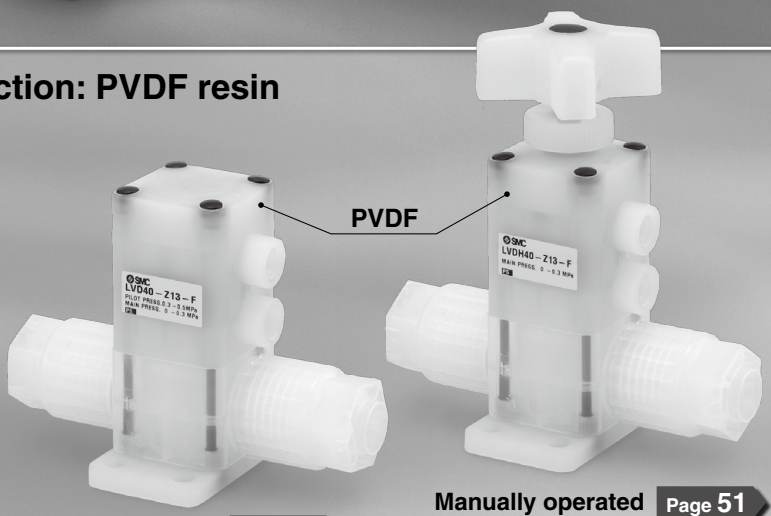
Material of actuator section: PVDF resin

Body
New PFA

Diaphragm
PTFE

Actuator section
PVDF

Choice of buffer materials
FKM, EPDM



Air operated Page 41

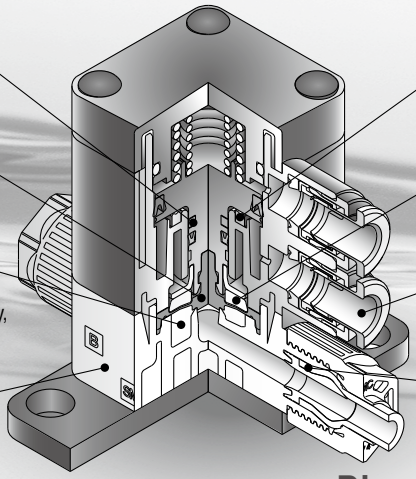
Manually operated Page 51
LVD-F/FN Series

Guide ring
Eliminates lateral motion of the poppet which reduces internal leakage.

Diaphragm (PTFE)
Special diaphragm construction ensures gentle opening and closing that prevents the formation of micro-bubbles.

Minimal residual liquid
Residual liquid is minimized by the tapered shape and integrated fitting construction, allowing liquid to flow smoothly, achieving improved swept flow rate characteristics.

Body (New PFA)
Compatible with chemicals such as acids, bases and ultrapure water.

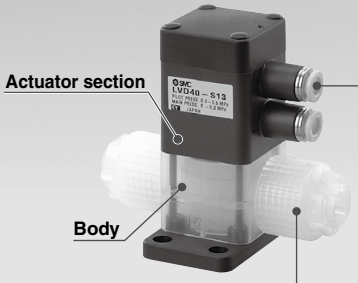


Piston bumper
Absorbs piston momentum to minimize impact-induced particle generation.

Buffer
Protects diaphragm from deformation and damage due to back pressure.

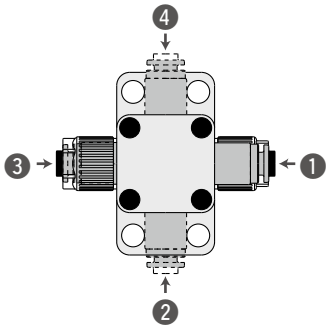
Pilot port
Integral clean One-touch fitting construction
Can select female thread (M5 x 0.8).

Integrated fitting construction
Offers quadruple seal construction. Nut lock mechanism. High flexural strength. Different tubing sizes can be selected.



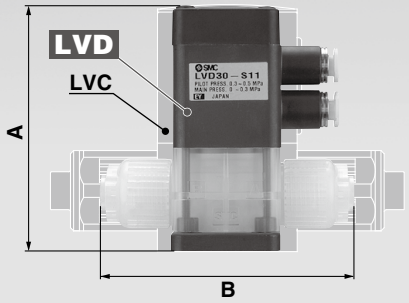
Integrated fitting construction
Hyper Fitting, the LQ1 series is used.

Piping from 4 directions are possible.



Integral clean One-touch fitting construction
(The KP series is used.)
Can select female thread (M5 x 0.8).

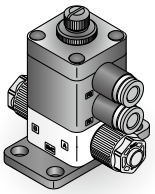
Dimension across inlet/outlet ports: Reduced by up to 29%



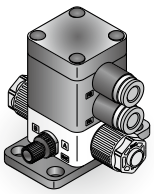
[mm]

	Class 2		Class 3		Class 4		Class 5	
	LVC20	**LVD20**	LVC30	**LVD30**	LVC40	**LVD40**	LVC50	**LVD50**
A	54.5	**54.5**	79	**79.5**	96	**82**	129	**105.5**
B	79	**67**	106	**83**	131	**93**	154	**114**

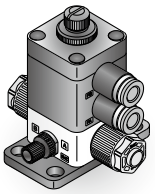
Options



With flow rate adjustment



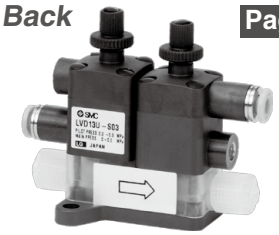
With bypass



With flow rate adjustment & bypass

Suck Back

Page 33



Variations

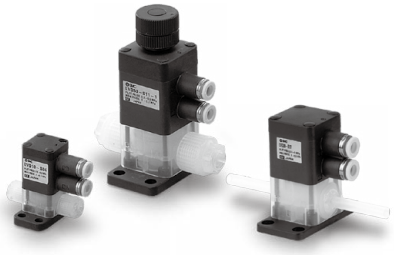
[Integrated fittings]··· Page 31

Orifice diameter	Flow rate characteristics Kv (Cv)	Model	Applicable tubing O.D.														
			Metric size								Inch size						
			3	4	6	8	10	12	19	25	1/8	3/16	1/4	3/8	1/2	3/4	1
2	0.07 (0.09)	LVD10	○	○							○						
4	0.3 (0.35)	LVD20	●	●	○						●	●	○				
8	1.1 (1.3)	LVD30			●	●	○						●	○			
10	1.6 (1.9)	LVD40					●	○						●	○		
16	4.2 (5)	LVD50						●	○						●	○	

[Tube extensions]··· Page 38

Orifice diameter	Flow rate characteristics Kv (Cv)	Model	Applicable tubing O.D.								
			Metric size					Inch size			
			6	8	10	12	19	1/4	3/8	1/2	3/4
4	0.3 (0.35)	LVD20	○					○			
8	1.1 (1.3)	LVD30		○					○		
10	1.6 (1.9)	LVD40			○					○	
16	4.2 (5)	LVD50				○					○

● With reducer ○ Basic size



Air Operated ***LVD-$^{F}_{FN}$ Series*** Page 41

Manually Operated ***LVDH-$^{F}_{FN}$ Series*** Page 51

Body: PFA
Actuator section: PVDF
Buffer: FKM/EPDM (Selection)

Type of fitting: Either "LQ1", "LQ3" or "tube extensions" can be selected.

Japan's Export Trade Control Order
Not applicable for list control
∗ Only the LVD50 and 60 apply to the list control.

Pilot port can be selected from 4 directions.
∗ Inapplicable to the LVD60.

Options: With flow rate adjustment, With bypass, With indicator, High back pressure (0.5 MPa)

LVD40-Z13-F1
With flow rate adjustment

LVD40-Z13-F

LVDH40-Z13-F

Variations

[LQ1 integrated fittings]··· Pages 41, 51

Orifice diameter	Flow rate characteristics Kv (Cv)	Model	Applicable tubing O.D.													
			Metric size								Inch size					
			3	4	6	8	10	12	19	25	1/8	3/16	1/4	3/8	1/2	3/4	1
4	0.3 (0.35)	LVD20-F/FN	●	●	○						●	●	○				
8	1.1 (1.3)	LVD30-F/FN			●	●	○						●	○			
10	1.6 (1.9)	LVD40-F/FN					●	○						●	○		
16	4.2 (5)	LVD50-F/FN						●	○						●	○	
22	6.8 (8)	LVD60-F/FN							●	○						●	○

● With reducer ○ Basic size

[LQ3 integrated fittings]··· Pages 45, 53

Orifice diameter	Flow rate characteristics Kv (Cv)	Model	Applicable tubing O.D.										
			Metric size						Inch size				
			6	8	10	12	19	25	1/4	3/8	1/2	3/4	1
4	0.3 (0.35)	LVD20-F/FN	○						○				
8	1.1 (1.3)	LVD30-F/FN		○	○					○			
10	1.6 (1.9)	LVD40-F/FN				○					○		
16	4.2 (5)	LVD50-F/FN					○					○	
22	6.8 (8)	LVD60-F/FN						○					○

[Tube extensions]··· Pages 48, 55

Orifice diameter	Flow rate characteristics Kv (Cv)	Model	Applicable tubing O.D.										
			Metric size						Inch size				
			6	8	10	12	19	25	1/4	3/8	1/2	3/4	1
4	0.3 (0.35)	LVD20-F/FN	○						○				
8	1.1 (1.3)	LVD30-F/FN			○					○			
10	1.6 (1.9)	LVD40-F/FN				○					○		
16	4.2 (5)	LVD50-F/FN					○					○	
22	6.8 (8)	LVD60-F/FN						○					○

Air Operated
Insert Bushing, Integrated Fittings
LVD Series

RoHS

How to Order

LVD 1 0 – S 03 □ □ □ – □ □

Body class

Symbol	Body class	Orifice dia.
1	1	ø2
2	2	ø4
3	3	ø8
4	4	ø10
5	5	ø16

Valve type

0	N.C.
1	N.O.
2	Double acting

Note) Refer to "Variations" in the table below for valve type combinations.

LQ1 integrated fittings

Applicable tubing size

Symbol	Connecting tubing size	Body class 1	2	3	4	5
Metric size						
03	3 x 2	○	●			
04	4 x 3	○	●			
06	6 x 4		○	●		
08	8 x 6			●		
10	10 x 8			○	●	
12	12 x 10				○	●
19	19 x 16					○
Inch size						
03	1/8" x 0.086"	○	●			
05	3/16" x 1/8"		●			
07	1/4" x 5/32"		○	●		
11	3/8" x 1/4"			○	●	
13	1/2" x 3/8"				○	●
19	3/4" x 5/8"					○

○Basic size ●With reducer

Note) Refer to page 60 for details on the applicable tubing sizes.

Pilot port type

Symbol	Body class	Type
Nil	1	ø4 One-touch fitting
	2, 3, 4, 5	ø6 One-touch fitting
2	1, 2, 3, 4, 5	M5 x 0.8

Port B (OUT) different diameter size

Symbol	Application
Nil	Ports A & B same size
Refer to the applicable tubing table to the left.	Different diameter tubings can be selected within the same body class. Different diameter tubing can not be selected for the body size 1.

Option

Nil	None
1	With flow rate adjustment
2	With bypass
3	With flow rate adjustment & bypass

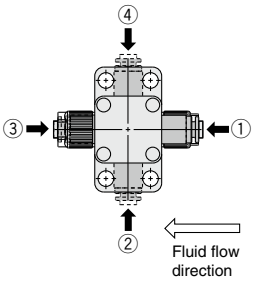
Note) Refer to "Variations" in the table below for option combinations. Options can not be combined each other.

Material

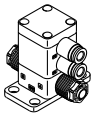
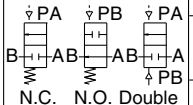
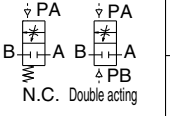
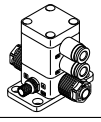
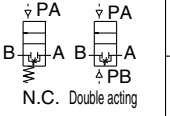
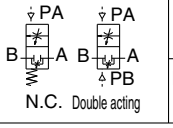
Symbol	Body	Actuator section / End plate	Diaphragm	Buffer	Note
Nil	PFA	PPS	PTFE	FKM	—
N	PFA	PPS	PTFE	EPDM	Ammonium hydroxide compatible

Pilot port position

Symbol	Position
Nil	①
P2	②
P3	③
P4	④

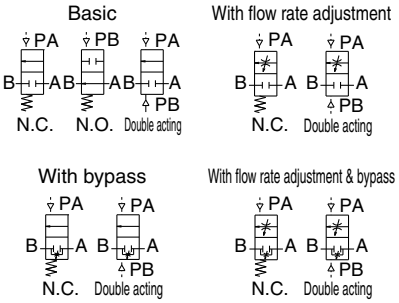


Variations

Type	Symbol	Valve type	LVD10	LVD20	LVD30	LVD40	LVD50
		Model	LVD10	LVD20	LVD30	LVD40	LVD50
		Orifice diameter	ø2	ø4	ø8	ø10	ø16
		Tubing O.D. Metric	3, 4	3, 4, 6	6, 8, 10	10, 12	12, 19
		Tubing O.D. Inch	1/8	1/8, 3/16, 1/4	1/4, 3/8	3/8, 1/2	1/2, 3/4
Basic 	 N.C. N.O. Double acting	N.C.	○	○	○	○	○
		N.O.	○	○	○	○	○
		Double acting	○	○	○	○	○
With flow rate adjustment 	 N.C. Double acting	N.C.	○	○	○	○	○
		Double acting	○	○	○	○	○
With bypass 	 N.C. Double acting	N.C.	—	○	○	○	○
		Double acting	—	○	○	○	○
With flow rate adjustment & bypass 	 N.C. Double acting	N.C.	—	○	○	○	○
		Double acting	—	○	○	○	○

SMC

Symbol



Standard Specifications

Model		LVD10	LVD20	LVD30	LVD40	LVD50
Tubing O.D. Note)	Metric	3, 4	3, 4, 6	6, 8, 10	10, 12	12, 19
	Inch	1/8	1/8, 3/16, 1/4	1/4, 3/8	3/8, 1/2	1/2, 3/4
Orifice diameter		ø2	ø4	ø8	ø10	ø16
Flow rate characteristics	Kv	0.07	0.3	1.1	1.6	4.2
	Cv	0.09	0.35	1.3	1.9	5
Withstand pressure [MPa]		1				
Operating pressure [MPa]	A→B flow	0 to 0.5		0 to 0.3		
	B→A flow	0 to 0.2		0 to 0.1		
Back pressure [MPa]		0.3 or less		0.2 or less		
Valve leakage [cm³/min]		0 (With water pressure)				
Pilot air pressure [MPa]		0.3 to 0.5				
Pilot port size	One-touch fitting	ø4 x ø3 tubing	ø6 x ø4 tubing			
	Threaded	M5 x 0.8				
Fluid temperature [°C]		0 to 100				
Ambient temperature [°C]		0 to 60				
Weight [kg]		0.04	0.09	0.16	0.19	0.40

Note) Refer to page 60 for details of the applicable tubing sizes.

Different Diameter Tubing Applicable with Reducer

Different diameter tubing can be selected (within a body class) by using a nut and insert bushing (reducer). Different diameter tubing cannot be selected for the body size 1.

● With reducer

Body class	Tubing O.D.												
	Metric size							Inch size					
	3	4	6	8	10	12	19	1/8	3/16	1/4	3/8	1/2	3/4
1	○	○	—	—	—	—	—	○	—	—	—	—	—
2	●	●	○	—	—	—	—	●	●	○	—	—	—
3	—	—	●	●	○	—	—	—	—	●	○	—	—
4	—	—	—	—	●	○	—	—	—	—	●	○	—
5	—	—	—	—	—	●	○	—	—	—	—	●	○

Note) Refer to page 57 for information on changing tubing sizes.

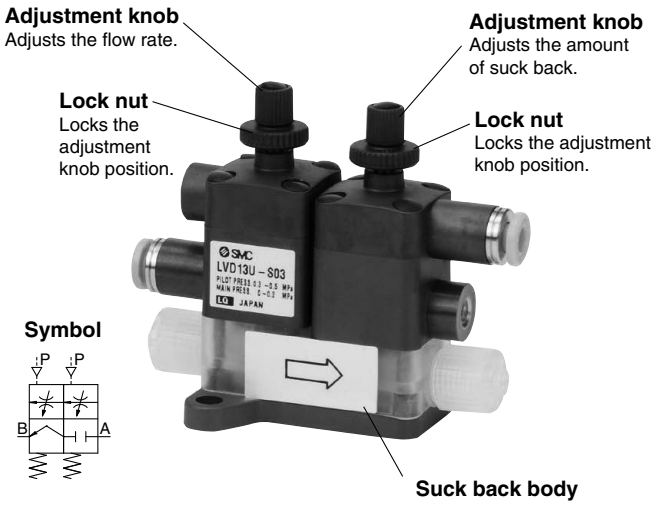
⚠ Precautions

Be sure to read this before handling the products. Refer to page 501 for Safety Instructions, and pages 59 to 61 for Compact Type High Purity Air Operated Chemical Liquid Valve Precautions.

Suck Back

A change of volume inside the suck back valve pulls in liquid at the end of the nozzle to prevent dripping.

Pilot port with One-touch fittings



Pilot port threaded type

Standard Specifications

Model		LVD13U
Tubing O.D. Note)	Metric size	3, 4
	Inch size	1/8
Orifice diameter		ø2
Flow rate characteristics	Kv	0.07
	Cv	0.09
Withstand pressure [MPa]		1
Operating pressure [MPa]		0 to 0.2
Maximum suck back volume [cm³]		0.03
Pilot air pressure [MPa]		0.3 to 0.5
Pilot port size	One-touch fitting	ø4 x ø3 tubing
	Threaded	M5 x 0.8
Fluid temperature [°C]		0 to 100
Ambient temperature [°C]		0 to 60
Weight [kg]		0.07

Note) Refer to page 60 for details on the applicable tubing sizes.

How to Order

LVD 1 3 U – S 03 ☐

Body class

Symbol	Body class
1	1

Valve type

3	Suck back valve

Applicable tubing size Note)

Symbol	Connecting tubing size
03	3 x 2, 1/8" x 0.086"
04	4 x 3

Note) Refer to page 60 for details on the applicable tubing sizes.

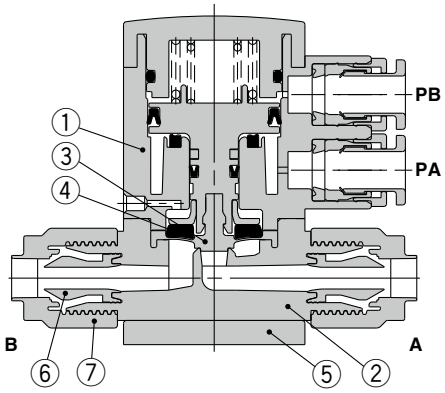
Pilot port configuration

Nil	ø4 One-touch fitting
2	M5 x 0.8

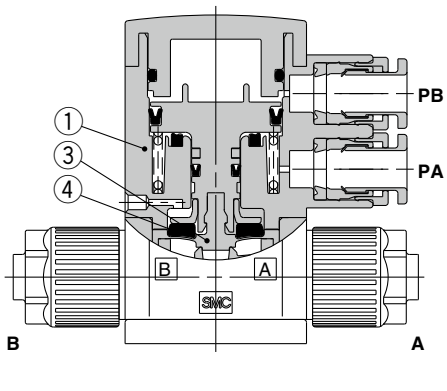
Construction

Basic type

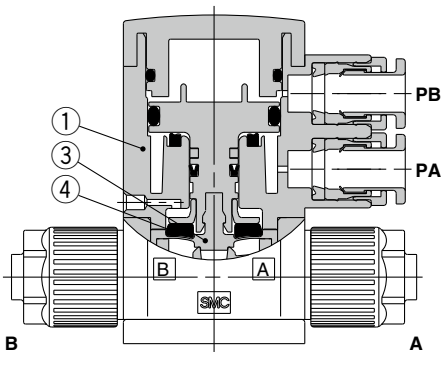
N.C.

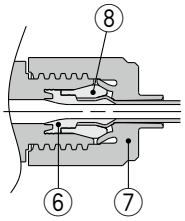


N.O.



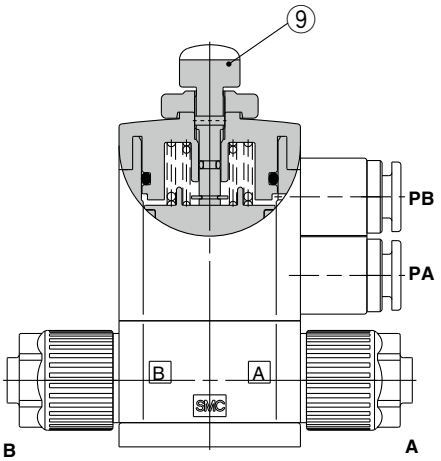
Double acting



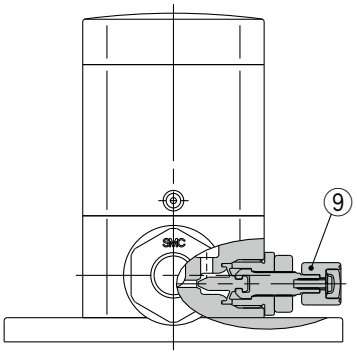


With reducer

With flow rate adjustment



With bypass

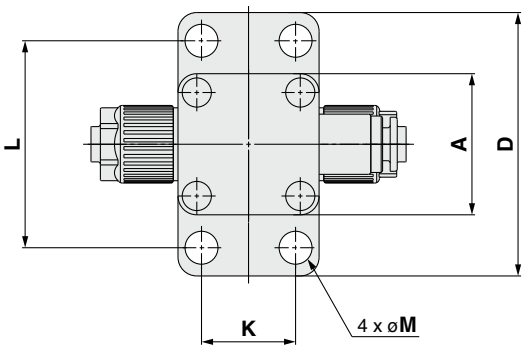


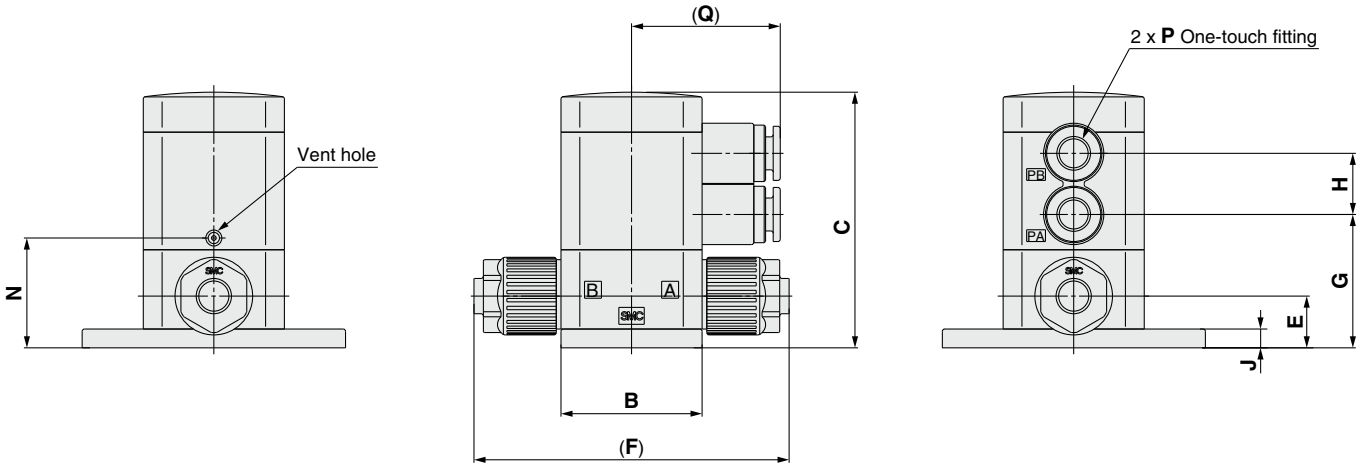
Component Parts

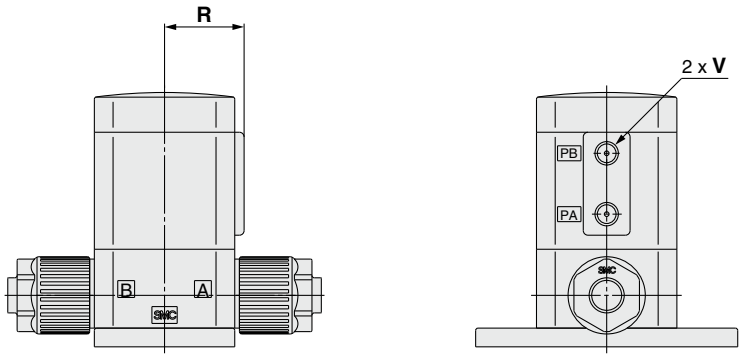
No.	Description	Material
1	**Actuator section**	PPS
2	**Body**	PFA
3	**Diaphragm**	PTFE
4	**Buffer**	FKM
		EPDM
5	**End plate**	PPS
6	**Insert bushing**	PFA
7	**Nut**	PFA
8	**Collar**	PFA
9	**Flow rate adjuster section**	PPS

Dimensions

Basic type







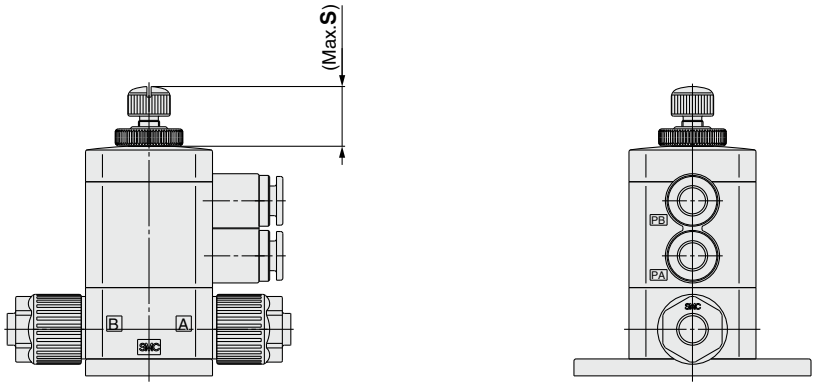
Pilot port threaded type

Dimensions

[mm]

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	V
LVD1□-S□	20	20	45	39	9.5	46	23	11.5	4.5	11	30	5	21	ø4 (5/32")	28	22.5	M5 x 0.8
LVD2□-S□	30	30	54.5	56	11	67	28.5	13	4	20	44	7	23.5	ø6	31.5	17.5	M5 x 0.8
LVD3□-S□	35	35	79.5	62	17.5	83	42.4	17.5	6	22	50	7	36.8	ø6	36	21	M5 x 0.8
LVD4□-S□	35	35	82	62	20	93	44.9	17.5	6	22	50	7	39.3	ø6	36	21	M5 x 0.8
LVD5□-S□	45	45	105.7	76	25	114	65.2	17.5	8	32	64	7	52.2	ø6	38.5	25	M5 x 0.8

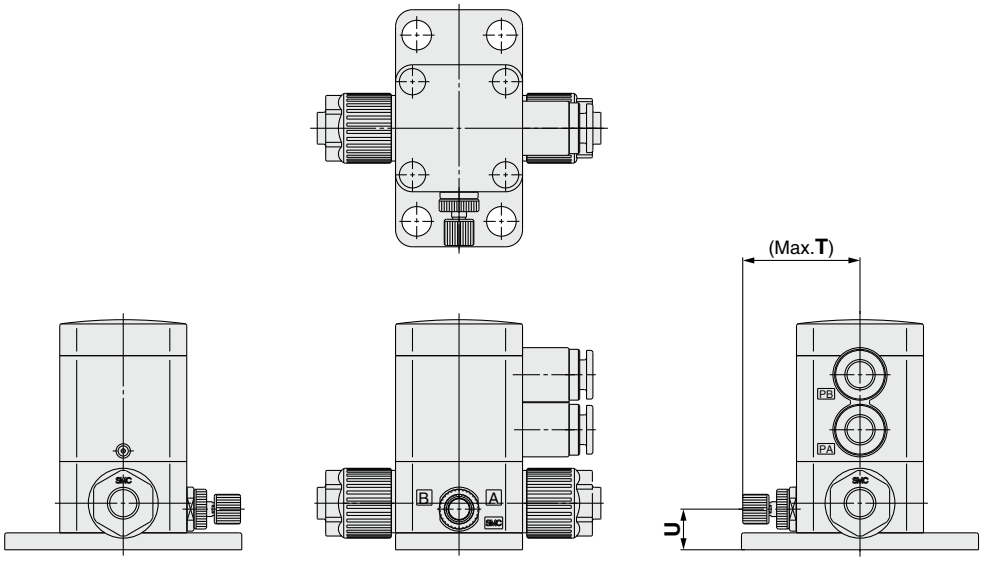
With flow rate adjustment



Dimensions [mm]

Model	S
LVD1□-S□	14
LVD2□-S□	12.5
LVD3□-S□	26
LVD4□-S□	26
LVD5□-S□	29.5

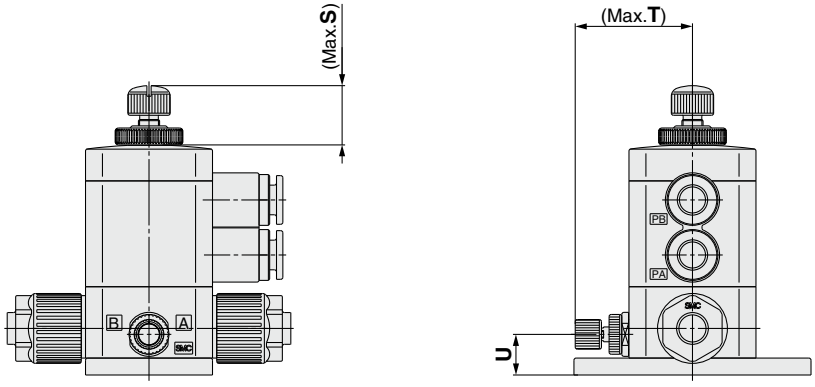
With bypass



Dimensions [mm]

Model	T	U
LVD2□-S□	28	9.6
LVD3□-S□	34	17.5
LVD4□-S□	35	20
LVD5□-S□	57	25

With flow rate adjustment & bypass



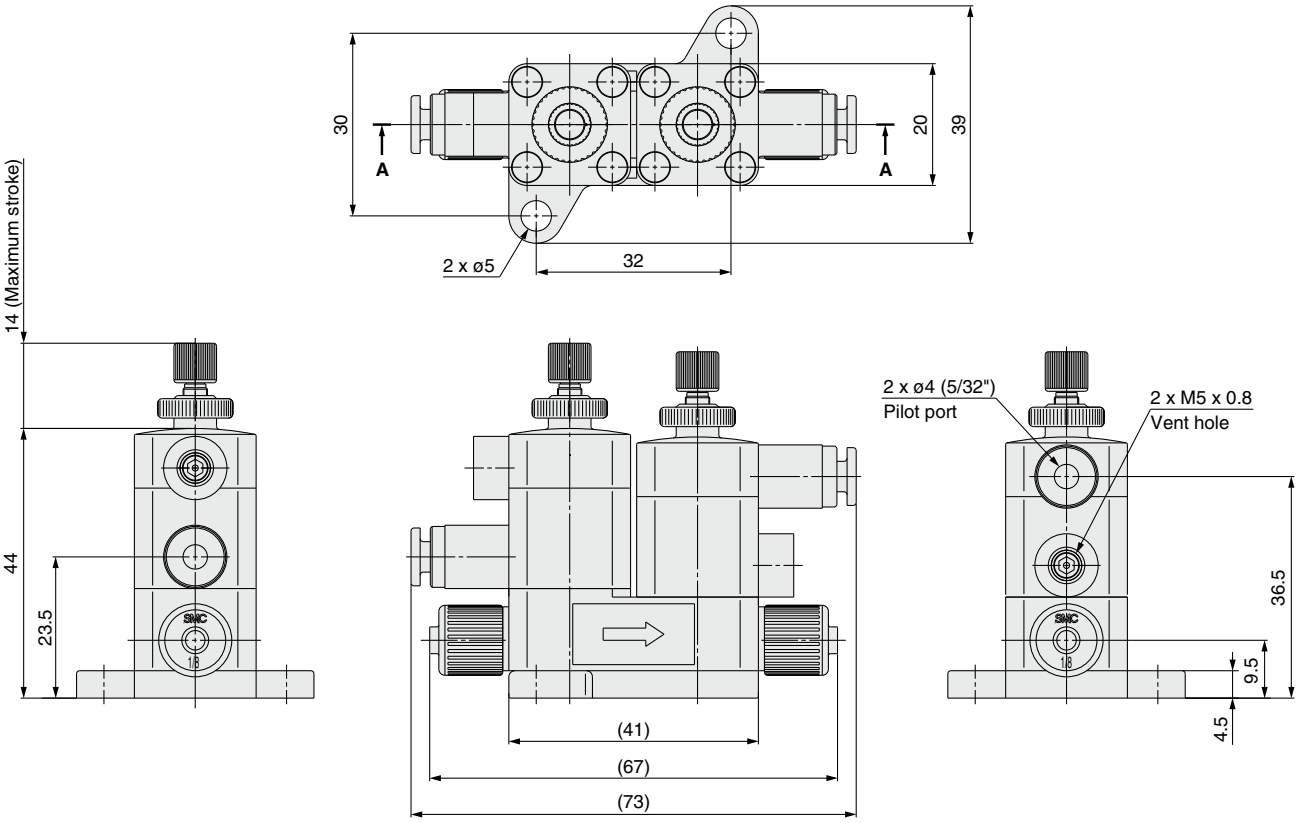
Dimensions [mm]

Model	S	T	U
LVD2□-S□	12.5	28	9.6
LVD3□-S□	26	34	17.5
LVD4□-S□	26	35	20
LVD5□-S□	29.5	57	25

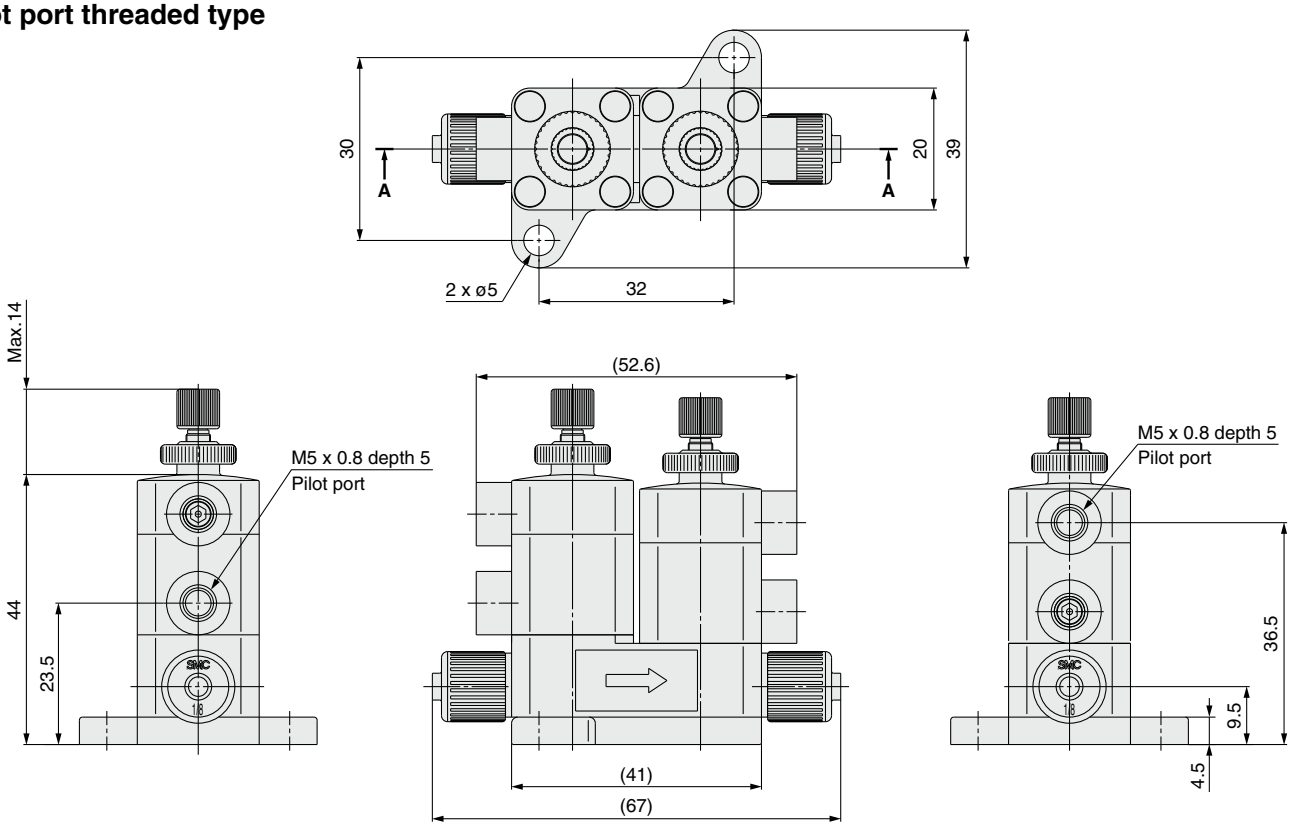
Dimensions

Suck back valve unit:

Pilot port with One-touch fittings



Pilot port threaded type



Air Operated
Tube Extensions
LVD-T Series

RoHS

How to Order

LVD 2 0 – T 06 □ □ – □ □

Body class

Symbol	Body class	Orifice dia.
2	2	ø4
3	3	ø8
4	4	ø10
5	5	ø16

Valve type

0	N.C.
1	N.O.
2	Double acting

Note) Refer to "Variations" in the table below for valve type combinations.

Option

Nil	None
1	With flow rate adjustment

Note) Refer to "Variations" in the table below for option combinations.

Material

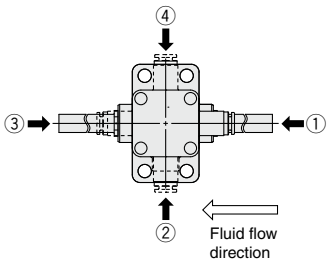
Symbol	Body	Actuator section / End plate	Diaphragm	Buffer	Note
Nil	PFA	PPS	PTFE	FKM	—
N	PFA	PPS	PTFE	EPDM	Ammonium hydroxide compatible

Tubing O.D.

Symbol	Tubing O.D.	Body class 2	3	4	5
Metric size					
06	ø6	○			
10	ø10		○		
12	ø12			○	
19	ø19				○
Inch size					
07	1/4"	○			
11	3/8"		○		
13	1/2"			○	
19	3/4"				○

Pilot port position

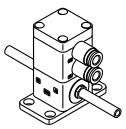
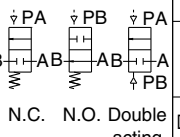
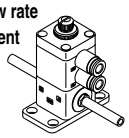
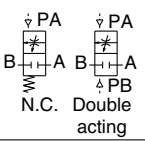
Symbol	Position
Nil	①
P2	②
P3	③
P4	④



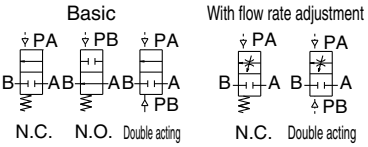
Pilot port type

Symbol	Type
Nil	ø6 One-touch fitting
2	M5 x 0.8

Variations

Type	Symbol (Valve type)	Model	LVD20-T	LVD30-T	LVD40-T	LVD50-T
		Orifice diameter	ø4	ø8	ø10	ø16
		Tubing O.D. Metric	6	10	12	19
		Tubing O.D. Inch	1/4	3/8	1/2	3/4
Basic 	 N.C. N.O. Double acting	N.C.	○	○	○	○
		N.O.	○	○	○	○
		Double acting	○	○	○	○
With flow rate adjustment 	 N.C. Double acting	N.C.	○	○	○	○
		Double acting	○	○	○	○

Symbol



⚠ Precautions

Be sure to read this before handling the products. Refer to page 501 for Safety Instructions, and pages 59 to 61 for Compact Type High Purity Air Operated Chemical Liquid Valve Precautions.

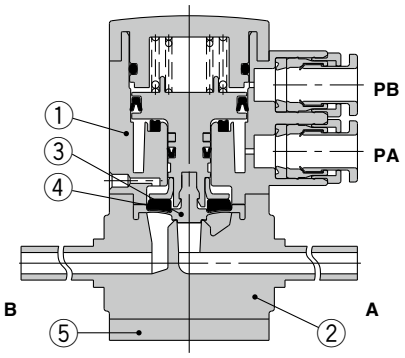
Standard Specifications

Model		LVD20	LVD30	LVD40	LVD50
Tubing O.D.	Metric	6	10	12	19
	Inch	1/4	3/8	1/2	3/4
Orifice diameter		ø4	ø8	ø10	ø16
Flow rate characteristics	Kv	0.3	1.1	1.6	4.2
	Cv	0.35	1.3	1.9	5
Withstand pressure [MPa]		1			
Operating pressure [MPa]	A→B flow	0 to 0.5	0 to 0.3		
	B→A flow	0 to 0.2	0 to 0.1		
Back pressure [MPa]		0.3 or less	0.2 or less		
Valve leakage [cm³/min]		0 (With water pressure)			
Pilot air pressure [MPa]		0.3 to 0.5			
Pilot port size	One-touch fitting	ø6 x ø4 tube			
	Threaded	M5 x 0.8			
Fluid temperature [°C]		0 to 100			
Ambient temperature [°C]		0 to 60			
Weight [kg]		0.09	0.15	0.17	0.36

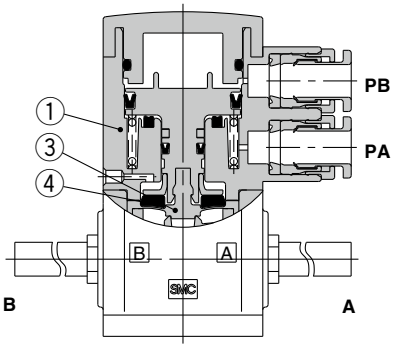
Construction

Basic type

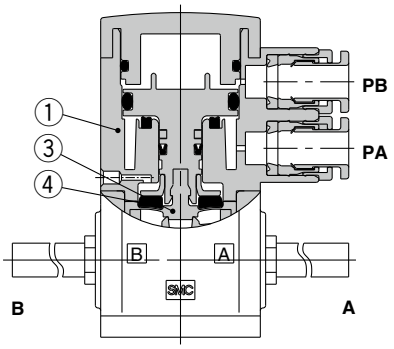
N.C.



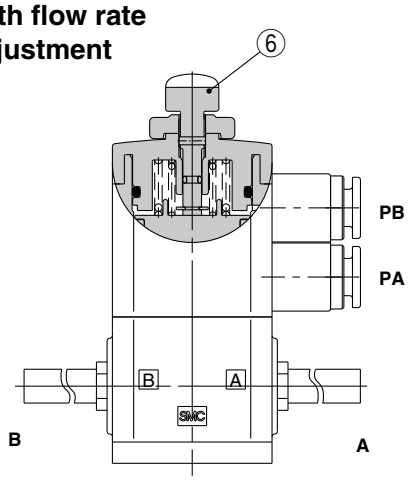
N.O.



Double acting



With flow rate adjustment

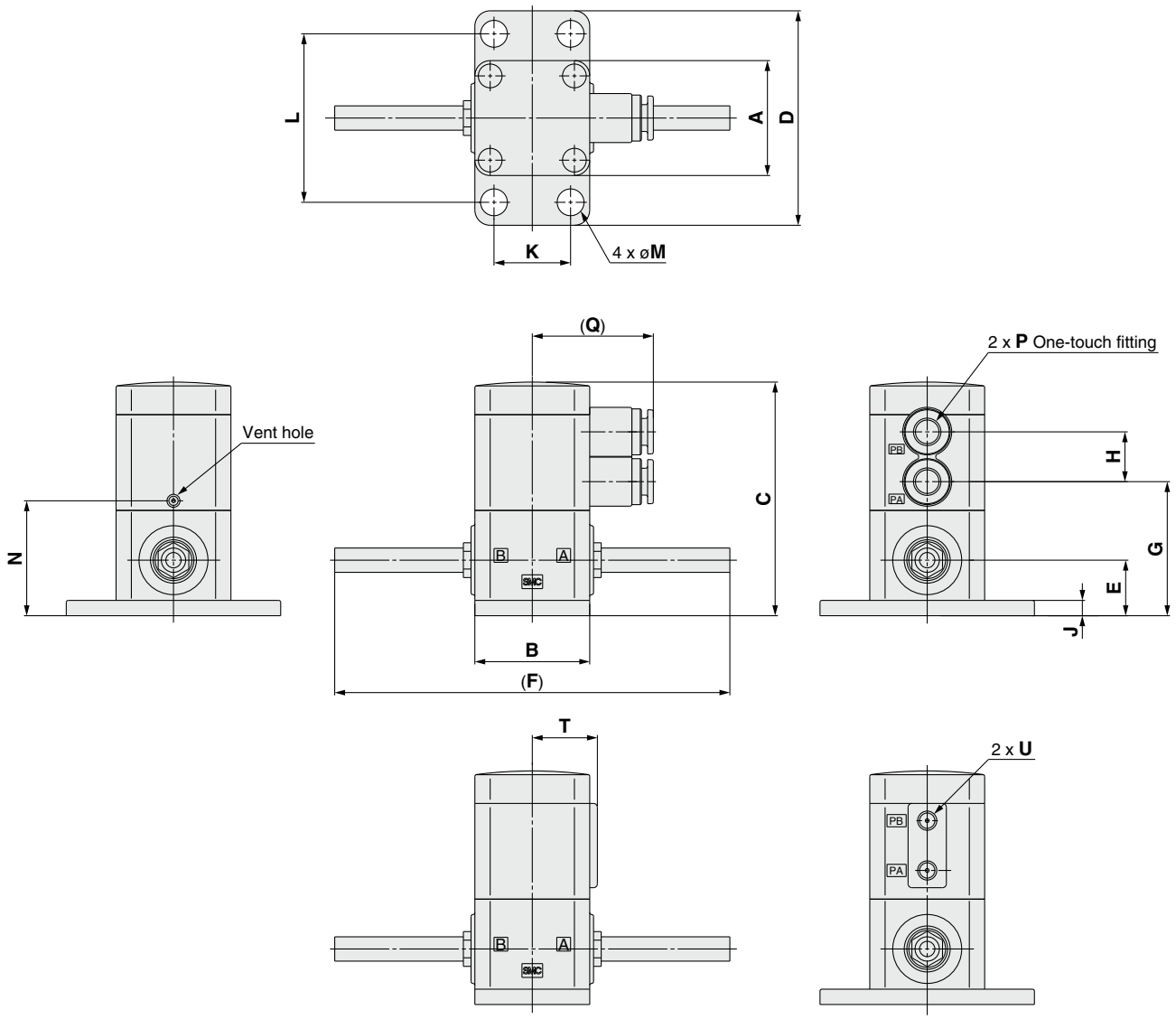


Component Parts

No.	Description	Material
1	Actuator section	PPS
2	Body	PFA
3	Diaphragm	PTFE
4	Buffer	FKM
		EPDM
5	End plate	PPS
6	Flow rate adjuster section	PPS

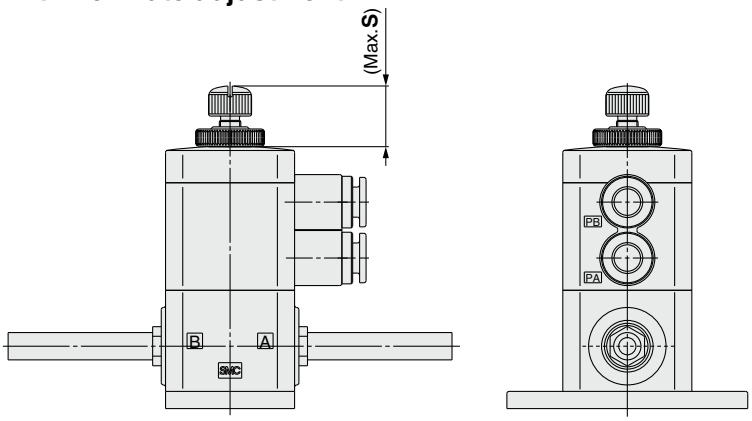
Dimensions

Basic type



Pilot port threaded type

With flow rate adjustment



Dimensions [mm]

Model	S
LVD2□-T□	12.5
LVD3□-T□	26
LVD4□-T□	26
LVD5□-T□	29.5

Dimensions [mm]

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	T	U
LVD2□-T□	30	30	61	56	14.5	103	35	13	4	20	44	7	30	ø6	31.5	17.5	M5 x 0.8
LVD3□-T□	35	35	79.5	62	17.5	136	42.4	17.5	6	22	50	7	36.8	ø6	36	21	M5 x 0.8
LVD4□-T□	35	35	82	62	20	137	44.9	17.5	6	22	50	7	39.3	ø6	36	21	M5 x 0.8
LVD5□-T□	45	45	105.7	76	25	169.5	65	17.5	8	32	64	7	52.2	ø6	38.5	25	M5 x 0.8

Air Operated
Insert Bushing, Integrated Fittings
LVD-F/FN Series RoHS

How to Order Valves

LVD 2 0 – V 07 □ □ □ – FN □

Body class

Symbol	Body class	Orifice dia.
2	2	ø4
3	3	ø8
4	4	ø10
5	5	ø16
6	6	ø22

Valve type

0	N.C.
1	N.O.
2	Double acting

Fitting type

Symbol	Model
V	LQ1

Applicable tubing size

Symbol	Connecting tubing size	Body class 2	3	4	5	6
Metric size						
03	3 x 2	●				
04	4 x 3	●				
06	6 x 4	○	●			
08	8 x 6		●			
10	10 x 8		○	●		
12	12 x 10			○	●	
19	19 x 16				○	●
25	25 x 22					○
Inch size						
03	1/8" x 0.086"	●				
05	3/16" x 1/8"	●				
07	1/4" x 5/32"	○	●			
11	3/8" x 1/4"		○	●		
13	1/2" x 3/8"			○	●	
19	3/4" x 5/8"				○	●
25	1" x 7/8"					○

○Basic size ●With reducer

Port B (OUT) different diameter size

Symbol	Application
Nil	Ports A & B same size
Refer to the applicable tubing table shown above.	Different diameter tubings can be selected within the same body class.

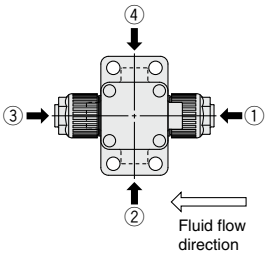
Pilot port thread type

Nil	Rc1/8
N	NPT1/8

Pilot port position

Symbol	Position
Nil	①
P2	②
P3	③
P4	④

Note) P2 and P4 are not available for the LVD6□.



Material

Symbol	Body	Actuator section / End plate	Diaphragm	Seal	Buffer
F	PFA	PVDF	PTFE	FKM	
FN	PFA	PVDF	PTFE	EPDM	

Option

Nil	None
1	With flow rate adjustment
2	With bypass
3	With flow rate adjustment & bypass
4	With indicator
5	High back pressure (0.5 MPa) tolerant
6	High back pressure with flow rate adjustment
7	High back pressure with bypass
8	High back pressure with flow rate adjustment & bypass
9	High back pressure with indicator
24	With bypass & indicator

Note 1) With flow rate adjustment: Only available with N.C. valve and double acting valve, With indicator: Only available with N.C. valve, With bypass: Only available with N.C. valve and double acting valve.
Note 2) "With bypass" type is not available for the LVD2□ and LVD6□.

Standard Specifications

Model			LVD20	LVD30	LVD40	LVD50	LVD60
Tubing O.D.		Metric	3, 4, 6	6, 8, 10	10, 12	12, 19	19, 25
		Inch	1/8, 3/16, 1/4	1/4, 3/8	3/8, 1/2	1/2, 3/4	3/4, 1
Orifice diameter			ø4	ø8	ø10	ø16	ø22
Flow rate characteristics	Kv		0.3	1.1	1.6	4.2	6.8
	Cv		0.35	1.3	1.9	5	8
Withstand pressure [MPa]			1				
Operating pressure [MPa]	Standard	A→B flow	0 to 0.5	0 to 0.3			0 to 0.4
		B→A flow	0 to 0.2	0 to 0.1			
	High back pressure	A→B flow	0 to 0.5				
		B→A flow	0 to 0.4				
Back pressure [MPa]	Standard	N.C./N.O.	0.3 or less	0.2 or less			0.2 or less
		Double acting					0.3 or less
	High back pressure	N.C./N.O./ Double acting	0.5 or less				
Valve leakage [cm³/min]			0 (With water pressure)				
Pilot air pressure [MPa]			0.3 to 0.5 (High back pressure: 0.5 to 0.8)				
Pilot port size			Rc1/8, NPT1/8				
Fluid temperature [°C]			0 to 100				
Ambient temperature [°C]			0 to 60				

Different Diameter Tubing Applicable with Reducer

Different diameter tubing can be selected (within a body class) by using a nut and insert bushing (reducer).

● With reducer

Body class	Tubing O.D.														
	Metric size								Inch size						
	3	4	6	8	10	12	19	25	1/8	3/16	1/4	3/8	1/2	3/4	1
2	●	●	○	—	—	—	—	—	●	●	○	—	—	—	—
3	—	—	●	●	○	—	—	—	—	—	●	○	—	—	—
4	—	—	—	—	●	○	—	—	—	—	—	●	○	—	—
5	—	—	—	—	—	●	○	—	—	—	—	—	●	○	—
6	—	—	—	—	—	—	●	○	—	—	—	—	—	●	○

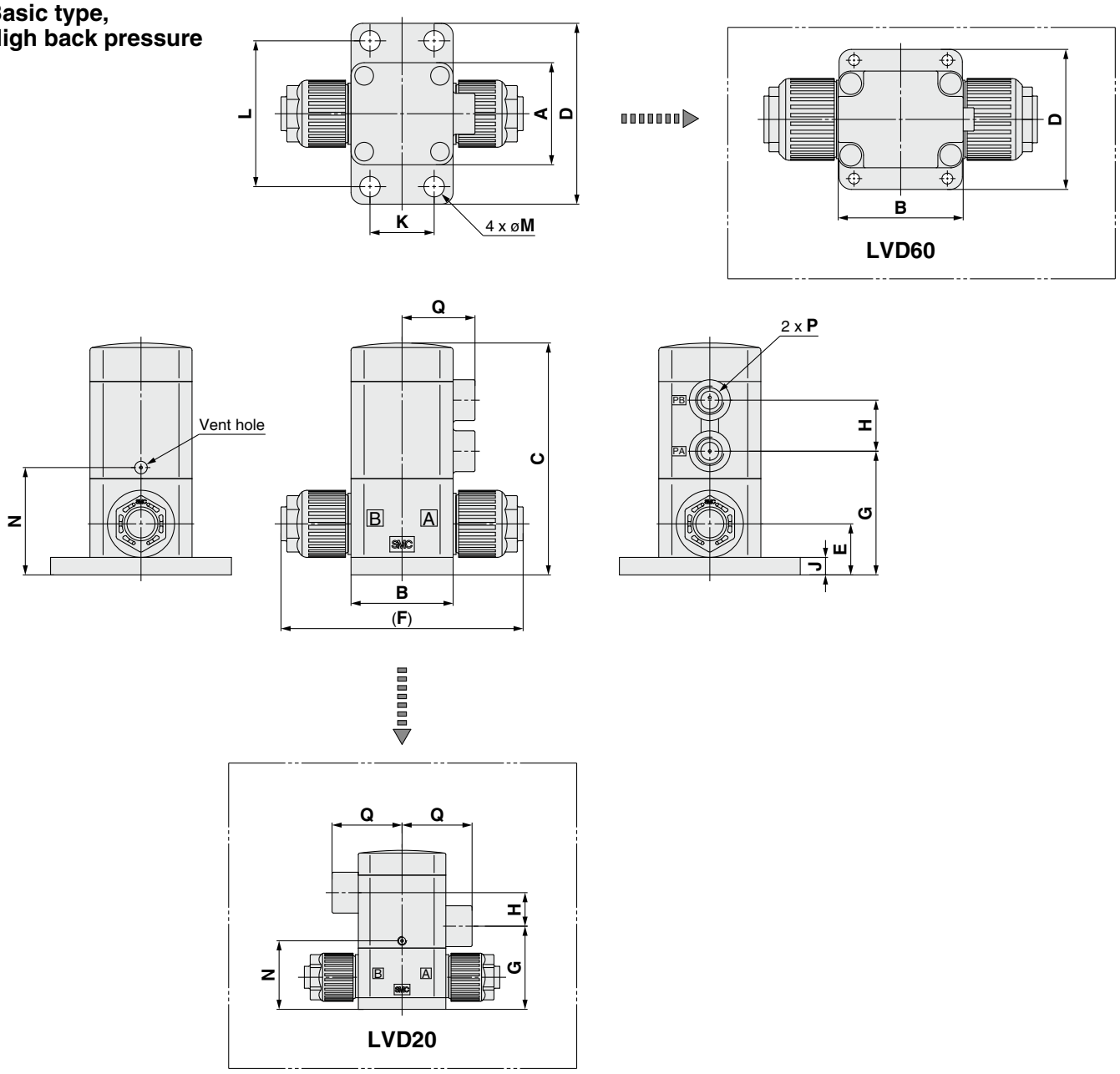
Note) Refer to page 57 for information on changing tubing sizes.

⚠Precautions

Be sure to read this before handling the products. Refer to page 501 for Safety Instructions, and pages 59 to 61 for Compact Type High Purity Air Operated Chemical Liquid Valve Precautions.

Dimensions

Basic type,
High back pressure

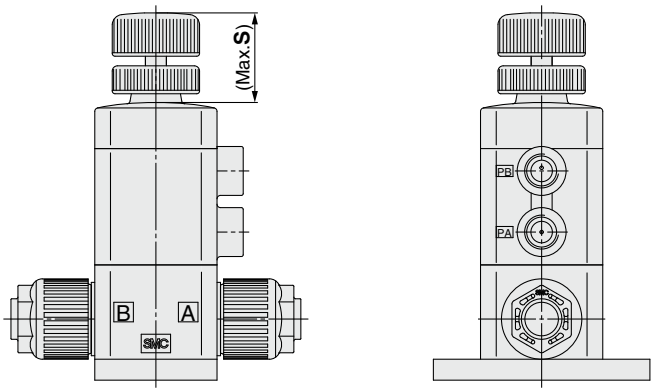


Dimensions [mm]

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
LVD2□-V□-F□	30	30	54.5	56	11	67	28.5	11.5	4	20	44	7	23.5	Rc1/8 NPT1/8	24
LVD3□-V□-F□	35	35	79.5	62	17.5	83	42.4	17.5	6	22	50	7	36.8	Rc1/8 NPT1/8	25
LVD4□-V□-F□	35	35	82	62	20	93	44.9	17.5	6	22	50	7	39.3	Rc1/8 NPT1/8	25
LVD5□-V□-F□	45	45	105.7	76	25	114	65.2	17.5	8	32	64	7	52.2	Rc1/8 NPT1/8	27.5
LVD6□-V□-F□	58	74	137.8	84	32	164	76.8	27.5	8	56	71	6.5	70.8	Rc1/8 NPT1/8	44

Dimensions

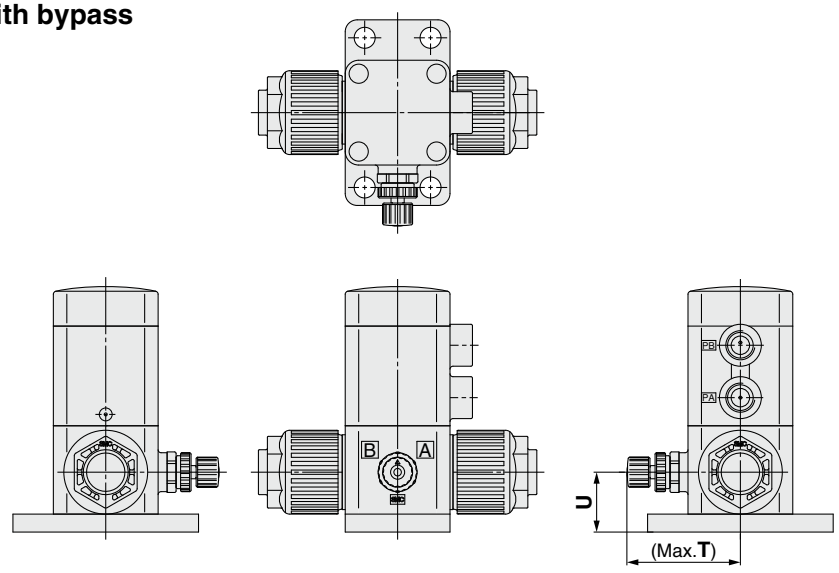
With flow rate adjustment, High back pressure with flow rate adjustment



Dimensions [mm]

Model	S
LVD2□-V□-F1	18.5
LVD3□-V□-F1	28.5
LVD4□-V□-F1	28.5
LVD5□-V□-F1	30.1
LVD6□-V□-F1	38

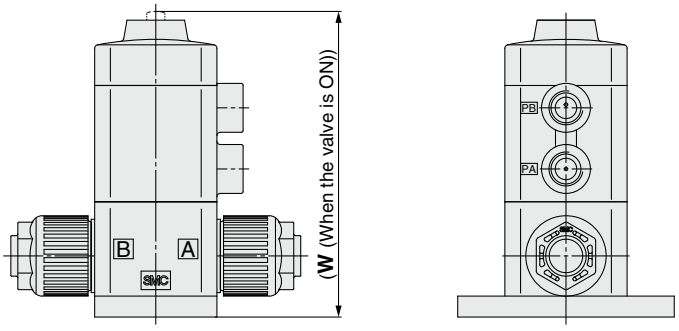
With bypass, High back pressure with bypass



Dimensions [mm]

Model	T	U
LVD3□-V□-F2	36.9	17.5
LVD4□-V□-F2	37.9	20
LVD5□-V□-F2	60.6	25

With indicator, High back pressure with indicator



Dimensions [mm]

Model	W
LVD20-V□-F4	56.4
LVD30-V□-F4	87.3
LVD40-V□-F4	89.8
LVD50-V□-F4	114.6
LVD60-V□-F4	149.4

Air Operated
Flare, Integrated Fittings
LVD-F/FN Series RoHS

How to Order Valves

LVD 2 0 – Z 07 □ □ – FN □

Body class

Symbol	Body class	Orifice dia.
2	2	ø4
3	3	ø8
4	4	ø10
5	5	ø16
6	6	ø22

Valve type

0	N.C.
1	N.O.
2	Double acting

Fitting type

Symbol	Model
Z	LQ3

Applicable tubing size

Symbol	Connecting tubing size	Body class 2	3	4	5	6
Metric size						
06	6 x 4	○				
08	8 x 6		○			
10	10 x 8		○			
12	12 x 10			○		
19	19 x 16				○	
25	25 x 22					○
Inch size						
07	1/4" x 5/32"	○				
11	3/8" x 1/4"		○			
13	1/2" x 3/8"			○		
19	3/4" x 5/8"				○	
25	1" x 7/8"					○

Pilot port thread type

Nil	Rc1/8
N	NPT1/8

Option

Nil	None
1	With flow rate adjustment
4	With indicator
5	High back pressure (0.5 MPa) tolerant
6	High back pressure with flow rate adjustment
9	High back pressure with indicator

Note) With flow rate adjustment: Only available with N.C. valve and double acting valve
With indicator: Only available with N.C. valve

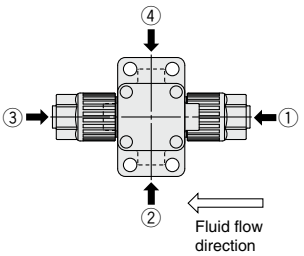
Material

Symbol	Body	Actuator section / End plate	Diaphragm	Seal	Buffer
F	PFA	PVDF	PTFE	FKM	
FN	PFA	PVDF	PTFE	EPDM	

Pilot port position

Symbol	Position
Nil	①
P2	②
P3	③
P4	④

Note) P2 and P4 are not available for the LVD6□.



Standard Specifications

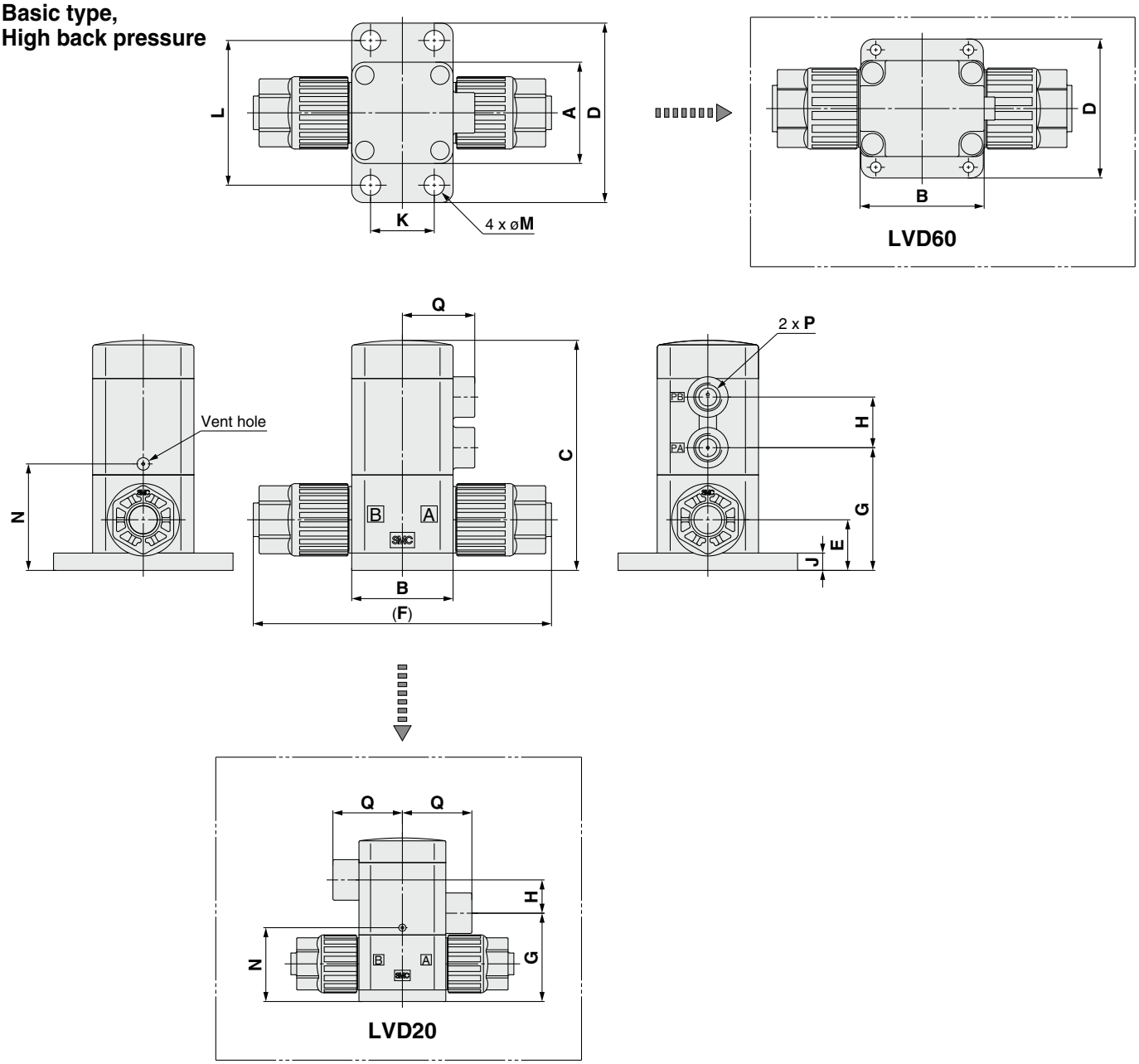
Model			LVD20	LVD30	LVD40	LVD50	LVD60
Tubing O.D.		Metric	6	8, 10	12	19	25
		Inch	1/4	3/8	1/2	3/4	1
Orifice diameter			ø4	ø8	ø10	ø16	ø22
Flow rate characteristics	Kv		0.3	1.1	1.6	4.2	6.8
	Cv		0.35	1.3	1.9	5	8
Withstand pressure [MPa]			1				
Operating pressure [MPa]	Standard	A→B flow	0 to 0.5	0 to 0.3			0 to 0.4
		B→A flow	0 to 0.2	0 to 0.1			
	High back pressure	A→B flow	0 to 0.5				
		B→A flow	0 to 0.4				
Back pressure [MPa]	Standard	N.C./N.O.	0.3 or less	0.2 or less			0.2 or less
		Double acting					0.3 or less
	High back pressure	N.C./N.O./ Double acting	0.5 or less				
Valve leakage [cm³/min]			0 (With water pressure)				
Pilot air pressure [MPa]			0.3 to 0.5 (High back pressure: 0.5 to 0.8)				
Pilot port size			Rc1/8, NPT1/8				
Fluid temperature [°C]			0 to 100				
Ambient temperature [°C]			0 to 60				

⚠Precautions

Be sure to read this before handling the products. Refer to page 501 for Safety Instructions, and pages 59 to 61 for Compact Type High Purity Air Operated Chemical Liquid Valve Precautions.

Dimensions

**Basic type,
High back pressure**

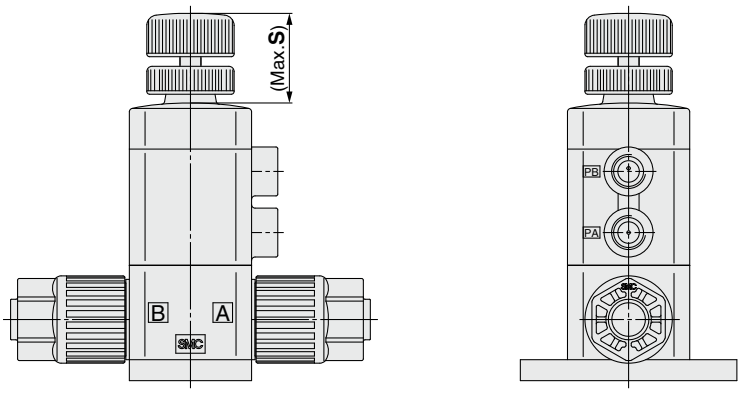


Dimensions [mm]

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
LVD2□-Z□-F□	30	30	56.5	56	13	77	30.5	11.5	4	20	44	7	25.5	Rc1/8 NPT1/8	24
LVD3□-Z□-F□	35	35	79.5	62	17.5	103	42.4	17.5	6	22	50	7	36.8	Rc1/8 NPT1/8	25
LVD4□-Z□-F□	35	35	82	62	20	112	44.9	17.5	6	22	50	7	39.3	Rc1/8 NPT1/8	25
LVD5□-Z□-F□	45	45	105.7	76	25	134	65.2	17.5	8	32	64	7	52.2	Rc1/8 NPT1/8	27.5
LVD6□-Z□-F□	58	74	137.8	84	32	181	76.8	27.5	8	56	71	6.5	70.8	Rc1/8 NPT1/8	44

Dimensions

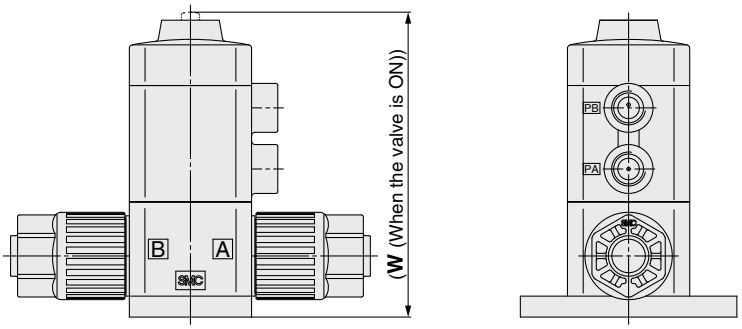
With flow rate adjustment, High back pressure with flow rate adjustment



Dimensions [mm]

Model	S
LVD2□-Z□-F1	18.5
LVD3□-Z□-F1	28.5
LVD4□-Z□-F1	28.5
LVD5□-Z□-F1	30.1
LVD6□-Z□-F1	38

With indicator, High back pressure with indicator



Dimensions [mm]

Model	W
LVD20-Z□-F4	58.4
LVD30-Z□-F4	87.3
LVD40-Z□-F4	89.8
LVD50-Z□-F4	114.6
LVD60-Z□-F4	149.4

Air Operated Tube Extensions
LVD-T-F/FN Series RoHS

How to Order Valves

LVD 2 0 – T 07 □ □ – FN □

Body class

Symbol	Body class	Orifice dia.
2	2	ø4
3	3	ø8
4	4	ø10
5	5	ø16
6	6	ø22

Valve type

0	N.C.
1	N.O.
2	Double acting

Fitting type

Symbol	Type
T	Tube extensions

Tubing O.D.

Symbol	Tubing O.D.	Body class 2	3	4	5	6
Metric size						
06	ø6	○				
10	ø10		○			
12	ø12			○		
19	ø19				○	
25	ø25					○
Inch size						
07	1/4	○				
11	3/8		○			
13	1/2			○		
19	3/4				○	
25	1					○

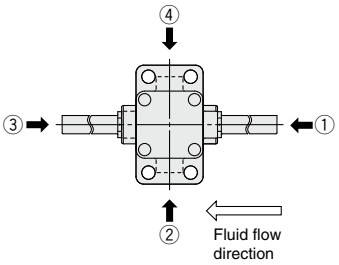
Pilot port thread type

Nil	Rc1/8
N	NPT1/8

Pilot port position

Symbol	Position
Nil	①
P2	②
P3	③
P4	④

Note) P2 and P4 are not available for the LVD6□.



Option

Nil	None
1	With flow rate adjustment
4	With indicator
5	High back pressure (0.5 MPa) tolerant
6	High back pressure with flow rate adjustment
9	High back pressure with indicator

Note) With flow rate adjustment: Only available with N.C. valve and double acting valve
With indicator: Only available with N.C. valve

Material

Symbol	Body	Actuator section / End plate	Diaphragm	Seal	Buffer
F	PFA	PVDF	PTFE	FKM	
FN	PFA	PVDF	PTFE	EPDM	

Standard Specifications

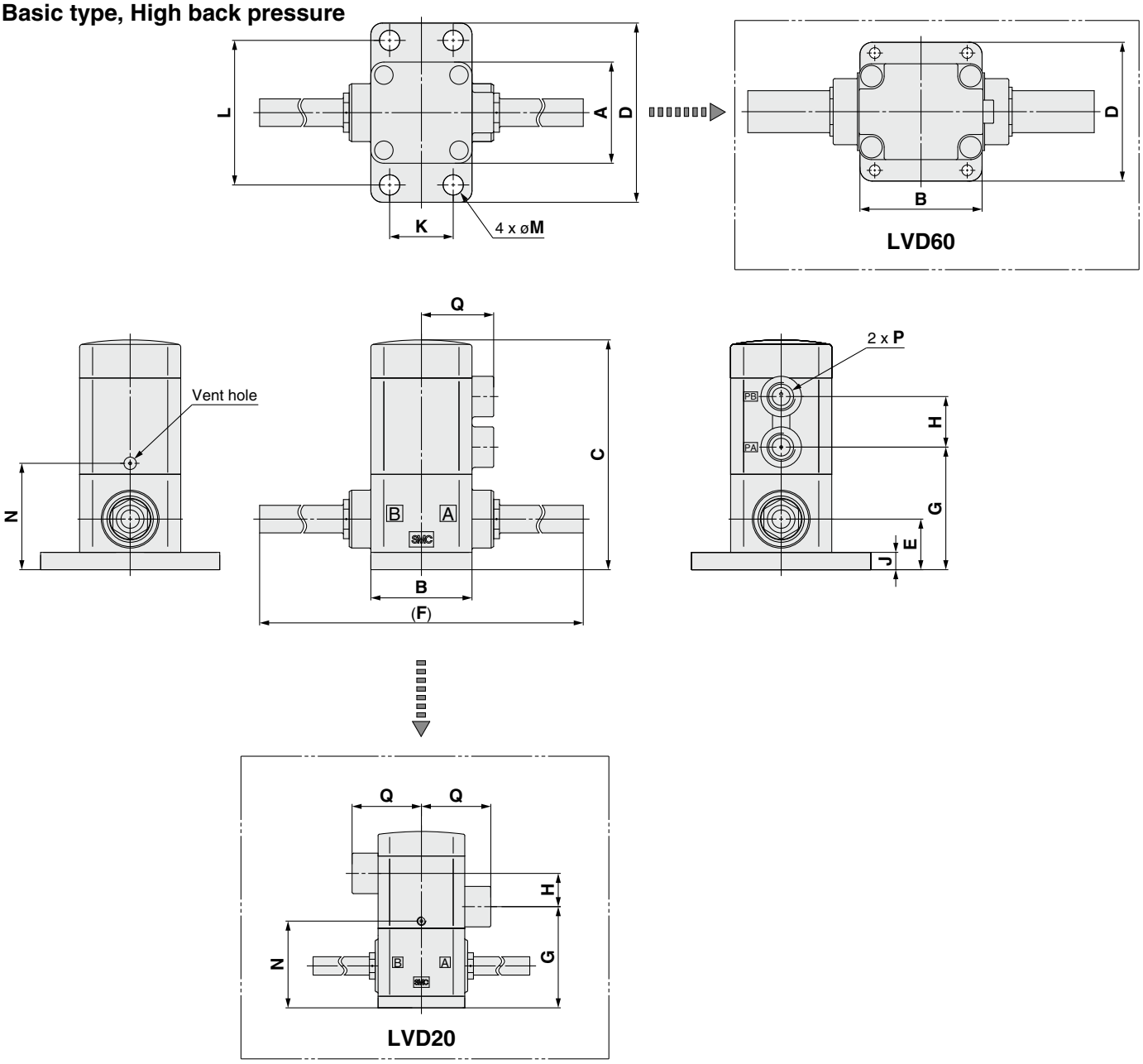
Model			LVD20	LVD30	LVD40	LVD50	LVD60
Tubing O.D.		**Metric**	6	10	12	19	25
		Inch	1/4	3/8	1/2	3/4	1
Orifice diameter			ø4	ø8	ø10	ø16	ø22
Flow rate characteristics	**Kv**		0.3	1.1	1.6	4.2	6.8
	Cv		0.35	1.3	1.9	5	8
Withstand pressure [MPa]			1				
Operating pressure [MPa]	Standard	**A→B flow**	0 to 0.5	0 to 0.3			0 to 0.4
		B→A flow	0 to 0.2	0 to 0.1			
	High back pressure	**A→B flow**	0 to 0.5				
		B→A flow	0 to 0.4				
Back pressure [MPa]	Standard	**N.C./N.O.**	0.3 or less	0.2 or less			0.2 or less
		Double acting					0.3 or less
	High back press.	N.C./N.O./Double acting	0.5 or less				
Valve leakage [cm³/min]			0 (With water pressure)				
Pilot air pressure [MPa]			0.3 to 0.5 (High back pressure: 0.5 to 0.8)				
Pilot port size			Rc1/8, NPT1/8				
Fluid temperature [°C]			0 to 100				
Ambient temperature [°C]			0 to 60				

⚠Precautions

Be sure to read this before handling the products. Refer to page 501 for Safety Instructions, and pages 59 to 61 for Compact Type High Purity Air Operated Chemical Liquid Valve Precautions.

Dimensions

Basic type, High back pressure

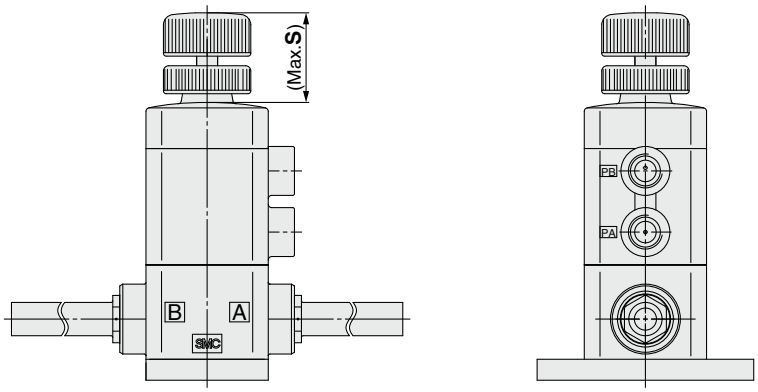


Dimensions [mm]

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
LVD2□-T□-F□	30	30	61	56	14.5	103	35	11.5	4	20	44	7	30	Rc1/8 NPT1/8	24
LVD3□-T□-F□	35	35	79.5	62	17.5	136	42.4	17.5	6	22	50	7	36.8	Rc1/8 NPT1/8	25
LVD4□-T□-F□	35	35	82	62	20	137	44.9	17.5	6	22	50	7	39.3	Rc1/8 NPT1/8	25
LVD5□-T□-F□	45	45	105.7	76	25	169.5	65.2	17.5	8	32	64	7	52.2	Rc1/8 NPT1/8	27.5
LVD6□-T□-F□	58	74	137.8	84	32	210	76.8	27.5	8	56	71	6.5	70.8	Rc1/8 NPT1/8	44

Dimensions

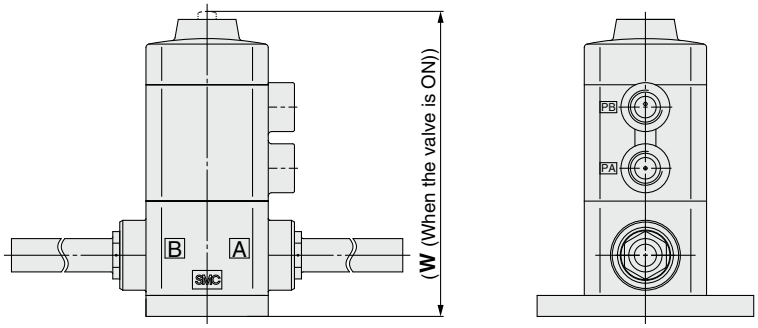
With flow rate adjustment, High back pressure with flow rate adjustment



Dimensions [mm]

Model	S
LVD2□-T□-F1	18.5
LVD3□-T□-F1	28.5
LVD4□-T□-F1	28.5
LVD5□-T□-F1	30.1
LVD6□-T□-F1	38

With indicator, High back pressure with indicator



Dimensions [mm]

Model	W
LVD20-T□-F4	62.9
LVD30-T□-F4	87.3
LVD40-T□-F4	89.8
LVD50-T□-F4	114.6
LVD60-T□-F4	149.4

Manually Operated
Insert Bushing, Integrated Fittings
LVDH-F/FN Series RoHS

How to Order Valves

LVDH 2 0 – V 07 [ ] – FN

Body class

Symbol	Body class	Orifice dia.
2	2	ø4
3	3	ø8
4	4	ø10
5	5	ø16
6	6	ø22

Fitting type

Symbol	Model
V	LQ1

Material

Symbol	Body	Actuator section / End plate	Diaphragm	Seal	Buffer
F	PFA	PVDF	PTFE	FKM	
FN	PFA	PVDF	PTFE	EPDM	

Applicable tubing size

Symbol	Connecting tubing size	Body class 2	3	4	5	6
Metric size						
03	3 x 2	●				
04	4 x 3	●				
06	6 x 4	○	●			
08	8 x 6		●			
10	10 x 8		○	●		
12	12 x 10			○	●	
19	19 x 16				○	●
25	25 x 22					○
Inch size						
03	1/8" x 0.086"	●				
05	3/16" x 1/8"	●				
07	1/4" x 5/32"	○	●			
11	3/8" x 1/4"		○	●		
13	1/2" x 3/8"			○	●	
19	3/4" x 5/8"				○	●
25	1" x 7/8"					○

○Basic size ●With reducer

Port B (OUT) different diameter size

Symbol	Application
Nil	Ports A & B same size
Refer to the applicable tubing table to the left.	Different diameter tubings can be selected within the same body class.

Standard Specifications

Model		LVDH20	LVDH30	LVDH40	LVDH50	LVDH60
Tubing O.D.	**Metric**	3, 4, 6	6, 8, 10	10, 12	12, 19	19, 25
	Inch	1/8, 3/16, 1/4	1/4, 3/8	3/8, 1/2	1/2, 3/4	3/4, 1
Orifice diameter		ø4	ø8	ø10	ø16	ø22
Flow rate characteristics	**Kv**	0.3	1.1	1.6	4.2	6.8
	Cv	0.35	1.3	1.9	5	8
Withstand pressure [MPa]		1				
Operating pressure [MPa]	**A→B flow**	0 to 0.5				
Valve leakage [cm³/min]		0 (With water pressure)				
Fluid temperature [°C]		0 to 100				
Ambient temperature [°C]		0 to 60				

Different Diameter Tubing Applicable with Reducer

Different diameter tubing can be selected (within a body class) by using a nut and insert bushing (reducer).

●With reducer

Body class	Tubing O.D.														
	Metric size								Inch size						
	3	4	6	8	10	12	19	25	1/8	3/16	1/4	3/8	1/2	3/4	1
2	●	●	○	—	—	—	—	—	●	●	○	—	—	—	—
3	—	—	●	●	○	—	—	—	—	—	●	○	—	—	—
4	—	—	—	—	●	○	—	—	—	—	—	●	○	—	—
5	—	—	—	—	—	●	○	—	—	—	—	—	●	○	—
6	—	—	—	—	—	—	●	○	—	—	—	—	—	●	○

Note) Refer to page 57 for information on changing tubing sizes.

⚠Precautions

Be sure to read this before handling the products. Refer to page 501 for Safety Instructions, and pages 59 to 61 for Compact Type High Purity Air Operated Chemical Liquid Valve Precautions.

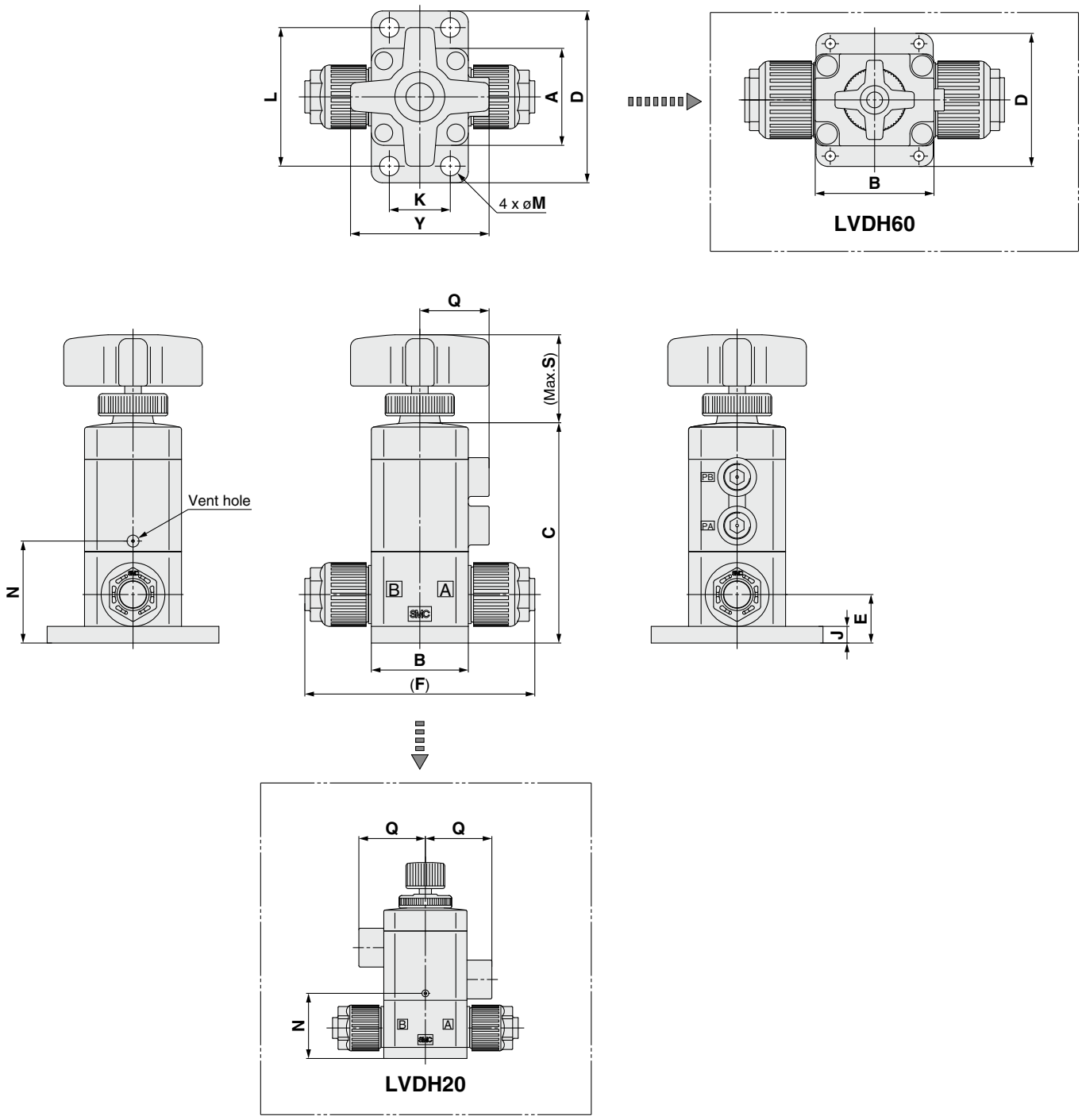
Handle Operation

In order to prevent valve breakage due to excessive handle operation, the number of handle rotations is shown in the table below as a guide for handle operation when opening or closing the valve.

Number of Handle Rotations (from fully open to fully closed)

Body class	Number of rotations
2	6 to 7
3	3 to 4
4	
5	5 to 6
6	

Dimensions



Dimensions [mm]

Model	A	B	C	D	E	F	J	K	L	M	N	Q	S	Y
LVDH20-V□-F□	30	30	54.5	56	11	67	4	20	44	7	23.5	24	18.5	—
LVDH30-V□-F□	35	35	79.5	62	17.5	83	6	22	50	7	36.8	25	34.6	50
LVDH40-V□-F□	35	35	82	62	20	93	6	22	50	7	39.3	25	34.6	50
LVDH50-V□-F□	45	45	105.7	76	25	114	8	32	64	7	52.2	27.5	36.2	50
LVDH60-V□-F□	58	74	137.8	84	32	164	8	56	71	6.5	70.8	44	39	50

Manually Operated
Flare, Integrated Fittings
LVDH-F/FN Series RoHS

How to Order Valves

LVDH 2 0 – Z 07 – FN

Body class

Symbol	Body class	Orifice dia.
2	2	ø4
3	3	ø8
4	4	ø10
5	5	ø16
6	6	ø22

Material

Symbol	Body	Actuator section End plate	Diaphragm	Seal	Buffer
F	PFA	PVDF	PTFE	FKM	
FN	PFA	PVDF	PTFE	EPDM	

Fitting type

Symbol	Model
Z	LQ3

Applicable tubing size

Symbol	Connecting tubing size	Body class 2	3	4	5	6
Metric size						
06	6 x 4	○				
08	8 x 6		○			
10	10 x 8		○			
12	12 x 10			○		
19	19 x 16				○	
25	25 x 22					○
Inch size						
07	1/4" x 5/32"	○				
11	3/8" x 1/4"		○			
13	1/2" x 3/8"			○		
19	3/4" x 5/8"				○	
25	1" x 7/8"					○

Standard Specifications

Model		LVDH20	LVDH30	LVDH40	LVDH50	LVDH60
Tubing O.D.	**Metric**	6	8, 10	12	19	25
	Inch	1/4	3/8	1/2	3/4	1
Orifice diameter		ø4	ø8	ø10	ø16	ø22
Flow rate characteristics	**Kv**	0.3	1.1	1.6	4.2	6.8
	Cv	0.35	1.3	1.9	5	8
Withstand pressure [MPa]		1				
Operating pressure [MPa]	**A→B flow**	0 to 0.5				
Valve leakage [cm³/min]		0 (With water pressure)				
Fluid temperature [°C]		0 to 100				
Ambient temperature [°C]		0 to 60				

⚠Precautions

Be sure to read this before handling the products. Refer to page 501 for Safety Instructions, and pages 59 to 61 for Compact Type High Purity Air Operated Chemical Liquid Valve Precautions.

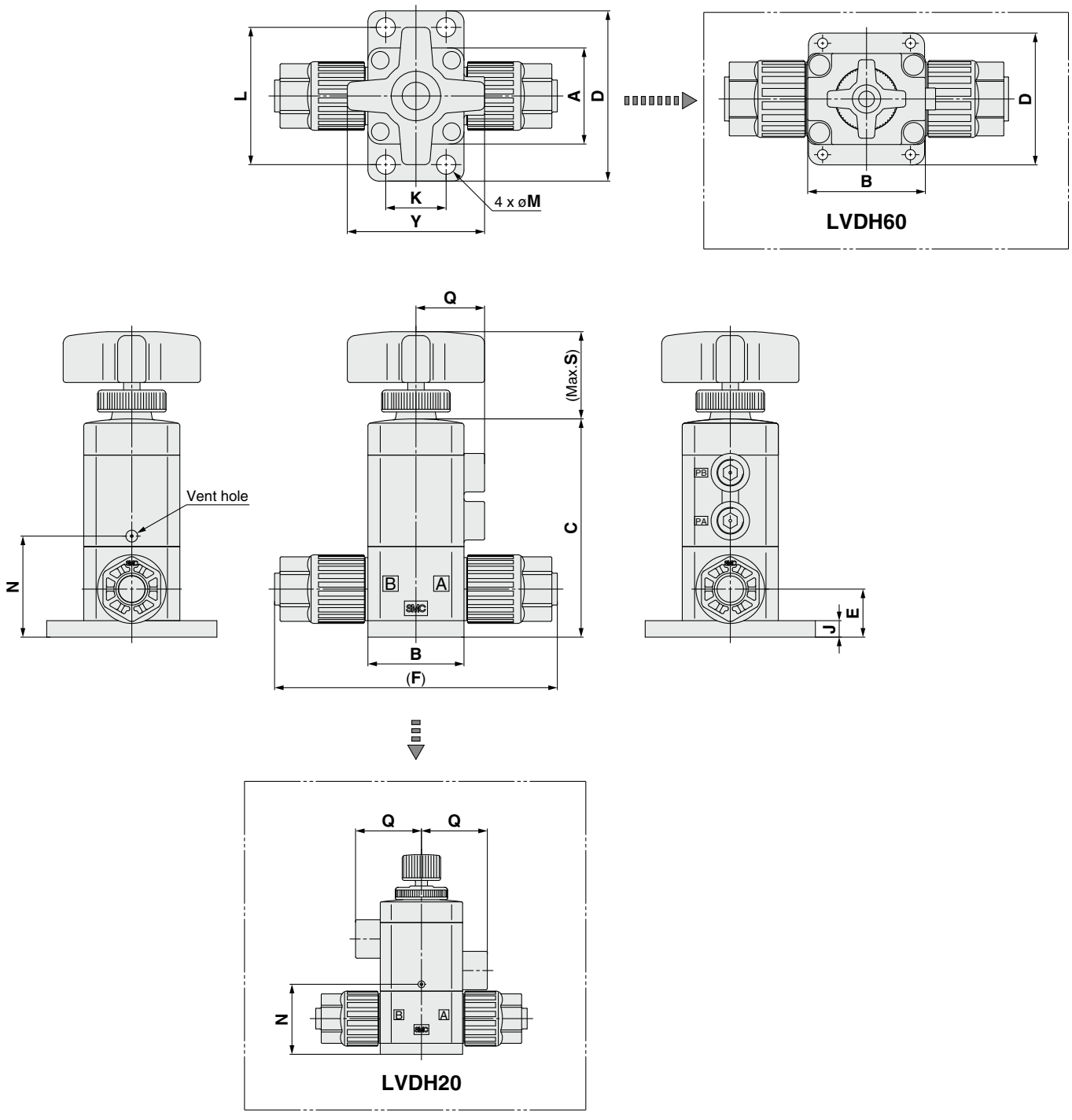
Handle Operation

In order to prevent valve breakage due to excessive handle operation, the number of handle rotations is shown in the table below as a guide for handle operation when opening or closing the valve.

Number of Handle Rotations (from fully open to fully closed)

Body class	Number of rotations
2	6 to 7
3	3 to 4
4	
5	5 to 6
6	

Dimensions



Dimensions [mm]

Model	A	B	C	D	E	F	J	K	L	M	N	Q	S	Y
LVDH20-Z□-F□	30	30	56.5	56	13	77	4	20	44	7	25.5	24	18.5	—
LVDH30-Z□-F□	35	35	79.5	62	17.5	103	6	22	50	7	36.8	25	34.6	50
LVDH40-Z□-F□	35	35	82	62	20	112	6	22	50	7	39.3	25	34.6	50
LVDH50-Z□-F□	45	45	105.7	76	25	134	8	32	64	7	52.2	27.5	36.2	50
LVDH60-Z□-F□	58	74	137.8	84	32	181	8	56	71	6.5	70.8	44	39	50

Manually Operated Tube Extensions
LVDH-T-F/FN Series RoHS

How to Order Valves

LVDH 2 0 – T 07 – FN

Body class

Symbol	Body class	Orifice dia.
2	2	ø4
3	3	ø8
4	4	ø10
5	5	ø16
6	6	ø22

Material

Symbol	Body	Actuator section End plate	Diaphragm	Seal	Buffer
F	PFA	PVDF	PTFE	FKM	
FN	PFA	PVDF	PTFE	EPDM	

Fitting type

Symbol	Type
T	Tube extensions

Tubing O.D.

Symbol	Tubing O.D.	Body class 2	3	4	5	6
Metric size						
06	ø6	○				
10	ø10		○			
12	ø12			○		
19	ø19				○	
25	ø25					○
Inch size						
07	1/4	○				
11	3/8		○			
13	1/2			○		
19	3/4				○	
25	1					○

Standard Specifications

Model		LVDH20	LVDH30	LVDH40	LVDH50	LVDH60
Tubing O.D.	**Metric**	6	10	12	19	25
	Inch	1/4	3/8	1/2	3/4	1
Orifice diameter		ø4	ø8	ø10	ø16	ø22
Flow rate characteristics	**Kv**	0.3	1.1	1.6	4.2	6.8
	Cv	0.35	1.3	1.9	5	8
Withstand pressure [MPa]		1				
Operating pressure [MPa]	**A→B flow**	0 to 0.5				
Valve leakage [cm³/min]		0 (With water pressure)				
Fluid temperature [°C]		0 to 100				
Ambient temperature [°C]		0 to 60				

⚠Precautions

Be sure to read this before handling the products. Refer to page 501 for Safety Instructions, and pages 59 to 61 for Compact Type High Purity Air Operated Chemical Liquid Valve Precautions.

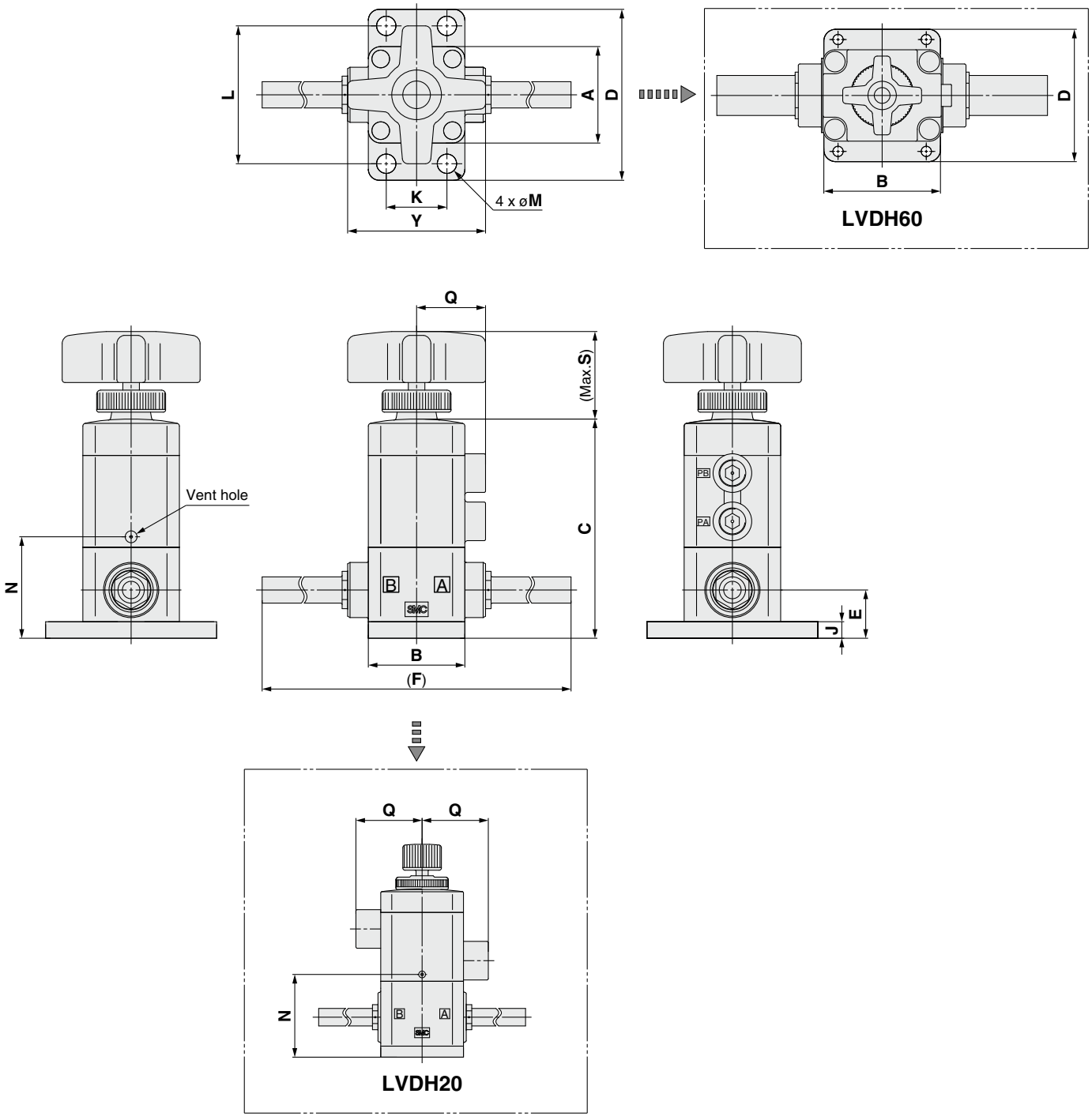
Handle Operation

In order to prevent valve breakage due to excessive handle operation, the number of handle rotations is shown in the table below as a guide for handle operation when opening or closing the valve.

Number of Handle Rotations (from fully open to fully closed)

Body class	Number of rotations
2	6 to 7
3	3 to 4
4	
5	5 to 6
6	

Dimensions



Dimensions [mm]

Model	A	B	C	D	E	F	J	K	L	M	N	Q	S	Y
LVDH20-T□-F□	30	30	61	56	14.5	103	4	20	44	7	30	24	18.5	—
LVDH30-T□-F□	35	35	79.5	62	17.5	136	6	22	50	7	36.8	25	34.6	50
LVDH40-T□-F□	35	35	82	62	20	137	6	22	50	7	39.3	25	34.6	50
LVDH50-T□-F□	45	45	105.7	76	25	169.5	8	32	64	7	52.2	27.5	36.2	50
LVDH60-T□-F□	58	74	137.8	84	32	210	8	56	71	6.5	70.8	44	39	50

Fittings and Special Tools

Fittings

Changing Tubing Sizes

The tubing size can be changed within the same body class (body size) by replacing the nut and insert bushing.
Different diameter tubing can not be selected for the body size 1.

Body class	Tubing O.D.														
	Metric size								Inch size						
	3	4	6	8	10	12	19	25	1/8	3/16	1/4	3/8	1/2	3/4	1
1	○	○	—	—	—	—	—	—	○	—	—	—	—	—	—
2	●	●	○	—	—	—	—	—	●	●	○	—	—	—	—
3	—	—	●	●	○	—	—	—	—	—	●	○	—	—	—
4	—	—	—	—	●	○	—	—	—	—	—	●	○	—	—
5	—	—	—	—	—	●	○	—	—	—	—	—	●	○	—
6	—	—	—	—	—	—	●	○	—	—	—	—	—	●	○

Part Composition

	Component parts		
	Nut	Insert	Collar (Insert assembly)
○ Basic size	Yes	Yes	No
● Reducer type	Yes	Yes	Yes

⚠ Caution

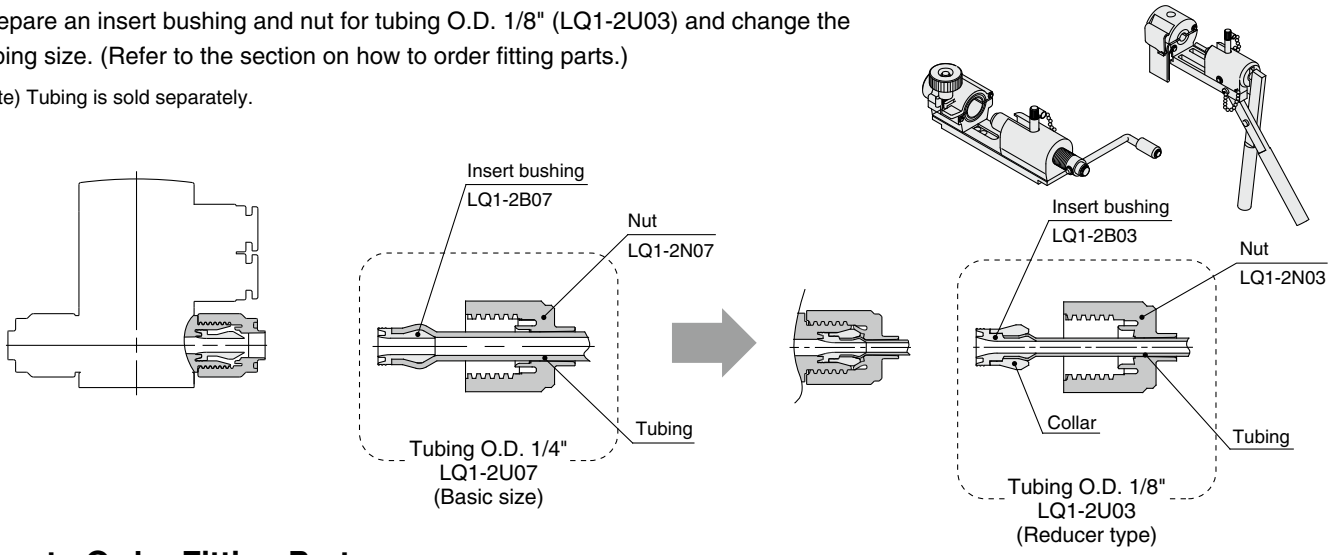
1. Connect tubing with special tools.
Refer to the pamphlet "High-Purity Fluoropolymer Fittings Hyper Fitting/Series LQ1, 2 Work Procedure Instructions" (M-E05-1) for connecting tubing and special tools. (Downloadable from our website.)

Changing tubing sizes

Example) Changing the tubing from an outside diameter of 1/4" to 1/8" in body class 2.

Prepare an insert bushing and nut for tubing O.D. 1/8" (LQ1-2U03) and change the tubing size. (Refer to the section on how to order fitting parts.)

Note) Tubing is sold separately.



How to Order Fitting Parts

LQ1 − 1 U 03

∗ Type U is recommended when changing tubing sizes.

Tubing size Note)

Symbol	Tubing size	Body class (fittings)
03	1/8" x 0.086", 3 x 2	1
04	4 x 3	
03	1/8" x 0.086"	2
04	4 x 3	
05	3/16" x 1/8"	
06	6 x 4	
07	1/4" x 5/32"	
06	6 x 4	3
08	8 x 6	
10	10 x 8	
07	1/4" x 5/32"	
11	3/8" x 1/4"	
10	10 x 8	4
12	12 x 10	
11	3/8" x 1/4"	
13	1/2" x 3/8"	
12	12 x 10	5
13	1/2" x 3/8"	
19	3/4" x 5/8", 19 x 16	
19	3/4" x 5/8", 19 x 16	6
25	1" x 7/8", 25 x 22	

Note) Refer to page 60 for details on the applicable tubing sizes.

Type of part

Symbol	Type of part
U	Nut & Insert bushing
B	Insert bushing
N	Nut

Body class fittings

Symbol	Body class (fittings)
1	1
2	2
3	3
4	4
5	5
6	6

LVD Series
Applicable Fluids

High Purity Air Operated Chemical Liquid Valve Material and Fluid Compatibility Check List

Chemical		Compatibility
Acetone		○ Note 1) 2)
Ammonium hydroxide		○ Note 2)
Isobutyl alcohol		○ Note 1) 2)
Isopropyl alcohol		○ Note 1) 2)
Hydrochloric acid		○
Ozone (dry)		○
Hydrogen peroxide	Concentration 5% or less, Temperature 50°C or less	○
Ethyl acetate		○ Note 1) 2)
Butyl acetate		○ Note 1) 2)
Nitric acid (except fuming nitric acid)	Concentration 10% or less	○ Note 2)
DI water (deionized water)		○
Sodium hydroxide (caustic soda)	Concentration 50% or less	○
Nitrogen gas		○
Ultrapure water		○
Toluene		○ Note 1) 2)
Hydrofluoric acid		×
Sulfuric acid (except fuming sulfuric acid)		○ Note 2)
Phosphoric acid	Concentration 80% or less	○

Table symbols
○ : Can be used.
○ : Can be used under certain conditions.
× : Cannot be used.

The material and fluid compatibility check list provides reference values as a guide only.
Note 1) Since static electricity may be generated, implement suitable countermeasures.
Note 2) Use caution as permeation may occur. The permeated fluid may effect the parts of other materials.

- Compatibility is indicated for fluid temperatures of 100°C or less.
- The material and fluid compatibility check list provides reference values as a guide only, therefore we do not guarantee the application to our product.
- The data above is based on the information presented by the material manufacturers.
- SMC is not responsible for its accuracy and any damage happened because of this data.

Compact Type High Purity Air Operated Chemical Liquid Valve Precautions 1

Be sure to read this before handling the products.

Design / Selection

⚠ Warning

1. Check the specifications.

Give careful consideration to operating conditions such as the application, fluid and environment, and use within the operating ranges specified in this catalog.

2. Fluids

Operate after confirming the compatibility of the product's component materials with fluids, using the check list on page 58. Please contact SMC regarding fluids other than those in the check list. Operate within the indicated fluid temperature range.

3. Maintenance space

Ensure the necessary space for maintenance and inspections.

4. Fluid pressure range

Keep the supplied fluid pressure within the operating pressure range shown in the catalog.

5. Ambient environment

Install the product in an environment where there is no effect from radiant heat caused by heat sources, etc., and use within the ambient operating temperature range. After confirming the compatibility of the product's component materials with the ambient environment, operate so that fluid does not adhere to the product's exterior surfaces.

6. Liquid seals

When circulating fluid:

Provide a relief valve in the system so that fluid does not get into the liquid seal circuit.

7. Countermeasures for static electricity

Since static electricity may be generated depending on the fluid being used, implement suitable countermeasures.

Mounting

⚠ Warning

1. If air leakage increases or equipment does not operate properly, stop operation.

After mounting, perform suitable function and leak tests to confirm that the mounting is correct.

2. Operation Manual

Mount and operate the product after reading the manual carefully and understanding its contents. Also, keep the manual where it can be referred to as necessary.

Piping

⚠ Caution

1. Preparation before piping

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

Install piping so that it does not apply pulling, pressing, bending or other forces on the valve body.

Piping

⚠ Caution

2. Use the tightening torques shown below for the threaded pilot port.

Tightening Torque for Operating Port

Operating port	Torque [N·m]
M5	1/6 turn with a tightening tool after first tightening by hand
Rc, NPT1/8	0.8 to 1.0

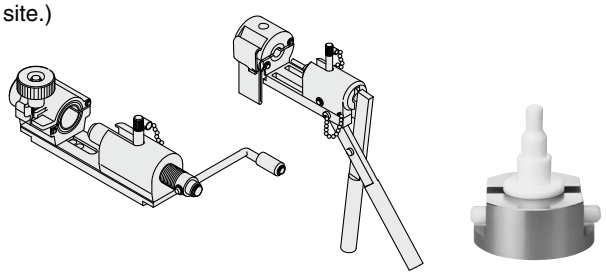
3. Use pilot ports and sensor (breathing) ports as indicated below.

	PA port	PB port	Sensor (breathing) port
N.C.	Pressure	Breathing	Breathing
N.O.	Breathing	Pressure	Breathing
Double acting	Pressure	Pressure	Breathing

In the case of N.C. and N.O. types, the port which does not receive operating pressure is released to atmosphere. When intake and exhaust directly from the valve is not desired due to problems with the ambient environment or scattering of dust, etc., install piping and perform intake and exhaust at a location which does not present a problem.

4. Connect tubing with special tools.

Refer to the pamphlet “High-Purity Fluoropolymer Fittings Hyper Fitting/Series LQ1, 2 Work Procedure Instructions” (M-E05-1) or “High Purity Fluoropolymer Fittings Hyper Fitting/ Flare Type Series LQ3 Fitting Procedure” (M-E06-4) for connecting tubing and special tools. (Downloadable from our web site.)



5. Tighten the nut until it touches the end surface of the body, and then tighten it an additional 1/8 turn. If the nut won’t turn any further, then it means a sufficient tightening has occurred. Refer to the proper tightening torques shown below.

Tightening Torque for Piping

Body class	Torque [N·m]	
	LQ1	**LQ3**
2	0.3 to 0.4	1.6 to 1.8
3	0.8 to 1.0	3.2 to 3.5
4	1.0 to 1.2	5.0 to 5.3
5	2.5 to 3.0	10.0 to 10.5
6	5.5 to 6.0	22.5 to 23.0

Operating Air Supply

⚠ Warning

1. Use clean air.

Do not use compressed air which includes chemicals, synthetic oils containing organic solvents, salt, or corrosive gases, etc., as this may cause damage or malfunction.

Compact Type High Purity Air Operated Chemical Liquid Valve Precautions 2

Be sure to read this before handling the products.

Installation and Removal of Tubing for Pilot Port Section

⚠ Caution

1. Installation of tubing

1) Using tube cutters TK-1, 2 or 3, take a tube having no flaws on its periphery and cut it off at a right angle. Do not use pinchers, nippers or scissors, etc. The tubing might be cut diagonally or flattened, making installation impossible or causing problems such as disconnection and leakage.

2) Hold the tube and push it in slowly, inserting it securely all the way into the fitting.

3) After inserting the tubing, pull on it tightly to confirm that it will not come out. If it is not installed securely all the way into the fitting, problems such as leakage or disconnection of the tubing can occur.

4) Grease is not used due to the KP series oil-free specification. For this reason, greater insertion force is required when tubing is installed. In particular, polyurethane tubing may fold when inserted due to its softness. Hold the end of the tubing, and insert it all the way in slowly and securely. Refer to dimension "M" in the dimension drawings for guidance on the insertion depth of tubing.

2. Removal of tubing

1) Push in the release button sufficiently, pressing the collar evenly around its circumference.

2) Pull out the tubing while holding down the release button so that it does not pop out. If the release button is not pressed down sufficiently, there will be increased bite on the tubing and it will become more difficult to pull it out.

3) When the removed tubing is to be used again, first cut off the section of the tubing which has been chewed.
Using the chewed portion of the tube as it is can cause problems such as leakage or difficulty in removing the tubing.

Precautions on Use of Other Tubing Brands

⚠ Caution

1. When using tubing brands other than SMC, confirm that the tubing outside diameter tolerances satisfy the following specifications.

1) Polyolefin tubing:	Within ±0.1 mm
2) Polyurethane tubing:	Within ±0.15 mm, Within −0.2 mm
3) Nylon tubing:	Within ±0.1 mm
4) Soft nylon tubing:	Within ±0.1 mm

Do not use tubing if the outside diameter tolerance is not satisfied. It may not be possible to connect the tubing, or leakage or disconnection may occur after connection.
Polyolefin tubing is recommended for use with clean room fittings. Note that while other types of tubing will satisfy performance standards for leakage and tubing pull-out strength, etc., the degree of cleanliness will deteriorate.

Operating Environment

⚠ Warning

1. Do not use in a location having an explosive atmosphere.

2. Do not operate in locations where vibration or impact occurs.

Operating Environment

⚠ Warning

3. Do not use in locations where radiated heat will be received from nearby heat sources.

4. Do not use in environments which exceed the ambient temperature specifications of the product.

Maintenance

⚠ Warning

1. Maintenance should be performed in accordance with the procedures in the Operation Manual.
Incorrect handling can cause damage or malfunction of machinery and equipment, etc.

2. Before removing equipment or compressed air supply/exhaust devices, shut off the air and power supplies, and exhaust compressed air from the system.
Further, when restarting equipment after remounting or replacement, first confirm safety and then check the equipment for normal operation.

3. Perform work after removing residual chemicals and carefully replacing them with DI water or air, etc.

4. Do not disassemble the product. Products which have been disassembled cannot be guaranteed.

5. In order to obtain optimum performance from valves, perform periodic inspections to confirm that there are no leaks from valves or fittings, etc.

⚠ Caution

1. Removal of drainage
Flush drainage from filters regularly.

Handling

⚠ Warning

1. Operate within the ranges of the maximum operating pressure and back pressure.

2. Do not change the pilot port direction. Products which have been disassembled cannot be guaranteed.

⚠ Caution

1. Please note that when the product is shipped from the factory, gases such as N_2 and air may leak from the valve at a rate of 1 cm^3/min (when pressurized).

2. When operated at a very low flow rate, the product with flow rate adjustment may vibrate, etc. depending on the operating conditions. Therefore, operate only after careful examination of the flow rate, pressure and piping conditions.

Compact Type High Purity Air Operated Chemical Liquid Valve Precautions 3

Be sure to read this before handling the products.

Handling

⚠ Caution

3. Water hammering may occur depending on the fluid pressure conditions. In most cases, improvement is possible by adjusting the pilot pressure with a speed controller, etc., but the flow rate, pressure and piping conditions should be reviewed.
4. To adjust the flow rate with flow rate adjustment, open gradually starting from the fully closed condition.
   Opening is accomplished by turning the adjustment knob counterclockwise. Additionally, do not apply any unreasonable force to the adjustment handle when nearing a fully opened or closed condition. This may result in deformation of the orifice sheet surface or damage to the threaded part of the adjustment handle.
   The handle is in the fully closed condition when the product is shipped from the factory.
   In addition, do not apply excessive force to the adjustment knob even when the lock nut is in a tightened state. Operate the adjustment knob when the lock nut is in a loosened state.
5. After long periods of nonuse, perform a test run before beginning regular operation.
6. Since the product is packaged in a clean room, use sufficient care in handling when opened.

Use of Tubing

⚠ Caution

1. Refer to the applicable tubing sizes shown below for tubing to be used.

Applicable Tubing Sizes

	Connection tubing size	O.D. [mm]		Internal thickness [mm]	
		Standard size	Tolerance	Standard size	Tolerance
Metric size	ø3 x ø2	3.0	+0.2 −0.1	0.5	±0.06
	ø4 x ø3	4.0			
	ø6 x ø4	6.0		1.0	±0.1
	ø8 x ø6	8.0			
	ø10 x ø8	10.0			
	ø12 x ø10	12.0			
	ø19 x ø16	19.0	+0.3 −0.1	1.5	±0.15
	ø25 x ø22	25.0			
Inch size	1/8" x 0.086"	3.18	+0.2 −0.1	0.5	±0.1
	3/16" x 1/8"	4.75		0.8	
	1/4" x 5/32"	6.35		1.2	±0.12
	3/8" x 1/4"	9.53		1.6	±0.15
	1/2" x 3/8"	12.7			
	3/4" x 5/8"	19.0	+0.3 −0.1		
	1" x 7/8"	25.4			

Return of Product

⚠ Warning

If the product to be returned is contaminated or is possibly contaminated with substances that are harmful to humans, for safety reasons, please contact SMC beforehand and then employ a specialist cleaning company to decontaminate the product. After the decontamination prescribed above has been carried out, submit a Product Return Request Sheet or the Detoxification/Decontamination Certificate to SMC and await SMC's approval and further instructions before attempting to return the item.
Please refer to the International Chemical Safety Cards (ICSC) for a list of harmful substances.