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 769 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

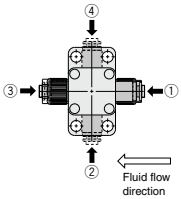
Note) Refer to "Variations" in the table below for option combinations. Options can not be combined each other.

Material

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

Pilot port position

Symbol	Position
Nil	①
P2	②
P3	③
P4	④



Variations

Type	Symbol	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	○	○	○	○	○
With flow rate adjustment		N.C.	○	○	○	○	○
		Double acting	○	○	○	○	○
With bypass		N.C.	—	○	○	○	○
		Double acting	—	○	○	○	○
With flow rate adjustment & bypass		N.C.	—	○	○	○	○
		Double acting	—	○	○	○	○

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 769 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 766 for information on changing tubing sizes.

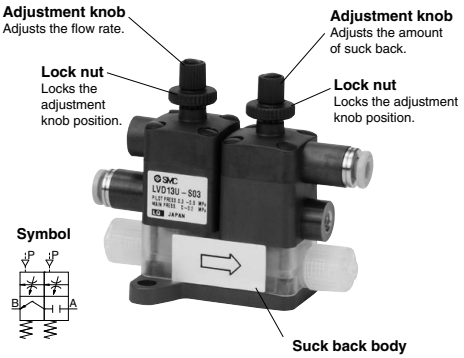
⚠ Precautions

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions, and pages 768 and 769 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 769 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 769 for details on the applicable tubing sizes.

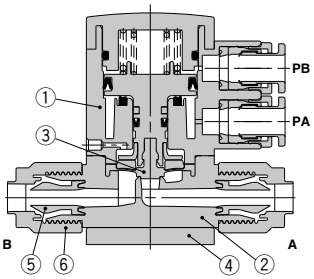
Pilot port configuration

Nil	ø4 One-touch fitting
2	M5 x 0.8

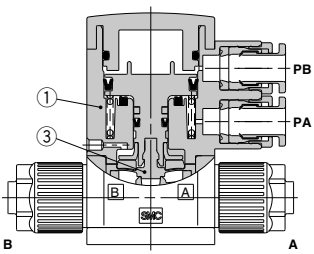
Construction

Basic type

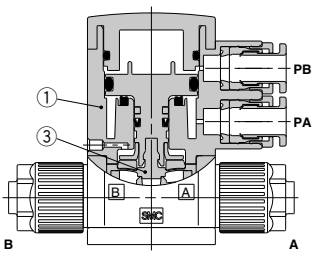
N.C.

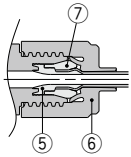


N.O.



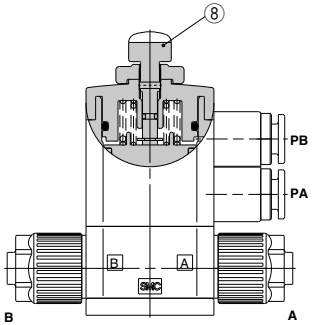
Double acting



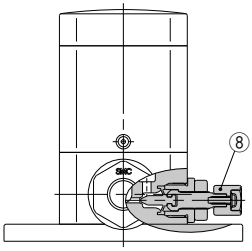


With reducer

With flow rate adjustment



With bypass

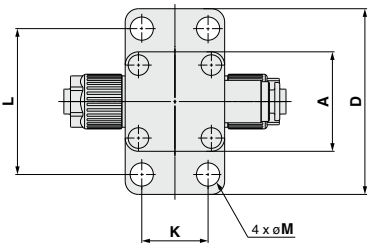


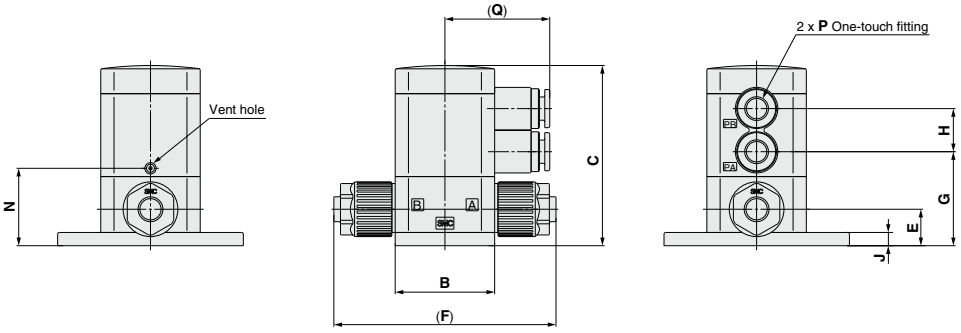
Component Parts

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

Dimensions

Basic type



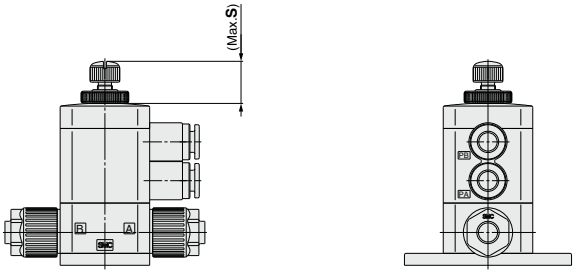


Pilot port threaded type

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

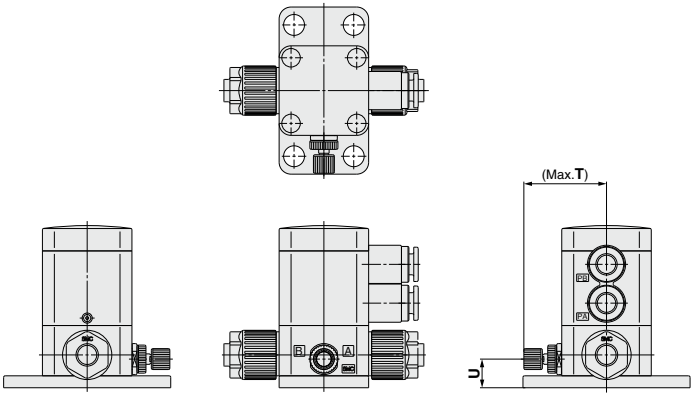
With flow rate adjustment



Dimensions [mm]

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

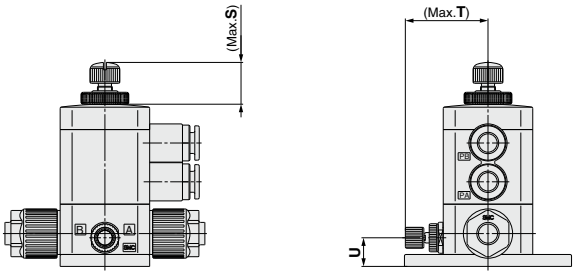
With bypass



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



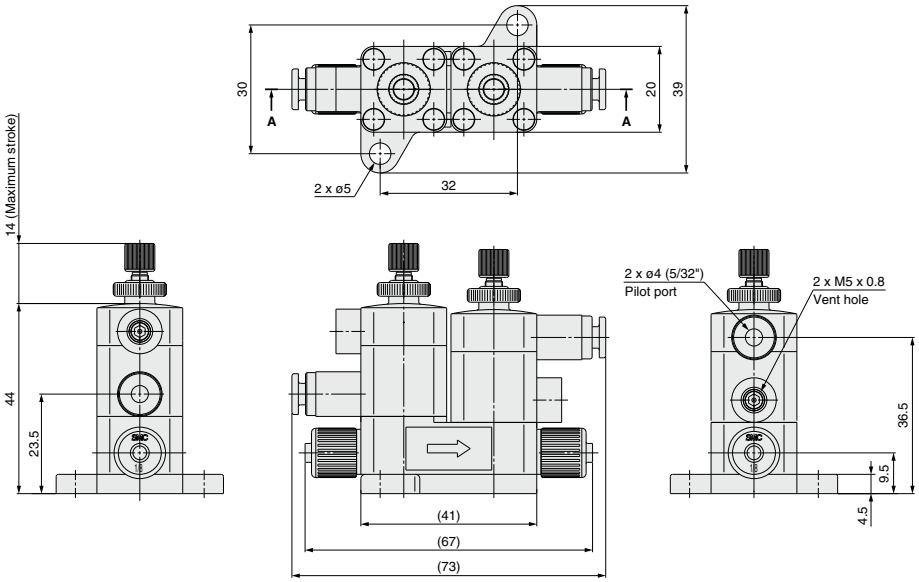
Dimensions [mm]

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

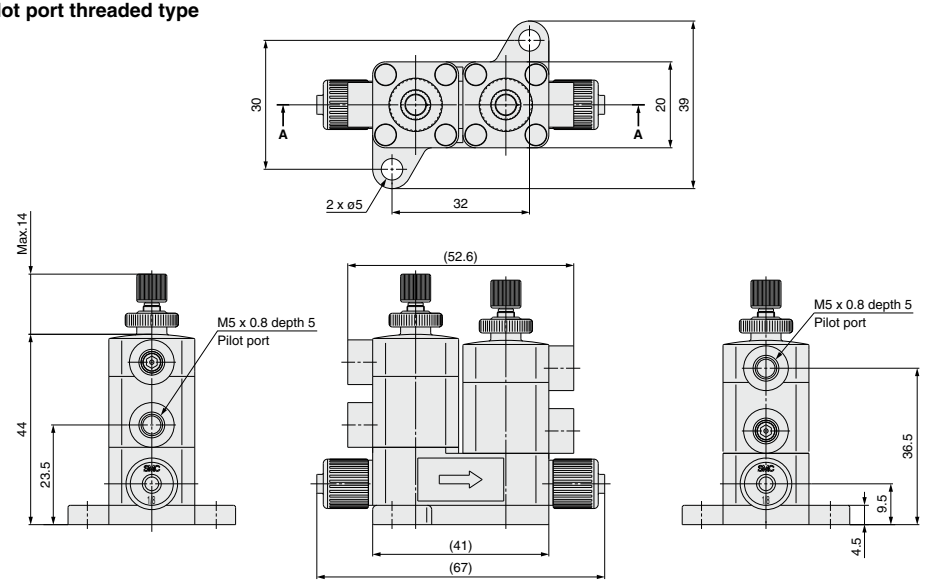
Dimensions

Suck back valve unit:

Pilot port with One-touch fittings



Pilot port threaded type



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.

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

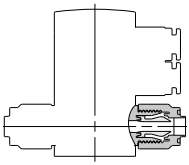
1. Connect tubing with special tools.
Refer to the pamphlet "High-Purity Fluoropolymer Fittings Hyper Fitting/Series LQ1, 2 Work Procedure Instructions" (M-E05-1) for connecting tubing and special tools. (Downloadable from our website.)

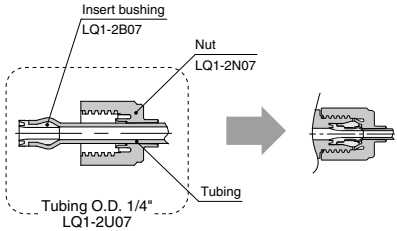
Changing tubing sizes

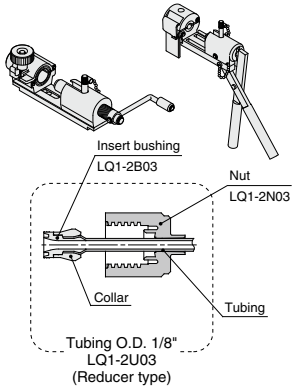
Example) Changing the tubing from an outside diameter of 1/4" to 1/8" in body class 2.

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.

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

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 769 for details on the applicable tubing sizes.

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.