



# Operation Manual

PRODUCT NAME

EXTERNAL NON-METAL TYPE  
CHEMICAL AIR OPERATE VALVE

MODEL / Series / Product Number

LVQ Series


**SMC Corporation**


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## Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)\*1), and other safety regulations.

 **Danger:** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

 **Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

 **Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

1) ISO 4414: Pneumatic fluid power - General rules and safety requirements for systems and their components  
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components  
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots etc.

### Warning

#### 1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

#### 2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

#### 3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

#### 4. Our products cannot be used beyond their specifications. Our products are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not covered.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

### Caution

#### 1. We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing business.

##### Use in non-manufacturing business is not covered.

Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act. The new Measurement Act prohibits use of any unit other than SI units in Japan.

## Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

### Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.\*2)  
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.  
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

##### \*2) Vacuum pads are excluded from this 1 year warranty.

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

### Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.



## LVQ Series

# Air Operated Chemical Liquid Valve/Precautions 1

Be sure to read this before handling the products.

### Design / Selection

#### ⚠ Warning

##### 1. Confirm 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 27. 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 specified in this 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.

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

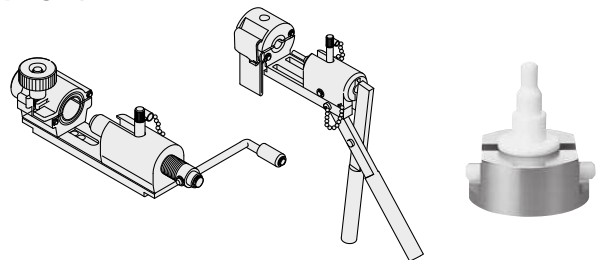
###### Tightening Torque for Pilot Port

Pilot port	Torque (N·m)
Rc, NPT 1/8	0.8 to 1.0

##### 3. Metal fittings

In the case of threaded pilot port, do not pipe the metal fittings which can cause damage to the thread part.

##### 4. For information on tubing connection and special tools, please see the pamphlet "High Purity Fluoropolymer Fittings Hyper Fitting LQ1/2 Series Work Procedure Instructions" (M-E05-1) or "High Purity Fluoropolymer Fittings Hyper Fitting/Flare Type LQ3 Series Fitting Procedure" (M-E06-4). (The pamphlets can be downloaded from the SMC home page.)



### 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.



## LVQ Series

# Air Operated Chemical Liquid Valve/Precautions 2

Be sure to read this before handling the products.

### 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 sizes	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	+0.3 -0.1	1.5	±0.15
	ø12 x ø10	12.0			
	ø19 x ø16	19.0			
	ø25 x ø22	25.0			
Inch sizes	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			
	1/2" x 3/8"	12.7	+0.3 -0.1	1.6	±0.15
	3/4" x 5/8"	19.0			
	1" x 7/8"	25.4			

### Operating Environment

#### ⚠ Warning

1. Do not use in a location having an explosive atmosphere.
2. Do not use in locations where vibration or impact occurs.
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 re-mounting 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 pure 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.

### Maintenance

#### ⚠ Caution

1. Removal of drainage  
Flush drainage from filters regularly.

### Precautions

#### ⚠ 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<sub>2</sub> and air may leak from the valve at a rate of 1 cm<sup>3</sup>/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.
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.

### Return of Product

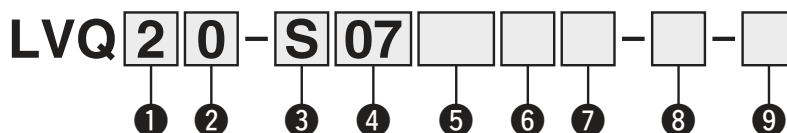
#### ⚠ Warning

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.

# Air Operated Insert Bushing, Integrated Fitting Type Hyper Fitting *LVQ Series*



## How to Order



### 1 Body class

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

### 2 Valve type

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

Note) For valve type combinations, refer to variations on the next page.

### 3 Fitting type

Symbol	Fitting type	Body class
V	LQ1	2, 3, 4, 5, 6
S	LQ2	2, 3, 4, 5

Note) Insert bushing is used in common.

### 4 Applicable tubing size <sup>Note)</sup>

Symbol	Connection tubing size	Body class					
		2	3	4	5	6	
<b>Metric size</b>							
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					○	
<b>Inch size</b>							
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

Note) Refer to page 4 for details of the applicable tubing sizes.

### 5 Port B (OUT) different dia. size

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

### 6 Pilot port type

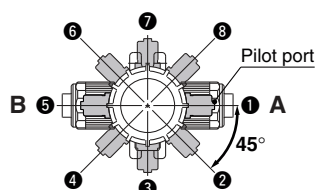
Nil	LQ1 integrated fitting	Connection tubing size 1/8" x 0.086" (3 x 2) <sup>Note)</sup>
M	LQ1 integrated fitting	Connection tubing size 4 x 3 <sup>Note)</sup>
R	Threaded	Rc1/8
N	Threaded	NPT1/8

Note) Refer to page 4 for details of the applicable tubing sizes.

### 7 Pilot port direction

Symbol	Direction
Nil	1
P2	2
P3	3
P4	4
P5	5
P6	6
P7	7
P8	8

#### Pilot port piping direction



\* Specify the piping direction by part number when ordering the product. Do not change the pilot port direction. (Refer to Precautions on page 4.)

**8 Option 1**

Nil	None
1	With flow rate adjustment
2	With by-pass
3	With flow rate adjustment & by-pass
4	With indicator
5	High back pressure (0.42 MPa)
6	High back pressure with flow rate adjustment
7	High back pressure with by-pass
8	High back pressure with flow rate adjustment & by-pass
9	High back pressure with indicator
24	With indicator & by-pass

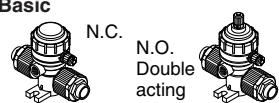
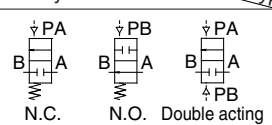


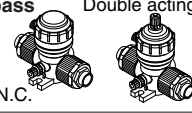
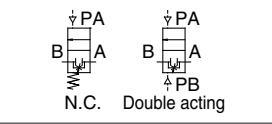

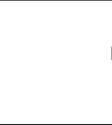

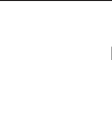
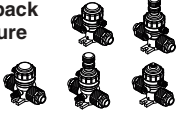
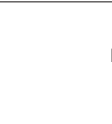

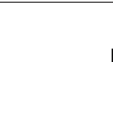
Note) Refer to variations in the table below for valve type and option 1 combinations. Options in the same table can not be combined each other.

**9 Option 2**

Symbol	Applicable option										Note
	1	2	3	4	5	6	7	8	9	24	
Nil	○	○	○	○	○	○	○	○	○	○	—
J	○	—	—	—	—	—	—	—	—	—	For high temperature
K	○	○	○	○	○	○	○	○	○	○	Buffer material FFKM
N	○	○	○	○	○	○	○	○	○	○	For ammonium hydroxide
P	—	—	—	○	○	—	—	—	—	—	High flow type LVQ6□ only

Note 1) Options 2 in the same table cannot be combined each other.  
Note 2) High back pressure specifications (5 to 9) in Option 1 and high temperature specification (J) in Option 2 cannot be combined.

**Variations**

Type	Symbol	Valve type	Model	LVQ20	LVQ30	LVQ40	LVQ50	LVQ60
			Orifice diameter					
			Tubing O.D.					
			Inch					
<b>Basic</b> 		N.C. N.O. Double acting	N.C.	○	○	○	○	○
			N.O.	○	○	○	○	○
			Double acting	○	○	○	○	○
<b>With flow rate adjustment</b> 		N.C.	N.C.	○	○	○	○	○
<b>With by-pass</b> 		N.C. Double acting	N.C.	○	○	○	○	○
			Double acting	○	○	○	○	○
<b>With flow rate adjustment &amp; by-pass</b> 		N.C.	N.C.	○	○	○	○	○
<b>With indicator</b> 		N.C.	N.C.	○	○	○	○	○
<b>High back pressure</b> 		N.C.	N.C.	○	○	○	○	○
<b>With indicator &amp; by-pass</b> 		N.C.	N.C.	○	○	○	○	○

## Standard Specifications



Model		LVQ20	LVQ30	LVQ40	LVQ50	LVQ60
Tubing O.D. <sup>Note 1)</sup>	Metric	6	10	12	19	25
	Inch	1/4	3/8	1/2	3/4	1
Fitting type	IN/OUT port	LQ1 or LQ2				LQ1
	Pilot port	LQ1				
Orifice diameter		ø4	ø8	ø10	ø16	ø22
Flow rate characteristics	Kv	0.3	1.1	1.6	4.2	6.8 (8.1) <sup>Note 2)</sup>
	Cv	0.35	1.3	1.9	5	8 (9.5) <sup>Note 2)</sup>
Withstand pressure (MPa)		1				
Operating pressure <A→B flow>	Standard	-98 kPa to 0.5 MPa <sup>Note 3)</sup>			-98 kPa to 0.4 MPa <sup>Note 3)</sup>	
	High temperature	-98 kPa to 0.3 MPa <sup>Note 3)</sup>				
Back pressure (MPa)	Standard	0.3 or less			0.2 or less	
	High back pressure	0.42 or less				
	High temperature	0.3 or less			0.2 or less	
Valve leakage (cm <sup>3</sup> /min)		0 (With water pressure)				
Pilot air pressure (MPa)		0.3 to 0.5 (High back pressure: 0.45 to 0.55)				
Pilot port size		1/8" (ø3), ø4, Rc 1/8, NPT 1/8				
Fluid temperature (°C)	Standard	0 to 100				
	High temperature	0 to 170				
Ambient temperature (°C)		0 to 60				
Weight (kg)		0.08	0.17	0.22	0.70	0.81

Note 1) Refer to page 4 for details of the applicable tubing sizes.

Note 2) ( ): High flow type

Note 3) This product cannot be used for vacuum retention. Also, connecting the vacuum to the B port may reduce the life of the product.

**⚠ Specific Product Precautions**

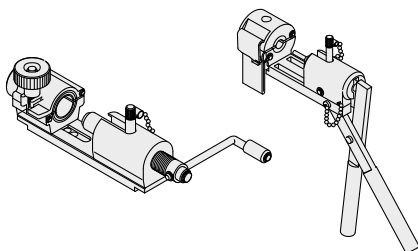
Be sure to read this before handling the products. Refer to back page 2 for Safety Instructions and pages 3 and 4 for Air Operated Chemical Liquid Valve Precautions.

### Piping

## ⚠ Caution

### 1. Connect tubing by special tools.

For information on tubing connection and special tools, please see the pamphlet "High Purity Fluoropolymer Fittings Hyper Fitting LQ1/2 Series Work Procedure Instructions" (M-E05-1). (The pamphlet can be downloaded from the SMC home page.)



2. 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	LQ2
2	0.3 to 0.4	1.5 to 2.0
3	0.8 to 1.0	3.0 to 3.5
4	1.0 to 1.2	7.5 to 9.0
5	2.5 to 3.0	11.0 to 13.0
6	5.5 to 6.0	—

## Applicable Different Diameter Tubings with Reducer

Different diameter tubings can be selected (within the same body class) by using a nut and an insert bushing (reducer).

● With reducer

Body class	Connection 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 28 for information on changing tubing sizes.

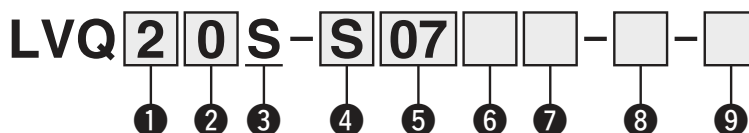


# Air Operated Insert Bushing, Integrated Fitting Type Space Saving/Space Saving Connection **LVQS Series**

RoHS

The LQ2 insert/integrated fitting type space-saving fitting for the LVQ series high-purity chemical liquid valve is to be discontinued as of March 2025. Select the LQ1 fitting instead.

## How to Order



### 1 Body class

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

### 2 Valve type

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

Note) For valve type combinations, refer to variations on the next page.

### 3 Body type

S	Space saving connection
---	-------------------------

### 4 Fitting type

Symbol	Fitting type	Body class
V	LQ1	2, 3, 4, 5, 6
S	LQ2	2, 3, 4, 5

Note) Insert bushing is used in common.

### 5 Applicable fitting size

Symbol	Fitting size	Body class				
		2	3	4	5	6
07	2	○				
11	3		○			
13	4			○		
19	5				○	
25	6					○

Note) Refer to page 10 for How to Order fitting parts. Select a tube with the same size as the valve side fitting.

### 6 Pilot port type

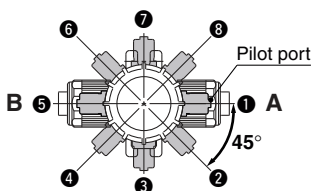
Nil	LQ1 integrated fitting	Connection tubing size 1/8" x 0.086" (3 x 2) <sup>Note)</sup>
M	LQ1 integrated fitting	Connection tubing size 4 x 3 <sup>Note)</sup>
R	Threaded	Rc1/8
N	Threaded	NPT1/8

Note) Refer to page 4 for details of the applicable tubing sizes.

### 7 Pilot port direction

Symbol	Direction
Nil	①
P2	②
P3	③
P4	④
P5	⑤
P6	⑥
P7	⑦
P8	⑧

#### Pilot port piping direction



\* Specify the piping direction by part number when ordering the product. Do not change the pilot port direction. (Refer to Precautions on page 4.)

**8 Option 1**

Nil	None
1	With flow rate adjustment
2	With by-pass
3	With flow rate adjustment & by-pass
4	With indicator
5	High back pressure (0.42 MPa)
6	High back pressure with flow rate adjustment
7	High back pressure with by-pass
8	High back pressure with flow rate adjustment & by-pass
9	High back pressure with indicator
24	With indicator & by-pass

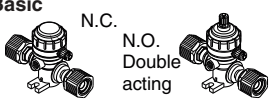
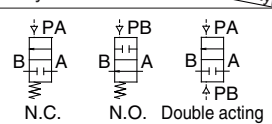


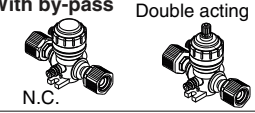
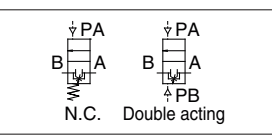



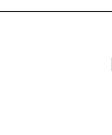




Note) Refer to variations in the table below for valve type and option 1 combinations. Options in the same table can not be combined each other.

**9 Option 2**

Symbol	Applicable option										Note
	1	2	3	4	5	6	7	8	9	24	
Nil	○	○	○	○	○	○	○	○	○	○	—
J	○	—	—	—	—	—	—	—	—	—	For high temperature
K	○	○	○	○	○	○	○	○	○	○	Buffer material FFKM
N	○	○	○	○	○	○	○	○	○	○	For ammonium hydroxide
P	—	—	—	○	○	—	—	—	—	—	High flow type LVQ6□ only

Note 1) Options 2 in the same table cannot be combined each other.  
Note 2) High back pressure specifications (5 to 9) in Option 1 and high temperature specification (J) in Option 2 cannot be combined.

**Variations**

Type	Symbol	Model	LVQ20	LVQ30	LVQ40	LVQ50	LVQ60
			Orifice diameter				
			2	3	4	5	6
<b>Basic</b> 		N.C.	○	○	○	○	○
		N.O.	○	○	○	○	○
		Double acting	○	○	○	○	○
<b>With flow rate adjustment</b> 		N.C.	○	○	○	○	○
<b>With by-pass</b> 		N.C.	○	○	○	○	○
		Double acting	○	○	○	○	○
<b>With flow rate adjustment &amp; by-pass</b> 		N.C.	○	○	○	○	○
<b>With indicator</b> 		N.C.	○	○	○	○	○
<b>High back pressure</b> 		N.C.	○	○	○	○	○
<b>With indicator &amp; by-pass</b> 		N.C.	○	○	○	○	○

## How to Order Space Saving Fittings

• **Applicable tubing size** Note 1) Note 2)

Size	No.	Applicable tubing size (mm)	Reducing
2	1	6 x 4	○
2	2	4 x 3	●
3	1	10 x 8	○
3	2	8 x 6	●
3	3	6 x 4	●
4	1	12 x 10	○
4	2	10 x 8	●
5	1	19 x 16	○
5	2	12 x 10	●
6	1	25 x 22	○
6	2	19 x 16	●

Size	Symbol	Applicable tubing size (inch)	Reducing
2	A	1/4" x 5/32"	○
2	B	3/16" x 1/8"	●
2	C	1/8" x 0.086"	●
3	A	3/8" x 1/4"	○
3	B	1/4" x 5/32"	●
4	A	1/2" x 3/8"	○
4	B	3/8" x 1/4"	●
5	A	3/4" x 5/8"	○
5	B	1/2" x 3/8"	●
6	A	1" x 7/8"	○
6	B	3/4" x 5/8"	●

○ Basic size ● With reducer

Note 1) Select the same size as the fitting on the valve.

Note 2) Refer to page 4 for details of the applicable tubing sizes.

LQ1 E 61 - SN - □  
LQ2 E 21 - SN - □

• **Packaging**

Symbol	Packaging
Nil	Clean packaging equivalent to Class M3.5
1	Standard packaging equivalent to Class M5.5

• **One (including insert bushing) of the nuts is not attached.**

• **Applicable tubing size** Note 1) Note 2)

Size	No.	Applicable tubing size (mm)	Reducing
2	1	6 x 4	○
2	2	4 x 3	●
3	1	10 x 8	○
3	2	8 x 6	●
3	3	6 x 4	●
4	1	12 x 10	○
4	2	10 x 8	●
5	1	19 x 16	○
5	2	12 x 10	●

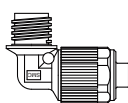
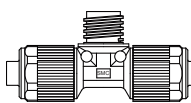
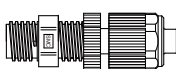
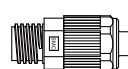
Size	Symbol	Applicable tubing size (inch)	Reducing
2	A	1/4" x 5/32"	○
2	B	3/16" x 1/8"	●
2	C	1/8" x 0.086"	●
3	A	3/8" x 1/4"	○
3	B	1/4" x 5/32"	●
4	A	1/2" x 3/8"	○
4	B	3/8" x 1/4"	●
5	A	3/4" x 5/8"	○
5	B	1/2" x 3/8"	●

○ Basic size ● With reducer

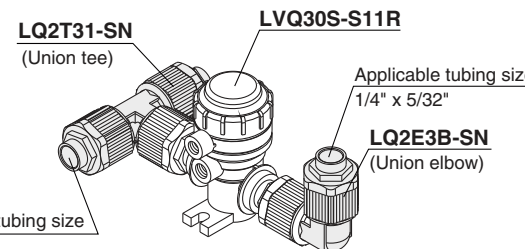
Note 1) Select the same size as the fitting on the valve.

Note 2) Refer to page 4 for details of the applicable tubing sizes.

• **Fitting type**

E	T
Union elbow 	Union tee 
P	U
Panel mount union 	Union 

### Piping Example



Applicable tubing size 10 x 8

Applicable tubing size 1/4" x 5/32"

**Ordering Example**

**LVQ30S-S11R** 1

**LQ2T31-SN** (Union tee) 1

**LQ2E3B-SN** (Union elbow) 1

Note) For shipment, the valve and fittings are individually packaged and dispatched together in 1 box.



## Standard Specifications

Model		LVQ20S	LVQ30S	LVQ40S	LVQ50S	LVQ60S
Connection fitting size		2	3	4	5	6
Fitting type	IN/OUT port	LQ1 or LQ2				LQ1
	Pilot port	LQ1				
Orifice diameter		ø4	ø8	ø10	ø16	ø22
Flow rate characteristics	Kv	0.3	1.1	1.6	4.2	6.8 (8.1) <sup>Note 1)</sup>
	Cv	0.35	1.3	1.9	5	8 (9.5) <sup>Note 1)</sup>
Withstand pressure (MPa)		1				
Operating pressure <A→B flow>	Standard	-98 kPa to 0.5 MPa <sup>Note 3)</sup>			-98 kPa to 0.4 MPa <sup>Note 3)</sup>	
	High temperature	-98 kPa to 0.3 MPa <sup>Note 3)</sup>				
Back pressure (MPa)	Standard	0.3 or less			0.2 or less	
	High back pressure	0.42 or less				
	High temperature	0.3 or less			0.2 or less	
Valve leakage (cm <sup>3</sup> /min)		0 (With water pressure)				
Pilot air pressure (MPa)		0.3 to 0.5 (High back pressure: 0.45 to 0.55)				
Pilot port size <sup>Note 2)</sup>		1/8" (ø3), ø4, Rc 1/8, NPT 1/8				
Fluid temperature (°C)	Standard	0 to 100				
	High temperature	0 to 170				
Ambient temperature (°C)		0 to 60				
Weight (kg)		0.085	0.175	0.223	0.725	0.835

Note 1) ( ): High flow type

Note 2) Refer to page 4 for details of the applicable tubing sizes.

Note 3) This product cannot be used for vacuum retention. Also, connecting the vacuum to the B port may reduce the life of the product.

## ⚠ Specific Product Precautions

Be sure to read this before handling the products. Refer to back page 2 for Safety Instructions and pages 3 and 4 for Air Operated Chemical Liquid Valve Precautions.

### Piping

## ⚠ Caution

1. Take extra care with the insert bushing when connecting the fittings.
2. 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.

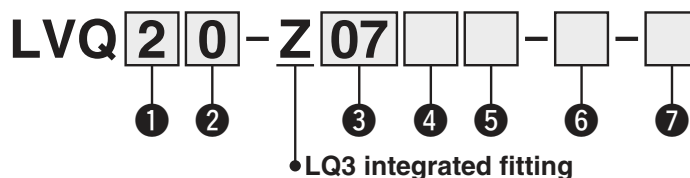
#### Tightening Torque for Piping

Body class	Torque (N·m)	
	LQ1	LQ2
2	0.3 to 0.4	1.5 to 2.0
3	0.8 to 1.0	3.0 to 3.5
4	1.0 to 1.2	7.5 to 9.0
5	2.5 to 3.0	11.0 to 13.0
6	5.5 to 6.0	—

# Air Operated Flare, Integrated Fitting Type Hyper Fitting **LVQ-Z Series**



## How to Order



### 1 Body class

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

### 2 Valve type

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

Note) For valve type combinations, refer to variations on the next page.

### 3 Applicable tubing size <sup>Note)</sup>

Symbol	Connection tubing size	Body class					
		2	3	4	5	6	
<b>Metric size</b>							
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					○	
<b>Inch size</b>							
03	1/8" x 0.086"	○					
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"					○	

Note) Refer to page 4 for details of the applicable tubing sizes.

### 4 Pilot port type

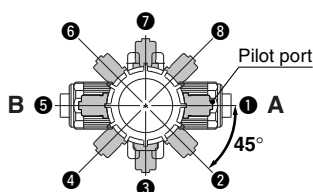
Nil	With LQ3 fitting	Connection tubing size 1/8" x 0.086" (3 x 2) <sup>Note)</sup>
M	With LQ3 fitting	Connection tubing size 4 x 3 <sup>Note)</sup>
R	Threaded	Rc1/8
N	Threaded	NPT1/8

Note) Refer to page 4 for details of the applicable tubing sizes.

### 5 Pilot port direction

Symbol	Direction
Nil	①
P2	②
P3	③
P4	④
P5	⑤
P6	⑥
P7	⑦
P8	⑧

#### Pilot port piping direction



\* Specify the piping direction by part number when ordering the product. Do not change the pilot port direction. (Refer to Precautions on page 4.)

**6 Option 1**

Nil	None
1	With flow rate adjustment
2	With by-pass
3	With flow rate adjustment & by-pass
4	With indicator
5	High back pressure (0.42 MPa)
6	High back pressure with flow rate adjustment
7	High back pressure with by-pass
8	High back pressure with flow rate adjustment & by-pass
9	High back pressure with indicator
24	With indicator & by-pass

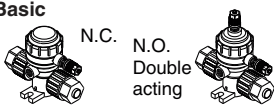
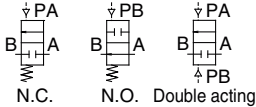

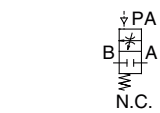
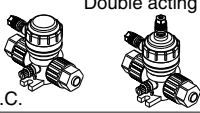
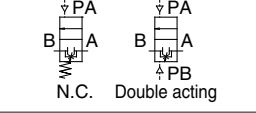

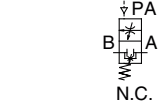


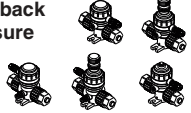
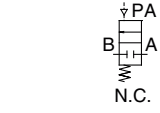


Note) Refer to variations in the table below for valve type and option 1 combinations. Options in the same table can not be combined each other.

**7 Option 2**

Symbol	Applicable option										Note
	1	2	3	4	5	6	7	8	9	24	
Nil	○	○	○	○	○	○	○	○	○	○	—
J	○	—	—	—	—	—	—	—	—	—	For high temperature
K	○	○	○	○	○	○	○	○	○	○	Buffer material FFKM
N	○	○	○	○	○	○	○	○	○	○	For ammonium hydroxide
P	—	—	—	○	○	—	—	—	—	—	High flow type LVQ6□ only

Note 1) Options 2 in the same table cannot be combined each other.  
Note 2) High back pressure specifications (5 to 9) in Option 1 and high temperature specification (J) in Option 2 cannot be combined.

**Variations**

Type	Symbol	Valve type	Model	LVQ20	LVQ30	LVQ40	LVQ50	LVQ60		
			Orifice diameter		ø4	ø8	ø10	ø16	ø22	
			Tubing O.D.		Metric	6	10	12	19	25
					Inch	1/4	3/8	1/2	3/4	1
<b>Basic</b> 		N.C.	○	○	○	○	○			
		N.O.	○	○	○	○	○			
		Double acting	○	○	○	○	○			
<b>With flow rate adjustment</b> 		N.C.	○	○	○	○	○			
<b>With by-pass</b> 		N.C.	○	○	○	○	○			
		Double acting	○	○	○	○	○			
<b>With flow rate adjustment &amp; by-pass</b> 		N.C.	○	○	○	○	○			
<b>With indicator</b> 		N.C.	○	○	○	○	○			
<b>High back pressure</b> 		N.C.	○	○	○	○	○			
<b>With indicator &amp; by-pass</b> 		N.C.	○	○	○	○	○			



## Standard Specifications

Model		LVQ20	LVQ30	LVQ40	LVQ50	LVQ60
Tubing O.D. <sup>Note 1)</sup>	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 (8.1) <sup>Note 2)</sup>
	Cv	0.35	1.3	1.9	5	8 (9.5) <sup>Note 2)</sup>
Withstand pressure (MPa)		1				
Operating pressure <A→B flow>	Standard	-98 kPa to 0.5 MPa <sup>Note 3)</sup>			-98 kPa to 0.4 MPa <sup>Note 3)</sup>	
	High temperature	-98 kPa to 0.3 MPa <sup>Note 3)</sup>				
Back pressure (MPa)	Standard	0.3 or less			0.2 or less	
	High back pressure	0.42 or less				
	High temperature	0.3 or less			0.2 or less	
Valve leakage (cm <sup>3</sup> /min)		0 (With water pressure)				
Pilot air pressure (MPa)		0.3 to 0.5 (High back pressure: 0.45 to 0.55)				
Pilot port size		1/8" (ø3), Rc 1/8, NPT 1/8				
Fluid temperature (°C)	Standard	0 to 100				
	High temperature	0 to 170				
Ambient temperature (°C)		0 to 60				
Weight (kg)		0.08	0.18	0.22	0.72	0.87

Note 1) Refer to page 4 for details of the applicable tubing sizes.

Note 2) ( ): High flow type

Note 3) This product cannot be used for vacuum retention. Also, connecting the vacuum to the B port may reduce the life of the product.

## ⚠ Specific Product Precautions

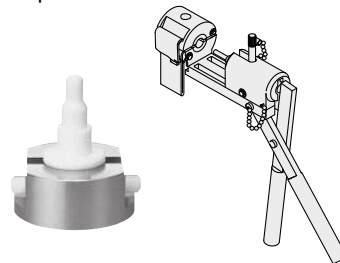
Be sure to read this before handling the products. Refer to back page 2 for Safety Instructions and pages 3 and 4 for Air Operated Chemical Liquid Valve Precautions.

### Piping

## ⚠ Caution

### 1. Connect tubing by special tools.

For information on tubing fittings and special tools, please see the pamphlet "High Purity Fluoropolymer Fittings Hyper Fitting/Flare Type LQ3 Series Fitting Procedure" (M-E06-4). (The pamphlet can be downloaded from the SMC home page.)



2. 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.

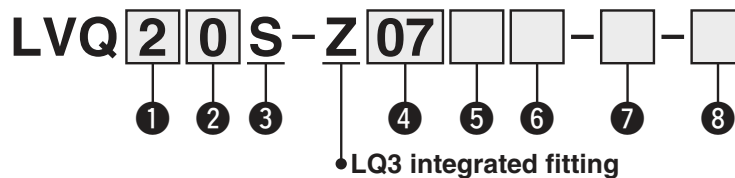
#### Tightening Torque for Piping

Body class	Torque (N·m)
2	1.6 to 1.8
3	3.2 to 3.5
4	5.0 to 5.3
5	10.0 to 10.5
6	22.5 to 23.0

# Air Operated Flare, Integrated Fitting Type Space Saving/Space Saving Connection **LVQS-Z Series**



## How to Order



### ① Body class

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

### ② Valve type

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

Note) For valve type combinations, refer to variations on the next page.

### ③ Body type

S	Space saving connection
---	-------------------------

### ④ Applicable fitting size

Symbol	Fitting size	Body class				
		2	3	4	5	6
07	2	○				
11	3		○			
13	4			○		
19	5				○	
25	6					○

Note) Refer to page 17 for How to Order fitting parts. Select a tube with the same size as the valve side fitting.

### ⑤ Pilot port type

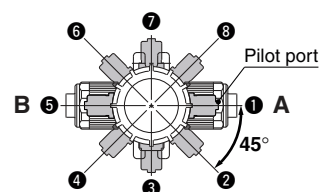
Nil	With LQ3 fitting	Connection tubing size 1/8" x 0.086" (3 x 2) <sup>Note)</sup>
M	With LQ3 fitting	Connection tubing size 4 x 3 <sup>Note)</sup>
R	Threaded	Rc1/8
N	Threaded	NPT1/8

Note) Refer to page 4 for details of the applicable tubing sizes.

### ⑥ Pilot port direction

Symbol	Direction
Nil	①
P2	②
P3	③
P4	④
P5	⑤
P6	⑥
P7	⑦
P8	⑧

#### Pilot port piping direction



\* Specify the piping direction by part number when ordering the product. Do not change the pilot port direction. (Refer to Precautions on page 4.)



**7 Option 1**

Nil	None
1	With flow rate adjustment
2	With by-pass
3	With flow rate adjustment & by-pass
4	With indicator
5	High back pressure (0.42 MPa)
6	High back pressure with flow rate adjustment
7	High back pressure with by-pass
8	High back pressure with flow rate adjustment & by-pass
9	High back pressure with indicator
24	With indicator & by-pass

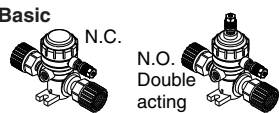
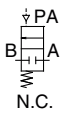
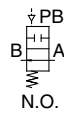
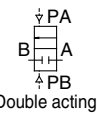
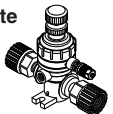
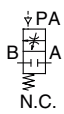
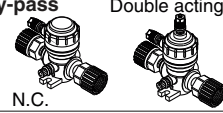
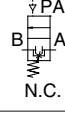
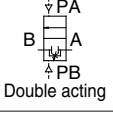

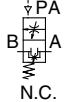



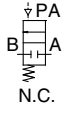


Note) Refer to variations in the table below for valve type and option 1 combinations. Options in the same table can not be combined each other.

**8 Option 2**

Symbol	Applicable option										Note
	1	2	3	4	5	6	7	8	9	24	
Nil	○	○	○	○	○	○	○	○	○	○	—
J	○	—	—	—	—	—	—	—	—	—	For high temperature
K	○	○	○	○	○	○	○	○	○	○	Buffer material FFKM
N	○	○	○	○	○	○	○	○	○	○	For ammonium hydroxide
P	—	—	—	○	○	—	—	—	—	—	High flow type LVQ6□ only

Note 1) Options 2 in the same table cannot be combined each other.  
Note 2) High back pressure specifications (5 to 9) in Option 1 and high temperature specification (J) in Option 2 cannot be combined.

**Variations**

Type	Symbol	Valve type	Model	LVQ20S	LVQ30S	LVQ40S	LVQ50S	LVQ60S
			Orifice diameter	ø4	ø8	ø10	ø16	ø22
			Connection fitting size	2	3	4	5	6
<b>Basic</b> 	  	N.C.	○	○	○	○	○	
		N.O.	○	○	○	○	○	
		Double acting	○	○	○	○	○	
<b>With flow rate adjustment</b> 		N.C.	○	○	○	○	○	
<b>With by-pass</b> 	 	N.C.	○	○	○	○	○	
		Double acting	○	○	○	○	○	
<b>With flow rate adjustment &amp; by-pass</b> 		N.C.	○	○	○	○	○	
<b>With indicator</b> 		N.C.	○	○	○	○	○	
<b>High back pressure</b> 		N.C.	○	○	○	○	○	
<b>With indicator &amp; by-pass</b> 		N.C.	○	○	○	○	○	

# LVQS-Z Series

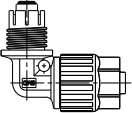
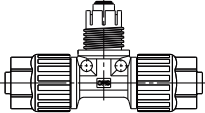
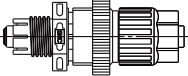
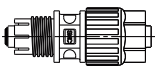
## How to Order Space Saving Fittings

**LQ3 E 6A – SN –**   

• **Packaging**

Symbol	Packaging
<b>Nil</b>	Clean packaging equivalent to Class M3.5
<b>1</b>	Standard packaging equivalent to Class M5.5

• **Fitting type**

<b>E</b>	<b>T</b>
Union elbow 	Union tee 
<b>P</b>	<b>U</b>
Panel mount union 	Union 

• **One of the nuts is not attached.**

• **Applicable tubing size** Note 1) Note 2)

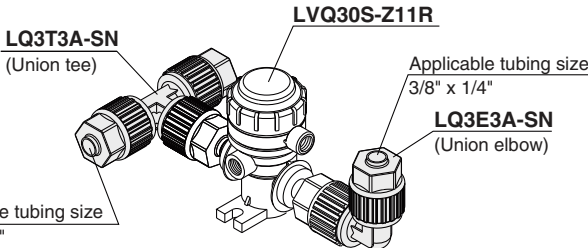
Size	Symbol	Applicable tubing size (mm)
<b>2</b>	<b>1</b>	6 x 4
<b>3</b>	<b>1</b>	10 x 8
<b>3</b>	<b>2</b>	8 x 6
<b>4</b>	<b>1</b>	12 x 10
<b>5</b>	<b>1</b>	19 x 16
<b>6</b>	<b>1</b>	25 x 22

Size	Symbol	Applicable tubing size (inch)
<b>2</b>	<b>A</b>	1/4" x 5/32"
<b>3</b>	<b>A</b>	3/8" x 1/4"
<b>4</b>	<b>A</b>	1/2" x 3/8"
<b>5</b>	<b>A</b>	3/4" x 5/8"
<b>6</b>	<b>A</b>	1" x 7/8"

Note 1) Select the same size as the fitting on the valve.

Note 2) Refer to page 4 for details of the applicable tubing sizes.

### Piping Example



**Ordering Example**

<b>LVQ30S-Z11R</b>	1
<b>LQ3T3A-SN</b> (Union tee)	1
<b>LQ3E3A-SN</b> (Union elbow)	1

Note) For shipment, the valve and fittings are individually packaged and dispatched together in 1 box.

## Standard Specifications



Model		LVQ20S	LVQ30S	LVQ40S	LVQ50S	LVQ60S
<b>Connection fitting size</b>		2	3	4	5	6
<b>Orifice diameter</b>		ø4	ø8	ø10	ø16	ø22
<b>Flow rate characteristics</b>	<b>Kv</b>	0.3	1.1	1.6	4.2	6.8 (8.1) <sup>Note 1)</sup>
	<b>Cv</b>	0.35	1.3	1.9	5	8 (9.5) <sup>Note 1)</sup>
<b>Withstand pressure (MPa)</b>		1				
<b>Operating pressure &lt;A→B flow&gt;</b>	<b>Standard</b>	-98 kPa to 0.5 MPa <sup>Note 3)</sup>			-98 kPa to 0.4 MPa <sup>Note 3)</sup>	
	<b>High temperature</b>	-98 kPa to 0.3 MPa <sup>Note 3)</sup>				
<b>Back pressure (MPa)</b>	<b>Standard</b>	0.3 or less			0.2 or less	
	<b>High back pressure</b>	0.42 or less				
	<b>High temperature</b>	0.3 or less			0.2 or less	
<b>Valve leakage (cm<sup>3</sup>/min)</b>		0 (With water pressure)				
<b>Pilot air pressure (MPa)</b>		0.3 to 0.5 (High back pressure: 0.45 to 0.55)				
<b>Pilot port size<sup>Note 2)</sup></b>		1/8" (ø3), ø4, Rc 1/8, NPT 1/8				
<b>Fluid temperature (°C)</b>	<b>Standard</b>	0 to 100				
	<b>High temperature</b>	0 to 170				
<b>Ambient temperature (°C)</b>		0 to 60				
<b>Weight (kg)</b>		0.085	0.175	0.223	0.725	0.835

Note 1) ( ): High flow type

Note 2) Refer to page 4 for details of the applicable tubing sizes.

Note 3) This product cannot be used for vacuum retention. Also, connecting the vacuum to the B port may reduce the life of the product.

## ⚠ Specific Product Precautions

**Be sure to read this before handling the products. Refer to back page 2 for Safety Instructions and pages 3 and 4 for Air Operated Chemical Liquid Valve Precautions.**

### Piping

## ⚠ Caution

1. 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.

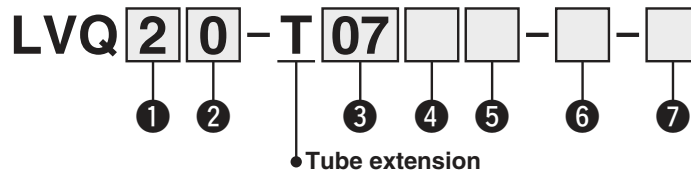
#### Tightening Torque for Piping

Body class	Torque (N·m)
<b>2</b>	1.6 to 1.8
<b>3</b>	3.2 to 3.5
<b>4</b>	5.0 to 5.3
<b>5</b>	10.0 to 10.5
<b>6</b>	22.5 to 23.0

# Air Operated Tube Extension Type **LVQ-T Series**



## How to Order



### ① Body class

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

### ② Valve type

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

Note) For valve type combinations, refer to variations on the next page.

### ③ Applicable tubing size

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

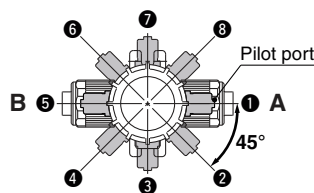
### ④ Pilot port type

Symbol	With LQ1 fitting	Connection tubing O.D. 1/8" (ø3)
Nil	With LQ1 fitting	Connection tubing O.D. 1/8" (ø3)
M	With LQ1 fitting	Connection tubing O.D. ø4
R	Threaded	Rc1/8
N	Threaded	NPT1/8

### ⑤ Pilot port direction

Symbol	Direction
Nil	①
P2	②
P3	③
P4	④
P5	⑤
P6	⑥
P7	⑦
P8	⑧

#### Pilot port piping direction



\* Specify the piping direction by part number when ordering the product. Do not change the pilot port direction. (Refer to Precautions on page 4.)

**6 Option 1**

Nil	None
1	With flow rate adjustment
2	With by-pass
3	With flow rate adjustment & by-pass
4	With indicator
5	High back pressure (0.42 MPa)
6	High back pressure with flow rate adjustment
7	High back pressure with by-pass
8	High back pressure with flow rate adjustment & by-pass
9	High back pressure with indicator

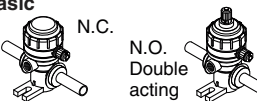





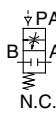

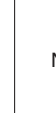
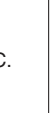
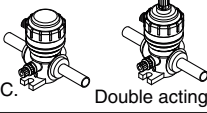




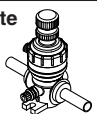


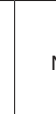
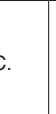

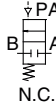

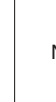
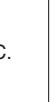
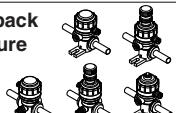
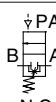

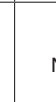
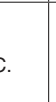
Note) Refer to variations in the table below for valve type and option 1 combinations. Options in the same table can not be combined each other.

**7 Option 2**

Symbol	Applicable option									Note
	1	2	3	4	5	6	7	8	9	
Nil	○	○	○	○	○	○	○	○	○	—
J	○	—	—	—	—	—	—	—	—	For high temperature
K	○	○	○	○	○	○	○	○	○	Buffer material FFKM
N	○	○	○	○	○	○	○	○	○	For ammonium hydroxide
P	—	—	—	○	○	—	—	—	—	High flow type LVQ6□ only

Note 1) Options 2 in the same table cannot be combined each other.  
Note 2) High back pressure specifications (5 to 9) in Option 1 and high temperature specification (J) in Option 2 cannot be combined.

**Variations**

Type	Symbol	Valve type	Model	LVQ20	LVQ30	LVQ40	LVQ50	LVQ60	
			Orifice diameter	ø4	ø8	ø10	ø16	ø22	
			Tubing O.D.	Metric	6	10	12	19	25
			Inch	1/4	3/8	1/2	3/4	1	
<b>Basic</b> 	 PA  PB  PA  PB	N.C.	○	○	○	○	○		
		N.O.	○	○	○	○	○		
		Double acting	○	○	○	○	○		
<b>With flow rate adjustment</b> 	 PA  PB  PA  PB	N.C.	○	○	○	○	○		
<b>With by-pass</b> 	 PA  PB  PA  PB	N.C.	○	○	○	○	○		
		Double acting	○	○	○	○	○		
<b>With flow rate adjustment &amp; by-pass</b> 	 PA  PB  PA  PB	N.C.	○	○	○	○	○		
<b>With indicator</b> 	 PA  PB  PA  PB	N.C.	○	○	○	○	○		
<b>High back pressure</b> 	 PA  PB  PA  PB	N.C.	○	○	○	○	○		

# LVQ-T Series



## Standard Specifications

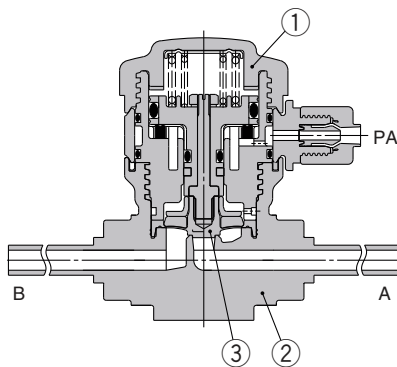
Model		LVQ20	LVQ30	LVQ40	LVQ50	LVQ60
Tubing O.D.	Metric	6	10	12	19	25
	Inch	1/4	3/8	1/2	3/4	1
Orifice diameter		ø4	ø8	ø10	ø16	ø22
Flow rate characteristics	Kv	0.3	1.1	1.6	4.2	6.8 (8.1) <sup>Note 1)</sup>
	Cv	0.35	1.3	1.9	5	8 (9.5) <sup>Note 1)</sup>
Withstand pressure (MPa)		1				
Operating pressure <A→B flow>	Standard	-98 kPa to 0.5 MPa <sup>Note 2)</sup>			-98 kPa to 0.4 MPa <sup>Note 2)</sup>	
	High temperature	-98 kPa to 0.3 MPa <sup>Note 2)</sup>				
Back pressure (MPa)	Standard	0.3 or less			0.2 or less	
	High back pressure	0.42 or less				
	High temperature	0.3 or less			0.2 or less	
Valve leakage (cm <sup>3</sup> /min)		0 (With water pressure)				
Pilot air pressure (MPa)		0.3 to 0.5 (High back pressure: 0.45 to 0.55)				
Pilot port size		1/8" (ø3), ø4, Rc 1/8, NPT 1/8				
Fluid temperature (°C)	Standard	0 to 100				
	High temperature	0 to 170				
Ambient temperature (°C)		0 to 60				
Weight (kg)		0.08	0.15	0.16	0.60	0.70

Note 1) ( ): High flow type

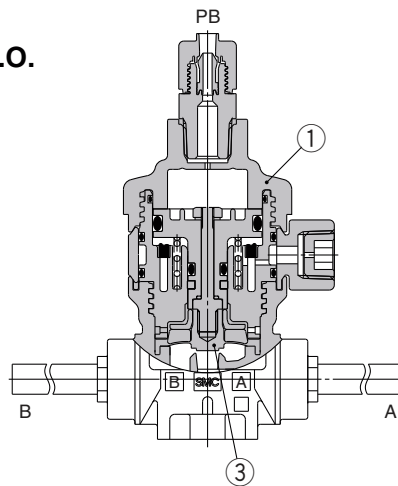
Note 2) This product cannot be used for vacuum retention. Also, connecting the vacuum to the B port may reduce the life of the product.

## Construction

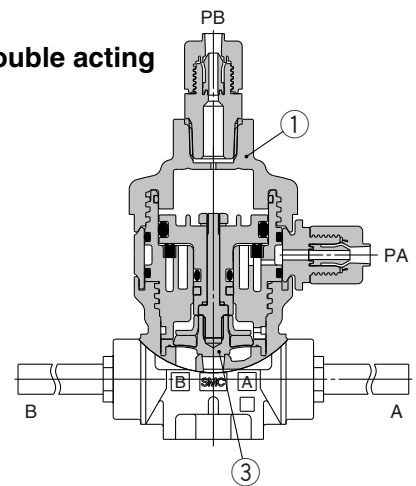
Basic  
N.C.



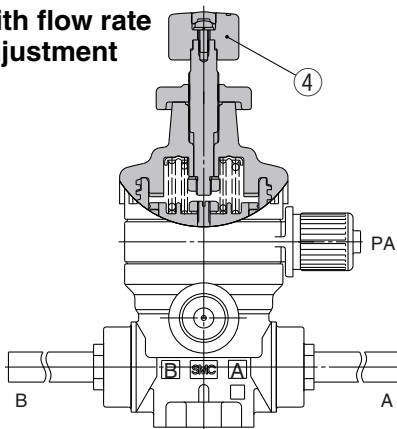
N.O.



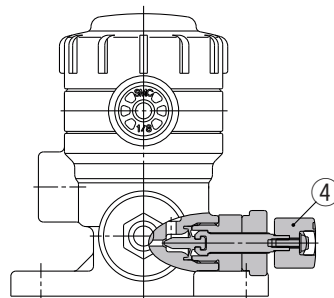
Double acting



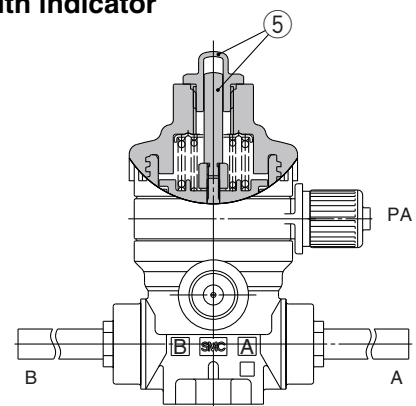
With flow rate adjustment



With by-pass



With indicator



### Component Parts

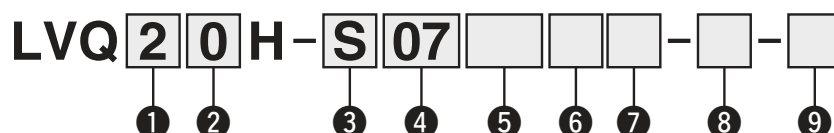
No.	Description	Material
1	Actuator	PVDF
2	Body	PFA
3	Diaphragm	PTFE
4	Flow rate adjuster	PVDF
5	Indicator/Cover	PP

# Air Operated, 0.5 MPa Back Pressure Tolerant Insert Bushing, Integrated Fitting Type Hyper Fitting

## LVQ□□H Series

RoHS

### How to Order



#### 1 Body class

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

#### 2 Valve type

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

Note) For valve type combinations, refer to variations on the next page.

#### 3 Fitting type

Symbol	Fitting type	Body class
V	LQ1	2, 3, 4, 5, 6
S	LQ2	2, 3, 4, 5

Note) Insert bushing is used in common.

#### 4 Applicable tubing size <sup>Note)</sup>

Symbol	Connection tubing size	Body class					
		2	3	4	5	6	
<b>Metric size</b>							
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					○	
<b>Inch size</b>							
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

Note) Refer to page 4 for details of the applicable tubing sizes.

#### 5 Port B (OUT) different dia. size

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

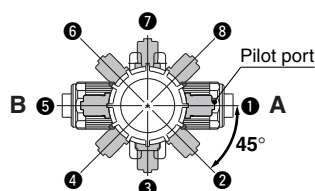
#### 6 Pilot port type

Symbol	Pilot port type	Connection tubing O.D.
Nil	LQ1 integrated fitting	1/8" (ø3)
M	LQ1 integrated fitting	ø4
R	Threaded	Rc1/8
N	Threaded	NPT1/8

#### 7 Pilot port direction

Symbol	Direction
Nil	①
P2	②
P3	③
P4	④
P5	⑤
P6	⑥
P7	⑦
P8	⑧

#### Pilot port piping direction



\* Specify the piping direction by part number when ordering the product. Do not change the pilot port direction. (Refer to Precautions on page 4.)

**8 Option 1**

Nil	None
1	With flow rate adjustment
2	With by-pass
3	With flow rate adjustment & by-pass
4	With indicator
24	With indicator & by-pass

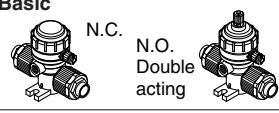
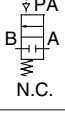
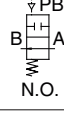
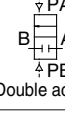

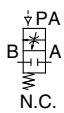
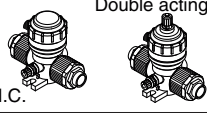
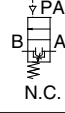
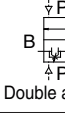

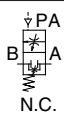

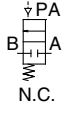

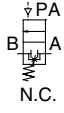
Note) Refer to variations in the table below for valve type and option 1 combinations. Options in the same table cannot be combined each other.

**9 Option 2**

Symbol	Applicable option					Note
	1	2	3	4	24	
Nil	○	○	○	○	○	—
K	○	○	○	○	○	Buffer material FFKM
N	○	○	○	○	○	For ammonium hydroxide
P	—	—	—	○	—	High flow type LVQ6□ only

Note) Options 2 in the same table cannot be combined each other.

**Variations**

Type	Symbol	Model	LVQ20H	LVQ30H	LVQ40H	LVQ50H	LVQ60H
			Orifice diameter				
			Tubing O.D.				
			Valve type				
<b>Basic</b> 	 PA  PB  PA N.C. N.O. Double acting	N.C.	○	○	○	○	○
		N.O.	○	○	○	○	○
		Double acting	○	○	○	○	○
<b>With flow rate adjustment</b> 	 PA N.C.	N.C.	○	○	○	○	○
<b>With by-pass</b> 	 PA  PA N.C. Double acting	N.C.	○	○	○	○	○
		Double acting	○	○	○	○	○
<b>With flow rate adjustment &amp; by-pass</b> 	 PA N.C.	N.C.	○	○	○	○	○
<b>With indicator</b> 	 PA N.C.	N.C.	○	○	○	○	○
<b>With indicator &amp; by-pass</b> 	 PA N.C.	N.C.	○	○	○	○	○

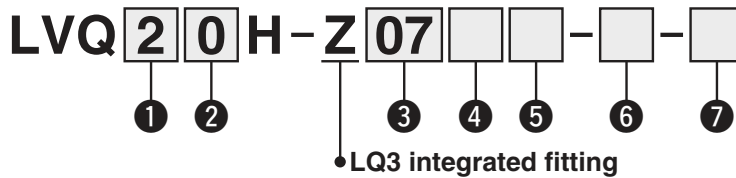


# Air Operated, 0.5 MPa Back Pressure Tolerant Flare, Integrated Fitting Type Hyper Fitting

# LVQ□□H-Z Series

RoHS

## How to Order



### 1 Body class

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

### 2 Valve type

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

Note) For valve type combinations, refer to variations on the next page.

### 3 Applicable tubing size <sup>Note)</sup>

Symbol	Connection tubing size	Body class					
		2	3	4	5	6	
<b>Metric size</b>							
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					○	
<b>Inch size</b>							
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"					○	

Note) Refer to page 4 for details of the applicable tubing sizes.

### 4 Pilot port type

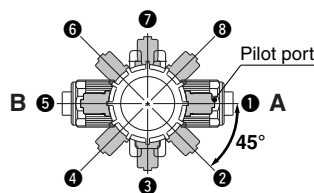
Nil	With LQ3 fitting	Connection tubing size 1/8" x 0.086" (3 x 2) <sup>Note)</sup>
M	With LQ3 fitting	Connection tubing size 4 x 3 <sup>Note)</sup>
R	Threaded	Rc1/8
N	Threaded	NPT1/8

Note) Refer to page 4 for details of the applicable tubing sizes.

### 5 Pilot port direction

Symbol	Direction
Nil	①
P2	②
P3	③
P4	④
P5	⑤
P6	⑥
P7	⑦
P8	⑧

#### Pilot port piping direction



\* Specify the piping direction by part number when ordering the product. Do not change the pilot port direction. (Refer to Precautions on page 4.)

**6 Option 1**

Nil	None
1	With flow rate adjustment
2	With by-pass
3	With flow rate adjustment & by-pass
4	With indicator
24	With indicator & by-pass

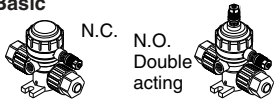
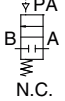


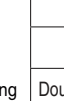

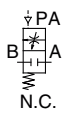

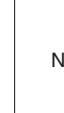
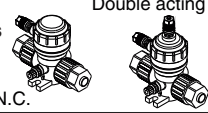
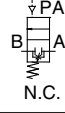
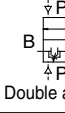
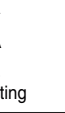
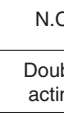

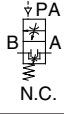

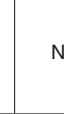
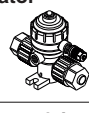
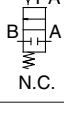

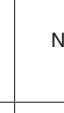

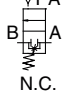

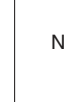
Note) Refer to variations in the table below for valve type and option 1 combinations. Options in the same table cannot be combined each other.

**7 Option 2**

Symbol	Applicable option					Note
	1	2	3	4	24	
Nil	○	○	○	○	○	—
K	○	○	○	○	○	Buffer material FFKM
N	○	○	○	○	○	For ammonium hydroxide
P	—	—	—	○	—	High flow type LVQ6□ only

Note) Options 2 in the same table cannot be combined each other.

**Variations**

Type	Symbol	Valve type	Model	LVQ20H	LVQ30H	LVQ40H	LVQ50H	LVQ60H	
			Orifice diameter	ø4	ø8	ø10	ø16	ø22	
			Tubing O.D.	Metric	6	10	12	19	25
			Inch	1/4	3/8	1/2	3/4	1	
<b>Basic</b> 	 PA  PB  PA  PB	N.C.	○	○	○	○	○		
		N.O.	○	○	○	○	○		
		Double acting	○	○	○	○	○		
<b>With flow rate adjustment</b> 	 PA  A  N.C.	N.C.	○	○	○	○	○		
<b>With by-pass</b> 	 PA  A  PA  PB	N.C.	○	○	○	○	○		
		Double acting	○	○	○	○	○		
<b>With flow rate adjustment &amp; by-pass</b> 	 PA  A  N.C.	N.C.	○	○	○	○	○		
<b>With indicator</b> 	 PA  A  N.C.	N.C.	○	○	○	○	○		
<b>With indicator &amp; by-pass</b> 	 PA  A  N.C.	N.C.	○	○	○	○	○		

## Specifications



### ⚠ Specific Product Precautions

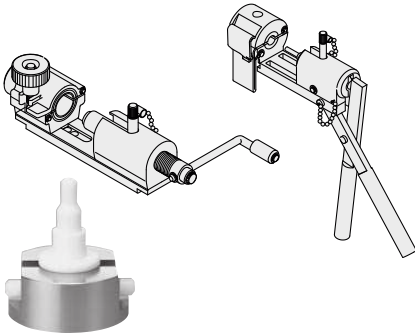
Be sure to read this before handling the products. Refer to back page 2 for Safety Instructions and pages 3 and 4 for Air Operated Chemical Liquid Valve Precautions.

### Piping

## ⚠ Caution

### 1. Connect tubing by special tools.

For information on tubing connection and special tools, please see the pamphlet "High Purity Fluoropolymer Fittings Hyper Fitting LQ1/2 Series Work Procedure Instructions" (M-E05-1) and "High Purity Fluoropolymer Fittings Hyper Fitting/Flare Type LQ3 Series Fitting Procedure" (M-E06-4). (The pamphlet can be downloaded from the SMC home page.)



2. 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	LQ2	LQ3
2	0.3 to 0.4	1.5 to 2.0	1.6 to 1.8
3	0.8 to 1.0	3.0 to 3.5	3.2 to 3.5
4	1.0 to 1.2	7.5 to 9.0	5.0 to 5.3
5	2.5 to 3.0	11.0 to 13.0	10.0 to 10.5
6	5.5 to 6.0	—	22.5 to 23.0

Model		LVQ20H	LVQ30H	LVQ40H	LVQ50H	LVQ60H
Tubing O.D. <sup>Note 1)</sup>	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 (8.1) <sup>Note 1)</sup>
	Cv	0.35	1.3	1.9	5	8 (9.5) <sup>Note 1)</sup>
Withstand pressure (MPa)		1				
Operating pressure <A→B flow>		-98 kPa to 0.5 MPa <sup>Note 3)</sup>				
Back pressure (MPa)		0.5 or less				
Valve leakage (cm <sup>3</sup> /min)		0 (With water pressure)				
Pilot air pressure (MPa)		0.5 to 0.8				
Pilot port size <sup>Note 2)</sup>		1/8" (ø3), ø4, Rc 1/8, NPT 1/8				
Fluid temperature (°C)		0 to 100				
Ambient temperature (°C)		0 to 60				
Weight (kg)		0.08	0.17	0.22	0.70	0.81

Note 1) ( ): High flow type

Note 2) Refer to page 4 for details of the applicable tubing sizes.

Note 3) This product cannot be used for vacuum retention. Also, connecting the vacuum to the B port may reduce the life of the product.

## Dimensions

Dimensions are the same as those of the standard specifications.

## Applicable Different Diameter Tubings with Reducer (LVQ□□H- $\frac{V}{S}$ )

Different diameter tubings can be selected (within the same body class) by using a nut and an insert bushing (reducer). ● With reducer

Body class	Connection tubing O.D.													
	Metric size							Inch size						
	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 28 for information on changing tubing sizes.



# LVQ Series Applicable Fluids

## Material and Fluid Compatibility Check List for Air Operated Chemical Valves

Chemical	Compatibility
Acetone	<input type="radio"/> Note 1, 2)
Ammonium hydroxide	<input type="radio"/> Note 2)
Isobutyl alcohol	<input type="radio"/> Note 1, 2)
Isopropyl alcohol	<input type="radio"/> Note 1, 2)
Hydrochloric acid	<input type="radio"/>
Ozone (dry)	<input type="radio"/>
Hydrogen peroxide Concentration 5% or less, 50°C or less	<input type="radio"/>
Ethyl acetate	<input type="radio"/> Note 1, 2)
Butyl acetate	<input type="radio"/> Note 1, 2)
Nitric acid (except fuming nitric acid) Concentration 10% or less	<input type="radio"/> Note 2)
Deionized water (pure water)	<input type="radio"/>
Sodium hydroxide (caustic soda) Concentration 50% or less	<input type="radio"/>
Nitrogen gas	<input type="radio"/>
Super pure water	<input type="radio"/>
Toluene	<input type="radio"/> Note 1, 2)
Hydrofluoric acid	<input type="radio"/> Note 2)
Sulfuric acid (except fuming sulfuric acid)	<input type="radio"/> Note 2)
Phosphoric acid Concentration 80% or less	<input type="radio"/>

Table symbols  : Can be used  
 : Can be used in 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.
- Use a fluid with a viscosity of 300 cp or less. Failure to do so may cause valve closing failure.

# LVQ Series Fittings and Special Tools

## Fittings

### How to Change Tubing Sizes

The tubing size can be changed within the same body class (body size) by replacing the nut and insert bushing.

Body class	Connection tubing O.D.													
	Metric size						Inch size							
	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	—	—	—	—	—	●	○	—	—	—	—	—	●	○

#### Parts Composition

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

### ⚠ Caution

#### 1. Connect tubing by special tools.

For information on tubing connection and special tools, please see the pamphlet "High Purity Fluoropolymer Fittings Hyper Fitting LQ1/2 Series Work Procedure Instructions" (M-E05-1). (The pamphlet can be downloaded from the SMC home page.)

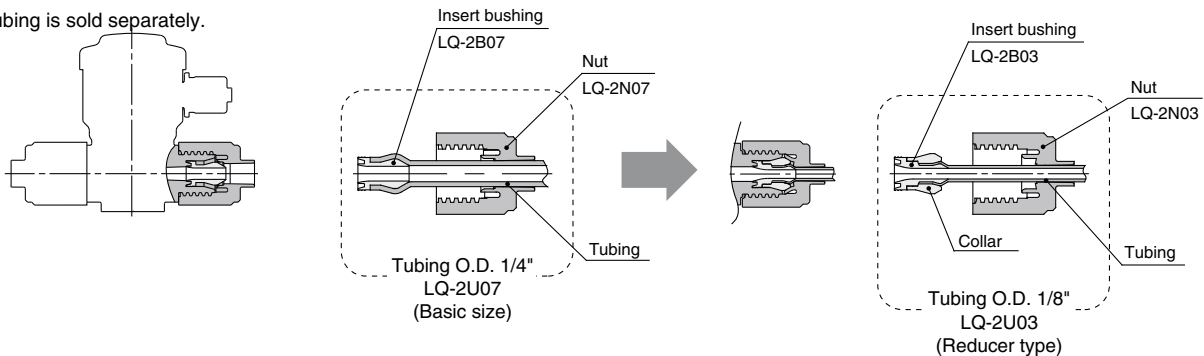
#### Changing the tubing size

Example) Changing the tubing from an O.D. 1/4" to O.D. 1/8" within the body class 2.

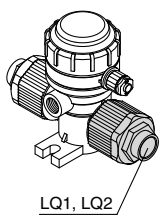
Prepare an insert bushing and nut for 1/8" O.D. tubing (LQ-2U03) and change the tubing size.

(Refer to How to Order Fitting Parts.)

Note) Tubing is sold separately.



### How to Order Fitting Parts



**LQ**   - **2** **U** **03**

\* U type is recommended when changing tubing sizes.

#### Fitting type

Symbol	Applicable fitting
Nil	LQ2
1	LQ1

#### Body class (fittings)

Symbol	Body class (fittings)	Applicable fitting
2	2	LQ1 LQ2
3	3	
4	4	
5	5	
6	6	LQ1

#### Parts type

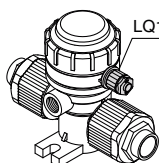
Symbol	Parts type
U	Nut & Insert bushing
B	Insert bushing
N	Nut

#### Tubing size<sup>Note)</sup>

Symbol	Tubing size	Body class (fittings)	Applicable fitting	Symbol	Tubing size	Body class (fittings)	Applicable fitting
03	1/8" x 0.086"(3 x 2)	2	LQ1 LQ2	10	10 x 8	4	LQ1 LQ2
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	LQ1 LQ2		
08	8 x 6						
10	10 x 8						
07	1/4" x 5/32"						
11	3/8" x 1/4"						
12	12 x 10	5	LQ1 LQ2				
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	LQ1				
25	1" x 7/8", 25 x 22						

Note) Refer to page 4 for details of the applicable tubing sizes.

#### For pilot port



**LQ1** - **1** **U** **03**

#### Body class (fittings)

Symbol	Body class (fittings)	Applicable fitting
1	1	LQ1

#### Parts type

Symbol	Parts type
U	Nut & Insert bushing
B	Insert bushing
N	Nut

#### Tubing size<sup>Note 1) Note 2)</sup>

Symbol	Tubing size	Body class (fittings)
03	1/8" x 0.086"(3 x 2)	1
04	4 x 3	

Note 1) Cannot change to tubing with different diameter.

Note 2) Refer to page 4 for details of the applicable tubing sizes.

# Failure and countermeasures

Failure		Causes	Countermeasures
Malfunction	1.Fluid doesn't stop. 	1)Malfunction of pilot valve 2)Failure of electrical system	<ul style="list-style-type: none"> <li>•Replace valve</li> <li>•Clean air supply source</li> <li>•Check power supply</li> </ul>
		1)Lacking pilot pressure (N.O.valve,double acting valve) 2)Main pressure is high.	<ul style="list-style-type: none"> <li>•Set proper pressure</li> <li>•Set proper pressure</li> </ul>
		1)Back pressure is high 2)Particle intrusion 3)Misrouting of pilot port	<ul style="list-style-type: none"> <li>•Set proper pressure</li> <li>•Eliminate particles and install filter.</li> <li>•Check if the connection of pilot port is correct.</li> </ul>
Malfunction	2.Fluid doesn't stop 	1)Malfunction of pilot valve 2)Failure of electrical system	<ul style="list-style-type: none"> <li>•Replace valve</li> <li>•Clean air supply source</li> <li>•Check power supply</li> </ul>
		1)Lacking pilot pressure (N.C.valve)	<ul style="list-style-type: none"> <li>•Set proper pressure</li> </ul>
		1)No main pressure 2)Side failure of piston packing.	<ul style="list-style-type: none"> <li>•Check to proper pressure</li> <li>•Replace product.</li> </ul>
Failure of air tight	1.Internal leakage	1)Intrusion of particles 2)Flaws on valve seat	<ul style="list-style-type: none"> <li>•Eliminate particles and install filter.</li> <li>•Replace product</li> </ul>
	2.External leakage	1)Tightening failure 2)Breakage of diaphragm	<ul style="list-style-type: none"> <li>•Tighten additionally</li> <li>•Replace product</li> </ul>

Revision history
A: Newly created due to changes to safety instructions.

# SMC Corporation

Tel: + 81 3 5207 8249 Fax: +81 3 5298 5362

URL <https://www.smcworld.com>

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.  
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